

Sun Storage 6180 Array

Hardware Release Notes, Release 6.8.x



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Sun Storage 6180 Array Hardware Release Notes

This document contains important release information about Oracle's Sun Storage 6180 array running Sun Storage Common Array Manager (CAM), Version 6.8.x. Read about issues or requirements that can affect the installation and operation of the array.

The release notes consist of the following sections:

- ["What's In This Firmware Release" on page 1](#)
- ["About the Array" on page 3](#)
- ["System Requirements" on page 4](#)
- ["Device Mapper Multipath \(DMMP\) for the Linux Operating System" on page 15](#)
- ["Restrictions and Known Issues" on page 22](#)
- ["Product Documentation" on page 34](#)
- ["Documentation, Support, and Training" on page 35](#)

What's In This Firmware Release

Array controller firmware version 7.77.xx.xx remains the same as delivered with CAM 6.8.0, and provides the following updates for the Sun Storage 6180 array:

- Disk drive replacement changes
- Cache battery expiration notification
- Oracle Linux 6.0 and Oracle Enterprise Linux 5.6, 5.5 platform support
- Red Hat Enterprise Linux 6.0, 5.6, 5.5, 4.9, 4.8 platform support
- SUSE Linux Enterprise Server (SLES) 11 and 11.1 with Device Mapper Multipath (DMMP) failover driver

For information about Sun Storage Common Array Manager enhancements and bug fixes for this release, see the *Sun Storage Common Array Manager Software Release Notes*.

Downloading Patches and Updates

To download Sun Storage Common Array Manager, as well as server patches pertaining to the Sun Storage 6180 array, follow this procedure.

1. Sign in to My Oracle Support:

<https://support.oracle.com/>

2. At the top of the page, click the Patches & Updates tab.

3. Search for CAM software and patches in one of two ways:

- If you have a patch number:

a. Under the Patch Search section, click the Search tab.

b. In the Patch Name or Number field, enter the patch number. For example, 10272123 or 141474-01.

c. Click Search.

- If you do not have a patch number:

a. Under the Patch Search section, click the Search tab, and then click the Product or Family (Advanced Search) link.

b. Check Include all products in a family.

c. In the Product field, start typing the product name. For example, "Sun Storage Common Array Manager (CAM)" or "Sun Storage 6180 array."

d. Select the product name when it appears.

e. In the Release field, expand the product name, check the release and patches you want to download, and then click Close.

f. Click Search.

4. Select the patch you want to download.

5. Click ReadMe for a patch description and installation instructions.

6. Click Download for a single patch, or Add to Plan to download a group of patches.

Disk Drive Replacement Changes

Sun Storage 6180 array disk drives can now be replaced by customers. Previously designated as field replaceable units (FRUs), disk drives are now customer-replaceable units (CRUs).

When inserting a replacement disk drive, be sure the role of the replacement drive is “unassigned” to a virtual disk. All data will be erased before the controller reconstructs the data on the replacement disk drive.



Caution – Potential for data loss—Use care when determining what disk drive to use as a replacement for a failed disk drive. All data on the replacement disk drive will be erased, before data reconstruction occurs.

Cache Battery Expiration Notification

Sun Storage 6180 arrays use smart battery technology which maintains and reports its own status, providing a more accurate reporting of battery status. When a battery can no longer hold a charge, the battery is flagged for replacement, rather than a battery expiration report provided by the array firmware.

About the Array

The Sun Storage 6180 array is a high-performance, enterprise-class, full 8 Gigabit per second (Gb/s) I/O Fibre Channel solution (with backend loop speeds of 2 or 4 Gb/s) that combines outstanding performance with the highest reliability, availability, flexibility, and manageability.

The Sun Storage 6180 array is modular, rackmountable, and scalable from a single dual-controller tray (1x1) configuration to a maximum configuration of 1x7 with six additional CSM200 expansion trays behind one controller tray.

System Requirements

The software and hardware products that have been tested and qualified to work with the Sun Storage 6180 array are described in the following sections.

- [“Firmware Requirements” on page 4](#)
- [“Disk Drives and Tray Capacity” on page 5](#)
- [“Data Host Requirements” on page 6](#)

Firmware Requirements

The firmware version for Sun Storage 6180 array features described in this release note is version 07.77.xx.xx. This firmware version (or higher) is installed on the array controllers prior to shipment and is also delivered with the latest version of Sun Storage Common Array Manager (CAM).

