

VERITAS Volume Manager 3.1 Reference Guide

for HP-UX 11i and HP-UX 11i Version 1.5

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Preface

The *VERITAS Volume Manager 3.1 Reference Guide* provides information on how to use Volume Manager.

Audience

This guide is intended for system administrators responsible for installing, configuring, and maintaining systems under the control of the VERITAS Volume Manager.

This guide assumes that the user has a:

- working knowledge of the UNIX operating system
- basic understanding of system administration
- basic understanding of volume management

Scope

This guide includes reference information such as error messages and a disk array overview.

Organization

This guide is organized as follows:

- Chapter 1 , “Volume Manager Commands,” provides brief descriptions of commonly used Volume Manager commands.
- Chapter 2 , “Error Messages,” provides information on error messages associated with the Volume Manager configuration daemon (`vxconfigd`), the kernel, and other utilities.
- Chapter 3 , “Disk Arrays,” describes traditional disk arrays and provides a general overview of available arrays.

Related Documents

The following documents provide information related to the Volume Manager:

- *VERITAS Volume Manager 3.1 Administrator's Guide*
- *VERITAS Volume Manager 3.1 Migration Guide*
- *VERITAS Volume Manager 3.1 Storage Administrator Administrator's Guide*
- *VERITAS Volume Manager 3.1 for HP-UX Release Notes*
- VERITAS Volume Manager and Storage Administrator manual pages

Conventions

We use the following typographical conventions.

<i>audit</i> (5)	An HP-UX manpage. <i>audit</i> is the name and <i>5</i> is the section in the <i>HP-UX Reference</i> . On the web and on the Instant Information CD, it may be a hot link to the manpage itself. From the HP-UX command line, you can enter “man <i>audit</i> ” or “man <i>5 audit</i> ” to view the manpage. See <i>man</i> (1).
<i>Book Title</i>	The title of a book. On the web and on the Instant Information CD, it may be a hot link to the book itself.
KeyCap	The name of a keyboard key. Note that Return and Enter both refer to the same key.
<i>Emphasis</i>	Text that is emphasized.
Emphasis	Text that is strongly emphasized.
Term	The defined use of an important word or phrase.
ComputerOut	Text displayed by the computer.
UserInput	Commands and other text that you type.
Command	A command name or qualified command phrase.
<i>Variable</i>	The name of a variable that you may replace in a command or function or information in a display that represents several possible values.
[]	The contents are optional in formats and command descriptions. If the contents are a list separated by , choose one of the items.
{ }	The contents are required in formats and command descriptions. If the contents are a list separated by , you must choose one of the items.
...	The preceding element may be repeated an arbitrary number of times.
	Separates items in a list of choices.

1 **Volume Manager Commands**

Introduction

This chapter provides brief descriptions of commonly used Volume Manager commands. For more detailed information about the commands, refer to the appropriate manual pages.

This chapter introduces the following Volume Manager commands:

- “vxassist - creating and changing volumes”
- “vxdctl - managing the vxconfigd Daemon”
- “vxdg - performing disk group tasks”
- “vxdisk - performing disk tasks”
- “vxdiskadd - adding disks”
- “vxdiskadm - performing disk tasks”
- “vxedit -changing VM objects”
- “vxmake - creating VM objects”
- “vxmend - correcting configuration problems”
- “vxplex - performing plex tasks”
- “vxprint - printing configuration information”
- “vxsd - performing subdisk tasks”
- “vxstat - printing volume statistics”
- “vxtrace - tracing volume tasks”
- “vxunrelocate - moving relocated subdisks”
- “vxvol - performing volume tasks”

vxassist - creating and changing volumes

You can use the `vxassist` command to create and change volumes. `vxassist` is an automated one-step interface to Volume Manager tasks. Unlike some Volume Manager commands, `vxassist` does not require a thorough understanding of Volume Manager concepts.

`vxassist` can do tasks that would otherwise require the use of several other Volume Manager commands. `vxassist` automatically performs all underlying and related tasks that would otherwise be done by the user (in the form of other commands).

`vxassist` does not conflict with existing Volume Manager commands or preclude their use. Objects created by `vxassist` are compatible and inter-operable with objects created by other Volume Manager commands and interfaces.

`vxassist` performs these tasks:

- finds space for and creates volumes
- finds space for and creates mirrors for existing volumes
- finds space for and extends existing volumes
- shrinks existing volumes and frees unused space
- provides facilities for the online backup of existing volumes
- provides an estimate of the maximum size for a new or existing volume
- changes a volume's layout

For detailed information about how to use `vxassist`, refer to the `vxassist(1M)` manual page.

Advantages of using `vxassist` include:

- The use of `vxassist` involves only one step (command) on the part of the user.
- You are required to specify only minimal information to `vxassist`, yet you can optionally specify additional parameters to modify or control its actions.

- `vxassist` tasks result in a set of configuration changes that either succeed or fail as a group, rather than individually. Most `vxassist` tasks work so that system crashes or other interruptions do not leave intermediate states to be cleaned up. If `vxassist` finds an error or an exceptional condition, it exits without leaving partially-changed configurations. The system is left in the same state as it was prior to the attempted `vxassist` task.

How `vxassist` Works

The `vxassist` command allows you to create and modify volumes. You specify the basic volume creation or modification requirements and `vxassist` performs the necessary tasks.

`vxassist` obtains most of the information it needs from sources other than your input. `vxassist` obtains information about the existing objects and their layouts from the objects themselves.

For tasks requiring new disk space, `vxassist` seeks out available disk space and allocates it in the configuration that conforms to the layout specifications and that offers the best use of free space.

The `vxassist` command typically takes this form:

```
vxassist keyword volume_name [attributes...]
```

where *keyword* selects the task to perform. The first argument after a `vxassist` keyword is a volume name, which is followed by a set of attributes. For details on available `vxassist` keywords and attributes, refer to the `vxassist(1M)` manual page.

`vxassist` creates and manipulates volumes based on a set of established defaults, but also allows you to supply preferences for each task.

`vxassist` Defaults

`vxassist` uses a set of tunable parameters that can be specified in the defaults files or at the command line. The tunable parameters default to reasonable values if they are not listed on the command line. Tunables listed on the command line override those specified elsewhere. Here are the tunable parameters:

- Internal defaults—The built-in defaults are used when the value for a particular tunable is not specified elsewhere (on the command line or in a defaults file).

- **System-wide defaults file**—The system-wide defaults file contains default values that you can alter. These values are used for tunables that are not specified on the command line or in an alternate defaults file.
- **Alternate defaults file**—A non-standard defaults file, specified with the command `vxassist -d alt_defaults_file`.
- **Command line**—The tunable values specified on the command line override any values specified internally or in defaults files.

Defaults File

The default behavior of `vxassist` is controlled by the tunables specified in the `/etc/default/vxassist` file. The format of the defaults file is a list of `attribute=value` pairs separated by new lines. These `attribute=value` pairs are the same as those specified as options on the `vxassist` command line (refer to the `vxassist(1M)` manual page for details).

Here is a sample `vxassist` defaults file:

```
# by default:
# create unmirrored, unstriped volumes
# allow allocations to span drives
# with RAID-5 create a log, with mirroring don't create
a log
# align allocations on cylinder boundaries

layout=nomirror,nostripe,span,nocontig,raid5log,noregio
nlog,
    diskalign

# use the fsgen usage type, except when creating RAID-5
volumes
    usetype=fsgen

# allow only root access to a volume
mode=u=rw,g=,o=
user=root
group=root

# when mirroring, create two mirrors
nmirror=2
```

Volume Manager Commands

vxassist - creating and changing volumes

```
# for regular striping, by default create between 2 and
8 stripe
# columns
  max_nstripe=8
  min_nstripe=2

# for RAID-5, by default create between 3 and 8 stripe
columns
  max_nraid5stripe=8
  min_nraid5stripe=3

# create 1 log copy for both mirroring and RAID-5
volumes, by
  default
  nregionlog=1
  nraid5log=1

# by default, limit mirroring log lengths to 32Kbytes
  max_regionloglen=32k

# use 64K as the default stripe unit size for regular
volumes
  stripe_stwid=64k

# use 16K as the default stripe unit size for RAID-5
volumes
  raid5_stwid=16k
```

vxctl - managing the vxconfigd Daemon

The volume configuration daemon (`vxconfigd`) is the interface between the Volume Manager commands and the kernel device drivers. The `vxctl` command is the interface to `vxconfigd`.

`vxctl` is used for:

- performing tasks related to the state of the `vxconfigd` daemon
- managing boot information and Volume Manager root configuration initialization
- manipulating the contents of the `volboot` file that contains a list of disks containing root configuration databases (this is not normally necessary, as Volume Manager automatically locates all disks on the system)
- reconfiguring the DMP database (if used on your system) to reflect new disk devices attached to the system, and removal of any disk devices from the system
- creating DMP (if used on your system) device nodes in the device directories `/dev/vx/dmp` and `/dev/vx/rdmp`
- reflecting the change in path type into the DMP database for active/passive disk arrays. You can change the path type from primary to secondary and vice-versa through the utilities provided by disk array vendors

The `config` device is a special device file created by the Volume Manager that interacts with `vxctl` to make system configuration changes. Some `vxctl` tasks involve modifications to the `volboot` file that indicates the location of some root configuration copies.

For detailed information about how to use `vxctl`, refer to the `vxctl(1M)` manual page.

vxdg - performing disk group tasks

The `vxdg` command performs Volume Manager tasks on disk groups. `vxdg` is used for operating on disk groups. `vxdg` creates new disk groups, and administers existing disk groups. See the `vxdg(1M)` manual page for information on how to use `vxdg`.

vxdisk - performing disk tasks

The `vxdisk` command performs Volume Manager tasks on disks under VxVM control. `vxdisk` defines special disk devices, initializes information stored on disks (that the Volume Manager uses to identify and manage disks), and performs additional special operations. See the `vxdisk(1M)` manual page for information on how to use `vxdisk`.

vxdiskadd - adding disks

The `vxdiskadd` command adds standard disks to the Volume Manager. `vxdiskadd` leads you through the process of initializing a new disk by displaying information and prompts. See the `vxdiskadd(1M)` manual page for information on how to use `vxdiskadd`.

vxdiskadm - performing disk tasks

`vxdiskadm` is the Volume Manager Support Operations menu interface. This command provides a menu of disk operations. Each entry in the main menu leads you through a particular task by providing you with information and prompts. Default answers are provided for many questions so you can easily select typical answers. Refer to the `vxdiskadm(1M)` manual page for information on how to use `vxdiskadm`.

vxedit -changing VM objects

The `vxedit` command sets and changes attributes for Volume Manager configuration records. `vxedit` has two functions:

- `vxedit` can remove or rename Volume Manager objects.
- `vxedit` allows you to modify certain records in the volume management databases. Only fields that are not volume usage-type-dependent can be modified.

Volume Manager objects that are associated with other objects are not removable by `vxedit`. This means that `vxedit` cannot remove a subdisk that is associated with a plex or a plex that is associated with a volume.

NOTE

Using the recursive suboption (`-r`) to the removal option of `vxedit` removes all objects from the specified object downward. In this way, a plex and its associated subdisks, or a volume and its associated plexes and their associated subdisks, can be removed by a single `vxedit` command.

For detailed information about how to use `vxedit`, refer to the `vxedit(1M)` manual page.

vxmake - creating VM objects

You can use the `vxmake` command to add a new volume, plex, or subdisk to the set of objects managed by Volume Manager. `vxmake` adds a new record for that object to the Volume Manager configuration database. You can create records from parameters specified on the command line or by using a description file.

You can specify operands on the command line as follows:

```
vxmake -Usage_type vol volume_name len=length  
plex=plex_name,...
```

where:

- the first operand (keyword) determines the kind of object to be created
- the second operand is the name given to that object
- additional operands specify attributes for the object

If no operands are specified on the command line, then a description file is used to specify the records to create.

