

Installing and Managing VERITAS® Array Support Library 3.5 for HP-UX® and NetApp® Storage

Information in this document

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Overview of the Array Support Library

What the Array Support Library is

The Array Support Library (ASL) is a NetApp-provided library that provides information about storage array attributes and multipathing configuration to the Device Discovery Layer (DDL) and Dynamic Multipathing (DMP) components of VERITAS Volume Manager™ (VxVM).

The DDL is a component of VxVM that discovers available enclosure information and the multipathing attributes of disks and disk arrays that are connected to a host system. The DDL calls ASL functions during the storage discovery process on the host.

You can add or remove ASLs from a running VxVM system. This way, dynamic multipathing support is added or removed from VxVM without interrupting I/O or rebooting the VxVM system.

What the ASL 3.5 provides

The ASL 3.5 identifies which LUNs are NetApp storage so that these LUNs are not identified as JBOD. By using the ASL 3.5, you obtain the following information about NetApp LUNs:

- ◆ Enclosure-based naming—The name of the disk is based on the logical name of its enclosure, or disk array, and not a raw device name.
- ◆ Multipathing policy—Whether the NetApp storage is accessed as an Active/Active (A/A) disk array or an Active/Passive Group (A/PG) disk array. The ASL also provides information about primary and secondary paths to NetApp storage.

Using NetApp storage with ASL

You cannot use NetApp storage appliances simultaneously as JBODs and vendor arrays. If you install ASL, NetApp storage appliances cannot be configured in VxVM as JBODs. The LUNs are reported as NetApp disks unless you explicitly exclude them by using the `vxddladm exclude array` command.

Installing ASL 3.5

System requirements

The following table lists system requirements for ASL 3.5.

Component	Requirement
Network Appliance™ hardware and Data ONTAP™ software	Data ONTAP versions 6.5.x and 7.0.x software and filer models supported for SAN configurations For the most up-to-date information about filer models supported, see the <i>Compatibility and Configuration Guide for NetApp's FCP and iSCSI Products</i> at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/.
FCP Attach Kit	FCP HP-UX Attach Kit 1.1
VxVM	VxVM 3.5, Update 3 Make sure your system has the latest VERITAS patch bundles required by NetApp. For the most up-to-date information about VxVM versions and update patch bundles required, see the <i>Compatibility and Configuration Guide for NetApp's FCP and iSCSI Products</i> at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/. You obtain these patch bundles from the VERITAS web site at http://www.veritas.com/.

Component	Requirement
HP-UX® operating system	Versions 11i version 1 For the most up-to-date information about required OS versions and patches, see the following documents: ◆ <i>Compatibility and Configuration Guide for NetApp's FCP and iSCSI Products</i> at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/ ◆ VERITAS installation notes

Installing the ASL

To install the ASL complete the following steps.

Step	Action
1	Log in to the VxVM system as the root user.
2	If you already have NetApp storage configured as JBOD in your VxVM configuration, remove the JBOD support for NetApp by entering: <code>vxddladm rmjbod vid=NETAPP</code>
3	Check the VERITAS web site for NetApp HP-UX ASL version 3.5 and follow directions. If NetApp HP-UX ASL 3.5 is not available, you can obtain it from the NetApp CD-ROM or the software download page for the FCP HP-UX Attach Kit 1.1 by following one of the methods below: ◆ If you obtain ASL software from the CD-ROM - mount the CD-ROM on the host system and change to the directory where the CD-ROM is mounted. Copy the NTAPas1.tar file to a local directory, and change to the directory where you copied the file. ◆ If you obtain software from the Attach Kit download page, change to the directory to which you downloaded the NTAPas1.tar.Z file.
4	Change to the directory to which you downloaded the NTAPas1.tar.Z file and uncompress the software by entering the following command: <code>gunzip NTAPas1.tar.Z</code>
5	Install the NTAPas1 package by entering the following command: <code>swinstall -s path/NTAPas1.tar NTAPas1</code> <i>path</i> is the directory to which you uncompressed the NTAPas1.tar.Z file. Note _____The installation script checks for required VERITAS patch bundles. If you do not have the required patch bundles on your system, the install script aborts. If the install script aborts, check the <i>Compatibility and Configuration Guide for NetApp's FCP and iSCSI Products</i> at http://now.netapp.com/NOW/knowledge/docs/san/fcp_iscsi_config/ for information about required patch bundles. _____
6	Rescan all disk devices and detect any new NetApp LUNs by entering the following commands: <code>ioscan -funC disk</code> <code>insf</code> <code>vxctl enable</code>

