

VERITAS Volume Manager 4.1 Troubleshooting Guide

VERITAS Volume Manager 4.1

HP-UX 11i v2



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Preface

The VERITAS Volume Manager Troubleshooting Guide provides information about how to recover from hardware failure, and how to understand and deal with VERITAS Volume Manager (VxVM) error messages during normal operation. It includes guidelines for recovering from the failure of disks and other hardware upon which virtual software objects such as subdisks, plexes and volumes are constructed in VxVM. Information is also included on how to configure command and transaction logging, and to back up and restore disk group configurations.

This guide assumes that you have a:

- Basic knowledge of the HP-UXTM operating system (OS).
- Basic understanding of HP-UX system administration.
- Basic understanding of storage management in VxVM.

NOTE Most VERITAS Volume Manager commands require superuser or other appropriate privileges.

How This Guide Is Organized

This guide is organized as follows:

- “Recovery from Hardware Failure” on page 11
- “Recovery from Failure of Instant Snapshot Operations” on page 39
- “Recovery from Boot Disk Failure” on page 51
- “Logging Commands and Transactions” on page 61
- “Backing Up and Restoring Disk Group Configurations” on page 67
- “Error Messages” on page 75

Refer to the Release Notes for information about the other documentation that is provided with this product.

Conventions

The following table describes the typographic conventions used in this guide.

Typeface	Usage	Examples
monospace	Computer output, file contents, 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>ls (1)</code> manual page for more information.
<i>italic</i>	New terms, book titles, emphasis, variables to be replaced by a name or value	See the <i>User's Guide</i> for details. The variable <code>ncsize</code> determines the value of..
monospace (bold)	User input; the “#” symbol indicates a command prompt	# mount -F vxfs /h/filesys
<i>monospace (bold and italic)</i>	Variables to be replaced by a name or value in user input	# mount -F <i>fstype</i> <i>mount_point</i>
Symbol	Usage	Examples
%	C shell prompt	
\$	Bourne/Korn/Bash shell prompt	
#	Superuser prompt (all shells)	
\	Continued input on the following line	# mount -F vxfs \ /h/filesys
[]	In a command synopsis, brackets indicates an optional argument	<code>ls [-a]</code>

Typeface	Usage	Examples
	In a command synopsis, a vertical bar separates mutually exclusive arguments	mount [suid nosuid]

1 Recovery from Hardware Failure

Introduction

Veritas Veritas Volume Manager (VxVM) protects systems from disk and other hardware failures and helps you to recover from such events. This chapter describes recovery procedures and information to help you prevent loss of data or system access due to disk and other hardware failures.

If a volume has a disk I/O failure (for example, because the disk has an uncorrectable error), VxVM can detach the plex involved in the failure. I/O stops on that plex but continues on the remaining plexes of the volume.

If a disk fails completely, VxVM can detach the disk from its disk group. All plexes on the disk are disabled. If there are any unmirrored volumes on a disk when it is detached, those volumes are also disabled.

NOTE Apparent disk failure may not be due to a fault in the physical disk media or the disk controller, but may instead be caused by a fault in an intermediate or ancillary component such as a cable, host bus adapter, or power supply.

The hot-relocation feature in VxVM automatically detects disk failures, and notifies the system administrator and other nominated users of the failures by electronic mail. Hot-relocation also attempts to use spare disks and free disk space to restore redundancy and to preserve access to mirrored and RAID-5 volumes. For more information, see the *Administering Hot-Relocation* chapter in the *VERITAS Volume Manager Administrator's Guide*.

Recovery from failures of the boot (`root`) disk requires the use of the special procedures described in “Recovery from Boot Disk Failure” on page 51.

Listing Unstartable Volumes

An unstartable volume can be incorrectly configured or have other errors or conditions that prevent it from being started. To display unstartable volumes, use the `vxinfo` command. This displays information about the accessibility and usability of volumes:

```
# vxinfo [-g diskgroup] [volume ...]
```

The following example output shows one volume, `mkting`, as being unstartable:

```
home      fsgen      Started
mkting    fsgen      Unstartable
src        fsgen      Started
rootvol   root       Started
swapvol   swap       Started
```

Displaying Volume and Plex States

To display detailed information about the configuration of a volume including its state and the states of its plexes, use the following form of the `vxprint` command:

```
# vxprint [-g diskgroup] -hvt [volume ...]
```

The following example shows a disabled volume, `vol`, which has two clean plexes, `vol-01` and `vol-02`, each with a single subdisk:

```
# vxprint -g mydg -hvt vol
Disk group: mydg
V  NAME      RVG/VSET/COKSTATE  STATE   LENGTH  READPOL  PREFPLEXUTYPE
PL NAME     VOLUME           KSTATE  STATE   LENGTH  LAYOUT   NCOL/WIDMODE
SD NAME     PLEX             DISK    DISKOFFS LENGTH  [COL/]OFF DEVICE  MODE
SV NAME     PLEX             VOLNAME NVOLLAYR LENGTH  [COL/]OFFAM/NM   MODE
SC NAME     PLEX             CACHE   DISKOFFS LENGTH  [COL/]OFFDEVICE  MODE
DC NAME     PARENTVOL        LOGVOL
SP NAME     SNAPVOL          DCO
v  vol       -                DISABLED ACTIVE   212880  SELECT   -        fsgen
pl vol-01    vol              DISABLED CLEAN   212880  CONCAT   -        RW
sd mydg11-01 vol-01          mydg11    0       212880  0        c1t0d0  ENA
pl vol-02    vol              DISABLED CLEAN   212880  CONCAT   -        RW
sd mydg12-01 vol-02          mydg12    0       212880  0        c1t1d0  ENA
```

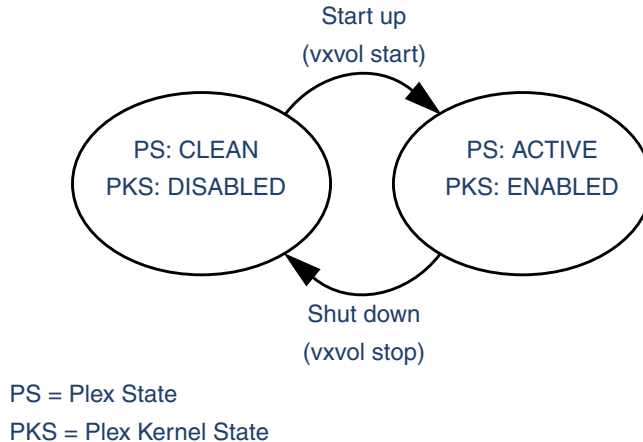
See the “Creating and Administering Plexes” and “Administering Volumes” chapters in the VERITAS VolumeManager Administrator’s Guide for a description of the possible plex and volume states.

Understanding the Plex State Cycle

Changing plex states are part of normal operations, and do not necessarily indicate abnormalities that must be corrected. A firm understanding of the various plex states and their interrelationship is necessary if you want to be able to perform the recovery procedure described in this chapter.

The Figure 1-1, “Main Plex State Cycle,” shows the main transitions that take place between plex states in VxVM. (For more information about plex states, see the chapter “Creating and Administering Plexes” in the *VERITAS Volume Manager Administrator’s Guide*.)

Figure 1-1 **Main Plex State Cycle**

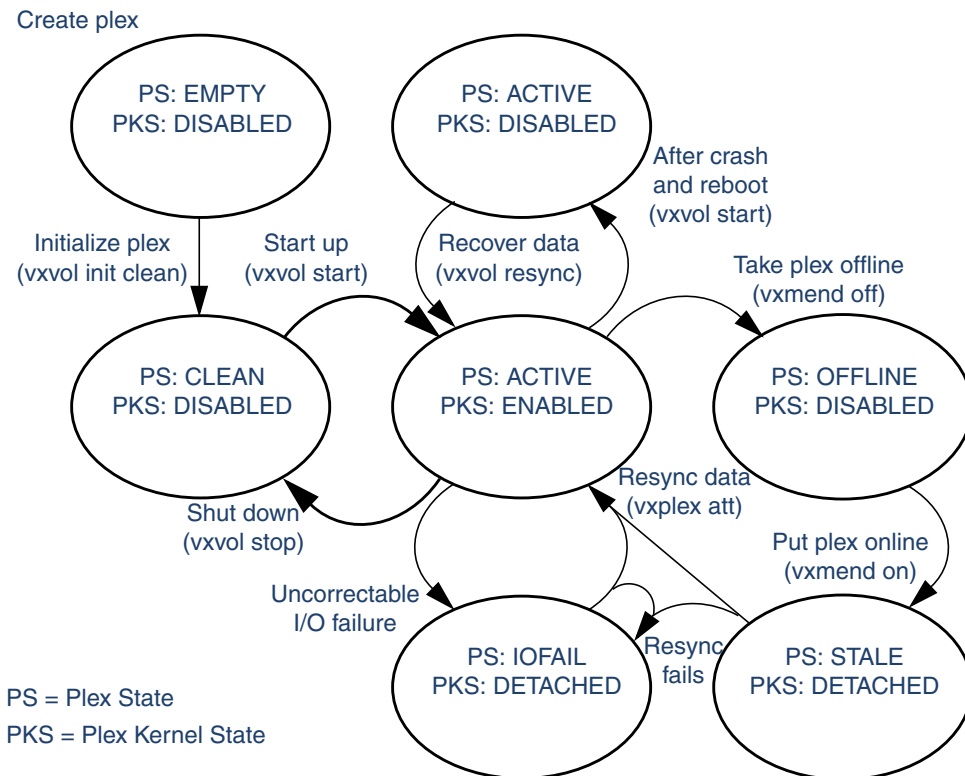


At system startup, volumes are started automatically and the `vxvol start` task makes all `CLEAN` plexes `ACTIVE`. At shutdown, the `vxvol stop` task marks all `ACTIVE` plexes `CLEAN`. If all plexes are initially `CLEAN` at startup, this indicates that a controlled shutdown occurred and optimizes the time taken to start up the volumes.

The figure Figure 1-2, “Additional Plex State Transitions,” shows additional transitions that are possible between plex states as a result of hardware problems, abnormal system shutdown, and intervention by the system administrator.

When first created, a plex has state `EMPTY` until the volume to which it is attached is initialized. Its state is then set to `CLEAN`. Its plex kernel state remains set to `DISABLED` and is not set to `ENABLED` until the volume is started.

Figure 1-2 Additional Plex State Transitions



After a system crash and reboot, all plexes of a volume are **ACTIVE** but marked with plex kernel state **DISABLED** until their data is recovered by the `vxvol resync` task.

A plex may be taken offline with the `vxmend off` command, made available again using `vxmend on`, and its data resynchronized with the other plexes when it is reattached using `vxplex att`. A failed resynchronization or uncorrectable I/O failure places the plex in the **IOFAIL** state.

“Recovering an Unstartable Mirrored Volume” on page 17, and subsequent sections describe the actions that you can take if a system crash or I/O error leaves no plexes of a mirrored volume in a **CLEAN** or **ACTIVE** state.

For information on the recovery of RAID-5 volumes, see “Failures on RAID-5 Volumes” on page 22 and subsequent sections.

Recovering an Unstartable Mirrored Volume

A system crash or an I/O error can corrupt one or more plexes of a mirrored volume and leave no plex `CLEAN` or `ACTIVE`. You can mark one of the plexes `CLEAN` and instruct the system to use that plex as the source for reviving the others as follows:

Step 1. Place the desired plex in the `CLEAN` state using the following command:

```
# vxmend fix clean plex
```

For example, to place the plex `vol101-02` in the `CLEAN` state:

```
# vxmend fix clean vol101-02
```

Step 2. To recover the other plexes in a volume from the `CLEAN` plex, the volume must be disabled, and the other plexes must be `STALE`. If necessary, make any other `CLEAN` or `ACTIVE` plexes `STALE` by running the following command on each of these plexes in turn:

```
# vxmend fix stale plex
```

Step 3. To enable the `CLEAN` plex and to recover the `STALE` plexes from it, use the following command:

```
# vxvol start volume
```

For example, to recover volume `vol101`:

```
# vxvol start vol101
```

For more information about the `vxmend` and `vxvol` command, see the *vxmend* (1M) and *vxvol* (1M) manual pages.

NOTE Following severe hardware failure of several disks or other related subsystems underlying all the mirrored plexes of a volume, it may be impossible to recover the volume using `vxmend`. In this case, remove the volume, recreate it on hardware that is functioning correctly, and restore the contents of the volume from a backup or from a snapshot image.

Recovering an Unstartable Volume with a Disabled Plex in the RECOVER State

A plex is shown in the RECOVER state if its contents are out-of-date with respect to the volume. This can happen if a disk containing one or more of the plex's subdisks has been replaced or reattached. If a plex is shown as being in this state, it can be recovered as follows:

1. Use the following command to force the plex into the OFFLINE state:

```
# vxmend [-g diskgroup] -o force off plex
```

2. Place the plex into the STALE state using this command:

```
# vxmend [-g diskgroup] on plex
```

3. If there are other ACTIVE or CLEAN plexes in the volume, use the following command to reattach the plex to the volume:

```
# vxplex [-g diskgroup] att plex volume
```

If the volume is already enabled, resynchronization of the plex is started immediately. If there are no other clean plexes in the volume, use this command to make the plex DISABLED and CLEAN:

```
# vxmend [-g diskgroup] fix clean plex
```

4. If the volume is not already enabled, use the following command to start it, and preform any resynchronization of the plexes in the background:

```
# vxvol [-g diskgroup] -o bg start volume
```

NOTE If the data in the plex was corrupted, and the volume has no ACTIVE or CLEAN redundant plexes from which its contents can be resynchronized, it must be restored from a backup or from a snapshot image.

Forcibly Restarting a Disabled Volume

If a disk failure caused a volume to be disabled, and the volume does not contain any valid redundant plexes, you must restore the volume from a backup after replacing the failed disk. Any volumes that are listed as Unstartable must be restarted using the `vxvol` command before restoring their contents from a backup:

```
# vxvol [-g diskgroup] -o bg -f start volume
```

The `-f` option forcibly restarts the volume, and the `-obg` option resynchronizes its plexes as a background task. For example, to restart the volume `myvol` so that it can be restored from backup, use the following command:

```
# vxvol -g mydg -o bg -f start myvol
```

Clearing the Falling Flag for a Disk

If I/O errors are intermittent rather than persistent, VERITAS Volume Manager sets the failing flag on a disk, rather than detaching the disk. Such errors can occur due to the temporary removal of a cable, controller faults, a partially faulty LUN in a disk array, or a disk with a few bad sectors or tracks.

If the hardware fault is not with the disk itself (for example, it is caused by problems with the controller or the cable path to the disk), you can use the `vxedit` command to unset the failing flag after correcting the source of the I/O error.

CAUTION Do not unset the failing flag if the reason for the I/O errors is unknown. If the disk hardware truly is failing, and the flag is cleared, there is a risk of data loss.

To clear the failing flag on a disk:

- Use the `vxdisklist` command to find out which disks are failing:

```
# vxdisk list
DEVICE TYPE          DISK   GROUP  STATUS
c1t1d0 auto:simple mydg01 mydg   online
c1t1d0 auto:simple mydg02 mydg   online failing
c1t1d0 auto:simple mydg03 mydg   online
. . .
```

- Use the `vxeditset` command to clear the flag for each disk that is marked as failing (in this example, `mydg02`):

```
# vxedit set failing=off mydg02
```

- Use the `vxdisklist` command to verify that the failing flag has been cleared:

```
# vxdisk list
DEVICE TYPE          DISK   GROUP  STATUS
c1t1d0 auto:simple mydg01 mydg   online
c1t2d0 auto:simple mydg02 mydg   online
c1t3d0 auto:simple mydg03 mydg   online
. . .
```

Reattaching Failed Disks

You can perform a reattach operation if a disk fails completely and hot-relocation is not possible, or if VxVM is started with some disk drivers unloaded and unloadable (causing disks to enter the failed state). If the underlying problem has been fixed, you can use the `vxreattach` command to reattach the disks without plexes being flagged as STALE. However, the reattach must occur before any volumes on the disk are started.

The `vxreattach` command is called as part of disk recovery from the `vxdiskadm` menus and during the boot process. If possible, `vxreattach` reattaches the failed disk media record to the disk with the same device name. Reattachment places a disk in the same disk group as it was located in before and retains its original disk media name.

To reattach a failed disk:

1. Use the `vxdisklist` command to see which disks have failed, as shown in the following example:

```
# vxdisk list
DEVICE    TYPE           DISK          GROUP         STATUS
c1t1d0    auto:simple    mydg01       mydg          online
c1t2d0    auto:simple    mydg02       mydg          online
-         -              mydg03       mydg          failed was: c1t3d0
-         -              mydg04       mydg          failed was: c1t4d0
```

2. Once the fault has been corrected, the disks can be reattached by using the following command to rescan the device list:

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

3. Use the `vxreattach` command with no options to reattach the disks:

```
# /etc/vx/bin/vxreattach
```

After reattachment takes place, recovery may not be necessary unless a disk was faulty and had to be replaced. Reattachment can fail if the original (or another) cause for the disk failure still exists.

You can use the command `vxreattach-c` to check whether reattachment is possible, without performing the operation. Instead, it displays the disk group and disk media name where the disk can be reattached.

See the `vxreattach(1M)` manual page for more information on the `vxreattach` command.

Failures on RAID-5 Volumes

Failures are seen in two varieties: *system failures* and *disk failures*. A system failure means that the system has abruptly ceased to operate due to an operating system panic or power failure. Disk failures imply that the data on some number of disks has become unavailable due to a system failure (such as a head crash, electronics failure on disk, or disk controller failure).

System Failures

RAID-5 volumes are designed to remain available with a minimum of disk space overhead, if there are disk failures. However, many forms of RAID-5 can have data loss after a system failure. Data loss occurs because a system failure causes the data and parity in the RAID-5 volume to become unsynchronized. Loss of synchronization occurs because the status of writes that were outstanding at the time of the failure cannot be determined.