A *description file* is a file that contains plain text that describes the objects to be created with `vxmake`. A description file can contain several commands, and can be edited to perform a list of tasks. The description file is read from standard input, unless the `-d description_file` option specifies a filename. The following is a sample description file:

```
#rectyp #name #options  
sd disk3-01 disk=disk3 offset=0 len=10000  
sd disk3-02 disk=disk3 offset=25000 len=10480  
sd disk4-01 disk=disk4 offset=0 len=8000  
sd disk4-02 disk=disk4 offset=15000 len=8000  
sd disk4-03 disk=disk4 offset=30000 len=4480  
plex db-01 layout=STRIPE ncolumn=2 stwidth=16k  
  
sd=disk3-01:0/0,disk3-02:0/10000,disk4-01:1/0,\  
disk4-02:1/8000, disk4-03:1/16000  
sd ramd1-01 disk=ramd1 len=640  
comment="Hot spot for dbvol  
plex db-02 sd=ramd1-01:40320  
vol db usetype=gen plex=db-01,db-02
```

Volume Manager Commands

vxmake - creating VM objects

```
readpol=prefer pfname=db-02  
comment="Uses mem1 for hot spot in  
last 5m
```

This description file specifies a volume with two plexes. The first plex has five subdisks on physical disks. The second plex is preferred and has one subdisk on a volatile memory disk.

For detailed information about how to use `vxmake`, refer to the `vxmake(1M)` manual page.

vxmend - correcting configuration problems

The `vxmend` command performs Volume Manager usage-type-specific tasks on volumes, plexes, and subdisks. These tasks fix simple problems in configuration records (such as clearing utility fields, changing volume or plex states, and offlining or onlining volumes or plexes).

`vxmend` is used primarily to escape from a state that was accidentally reached. The `offline` and `online` functions can be performed with disk-related commands.

For detailed information about how to use `vxmend`, refer to the `vxmend(1M)` manual page.

vxplex - performing plex tasks

The `vxplex` command performs Volume Manager tasks on a plex or on volume-and-plex combinations. The first operand is a keyword that specifies the task to perform. The remaining operands specify the objects to which the task is to be applied.

You can use the `vxplex` command to:

Attach or detach a plex and a volume. A detached plex does not share in I/O activity to the volume, but remains associated with the volume. A detached plex is reattached when a volume is next started.

- Dissociate a plex from the associated volume. When a plex is dissociated, its relationship to the volume is broken. The plex is then available for other uses and can be associated with a different volume. This is useful as part of a backup procedure.
- Copy the contents of the specified volume to the named plex(es). This task makes a copy of a volume (for backup purposes) without mirroring the volume in advance.
- Move the contents of one plex to a new plex. This is useful for moving a plex on one disk to a different location.

For detailed information about how to use `vxplex`, refer to the `vxplex(1M)` manual page.

vxprint - printing configuration information

The `vxprint` command displays information from records in a Volume Manager configuration database. You can use this command to display partial or complete information about any or all Volume Manager objects. The format can be hierarchical to clarify relationships between Volume Manager objects. UNIX system utilities such as `awk`, `sed`, or `grep` can also use `vxprint` output.

For detailed information about how to use `vxprint`, refer to the `vxprint(1M)` manual page.

vxsd - performing subdisk tasks

The `vxsd` command performs Volume Manager tasks on subdisks. `vxsd` maintains subdisk-mirror associations. You can use `vxsd` to:

- associate or dissociate a subdisk from its associated mirror
- move the contents of a subdisk to another subdisk
- split one subdisk into two subdisks that occupy the same space as the original
- join two contiguous subdisks into one.

For detailed information about how to use `vxsd`, refer to the `vxsd(1M)` manual page.

vxstat - printing volume statistics

The `vxstat` command prints statistics about Volume Manager objects and block devices under Volume Manager control. `vxstat` reads the summary statistics for Volume Manager objects and formats them to the standard output. These statistics represent Volume Manager activity from the time the system initially booted or from the last time statistics were cleared. If no Volume Manager object name is specified, statistics from all volumes in the configuration database are reported.

For detailed information about how to use `vxstat`, refer to the `vxstat(1M)` manual page.

vxtrace - tracing volume tasks

The `vxtrace` command prints kernel I/O error or I/O error trace event records on the standard output or writes them to a file in binary format. Binary trace records written to a file can also be read back and formatted by `vxtrace`.

If no operands are given, then either all error trace data or all I/O trace data on all virtual disk devices are reported. With error trace data, you can select all accumulated error trace data, wait for new error trace data, or both (the default). Selection can be limited to a specific disk group, to specific Volume Manager kernel I/O object types, or to particular named objects or devices.

For detailed information about how to use `vxtrace`, refer to the `vxtrace(1M)` manual page.

vxunrelocate - moving relocated subdisks

The `vxunrelocate` command moves subdisks that have been relocated by the hot-relocation feature back to their original disks. This allows you to restore the system back to the configuration that existed before the disk failure. See the `unrelocate(1M)` manual page for information on how to use `vxunrelocate`.

vxvol - performing volume tasks

The `vxvol` command performs Volume Manager tasks on volumes. You can use `vxvol` to:

- initialize a volume
- start a volume
- stop a volume
- establish the read policy for a volume

Starting a volume changes its kernel state from `DISABLED` or `DETACHED` to `ENABLED`. Stopping a volume changes its state from `ENABLED` or `DETACHED` to `DISABLED` (however, it is seldom useful to stop a volume). For more information about volume states, see the “Recovery” chapter in the *VERITAS Volume Manager Administrator’s Guide*.

You can use `vxvol` to specify one of these read policies:

- `round` reads each plex in turn in “round-robin” fashion for each nonsequential I/O detected. Sequential access causes only one plex to be accessed. This takes advantage of the drive or controller read-ahead caching policies.
- `prefer` reads first from a plex that has been named as the preferred plex.
- `select` chooses a default policy based on plex associations to the volume. If the volume has an enabled striped plex, `select` defaults to preferring that plex; otherwise, it defaults to round-robin.

For detailed information about how to use `vxvol`, refer to the `vxvol(1M)` manual page.

2 Error Messages

Introduction

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

NOTE

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

Descriptions 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.

The following sections are included in this chapter:

- “Logging Error Messages”
- “Volume Manager Configuration Daemon Error Messages”
- “DMP Error Messages”
- “Cluster Error Messages”
- “Kernel Error Messages”

Logging Error Messages

The Volume Manager provides the option of logging console output to a file. This logging is useful in that any messages output just before a system crash will be available in the log file (presuming that the crash does not result in file system corruption). `vxconfigd` controls whether such logging is turned on or off. If enabled, the default log file is `/var/vxvm/vxconfigd.log`.

`vxconfigd` also supports the use of `syslog()` to log all of its regular console messages. When this is enabled, all console output is directed through the `syslog()` interface.

`syslog()` and log file logging can be used together to provide reliable logging (into a private log file), along with distributed logging through `syslogd`.

Both `syslog()` and log file logging are disabled by default.

To enable logging of console output to a file, you can either invoke `vxconfigd` as follows or edit Volume Manager startup scripts (described later):

```
vxconfigd -x log
```

To enable `syslog()` logging of console output, you can either invoke `vxconfigd` as follows or edit Volume Manager startup scripts (described later):

```
vxconfigd -x syslog
```

To enable log file and/or `syslog()` logging, you can also edit the following portion of the `/etc/init.d/vxvm-sysboot` startup script:

```
# 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
/var/vxvm/vxconfigd.log                #
#opts="$opts -x logfile=/foo/bar"      # specify an
alternate log file                      #
#opts="$opts -x timestamp"            # timestamp
```

Error Messages

Logging Error Messages

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
```

Uncomment the line(s) corresponding to the feature(s) that you want enabled at startup. For example, to set up `vxconfigd` to automatically use file logging, uncomment the `opts="$opts -x log"` string.

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

Volume Manager Configuration Daemon Error Messages

The Volume Manager is fault-tolerant and resolves most problems without system administrator intervention. If the Volume Manager configuration daemon (`vxconfigd`) recognizes what actions are necessary, it will queue up the transactions that are required. Volume Manager provides atomic changes of system configurations; either a transaction completes fully or the system appears as though the transaction was never attempted. When `vxconfigd` is unable to recognize and fix system problems, the system administrator needs to handle the task of problem solving.

The following sections cover the error messages associated with the Volume Manager configuration daemon.

`vxconfigd` Usage Messages

The following are usage messages associated with `vxconfigd`.

Usage: `vxconfigd - long`

Usage: `vxconfigd [-dkf] [-r reset] [-m mode] [-x level]`

Recognized options:

`-d` set initial mode to disabled for transactions

`-k` kill the existing configuration daemon process

`-f` operate in foreground; default is to operate in background

`-r` reset kernel state; requires 'reset' option argument

`-m` mode set vold's operating mode

modes: `disable`, `enable`, `bootload`, `bootstart`

`-x` debugset debugging level to <debug>, 0 turns off debugging

`-R` fileset filename for client request rendezvous

`-D` fileset filename for client diag request rendezvous

- Description

This is the full usage message for `vxconfigd`, which results from entering the command `vxconfigd help`.

Error Messages

Volume Manager Configuration Daemon Error Messages

Usage: vxconfigd - short

Usage: vxconfigd [-dkf] [-r reset] [-m mode] [-x level]

For detailed help use: vxconfigd help

- Description

This is the standard vxconfigd usage error message. Appearance of this message implies that some option was supplied incorrectly.

- Action

If you need help in using vxconfigd, try using the command vxconfigd help.

For more detailed information, see the vxconfigd(1M) manual page.

-r must be followed by 'reset'

-r must be followed by 'reset'

- Description

This is a usage error. The -r option requires an option argument consisting of the string reset.

- Action

Either don't use the -r option, or supply the reset option argument.

-x argument: invalid debug string

-x argument: invalid debug string

- Description

An unrecognized string was specified as an argument to the -x option.

- Action

See vxconfigd(1M) for a list of valid arguments to -x.

-x devprefix=device_prefix: prefix too long

-x devprefix=device_prefix: prefix too long

- Description

The -x devprefix=device_prefix option was used to define a prefix path for the /dev/dsk and /dev/rdisk directories, and that prefix was too long.

- Action
Use a shorter prefix.

vxconfigd Error Messages

The following are general error messages associated with vxconfigd.

`signal_name [core dumped]`

`vxvm:vxconfigd: ERROR: signal_name [- core dumped]`

- Description
The vxconfigd daemon encountered an unexpected signal while starting up. The specific signal is indicated by *signal_name*. If the signal caused the vxconfigd process to dump core, then that will be indicated. This could be caused by a bug in vxconfigd, particularly if *signal_name* is "Segmentation fault." Alternately, this could have been caused by a user sending vxconfigd a signal with the kill utility.
- Action
Contact Customer Support.

`Unrecognized operating mode`

`vxvm:vxconfigd: ERROR: mode_name: 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.

`vxconfigd cannot boot-start RAID-5 volumes`

`vxvm:vxconfigd: ERROR: volume_name: vxconfigd cannot boot-start RAID-5 volumes`

- Description

A volume that `vxconfigd` should start immediately upon booting the system (i.e., 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 the Volume Manager from a network-mounted root file system (or from a CD-ROM), and reconfigure the `/usr` file system to be defined on a regular non-RAID-5 volume.

`Cannot get all disk groups from the kernel`

```
vxvm:vxconfigd: ERROR: Cannot get all disk groups from the
kernel: reason
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

`Cannot get all disks from the kernel`

```
vxvm:vxconfigd: ERROR: Cannot get all disks from the
kernel:
reason
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

`Cannot get kernel transaction state`

```
vxvm:vxconfigd: ERROR:
Cannot get kernel transaction state: reason
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

Volume Manager Configuration Daemon Error Messages

- Action

Contact Customer Support for more information.

