

VERITAS Volume Manager 4.1

Hardware Notes

Solaris x64 Platform Edition

Maintenance Pack 1

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VERITAS Software Corporation
350 Ellis Street
Mountain View, CA 94043
USA
Phone 650-527-8000 Fax 650-527-2908
www.veritas.com

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Preface

The *VERITAS Volume Manager Hardware Notes* provides hardware information for VERITAS Volume Manager (VxVM) 4.1 Maintenance Pack 1 (MP1).

This guide is intended for system administrators responsible for installing, configuring, and maintaining systems under the control of VxVM. The purpose of this manual is to provide the system administrator with information on hardware requirements for VxVM 4.1 MP1.

This guide assumes that you have a:

- ◆ working knowledge of the Solaris™ operating system
- ◆ basic understanding of Solaris system administration
- ◆ basic understanding of storage management

This manual describes how to use the VxVM command line interface for administering hardware with VxVM. Detailed descriptions of the VxVM commands and utilities, their options, and details on their use are located in the VxVM manual pages.

Note Most VxVM commands require superuser or other appropriate privileges.



Conventions

Convention	Usage	Example
monospace	Used for path names, commands, output, directory and file names, functions, and parameters.	Read tunables from the <code>/etc/vx/tunefstab</code> file. See the <code>ls(1)</code> manual page for more information.
monospace (bold)	Indicates user input.	# ls pubs C:\> dir pubs
<i>italic</i>	Identifies book titles, new terms, emphasized text, and variables replaced with a name or value.	See the <i>User's Guide</i> for details. The variable <i>system_name</i> indicates the system on which to enter the command.
bold	Depicts GUI objects, such as fields, list boxes, menu selections, etc. Also depicts GUI commands.	Enter your password in the Password field. Press Return .
blue text	Indicates hypertext links.	See " Getting Help " on page vii.
#	Unix superuser prompt (all shells).	# cp /pubs/4.0/user_book /release_mgnt/4.0/archive
C:\>	Windows user prompt.	C:\> copy \pubs\4.0\user_book c:\release_mgnt\4.0\archive

Getting Help

For technical assistance, visit <http://support.veritas.com> and select phone or email support. This site also provides access to resources such as TechNotes, product alerts, software downloads, hardware compatibility lists, and the VERITAS customer email notification service. Use the Knowledge Base Search feature to access additional product information, including current and past releases of product documentation.

Diagnostic tools are also available to assist in troubleshooting problems associated with the product. These tools are available on disc or can be downloaded from the VERITAS FTP site. See the `README.VRTSspt` file in the `/support` directory for details.

For license information, software updates and sales contacts, visit <https://my.veritas.com/productcenter/ContactVeritas.jsp>. For information on purchasing product documentation, visit <http://webstore.veritas.com>.

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Hardware Notes

This document provides hardware support information for VERITAS Volume Manager 4.1 Maintenance Pack 1 (MP1) on the x64 platform.

The following topics are discussed in this guide:

- ◆ [Hardware Support in VxVM 4.1 MP1](#)
- ◆ [The DMP Command Utility \(vxddmpadm\)](#)
- ◆ [Installing an Array Support Library \(ASL\)](#)
- ◆ [DMP and JBOD Disk Array Support](#)
- ◆ [DMP Coexistence with EMC PowerPath](#)
- ◆ [Dynamic LUN Expansion](#)

Hardware Support in VxVM 4.1 MP1

This release of VxVM has been tested on Solaris 10 (64-bit).

You can extract a list of supported hardware including arrays from the VERITAS customer support web site at <http://support.veritas.com/docs/275752>.



The DMP Command Utility (vxddmpadm)

The `vxddmpadm` utility administers the DMP functionality of VxVM. Refer to the manual page of the `vxddmpadm(1M)` utility for a detailed description of the options and attributes of this command.

You can use the `vxddmpadm` utility option `listctlr` to list all controllers connected to disks that are attached to the host. For example, to list all controllers connected to disks on the host, use the following command:

```
# vxddmpadm listctlr all
```

to display the output from the above command:

CTLR-NAME	ENCLR-TYPE	STATE	ENCLR-NAME
=====			
c0	OTHER	ENABLED	Disk
c1	Disk	ENABLED	Disk
c2	Disk	ENABLED	Disk

All the above controllers are in the `ENABLED` state which indicates that they are available for I/O operations.