Step	Action																				
7	If your host is connected to NetApp storage and you can verify the installation by entering the following command and then locating the NetApp Enclosure Type in the output of the <code>vxddmpadm listenclosure all</code> command. The output shows the model name of the NetApp storage device if you are using enclosure-based naming with VxVM. <pre># vxddmpadm listenclosure all</pre> <table><tr><th>ENCLR_NAME</th><th>ENCLR_TYPE</th><th>ENCLR_SNO</th><th>STATUS</th></tr><tr><td colspan="4">=====</td></tr><tr><td>Disk</td><td>Disk</td><td>DISKS</td><td>CONNECTED</td></tr><tr><td>F8800</td><td>F880</td><td>1024626</td><td>CONNECTED</td></tr><tr><td>F8801</td><td>F880</td><td>1230382</td><td>CONNECTED</td></tr></table>	ENCLR_NAME	ENCLR_TYPE	ENCLR_SNO	STATUS	=====				Disk	Disk	DISKS	CONNECTED	F8800	F880	1024626	CONNECTED	F8801	F880	1230382	CONNECTED
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8	If your host is not yet connected to NetApp storage, enter the following command: <pre>vxddladm listsupport all</pre> Example results: <table><tr><th>LIB_NAME</th><th>ARRAY_TYPE</th><th>VID</th><th>PID</th></tr><tr><td>=====</td><td>=====</td><td>=====</td><td>=====</td></tr><tr><td>libvxaautoraid.sl</td><td>A/A</td><td>HP</td><td>C3586A</td></tr><tr><td>libvxaautoraid.sl</td><td>A/A</td><td>HP</td><td>C5447A</td></tr><tr><td>libvxaautoraid.sl</td><td>A/A</td><td>HP</td><td>A5257A</td></tr><tr><td>libvxdgc.sl</td><td>A/P</td><td>DGC</td><td>all</td></tr><tr><td>libvxeccs.sl</td><td>A/A</td><td>ECCS</td><td>all</td></tr><tr><td>libvxemc.sl</td><td>A/A</td><td>EMC</td><td>SYMMETRIX</td></tr><tr><td>libvxfc60.sl</td><td>A/P</td><td>HP</td><td>A5277A</td></tr><tr><td>libvxfujitsu.sl</td><td>A/A</td><td>FUJITSU</td><td>GR710</td></tr><tr><td>libvxfujitsu.sl</td><td>A/A</td><td>FUJITSU</td><td>GR720</td></tr><tr><td>libvxfujitsu.sl</td><td>A/A</td><td>FUJITSU</td><td>GR730</td></tr><tr><td>libvxfujitsu.sl</td><td>A/A</td><td>FUJITSU</td><td>GR740</td></tr><tr><td>libvxfujitsu.sl</td><td>A/A</td><td>FUJITSU</td><td>GR820</td></tr><tr><td>libvxfujitsu.sl</td><td>A/A</td><td>FUJITSU</td><td>GR840</td></tr><tr><td>libvxhds.sl</td><td>A/A</td><td>HITACHI</td><td>OPEN-*</td></tr><tr><td>libvxhitachi.sl</td><td>A/PG</td><td>HITACHI</td><td>DF350</td></tr><tr><td>libvxhitachi.sl</td><td>A/PG</td><td>HITACHI</td><td>DF400</td></tr><tr><td>libvxhitachi.sl</td><td>A/PG</td><td>HITACHI</td><td>DF500</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS1200</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS1200F</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS3000SL</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS3000SM</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS3001</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS3002</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS1000</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS1000F</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS1100</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS1100F</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS3011</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS1230</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS450</td></tr><tr><td>libvxnec.sl</td><td>A/A</td><td>NEC</td><td>DS450F</td></tr><tr><td>libvxshark.sl</td><td>A/A</td><td>IBM</td><td>2105</td></tr><tr><td>libvxva.sl</td><td>A/A</td><td>HP</td><td>A6188A</td></tr><tr><td>libvxva.sl</td><td>A/A</td><td>HP</td><td>A6189A</td></tr><tr><td>libvxveritas.sl</td><td>A/PF</td><td>VERITAS</td><td>all</td></tr><tr><td>libvxxp256.sl</td><td>A/A</td><td>HP</td><td>OPEN-*</td></tr><tr><td>libvxnetapp.sl</td><td>A/PG;A/A</td><td>NETAPP</td><td>all</td></tr></table>	LIB_NAME	ARRAY_TYPE	VID	PID	=====	=====	=====	=====	libvxaautoraid.sl	A/A	HP	C3586A	libvxaautoraid.sl	A/A	HP	C5447A	libvxaautoraid.sl	A/A	HP	A5257A	libvxdgc.sl	A/P	DGC	all	libvxeccs.sl	A/A	ECCS	all	libvxemc.sl	A/A	EMC	SYMMETRIX	libvxfc60.sl	A/P	HP	A5277A	libvxfujitsu.sl	A/A	FUJITSU	GR710	libvxfujitsu.sl	A/A	FUJITSU	GR720	libvxfujitsu.sl	A/A	FUJITSU	GR730	libvxfujitsu.sl	A/A	FUJITSU	GR740	libvxfujitsu.sl	A/A	FUJITSU	GR820	libvxfujitsu.sl	A/A	FUJITSU	GR840	libvxhds.sl	A/A	HITACHI	OPEN-*	libvxhitachi.sl	A/PG	HITACHI	DF350	libvxhitachi.sl	A/PG	HITACHI	DF400	libvxhitachi.sl	A/PG	HITACHI	DF500	libvxnec.sl	A/A	NEC	DS1200	libvxnec.sl	A/A	NEC	DS1200F	libvxnec.sl	A/A	NEC	DS3000SL	libvxnec.sl	A/A	NEC	DS3000SM	libvxnec.sl	A/A	NEC	DS3001	libvxnec.sl	A/A	NEC	DS3002	libvxnec.sl	A/A	NEC	DS1000	libvxnec.sl	A/A	NEC	DS1000F	libvxnec.sl	A/A	NEC	DS1100	libvxnec.sl	A/A	NEC	DS1100F	libvxnec.sl	A/A	NEC	DS3011	libvxnec.sl	A/A	NEC	DS1230	libvxnec.sl	A/A	NEC	DS450	libvxnec.sl	A/A	NEC	DS450F	libvxshark.sl	A/A	IBM	2105	libvxva.sl	A/A	HP	A6188A	libvxva.sl	A/A	HP	A6189A	libvxveritas.sl	A/PF	VERITAS	all	libvxxp256.sl	A/A	HP	OPEN-*	libvxnetapp.sl	A/PG;A/A	NETAPP	all
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Removing the ASL