Cannot get private storage from kernel

`vxvm:vxconfigd: ERROR:`

Cannot get private storage from kernel: *reason*

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Cannot get private storage size from kernel

`vxvm:vxconfigd: ERROR:`

Cannot get private storage size from kernel: *reason*

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Cannot get record from the kernel

`vxvm:vxconfigd: ERROR:`

Cannot get record *record_name* from the kernel: *reason*

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Cannot kill existing daemon, pid=*process-ID*

`vxvm:vxconfigd: ERROR: 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, then the above error message will be 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 appears again, contact Customer Support.

Cannot make directory

vxvm:vxconfigd: ERROR: Cannot make directory
directory_path: reason

- Description

`vxconfigd` failed to create a directory that it expects to be able to create. Directories that `vxconfigd` might try to create are: `/dev/vx/dsk`, `/dev/vx/rdsk`, and `/var/vxvm/tempdb`. Also, for each disk group, `/dev/vx/dsk/diskgroup` and `/dev/vx/rdsk/diskgroup` directories are created. The system error related to the failure is given in *reason*. A system error of "No such file or directory" indicates that one of the prefix directories (for example, `/var/vxvm`) does not exist.

This type of error normally implies that the Volume Manager packages were installed incorrectly. Such an error can also occur if alternate file or directory locations are specified on the command line, using the `-x` option. The `_VXVM_ROOT_DIR` environment variable may also relocate to a directory that lacks a `var/vxvm` subdirectory.

- Action

Try to create the directory manually and then issue the command `vxctl enable`. If the error is due to incorrect installation of the Volume Manager packages, try to add the Volume Manager packages again.

Volume Manager Configuration Daemon Error Messages

Cannot open /etc/vfstab

`vxvm:vxconfigd: ERROR: Cannot open /etc/vfstab: reason`

- Description

`vxconfigd` could not open the `/etc/vfstab` file, for the reason given. The `/etc/vfstab` file is used to determine which volume (if any) to use for the `/usr` file system. If the `/etc/vfstab` file cannot be opened, `vxconfigd` prints the above error message and exits.

- Action

This error implies that your root file system is currently unusable. You may be able to repair your root file system by mounting the root file system 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 the “Recovery” chapter of the Administrator’s Guide.

Cannot recover operation in progress

`vxvm:vxconfigd: ERROR: Cannot recover operation in progress`

`Failed to get group group from the kernel: error`

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Cannot reset VxVM kernel

`vxvm:vxconfigd: ERROR: 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 for this is “A virtual disk device is open.” That error implies that a VxVM tracing device or volume device is open.

- Action

If, for some reason, you really want to reset the kernel devices, you will need to track down and kill all processes that have a volume or

VxVM tracing device open. Also, if any volumes are mounted as file systems, unmount those file systems.

An error reason other than “A virtual disk device is open” should not normally occur unless there is a bug in the operating system or in the Volume Manager.

Cannot start volume, no valid complete plexes

**vxvm:vxconfigd: ERROR: Cannot start volume volume,
no valid complete plexes**

- Description

This error indicates that the volume for either the root or /usr file system cannot be started because the volume contains no 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 restore the root or /usr file system or to reinstall the system. Restoring the root or /usr file system requires that you have a valid backup. See the “Recovery” chapter of the Administrator’s Guide for information on how to fix problems with root or /usr file system volumes.

Cannot start volume, no valid plexes

**vxvm:vxconfigd: ERROR: Cannot start volume volume,
no valid plexes**

- Description

This error indicates that the volume for either the root or /usr file system cannot be started because the volume contains no 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, dissociating, 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 restore the root or `/usr` file system or to reinstall the system. Restoring the root or `/usr` file system requires that you have a valid backup. See the “Recovery” chapter of the Administrator’s Guide for information on how to fix problems with root or `/usr` file system volumes.

`Cannot start volume, volume state is invalid`

`vxvm:vxconfigd: ERROR: Cannot start volume volume,
volume state is invalid`

- Description

The volume for the root or `/usr` file system is in an unexpected state (not `ACTIVE`, `CLEAN`, `SYNC` or `NEEDSYNC`). This should not happen unless the system administrator circumvents the mechanisms used by the Volume Manager to create these volumes.

- Action

The only recourse is to bring up the Volume Manager on a CD-ROM or NFS-mounted root file system and to fix the state of the volume. See the “Recovery” chapter of the Administrator’s Guide for further information.

`Cannot store private storage into the kernel`

`vxvm:vxconfigd: ERROR: Cannot store private storage into
the
kernel: error`

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

`Differing version of vxconfigd installed`

`vxvm:vxconfigd: ERROR: Differing version of vxconfigd
installed`

- Description

Error Messages

Volume Manager Configuration Daemon Error Messages

A `vxconfigd` daemon was started after the stopping of an earlier `vxconfigd` with a non-matching version number. This can happen, for example, if you upgrade from an earlier release of Volume Manager to VxVM 3.0 and run `vxconfigd` without a reboot.

- Action

To fix, reboot the system.

```
Disk, group, device: not updated with new host ID
```

```
vxvm:vxconfigd: ERROR: Disk disk, group group, device  
device:
```

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

```
Error: reason
```

- Description

This can result from using `vxctl hostid` to change the 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. Most likely, this indicates that the given disk has become inaccessible or has failed in some other way.

- Action

Try running the following 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 been taken out of use already. If the disk is still operational (which should not be the case), `vxdisk` will print:

```
device: Okay
```

If the disk is listed as Okay, try `vxctl hostid` again. If it still results in an error, contact Customer Support.

```
Disk group, Disk: Cannot auto-import group
```

```
vxvm:vxconfigd: ERROR: 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: 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 the Volume Manager 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 error types of:

```
Format error in configuration copy
Invalid magic number
Invalid block number
Duplicate record in configuration
Configuration records are inconsistent
```

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 the Volume Manager).

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.

- Action

If the error is clearly caused by excessive disk failures, then you may have to recreate the disk group 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 Customer Support.

```
Disk group, Disk: Group name collides with record in rootdg
```

```
vxvm:vxconfigd: ERROR: Disk group group, Disk device:  
Group name collides with record in rootdg
```

- Description

The name of a disk group that is being imported conflicts with the name of a record in the `rootdg` disk group. Volume Manager does not allow this kind of conflict because of the way the `/dev/vx/dsk` directory is organized: devices corresponding to records in the root disk group share this directory with subdirectories for each disk group.

- Action

Either remove or rename the conflicting record in the root disk group, or rename the disk group on import. See the `vxdbg(1M)` manual page for information on how to use the `import` operation to rename a disk group.

```
Disk group, Disk: Skip disk group with duplicate name
```

```
vxvm:vxconfigd: ERROR: Disk group group, Disk device:  
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.

The Volume Manager 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, then the new disk group will be imported first, and the auto-import of the older disk group will fail

Volume Manager Configuration Daemon Error Messages

with `group` with duplicate name (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 `vxchg(1M)` manual page for information on how to use the `import` operation to rename a disk group.

Disk group: Cannot recover temp database

```
vxvm:vxconfigd: ERROR: 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 you if you disable and enable it with `vxctl disable` and `vxctl enable`. This error indicates a failure related to reading the file `/var/vxvm/tempdb/groupname`. 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:

Step 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.

Step 2. Run the command:

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

This will recreate the temporary database files for all imported disk groups.

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.

Disk group: Disabled by errors

```
vxvm:vxconfigd: ERROR: Disk group group: Disabled by errors
```

- Description

This message indicates that some error condition has made it impossible for Volume Manager 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 `rootdg` disk group, then the following additional error should be displayed:

```
vxvm:vxconfigd: ERROR: 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 `rootdg`.

- 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. Failure of the `rootdg` disk group may require reinstallation of the system if your system uses a `root` or `/usr` file system defined on a volume.

Disk group: Errors in some configuration copies: Disk, copy

```
vxvm:vxconfigd: ERROR: Disk group group:  
Errors in some configuration copies: Disk disk, copy  
number:  
[Block number]: reason ...
```

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- 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 reimport may succeed in importing the disk group. Otherwise, the disk group may have to be recreated from scratch.

Disk group: Reimport of disk group failed

**vxvm:vxconfigd: ERROR: Disk group *group*:
Reimport of disk group failed: *reason***

- Description

After `vxconfigd` was stopped and restarted (or disabled and then enabled), the Volume Manager 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.

Disk group: update failed

**vxvm:vxconfigd: ERROR: 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:

Error Messages

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```
vxvm:vxconfigd: ERROR: 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.

```
Failed to store commit status list into kernel
```

```
vxvm:vxconfigd: ERROR: Failed to store commit status list into kernel: reason
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

```
GET_VOLINFO ioctl failed
```

```
vxvm:vxconfigd: ERROR: GET_VOLINFO ioctl failed: reason
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

```
Get of current rootdg failed
```

```
vxvm:vxconfigd: ERROR: Get of current rootdg failed: reason
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Memory allocation failure

```
vxvm:vxconfigd: ERROR: Memory allocation failure
```

- Description

This implies that there is insufficient memory to start up the Volume Manager and to get the volumes for the root and /usr file systems running.

- Action

This error should not normally occur, unless your system has very small amounts of memory. Adding just 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.

Mount point: volume not in rootdg disk group

```
vxvm:vxconfigd: ERROR: Mount point path:
volume not in rootdg disk group
```

- Description

The volume device listed in the /etc/vfstab file for the given mount-point directory (normally /usr) is listed as in a disk group other than rootdg. This error should not occur if the standard Volume Manager procedures are used for encapsulating the disk containing the /usr file system.

- Action

You will need to boot the Volume Manager from a network or CD-ROM mounted root file system. Then, start up the Volume Manager using fixmountroot on a valid mirror disk of the root file system. After starting Volume Manager, mount the root file system volume and edit the /etc/vfstab file. Change the file to use a direct partition for the file system. There should be a comment in the /etc/vfstab file that indicates which partition to use, for example:

```
#NOTE: volume usr (/usr) encapsulated partition
```

```
c0t3d0s5 (or c0b0t3d0s5 if your system uses a bus).
```

No convergence between root disk group and disk list

```
vxvm:vxconfigd: ERROR:
No convergence between root disk group and disk list
Disks in one version of rootdg:
```

```
device type=device_type info=devinfo ...  
Disks in alternate version of rootdg:  
device type=device_type info=devinfo ...
```

- Description

This message can appear when `vxconfigd` is not running in autoconfigure mode (see the `vxconfigd(1M)` manual page) and when, after several retries, it can not resolve the set of disks belonging to the root disk group. The algorithm for non-autoconfigure disks is to scan disks listed in the `/etc/vx/volboot` file and then examine the disks to find a database copy for the `rootdg` disk group. The database copy is then read to find the list of disk access records for disks contained in the group. These disks are then examined to ensure that they contain the same database copy. As such, this algorithm expects to gain convergence on the set of disks and the database copies contained on them. If a loop is entered and convergence cannot be reached, then this message will appear and the root disk group importation will fail.

- Action

Reorganizing the physical locations of the devices attached to the system may break the deadlock. Failing this, contact Customer Support.

Open of directory failed

```
vxvm:vxconfigd: ERROR: Open of directory directory  
failed: reason
```

- Description

An open failed for the `/dev/vx/dsk` or `/dev/vx/rdsk` directory (or a subdirectory of either of those directories). The only likely cause of such a failure should be that the directory was removed by the administrator or by an errant program. For this case, the *reason* should be “No such file or directory.” An alternate possible cause is an I/O failure.

- Action

If the error was “No such file or directory,” then create the directory (using `mkdir`). Then run the command `vxctl enable`.

If the error was an I/O error, then there may be other serious damage to the root file system. You may need to reformat your root disk and

Volume Manager Configuration Daemon Error Messages

restore the root file system from backup. Contact your system vendor or consult your system documentation.

Read of directory failed

vxvm:vxconfigd: ERROR: Read of directory *directory* failed: *reason*

- Description

There was a failure in reading the `/dev/vx/dsk` or `/dev/vx/rdisk` directory (or a subdirectory of either of those directories). The only likely cause of this error is an I/O failure on the root file system.

- Action

If the error was an I/O error, then there may be other serious damage to the root file system. You may need to reformat your root disk and restore the root file system from backup. Contact your system vendor or consult your system documentation.

System boot disk does not have a valid root plex

**vxvm:vxconfigd: ERROR:
System boot disk does not have a valid root plex
Please boot from one of the following disks:
Disk: *diskname* Device: *device* ...**

- Description

The system is configured to use a volume for the root file system, but was not booted on a disk containing a valid mirror of the root volume. Disks containing valid root mirrors are listed as part of the error message. A disk is usable as a boot disk if there is a root mirror on that disk which is not stale or offline.

- Action

Try to boot from one of the disks named in the error message.

Under some operating systems, you may be able to boot using a device alias for one of the named disks. For example, use this command:

```
boot vx-diskname
```

System startup failed

vxvm:vxconfigd: ERROR: 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.

There is no volume configured for the root device

```
vxvm:vxconfigd: ERROR: There is no volume configured for
the
root device
```

- Description

The system is configured to boot from a root file system defined on a volume, but there is no root volume listed in the configuration of the `rootdg` disk group.

There are two possible causes of this error:

- Case 1: The `/etc/system` file was erroneously updated to indicate that the root device is `/pseudo/vxio@0:0`. This should happen only as a result of direct manipulation by the administrator.
 - Case 2: The system somehow has a duplicate `rootdg` disk group, one of which contains a root file system volume and one of which does not, and `vxconfigd` somehow chose the wrong one. Since `vxconfigd` chooses the more recently accessed version of `rootdg`, 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 renamed to `rootdg` with locks given to this host.
- Action

In case 1, boot the system on a CD-ROM or networking-mounted root file system, directly mount the disk partition of the root file system, and remove the following lines from `/etc/system`:

```
rootdev:/pseudo/vxio@0:0
set vxio:vol_rootdev_is_volume=1
```

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In case 2, either boot with all drives in the offending version of `rootdg` turned off, or import and rename [see `vxdg(1M)`] the offending `rootdg` disk group from another host. In the case of turning off drives, run the following command after booting:

```
vxdg flush rootdg
```

This will update time stamps on the imported version of `rootdg`, which should make the correct version appear to be the more recently accessed. If this does not correct the problem, then contact Customer Support.

```
Unexpected configuration tid for group found in kernel
```

```
vxvm:vxconfigd: ERROR:
```

```
Unexpected configuration tid for group group found in kernel
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

```
Unexpected error during volume reconfiguration
```

```
vxvm:vxconfigd: ERROR:
```

```
Unexpected error during volume volume reconfiguration: reason
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

```
Unexpected error fetching disk for volume
```

```
vxvm:vxconfigd: ERROR:
```

```
Unexpected error fetching disk for disk volume: reason
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

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- Action

Contact Customer Support for more information.

Unexpected values stored in the kernel

```
vxvm:vxconfigd: ERROR: Unexpected values stored in the kernel
```

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Version number of kernel does not match vxconfigd

```
vxvm:vxconfigd: ERROR:
Version number of kernel does not match vxconfigd
```

- Description

The release of `vxconfigd` does not match the release of the Volume Manager kernel drivers. This should happen only as a result of upgrading Volume Manager, and then running `vxconfigd` without a reboot.

- Action

Reboot the system. If that does not cure the problem, then add the VxVM packages again.

Volume for mount point /usr not found in rootdg disk group

```
vxvm:vxconfigd: ERROR:
Volume volume for mount point /usr not found in rootdg 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 `rootdg` disk group. There are a couple of possible causes of this error:

- The `/etc/vfstab` file was erroneously updated to indicate the device for the `/usr` file system is a volume, but the volume named

Volume Manager Configuration Daemon Error Messages

is not in the `rootdg` disk group. This should happen only as a result of direct manipulation by the administrator.

- The system somehow has a duplicate `rootdg` 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 `rootdg`. Since `vxconfigd` chooses the more recently accessed version of `rootdg`, 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 renamed to `rootdg` 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 using the procedures defined in the “Recovery” chapter of the Administrator’s Guide. If the root file system is not defined on a volume, then just mount the root file system directly. Edit the `/etc/vfstab` file to correct the entry for the `/usr` file system.

In case 2, either boot with all drives in the offending version of `rootdg` turned off, or import and rename [see `vxchg(1M)`] the offending `rootdg` disk group from another host. In the case of turning off drives, run the following command after booting:

```
vxchg flush rootdg
```

This will update time stamps on the imported version of `rootdg`, which should make the correct version appear to be the more recently accessed. If this does not correct the problem, then contact Customer Support.

```
cannot open /dev/vx/config
```

```
vxvm:vxconfigd: ERROR: cannot open /dev/vx/config:
reason
```

- Description

The `/dev/vx/config` device could not be opened. `vxconfigd` uses this device to communicate with the Volume Manager kernel drivers. The `reason` string indicates the reason for the open failure. The most likely reason is `Device is already open`. This reason indicates that some process (most likely `vxconfigd`) already has `/dev/vx/config`

open. Other less likely reasons are “No such file or directory” or “No such device or address.” For either of these two reasons, the two likely causes are:

- The Volume Manager package installation did not complete correctly.
- The device node was removed by the administrator or by an errant shell script.
- Action

For the reason “Device is already open,” if you really want to run `vxconfigd`, then stop or kill the old one. You can kill whatever process has `vxconfigd` open by running the command:

```
vxctl -k stop
```

For other failure reasons, consider reinstalling the base Volume Manager software. This will reconfigure the device node and reinstall the Volume Manager kernel device drivers. See the *VERITAS Volume Manager 3.1 for HP-UX Release Notes* for information on how to install the software on HP-UX 11i systems. If you cannot reinstall the package, then contact Customer Support for more information.

enable failed

vxvm:vxconfigd: ERROR: enable failed: reason

- Description

Regular startup of `vxconfigd` failed for the stated reason. This error can also result from the command `vxctl enable`. This error may include the following additional text:

```
additional-reason: aborting
```

This message indicates that the failure was fatal and that `vxconfigd` is forced to exit. The most likely cause that results in an abort is inability to create IPC channels for communicating with other utilities.

```
additional-reason: transactions are disabled
```

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

Additionally, this may be followed with:

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```
vxvm:vxconfigd: ERROR: Disk group group: Errors in
some configuration copies:
Disk device, copy number: Block bno: error    ...
```

Reasons for failure vary considerably. Other error messages may be displayed that further indicate the underlying problem. If the Errors in some configuration copies error occurs, then that may indicate the problem.

- Action

Evaluate other error messages occurring with this one to determine the root cause of the problem. Make changes suggested by the other errors and then retry the command.

```
/dev/vx/info
```

```
vxvm:vxconfigd: ERROR: /dev/vx/info: reason
```

- Description

The `/dev/vx/info` device could not be opened, or did not respond to a Volume Manager kernel request. This error most likely indicates one of the following:

- The Volume Manager package installation did not complete correctly.
- The device node was removed by the administrator or by an errant shell script.

- Action

Consider reinstalling the base Volume Manager software. This will reconfigure the device node and reinstall the Volume Manager kernel device drivers. See the *VERITAS Volume Manager 3.1 for HP-UX Release Notes* for information on how to install the software on HP-UX 11i systems.

vxconfigd Fatal Error Messages

The following are fatal error messages associated with `vxconfigd`.

```
Disk group rootdg: Inconsistency -- Not loaded into
kernel
```

```
vxvm:vxconfigd: FATAL ERROR: Disk group rootdg:
Inconsistency -- Not loaded into kernel
```

Volume Manager Configuration Daemon Error Messages

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Group: Cannot update kernel

vxvm:vxconfigd: FATAL ERROR: Group *group*: Cannot update kernel

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Interprocess communication failure

**vxvm:vxconfigd: FATAL ERROR:
Interprocess communication failure: *reason***

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Invalid status stored in kernel

vxvm:vxconfigd: FATAL ERROR: Invalid status stored in kernel

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Memory allocation failure during startup

Volume Manager Configuration Daemon Error Messages

`vxvm:vxconfigd: FATAL ERROR:`

`Memory allocation failure during startup`

- Description

This implies that there is insufficient memory to start up the Volume Manager and to get the volumes for the root and `/usr` file systems running.

- Action

This error should not normally occur, unless your system has very small amounts of memory. Adding just 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.

`Rootdg cannot be imported during boot`

`vxvm:vxconfigd: FATAL ERROR:`

`Rootdg cannot be imported during boot`

- Description

This is an internal Volume Manager error. This error should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

`Unexpected threads failure`

`vxvm:vxconfigd: FATAL ERROR: Unexpected threads failure:
reason`

- Description

This is an unexpected operating system error. This error should not occur unless there is a bug in the Volume Manager or in the operating system multi-threading libraries.

- Action

Contact Customer Support for more information.

vxconfigd Notice Messages

The following are notice messages associated with `vxconfigd`.

`Detached disk`

vxvm:vxconfigd: NOTICE: 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, the Volume Manager objects affected by the disk failure may be taken care of automatically. Mail will be sent to `root` indicating what actions were taken by the Volume Manager and what further actions the administrator should take.

Detached log for volume

vxvm:vxconfigd: NOTICE: 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 `vxchg -k rmdisk`. A failing disk is indicated by a Detached disk *disk* message.

- Action

If the log is mirrored, hot-relocation may automatically relocate the failed log. Remove the failing logs using either `vxplex dis` or `vxsd dis`. Then, use `vxassist addlog` [see the `vxassist(1M)` manual page] to add a new log to the volume.

Detached plex in volume

vxvm:vxconfigd: NOTICE: 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 `vxchg -k rmdisk`. A failing disk is indicated by a Detached disk *disk* message.

- Action

If hot-relocation is enabled, the Volume Manager objects affected by the disk failure may be taken care of automatically. Mail will be sent to `root` indicating what actions were taken by the Volume Manager and what further actions the administrator should take.

Volume Manager Configuration Daemon Error Messages

Detached subdisk in volume

`vxvm:vxconfigd: NOTICE: 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 `vxchg -k rmdisk`. A failing disk is indicated by a `Detached disk disk` message.

- Action

If hot-relocation is enabled, the Volume Manager objects affected by the disk failure may be taken care of automatically. Mail will be sent to `root` indicating what actions were taken by the Volume Manager and what further actions the administrator should take.

Detached volume

`vxvm:vxconfigd: NOTICE: 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 `vxchg -k rmdisk`. A failing disk is indicated by a `Detached disk 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

There is no action to be taken. Contact Customer Support for more information.

Offlining config copy on disk

`vxvm:vxconfigd: NOTICE:`

`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

You should consider replacing the indicated disk, since this error implies that the disk has deteriorated to the point where write errors

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cannot be repaired automatically. This can also result from transient errors, such as cabling problems or power problems. Check for a cabling problem.

Volume entering degraded mode

```
vxvm:vxconfigd: NOTICE: Volume volume entering degraded mode
```

- Description

The detach of a subdisk in the named RAID-5 volume has caused that volume to enter “degraded” mode. While in degraded mode, performance of the RAID-5 volume will be 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, the Volume Manager objects affected by the disk failure may be taken care of automatically. Mail will be sent to `root` indicating what actions were taken by the Volume Manager and what further actions the administrator should take.

vxconfigd Warning Messages

The following are warning messages associated with `vxconfigd`.

```
Bad request: client, portal [REQUEST|DIAG], size
```

```
vxvm:vxconfigd: WARNING:
```

```
Bad request number: client number, portal [REQUEST|DIAG],  
size number
```

- Description

This is a diagnostic message that indicates an invalid request generated by a utility that has connected to `vxconfigd`. This message indicates a bug in that connected utility.

- Action

If you are actually developing a new utility, then this error indicates a bug in your code. Otherwise, this error indicates a bug in the Volume Manager. Contact Customer Support for more information.

```
Cannot change disk group record in kernel
```

Volume Manager Configuration Daemon Error Messages

vxvm:vxconfigd: WARNING:

Cannot change disk group record in kernel: *reason*

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Cannot create device

vxvm:vxconfigd: WARNING: 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

Try removing some files from the root file system. Then, regenerate the device node with the command:

```
vxctl enable
```

Cannot exec `/usr/bin/rm` to remove directory

vxvm:vxconfigd: WARNING:

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, you should restore it from somewhere.