If a loss of sync occurs while a RAID-5 volume is being accessed, the volume is described as having *stale parity*. The parity must then be reconstructed by reading all the non-parity columns within each stripe, recalculating the parity, and writing out the parity stripe unit in the stripe. This must be done for every stripe in the volume, so it can take a long time to complete.

CAUTION While the resynchronization of a RAID-5 volume *without* log plexes is being performed, any failure of a disk within the volume causes its data to be lost.

Besides the vulnerability to failure, the resynchronization process can tax the system resources and slow down system operation.

RAID-5 logs reduce the damage that can be caused by system failures, because they maintain a copy of the data being written at the time of the failure. The process of resynchronization consists of reading that data and parity from the logs and writing it to the appropriate areas of the RAID-5 volume. This greatly reduces the amount of time needed for a resynchronization of data and parity. It also means that the volume never becomes truly stale. The data and parity for all stripes in the volume are known at all times, so the failure of a single disk cannot result in the loss of the data within the volume.

Disk Failures

An uncorrectable I/O error occurs when disk failure, cabling or other problems cause the data on a disk to become unavailable. For a RAID-5 volume, this means that a subdisk becomes unavailable. The subdisk cannot be used to hold data and is considered stale and detached. If the underlying disk becomes available or is replaced, the subdisk is still considered stale and is not used.

If an attempt is made to read data contained on a stale subdisk, the data is reconstructed from data on all other stripe units in the stripe. This operation is called a reconstructing-read. This is a more expensive operation than simply reading the data and can result in degraded read performance. When a RAID-5 volume has stale subdisks, it is considered to be in degraded mode.

A RAID-5 volume in degraded mode can be recognized from the output of the `vxprint -ht` command as shown in the following display:

```

V  NAME          RVG/VSET/COKSTATESTATE   LENGTH  READPOL  PREFPLEX  UTYPE
PL NAME          VOLUME      KSTATE STATE   LENGTH  LAYOUT   NCOL/WID  MODE
SD NAME          PLEX        DISK DISKOFFS  LENGTH  [COL/]OFF  DEVICE    MODE
SV NAME          PLEX        VOLNAME NVOLLAYR  LENGTH  [COL/]OFF  AM/NM     MODE
...
v  r5vol -          ENABLED DEGRADED          204800  RAID     -         raid5
pl r5vol-01  r5vol  ENABLED ACTIVE          204800  RAID     3/16     RW
sd disk01-01 r5vol-01disk01 0          102400  0/0     c2t9d0   ENA
sd disk02-01 r5vol-01disk02 0          102400  1/0     c2t10d0  dS
sd disk03-01 r5vol-01disk03 0          102400  2/0     c2t11d0  ENA
pl r5vol-02  r5vol  ENABLED LOG             1440    CONCAT  -         RW
sd disk04-01 r5vol-02disk04 0          1440    0       c2t12d0  ENA
pl r5vol-03  r5vol  ENABLED LOG             1440    CONCAT  -         RW
                sd disk05-01 r5vol-03disk05 0          1440    0       c2t14d0  ENA

```

The volume `r5vol` is in degraded mode, as shown by the volume state, which is listed as `DEGRADED`. The failed subdisk is `disk02-01`, as shown by the `MODE` flags; `d` indicates that the subdisk is detached, and `S` indicates that the subdisk's contents are stale.

NOTE Do not run the `vxr5check` command on a RAID-5 volume that is in degraded mode.

A disk containing a RAID-5 log plex can also fail. The failure of a single RAID-5 log plex has no direct effect on the operation of a volume provided that the RAID-5 log is mirrored. However, loss of all RAID-5 log plexes in a volume makes it vulnerable to a complete failure. In the output of the `vxprint-ht` command, failure within a RAID-5 log plex is indicated by the plex state being shown as `BADLOG` rather than `LOG`. This is shown in the following display, where the RAID-5 log plex `r5vol-02` has failed:

V NAME	RVG/VSET/	COKSTATESTATE		LENGTH	READPOL	PREFPLEX	UTYPE
PL NAME	VOLUME	KSTATE	STATE	LENGTH	LAYOUT	NCOL/WID	MODE
SD NAME	PLEX	DISK	DISKOFFS	LENGTH	[COL/]OFF	DEVICE	MODE
SV NAME	PLEX	VOLNAME	NVOLLAYR	LENGTH	[COL/]OFF	AM/NM	MODE
...							
v r5vol	-	ENABLED	ACTIVE	204800	RAID -		raid5
pl r5vol-01	r5vol	ENABLED	ACTIVE	204800	RAID	3/16	RW
sd disk01-01	r5vol-01	disk01	0	102400	0/0	c2t9d0	ENA
sd disk02-01	r5vol-01	disk02	0	102400	1/0	c2t10d0	ENA
sd disk03-01	r5vol-01	disk03	0	102400	2/0	c2t11d0	ENA
pl r5vol-02	r5vol	DISABLED	BADLOG	1440	CONCAT	-	RW
sd disk04-01	r5vol-02	disk04	0	1440	0	c2t12d0	ENA
pl r5vol-03	r5vol	ENABLED	LOG	1440	CONCAT	-	RW
sd disk05-01	r5vol-12	disk05	0	1440	0	c2t14d0	ENA

Default Startup Recovery Process for RAID-5

VxVM may need to perform several operations to restore fully the contents of a RAID-5 volume and make it usable. Whenever a volume is started, any RAID-5 log plexes are zeroed before the volume is started. This prevents random data from being interpreted as a log entry and corrupting the volume contents. Also, some subdisks may need to be recovered, or the parity may need to be resynchronized (if RAID-5 logs have failed).

VxVM takes the following steps when a RAID-5 volume is started:

- Step 1.** If the RAID-5 volume was not cleanly shut down, it is checked for valid RAID-5 log plexes.

- If valid log plexes exist, they are replayed. This is done by placing the volume in the `DETACHED` volume kernel state and setting the volume state to `REPLAY`, and enabling the RAID-5 log plexes. If the logs can be successfully read and the replay is successful, move on to Step 2.
- If no valid logs exist, the parity must be resynchronized. Resynchronization is done by placing the volume in the `DETACHED` volume kernel state and setting the volume state to `SYNC`. Any log plexes are left in the `DISABLED` plex kernel state.

The volume is not made available while the parity is resynchronized because any subdisk failures during this period makes the volume unusable. This can be overridden by using the `-o unsafe start` option with the `vxvol` command. If any stale subdisks exist, the RAID-5 volume is unusable.

CAUTION The `-o unsafe start` option is considered dangerous, as it can make the contents of the volume unusable. Using it is not recommended.

Step 2. Any existing log plexes are zeroed and enabled. If all logs fail during this process, the start process is aborted.

Step 3. If no stale subdisks exist or those that exist are recoverable, the volume is put in the `ENABLED` volume kernel state and the volume state is set to `ACTIVE`. The volume is now started.

Recovering a RAID-5 Volume

The types of recovery that may typically be required for RAID-5 volumes are the following:

- “Parity Resynchronization” on page 26
- “Log Plex Recovery” on page 27
- “Stale Subdisk Recovery” on page 27

Parity resynchronization and stale subdisk recovery are typically performed when the RAID-5 volume is started, or shortly after the system boots. They can also be performed by running the `vxrecover` command.

For more information on starting RAID-5 volumes, see “Starting RAID-5 Volumes” on page 28.

If hot-relocation is enabled at the time of a disk failure, system administrator intervention is not required unless no suitable disk space is available for relocation. Hot-relocation is triggered by the failure and the system administrator is notified of the failure by electronic mail.

Hot relocation automatically attempts to relocate the subdisks of a failing RAID-5 plex. After any relocation takes place, the hot-relocation daemon (`vxrelocd`) also initiates a parity resynchronization.

In the case of a failing RAID-5 log plex, relocation occurs only if the log plex is mirrored; the `vxrelocd` daemon then initiates a mirror resynchronization to recreate the RAID-5 log plex. If hot-relocation is disabled at the time of a failure, the system administrator may need to initiate a resynchronization or recovery.

NOTE Following severe hardware failure of several disks or other related subsystems underlying a RAID-5 plex, it may be impossible to recover the volume using the methods described in this chapter. In this case, remove the volume, recreate it on hardware that is functioning correctly, and restore the contents of the volume from a backup.

Parity Resynchronization

In most cases, a RAID-5 array does not have stale parity. Stale parity only occurs after all RAID-5 log plexes for the RAID-5 volume have failed, and then only if there is a system failure. Even if a RAID-5 volume has stale parity, it is usually repaired as part of the volume start process.

If a volume without valid RAID-5 logs is started and the process is killed before the volume is resynchronized, the result is an active volume with stale parity. For an example of the output of the `vxprint -ht` command, see the following example for a stale RAID-5 volume:

```
V NAME      RVG      KSTATE  STATE  LENGTH  READPOL  PREFPLEX  UTYPE
PL NAME     VOLUME  KSTATE  STATE  LENGTH  LAYOUT   NCOL/WID  MODE
SD NAME     PLEX    DISK    DISKOFFSLENGTH [COL/]OFF DEVICE    MODE
SV NAME     PLEX    VOLNAME NVOLLAYLENGTH [COL/]OFF AM/NM     MODE
...
v  r5vol    -        ENABLED NEEDSYNC204800 RAID      -         raid5
pl r5vol-01 r5vol    ENABLED ACTIVE  204800  RAID      3/16      RW
sd disk01-01 r5vol-01disk01 0      102400  0/0      c2t9d0    ENA
sd disk02-01 r5vol-01disk02 0      102400  1/0      c2t10d0   dS
sd disk03-01 r5vol-01disk03 0      102400  2/0      c2t11d0   ENA...
```

This output lists the volume state as `NEEDSYNC`, indicating that the parity needs to be resynchronized. The state could also have been `SYNC`, indicating that a synchronization was attempted at start time and that a synchronization process should be doing the synchronization. If no such process exists or if the volume is in the `NEEDSYNC` state, a synchronization can be manually started by using the `resync` keyword for the `vxvol` command. For example, to resynchronize the RAID-5 volume in the Figure 1-3, “Invalid RAID-5 Volume,” use the following command:

```
# vxvol -g mydg resync r5vol
```

Parity is regenerated by issuing `VOL_R5_RESYNC ioctl`s to the RAID-5 volume. The resynchronization process starts at the beginning of the RAID-5 volume and resynchronizes a region equal to the number of sectors specified by the `-o iosize` option. If the `-o iosize` option is not specified, the default maximum I/O size is used. The `resync` operation then moves onto the next region until the entire length of the RAID-5 volume has been resynchronized.

For larger volumes, parity regeneration can take a long time. It is possible that the system could be shut down or crash before the operation is completed. In case of a system shutdown, the progress of parity regeneration must be kept across reboots. Otherwise, the process has to start all over again.

To avoid the restart process, parity regeneration is *checkpointed*. This means that the offset up to which the parity has been regenerated is saved in the configuration database. The `-o checkpoint=size` option controls how often the checkpoint is saved. If the option is not specified, the default checkpoint size is used.

Because saving the checkpoint offset requires a transaction, making the checkpoint size too small can extend the time required to regenerate parity. After a system reboot, a RAID-5 volume that has a checkpoint offset smaller than the volume length starts a parity resynchronization at the checkpoint offset.

Log Plex Recovery

RAID-5 log plexes can become detached due to disk failures. These RAID-5 logs can be reattached by using the `att` keyword for the `vxplex` command. To reattach the failed RAID-5 log plex, use the following command:

```
# vxplex att r5vol r5vol-11
```

Stale Subdisk Recovery

Stale subdisk recovery is usually done at volume start time. However, the process doing the recovery can crash, or the volume may be started with an option such as `-o delayrecover` that prevents subdisk recovery. In addition, the disk on which the subdisk resides can be replaced without recovery operations being performed. In such cases, you can perform subdisk

recovery using the `vxvol recover` command. For example, to recover the stale subdisk in the RAID-5 volume shown in the figure “Invalid RAID-5 Volume” on page 29, use the following command:

```
# vxvol -g mydg recover r5vol disk05-00
```

A RAID-5 volume that has multiple stale subdisks can be recovered in one operation. To recover multiple stale subdisks, use the `vxvolrecover` command on the volume, as follows:

```
# vxvol -g mydg recover r5vol
```

Recovery After Moving RAID-5 Subdisks

When RAID-5 subdisks are moved and replaced, the new subdisks are marked as STALE in anticipation of recovery. If the volume is active, the `vxsd` command may be used to recover the volume. If the volume is not active, it is recovered when it is next started. *The RAID-5 volume is degraded for the duration of the recovery operation.*

Any failure in the stripes involved in the move makes the volume unusable. The RAID-5 volume can also become invalid if its parity becomes stale. To avoid this occurring, `vxsd` does not allow a subdisk move in the following situations:

- a stale subdisk occupies any of the same stripes as the subdisk being moved
- the RAID-5 volume is stopped but was not shut down cleanly; that is, the parity is considered stale
- the RAID-5 volume is active and has no valid log areas

Only the third case can be overridden by using the `-o force` option.

Subdisks of RAID-5 volumes can also be split and joined by using the `vxsd split` command and the `vxsd join` command. These operations work the same way as those for mirrored volumes.

NOTE RAID-5 subdisk moves are performed in the same way as subdisk moves for other volume types, but without the penalty of degraded redundancy.

Starting RAID-5 Volumes

When a RAID-5 volume is started, it can be in one of many states. After a normal system shutdown, the volume should be clean and require no recovery. However, if the volume was not closed, or was not unmounted before a crash, it can require recovery when it is started, before it can be made available. This section describes actions that can be taken under certain conditions.

Under normal conditions, volumes are started automatically after a reboot and any recovery takes place automatically or is done through the `vxrecover` command.

Unstartable RAID-5 Volumes

A RAID-5 volume is unusable if some part of the RAID-5 plex does not map the volume length:

- the RAID-5 plex cannot be sparse in relation to the RAID-5 volume length
- the RAID-5 plex does not map a region where two subdisks have failed within a stripe, either because they are stale or because they are built on a failed disk

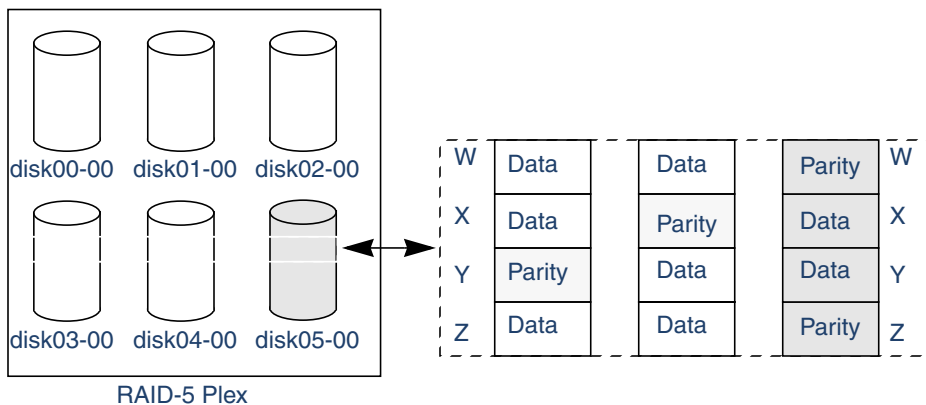
When this occurs, the `vxvol start` command returns the following error message:

```
vxvm:vxvol: ERROR: Volume r5vol is not startable; RAID-5 plex does not map entire volume length.
```

At this point, the contents of the RAID-5 volume are unusable.

Another possible way that a RAID-5 volume can become unstartable is if the parity is stale and a subdisk becomes detached or stale. This occurs because within the stripes that contain the failed subdisk, the parity stripe unit is invalid (because the parity is stale) and the stripe unit on the bad subdisk is also invalid. The situation shown in Figure 1-3, “Invalid RAID-5 Volume,” illustrates a RAID-5 volume that has become invalid due to stale parity and a failed subdisk.

Figure 1-3 Invalid RAID-5 Volume



This example shows four stripes in the RAID-5 array. All parity is stale and subdisk `disk05-00` has failed. This makes stripes X and Y unusable because two failures have occurred within those stripes.

This qualifies as two failures within a stripe and prevents the use of the volume. In this case, the output display from the `vxvol start` command is as follows:

```
vxvm:vxvol: ERROR: Volume r5vol is not startable; some subdisks are unusable and the parity is stale.
```

This situation can be avoided by *always* using two or more RAID-5 log plexes in RAID-5 volumes. RAID-5 log plexes prevent the parity within the volume from becoming stale which prevents this situation (see “System Failures” on page 22 for details).

Forcibly Starting RAID-5 Volumes

You can start a volume even if subdisks are marked as stale. For example, if a stopped volume has stale parity and no RAID-5 logs and a disk becomes detached and then reattached.

The subdisk is considered stale even though the data is not out of date (because the volume was in use when the subdisk was unavailable) and the RAID-5 volume is considered invalid. To prevent this case, always have multiple valid RAID-5 logs associated with the array whenever possible.

To start a RAID-5 volume with stale subdisks, you can use the `-f` option with the `vxvol start` command. This causes all stale subdisks to be marked as non-stale. Marking takes place before the `start` operation evaluates the validity of the RAID-5 volume and what is needed to start it. Also, you can mark individual subdisks as non-stale by using the following command:

```
# vxmend [-g diskgroup] fix unstale subdisk
```

- If some subdisks are stale and need recovery, and if valid logs exist, the volume is enabled by placing it in the `ENABLED` kernel state and the volume is available for use during the subdisk recovery. Otherwise, the volume kernel state is set to `DETACHED` and it is not available during subdisk recovery.