The state `DISABLED` is used to indicate that controllers are unavailable for I/O operations. The unavailability can be due to a hardware failure or due to I/O operations being disabled on that controller by the System Administrator. The controller state can be changed by using the `vxddmpadm` utility.

To list all the paths that are connected to a particular controller, you can use the `getsubpaths` option with the `ctlr` attribute. For example, use the following command:

```
# vxddmpadm getsubpaths ctlr=c1
```

to display the output from the above command:

NAME	STATE [A]	PATH-TYPE [M]	DMPNODENAME	ENCLR-TYPE	ENCLR-NAME
=====					
c1t0d0s2	ENABLED (A)	-	c2t0d0s2	Disk	Disk
c1t1d0s2	ENABLED (A)	-	c2t1d0s2	Disk	Disk
c1t2d0s2	ENABLED (A)	-	c2t2d0s2	Disk	Disk
c1t3d0s2	ENABLED (A)	-	c2t3d0s2	Disk	Disk
c1t4d0s2	ENABLED (A)	-	c2t4d0s2	Disk	Disk
c1t5d0s2	ENABLED (A)	-	c2t5d0s2	Disk	Disk
c1t6d0s2	ENABLED (A)	-	c2t6d0s2	Disk	Disk
c1t16d0s2	ENABLED (A)	-	c2t16d0s2	Disk	Disk
c1t17d0s2	ENABLED (A)	-	c2t17d0s2	Disk	Disk
c1t18d0s2	ENABLED (A)	-	c2t18d0s2	Disk	Disk
c1t19d0s2	ENABLED (A)	-	c2t19d0s2	Disk	Disk
c1t20d0s2	ENABLED (A)	-	c2t20d0s2	Disk	Disk
...					

The output display shows the paths that are connected to the controller named `c1`. Each line in the output that describes a path may be interpreted as follows, using path `c1t0d0s2` as an example:

- ◆ Path `c1t0d0s2` (represented by nodes in the `/dev/rdisk` and `/dev/dsk` directories) is in the `ENABLED` state, and the `(A)` flag shows that I/O is active on the path.
- ◆ Path `c1t0d0s2` is represented by the DMP device node `c2t0d0s2`, which is represented by device nodes in the `/dev/vx/dmp` and `/dev/vx/rdmp` directories.

You can use the `getsubpaths` option combined with the `dmpnodename` attribute to list all paths that are connected to a LUN (represented by a DMP device). For example, to list information about paths that lead to the LUN named `c1t0d0s2`, use the following command:

```
# vxddmpadm getsubpaths dmpnodename=c1t0d0s2
```

to display the output from the above command:

NAME	STATE [M]	PATH-TYPE [M]	CTLR-NAME	ENCLR-TYPE	ENCLR-NAME
c2t0d0s2	DISABLED	-	c2	Disk	Disk
c1t0d0s2	ENABLED (A)	-	c1	Disk	Disk

The listing above shows that the DMP device `c1t0d0s2` has two paths to it that are named `c1t0d0s2` and `c2t0d0s2`. Additional information indicates that only one of these paths is available for I/O operations. One of these paths is in the `ENABLED` state and the other is in the `DISABLED` state.

To retrieve the name of the DMP device that controls a particular path, the `getdmpnode` option can be combined with the `nodename` attribute by using the following command:

```
# vxddmpadm getdmpnode nodename=c1t0d0s2
```

to display the output from the above command:

NAME	STATE	ENCLR-TYPE	PATHS	ENBL	DSBL	ENCLR-NAME
c2t0d0s2	ENABLED	Disk	2	2	0	Disk

This example output shows that the physical path `c1t0d0s2` is owned by the DMP device `c2t0d0s2`, which has two paths to it.



Installing an Array Support Library (ASL)

VxVM provides Dynamic Multipathing (DMP) support for new disk arrays in the form of Array Support Library (ASL) software packages. You can obtain ASL packages for new arrays from:

- ◆ The VERITAS software disc.
- ◆ The Storage Array Vendor's support site.
- ◆ The VERITAS Technical Support site, <http://support.veritas.com>. Select "Volume Manager" from the Product Family menu and "Volume Manager for Unix" from the Product menu. Then click on Knowledge Base Search and enter "asl" followed by the vendor and/or model name.