You do not need to stop any volumes created on unaffected disk arrays, such as disk arrays from other vendors, before removing ASL support. This is also true for arrays or disks in the OTHER_DISKS category. OTHER_DISKS are local non-FCP-attached disks. Volumes created on these arrays remain accessible because they are not multipathed.

Only one version of an ASL that supports NetApp storage can be installed on the host at any given time. You cannot have multiple versions of the NetApp ASL installed simultaneously.

To remove the ASL, complete the following steps.

Step	Action
1	Log into the host as the root user.
2	Enter the following command to remove the NTAPas1 package: <code>swremove NTAPas1</code>

Obtaining multipathing information

What an ASL array type is

The ASL reports information about the multipathing configuration to the DDL as one of the following disk array types:

- ◆ **Active/Active (A/A)**—There are multiple active paths to storage and simultaneous I/O is supported on all paths. If a path fails, I/O is distributed across the remaining paths.
- ◆ **Active/Passive Group (A/PG)**—There is a single active path and multiple secondary paths to storage, and I/O is supported on one path. Failover occurs at the controller level and not at the LUN level. All LUNs that share the same path, the same host and target controllers form a failover group. If a LUN path fails, all LUNs in its failover group fail over to a secondary path.

For additional information, see the following documents:

- ◆ *Veritas Array Support Library 3.5 Developer's Guide* - for details about load balancing.
- ◆ *Veritas Volume Manager 3.5 Administrator's Guide* - for details about system management

How the filer's FCP failover mode correspond to array types

In clustered NetApp storage configurations, the A/PG array type corresponds to all filer cfmode settings that are supported in configurations with HP-UX hosts: partner, mixed, and dual_fabric. The standby cfmode setting is not supported in configurations with HP-UX hosts.

Note

The ASL also supports direct attached, nonclustered configurations, including NearStore models. These configurations have no cfmode settings. ASL reports these configurations as Active/Active (A/A) array types. For more details about array types, see the *Veritas Array Support Library 3.5 Developer's Guide*.

How sanlun displays the array type

The FCP HP-UX Attach Kit includes the `sanlun` command in the `/opt/NetApp/santools/bin` directory. You use the `sanlun` command to display information about paths to LUNs on the NetApp storage appliance.

The FCP HP-UX Attach Kit supports both VxVM and the HP-UX Logical Volume Manager (LVM).

- ◆ When the ASL is installed and the LUN is controlled by VxVM, the output of the `sanlun` command displays the `Multipath_Policy` as A/PG for clustered storage and A/A for non-clustered (single filer) configurations. VERITAS DMP 3.5 is the `Multipathing-provider`.
- ◆ If the LUN is controlled by the HP-UX Logical Volume Manager, the output displays the `Multipath_Policy` as A/P and HP PVlinks is the `Multipathing-provider`.
- ◆ If the LUN is not controlled by a volume manager, then the `Multipathing_Policy` is none and the `Multipathing-provider` is none.