This is done because if the system were to crash or the volume was ungracefully stopped while it was active, the parity becomes stale, making the volume unusable. If this is undesirable, the volume can be started with the `-o unsafe start` option.

CAUTION The `-o unsafe start` option is considered dangerous, as it can make the contents of the volume unusable. It is therefore not recommended.

- The volume state is set to `RECOVER` and stale subdisks are restored. As the data on each subdisk becomes valid, the subdisk is marked as no longer stale.

If any subdisk recovery fails and there are no valid logs, the volume start is aborted because the subdisk remains stale and a system crash makes the RAID-5 volume unusable. This can also be overridden by using the `-o unsafe start` option.

CAUTION The `-o unsafe start` option is considered dangerous, as it can make the contents of the volume unusable. It is therefore not recommended.

If the volume has valid logs, subdisk recovery failures are noted but they do not stop the start procedure.

- When all subdisks have been recovered, the volume is placed in the `ENABLED` kernel state and marked as `ACTIVE`. It is now started.

Recovering from Incomplete Disk Group Moves

If the system crashes or a subsystem fails while a disk group move, split or join operation is being performed, VxVM attempts either to reverse or to complete the operation when the system is restarted or the subsystem is repaired. Whether the operation is reversed or completed depends on how far it had progressed.

Automatic recovery depends on being able to import both the source and target disk groups. If this is not possible (for example, if one of the disk groups has been imported on another host), perform the following steps to recover the disk group:

Step 1. Use the `vxprint` command to examine the configuration of both disk groups. Objects in disk groups whose move is incomplete have their `TUTIL0` fields set to `MOVE`.

Step 2. Enter the following command to attempt completion of the move:

```
# vxdg recover sourcedg
```

This operation fails if one of the disk groups cannot be imported because it has been imported on another host or because it does not exist:

```
vxvm: vxdg: ERROR: diskgroup: Disk group does not exist
```

If the recovery fails, perform one of the following steps as appropriate.

- If the disk group has been imported on another host, export it from that host, and import it on the current host. If all the required objects already exist in either the source or target disk group, use the following command to reset the `MOVE` flags in that disk group:

```
# vxdg -o clean recover diskgroup1
```

Use the following command on the other disk group to remove the objects that have `TUTIL0` fields marked as `MOVE`:

```
# vxdg -o remove recover diskgroup2
```

- If only one disk group is available to be imported, use the following command to reset the `MOVE` flags on this disk group:

```
# vxdg -o clean recover diskgroup
```

Recovery from Failure of a DCO Volume

NOTE The procedures in this section depend on the DCO version number. See the VERITAS Volume Manager Administrator's Guide for information about DCO versioning.

Persistent FastResync uses a data change object (DCO) volume to perform tracking of changed regions in a volume. If an error occurs while reading or writing a DCO volume, it is detached and the badlog flag is set on the DCO. All further writes to the volume are not tracked by the DCO.

The following sample output from the `vxprint` command shows a complete volume with a detached DCO volume (the `TUTIL0` and `PUTIL0` fields are omitted for clarity):

<Program Listing Here>

This output shows the mirrored volume, `vol1`, its snapshot volume, `SNAP-vol1`, and their respective DCOs, `vol1_dco` and `SNAP-vol1_dco`. The two disks, `mydg03` and `mydg04`, that hold the DCO plexes for the DCO volume, `vol1_dcl`, of `vol1` have failed.

As a result, the DCO volume, `vol1_dcl`, of the volume, `vol1`, has been detached and the state of `vol1_dco` has been set to `BADLOG`. For future reference, note the entries for the snap objects, `vol1_snp` and `SNAP-vol1_snp`, that point to `vol1` and `SNAP-vol1` respectively.

You can use such output to deduce the name of a volume's DCO (in this example, `vol1_dco`), or you can use the following `vxprint` command to display the name of a volume's DCO:

```
# vxprint [-g diskgroup] -F%dco_name volume
```

You can use the `vxprint` command to check if the badlog flag is set for the DCO of a volume as shown here:

```
# vxprint [-g diskgroup] -F%badlog dco_name
```

This command returns the value on if the badlog flag is set. For the example output, the command would take this form:

```
# vxprint -g mydg -F%badlog vol1_dco on
```

Use the following command to verify the version number of the DCO:

```
# vxprint [-g diskgroup] -F%version dco_name
```

This returns a value of 0 or 20. For the example output, the command would take this form:

```
# vxprint -g mydg -F%version vol1_dco
```

The DCO version number determines the recovery procedure that you should use:

- “Recovering a Version 0 DCO” on page 35
- “Recovering a Version 20 DCO” on page 37

Recovering a Version 0 DCO

For a version 0 DCO, perform the following steps to recover the DCO volume:

1. Correct the problem that caused the I/O failure.
2. Use the following command to remove the badlog flag from the DCO:

```
# vxdco [-g diskgroup] -o force enable dco_name
```

For the example output, the command would take this form:

```
# vxdco -g mydg -o force enable vol1_dco
```

The entry for vol1_dco in the output from vxprint now looks like this:

```
dc vol1_dco vol1 ----
```

3. Restart the DCO volume using the following command:

```
# vxvol [-g diskgroup] start dco_log_vol
```

For the example output, the command would take this form:

```
# vxvol -g mydg start vol1_dcl
```

4. Use the vxassistsnapclear command to clear the FastResync maps for the original volume and for all its snapshots. This ensures that potentially stale FastResync maps are not used when the snapshots are snapped back (a full resynchronization is performed). FastResync tracking is re-enabled for any subsequent snapshots of the volume.

CAUTION You must use the vxassistsnapclear command on all the snapshots of the volume after removing the badlog flag from the DCO. Otherwise, data may be lost or corrupted when the snapshots are snapped back.

If a volume and its snapshot volume are in the same disk group, the following command clears the FastResync maps for both volumes:

```
# vxassist [-g diskgroup] snapclear volume snap_obj_to_snapshot
```

Here snap_obj_to_snapshot is the name of the snap object associated with volume that points to the snapshot volume.

For the example output, the command would take this form:

```
# vxassist -g mydg snapclear vol1 SNAP-vol1_snp
```

If a snapshot volume and the original volume are in different disk groups, you must perform a separate snapclear operation on each volume:

```
# vxassist -g diskgroup1 snapclear volume snap_obj_to_snapshot # vxassist -g  
diskgroup2 snapclear snapvol snap_obj_to_volume
```

Here `snap_obj_to_volume` is the name of the snap object associated with the snapshot volume, `snapvol`, that points to the original volume.

For the example output, the commands would take this form if SNAP-vol1 had been moved to the disk group, `snapdg`:

```
# vxassist -g mydg snapclear vol1 SNAP-vol1_snp  
# vxassist -g snapdg snapclear SNAP-vol1 vol1_snp
```

5. To snap back the snapshot volume on which you performed a snapclear in the previous step, use the following command (after using the `vxdgmove` command to move the snapshot plex back to the original disk group, if necessary):

```
# vxplex -f [-g diskgroup] snapback volume snapvol_plex
```

6. For the example output, the command would take this form:

```
# vxplex -f -g mydg snapback vol1 vol1-03
```

NOTE You cannot use `vxassistsnapback` because the `snapclear` operation removes the snapshot association information.

Recovering a Version 20 DCO

For a version 20 DCO, perform the following steps to recover the DCO volume:

1. Correct the problem that caused the I/O failure.
2. Use the `vxsnap` command to dissociate each full-sized instant snapshot volume that is associated with the volume:

```
# vxsnap [-g diskgroup] dis snapvol
```

For the example output, the command would take this form:

```
# vxsnap -g mydg dis SNAP-vol1
```

3. Unprepare the volume using the following command:

```
# vxsnap [-g diskgroup] unprepare volume
```

For the example output, the command would take this form:

```
# vxsnap -g mydg unprepare vol1
```

4. Start the volume using the `vxvol` command:

```
# vxvol [-g diskgroup] start volume
```

For the example output, the command would take this form:

```
# vxvol -g mydg start vol1
```

5. Prepare the volume again using the following command:

```
# vxsnap [-g diskgroup] prepare volume [ndcomirs=number] \  
[regionsize=size] [drl=yes|no|sequential] \  
[storage_attribute ...]
```

For the example output, the command might take this form:

```
# vxsnap -g mydg prepare vol1 ndcomirs=2 drl=yes
```

This adds a DCO volume with 2 plexes, and also enables DRL and FastResync (if licensed).

See the VERITAS Volume Manager Administrator's Guide and the `vxsnap(1M)` manual page for full details of how to use the `vxsnapprepare` command.

2 Recovery from Failure of Instant Snapshot Operations

This chapter describes how to recover from various failure and error conditions that may occur during instant snapshot operations:

- “Failure of vxsnap prepare” on page 41
- “Failure of vxsnap make for Full-Sized Instant Snapshots” on page 42
- “Failure of vxsnap make for Break-Off Instant Snapshots” on page 43
- “Failure of vxsnap make for Space-Optimized Instant” on page 44
- “Failure of vxsnap restore” on page 45
- “Failure of vxsnap reattach or refresh” on page 46
- “I/O Errors During Resynchronization” on page 48
- “I/O Failure on a DCO Volume” on page 49

See the VERITAS Volume Manager Administrator’s Guide and the vxsnap(1M) manual page for full details of the creation and administration of instant snapshots.

Failure of vxsnap prepare

If a vxsnapprepare operation fails prematurely, the vxprint command may show the new DCO volume in the INSTSNAPTMP state. VxVM can usually recover the DCO volume without intervention. However, in certain situations, this recovery may not succeed. If this happens, use the following command to delete the DCO volume:

```
# vxedit [-g diskgroup] rm DCO_volume
```

Alternatively, the DCO volume is removed automatically when the system is next restarted. When the DCO volume has been removed, run the vxsnapprepare command again.

Failure of vxsnap make for Full-Sized Instant Snapshots

If a vxsnapmake operation fails during the creation of a full-sized instant snapshot, the snapshot volume may go into the DISABLED state, be marked invalid and be rendered unstartable. You can use the following command to check that the inst_invalid flag is set to on:

```
# vxprint [-g diskgroup] -F%inst_invalid snapshot_volume
```

VxVM can usually recover the snapshot volume without intervention. However, in certain situations, this recovery may not succeed. If this happens, use the following steps to delete the DCO volume:

1. Use the vxmend command to clear the snapshot volume's tutil0 field:

```
# vxmend [-g diskgroup] clear tutil0 snapshot_volume
```

2. Run the following command on the snapshot volume:

```
# vxsnap [-g diskgroup] unprepare snapshot_volume
```

3. Prepare the snapshot volume again for snapshot operations:

```
# vxsnap [-g diskgroup] prepare snapshot_volume
```

Failure of vxsnap make for Break-Off Instant Snapshots

If a vxsnapmake operation fails during the creation of a third-mirror break-off instant snapshot, the snapshot volume may go into the INSTSNAPTMP state. VxVM can usually recover the snapshot volume without intervention. However, in certain situations, this recovery may not succeed. If this happens, use the following command to delete the snapshot volume:

```
# vxedit [-g diskgroup] rm snapshot_volume
```

Alternatively, the snapshot volume is removed automatically when the system is next restarted.

Failure of vxsnap make for Space-Optimized Instant

Snapshots

If a vxsnapmake operation fails during the creation of a space-optimized instant snapshot, the snapshot volume may go into the INSTSNAPTMP state. VxVM can usually recover the snapshot volume without intervention. However, in certain situations, this recovery may not succeed. If this happens, use the following command to delete the snapshot volume:

```
# vxedit [-g diskgroup] rm snapshot_volume
```

Alternatively, the snapshot volume is removed automatically when the system is next restarted.

If the vxsnapmake operation was being performed on a prepared cache object by specifying the cache attribute, the cache object remains intact after deleting the snapshot. If the cachesize attribute was used to specify a new cache object, the cache object does not exist after deleting the snapshot.

Failure of vxsnap restore

If a vxsnaprestore operation fails, the volume being restored may go into the DISABLED state. Use the following command to start the volume:

```
# vxvol [-g diskgroup] start volume
```

Failure of vxsnap reattach or refresh

If a vxsnap reattach or refresh operation fails, the volume being refreshed may go into the DISABLED state, be marked invalid and be rendered unstartable. You can use the following command to check that the inst_invalid flag is set to on:

```
# vxprint [-g diskgroup] -F%inst_invalid volume
```

Use the following steps to recover the volume:

1. Use the vxmend command to clear the volume's tutil0 field:

```
# vxmend [-g diskgroup] clear tutil0 volume
```

2. Use the vxsnap command to dissociate the volume from the snapshot hierarchy:

```
# vxsnap [-g diskgroup] dis volume
```

3. Use the following command to start the volume:

```
# vxvol [-g diskgroup] start volume
```

4. Re-run the failed reattach or refresh command.

NOTE This results in a full resynchronization of the volume. Alternatively, remove the snapshot volume and recreate it if required.

Copy-on-write Failure

If an error is encountered while performing an internal resynchronization of a volume's snapshot, the snapshot volume goes into the INVALID state, and is made inaccessible for I/O and instant snapshot operations.

Use the following steps to recover the snapshot volume:

1. Use the vxsnap command to dissociate the volume from the snapshot hierarchy:

```
# vxsnap [-g diskgroup] dis snapshot_volume
```

2. Unprepare the volume using the following command:

```
# vxsnap [-g diskgroup] unprepare snapshot_volume
```

3. Prepare the volume using the following command:

```
# vxsnap [-g diskgroup] prepare volume [ndcomirs=number] \  
[regionsize=size] [drl=yes|no|sequential] \  
[storage_attribute ...]
```

See the VERITAS Volume Manager Administrator's Guide and the vxsnap(1M) manual page for full details of how to use the vxsnapprepare command.

The volume can now be used again for snapshot operations.

Alternatively, you can remove the snapshot volume and recreate it if required.

I/O Errors During Resynchronization

Snapshot resynchronization (started by `vxsnapsyncstart`, or by specifying `sync=on` to `vxsnap`) stops if an I/O error occurs, and displays the following message on the system console:

```
VxVM vxsnap ERROR V-5-1-6840 Synchronization of the volume volume  
stopped due to I/O error
```

After correcting the source of the error, use the following command to restart the resynchronization operation:

```
# vxsnap [-b] [-g diskgroup] syncstart volume
```

See the VERITAS Volume Manager Administrator's Guide and the `vxsnap(1M)` manual page for full details of how to use the `vxsnapsyncstart` command.

I/O Failure on a DCO Volume

If an I/O failure occurs on a DCO volume, its FastResync maps and DRL log cannot be accessed, and the DCO volume is marked with the BADLOG flag. DRL logging and recovery, and instant snapshot operations are not possible with the volume until you recover its DCO volume using the procedure described in “Recovering a Version 20 DCO” on page 37 .

NOTE If the I/O failure also affects the data volume, it must be recovered before its DCO volume can be recovered.

Recovery from Failure of Instant Snapshot Operations
I/O Failure on a DCO Volume

3 Recovery from Boot Disk Failure

Introduction

Veritas Veritas Volume Manager (VxVM) protects systems from disk and other hardware failures and helps you to recover from such events. This chapter describes recovery procedures and provides information that help to prevent loss of data or system access due to the failure of the boot (root) disk.

For information about recovering volumes and their data on non-boot disks, see Chapter 1, “Recovery from Hardware Failure,” on page 11.

NOTE For additional information, see the HP documentation Web Site at <http://docs.hp.com>. Click on **Search This Site**, search for *Ignite-UX Administration Guide*, and select the link to the 11i version. For information on actions to recover your system, select the section “System Recovery.” Pay particular attention to the information contained in the subsection “Expert Recovery Using the Core Media.”

Recovery from a Failed VxVM Root Mirror Disk

If a failed primary boot disk is under VxVM control and is mirrored, follow these steps to replace it:

- Step 1.** Replace the failed boot disk. Depending on the system hardware, this may require you to shut down and power off the system.
- Step 2.** Boot the system from a mirror of the root disk, and use the following command to initialize the replacement disk:

```
# /etc/vx/bin/vxdisksetup -iB rootdisk_access_name privlen=1024
```

The `-b` option sets the newly mirrored disk as the alternate boot disk in the NVRAM.

The `-v` option gives progress indications as each volume is being mirrored.

Recovery by Booting from Recovery Media

If there is a failure to boot from the VxVM boot disk on HP-UX 11i, and no bootable root mirror is available, it may be necessary to boot from an alternate boot source, or from *recovery media* such as the following:

- HP-UX 11i installation CD.
- Bootable recovery tape.
- Secondary boot disk in the configuration.
- HP-UX Ignite-UX server that is accessible over a LAN.

There are several problems that can only be repaired if the system is booted from recovery media. These problems include:

- The HP-UX kernel is corrupted or non-bootable.
- Files required for booting are missing, such as:
 - `/stand/ioconfig` file.
 - Device files in `/dev/vx`.
- Corrupted LIF area on the boot disk.

Detailed information on how to recover from these and many other failures is documented in the “Expert Recovery Using the Core Media” section of the *Ignite-UX Administration Guide*. (See “Introduction” on page 52 for information on how to access this book on the HP documentation web site.)

If these methods fail, use the procedures described in “Recovery by Reinstallation” on page 59.

Starting VxVM after Booting from Recovery Media

You can use the `vx_emerg_start` utility to start VxVM after booting a system from recovery media. This command allows a rootable VxVM configuration to be repaired in the event of a catastrophic failure. The command is invoked as shown here:

```
# vx_emerg_start hostname
```

The `hostname` argument specifies the name (node name) of the system that you are repairing. This name must match the name of the system that you are repairing, because it is unlikely to be recorded on the recovery media from which you booted the system.

Recovering the Root Volume After VxVM Emergency Startup

After you have used `vx_emerg_start` to start VxVM, use the `vxprint` command to determine the configuration state.