To update controller firmware on an existing array:

1. **Download the software as described in [“Downloading Patches and Updates” on page 2](#).**
2. **Log into Sun Storage Common Array Manager.**
3. **Select the check box to the left of the array you want to update.**
4. **Click Install Firmware Baseline.**
5. **Follow the wizard instructions.**

Disk Drives and Tray Capacity

TABLE 1 lists the size, spindle speed, type, interface speed, and tray capacity for supported Fibre Channel (FC), Serial Advanced Technology Attachment (SATA), and Serial Attached SCSI (SAS) disk drives for the Sun Storage 6180 array. Additional legacy drives might also be supported with this product.

The following list of supported disk drives replaces the listing in the *Sun Storage 6180 Array Hardware Installation Guide*.

TABLE 1 Supported Disk Drives

Drive	Description
FC, 73GB, Solid State Disk	73-Gbyte SSD drives (4 Gbits/sec); 1168 Gbytes per tray
FC, 73G15K	73-Gbyte 15,000-RPM FC drives (4 Gbits/sec); 1168 Gbytes per tray
FC, 146G10K	146-Gbyte 10,000-RPM FC drives (4 Gbits/sec); 2336 Gbytes per tray
FC, 146G15K	146-Gbyte 15,000-RPM FC drives (4 Gbits/sec); 2336 Gbytes per tray
FC, 300G10K	300-Gbyte 10,000-RPM FC drives (4 Gbits/sec); 4800 Gbytes per tray
FC, 300G15K	300-Gbyte 15,000-RPM FC drives (4 Gbits/sec); 4800 Gbytes per tray
FC, 400G10K	400-Gbyte 10,000-RPM FC drives (4 Gbits/sec); 6400 Gbytes per tray
FC, 450G15K	450-Gbyte 15,000-RPM FC drives (4 Gbits/sec); 7200 Gbytes per tray
SATA-2, 500G7.2K	500-Gbyte 7,200-RPM SATA drives (3 Gbits/sec); 8000 Gbytes per tray
FC, 600GB15K, Encryption Capable	600-Gbyte 15,000-RPM FC drives Encryption Capable (4 Gbits/sec); 9600 Gbytes per tray
SATA-2, 750G7.2K	750-Gbyte 7,200-RPM SATA drives (3 Gbits/sec); 12000 Gbytes per tray
SATA-2, 1T7.2K	1-Tbyte 7,200-RPM SATA drives (3 Gbits/sec); 16000 Gbytes per tray
SATA-2, 2TB7.2K	2-Tbyte 7,200-RPM SATA drives (3 Gbits/sec); 32000 Gbytes per tray

Array Expansion Module Support

The CSM200 is the only expansion tray supported by the Sun Storage 6180 array. To add capacity to a 6180 array, refer to the following Service Advisor procedures:

- Adding Expansion Trays
- Upgrade Firmware

Caution – To add trays with existing stored data, contact Oracle Support for assistance to avoid data loss.

TABLE 2 IOM Code for the Sun Storage 6180 Array

Array Controller	Firmware	Supported Expansion Module	IOM Code
Sun Storage 6180	07.77.13.11	CSM200	98E4

For additional baseline firmware information, such as controller, NVSRAM, disk drive, version, and firmware file, see *Sun Storage Array Baseline Firmware Reference*.

Data Host Requirements

This section describes supported data host software, HBAs, and switches.

- [“Multipathing Software” on page 7](#)
- [“Supported Host Bus Adaptors \(HBAs\)” on page 8](#)
- [“Supported FC and Multilayer Switches” on page 13](#)
- [“Supported Premium Features” on page 14](#)

Multipathing Software

TABLE 3 provides a summary of the data host requirements for the Sun Storage 6180 array. It lists the current multipathing software and supported host bus adapters (HBAs) by operating system.

You must install multipathing software on each data host that communicates with the Sun Storage 6180 array.

Note – Single path data connections are not recommended. For more information, see [“Single Path Data Connections”](#) on page 25.

TABLE 3 lists supported multipathing software by operating system.

TABLE 3 Multipathing Software

Operating System	Multipathing Software	Minimum Version	Host Type Setting	Notes
Solaris 10*	STMS/MPxIO	Update 6 or Update 5 with patch 140919-04 (SPARC), 140920-04 (x64/x86)	Solaris with MPxIO	Multipathing software included in Solaris OS 10
Solaris 10 with DMP	Symantec Veritas Dynamic Multi-Pathing (DMP)	5.0MP3	Solaris with DMP	
Windows 2003 SP2, R2 Non-clustered	MPIO	01.03.0302.0504	Windows 2003 Non-clustered	
Windows 2003/2008 MSCS Cluster	MPIO	01.03.0302.0504	Windows Server 2003 Clustered	You must use MPIO for 7.10 and above
Windows 2003 Non-clustered with DMP	DMP	5.1	Windows Server 2003 Non-clustered (with Veritas DMP)	See Symantec Hardware Compatibility List (HCL)
Windows 2003 Clustered with DMP	DMP	5.1	Windows Server 2003 clustered (with Veritas DMP)	See Symantec HCL
Windows Server 2008 R2 (64-bit only)	MPIO	01.03.0302.0504	Windows Server 2003	
Oracle VM 2.2.2	RDAC	09.03.0C02.0331	Linux	RDAC version 09.03.0C02.0331 is included with Oracle VM 2.2.2
Oracle Linux 6.0, 5.6, 5.5 [†]	RDAC	09.03.0C02.0453	Linux	