- ◆ If you are using enclosure based naming, the NetApp storage model name is listed as the DMP-NODE. If you are using disk device based naming, the DMP-NODE is listed in device-name format (for example, c16t0d1).

The following example shows partial output of the `sanlun` command when a LUN is controlled by VxVM and the host is attached to a NetApp cluster.

```
filerX:/vol/vol1/vxvm_data1 (LUN 1) DMP-NODE: (F880_1)
      25m (26214400)          lun state: GOOD
Filer_CF_State: Cluster Enabled  Multipathing_Policy: A/PG
Multipath-provider: Veritas DMP 3.5
```

Using VxVM to display available paths

To obtain information about available paths to a LUN using VxVM, complete the following steps

Step	Action																																				
1	Enter the following command to view all devices: <pre>vxdisk list</pre> Result: The VxVM management interface displays the vxdisk device, type, disk, group and status. It also shows which devices are managed by the HP-UX Logical Volume Manager (LVM) and which disks are managed by VxVM. Example: <pre># vxdisk list</pre> <table><tr><th>DEVICE</th><th>TYPE</th><th>DISK</th><th>GROUP</th><th>STATUS</th></tr><tr><td>Disk_0</td><td>simple</td><td>-</td><td>-</td><td>LVM</td></tr><tr><td>F8800_0</td><td>simple</td><td>-</td><td>-</td><td>LVM</td></tr><tr><td>F8800_1</td><td>simple</td><td>-</td><td>-</td><td>LVM</td></tr><tr><td>F8801_0</td><td>simple</td><td>disk01</td><td>rootdg</td><td>online</td></tr><tr><td>F8801_1</td><td>simple</td><td>ntapdg101</td><td>ntapdg1</td><td>online</td></tr></table>	DEVICE	TYPE	DISK	GROUP	STATUS	Disk_0	simple	-	-	LVM	F8800_0	simple	-	-	LVM	F8800_1	simple	-	-	LVM	F8801_0	simple	disk01	rootdg	online	F8801_1	simple	ntapdg101	ntapdg1	online						
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F8800_1	simple	-	-	LVM																																	
F8801_0	simple	disk01	rootdg	online																																	
F8801_1	simple	ntapdg101	ntapdg1	online																																	
2	On the host console, enter the following command to display path information for the device you want: <pre>vxddmpadm getsubpaths dmpnodename=<device></pre> where <device> is the name listed under the output of the vxdisk list command. Example: <pre># vxddmpadm getsubpaths dmpnodename=F8801_1</pre> <table><tr><th>NAME</th><th>STATE</th><th>PATH-TYPE</th><th>CTLR-NAME</th><th>ENCLR-TYPE</th><th>ENCLR-NAME</th></tr><tr><td>=====</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>c16t0d1</td><td>ENABLED</td><td>SECONDARY</td><td>c16</td><td>F880</td><td>F8801</td></tr><tr><td>c17t0d1</td><td>ENABLED</td><td>PRIMARY</td><td>c17</td><td>F880</td><td>F8801</td></tr><tr><td>c18t0d1</td><td>ENABLED</td><td>SECONDARY</td><td>c18</td><td>F880</td><td>F8801</td></tr><tr><td>c19t0d1</td><td>ENABLED</td><td>PRIMARY</td><td>c19</td><td>F880</td><td>F8801</td></tr></table>	NAME	STATE	PATH-TYPE	CTLR-NAME	ENCLR-TYPE	ENCLR-NAME	=====						c16t0d1	ENABLED	SECONDARY	c16	F880	F8801	c17t0d1	ENABLED	PRIMARY	c17	F880	F8801	c18t0d1	ENABLED	SECONDARY	c18	F880	F8801	c19t0d1	ENABLED	PRIMARY	c19	F880	F8801
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c19t0d1	ENABLED	PRIMARY	c19	F880	F8801																																