One common problem is that all the plexes of the root volume, `rootvol`, are stale. This would be shown in the `STATE` field of the `vxprint` output as follows:

```
TY   NAME           ASSOC      KSTATE    LENGTH  PLOFFS  STATE ...
v    rootvol        root       DISABLED  393216  -       ACTIVE ...
pl   rootvol-01     rootvol    DISABLED  393216  -       STALE ...
sd   rootdisk01-02  rootvol-01 ENABLED    393216  0       -...
pl   rootvol-02     rootvol    DISABLED  393216  -       STALE ...
sd   rootdisk02-02  rootvol-02 ENABLED    393216  0       -   ...
```

When this happens, the root volume can usually be repaired by using the following command:

```
# vxvol -g rootdg -f start rootvol
```

If the root volume is mirrored, recovery is started. Wait until recovery completes and the command exits. Then run the `fsck` command and mount the root file system as shown here:

```
# fsck -F vxfs -o full /dev/vx/rdisk/rootdg/rootvol
# mkdir /tmp_mnt
# mount -F vxfs /dev/vx/dsk/rootdg/rootvol /tmp_mnt
```

The following form of the `vx_emerg_start` command combines all these operations in a single command to recover the root volume and its mirrors, check the root file system, and mount it:

```
# vx_emerg_start -m hostname
```

When you have recovered the volumes on the VxVM root disk, and performed any other necessary repairs, reboot the system:

```
# reboot
```

Fixing a Missing or Corrupt `/etc/vx/volboot` File

The following messages may be displayed at boot time if the `/etc/vx/volboot` file is missing or its contents are incorrect:

```
vxvm:vxconfigd: ERROR: enable failed: Volboot file not loaded
```

transactions are disabled.

```
vxvm:vxconfigd: FATAL ERROR: Rootdg cannot be imported during boot
```

```
Error returned from vxconfigd -m boot, halting
```

- *Description:* During system bootup, the VxVM configuration daemon reads the file `/etc/vx/volboot`. If that file is missing or corrupted, the configuration daemon fails and aborts the boot sequence.
- *Action:* Reboot from recovery media and run the following command:

```
# vx_emerg_start -m hostname
```

This determines if the `volboot` file is present, and rewrites it if it is not present.

Using VxVM Maintenance Mode Boot (MMB)

Another method for performing limited recovery on a VxVM boot disk is to use the VxVM Maintenance Mode Boot (MMB). MMB mode is initiated by booting the system and gaining control at the ISL prompt. Boot the system from the primary or secondary boot device, and enter the following command at the boot prompt:

```
hpux -vm
```

This causes the bootloader and the HP-UX kernel to take alternate actions in finding the parts of the system that are required to boot the system.

The bootloader starts reading the `stand` file system at 1KB block 3168 instead of locating it from the LIF label. The VxVM kernel rootability code uses root volume extent information in the `/stand/rootconf` file to set up the extents of the root volume, and `init` is instructed to bring the system up to single-user mode. When invoked from the `pre_init_rc` script, the `vxconfigd` daemon exits gracefully if it determines from the kernel that the system is in MMB mode. The system is left running with only the `root` volume mounted, and VxVM runs with temporary objects pointing to the `root` volume.

CAUTION Use extreme caution when attempting to bring a system up in MMB mode if the system has a mirrored root volume. The `vxconfigd` daemon does not run in this mode, and only one copy of the root volume data is used. Writing to the root file system in MMB mode can cause file system corruption when both mirrors are subsequently configured.

Use the `vx_emerg_start` command to start the volume manager while in MMB mode. This command avoids writing to the `root` file system when the system is in MMB mode unless it needs to update the `volboot` file.

If it is necessary to update the `volboot` file in MMB mode, the `vx_emerg_start` command warns you that you must re-run `vx_emerg_start` with the `-f` (force) option specified to perform the write.

After running `vx_emerg_start` to start VxVM while in MMB mode on a mirrored root, it is recommended that you remove the half of the mirror from which the system was *not* booted. This can be done as follows:

Step 1. Determine which disk you booted from.

Step 2. Run the command `vxdisk list`, and locate your system's boot disk in the leftmost `DEVICE` column of the output. Find the disk media (DM) name of the boot device by locating the boot device in the `DISK` column. The name of this device should be similar to `rootdisk01` or `rootdisk02`. Also note the disk media name of the mirror disk.

Step 3. Run the following command:

```
# vxprint -g rootdg rootvol
```

If your system has a mirrored root volume, two plex entry lines are listed (with `p1` in the leftmost column), and immediately below each plex entry is the subdisk entry that is associated with the plex (with `sd` in the leftmost column).

Step 4. Examine the `NAME` field that is immediately to the right of the `sd` entry. This is the subdisk name, which is composed of the DM name followed by `-nn`, where `nn` is a number, such as `03` or `04`, that uniquely identifies the subdisk. Identify the disk media name of the root mirror disk from which the system was not booted.

Step 5. Use the following command to remove the plex and its associated subdisk for the root mirror disk from which the system was not booted:

```
# vxplex -o rm dis plex
```

The following example shows how to remove the `rootvol` plex that is associated with the disk `rootdisk02`:

```
# vxprint -g rootdg rootvol
```

TY	NAME	ASSOC	KSTATE	LENGTH	PLOFFS	STATE
v	rootvol	root	ENABLED	524288	-	ACTIVE
p1	rootvol-01	rootvol	ENABLED	524288	-	ACTIVE
sd	rootdisk01-03	rootvol-01	ENABLED	524288	0	-
p1	rootvol-02	rootvol	ENABLED	524288	-	ACTIVE
sd	rootdisk02-03	rootvol-02	ENABLED	524288	0	-

```
# vxplex -o rm dis rootvol-02
```

NOTE The `TUTILO` and `PUTILO` fields have been removed from the `vxprint` output for readability.

When the system has been repaired, and is in normal mode, you can use the following command to remirror the root volume:

```
# vxassist -g rootdg mirror rootvol dm:rootdisk02
```

Recovery by Reinstallation

NOTE If you configured VxVM rootability by installing via Ignite-UX, consult the “System Recovery” section of the *Ignite-UX Administration Guide*, before consulting this section. In many instances, reinstalling from a saved Ignite-UX configuration is sufficient to recover a failed boot disk.

Reinstallation is only necessary if all copies of your boot (root) disk are damaged, or if certain critical files are lost due to file system damage. If these types of failures occur, any volumes that are not directly involved in the failure do not need to be reconfigured.

4 Logging Commands and Transactions

This chapter provides information on how to administer logging of commands and transactions in VERITAS Volume Manager (VxVM). Logging Commands For information on how to administer error logging, see “Error Messages” on page 75“.

Logging Commands

The `vxcmdlog` command allows you to log the invocation of other VxVM commands to a file. The following table demonstrates the usage of `vxcmdlog`:

Table 4-1 Usage of vxcmdlog

Command	Description
<code>vxcmdlog -l</code>	List current settings for command logging.
<code>vxcmdlog -m on</code>	Turn on command logging.
<code>vxcmdlog -s 512k</code>	Set the maximum command log file size to 512KB.
<code>vxcmdlog -n 10</code>	Set the maximum number of historic command log files to 10.
<code>vxcmdlog -n no_limit</code>	Remove any limit on the number of historic command log files.
<code>vxcmdlog -m off</code>	Turn off command logging.

Command lines are logged to the file, `cmdlog`, in the directory `/etc/vx/log`. This path name is a symbolic link to a directory whose location depends on the operating system. If required, you can redefine the directory which is linked. If you want to preserve the settings of the `vxcmdlog` utility, you must also copy the settings file, `.cmdlog`, to the new directory.

NOTE The `.cmdlog` file is a binary and should not be edited.

The size of the command log is checked after an entry has been written so the actual size may be slightly larger than that specified. When the log reaches a maximum size, the current command log file, `cmdlog`, is renamed as the next available historic log file, `cmdlog.number`, where `number` is an integer from 1 up to the maximum number of historic log files that is currently defined, and a new current log file is created.

A limited number of historic log files is preserved to avoid filling up the file system. If the maximum number of historic log files has been reached, the oldest historic log file is removed, and the the current log file is renamed as that file.

Each log file contains a header that records the host name, host ID, and the date and time that the log was created.

The following are sample entries from a command log file:

```
# 0, 2329, Wed Feb 12 21:19:31 2003
/usr/sbin/vxdctl mode
# 17051, 2635, Wed Feb 12 21:19:33 2003
/usr/sbin/vxdisk -q -o alldgs list
# 0, 2722, Wed Feb 12 21:19:34 2003
/etc/vx/diag.d/vxprivutil dumpconfig /dev/vx/rdmp/Disk_4
# 26924, 3001, Thu Feb 13 19:30:57 2003
/usr/sbin/vxdisk list Disk_1
```

Each entry usually contains a client ID that identifies the command connection to the `vxconfigd` daemon, the process ID of the command that is running, a time stamp, and the command line including any arguments. If the client ID is 0, as in the third entry shown here, this means that the command did not open a connection to `vxconfigd`.

NOTE

The client ID is the same as that recorded for the corresponding transactions in the transactions log. See “Logging Transactions” on page 64 and “Associating Command and Transaction Logs” on page 66 for more information.

Most command scripts are not logged, but the command binaries that they call are logged. Exceptions are the `vxdisksetup`, `vxinstall`, and `vxdiskunsetup` scripts, which are logged.

If there is an error reading from the settings file, command logging switches to its built-in default settings. This may mean, for example, that logging remains enabled after being disabled using `vxcmdlog-moff` command. If this happens, use the `vxcmdlog` utility to recreate the settings file, or restore the file from a backup.

See the `vxcmdlog(1M)` manual page for more information about the `vxcmdlog` utilit.

Logging Transactions

The `vxtranslog` command allows you to log VxVM transactions to a file. The following table demonstrates the usage of `vxtranslog`:

Table 4-2 Usage of `vxcmdlog`

Command	Description
<code>vxtranslog -l</code>	List current settings for transaction logging.
<code>vxtranslog -m on</code>	Turn on transaction logging.
<code>vxtranslog -s 512k</code>	Set the maximum transaction log file size to 512KB.
<code>vxtranslog -n 10</code>	Set the maximum number of historic transaction log files to 10.
<code>vxtranslog -n no_limit</code>	Remove any limit on the number of historic transaction log files.
<code>vxtranslog -q on</code>	Turn on query logging.
<code>vxtranslog -q off</code>	Turn off query logging.
<code>vxtranslog -m off</code>	Turn off transaction logging.

Transactions are logged to the file, `translog`, in the directory `/etc/vx/log`. This path name is a symbolic link to a directory whose location depends on the operating system. If required, you can redefine the directory which is linked. If you want to preserve the settings of the `vxtranslog` utility, you must also copy the settings file, `.translog`, to the new directory.

NOTE The `.translog` file is a binary and should not be edited.

The size of the transaction log is checked after an entry has been written so the actual size may be slightly larger than that specified. When the log reaches a maximum size, the current transaction log file, `translog`, is renamed as the next available historic log file, `translog.number`, where `number` is an integer from 1 up to the maximum number of historic log files that is currently defined, and a new current log file is created.

A limited number of historic log files is preserved to avoid filling up the file system. If the maximum number of historic log files has been reached, the oldest historic log file is removed, and the current log file is renamed as that file.

Each log file contains a header that records the host name, host ID, and the date and time that the log was created.

The following are sample entries from a transaction log file:

```
Fri Oct 17 13:23:30 2003
Clid = 23460, PID = 21240, Part = 0, Status = 0, Abort Reason = 0
DA_GET Disk_0
DISK_GET_ATTRS Disk_0
DISK_DISK_OP Disk_0 8
DEVNO_GET Disk_0
DANAME_GET 0x160045 0x160072
GET_ARRAYNAME Disk DISKS
CTLR_PTOLNAME 11-08-01
GET_ARRAYNAME Disk DISKS
CTLR_PTOLNAME 21-08-01
DROPPED <no request data>
```

The first line of each log entry is the time stamp of the transaction. The `Clid` field corresponds to the client ID for the connection that the command opened to `vxconfigd`. The `PID` field shows the process ID of the utility that is requesting the operation. The `Status` and `Abort Reason` fields contain error codes if the transaction does not complete normally. The remainder of the record shows the data that was used in processing the transaction.

NOTE The client ID is the same as that recorded for the corresponding command line in the command log. See “Logging Commands” on page 62 and “Associating Command and Transaction Logs” on page 66 for more information.

If there is an error reading from the settings file, transaction logging switches to its built-in default settings. This may mean, for example, that logging remains enabled after being disabled using `vxtranslog-moff` command. If this happens, use the `vxtranslog` utility to recreate the settings file, or restore the file from a backup.

Associating Command and Transaction Logs

The Client and process IDs that are recorded for every request and command assist you in correlating entries in the command and transaction logs. To find out which command issued a particular request in transaction log, use a command such as the following to search for the process ID and the client ID in the command log:

```
# egrep -n PID cmdlog | egrep Clid
```

In this example, the following request was recorded in the transaction log:

```
Wed Feb 12 21:19:36 2003
Clid = 8309, PID = 2778, Part = 0, Status = 0, Abort Reason = 0
DG_IMPORT foodg
DG_IMPORT foodg
DISCONNECT <no request data>
```

To locate the utility that issued this request, the command would be:

```
# egrep -n 2778 cmdlog | egrep 8309
7310:# 8309, 2778, Wed Feb 12 21:19:36 2003
```

The output from the example shows a match at line 7310 in the command log. Examining lines 7310 and 7311 in the command log indicates that the `vx dg import` command was run on the `foodg` disk group:

```
# sed -e '7310,7311!d' cmdlog
# 8309, 2778, Wed Feb 12 21:19:36 2003 7311
/usr/sbin/vxdg -m import foodg
```

NOTE If there are multiple matches for the combination of the client and process ID, you can determine the correct match by examining the time stamp.

If a utility opens a conditional connection to `vxconfigd`, its client ID is shown as zero in the command log, and as a non-zero value in the transaction log. You can use the process ID and time stamp to relate the log entries in such cases.

5 Backing Up and Restoring Disk Group Configurations

Disk group configuration backup and restoration allows you to backup and restore all configuration data for VERITAS Volume Manager (VxVM) disk groups, and for VxVM objects

such as volumes that are configured within the disk groups. Using this feature, you can recover from corruption of a disk group's configuration that is stored as metadata in the private region of a VM disk. After the disk group configuration has been restored, and the volume enabled, the user data in the public region is available again without the need to restore this from backup media.

CAUTION The backup and restore utilities act only on VxVM configuration data. They do not back up or restore any user or application data that is contained within volumes or other VxVM objects. If you use `vxdiskunsetup` and `vxdisksetup` on a disk, and specify attributes that differ from those in the configuration backup, this may corrupt the public region and any user data therein.

The `vxconfigbackupd` daemon monitors changes to the VxVM configuration and automatically records any configuration changes that occur. Two utilities, `vxconfigbackup` and `vxconfigrestore`, are provided for backing up and restoring a VxVM configuration for a disk group.

When importing a disk group, any of the following errors indicate that the disk group configuration and/or disk private region headers have become corrupted:

```
VxVM vxconfigd ERROR V-5-1-569 Disk group group, Disk disk: Cannot auto-import group: reason
```

The reason for the error is usually one of the following:

```
Configuration records are inconsistent
Disk group has no valid configuration copies
Duplicate record in configuration
Errors in some configuration copies
Format error in configuration copy
Invalid block number
Invalid magic number
```

If VxVM cannot update a disk group's configuration because of disk errors, it disables the disk group and displays the following error:

```
VxVM vxconfigd ERROR V-5-1-123 Disk group group: Disabled by errors
```

If such errors occur, you can restore the disk group configuration from a backup after you have corrected any underlying problem such as failed or disconnected hardware. Configuration data from a backup allows you to reinstall the private region headers of VxVM disks in a disk

group whose headers have become damaged, to recreate a corrupted disk group configuration, or to recreate a disk group and the VxVM objects within it. You can also use the configuration data to recreate a disk group on another system if the original system is not available.

NOTE Restoration of a disk group configuration requires that the same physical disks are used as were configured in the disk group when the backup was taken.

The following sections describe how to back up and restore disk group configurations.

Backing Up a Disk Group Configuration

VxVM uses the disk group configuration daemon to monitor the configuration of disk groups, and to back up the configuration whenever it is changed. By default, the five most recent backups are preserved. If required, you can also back up a disk group configuration by running the `vxconfigbackup` command.

The following table describes the files that record disk group configuration information:

Table 5-1 Files that record disk group information

Backup Files	Description
<code>/etc/vx/cbr/bk/diskgroup.dgid/dgid.dginfo</code>	Disk group information.
<code>/etc/vx/cbr/bk/diskgroup.dgid/dgid.dginfo</code> <code>.diskinfo</code>	Disk attributes.
<code>/etc/vx/cbr/bk/diskgroup.dgid/dgid.dginfo</code> <code>.binconfig</code>	Binary configuration copy.
<code>/etc/vx/cbr/bk/diskgroup.dgid/dgid.dginfo</code> <code>.cfgrec</code>	Configuration records in <code>vxprint-m</code> format.

Here `diskgroup` is the name of the disk group, and `dgid` is the disk group ID. If a disk group is to be recreated on another system, copy these files to that system.

CAUTION Take care that you do not overwrite any files on the target system that are used by a disk group on that system.

To back up a disk group manually, use this command:

```
# /etc/vx/bin/vxconfigbackup diskgroup
```

To back up all disk groups, use this version of the command:

```
# /etc/vx/bin/vxconfigbackup
```

For more information, see the `vxconfigbackup(1M)` manual page.

Restoring a Disk Group Configuration

You can use the `vxconfigrestore` utility to restore or recreate a disk group from its configuration backup. The restoration process has two stages: `precommit` and `commit`. In the `precommit` stage, you can examine the configuration of the disk group that would be restored from the backup. The actual disk group configuration is not permanently restored until you choose to `commit` the changes.