Cannot fork to remove directory

vxvm:vxconfigd: WARNING:

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, then your overall system performance is probably being substantially effected. Consider adding more memory or paging space.

Cannot issue internal transaction

vxvm:vxconfigd: WARNING:

Cannot issue internal transaction: *reason*

- Description

This problem usually occurs only if there is a Volume Manager bug. However, it may occur in cases where memory is low.

- Action

Contact Customer Support for more information.

Cannot open log file

vxvm:vxconfigd: WARNING: Cannot open log file

log_filename*: *reason

- Description

The `vxconfigd` console output log file could not be opened for the given reason. A log file is opened if `-x log` is specified, or if a log file is specified with `-x logfile=file`. The default log file is `/var/vxvm/vxconfigd.log`. The most likely cause for failure is “No

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such file or directory,” which indicates that the directory containing the log file does not exist.

- Action

Create any needed directories, or use a different log file path name.

Detaching plex from volume

vxvm:vxconfigd: WARNING: Detaching plex *plex* from volume *volume*

- Description

The given plex is being detached from the given volume as part of starting the volume. This error only happens for volumes that are started automatically by `vxconfigd` at system startup (i.e., for the root and `/usr` file system volumes). The plex is being detached as a result of an I/O failure, a disk failure during startup or prior to the last system shutdown or crash, or a disk removal prior to the last system shutdown or crash.

- Action

If you want to ensure that the root or `/usr` file system retains the same number of active mirrors, then remove the given plex and add a new mirror using the `vxassist mirror` operation. You might also consider replacing any bad disks before using `vxassist mirror`.

Disk in group flagged as shared; Disk skipped

vxvm:vxconfigd: WARNING:

Disk *disk* in group *group* flagged as shared; Disk skipped

- Description

The given disk is listed as shared, but the running version of Volume Manager does not support shared disk groups. This message can usually be ignored.

- Action

There is no action to take. If you want to use the disk on this system, then use `vxdiskadd` to add the disk for use by the local system. However, do not do that if the disk really is in a shared disk group that is in use by other systems that are sharing this disk.

Disk in group locked by host Disk skipped

```
vxvm:vxconfigd: WARNING:  
Disk disk in group group locked by host hostid Disk  
skipped
```

- Description

The given disk is listed as locked by the host with the listed Volume Manager *hostid* (usually the same as the system hostname). This message can usually be ignored.

- Action

There is no action to take. If you want to use the disk on this system, then use `vxdiskadd` to add the disk for use by the local system. However, *do not* do that if the disk really is in a disk group that is in use by another system that is sharing this disk.

```
Disk in group: Disk device not found
```

```
vxvm:vxconfigd: WARNING: 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 disk IDs stored in the Volume Manager header on a disk and disk IDs stored in the disk group configuration. The configuration contains the official list of disk IDs for all disks in a disk group (the IDs are contained in disk media configuration records). The physical disks are then scanned to match that list against the disk IDs stored in disk headers. 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 failed 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 or DRL log plexes on this disk will be unusable; any RAID-5 subdisks or mirrored plexes containing subdisks on this disk will also be unusable. These disk failures (particularly multiple disk failures) may cause one or more volumes to become unusable.

- Action

Volume Manager Configuration Daemon Error Messages

If hot-relocation is enabled, the Volume Manager objects affected by the disk failure may be taken care of automatically. Mail will be sent to `root` indicating what actions were taken by the Volume Manager and what further actions the administrator should take.

Disk in kernel is not a recognized type

`vxvm:vxconfigd: WARNING:`

Disk *disk* in kernel is not a recognized type

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Disk names group, but group ID differs

`vxvm:vxconfigd: WARNING:`

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 will not have been imported. This can only happen if two disk groups of the same name exist that have different disk group ID values. In that case, one group will be imported along with all its disks and the other group will not. This message will appear for disks in the un-selected group.

- Action

If it turns out that the disk should be imported into the group, then this will have to be done by adding the disk to the group at a later stage. It will not happen automatically as part of the import. All configuration information for the disk will also be lost.

Disk group is disabled, disks not updated with new host ID

`vxvm:vxconfigd: WARNING`

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 of this. This warning message indicates that disks in that disk group were not updated with a new Volume Manager host ID.

This warning message should result only from a `vxctl hostid` 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 Volume Manager host ID for the system. In that case, the disk group should be imported directly using `vxvgimport` with the `-C` option.

Disk group: Disk group log may be too small

vxvm:vxconfigd: WARNING:

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 should normally never happen without first displaying a message about the database area size. 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.

- Action

If this situation does occur, then the disks in the group will have to be explicitly reinitialized with larger log areas (which would require data to be restored from backup). See the `vxdisk(1M)` manual page. To reinitialize all of the disks, they must be detached from the group with which they are associated and then reinitialized and re-added. The disk group should then be deported and re-imported for the changes to the log areas for the group to take effect.

Disk group: Errors in some configuration copies: Disk, copy

Volume Manager Configuration Daemon Error Messages

```
vxvm:vxconfigd: WARNING: Disk group group:
Errors in some configuration copies: Disk disk, copy
number:
[Block number]: reason ...
```

- Description

During a 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.

- Action

There are usually enough configuration copies for any disk group to ensure that these errors do not become a serious problem. No action is usually necessary.

Error in volboot file

```
vxvm:vxconfigd: WARNING:
Error in volboot file: reason Entry: disk device disk_type
disk_info
```

- Description

The `/etc/vx/volboot` file includes an invalid disk entry. This error should occur only if the file was edited directly (for example, using the `vi` editor).

- Action

This is just a warning message. The offending entry can be removed using the command:

```
vxctl rm disk device
```

Failed to store commit status list into kernel

```
vxvm:vxconfigd: WARNING:
Failed to store commit status list into kernel: reason
```

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Failed to update voldinfo area in kernel

vxvm:vxconfigd: WARNING:

Failed to update voldinfo area in kernel: *reason*

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Field too long in volboot file

vxvm:vxconfigd: WARNING:

Field too long in volboot file:

Entry: *disk device disk_type disk_info*

- Description

The `/etc/vx/volboot` file includes a disk entry with a field that is larger than the size the Volume Manager supports. This error should occur only if the file was edited directly (for example, using the `vi` editor).

- Action

This is just a warning message. The offending entry can be removed using the command:

```
vxctl rm disk device
```

Get of record from kernel failed

vxvm:vxconfigd: WARNING:

Get of record *record_name* from kernel failed: *reason*

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Group: Duplicate virtual device number(s)

Volume Manager Configuration Daemon Error Messages

```
vxvm:vxconfigd: WARNING:
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

You should use the `vx dg remminor` operation to renumber all volumes in the offending disk group permanently. See the `vx dg(1M)` manual page for more information.

```
Internal transaction failed
```

```
vxvm:vxconfigd: WARNING: Internal transaction failed:
reason
```

- Description

This problem usually occurs only if there is a Volume Manager bug. However, it may occur in cases where memory is low.

- Action

Contact Customer Support for more information.

```
cannot remove group from kernel
```

```
vxvm:vxconfigd: WARNING:
cannot remove group group from kernel: reason
```

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

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`client not recognized by VXVM library`

`vxvm:vxconfigd: WARNING:`

`client number not recognized by VXVM library`

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

`client not recognized`

`vxvm:vxconfigd: WARNING: client number not recognized`

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

`library and vxconfigd disagree on existence of client`

`vxvm:vxconfigd: WARNING:`

`library and vxconfigd disagree on existence of client number`

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

`library specified non-existent client`

`vxvm:vxconfigd: WARNING:`

`library specified non-existent client number`

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

`response to client failed`

`vxvm:vxconfigd: WARNING: response to client number
failed: reason`

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

`vold_turnclient failed`

`vxvm:vxconfigd: WARNING: vold_turnclient(number) failed
reason`

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

DMP Error Messages

Path Failure detected by vxdump driver

`vxvm:vxdump:NOTICE: Path failure on <major>/<minor>`

- Description

Appears when a path under the control of the DMP driver fails. The device number of the failed path is part of the message.

- Action

None.

Load of sd driver failed

`vxvm:vxdump:NOTICE: Could not load sd driver`

- Description

Appears when a path under the control of the DMP driver fails. The device number of the failed path is part of the message.

- Action

None.

Install of sd driver failed

`vxvm:vxdump:NOTICE: Could not install sd driver`

- Description

During initialization, if the vxdump driver tries to load the sd driver. If the attempt fails, this message appears.

- Action

None.

Can't lock sd driver

`vxvm:vxdump:NOTICE: could not lock sd driver`

- Description

The sd driver is locked during vxdump driver initialization to avoid unloading of the driver. The message is printed when the sd driver cannot be locked.

- Action

None.

Load of `ssd` driver failed

`vxvm:vxndmp:NOTICE: Could not load ssd driver`

- Description

Appears when a path under the control of the DMP driver fails. The device number of the failed path is part of the message.

- Action

None.

Install of `ssd` driver failed

`vxvm:vxndmp:NOTICE: Could not install ssd driver`

- Description

During initialization, the `vxndmp` driver tries to load the `ssd` driver. If the attempt fails, this message appears.

- Action

None.

Can't lock `ssd` driver

`vxvm:vxndmp:NOTICE: could not lock ssd driver`

- Description

The `ssd` driver is locked during `vxndmp` driver initialization to avoid unloading of the driver. The message is printed when the `ssd` driver cannot be locked.

- Action

None.

Attempt to disable controller failed

`vxvm:vxndmp:NOTICE:Attempt to disable controller controller_name failed. Rootdisk has just one enabled path.`

- Description

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DMP Error Messages

There is only one remaining active path to the root disk. This cannot be disabled. The user is trying to disable a controller accessible through this path.

- Action

Do not try to disable this controller. This is not allowed.

Disabled path belonging to `dmpnode`

```
vxvm:vxddmp:NOTICE:  
disabled path path device number belonging to dmpnode  
dmpnode device  
number
```

- Description

The path with the device number indicated by the message, has been marked disabled in the DMP database. This path is controlled by the DMP node indicated by the specified device number. This could have happened due to a hardware failure.

- Action

Check the underlying hardware in case you want to recover the desired path.

Enabled path belonging to `dmpnode`

```
vxvm:vxddmp:NOTICE:  
enabled path path device number belonging to dmpnode  
dmpnode device  
number
```

- Description

The path with the device number indicated by the message, has been marked enabled in the DMP database. This path is controlled by the DMP node indicated by the specified device number. This can happen if a previously disabled path has been repaired and the user has reconfigured the DMP database using the `vxddctl(1M)` command or, automatically.

- Action

None.

Disabled `dmpnode`

```
vxvm:vxddmp:NOTICE:disabled dmpnode dmpnode device number
```

- Description

The dmpnode with the device number indicated in the message, has been marked disabled in the DMP database. It will no longer be accessible to further IOs. It happens when all paths controlled by a DMP node are in the disabled state, and therefore inaccessible.

- Action

Check hardware or enable the appropriate controllers in order to get at least one path under this dmpnode in the enabled state. This will enable the dmpnode specified.

Enabled dmpnode

```
vxvm:vxdump:NOTICE:enabled dmpnode dmpnode device number
```

- Description

The dmpnode with the device number indicated by the message has been marked enabled in the DMP database. It will now allow IOs. This happens when at least one path controlled by this dmpnode has been enabled.

- Action

None.

Disabled controller connected to a disk array

```
vxvm:vxdump:NOTICE:  
disabled controller controller name connected to disk  
array  
disk array serial number
```

- Description

All paths that go through the specified controller connected to the specified disk array, are in disabled state. This happens user chooses to disable a particular controller for maintenance tasks.

- Action

None.