VxVM 4.0 allows an ASL to be added to a running VxVM system (see "[Adding an ASL package](#)" on page 5). This means that you can add support for a particular disk array type (including multipathing support by Dynamic Multipathing, DMP) without having to: stop VxVM, reboot the system, or modify the VxVM package.

Note For the installed ASL to be discovered correctly, the array LUNs must be visible to the operating system through multiple paths, and they must be appropriately configured to support DMP. For instructions on how to configure the array correctly, please contact the array vendor.

You can also remove ASL packages from a running VxVM system (see "[Removing an ASL Package](#)" on page 6). If the associated disk array type contains active volumes, these will remain available during and after the addition or removal of the ASL package.

Only one version of an ASL for a specific type/model of disk array can be active in the system. To install a different version of an ASL, you need to first remove the previous version of the ASL package, then install the new package (see "[Upgrading an ASL Package](#)" on page 6).

Commands Used to Maintain ASL Packages

The following packaging commands are available for installing, removing, and listing ASL packages.

Install	Remove	Obtain Information
pkgadd	pkgrm	pkginfo

See the appropriate manual page for more information on these commands.

Adding an ASL package

Only one version of an ASL can be active in the system. If you find a version of the ASL is already installed, refer to [“Upgrading an ASL Package”](#) on page 6.

Note Disk arrays that are supported by an ASL do not have to be connected to the system when the ASL package is installed.

To find out if package (*ASL_name*) is already installed; enter:

```
# pkginfo -l ASL_name
```

You will find the ASL packages on the Storage foundation CDROM CD1 in the */mount_point/storage_foundation/veritas_enabled* directory. They have the format, *packagename.gz.tar*.

To add an ASL package from CD-ROM, proceed as follows:

1. Change directory to the ASL packages directory;

```
# cd /mount_point/storage_foundation/veritas_enabled
```

2. Copy the required package to a temporary directory:

```
# cp packagename.tar.gz /tmp
```

3. Change directory to the temporary directory:

```
# cd /tmp
```

4. Unzip and extract the package:

```
# gzcatt packagename.tar.gz | tar -xvf -
```

5. Use `pkgadd` to install the package:

```
# pkgadd -d . ASL_Name
```

If `vxconfigd` is active, invoke Device Discovery Layer (DDL) to allow the newly installed ASL libraries to claim the disk arrays:

```
# vxdctl enable
```

If `vxconfigd` is not active, then invoke DDL the next time `vxconfigd` is activated.

6. Verify that disk array was claimed by the *ASL_name* library:

```
# vxdmpadm listenclosure all
# vxdisk list cxtxdxs2
# vxdmpadm getsubpaths ctlr=cx
```

where *x* is the appropriate control unit number.



Note If disk array has multiple paths, use the above commands to verify that all paths to disk are claimed.

Removing an ASL Package

Before removing an ASL package, first find out if the package (*ASL_name*) is installed; enter:

```
# pkginfo -l ASL_name
```

1. To remove an ASL package you enter:

```
# pkgrm ASL_name
```

2. If vxconfigd is active, invoke Device Discovery Layer (DDL) through the `vxddctl` command to allow the arrays to be reclaimed:

```
# vxddctl enable
```

If vxconfigd is not active, then invoke DDL the next time vxconfigd is activated.

(See VERITAS Volume Manager manual pages for command information.)

3. Verify that disk array was claimed as “Disk”.

```
# vxddmpadm listenclosure all
```

Note If the disk array has multiple paths, they must all be claimed as “DISK” (use the `vxddladm addjbod` command); otherwise, duplicate diskid errors will be detected.

Upgrading an ASL Package

Before upgrading an ASL package (installing a new version of an already installed package), first find out if the old package (*ASL_name*) is already present; enter:

```
# pkginfo -l ASL_name
```

1. Remove the package (*ASL_name*):

```
# pkgrm ASL_name
```

2. Proceed with [“Adding an ASL package”](#) on page 5.

DMP and JBOD Disk Array Support

DMP on JBOD drives enables DMP to multipath JBOD disk arrays connected to a system using VxVM. These JBOD disk arrays/disks can contain disks from any vendor. However, DMP can correctly detect multiple paths to these disks/disk arrays only if the following conditions are satisfied:

- ◆ The serial number field of the Standard SCSI INQUIRY DATA (bytes 36—47) should be “world wide unique” for any disk that is connected to a JBOD. This fact must be known to the user before the user attempts to configure DMP to add these disks to the JBOD category of DMP.