NOTE None of the disks or VxVM objects in the disk group may be open or in use by any application while the restoration is being performed.

You can choose whether or not any corrupted disk headers are to be reinstalled at this stage. If any of the disks' private region headers are invalid, restoration may not be possible without reinstalling the headers for the affected disks.

The following command performs a `precommit` analysis of the state of the disk group configuration, and reinstalls the disk headers where these have become corrupted:

```
# /etc/vx/bin/vxconfigrestore -p [-l directory]{diskgroup | dgid}
```

The disk group can be specified either by name or by ID.

The `-l` option allows you to specify a directory for the location of the backup configuration files other than the default location, `/etc/vx/cbr/bk`. See "Backing Up a Disk Group Configuration" on page 44xxxxxxxxxxxxxxxx for details.

To specify that the disk headers are not to be reinstalled, use this form of the command:

```
# /etc/vx/bin/vxconfigrestore -n [-l directory]{diskgroup | dgid}
```

At the `precommit` stage, you can use the `vxprint` command to examine the configuration that the restored disk group will have. You can choose to proceed to `commit` the changes and restore the disk group configuration. Alternatively, you can cancel the restoration before any permanent changes have been made.

To abandon restoration at the `precommit` stage, use this command:

```
# /etc/vx/bin/vxconfigrestore -d [-l directory]{diskgroup | dgid}
```

To `commit` the changes that are required to restore the disk group configuration, use the following command:

```
# /etc/vx/bin/vxconfigrestore -c [-l directory]{diskgroup | dgid}
```

If no disk headers are reinstalled, the configuration copies in the disks' private regions are updated from the latest binary copy of the configuration that was saved for the disk group.

Restoring a Disk Group Configuration

If any of the disk headers are reinstalled, a saved copy of the disks' attributes is used to recreate their private and public regions. These disks are also assigned new diskIDs. The VxVM objects within the disk group are then recreated using the backupconfiguration records for the disk group. This process also has the effect of creating new configuration copies in the disk group.

Volumes are synchronized in the background. For large volume configurations, it may take some time to perform the synchronization. You can use the `vxtask-1 list` command to monitor the progress of this operation.

NOTE Disks that are in use or whose layout has been changed are excluded from the restoration process.

For more information, see the `vxconfigrestore(1M)` manual page.

Resolving Conflicting Backups for a Disk Group

In some circumstances where disks have been replaced on a system, there may exist several conflicting backups for a disk group. In this case, you see a message similar to the following from the `vxconfigrestore` command:

```
VxVM vxconfigrestore ERROR V-5-1-6012 There are two backups that
have the same diskgroup name with different diskgroup id :
1047336696.19.xxx.veritas.com
1049135264.31.xxx.veritas.com
```

The solution is to specify the disk group by its ID rather than by its name to perform the restoration. The backup file, `/etc/vx/cbr/bk/diskgroup.dgid/dgid.dginfo`, contains a timestamp that records when the backup was taken.

The following is a sample extract from such a backup file that shows the timestamp and disk group ID information:

```
TIMESTAMP
Tue Apr 15 23:27:01 PDT 2003
.
.
.
DISK_GROUP_CONFIGURATION
Group: mydg
dgid: 1047336696.19.xxx.veritas.com
.
.
.
```

Use the timestamp information to decide which backup contains the relevant information, and use the `vxconfigrestore` command to restore the configuration by specifying the disk group ID instead of the disk group name.

6 Error Messages

This chapter provides information on error messages associated with the Veritas Volume Manager (VxVM) configuration daemon (`vxconfigd`), the kernel, and other utilities. It covers most informational, failure, and error messages displayed on the console by `vxconfigd`, and by the Veritas Volume Manager kernel driver, `vxio`. These include some errors that are infrequently encountered and difficult to troubleshoot.

NOTE Some error messages described here may not apply to your system.

Clarifications are included to elaborate on the situation or problem that generated a particular message. Wherever possible, a recovery procedure (*Action*) is provided to help you to locate and correct the problem.

You may find it useful to consult the VxVM command and transaction logs to understand the context in which an error occurred. See Chapter 4, “Logging Commands and Transactions,” on page 61 for more information.

Configuring Logging in the Startup Script

To enable log file or syslog logging, you can edit the following portion of the `/sbin/init.d/vxvm-sysboot` script that starts the VxVM configuration daemon, `vxconfigd`:

```
# comment-out or uncomment any of the following lines to enable or
# disable the corresponding feature in vxconfigd.

#opts="$opts -x syslog"           # use syslog for console messages
#opts="$opts -x log"             # messages to vxconfigd.log
#opts="$opts -x logfile=/foo/bar" # specify an alternate log file
#opts="$opts -x timestamp"       # timestamp console messages

# to turn on debugging console output, uncomment the following line.
# The debug level can be set higher for more output. The highest
# debug level is 9.

#debug=1                         # enable debugging console output
```

Comment or uncomment the lines corresponding to the features that you want to be disabled or enabled at startup. For example, the `opts="$opts -x syslog"` string is usually uncommented so that `vxconfigd` uses syslog logging by default. Inserting a `#` character at the beginning of the line turns off syslog logging for `vxconfigd`.

NOTE By default, `vxconfigd` is started at boot time with the `-xsyslog` option. This redirects `vxconfigd` console messages to syslog. If you want to retain this behavior when restarting `vxconfigd` from the command line, include the `-x syslog` argument, as restarting `vxconfigd` does not preserve the option settings with which it was previously running. Similarly, any VERITAS Volume Manager operations that require `vxconfigd` to be restarted may not retain the behavior that was previously specified by option settings.

For more information on logging options for `vxconfigd`, refer to the `vxconfigd(1M)` manual page.

Understanding Messages

VxVM is fault-tolerant and resolves most problems without system administrator intervention. If the configuration daemon (`vxconfigd`) recognizes the actions that are necessary, it queues up the transactions that are required. VxVM provides atomic changes of system configurations; either a transaction completes fully, or the system is left in the same state as though the transaction was never attempted. If `vxconfigd` is unable to recognize and fix system problems, the system administrator needs to handle the task of problem solving using the diagnostic messages that are returned from the software. The following sections list error messages that may be seen along with a more detailed description of the likely cause of the problem and suggestions for any actions that can be taken.

Messages have the following generic format:

```
product component severity message_number message_text
```

For VERITAS Volume Manager, the product is set to VxVM. The component can be the name of a kernel module or driver such as `vxdmp`, a configuration daemon such as `vxconfigd`, or a command such as `vxassist`.

Messages are divided into the following types of severity in decreasing order of impact on the system:

- **PANIC**

A panic is a severe event as it halts a system during its normal operation. A panic message from the kernel module or from a device driver indicates a hardware problem or software inconsistency so severe that the system cannot continue. The operating system may also provide a dump of the CPU register contents and a stack trace to aid in identifying the cause of the panic. The following is an example of such a message:

```
VxVM vxio PANIC V-5-0-239 Object association depth overflow
```

- **FATAL ERROR**

A fatal error message from a configuration daemon, such as `vxconfigd`, indicates a severe problem with the operation of VxVM that prevents it from running. The following is an example of such a message:

```
VxVM vxconfigd FATAL ERROR V-5-0-591 Disk group bootdg:  
Inconsistency --Not loaded into kernel
```

- **ERROR**

An error message from a command indicates that the requested operation cannot be performed correctly. The following is an example of such a message:

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```
VxVM vxassist ERROR V-5-1-5150 Insufficient number of active
snapshot mirrors in snapshot_volume.
```

- **WARNING**

A warning message from the kernel indicates that a non-critical operation has failed, possibly because some resource is not available or the operation is not possible. The following is an example of such a message:

```
VxVM vxio WARNING V-5-0-55 Cannot find device number for boot_path
```

- **NOTICE**

A notice message indicates that an error has occurred that should be monitored. Shutting down the system is unnecessary, although you may need to take action to remedy the fault at a later date. The following is an example of such a message:

```
VxVM vxio NOTICE V-5-0-252 read error on object subdisk of mirror plex in
volume volume (start offset, length length) corrected.
```

- **INFO**

An informational message does not indicate an error, and requires no action. The unique message number consists of an alpha-numeric string that begins with the letter "V". For example, in the message number, V-5-1-3141, "V" indicates that this is a VERITAS product error message, the first numeric field (5) encodes the product (in this case, VxVM), the second field (1) represents information about the product component, and the third field (3141) is the message index. The text of the error message follows the message number.

Messages

This section contains a list of messages that you may encounter during the operation of VERITAS Volume Manager. However, the list is not exhaustive and the second field may contain the name of different command, driver or module from that shown here.

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.

V-5-0-2

```
VxVM vxio WARNING V-5-0-2 object_type object_name block offset:Uncorrectable
read error ...
```



```
VxVM vxio WARNING V-5-0-2 object_type object_name block offset:Uncorrectable  
write error ...
```

- **Description:** A read or write operation from or to the specified VERITAS Volume Manager object failed. An error is returned to the application.
- **Action:** These errors may represent lost data. Data may need to be restored and failed media may need to be repaired or replaced. Depending on the type of object failing and on the type of recovery suggested for the object type, an appropriate recovery operation may be necessary.

V-5-0-4

```
VxVM vxio WARNING V-5-0-4 Plex plex detached from volume volume
```

- **Description:** An uncorrectable error was detected by the mirroring code and a mirror copy was detached.
- **Action:** To restore redundancy, it may be necessary to add another mirror. The disk on which the failure occurred should be reformatted or replaced.

NOTE This message may also appear during a plex detach operation in a cluster.
In this case, no action is required.

V-5-0-34

```
VxVM vxdmp NOTICE V-5-0-34 added disk array disk_array_serial_number
```

- **Description:** A new disk array has been added to the host.
- **Action:** None.

V-5-0-35

```
VxVM vxdmp NOTICE V-5-0-35 Attempt to disable controller controller_name failed.  
Rootdisk has just one enabled path.
```

- **Description:** An attempt is being made to disable the one remaining active path to the root disk controller.
- **Action:** The path cannot be disabled.

V-5-0-55

```
VxVM vxio WARNING V-5-0-55 Cannot find device number for boot_path
```

- Description: The boot path retrieved from the system PROMs cannot be converted to a valid device number.
- Action: Check your PROM settings for the correct boot string.

V-5-0-106

VxVM vxio WARNING V-5-0-106 detaching RAID-5 volume

- Description: Either a double-failure condition in the RAID-5 volume has been detected in the kernel or some other fatal error is preventing further use of the array.
- Action: If two or more disks have been lost due to a controller or power failure, use the `vxrecover` utility to recover them once they have been re-attached to the system. Check for other console error messages that may provide additional information about the failure.

V-5-0-108

VxVM vxio WARNING V-5-0-108 Device major, minor: Received spurious close

- Description: A close was received for an object that was not open. This can only happen if the operating system is not correctly tracking opens and closes.
- Action: No action is necessary; the system will continue.

V-5-0-110

VxVM vxdmp NOTICE V-5-0-110 disabled controller controller_name connected to disk array disk_array_serial_number

- Description: All paths through the controller connected to the disk array are disabled. This usually happens if a controller is disabled for maintenance.
- Action: None.

V-5-0-111

VxVM vxdmp NOTICE V-5-0-111 disabled dmpnode dmpnode_device_number

- Description: A DMP node has been marked disabled in the DMP database. It will no longer be accessible for further IO requests. This occurs when all paths controlled by a DMP node are in the disabled state, and therefore inaccessible.
- Action: Check hardware or enable the appropriate controllers to enable at least one path under this DMP node.

V-5-0-112

VxVM vxdmp NOTICE V-5-0-112 disabled path path_device_number belonging to dmpnode dmpnode_device_number

- Description: A path has been marked disabled in the DMP database. This path is controlled by the DMP node indicated by the specified device number. This may be due to a hardware failure.
- Action: Check the underlying hardware if you want to recover the desired path.

V-5-0-144

VxVM vxio WARNING V-5-0-144 Double failure condition detected on RAID-5 volume

- Description: I/O errors have been received in more than one column of a RAID-5 volume. This could be caused by:
 - a controller failure making more than a single drive unavailable
 - the loss of a second drive while running in degraded mode
 - two separate disk drives failing simultaneously (unlikely)
- Action: Correct the hardware failures if possible. Then recover the volume using the vxrecover command.

V-5-0-145

VxVM vxio WARNING V-5-0-145 DRL volume volume is detached

- Description: A Dirty Region Logging volume became detached because a DRL log entry could not be written. If this is due to a media failure, other errors may have been logged to the console.
- Action: The volume containing the DRL log continues in operation. If the system fails before the DRL has been repaired, a full recovery of the volume's contents may be necessary and will be performed automatically when the system is restarted. To recover from this error, use the vxassistaddlog command to add a new DRL log to the volume.

V-5-0-146

VxVM vxdmp NOTICE V-5-0-146 enabled controller controller_name connected to disk array disk_array_serial_number

- Description: All paths through the controller connected to the disk array are enabled. This usually happens if a controller is enabled after maintenance.
- Action: None.

V-5-0-147

VxVM vxdmp NOTICE V-5-0-147 enabled dmpnode dmpnode_device_number

- Description: A DMP node has been marked enabled in the DMP database. This happens when at least one path controlled by the DMP node has been enabled.
- Action: None.

V-5-0-148

VxVM vxdmp NOTICE V-5-0-148 enabled path path_device_number belonging to dmpnode dmpnode_device_number

- Description: A path has been marked enabled in the DMP database. This path is controlled by the DMP node indicated by the specified device number. This happens if a previously disabled path has been repaired, the user has reconfigured the DMP database using the `vxdctl(1M)` command, or the DMP database has been reconfigured automatically.
- Action: None.

V-5-0-164

VxVM vxio WARNING V-5-0-164 Failed to join cluster name, aborting

- Description: A node failed to join a cluster. This may be caused by the node being unable to see all the shared disks. Other error messages may provide more information about the disks that cannot be found.
- Action: Use the `vxdisk-slist` command on the master node to see what disks should be visible to the slave node. Then check that the operating system and VxVM on the failed node can also see these disks. If the operating system cannot see the disks, check the cabling and hardware configuration of the node. If only VxVM cannot see the disks, use the `vxdctlenable` command to make it scan again for the disks. When the disks are visible to VxVM on the node, retry the join.

V-5-0-166

VxVM vxio WARNING V-5-0-166 Failed to log the detach of the DRL volume
volume

- Description: An attempt failed to write a kernel log entry indicating the loss of a DRL volume. The attempted write to the log failed either because the kernel log is full, or because of a write error to the drive. The volume becomes detached.

- Action: Messages about log failures are usually fatal, unless the problem is transient. However, the kernel log is sufficiently redundant that such errors are unlikely to occur.

If the problem is not transient (that is, the drive cannot be fixed and brought back online without data loss), recreate the disk group from scratch and restore all of its volumes from backups. Even if the problem is transient, reboot the system after correcting the problem.

If error messages are seen from the disk driver, it is likely that the last copy of the log failed due to a disk error. Replace the failed drive in the disk group. The log re-initializes on the new drive. Finally force the failed volume into an active state and recover the data.

V-5-0-168

VxVM vxio WARNING V-5-0-168 Failure in RAID-5 logging operation

- Description: Indicates that a RAID-5 log has failed.
- Action: To restore RAID-5 logging to a RAID-5 volume, create a new log plex and attach it to the volume.

V-5-0-181

VxVM vxio WARNING V-5-0-181 Illegal vminor encountered

- Description: An attempt was made to open a volume device before vxconfigd loaded the volume configuration.
- Action: None; under normal startup conditions, this message should not occur. If necessary, start VxVM and re-attempt the operation.

V-5-0-194

VxVM vxio WARNING V-5-0-194 Kernel log full: volume detached

- Description: A plex detach failed because the kernel log was full. As a result, the mirrored volume will become detached.
- Action: It is unlikely that this condition ever occurs. The only corrective action is to reboot the system.

V-5-0-196

VxVM vxio WARNING V-5-0-196 Kernel log update failed: volume detached

- Description: Detaching a plex failed because the kernel log could not be flushed to disk. As a result, the mirrored volume became detached. This may be caused by all the disks containing a kernel log going bad.
- Action: Repair or replace the failed disks so that kernel logging can once again function.

V-5-0-207

VxVM vxio WARNING V-5-0-207 log object object_name detached from RAID-5 volume

- Description: Indicates that a RAID-5 log has failed.
- Action: To restore RAID-5 logging to a RAID-5 volume, create a new log plex and attach it to the volume.

V-5-0-216

VxVM vxio WARNING V-5-0-216 mod_install returned errno

- Description: A call made to the operating system mod_install function to load the vxio driver failed.
- Action: Check for additional console messages that may explain why the load failed. Also check the console messages log file for any additional messages that were logged but not displayed on the console.

V-5-0-237

VxVM vxio WARNING V-5-0-237 object subdisk detached from RAID-5 volume at column column offset offset

- Description: A subdisk was detached from a RAID-5 volume because of the failure of a disk or an uncorrectable error occurring on that disk.
- Action: Check for other console error messages indicating the cause of the failure. Replace a failed disk as soon as possible.

V-5-0-243

VxVM vxio WARNING V-5-0-243 Overlapping mirror plex detached from volume volume

- Description: An error has occurred on the last complete plex in a mirrored volume. Any sparse mirrors that map the failing region are detached so that they cannot be accessed to satisfy that failed region inconsistently.
- Action: The message indicates that some data in the failing region may no longer be stored redundantly.

V-5-0-244

VxVM vxdmp NOTICE V-5-0-244 Path failure on major/minor

- Description: A path under the control of the DMP driver failed. The device major and minor numbers of the failed device is supplied in the message.

- Action: None.

V-5-0-249

VxVM vxio WARNING V-5-0-249 RAID-5 volume entering degraded mode operation

- Description: An uncorrectable error has forced a subdisk to detach. At this point, not all data disks exist to provide the data upon request. Instead, parity regions are used to regenerate the data for each stripe in the array. Consequently, access takes longer and involves reading from all drives in the stripe.
- Action: Check for other console error messages that indicate the cause of the failure. Replace any failed disks as soon as possible.

V-5-0-251

VxVM vxio WARNING V-5-0-251 read error on object object of mirror plex in volume volume (start offset length length)

- Description: An error was detected while reading from a mirror. This error may lead to further action shown by later error messages.
- Action: If the volume is mirrored, no further action is necessary since the alternate mirror's contents will be written to the failing mirror; this is often sufficient to correct media failures. If this error occurs often, but never leads to a plex detach, there may be a marginally defective region on the disk at the position indicated. It may eventually be necessary to remove data from this disk (see the `vxevac(1M)` manual page) and then to reformat the drive.

If the volume is not mirrored, this message indicates that some data could not be read. The file system or other application reading the data may report an additional error, but in either event, data has been lost. The volume can be partially salvaged and moved to another location if desired.

NOTE	This message may also appear during a plex detach operation in a cluster. In this case, no action is required.
-------------	--

V-5-0-252

VxVM vxio NOTICE V-5-0-252 read error on object subdisk of mirror plex in volume volume (start offset length length) corrected

- Description: A read error occurred, which caused a read of an alternate mirror and a writeback to the failing region. This writeback was successful and the data was corrected on disk.

- Action: None; the problem was corrected automatically. Note the location of the failure for future reference. If the same region of the subdisk fails again, this may indicate a more insidious failure and the disk should be reformatted at the next reasonable opportunity.

V-5-0-258