Enabled controller connected to a disk array

```
vxvm:vxdump:NOTICE:  
enabled controller controller name connected to disk
```

Error Messages

DMP Error Messages

`array`
`disk array serial number`

- Description
All paths that go through the specified controller connected to the specified disk array, have been put into enabled state. This happens when the user chooses to enable a particular controller.
- Action
None.

`Removed disk array`

`vxvm:vxndmp:NOTICE:removed disk array disk array serial number`

- Description
The specified disk array has been disconnected from the host or some hardware failure has resulted in the disk array becoming inaccessible to the host.
- Action
None.

`Added disk array`

`vxvm:vxndmp:NOTICE:added disk array disk array serial number`

- Description
The new disk array has been added to the host.
- Action
None.

`Attempt to enable a controller that is not available`

`vxvm:vxndmpadm:ERROR:`

`Attempt to enable a controller that is not available`

- Description
This message is returned by the `vxndmpadm` utility when an attempt to enable a controller that is not working or physically present is made. To enable a controller, it should be visible to the OS and I/Os should be possible through it.

- Action

Check hardware and see if this controller is present and I/Os can be done through it

Attempt to enable a controller that is not available

`vxvm:vxddmpadm:ERROR:`

Attempt to enable a controller that is not available

- Description

This message is returned by the `vxddmpadm` utility when an attempt to enable a controller that is not working or physically present is made. To enable a controller, it should be visible to the OS and I/Os should be possible through it.

- Action

Check hardware and see if this controller is present and I/Os can be done through it

Attempt to start the restore daemon that is already running

`vxvm:vxddmpadm: ERROR:The VxVM restore daemon is already running. To change any of its parameters, stop and restart the restore daemon with the new set of arguments.`

- Description

`vxddmpadm` utility returns this error message when the `vxddmpadm start restore` command is executed while the restore daemon is running.

- Action

Stop the restore daemon. Restart the restore daemon with the required set of parameters.

Attempt to disable the last enabled path to a device

`vxvm:vxddmpadm: ERROR: 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.

Error Messages

DMP Error Messages

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

Cluster Error Messages

This section presents error messages that may occur with the Volume Manager in a cluster environment. Each message is accompanied by an explanation and a suggested user action.

NOTE

Some of these messages may appear on the console; others are returned by `vxclust`.

Attempt to start the restore daemon that is already running

`vxvm:vxdumpadm: ERROR:The VxVM restore daemon is already running. To change any of its parameters, stop and restart the restore daemon with the new set of arguments.`

- Description

`vxdumpadm` utility returns this error message when the `vxdumpadm start restore` command is executed while the restore daemon is running.

- Action

Stop the restore daemon. Restart the restore daemon with the required set of parameters.

Error in cluster processing

- Description

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

- Action

Make sure that the operation can be performed in the current environment.

Cannot find disk on slave node

Error Messages

Cluster Error Messages

- Description

A slave node cannot find a shared disk. This is accompanied by the `syslog` message:

```
vxvm:vxconfigd 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 `vxdisk list` and make sure that the same set of disks with the `shared` flag is visible on both nodes. If not, check connections to the disks.

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.

vxclust not there

- Description

An error during an attempt to join the 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.

Unable to add portal for cluster

- Description

`vxconfigd` was not able to create a portal for communication with the `vxconfigd` on the other node. This may happen in a degraded system that is experiencing shortages of system resources (such as memory or file descriptors).

- Action

If the system does not appear to be degraded, stop and restart `vxconfigd` and try again.

Vol recovery in progress

- Description

A node that crashed attempted to rejoin the cluster before its DRL map was merged into the recovery map.

- Action

Retry the join again later (when the merge operation has completed).

Cannot assign minor #

- Description

The slave attempted to join, but an existing volume on the slave has the same minor number as a shared volume on the master.

This message should be accompanied by the following console message:

```
WARNING vxvm:vxconfigd minor number ### disk group group in use
```

- Action

Before retrying the join, use `vx dg remminor diskgroup ###` (see the `vx dg(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 `remminor` operation will not take effect until the disk group is deported and updated either explicitly or through system restart.

Master sent no data

- Description

During the slave join protocol, a message without data was received. This message is only likely to be seen in the case of a programming error.

- Action

Contact Customer Support for more information.

Join in progress

- Description

Error Messages

Cluster Error Messages

An attempt was made to import or deport a shared disk group during a cluster reconfiguration.

- Action

Retry later.

Join not allowed now

- Description

A slave attempted to join the cluster when the master was not ready. The slave will retry automatically. If the retry succeeds, the following message should appear:

`vxclust: slave join complete`

- Action

No action is necessary if the join eventually completes. Otherwise, investigate the cluster monitor on the master.

Disk reserved by other host

- Description

An attempt to online a disk whose controller has been reserved by another host will fail with this error.

- Action

No action is necessary. The cluster manager will free the disk and the Volume Manager will online it when the node joins the cluster.

Group exists

`vxvm:vxconfigd: group group exists`

- Description

The slave tried to join the cluster, but there is already a shared disk group in the cluster with the same name as one of its private disk groups.

- Action

Use the `vx dg newname` operation to rename either the shared disk group on the master or the private disk group on the slave.

Plex detached from volume

```
WARNING: vxvm:vxio: Plex plex detached from volume volume  
NOTICE: vol_kmsg_send_wait_callback: got error 22  
NOTICE: commit: NOTE: Reason found for abort: code=6
```

- Description

These messages may appear during a plex detach operation on a slave.

- Action

These messages provide information and require no user action.

```
Read error on Plex of shared volume; Plex detached from  
volume
```

```
WARNING: vxvm:vxio: read error on Plex plex of shared  
volume
```

```
volume offset 10 length 1
```

```
WARNING: vxvm:vxio: Plex plex detached from volume volume
```

```
NOTICE: commit: NOTE: Reason found for abort: code=2
```

```
NOTICE: ktcvm_check: sent to slave node: node=1 mid=196
```

- Description

These messages may appear during a plex detach operation on the master.

- Action

These messages provide information and require no user action.

```
Return from cluster_establish is Configuration daemon  
error 242
```

- Description

This error may occur when a node fails to join the cluster or when a cluster join takes a long time. If the join fails, the node should retry the join automatically.

- Action

No action is necessary if the join is slow or a retry eventually succeeds.

```
Missing vxconfigd
```

- Description

The vxconfigd daemon is not running.

Error Messages

Cluster Error Messages

- Action

Restart the `vxconfigd` daemon.

```
vxconfigd not ready
```

```
node #: vxconfigd is not communicating properly
```

- Description

The `vxconfigd` daemon is not responding properly.

- Action

Stop and restart the `vxconfigd` daemon.

```
vxiod count must be above # to join cluster
```

```
ERROR: vxiod count must be above 5 to join cluster
```

- Description

The number of Volume Manager kernel daemons (`vxiod`) is less than the minimum number needed to join the cluster.

- Action

Increase the number of daemons using `vxiod`.

```
Insufficient DRL log size: logging is disabled.
```

- Description

A volume with an insufficient DRL log size was started. The volume gets started successfully, but DRL logging is disabled and a full recovery is performed.

- Action

Create a new DRL of sufficient size.

```
This node was running different CM. Please Reboot.
```

- Description

VxVM supports clustering under the control of various cluster managers. However, once a node joins the cluster under a particular cluster manager, it cannot be restarted under a different cluster manager until it is rebooted.

- Action

Reboot the host machine if the cluster must be started under a different cluster manager.

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.

Node activation conflict

- Description

The disk group could not be activated because it is activated in a conflicting mode on another node in the cluster.

- Action

Retry later, or deactivate the disk group on conflicting nodes.

Incorrect protocol version *num* in volboot file

- Description

This message may appear when a node attempts to join the cluster if VxVM software was incorrectly upgraded or the volboot file is corrupted.

- Action

Verify the supported cluster protocol versions using `vxdctl protocolversion`, and reinstall the Volume Manager if necessary.

Retry rolling upgrade

- Description

An attempt was made to upgrade the cluster to a higher protocol version when a transaction was in progress.

- Action

Retry later.

Error Messages

Cluster Error Messages

Version out of range for at least one node

- Description

One or more nodes in the cluster do not support the protocol version that would result from a protocol upgrade.

- Action

Make sure that the latest version of VxVM is installed on all nodes in the cluster.

Upgrade operation failed: Version out of range for at least one node

- Description

Before trying to upgrade a cluster by running `vxctl upgrade`, all the nodes should be able to support the new protocol version. If at least one of them doesn't support the the new protocol version, an upgrade can fail.

- Action

Make sure that the VxVM package that supports the new protocol version is installed on all nodes and retry the upgrade.

Upgrade operation failed: Error in cluster processing

- Description

The cluster protocol upgrade must be done on the master and cannot be done from a slave node.

- Action

Retry the `vxctl upgrade` command on the master node.

CVM protocol version out of range

- Description

When a node joins the cluster, it tries to join at a 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 VxVM release installed that supports the current protocol version of the cluster.

ERROR: upgrade operation failed: Already at highest version

- Description

The message conveys that the upgrade operation has failed because the cluster is already running at the highest protocol version that the master supports.

- Action

No further action is necessary as the master is already running at the highest protocol version it can support.

Not in cluster

- Description

Checking for the current protocol version (`vxctl protocolversion`) makes sense only if the node is in the cluster.

- Action

Bring the node in the cluster and retry.

Incorrect protocol version (15) in volboot file.

- Description

The `volboot` file contains an incorrect protocol version. It has either been corrupted or edited manually. The `volboot` file should always have a supported protocol version in it before trying to bring the node into the cluster.

- Action

Run `vxctl init`. This writes a valid protocol version in the `volboot` file. Restart `vxconfigd` and retry the join.

Upgrade operation failed: Retry rolling upgrade

- Description

No transactions should be in progress when an upgrade is tried.

- Action

Retry the upgrade later.

Kernel Error Messages

The following sections cover the kernel level error messages.

Kernel Notice Messages

The following are notice messages associated with the kernel.

Can't open disk in group

```
vxvm:vxio:NOTICE: Can't open disk disk in group  
disk_group.
```

If it is removable media (like a floppy), it may not be mounted

or ready. Otherwise, there may be problems with the drive.

Kernel error code *number*

- Description

The named disk cannot be accessed in the named disk group.

- Action

Ensure that the disk exists, is powered on, and is visible to the system.

Can't close disk in group

```
vxvm:vxio:NOTICE: Can't close disk disk in group  
disk_group. If it
```

is removable media (like a floppy), it may have been removed.

Otherwise, there may be problems with the drive. Kernel error

code *public_region_error/private_region_error*

- Description

This is unlikely to happen; closes cannot fail.

- Action

None.

Read error on object of mirror in volume corrected


```
vxvm:vxio:NOTICE: 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

No action is required. The problem was corrected automatically. The administrator may, however, note the failure as a reference because if the same region fails again or frequently, the error could indicate a more insidious failure and the disk should be reformatted at the next reasonable opportunity.

String on volume device in disk group

```
vxvm:vxio:NOTICE:  
string on volume device_# (device_name) in disk group  
group_name
```

- Description

An application requested message. The application running on top of the Volume Manager has requested the output of this message.

- Action

Refer to documentation for the appropriate application for more information.

Kernel Warning Messages

The following are warning messages associated with the kernel.

Received spurious close

```
vxvm:vxio:WARNING: Device major, minor: Received spurious  
close
```

- Description

This message happens if a close was received for an object that was previously not opened. This will only happen if the operating system is not correctly tracking opens and closes.

Error Messages

Kernel Error Messages

- Action

No action is necessary; the system will continue.

```
Failed to log the detach of the DRL volume
```

```
vxvm:vxio:WARNING:
```

```
Failed to log the detach of the DRL volume volume
```

- Description

An attempt to write a kernel log entry indicating the loss of a DRL volume failed. 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 will become detached.

- Action

Messages about log failures are often 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 (i.e. the drive cannot be fixed and brought back online without data loss), the disk group must be recreated from scratch and all of its volumes must be restored from backup. Even if the problem is transient, the system must be rebooted after correcting the problem.