Caution If any disk does not provide a unique serial number, DMP cannot detect multiple paths to the disk correctly and results are unpredictable. Contact the JBOD disk/disk array vendors to get correct information about unique serial numbers on disks.

- ◆ The JBOD disk arrays that require multipathing functionality from DMP should be of the Active/Active or Active/Passive types.

Once it is known that disks connected to a JBOD disk array satisfy the above conditions, you must use the `vxddladm addjbod` command to add disks to the JBOD category. See `vxddladm (1)` for further information.



DMP Coexistence with EMC PowerPath

With this release of VxVM, DMP can coexist with PowerPath. Depending on the scenario, you might need to install the EMC Cx600 ASL and its associated APM. To use DMP with PowerPath, you should be aware of the following scenarios.

- ◆ If you are installing VxVM 4.1 and PowerPath is installed, you do not need to install the Cx600 ASL and its associated APM. The array must be configured in explicit fail-over mode.
- ◆ If you are installing VxVM 4.1 and PowerPath is not installed, you must install the Cx600 ASL and its associated APM. The array can be in any mode.

The following table lists these scenarios and the required array modes:

PowerPath	DMP	Array mode
Installed	libvxemc.so handles EMC arrays and DGC claiming internally. PP handles fail-over. No need to install C.x600 ASL or Cx600 APM	Explicit fail-over
Not installed; the array is not Cx600	libvxemc.so handles the EMC Symmetrix array. DMP handles multipathing.	-
Not installed, but the array is Cx600	DMP handles multipathing. Cx600 ASL and Cx600 APM must be installed	-

Dynamic LUN Expansion

The following form of the `vxdisk` command can be used to make VxVM aware of the new size of a virtual disk device that has been resized:

```
# vxdisk [-f] [-g diskgroup] resize {accessname|medianame} \
  [length=value]
```

The device must have a SCSI interface that is presented by a smart switch, smart array or RAID controller. Following a resize operation to increase the length that is defined for a device, additional disk space on the device is available for allocation. You can optionally specify the new size by using the `length` attribute.



If a disk media name rather than a disk access name is specified, the disk group must either be specified using the `-g` option or the default disk group will be used. If the default disk group has not been set up, an error message will be generated.

Note A Storage Foundation license is required to use the `vxdisk resize` command.

This facility is provided to support dynamic LUN expansion by updating disk headers and other VxVM structures to match a new LUN size. It does not resize the LUN itself.

Any volumes on the device should only be grown after the device itself has first been grown. Otherwise, storage other than the device may be used to grow the volumes, or the volume resize may fail if no free storage is available.

Resizing should only be performed on devices that preserve data. Consult the array documentation to verify that data preservation is supported and has been qualified. The operation also requires that only storage at the end of the LUN is affected. Data at the beginning of the LUN must not be altered. No attempt is made to verify the validity of pre-existing data on the LUN. The operation should be performed on the host where the disk group is imported (or on the master node for a cluster-shared disk group).

Resizing of LUNs that are not part of a disk group is not supported. It is not possible to resize LUNs that are in the boot disk group (aliased as `bootdg`), in a deported disk group, or that are offline, uninitialized, being reinitialized, or in an error state.

Caution Do not perform this operation when replacing a physical disk with a disk of a different size as data is not preserved.

Before reducing the size of a device, any volumes on the device should first be reduced in size or moved off the device. By default, the resize fails if any subdisks would be disabled as a result of their being removed in whole or in part during a shrink operation.

If the device that is being resized has the only valid configuration copy for a disk group, the `-f` option may be specified to forcibly resize the device.

Resizing a device that contains the only valid configuration copy for a disk group can result in data loss if a system crash occurs during the resize.

Resizing a virtual disk device is a non-transactional operation outside the control of VxVM. This means that the resize command may have to be re-issued following a system crash. In addition, a system crash may leave the private region on the device in an unusable state. If this occurs, the disk must be reinitialized, reattached to the disk group, and its data resynchronized or recovered from a backup.