Step	Action																								
3	Enter the following command to obtain path information for a host HBA: <pre>vxdmpadm getsubpaths ctlr=<controller_name></pre> <i>controller_name</i> is the controller displayed under “CTRL-NAME” in the output of the <code>vxdmpadm getdmpnode</code> command you entered in Step 2. Result: The output displays information about the paths to the filer storage (whether the path is a primary or secondary path). The output also lists the filer that the device is mapped to. Example: <pre># vxdmpadm getsubpaths ctlr=c17</pre> <table><tr><th>NAME</th><th>STATE</th><th>PATH-TYPE</th><th>DMPNODENAME</th><th>ENCLR-TYPE</th><th>ENCLR-NAME</th></tr><tr><td>=====</td><td>=====</td><td>=====</td><td>=====</td><td>=====</td><td>=====</td></tr><tr><td>c17t0d0</td><td>ENABLED</td><td>PRIMARY</td><td>F8801_0</td><td>F880</td><td>F8801</td></tr><tr><td>c17t0d1</td><td>ENABLED</td><td>PRIMARY</td><td>F8801_1</td><td>F880</td><td>F8801</td></tr></table>	NAME	STATE	PATH-TYPE	DMPNODENAME	ENCLR-TYPE	ENCLR-NAME	=====	=====	=====	=====	=====	=====	c17t0d0	ENABLED	PRIMARY	F8801_0	F880	F8801	c17t0d1	ENABLED	PRIMARY	F8801_1	F880	F8801
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c17t0d1	ENABLED	PRIMARY	F8801_1	F880	F8801																				

Using sanlun to obtain multipathing information

To obtain multipathing information by using the `sanlun` command, complete the following step.