```
VxVM vxdmp NOTICE V-5-0-258 removed disk array disk_array_serial_number
```

- Description: A disk array has been disconnected from the host, or some hardware failure has resulted in the disk array becoming inaccessible to the host.
- Action: Replace disk array hardware if this has failed.

V-5-0-386

```
VxVM vxio WARNING V-5-0-386 subdisk subdisk failed in plex plex in volume volume
```

- Description: The kernel has detected a subdisk failure, which may mean that the underlying disk is failing.
- Action: Check for obvious problems with the disk (such as a disconnected cable). If hot-relocation is enabled and the disk is failing, recovery from subdisk failure is handled automatically.

V-5-1-90

```
VxVM vxconfigd ERROR V-5-1-90 mode: Unrecognized operating mode
```

- Description: An invalid string was specified as an argument to the `-m` option. Valid strings are: `enable`, `disable`, and `boot`.
- Action: Supply a correct option argument.

V-5-1-91

```
VxVM vxconfigd WARNING V-5-1-91 Cannot create device device_path: reason
```

- Description: `vxconfigd` cannot create a device node either under `/dev/vx/dsk` or under `/dev/vx/rdsk`. This should happen only if the root file system has run out of inodes.
- Action: Remove some unwanted files from the root file system. Then, regenerate the device node using the command:

```
# vxdctl enable
```

V-5-1-92

```
VxVM vxconfigd WARNING V-5-1-92 Cannot exec /usr/bin/rm to remove directory:  
reason
```


- **Description:** The given directory could not be removed because the `/usr/bin/rm` utility could not be executed by `vxconfigd`. This is not a serious error. The only side effect of a directory not being removed is that the directory and its contents continue to use space in the root file system. However, this does imply that the `/usr` file system is not mounted, or on some systems, that the `rm` utility is missing or is not in its usual location. This may be a serious problem for the general running of your system.
- **Action:** If the `/usr` file system is not mounted, you need to determine how to get it mounted. If the `rm` utility is missing, or is not in the `/usr/bin` directory, restore it.

V-5-1-111

VxVM vxconfigd WARNING V-5-1-111 Cannot fork to remove directory directory:
reason

- **Description:** The given directory could not be removed because `vxconfigd` could not fork in order to run the `rm` utility. This is not a serious error. The only side effect of a directory not being removed is that the directory and its contents will continue to use space in the root file system. The most likely cause for this error is that your system does not have enough memory or paging space to allow `vxconfigd` to fork.
- **Action:** If your system is this low on memory or paging space, your overall system performance is probably substantially degraded. Consider adding more memory or paging space.

V-5-1-116

VxVM vxconfigd WARNING V-5-1-116 Cannot open log file log_filename: reason

- **Description:** The `vxconfigd` console output log file could not be opened for the given reason.
- **Action:** Create any needed directories, or use a different log file path name as described in “Logging Error Messages” on page 77”.

V-5-1-117

VxVM vxconfigd ERROR V-5-1-117 Cannot start volume volume, no valid plexes

- **Description:** This error indicates that the volume cannot be started because it does not contain any valid plexes. This can happen, for example, if disk failures have caused all plexes to be unusable. It can also happen as a result of actions that caused all plexes to become unusable (for example, forcing the dissociation of subdisks or detaching, dissociation, or offlining of plexes).
- **Action:** It is possible that this error results from a drive that failed to spin up. If so, rebooting may fix the problem. If that does not fix the problem, then the only recourse is to repair the disks involved with the plexes and restore the file system from a backup.

V-5-1-121

VxVM vxconfigd NOTICE V-5-1-121 Detached disk disk

- Description: The named disk appears to have become unusable and was detached from its disk group. Additional messages may appear to indicate other records detached as a result of the disk detach.
- Action: If hot-relocation is enabled, VERITAS Volume Manager objects affected by the disk failure are taken care of automatically. Mail is sent to root indicating what actions were taken by VxVM and what further actions the administrator should take.

V-5-1-123

VxVM vxconfigd ERROR V-5-1-123 Disk group group: Disabled by errors

- Description: This message indicates that some error condition has made it impossible for VxVM to continue to manage changes to a disk group. The major reason for this is that too many disks have failed, making it impossible for vxconfigd to continue to update configuration copies. There should be a preceding error message that indicates the specific error that was encountered.

If the disk group that was disabled is the boot disk group, the following additional error is displayed:

```
VxVM vxconfigd ERROR V-5-1-104 All transactions are disabled
```

This additional message indicates that vxconfigd has entered the disabled state, which makes it impossible to change the configuration of any disk group, not just the boot disk group.

- Action: If the underlying error resulted from a transient failure, such as a disk cabling error, then you may be able to repair the situation by rebooting. Otherwise, the disk group configuration may have to be recreated by using the procedures given in “Backing Up a Disk Group Configuration” on page 70”, and the contents of any volumes restored from a backup.

V-5-1-124

VxVM vxconfigd ERROR V-5-1-124 Disk group group: update failed: reason

- Description: I/O failures have prevented vxconfigd from updating any active copies of the disk group configuration. This usually implies a large number of disk failures. This error will usually be followed by the error:

```
VxVM vxconfigd ERROR V-5-1-123 Disk group group: Disabled by errors
```

- Action: If the underlying error resulted from a transient failure, such as a disk cabling error, then you may be able to repair the situation by rebooting. Otherwise, the disk group may have to be recreated and restored from a backup.

V-5-1-134

VxVM vxconfigd ERROR V-5-1-134 Memory allocation failure

- Description: This implies that there is insufficient memory to start VxVM.
- Action: This error should not normally occur, unless your system has very small amounts of memory. Adding swap space will probably not help because this error is most likely to occur early in the boot sequence, before swap areas have been added.

V-5-1-135

VxVM vxconfigd FATAL ERROR V-5-1-135 Memory allocation failure during startup

- Description: This implies that there is insufficient memory to start up VxVM.
- Action: This error should not normally occur, unless your system has very small amounts of memory. Adding swap space probably will not help, because this error is most likely to occur early in the boot sequence, before swap areas have been added.

V-5-1-148

VxVM vxconfigd ERROR V-5-1-148 System startup failed

- Description: Either the root or the `/usr` file system volume could not be started, rendering the system unusable. The error that resulted in this condition should appear prior to this error message.
- Action: Look up other error messages appearing on the console and take the actions suggested in the descriptions of those messages.

V-5-1-169

VxVM vxconfigd ERROR V-5-1-169 cannot open `/dev/vx/config`: reason

- Description: The `/dev/vx/config` device could not be opened. `vxconfigd` uses this device to communicate with the VERITAS Volume Manager kernel drivers. The most likely reason is "Device is already open." This indicates that some process (most likely `vxconfigd`) already has `/dev/vx/config` open. Less likely reasons are "No such file or directory" or "No such device or address." For either of these reasons, likely causes are:
 - The VERITAS Volume Manager package installation did not complete correctly.

- The device node was removed by the administrator or by an errant shell script.
- Action: If the reason is "Device is already open," stop or kill the old `vxconfigd` by running the command:

```
# vxdctl -k stop
```

For other failure reasons, consider re-adding the base VERITAS Volume Manager package. This will reconfigure the device node and re-install the VERITAS Volume Manager kernel device drivers. See the VERITAS Volume Manager 3.5 for HP-UX Release Notes for information on how to add the package. If you cannot re-add the package, contact VERITAS Technical Support for more information.

```
VxVM vxconfigd ERROR V-5-1-169 Cannot open /etc/fstab: reason
```

- Description: `vxconfigd` could not open the `/etc/fstab` file, for the reason given. The `/etc/fstab` file is used to determine which volume (if any) to use for the `/usr` file system.
- Action: This error implies that your root file system is currently unusable. You may be able to repair the root file system by mounting it after booting from a network or CD-ROM root file system. If the root file system is defined on a volume, then see the procedures defined for recovering from a failed root file system in "Recovery from Boot Disk Failure" on page 51".

V-5-1-249

```
VxVM vxconfigd NOTICE V-5-1-249 Volume volume entering degraded mode
```

- Description: Detaching a subdisk in the named RAID-5 volume has caused the volume to enter "degraded" mode. While in degraded mode, performance of the RAID-5 volume is substantially reduced. More importantly, failure of another subdisk may leave the RAID-5 volume unusable. Also, if the RAID-5 volume does not have an active log, then failure of the system may leave the volume unusable.
- Action: If hot-relocation is enabled, VERITAS Volume Manager objects affected by the disk failure are taken care of automatically. Mail is sent to root indicating what actions were taken by VxVM and what further actions the administrator should take.

V-5-1-480

```
VxVM vxconfigd ERROR V-5-1-480 Cannot reset VxVM kernel: reason
```

- Description: The `-r` reset option was specified to `vxconfigd`, but the VxVM kernel drivers could not be reset. The most common reason is "A virtual disk device is open." This implies that a VxVM tracing or volume device is open.

- Action: If you want to reset the kernel devices, track down and kill all processes that have a volume or VERITAS Volume Manager tracing device open. Also, if any volumes are mounted as file systems, unmount those file systems.

Any reason other than "A virtual disk device is open" does not normally occur unless there is a bug in the operating system or in VxVM.

V-5-1-484

VxVM vxconfigd ERROR V-5-1-484 Cannot start volume volume, no valid complete plexes

- Description: These errors indicate that the volume cannot be started because the volume contains no valid complete plexes. This can happen, for example, if disk failures have caused all plexes to be unusable. It can also happen as a result of actions that caused all plexes to become unusable (for example, forcing the dissociation of subdisks or detaching, dissociation, or offlining of plexes).
- Action: It is possible that this error results from a drive that failed to spin up. If so, rebooting may fix the problem. If that does not fix the problem, then the only recourse is to repair the disks involved with the plexes and restore the file system from a backup.

V-5-1-525

VxVM vxconfigd NOTICE V-5-1-525 Detached log for volume volume

- Description: The DRL or RAID-5 log for the named volume was detached as a result of a disk failure, or as a result of the administrator removing a disk with `vx dg-k rmdisk`. A failing disk is indicated by a "Detached disk" message.
- Action: If the log is mirrored, hot-relocation tries to relocate the failed log automatically. Use either `vxplexdis` or `vxssddis` to remove the failing logs. Then, use `vxassistaddlog` (see the `vxassist(1M)` manual page) to add a new log to the volume.

V-5-1-526

VxVM vxconfigd NOTICE V-5-1-526 Detached plex plex in volume volume

- Description: The specified plex was disabled as a result of a disk failure, or as a result of the administrator removing a disk with `vx dg-k rmdisk`. A failing disk is indicated by a "Detached disk" message.
- Action: If hot-relocation is enabled, VERITAS Volume Manager objects affected by the disk failure are taken care of automatically. Mail is sent to root indicating what actions were taken by VxVM and what further actions the administrator should take.

V-5-1-527

VxVM vxconfigd NOTICE V-5-1-527 Detached subdisk subdisk in volume volume

- Description: The specified subdisk was disabled as a result of a disk failure, or as a result of the administrator removing a disk with `vx dg -krmdisk`. A failing disk is indicated by a "Detached disk" message.
- Action: If hot-relocation is enabled, VERITAS Volume Manager objects affected by the disk failure are taken care of automatically. Mail is sent to root indicating what actions were taken by VxVM and what further actions the administrator should take.

V-5-1-528

VxVM vxconfigd NOTICE V-5-1-528 Detached volume volume

- Description: The specified volume was detached as a result of a disk failure, or as a result of the administrator removing a disk with `vx dg -krmdisk`. A failing disk is indicated by a "Detached disk" message. Unless the disk error is transient and can be fixed with a reboot, the contents of the volume should be considered lost.
- Action: Contact VERITAS Technical Support.

V-5-1-543

VxVM vxconfigd ERROR V-5-1-543 Differing version of vxconfigd installed

- Description: A `vxconfigd` daemon was started after stopping an earlier `vxconfigd` with a non-matching version number. This can happen, for example, if you upgrade VxVM and then run `vxconfigd` without first rebooting.
- Action: Reboot the system.

V-5-1-544

VxVM vxconfigd WARNING V-5-1-544 Disk disk in group group flagged as shared; Disk skipped

- Description: The given disk is listed as shared, but the running version of VxVM does not support shared disk groups.
- Action: This message can usually be ignored. If you want to use the disk on this system, use `vx diskadd` to add the disk. Do not do this if the disk really is shared with other systems.

V-5-1-545

VxVM vxconfigd WARNING V-5-1-545 Disk disk in group group locked by host hostid
Disk skipped

- Description: The given disk is listed as locked by the host with the VERITAS Volume Manager host ID (usually the same as the system host name)
- Action: This message can usually be ignored. If you want to use the disk on this system, use `vxdiskadd` to add the disk. Do not do this if the disk really is shared with other systems.

V-5-1-546

VxVM vxconfigd WARNING V-5-1-546 Disk disk in group group: Disk device not found

- Description: No physical disk can be found that matches the named disk in the given disk group. This is equivalent to failure of that disk. (Physical disks are located by matching the disk IDs in the disk group configuration records against the disk IDs stored in the VERITAS Volume Manager header on the physical disks.) This error message is displayed for any disk IDs in the configuration that are not located in the disk header of any physical disk. This may result from a transient failure such as a poorly-attached cable, or from a disk that fails to spin up fast enough. Alternately, this may happen as a result of a disk being physically removed from the system, or from a disk that has become unusable due to a head crash or electronics failure.

Any RAID-5 plexes, DRL log plexes, RAID-5 subdisks or mirrored plexes containing subdisks on this disk are unusable. Such disk failures (particularly on multiple disks) may cause one or more volumes to become unusable.

- Action: If hot-relocation is enabled, VERITAS Volume Manager objects affected by the disk failure are taken care of automatically. Mail is sent to root indicating what actions were taken by VxVM and what further actions the administrator should take.

V-5-1-554

VxVM vxconfigd WARNING V-5-1-554 Disk disk names group group, but group ID differs

- Description: As part of a disk group import, a disk was discovered that had a mismatched disk group name and disk group ID. This disk is not imported. This can only happen if two disk groups have the same name but have different disk group ID values. In such a case, one group is imported along with all its disks and the other group is not. This message appears for disks in the un-selected group.

Understanding Messages

- **Action:** If the disks should be imported into the group, this must be done by adding the disk to the group at a later stage, during which all configuration information for the disk is lost.

V-5-1-557

```
VxVM vxconfigd ERROR V-5-1-557 Disk disk, group group, device device:
```

```
not updated with new host ID
```

```
Error: reason
```

- **Description:** This can result from using `vxctlhostid` to change the VERITAS Volume Manager host ID for the system. The error indicates that one of the disks in a disk group could not be updated with the new host ID. This usually indicates that the disk has become inaccessible or has failed in some other way.
- **Action:** Try running the following command to determine whether the disk is still operational:

```
# vxdisk check device
```

If the disk is no longer operational, `vxdisk` should print a message such as:

```
device: Error: Disk write failure
```

This will result in the disk being taken out of active use in its disk group, if it has not already been taken out of use. If the disk is still operational, which should not be the case, `vxdisk` prints:

```
device: Okay
```

If the disk is listed as "Okay," try running `vxctlhostid` again. If it still results in an error, contact VERITAS Technical Support.

V-5-1-568

```
VxVM vxconfigd WARNING V-5-1-568 Disk group group is disabled, disks not updated with new host ID
```

- **Description:** As a result of failures, the named disk group has become disabled. Earlier error messages should indicate the cause. This message indicates that disks in that disk group were not updated with a new VERITAS Volume Manager host ID. This warning message should result only from a `vxctlhostid` operation.
- **Action:** Typically, unless a disk group was disabled due to transient errors, there is no way to repair a disabled disk group. The disk group may have to be reconstructed from scratch. If the disk group was disabled due to a transient error such as a cabling problem, then a

future reboot may not automatically import the named disk group, due to the change in the system's VERITAS Volume Manager host ID. In such a case, import the disk group directly using `vxdgimport` with the `-C` option.

V-5-1-569