If error messages were seen from the disk driver, it is likely that the last copy of the log failed due to a disk error. The failed drive in the disk group should be replaced and the log will then be re-initialized on the new drive. The failed volume can then be forced into an active state and the data recovered.

```
DRL volume is detached
```

```
vxvm:vxio:WARNING: DRL volume volume is detached
```

- Description

A Dirty Region Logging volume became detached because a DRL log entry could not be written. This might be because of a media failure, in which case other errors may have been logged to the console.

- Action

The volume containing the DRL log will continue. If the system fails before the DRL can be repaired, a full recovery of the volume's contents may be necessary and will be performed automatically when

the system is restarted. To recover the DRL capability, a new DRL log should be added to the volume using the `vxassist addlog` command.

Read error on mirror of volume

```
vxvm:vxio:WARNING:  
read error on mirror plex of volume volume offset offset  
length length
```

- Description

An error was detected while reading a mirror. This error may lead to further action shown by later error messages.

- Action

If the volume is mirrored, no action is necessary at this time 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 marginal region on the disk at the position shown. It may eventually be necessary to remove data from this disk (see the `vxevac(1M)` manual page) and then to reformat the drive. In the unmirrored case, 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.

Write error on mirror of volume offset length

```
vxvm:vxio:WARNING: write error on mirror plex of volume  
volume  
offset offset length length
```

- Description

An error was detected while writing a mirror. This error will generally be followed by a detach message, unless the volume is un-mirrored.

- Action

The disk reporting the error is failing to correctly store written data. If the volume is not mirrored, consider removing the data and reformatting the disk. If the volume is mirrored, it will become detached and you should consider replacing or reformatting the disk.

Error Messages

Kernel Error Messages

If this error occurs often but never leads to a plex detach, there may be a marginal region on the disk at the position shown. It may eventually be necessary to remove data from this disk (see the `vxevac(1M)` manual page) and then to reformat the drive.

Object detached from volume

`vxvm:vxio:WARNING: object 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 evacuated and reformatted, if possible. If the drive has failed completely, it may need to be replaced.

Overlapping mirror detached from volume

`vxvm:vxio:WARNING: Overlapping mirror plex detached from volume volume`

- Description

An error has occurred on the last complete plex in the mirrored volume. Any sparse mirrors that map the failing region must be detached so that they cannot be accessed to satisfy that failed region inconsistently. This message indicates that such an overlapping mirror was found and is being detached.

- Action

No Action is directly necessary. The message indicates that the volume may have left some data inaccessible at the failing region and that it is no longer redundantly stored.

Kernel log full

`vxvm:vxio:WARNING: 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 could ever occur. The only corrective action for the detached volume is to reboot the system.

Kernel log update failed

```
vxvm:vxio:WARNING: Kernel log update failed: volume detached
```

- Description

A plex detach failed because the kernel log could not be flushed to disk. As a result, the mirrored volume will become detached. This could be caused by all the disks containing a kernel log going bad.

- Action

Correct the failed disks so that kernel logging can once again function.

Detaching RAID-5 volume

```
vxvm:vxio:WARNING: detaching RAID-5 raidvol
```

- 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 drives were lost due to a controller or power failure, then once the disks can be re-attached to the system, they should be recovered using the `vxrecover` utility. Check the console for other errors that may provide additional information as to the nature of the failure.

Object detached from RAID-5 volume

```
vxvm:vxio:WARNING: object subdisk detached from RAID-5 raidvol at column column offset offset
```

- Description

A subdisk was detached from a RAID-5 volume at the specified column number and offset. This is caused by the failure of a disk or an uncorrectable error occurring on that disk.

- Action

Error Messages

Kernel Error Messages

Check the console for other error messages indicating the cause of the failure. If the disk has failed, then it should be replaced as soon as possible.

RAID-5 volume entering degraded mode operation

vxvm:vxio:WARNING: RAID-5 *raidvol* entering degraded mode operation

- Description

This message occurs when an uncorrectable error has forced the detach of a subdisk. At this point, not all data disks exist to provide the data upon request. Instead, parity regions are required to regenerate the data for each stripe in the array. Accesses will consequently take longer and will involve reading from all drives in the stripe.

- Action

Check the console for other error messages indicating the cause of the failure. If the disk has failed, it should be replaced as soon as possible.

Double failure condition detected on RAID-5 volume

vxvm:vxio:WARNING: Double failure condition detected on RAID-5 *raidvol*

- Description

Double-failures occur if I/O errors are received at the same altitude in the array from more than one column of the array. This could be caused by a controller failure causing more than a single drive to become unavailable; by the loss of a second drive after having run in a degraded state for significant periods of time; or by two separate disk drives failing simultaneously (which is unlikely to happen).

- Action

If the condition is correctable and the drives recoverable, the conditions should be corrected. The volume can then be recovered using the `vxrecover(1M)` command.

Failure in RAID-5 logging operation

**vxvm:vxio:WARNING: Failure in RAID-5 logging operation
vxvm:vxio:WARNING: log object *object_name* detached from RAID-5 volume**

- Description

These two messages will appear together when a RAID-5 log has failed and has been detached.

- Action

To restore RAID-5 logging to the RAID-5 volume, simply create a new log region and attach it to the volume.

Stranded ilock on object

```
vxvm:vxio:WARNING: check_ilocks:  
stranded ilock on object_name start offset len length
```

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Overlapping ilocks

```
vxvm:vxio:WARNING: check_ilocks: overlapping ilocks:  
offset for length, offset for length
```

- Description

This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.

- Action

Contact Customer Support for more information.

Illegal vminor encountered

```
vxvm:vxio:WARNING: Illegal vminor encountered
```

- Description

If a volume device other than the root volume device is opened before a configuration has been loaded, this message could result.

- Action

No action should be necessary; an attempt to access a volume device was made before the volume daemon (`vxconfigd`) loaded the volume configuration. Under normal startup conditions, this message should

Error Messages

Kernel Error Messages

not occur. If the operation is necessary, start the Volume Manager and re-attempt the operation.

Uncorrectable read error

```
vxvm:vxio:WARNING: object_type object_name block offset:  
Uncorrectable read error
```

- Description

A read or write operation from the specified object failed. An error will be returned to the application.

- Action

This error represents lost data. The data may need to be restored and failed media may need to be repaired. Depending on the type of object failing and on the type of recovery suggested for that type, an appropriate recovery operation may be necessary.

Uncorrectable read/write error

```
vxvm:vxio:WARNING: object_type object_name block offset:  
Uncorrectable read error on object_type object_name block  
offset  
vxvm:vxio:WARNING: object_type object_name block offset:  
Uncorrectable write error on object_type object_name block  
offset
```

- Description

A read or write operation from the specified object failed. An error will be returned to the application. Although similar to the previous message, this message is able to supply more specific information about the failing object.

- Action

This error represents lost data. The data may need to be restored and failed media may need to be repaired. Depending on the type of object failing and on the type of recovery suggested for that type, an appropriate recovery operation may be necessary.

Root volumes are not supported on your PROM version

```
vxvm:vxio:WARNING: Root volumes are not supported on  
your PROM  
version.
```


- Description

The Volume Manager requires the ability to access the PROMs for your SPARC hardware. If the PROMs are not a recent OpenBoot PROM type, then root volumes will not be usable.

- Action

If you have set up a root volume, then undo the configuration (by running `vxunroot` or removing the `rootdev` line from `/etc/system`) as soon as possible and contact your hardware vendor for an upgrade to your PROM level.

`Cannot find device number`

```
vxvm:vxio:WARNING: Cannot find device number for  
boot_path
```

- Description

The supplied boot path was retrieved from the PROMs for your system. It cannot be converted to a valid device number.

- Action

Check your PROM settings for the correct boot string.

`mod_install returned errno`

```
vxvm:vxio:WARNING: mod_install returned errno
```

- Description

A call made to the operating system `mod_install()` function to load the `vxio` driver failed.

- Action

Check your console for additional 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.