TABLE 3 Multipathing Software (Continued)

Operating System	Multipathing Software	Minimum Version	Host Type Setting	Notes
SUSE Linux Enterprise Server 11 and 11.1	RDAC/MPP DMMP	09.03.0C00.0453	Linux	
SLES 10 SP1, 10.4	RDAC/MPP	09.03.0C02.0453	Linux	
Red Hat 6.0, 5.6, 5.5	RDAC	09.03.0C02.0453	Linux	
Red Hat 4, SLES 10	RDAC/MPP	09.03.0C02.0453	Linux	
Red Hat SLES with DMP	DMP	5.0MP3	Linux with DMP	See Symantec HCL
HPUX	Veritas DMP	5.0MP3	HP-UX	See Symantec HCL
AIX 6.1, 5.3	Cambex DPF	6.1.0.63	AIX	
AIX 5.3, 6.1 with DMP	DMP	5.0	AIX with DMP	See Symantec HCL

* Oracle recommends installing the latest Solaris update.

† Unbreakable Enterprise Kernel is not supported for this release.

Note – Download the multipathing drivers from My Oracle Support at <https://support.oracle.com>. Search for the appropriate driver using one of the keywords “MPIO,” “RDAC,” or “MPP.” See “[Downloading Patches and Updates](#)” on page 2.

Note – The multipathing driver for the IBM AIX platform is Veritas DMP, bundled in Veritas Storage Foundation 5.0 for the Sun Storage 6180 array. Download the Array Support Library (ASL) from <http://support.veritas.com/>.

Supported Host Bus Adaptors (HBAs)

TABLE 4, TABLE 5, and TABLE 6 list supported HBAs and other data host platform elements by operating system.

To obtain the latest HBA firmware:

- For Fibre Channel HBAs, download firmware from My Oracle Support using keyword “HBA.” For download instructions, see “[Downloading Patches and Updates](#)” on page 2.
- For SAS HBAs, go to <http://www.lsi.com/support/sun/>.
- For other HBA support information, refer to the manufacturer’s web site.

Download operating system updates from the web site of the operating system company.

Note – You must install the multipathing software before you install any OS patches.

TABLE 4 Supported HBAs for Solaris Data Host Platforms

Operating System	Minimum OS Patches*	Sun 2-Gbit HBAs	Sun 4-Gbit HBAs	Sun 8-Gb HBAs
Solaris 10 SPARC	Update 6 or Update 5 with patch 140919- 04	SG-XPCI1FC-QL2 (6767A)	SG-XPCIE1FC-QF4	SG-XPCIE1FC-QF8-Z
		SG-XPCI2FC-QF2-Z (6768A)	SG-XPCIE2FC-QF4	SG-XPCIE2FC-QF8-Z
		SG-XPCI1FC-EM2	SG-XPCIE1FC-EM4	SG-XPCIE1FC-EM8-Z
		SG-XPCI2FC-EM2	SG-XPCIE2FC-EM4	SG-XPCIE2FC-EM8-Z
			SG-XPCI1FC-QF4	SG-XPCIEFCGBE-Q8
			SG-XPCI2FC-QF4	SG-XPCIEFCGBE-E8
			SG-XPCI1FC-EM4	
			SG-XPCI2FC-EM4	
			SG-XPCIE2FCGBE-Q-Z	
			SG-XPCIE2FCGBE-E-Z	
Solaris 10 x64/x86	Update 6 or Update 5 with patch 140920- 04	SG-XPCI1FC-QL2 (6767A)	SG-XPCIE1FC-QF4	SG-XPCIE1FC-QF8-Z
		SG-XPCI2FC-QF2-Z (6768A)	SG-XPCIE2FC-QF4	SG-XPCIE2FC-QF8-Z
		SG-XPCI1FC-EM2	SG-XPCIE1FC-EM4	SG-XPCIE1FC-EM8-Z
		SG-XPCI2FC-EM2	SG-XPCIE2FC-EM4	SG-XPCIE2FC-EM8-Z
			SG-XPCI1FC-QF4	SG-XPCIEFCGBE-E8
			SG-XPCI2FC-QF4	SG-XPCIEFCGBE-Q8
			SG-XPCI1FC-EM4	
			SG-XPCI2FC-EM4	
			SG-XPCIE2FCGBE-Q-Z	
			SG-XPCIE2FCGBE-E-Z	

* Oracle recommends installing the latest Solaris update.