```
VxVM vxconfigd ERROR V-5-1-569 Disk group group, Disk disk: Cannot auto-import  
group: reason
```

- **Description:** On system startup, `vxconfigd` failed to import the disk group associated with the named disk. A message related to the specific failure is given in reason. Additional error messages may be displayed that give more information on the specific error. In particular, this is often followed by:

```
VxVM vxconfigd ERROR V-5-1-579 Disk group group: Errors in some  
configuration copies:  
Disk device, copy number: Block bno: error ...
```

The most common reason for auto-import failures is excessive numbers of disk failures, making it impossible for VxVM to find correct copies of the disk group configuration database and kernel update log. Disk groups usually have enough copies of this configuration information to make such import failures unlikely.

A more serious failure is indicated by errors such as:

```
Configuration records are inconsistent  
Disk group has no valid configuration copies  
Duplicate record in configuration  
Format error in configuration copy  
Invalid block number  
Invalid magic number
```

These errors indicate that all configuration copies have become corrupt (due to disk failures, writing on the disk by an application or the administrator, or bugs in VxVM).

Some correctable errors may be indicated by other error messages that appear in conjunction with the auto-import failure message. Look up those other errors for more information on their cause.

Failure of an auto-import implies that the volumes in that disk group will not be available for use. If there are file systems on those volumes, then the system may yield further errors resulting from inability to access the volume when mounting the file system.

Error Messages

Understanding Messages

- **Action:** If the error is clearly caused by excessive disk failures, then you may have to recreate the disk group configuration by using the procedures given in “Restoring a Disk Group Configuration” on page 71” , and restore contents of any volumes from a backup. There may be other error messages that appear which provide further information. See those other error messages for more information on how to proceed. If those errors do not make it clear how to proceed, contact VERITAS Technical Support.

V-5-1-571

VxVM vxconfigd ERROR V-5-1-571 Disk group group, Disk disk: Skip disk group with duplicate name

- **Description:** Two disk groups with the same name are tagged for auto-importing by the same host. Disk groups are identified both by a simple name and by a long unique identifier (disk group ID) assigned when the disk group is created. Thus, this error indicates that two disks indicate the same disk group name but a different disk group ID.

VxVM does not allow you to create a disk group or import a disk group from another machine, if that would cause a collision with a disk group that is already imported. Therefore, this error is unlikely to occur under normal use. However, this error can occur in the following two cases:

- A disk group cannot be auto-imported due to some temporary failure. If you create a new disk group with the same name as the failed disk group and reboot, the new disk group is imported first. The auto-import of the older disk group fails because more recently modified disk groups have precedence over older disk groups.
 - A disk group is deported from one host using the `-h` option to cause the disk group to be auto-imported on reboot from another host. If the second host was already auto-importing a disk group with the same name, then reboot of that host will yield this error.
- **Action:** If you want to import both disk groups, then rename the second disk group on import. See the `vxldg(1M)` manual page for information on how to use the import operation to rename a disk group.

V-5-1-577

VxVM vxconfigd WARNING V-5-1-577 Disk group group: Disk group log may be too small
Log size should be at least number blocks

- **Description:** The log areas for the disk group have become too small for the size of configuration currently in the group. This message only occurs during disk group import; it can only occur if the disk was inaccessible while new database objects were added to the

configuration, and the disk was then made accessible and the system restarted. This should not normally happen without first displaying a message about the database area size.

- **Action:** Reinitialize the disks in the group with larger log areas. Note that this requires that you restore data on the disks from backups. See the `vxdisk(1M)` manual page. To reinitialize all of the disks, detach them from the group with which they are associated, reinitialize and re-add them. Then deport and re-import the disk group to effect the changes to the log areas for the group.

V-5-1-579

VxVM vxconfigd ERROR V-5-1-579 Disk group group: Errors in some configuration copies: Disk disk, copy number: [Block number]: reason ...

- **Description:** During a failed disk group import, some of the configuration copies in the named disk group were found to have format or other types of errors which make those copies unusable. This message lists all configuration copies that have uncorrected errors, including any appropriate logical block number. If no other reasons are displayed, then this may be the cause of the disk group import failure.
- **Action:** If some of the copies failed due to transient errors (such as cable failures), then a reboot or re-import may succeed in importing the disk group. Otherwise, the disk group configuration may have to be restored. You can recreate a disk group configuration by using the procedures given in “Restoring a Disk Group Configuration” on page 71 “.

V-5-1-583

VxVM vxconfigd ERROR V-5-1-583 Disk group group: Reimport of disk group failed: reason

- **Description:** After `vxconfigd` was stopped and restarted (or disabled and then enabled), VxVM failed to recreate the import of the indicated disk group. The reason for failure is specified. Additional error messages may be displayed that give further information describing the problem.
- **Action:** A major cause for this kind of failure is disk failures that were not addressed before `vxconfigd` was stopped or disabled. If the problem is a transient disk failure, then rebooting may take care of the condition. The error may be accompanied by messages such as “Disk group has no valid configuration copies.” This indicates that the disk group configuration copies have become corrupt (due to disk failures, writing on the disk by an application or the administrator, or bugs in VxVM). You can recreate a disk group configuration by using the procedures given in “Restoring a Disk Group Configuration” on page 71“.

V-5-1-587

VxVM vxdg ERROR V-5-1-587 disk group groupname: import failed: reason

- **Description:** The import of a disk group failed for the specified reason
- **Action:** The action to be taken depends on the reason given in the error message:

Disk is in use by another host

No valid disk found containing disk group

The first message indicates that disks have been moved from a system that has crashed or that failed to detect the group before the disk was moved. The locks stored on the disks must be cleared.

The second message indicates that the disk group does not contain any valid disks (not that it does not contain any disks). The disks may be considered invalid due to a mismatch between the host ID in their configuration copies and that stored in the

/etc/vx/volboot file.

To clear locks on a specific set of devices, use the following command:

```
# vxdisk clearimport devicename ...
```

To clear the locks during import, use the following command:

```
# vxdg -C import diskgroup
```

CAUTION Be careful when using the `vxdiskclearimport` or `vxdg-Cimport` command on systems that have dual-ported disks. Clearing the locks allows those disks to be accessed at the same time from multiple hosts and can result in corrupted data.

An import operation fails if some disks for the disk group cannot be found among the disk drives attached to the system.

Disk for disk group not found

Disk group has no valid configuration copies

The first message indicates a recoverable error.

The second message indicates a fatal error that requires hardware repair or the creation of a new disk group, and recovery of the disk group configuration and data:

If some of the disks in the disk group have failed, you can force the disk group to be imported with this command:

```
# vxdg -f import diskgroup
```

CAUTION Be careful when using the `-f` option. It can cause the same disk group to be imported twice from different sets of disks, causing the disk group to become inconsistent.

These operations can also be performed using the `vxdiskadm` utility. To deport a disk group using `vxdiskadm`, select menu item 8 (Remove access to (deport) a disk group). To import a disk group, select item 7 (Enable access to (import) a disk group). The `vxdiskadmimport` operation checks for host import locks and prompts to see if you want to clear any that are found. It also starts volumes in the disk group.

V-5-1-663

```
VxVM vxconfigd WARNING V-5-1-663 Group group: Duplicate virtual device
number(s):
```

```
Volume volume remapped from major,minor to major,minor ...
```

- **Description:** The configuration of the named disk group includes conflicting device numbers. A disk group configuration lists the recommended device number to use for each volume in the disk group. If two volumes in two disk groups happen to list the same device number, then one of the volumes must use an alternate device number. This is called device number remapping. Remapping is a temporary change to a volume. If the other disk group is deported and the system is rebooted, then the volume that was remapped may no longer be remapped. Also, volumes that are remapped once are not guaranteed to be remapped to the same device number in further reboots.
- **Action:** Use the `vxdgremminor` command to renumber all volumes in the offending disk group permanently. See the `vxdg(1M)` manual page for more information.

V-5-1-737

```
VxVM vxconfigd ERROR V-5-1-737 Mount point path: volume not in bootdg disk group
```

- **Description:** The volume device listed in the `/etc/fstab` file for the given mount-point directory (normally `/usr`) is listed as in a disk group other than the boot disk group. This error should not occur if the standard VERITAS Volume Manager procedures are used for encapsulating the disk containing the `/usr` file system.
- **Action:** Boot VxVM from a network or CD-ROM mounted root file system. Then, start up VxVM using `fixmountroot` on a valid mirror disk of the root file system. After starting VxVM, mount the root file system volume and edit the `/etc/fstab` file. Change the file to use a direct partition for the file system. There should be a comment in the `/etc/fstab` file that indicates which partition to use.

V-5-1-768

VxVM vxconfigd NOTICE V-5-1-768 Offlining config copy number on disk disk:
Reason: reason

- Description: An I/O error caused the indicated configuration copy to be disabled. This is a notice only, and does not normally imply serious problems, unless this is the last active configuration copy in the disk group.
- Action: Consider replacing the indicated disk, since this error implies that the disk has deteriorated to the point where write errors cannot be repaired automatically. The error can also result from transient problems with cabling or power.

V-5-1-809

VxVM vxplex ERROR V-5-1-809 Plex plex in volume volume is locked by
another utility.

- Description: The `vxplex` command fails because a previous operation to attach a plex did not complete. The `vxprint` command should show that one or both of the temporary and persistent utility fields (TUTIL0 and PUTIL0) of the volume and one of its plexes are set.
- Action: If the `vxtasklist` command does not show a task running for the volume, use the `vxmend` command to clear the TUTIL0 and PUTIL0 fields for the volume and all its components for which these fields are set:

```
# vxmend -g diskgroup clear all volume plex ...
```

V-5-1-923

VxVM vxplex ERROR V-5-1-923 Record volume is in disk group diskgroup1
plex is in group diskgroup2.

- Description: An attempt was made to snap back a plex from a different disk group.
- Action: Move the snapshot volume into the same disk group as the original volume.

V-5-1-1171

VxVM vxconfigd ERROR V-5-1-1171 Version number of kernel does not
match vxconfigd

- Description: The release of `vxconfigd` does not match the release of the VERITAS Volume Manager kernel drivers. This should happen only as a result of upgrading VxVM, and then running `vxconfigd` without a reboot.
- Action: Reboot the system. If that does not cure the problem, re-add the VxVM packages.

V-5-1-1186

VxVM vxconfigd ERROR V-5-1-1186 Volume volume for mount point /usr not found in bootdg disk group

- **Description:** The system is configured to boot with /usr mounted on a volume, but the volume associated with /usr is not listed in the configuration of the boot disk group. There are two possible causes of this error:
 - **Case 1:** The /etc/fstab file was erroneously updated to indicate the device for the /usr file system is a volume, but the volume named is not in the boot disk group. This should happen only as a result of direct manipulation by the administrator.
 - **Case 2:** The system somehow has a duplicate boot disk group, one of which contains the /usr file system volume and one of which does not (or uses a different volume name), and vxconfigd somehow chose the wrong boot disk group. Since vxconfigd chooses the more recently accessed version of the boot disk group, this error can happen if the system clock was updated incorrectly at some point (causing the apparent access order of the two disk groups to be reversed). This can also happen if some disk group was deported and assigned the same name as the boot disk group with locks given to this host.
- **Action:** In case 1, boot the system on a CD-ROM or networking-mounted root file system. If the root file system is defined on a volume, then start and mount the root volume. If the root file system is not defined on a volume, mount the root file system directly. Edit the /etc/fstab file to correct the entry for the /usr file system.

In case 2, either boot with all drives in the offending version of the boot disk group turned off, or import and rename (see vxdbg(1M)) the offending boot disk group from another host. If you turn off drives, run the following command after booting:

```
# vxdbg flush bootdg
```

This updates time stamps on the imported version of the boot disk group, bootdg, which should make the correct version appear to be the more recently accessed. If this does not correct the problem, contact VERITAS Technical Support.

V-5-1-1589

VxVM vxconfigd ERROR V-5-1-1589 enable failed: aborting

- **Description:** Regular startup of vxconfigd failed. This error can also result from the command vxdetlenable.
- **Action:** The failure was fatal and vxconfigd was forced to exit. The most likely cause is that the operating system is unable to create interprocess communication channels to other utilities.

Error Messages

Understanding Messages

```
VxVM vxconfigd ERROR V-5-1-1589 enable failed: Error check group
configuration copies. Database file not found
```

- **Description:** Regular startup of `vxconfigd` failed. This error can also result from the command `vxctlenable`.

The directory `/var/vxvm/tempdb` is inaccessible. This may be because of root file system corruption, if the root file system is full, or if `/var` is a separate file system, because it has become corrupted or has not been mounted.

- **Action:** If the root file system is full, increase its size or remove files to make space for the `tempdb` file.

If `/var` is a separate file system, make sure that it has an entry in `/etc/fstab`. Otherwise, look for I/O error messages during the boot process that indicate either a hardware problem or misconfiguration of any logical volume management software being used for the `/var` file system. Also verify that the encapsulation (if configured) of your boot disk is complete and correct.

```
VxVM vxconfigd ERROR V-5-1-1589 enable failed: transactions are
disabled
```

- **Description:** Regular startup of `vxconfigd` failed. This error can also result from the command `vxctlenable`.

`vxconfigd` is continuing to run, but no configuration updates are possible until the error condition is repaired.

Additionally, this may be followed with:

```
VxVM vxconfigd ERROR V-5-1-579 Disk group group: Errors in some configuration
copies: Disk device, copy number: Block bno: error ...
```

Other error messages may be displayed that further indicate the underlying problem.

- **Action:** Evaluate the error messages to determine the root cause of the problem. Make changes suggested by the errors and then try rerunning the command.

If the "Errors in some configuration copies" error occurs again, that may indicate the real problem lies with the configuration copies in the disk group. You can recreate a disk group configuration by using the procedures given in "Restoring a Disk Group Configuration" on page 71".

V-5-1-2020

```
VxVM vxconfigd ERROR V-5-1-2020 Cannot kill existing daemon, pid=process_ID
```


- Description: The `-k` (kill existing `vxconfigd` process) option was specified, but a running configuration daemon process could not be killed. A configuration daemon process, for purposes of this discussion, is any process that opens the `/dev/vx/config` device (only one process can open that device at a time). If there is a configuration daemon process already running, then the `-k` option causes a SIGKILL signal to be sent to that process. If, within a certain period of time, there is still a running configuration daemon process, the above error message is displayed.
- Action: This error can result from a kernel error that has made the configuration daemon process unkillable, from some other kind of kernel error, or from some other user starting another configuration daemon process after the SIGKILL signal. This last condition can be tested for by running `vxconfigd-k` again. If the error message reappears, contact VERITAS Technical Support.

V-5-1-2197

VxVM vxconfigd ERROR V-5-1-2197 node N: missing vxconfigd

- Description: The `vxconfigd` daemon is not running on the indicated cluster node.
- Action: Restart the `vxconfigd` daemon.

V-5-1-2198

VxVM vxconfigd ERROR V-5-1-2198 node N: vxconfigd not ready

- Description: The `vxconfigd` daemon is not responding properly in a cluster.
- Action: Stop and restart the `vxconfigd` daemon on the node indicated.

V-5-1-2274

VxVM vxconfigd ERROR V-5-1-2274 volume:vxconfigd cannot boot-start RAID-5 volumes

- Description: A volume that `vxconfigd` should start immediately upon booting the system (that is, the volume for the `/usr` file system) has a RAID-5 layout. The `/usr` file system should never be defined on a RAID-5 volume.
- Action: It is likely that the only recovery for this is to boot VxVM from a network-mounted root file system, and reconfigure the `/usr` file system to be defined on a regular non-RAID-5 volume.

V-5-1-2290

VxVM vxdmpadm ERROR V-5-1-2290 Attempt to enable a controller that is not available

- **Description:** This message is returned by the `vxmpadm` utility when an attempt is made to enable a controller that is not working or is not physically present.
- **Action:** Check hardware and see if the controller is present and whether I/O can be performed through it.

V-5-1-2353

```
VxVM vxconfigd ERROR V-5-1-2353 Disk group group: Cannot recover temp
database: reason
```

Consider use of "`vxconfigd -x cleartempdir`" [see `vxconfigd(1M)`].

- **Description:** This can happen if you kill and restart `vxconfigd`, or if you disable and enable it with `vxctlisable` and `vxctlenable`. This error indicates a failure related to reading the file `/var/vxvm/tempdb/group`. This is a temporary file used to store information that is used when recovering the state of an earlier `vxconfigd`. The file is recreated on a reboot, so this error should never survive a reboot.
- **Action:** If you can reboot, do so. If you do not want to reboot, then do the following:

1. Ensure that no `vxvol`, `vxplex`, or `vxsd` processes are running.

Use `ps-e` to search for such processes, and use `kill` to kill any that you find. You may have to run `kill` twice to make these processes go away. Killing utilities in this way may make it difficult to make administrative changes to some volumes until the system is rebooted.

2. Recreate the temporary database files for all imported disk groups using the following command:

```
# vxconfigd -x cleartempdir 2> /dev/console
```

The `vxvol`, `vxplex`, and `vxsd` commands make use of these `tempdb` files to communicate locking information. If the file is cleared, then locking information can be lost. Without this locking information, two utilities can end up making incompatible changes to the configuration of a volume.

V-5-1-2524