Step	Action																																																																																																
1	On the host command line, enter the following command: <pre>sanlun lun show -p all</pre> Result: sanlun displays path information for each LUN. For LUNs managed by VxVM, the output displays the VERITAS multipathing policy (A/A or A/PG array types) and the path I/O policy. For LUNs managed by LVM, the output displays the PVlinks path order. Example: The following partial output shows paths to two LUNs managed by VxVM. One is the VERITAS root disk group (rootdg). Note that the output shows the VERITAS path I/O policy as Not Applicable. This is because the VERITAS policy is single active, but sanlun does not identify the path currently used for I/O. <pre># sanlun lun show -p all filerX:/vol/vol1/vxvm_data1 (LUN 1) DMP-NODE: (F880_1) 25m (26214400) lun state: GOOD Filer_CF_State: Cluster Enabled Multipath_Policy: A/PG Multipath-provider: Veritas DMP 3.5</pre> <table><tr><td>host</td><td>filer</td><td></td><td>primary</td><td>partner</td><td>Veritas</td></tr><tr><td>path</td><td>path</td><td>/dev/dsk</td><td>host</td><td>filer</td><td>filer</td><td>path I/O</td></tr><tr><td>state</td><td>type</td><td>filename</td><td>HBA</td><td>port</td><td>port</td><td>policy</td></tr><tr><td>up</td><td>primary</td><td>/dev/dsk/c17t0d1</td><td>td1</td><td>5a</td><td></td><td>Not Applicable</td></tr><tr><td>up</td><td>secondary</td><td>/dev/dsk/c16t0d1</td><td>td1</td><td></td><td>5b</td><td>Not Applicable</td></tr><tr><td>up</td><td>primary</td><td>/dev/dsk/c19t0d1</td><td>td0</td><td>4a</td><td></td><td>Not Applicable</td></tr><tr><td>up</td><td>secondary</td><td>/dev/dsk/c18t0d1</td><td>td0</td><td></td><td>4b</td><td>Not Applicable</td></tr></table> <pre>filerX:/vol/vol1/vxvm_rootdg (LUN 0) DMP-NODE: (c17t0d0) 25m (26214400) lun state: GOOD Filer_CF_State: Cluster Enabled Multipath_Policy: A/PG Multipath-provider: Veritas DMP 3.5</pre> <table><tr><td>host</td><td>filer</td><td></td><td>primary</td><td>partner</td><td>Veritas</td></tr><tr><td>path</td><td>path</td><td>/dev/dsk</td><td>host</td><td>filer</td><td>filer</td><td>path I/O</td></tr><tr><td>state</td><td>type</td><td>filename</td><td>HBA</td><td>port</td><td>port</td><td>policy</td></tr><tr><td>up</td><td>primary</td><td>/dev/dsk/c17t0d0</td><td>td1</td><td>5a</td><td></td><td>Not Applicable</td></tr><tr><td>up</td><td>secondary</td><td>/dev/dsk/c16t0d0</td><td>td1</td><td></td><td>5b</td><td>Not Applicable</td></tr><tr><td>up</td><td>primary</td><td>/dev/dsk/c19t0d0</td><td>td0</td><td>4a</td><td></td><td>Not Applicable</td></tr><tr><td>up</td><td>secondary</td><td>/dev/dsk/c18t0d0</td><td>td0</td><td></td><td>4b</td><td>Not Applicable</td></tr></table>	host	filer		primary	partner	Veritas	path	path	/dev/dsk	host	filer	filer	path I/O	state	type	filename	HBA	port	port	policy	up	primary	/dev/dsk/c17t0d1	td1	5a		Not Applicable	up	secondary	/dev/dsk/c16t0d1	td1		5b	Not Applicable	up	primary	/dev/dsk/c19t0d1	td0	4a		Not Applicable	up	secondary	/dev/dsk/c18t0d1	td0		4b	Not Applicable	host	filer		primary	partner	Veritas	path	path	/dev/dsk	host	filer	filer	path I/O	state	type	filename	HBA	port	port	policy	up	primary	/dev/dsk/c17t0d0	td1	5a		Not Applicable	up	secondary	/dev/dsk/c16t0d0	td1		5b	Not Applicable	up	primary	/dev/dsk/c19t0d0	td0	4a		Not Applicable	up	secondary	/dev/dsk/c18t0d0	td0		4b	Not Applicable
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Understanding ASL error message types

Understanding error message severity

The NetApp ASL works silently and seamlessly with the VxVM DDL. If an error, misconfiguration, or malfunction occurs, messages from the library are logged to the console using the host's logging facility. The following table lists the importance and severity of these messages.

Message severity	Definition	Action required
Error	Indicates that an ERROR status is being returned from the ASL to the VxVM DDL that prevents the device (LUN) from being used. The device might still appear in vxdisk list, but it is not usable.	Call VERITAS Technical Support for help.
Warning	Indicates that an UNCLAIMED status is being returned. Unless claimed by a subsequent ASL, dynamic multipathing is disabled. No error is being returned but the device (LUN) might not function as expected.	
Info	Indicates that a CLAIMED status is being returned. The device functions fully, with DMP enabled, but the results seen by the user might be other than what is expected. For example, the enclosure name might change.	