`subdisk failed in plex in volume`

```
vxvm:vxio:WARNING:  
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.

Error Messages

Kernel Error Messages

- Action
Check for obvious problems with the disk (such as a disconnected cable). If hot-relocation is enabled and the disk is failing, the subdisk failure may be taken care of automatically.

Kernel Panic Messages

The following are panic messages associated with the kernel.

`Object association depth overflow`

`vxvm:vxio:PANIC: Object association depth overflow`

- Description
This is an internal Volume Manager problem. This warning should not occur unless there is a bug in the Volume Manager.
- Action
Contact Customer Support for more information.

3 **Disk Arrays**

Introduction

This chapter describes traditional disk arrays and provides a general overview of available arrays.

Disk Array Overview

This section provides an overview of traditional disk arrays.

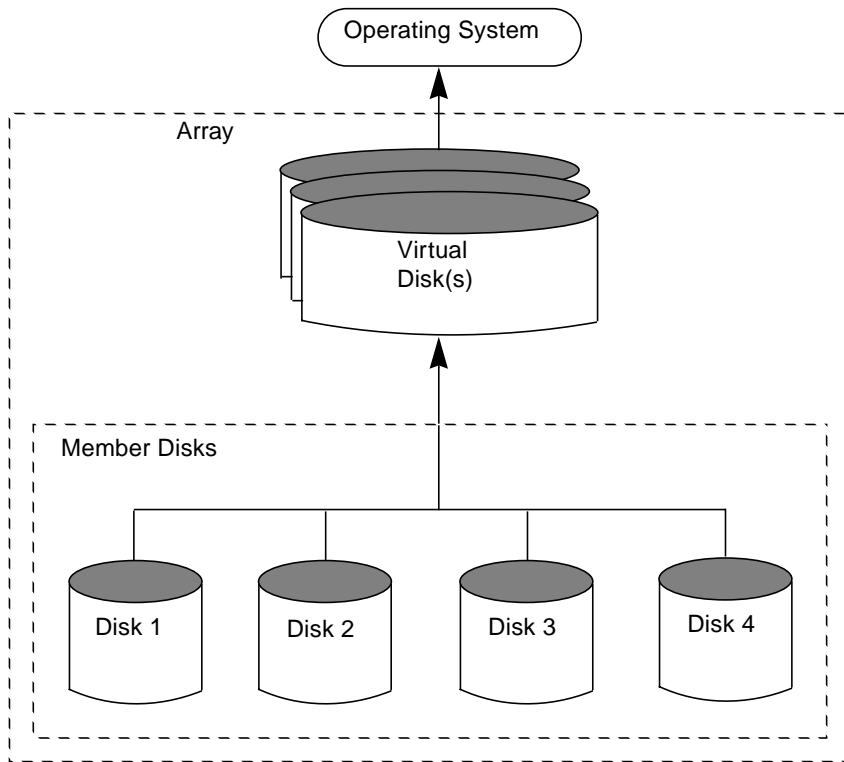
Performing I/O to disks is a slow process because disks are physical devices that require time to move the heads to the correct position on the disk before reading or writing. If all of the read or write operations are done to individual disks, one at a time, the read-write time can become unmanageable. Performing these operations on multiple disks can help to reduce this problem.

A *disk array* is a collection of disks that appears to the system as one or more virtual disks (also referred to as *volumes*). The virtual disks created by the software controlling the disk array look and act (to the system) like physical disks. Applications that interact with physical disks should work exactly the same with the virtual disks created by the array.

Data is spread across several disks within an array, which allows the disks to share I/O operations. The use of multiple disks for I/O improves I/O performance by increasing the data transfer speed and the overall throughput for the array.

Figure 3-1, “Standard Disk Array,” shows a standard disk array.

Figure 3-1 **Standard Disk Array**



Redundant Arrays of Independent Disks (RAID)

A *Redundant Array of Independent Disks (RAID)* is a disk array set up so that part of the combined storage capacity is used for storing duplicate information about the data stored in the array. The duplicate information allows you to regenerate the data in case of a disk failure.

Several levels of RAID exist. These are introduced in the following sections.

NOTE

The Volume Manager supports RAID levels 0, 1, and 5 only.

Volume Manager's implementations of RAID is described in the "Introduction to" Volume Manager" chapter of the *VERITAS Volume Manager Administrator's Guide*.

RAID-0

Although it does not provide redundancy, striping is often referred to as a form of RAID, known as RAID-0. The Volume Manager's implementation of striping is described in the "Introduction to Volume Manager" chapter of the *VERITAS Volume Manager Administrator's Guide*. RAID-0 offers a high data transfer rate and high I/O throughput, but suffers lower reliability and availability than a single disk.

RAID-1

Mirroring is a form of RAID, which is known as RAID-1. The Volume Manager's implementation of mirroring is described in the "Introduction to Volume Manager" chapter of the *VERITAS Volume Manager Administrator's Guide*. Mirroring uses equal amounts of disk capacity to store the original plex and its mirror. Everything written to the original plex is also written to any mirrors. RAID-1 provides redundancy of data and offers protection against data loss in the event of physical disk failure.

RAID-2

RAID-2 uses bitwise striping across disks and uses additional disks to hold Hamming code check bits. RAID-2 is described in a University of California at Berkeley research paper entitled *A Case for Redundant Arrays of Inexpensive Disks (RAID)*, by David A. Patterson, Garth Gibson, and Randy H. Katz (1987).

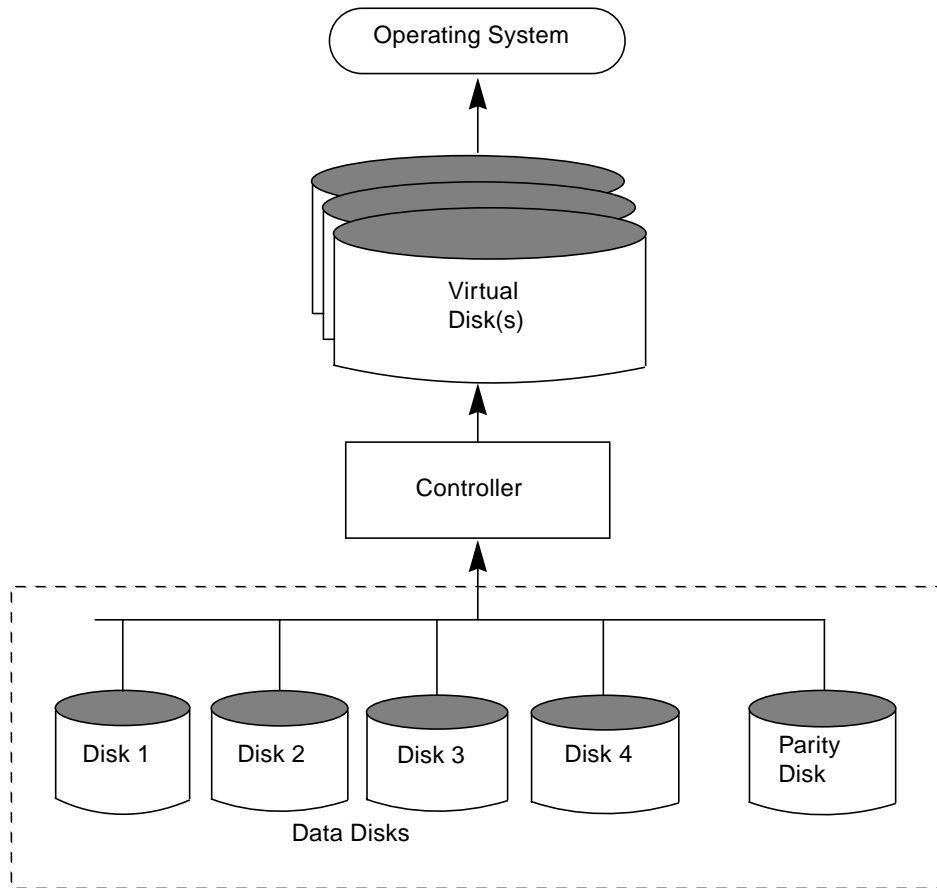
RAID-2 deals with error detection, but does not provide error correction. RAID-2 also requires large system block sizes, which limits its use.

RAID-3

RAID-3 uses a *parity disk* to provide redundancy. RAID-3 distributes the data in stripes across all but one of the disks in the array. It then writes the parity in the corresponding stripe on the remaining disk. This disk is the parity disk.

Figure 3-2, "RAID-3 Disk Array," shows a RAID-3 disk array.

Figure 3-2 RAID-3 Disk Array

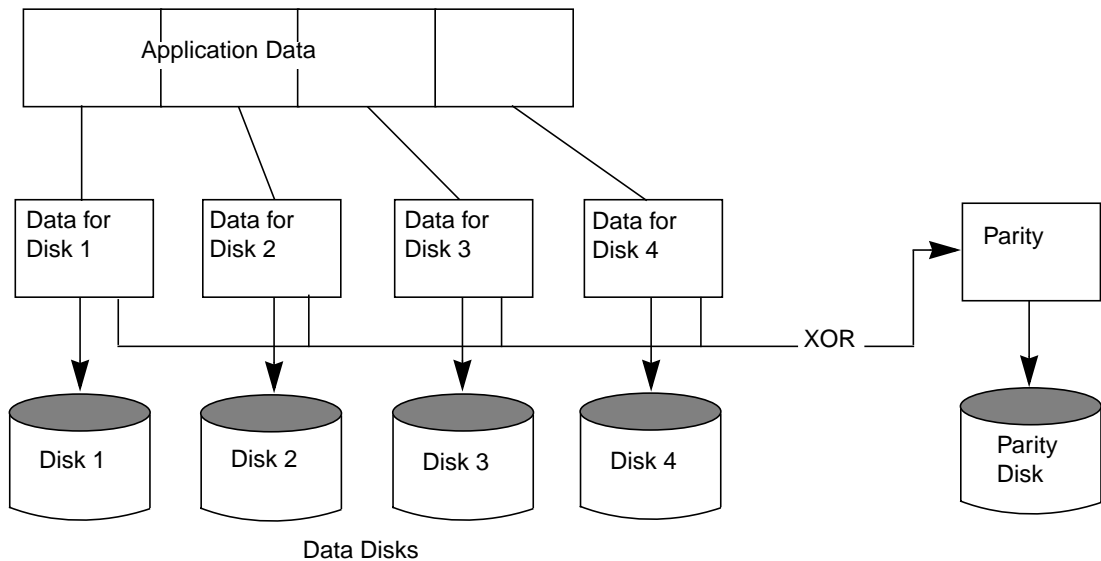


The user data is striped across the data disks. Each stripe on the parity disk contains the result of an exclusive OR (XOR) procedure done on the data in the data disks. If the data on one of the disks is inaccessible due to hardware or software failure, data can be restored by XORing the contents of the remaining data disks with the parity disk. The data on the failed disk can be rebuilt from the output of the XOR process.

RAID-3 typically uses a very small stripe unit size (also historically known as a *stripe width*), sometimes as small as one byte per disk (which requires special hardware) or one sector (block) per disk.

Figure 3-3, “Data Writes to RAID-3,” shows a data write to a RAID-3 array.

Figure 3-3 **Data Writes to RAID-3**



The parity disk model uses less disk space than mirroring, which uses equal amounts of storage capacity for the original data and the copy.

The RAID-3 model is often used with synchronized spindles in the disk devices. This synchronizes the disk rotation, providing constant rotational delay. This is useful in large parallel writes.

RAID-3 type performance can be emulated by configuring RAID-5 (described later) with very small stripe units.

RAID-4

RAID-4 introduces the use of independent-access arrays (also used by RAID-5). With this model, the system does not typically access all disks in the array when executing a single I/O procedure. This is achieved by ensuring that the stripe unit size is sufficiently large that the majority of I/Os to the array will only affect a single disk (for reads).

Disk Arrays

Disk Array Overview

An array attempts to provide the highest rate of data transfer by spreading the I/O load as evenly as possible across all the disks in the array. In RAID-3, the I/O load is spread across the data disks, as shown in Figure 3-3, “Data Writes to RAID-3,” and each write is executed on all the disks in the array. The data in the data disk is XORed and the parity is written to the parity disk.

RAID-4 maps data and uses parity in the same manner as RAID-3, by striping the data across all the data disks and XORing the data for the information on the parity disk. The difference between RAID-3 and RAID-4 is that RAID-3 accesses all the disks at one time and RAID-4 accesses each disk independently. This allows the RAID-4 array to execute multiple I/O requests simultaneously (provided they map to different member disks), while RAID-3 can only execute one I/O request at a time.

RAID-4 read performance is much higher than its write performance. It performs well with applications requiring high read I/O rates. RAID-4 performance is not as high in small, write-intensive applications.

The parity disk can cause a bottleneck in the performance of RAID-4. This is because all the writes that are taking place simultaneously on the data disks must each wait its turn to write to the parity disk. The transfer rate of the entire RAID-4 array in a write-intensive application is limited to the transfer rate of the parity disk.

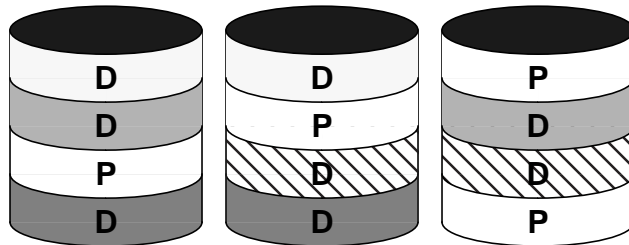
Since RAID-4 is limited to parity on one disk only, it is less useful than RAID-5.

RAID-5

RAID-5 is similar to RAID-4, using striping to spread the data over all the disks in the array and using independent access. However, RAID-5 differs from RAID-4 in that the parity is striped across all the disks in the array, rather than being concentrated on a single parity disk. This breaks the write bottleneck caused by the single parity disk write in the RAID-4 model.

Figure 3-4, “Parity Locations in a RAID-5 Model,” shows parity locations in a RAID-5 array configuration. Every stripe has a column containing a parity stripe unit and columns containing data. The parity is spread over all of the disks in the array, reducing the write time for large independent writes because the writes do not have to wait until a single parity disk can accept the data.

Figure 3-4 Parity Locations in a RAID-5 Model



D = Data Stripe Unit
P = Parity Stripe Unit

RAID-5 and how it is implemented by the Volume Manager is described in the “Introduction to Volume Manager” chapter of the *VERITAS Volume Manager Administrator’s Guide*.

Multipathed Disk Arrays

Some disk arrays provide multiple ports to access their disk devices. These ports, coupled with the HBA (Host Bus Adaptor) controller and any array-local data bus and I/O processor, make up multiple hardware paths to access the disk devices. Such disk arrays are called *multipathed disk arrays*. This type of disk array can be connected to host systems in many different configurations, (such as multiple ports connected to different controllers on a single host, chaining of the ports through a single controller on a host, or ports connected to different hosts simultaneously).

Multipathed disk arrays can be classified as either Active/Active type, or Active/Passive type.

Active/Passive Type Disk Arrays

This type of disk array designates one of the multiple paths to a disk device as the primary path, and the others as secondary paths. Access to a disk is enabled through its primary path. If the primary path fails, one of the secondary paths is made the new primary path to the disk device, either automatically, or through administrator intervention. Access to the disk device through a secondary path may be disabled, or may degrade system performance severely.

In this type of disk array, a disk device is bound to one of the redundant hardware components local to the disk array, (for example, the I/O bus, I/O controller, cache and access port). This disk is then said to be owned by the port, and the I/O path through that port is designated as the active path

Some disk arrays have a mode setting, called autotresspass mode, in which the disk arrays automatically mark a path as primary path when I/O is attempted through that path. This switch of primary path is an expensive operation, and degrades the performance of the disk array severely if different paths are used to access the disk alternately, by the same or different hosts.

Active/Active Type Disk Arrays

This type of disk array allows access to the disk devices simultaneously (at any time) through all the paths that are available, without significant performance degradation. Thus, all the paths are active all the time, except for failed paths.

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