```
VxVM vxconfigd ERROR V-5-1:2524 VOL_IO_DAEMON_SET failed: daemon count
must be above N while cluster
```

- **Description:** The number of VERITAS Volume Manager kernel daemons (`vxiod`) is less than the minimum number needed to join a cluster.
- **Action:** Increase the number of daemons using `vxiod`.

V-5-1-2630

VxVM vxconfigd WARNING V-5-1-2630 library and vxconfigd disagree on existence of client number

- Description: This warning may safely be ignored.
- Action: None required.

V-5-1-2824

VxVM vxconfigd ERROR V-5-1-2824 Configuration daemon error 242

- Description: A node failed to join a cluster, or a cluster join is taking too long. If the join fails, the node retries the join automatically.
- Action: No action is necessary if the join is slow or a retry eventually succeeds.

V-5-1-2829

VxVM vxdg ERROR V-5-1-2829 diskgroup: Disk group version doesn't support feature ; see the vxdg upgrade command

- Description: The version of the specified disk group does not support disk group move, split or join operations.
- Action: Use the vxdg upgrade diskgroup command to update the disk group version.

V-5-1-2830

VxVM vxconfigd ERROR V-5-1-2830 Disk reserved by other host

- Description: An attempt was made to online a disk whose controller has been reserved by another host in the cluster.
- Action: No action is necessary. The cluster manager frees the disk and VxVM puts it online when the node joins the cluster.

V-5-1-2860

VxVM vxdg ERROR V-5-1-2860 Transaction already in progress

- Description: One of the disk groups specified in a disk group move, split or join operation is currently involved in another unrelated disk group move, split or join operation (possibly as the result of recovery from a system failure).

- Action: Use the `vxprint` command to display the status of the disk groups involved. If `vxprint` shows that the `TUTIL0` field for a disk group is set to `MOVE`, and you are certain that no disk group move, split or join should be in progress, use the `vxdbg` command to clear the field as described in “Recovering from Incomplete Disk Group Moves” on page 32”. Otherwise, retry the operation.

V-5-1-2862

VxVM vxdbg ERROR V-5-1-2862 object: Operation is not supported

- Description: DCO and snap objects dissociated by Persistent FastResync, and VVR objects cannot be moved between disk groups.
- Action: None. The operation is not supported.

V-5-1-2866

VxVM vxdbg ERROR V-5-1-2866 object: Record already exists in disk group

- Description: A disk group join operation failed because the name of an object in one disk group is the same as the name of an object in the other disk group. Such name clashes are most likely to occur for snap objects and snapshot plexes.
- Action: Use the following command to change the object name in either one of the disk groups:

```
# vxedit -g diskgroup rename old_name new_name
```

For more information about using the `vxedit` command, see the `vxedit(1M)` manual page.

V-5-1-2870

VxVM vxdbg ERROR V-5-1-2870 volume: Volume or plex device is open or mounted

- Description: An attempt was made to perform a disk group move, split or join on a disk group containing an open volume.
- Action: It is most likely that a file system configured on the volume is still mounted. Stop applications that access volumes configured in the disk group, and unmount any file systems configured in the volumes.

V-5-1-2879

VxVM vxdbg ERROR V-5-1-2879 subdisk: Record is associated

- Description: The named subdisk is not a top-level object.

- Action: Objects specified for a disk group move, split or join must be either disks or top-level volumes.

V-5-1-2907

VxVM vxdg ERROR V-5-1-2907 diskgroup: Disk group does not exist

- Description: The disk group does not exist or is not imported
- Action: Use the correct name, or import the disk group and try again.

V-5-1-2908

VxVM vxdg ERROR V-5-1-2908 diskdevice: Request crosses disk group boundary

- Description: The specified disk device is not configured in the source disk group for a disk group move or split operation.
- Action: Correct the name of the disk object specified in the disk group move or split operation.

V-5-1-2911

VxVM vxdg ERROR V-5-1-2911 diskname: Disk is not usable

- Description: The specified disk has become unusable.
- Action: Do not include the disk in any disk group move, split or join operation until it has been replaced or repaired.

V-5-1-2922

VxVM vxconfigd ERROR V-5-1-2922 Disk group exists and is imported

- Description: A slave tried to join a cluster, but a shared disk group already exists in the cluster with the same name as one of its private disk groups.
- Action: Use the `vxdg -n newname import diskgroup` operation to rename either the shared disk group on the master, or the private disk group on the slave.

V-5-1-2928

VxVM vxdg ERROR V-5-1-2928 diskgroup: Configuration too large for configuration copies

- Description: The disk group's configuration database is too small to hold the expanded configuration after a disk group move or join operation.
- Action: None.

V-5-1-2933

VxVM vxdg ERROR V-5-1-2933 diskgroup: Cannot remove last disk group configuration copy

- Description: The requested disk group move, split or join operation would leave the disk group without any configuration copies.
- Action: None. The operation is not supported.

V-5-1-3009

VxVM vxdg ERROR V-5-1-3009 object: Name conflicts with imported diskgroup

- Description: The target disk group of a split operation already exists as an imported disk group.
- Action: Choose a different name for the target disk group.

V-5-1-3020

VxVM vxconfigd ERROR V-5-1-3020 Error in cluster processing

- Description: This may be due to an operation inconsistent with the current state of a cluster (such as an attempt to import or deport a shared disk group to or from the slave). It may also be caused by an unexpected sequence of commands from vxclust.
- Action: Perform the operation from the master node.

V-5-1-3022

VxVM vxconfigd ERROR V-5-1-3022 Cannot find disk on slave node

- Description: A slave node in a cluster cannot find a shared disk. This is accompanied by the syslog message:

```
VxVM vxconfigd ERROR V-5-1-2173 cannot find disk disk
```

- Action: Make sure that the same set of shared disks is online on both nodes. Examine the disks on both the master and the slave with the command `vxdisklist` and make sure that the same set of disks with the shared flag is visible on both nodes. If not, check the connections to the disks.

V-5-1-3023

VxVM vxconfigd ERROR V-5-1-3023 Disk in use by another cluster

- Description: An attempt was made to import a disk group whose disks are stamped with the ID of another cluster.

- Action: If the disk group is not imported by another cluster, retry the import using the -C (clear import) flag.

V-5-1-3024

VxVM vxconfigd ERROR V-5-1-3024 vxclust not there

- Description: An error during an attempt to join a cluster caused `vxclust` to fail. This may be caused by the failure of another node during a join or by the failure of `vxclust`.
- Action: Retry the join. An error message on the other node may clarify the problem.

V-5-1-3025

VxVM vxconfigd ERROR V-5-1-3025 Unable to add portal for cluster

- Description: `vxconfigd` was not able to create a portal for communication with the

- Action: Before retrying the join, use `vxchgremisor` (see the `vxchg(1M)` manual page) to choose a new minor number range either for the disk group on the master or for the conflicting disk group on the slave. If there are open volumes in the disk group, the `remisor` operation will not take effect until the disk group is deported and updated (either explicitly or by rebooting the system).

V-5-1-3032

VxVM vxconfigd ERROR V-5-1-3032 Master sent no data

- Description: During the slave join protocol, a message without data was received from the master. This message is only likely to be seen in the case of an internal VxVM error.
- Action: Contact VERITAS Technical Support.

V-5-1-3033

VxVM vxconfigd ERROR V-5-1-3033 Join in progress

- Description: An attempt was made to import or deport a shared disk group during a cluster reconfiguration.
- Action: Retry when the cluster reconfiguration has completed.

V-5-1-3034

VxVM vxconfigd ERROR V-5-1-3034 Join not currently allowed

- Description: A slave attempted to join a cluster when the master was not ready. The slave will retry automatically.
- Action: No action is necessary if the join eventually completes. Otherwise, investigate the cluster monitor on the master.

V-5-1-3042

VxVM vxconfigd ERROR V-5-1-3042 Clustering license restricts operation

- Description: An operation requiring a full clustering license was attempted, and such a license is not available.
- Action: If the error occurs when a disk group is being activated, dissociate all but one plex from mirrored volumes before activating the disk group. If the error occurs during a transaction, deactivate the disk group on all nodes except the master.

V-5-1-3046

VxVM vxconfigd ERROR V-5-1-3046 Node activation conflict

- Description: The disk group could not be activated because it is activated in a conflicting mode on another node in a cluster.
- Action: Retry later, or deactivate the disk group on conflicting nodes.

V-5-1-3049

VxVM vxconfigd ERROR V-5-1-3049 Retry rolling upgrade

- Description: An attempt was made to upgrade a cluster to a higher protocol version when a transaction was in progress.
- Action: Retry the upgrade at a later time.

V-5-1-3050

VxVM vxconfigd ERROR V-5-1-3050 Version out of range for at least one node

- Description: Before trying to upgrade a cluster by running `vxctlupgrade`, all nodes should be able to support the new protocol version. An upgrade can fail if at least one of them does not support the new protocol version.
- Action: Make sure that the VERITAS Volume Manager package that supports the new protocol version is installed on all nodes and retry the upgrade.

V-5-1-3091

VxVM vxdg ERROR V-5-1-3091 diskname : Disk not moving, but subdisks on it are

- Description: Some volumes have subdisks that are not on the disks implied by the supplied list of objects.
- Action: Use the `-oexpand` option to `vxdglistmove` to produce a self-contained list of objects.

V-5-1-3212

VxVM vxconfigd ERROR V-5-1-3212 Insufficient DRL log size: logging is disabled.

- Description: A volume with an insufficient DRL log size was started successfully, but DRL logging is disabled and a full recovery is performed.
- Action: Create a new DRL of sufficient size.

V-5-1-3243

VxVM vxdmpadm ERROR V-5-1-3243 The VxVM restore daemon is already running. You can stop and restart the restore daemon with desired arguments for changing any of its parameters.

- Description: The `vxdmpadmstartrestore` command has been executed while the restore daemon is already running.
- Action: Stop the restore daemon and restart it with the required set of parameters as shown in the `vxdmpadm(1M)` manual page.

V-5-1-3362

VxVM vxdmpadm ERROR V-5-1-3362 Attempt to disable controller failed. One (or more) devices can be accessed only through this controller. Use the `-f` option if you still want to disable this controller.

- Description: Disabling the controller could lead to some devices becoming inaccessible.
- Action: To disable the only path connected to a disk, use the `-f` option.

V-5-1-3486

VxVM vxconfigd ERROR V-5-1-3486 Not in cluster

- Description: Checking for the current protocol version (using `vxdctlprotocol` version) does not work if the node is not in a cluster.
- Action: Bring the node into the cluster and retry.

V-5-1-3689

VxVM vxassist ERROR V-5-1-3689 Volume record id `rid` is not found in the configuration.

- Description: An error was detected while reattaching a snapshot volume using `snapback`. This happens if a volume's record identifier (`rid`) changes as a result of a disk group split that moved the original volume to a new disk group. The snapshot volume is unable to recognize the original volume because its record identifier has changed.
- Action: Use the following command to perform the `snapback`:

```
# vxplex [-g diskgroup] -f snapback volume plex
```

V-5-1-3828

VxVM vxconfigd ERROR V-5-1-3828 upgrade operation failed: Already at highest version

- Description: An upgrade operation has failed because a cluster is already running at the highest protocol version supported by the master.
- Action: No further action is possible as the master is already running at the highest protocol version it can support.

V-5-1-3848

VxVM vxconfigd ERROR V-5-1-3848 Incorrect protocol version (number) in volboot file

- Description: A node attempted to join a cluster where VxVM software was incorrectly upgraded or the `volboot` file is corrupted, possibly by being edited manually. The `volboot` file should contain a supported protocol version before trying to bring the node into the cluster.
- Action: Verify the supported cluster protocol versions using the `vxctl protocol version` command. The `volboot` file should contain a supported protocol version before trying to bring the node into the cluster. Run `vxctlinit` to write a valid protocol version to the `volboot` file. Restart `vxconfigd` and retry the join.

V-5-1-4220

VxVM vxconfigd ERROR V-5-1-4220 DG move: can't import diskgroup, giving up

- Description: The specified disk group cannot be imported during a disk group move operation. (The disk group ID is obtained from the disk group that could be imported.)
- Action: The disk group may have been moved to another host. One option is to locate it and use the `vxdg recover` command on both the source and target disk groups. Specify the `-oclean` option with one disk group, and the `-oremove` option with the other disk group. See “Recovering from Incomplete Disk Group Moves” on page 32” for more information.

V-5-1-4267

VxVM vxassist WARNING V-5-1-4267 volume volume already has at least one snapshot plex
Snapshot volume created with these plexes will have a dco volume with no associated dco plex.

- Description: An error was detected while adding a DCO object and DCO volume to a mirrored volume. There is at least one snapshot plex already created on the volume. Because this snapshot plex was created when no DCO was associated with the volume, there is no DCO plex allocated for it.
- Action: See the section *Adding a Version 0 DCO and DCO Volume* in the chapter *Administering Volume Snapshots* of the *VERITAS Volume Manager Administrator's Guide*.

V-5-1-4277

```
VxVM vxconfigd ERROR V-5-1-4277 cluster_establish: CVM protocol  
version out of range
```

- Description: When a node joins a cluster, it tries to join at the protocol version that is stored in its volboot file. If the cluster is running at a different protocol version, the master rejects the join and sends the current protocol version to the slave. The slave re-tries with the current version (if that version is supported on the joining node), or the join fails.
- Action: Make sure that the joining node has a VERITAS Volume Manager release installed that supports the current protocol version of the cluster.

V-5-1-4551

```
VxVM vxconfigd ERROR V-5-1-4551 dg_move_recover: can't locate disk(s),  
giving up
```

- Description: Disks involved in a disk group move operation cannot be found, and one of the specified disk groups cannot be imported.
- Action: Manual use of the `vx dg recover` command may be required to clean the disk group to be imported. See "Recovering from Incomplete Disk Group Moves" on page 32" for more information.

V-5-1-4620

```
VxVM vxassist WARNING V-5-1-4620 Error while retrieving information  
from SAL
```

- Description: The `vxassist` command does not recognize the version of the SAN Access Layer (SAL) that is being used, or detects an error in the output from SAL.

- Action: If a connection to SAL is desired, ensure that the correct version of SAL is installed and configured correctly. Otherwise, suppress communication between vxassist and SAL by adding the following line to the vxassist defaults file (usually /etc/default/vxassist):

```
salcontact=no
```

V-5-1-4625

```
VxVM vxassist WARNING V-5-1-4625 SAL authentication failed...
```

- Description: The SAN Access Layer (SAL) rejects the credentials that are supplied by the vxassist command.
- Action: If connection to SAL is desired, use the vxspcshow command to set a valid user name and password. Otherwise, suppress communication between vxassist and SAL by adding the following line to the vxassist defaults file (usually /etc/default/vxassist):

```
salcontact=no
```

V-5-1-5150

```
VxVM vxassist ERROR V-5-1-5150 Insufficient number of active snapshot  
mirrors in snapshot_volume.
```

- Description: An attempt to snap back a specified number of snapshot mirrors to their original volume failed.
- Action: Specify a number of snapshot mirrors less than or equal to the number in the snapshot volume.

V-5-1-5160

```
VxVM vxplex ERROR V-5-1-5160 Plex plex not associated to a snapshot  
volume.
```

- Description: An attempt was made to snap back a plex that is not from a snapshot volume.
- Action: Specify a plex from a snapshot volume.

V-5-1-5161

```
VxVM vxplex ERROR V-5-1-5161 Plex plex not attached.
```

- Description: An attempt was made to snap back a detached plex.
- Action: Reattach the snapshot plex to the snapshot volume.

V-5-1-5162

VxVM vxplex ERROR V-5-1-5162 Plexes do not belong to the same snapshot volume.

- Description: An attempt was made to snap back plexes that belong to different snapshot volumes.
- Action: Specify the plexes in separate invocations of vxplexsnapback.

V-5-1-5929

VxVM vxconfigd NOTICE V-5-1-5929 Unable to resolve duplicate diskid.

- Description: When VxVM detects disks with duplicate disk IDs (unique internal identifiers), VxVM attempts to select the appropriate disk (using logic that is specific to an array). If a disk can not be selected, VxVM does not import any of the duplicated disks into a disk group. In the rare case when VxVM cannot make the choice, you must choose which duplicate disk to use.

NOTE In releases prior to 3.5, VxVM selected the first disk that it found if the selection process failed. From VxVM 3.5 onward, the default behavior is to avoid the selection of the wrong disk as this could lead to data corruption. Arrays with mirroring capability in hardware are particularly susceptible to such data corruption.

- Action: User intervention is required in the following cases:
 - Case 1: When DMP is disabled to an array that has multiple paths, then each path to the array is claimed as a unique disk.

If DMP is suppressed, VxVM does not know which path to select as the true path. You must choose which path to use. Decide which path to exclude, and then either edit the file `/etc/vx/vxvm.exclude`, or, if `vxconfigd` is running, select item 1 (suppress all paths through a controller from VxVM's view) or item 2 (suppress a path from VxVM's view) from `vxdiskadm` option 17 (Prevent multipathing/Suppress devices from VxVM's view).

The following example shows a `vxvm.exclude` file with paths `c8t0d0`, `c8t0d1`, and `c8t0d2` excluded from VxVM:

```
exclude_all 0

paths

c8t0d0 /0/4/0/0.8.0.108.0.0.0
```

```
c8t0d1 /0/4/0/0.8.0.108.0.0.1
c8t0d2 /0/4/0/0.8.0.108.0.0.2

controllers
#
product
#
pathgroups
```

- Case 2: Some arrays such as EMC and HDS provide mirroring in hardware. When a LUN pair is split, depending on how the process is performed, this may result in two disks with the same disk ID.

Check with your array vendor to make sure that you are using the correct split procedure. If you know which LUNs you want to use, choose which path to exclude, and then either edit the file `/etc/vx/vxvm.exclude`, or, if `vxconfigd` is running, select item 1 (Suppress all paths through a controller from VxVM's view) or item 2 (Suppress a path from VxVM's view) from `vxdiskadm` option 17 (Prevent multipathing/Suppress devices from VxVM's view).

- Case 3: If disks have become duplicated using the `dd` command or any other disk copying utility, choose which set of duplicate disks you want to exclude, and then either edit the file `/etc/vx/vxvm.exclude`, or, if `vxconfigd` is running, select item 1 (Suppress all paths through a controller from VxVM's view) or item 2 (Suppress a path from VxVM's view) from `vxdiskadm` option 17 (Prevent multipathing/Suppress devices from VxVM's view).