TABLE 5 Supported HBAs for Microsoft Windows Data Host Platforms

Host OS / Servers	HBAs*	Sun 2-Gb HBAs	Sun 4-Gb HBAs	Sun 8-Gb HBAs
Microsoft Windows Server 2008, R2 (64-bit only) / AMD x86 and EM64T	QLogic:	SG-XPCI1FC-EM2	SG-XPCIE1FC-QF4	SG-XPCIE1FC-QF8-Z
	QLE 256x	SG-XPCI2FC-EM2	SG-XPCIE2FC-QF4	SG-XPCIE2FC-QF8-Z
	QLE 246x	SG-XPCI1FC-QL2	SG-XPCIE1FC-EM4	SG-XPCIE1FC-EM8-Z
	QLA 246x	SG-XPCI2FC-QF2-Z	SG-XPCIE2FC-EM4	SG-XPCIE2FC-EM8-Z
	QLA 234x		SG-XPCI1FC-QF4	SG-XPCIEFCGBE-Q8
	QLA 2310F		SG-XPCI2FC-QF4	SG-XPCIEFCGBE-E8
	Emulex:		SG-XPCI1FC-EM4	
	LPe12000/LPe12002/ LPe1250		SG-XPCI2FC-EM4	
	Lpe11000/LPe11002/LPe1150		SG-XPCIE2FCGBE-Q-Z	
	LP11000/LP11002/LP1150		SG-XPCIE2FCGBE-E-Z	
	LP9802/9802DC/982			
	LP952/LP9002/LP9002DC			
	10000/10000DC/LP1050			
Microsoft Windows Server 2003 SP2, R2 / AMD x86 and EM64T	QLogic:	SG-XPCI1FC-EM2	SG-XPCIE1FC-QF4	SG-XPCIE1FC-QF8-Z
	QLE 256x	SG-XPCI2FC-EM2	SG-XPCIE2FC-QF4	SG-XPCIE2FC-QF8-Z
	QLE 246x	SG-XPCI1FC-QL2	SG-XPCIE1FC-EM4	SG-XPCIE1FC-EM8-Z
	QLA 246x	SG-XPCI2FC-QF2-Z	SG-XPCIE2FC-EM4	SG-XPCIE2FC-EM8-Z
	QLA 234x		SG-XPCI1FC-QF4	SG-XPCIEFCGBE-E8
	QLA 2310F		SG-XPCI2FC-QF4	SG-XPCIEFCGBE-Q8
	Emulex:		SG-XPCI1FC-EM4	
	LPe12000/LPe12002/LPe1250		SG-XPCI2FC-EM4	
	Lpe11000/LPe11002/LPe1150		SG-XPCIE2FCGBE-Q-Z	
	LP11000/LP11002/LP1150		SG-XPCIE2FCGBE-E-Z	
	LP9802/9802DC/982			
	LP952/LP9002/LP9002DC			
	10000/10000DC/LP1050			

TABLE 5 Supported HBAs for Microsoft Windows Data Host Platforms (Continued)

Host OS / Servers	HBAs*	Sun 2-Gb HBAs	Sun 4-Gb HBAs	Sun 8-Gb HBAs
Microsoft Windows 2003 64-bit with SP2, R2 / x64 (AMD) EM64T IA64	QLogic:	SG-XPCI1FC-EM2	SG-XPCIE1FC-QF4	SG-XPCIE1FC-QF8-Z
	QLE 256x	SG-XPCI2FC-EM2	SG-XPCIE2FC-QF4	SG-XPCIE2FC-QF8-Z
	QLE 246x	SG-XPCI1FC-QL2	SG-XPCIE1FC-EM4	SG-XPCIE1FC-EM8-Z
	QLA 246x	SG-XPCI2FC-QF2-Z	SG-XPCIE2FC-EM4	SG-XPCIE2FC-EM8-Z
	QLA 234x		SG-XPCI1FC-QF4	SG-XPCIEFCGBE-Q8
	QLA 2310F		SG-XPCI2FC-QF4	SG-XPCIEFCGBE-E8
	Emulex:		SG-XPCI1FC-EM4	
	LPe12000/LPe12002/LPe1250		SG-XPCI2FC-EM4	
	Lpe11000/LPe11002/LPe1150		SG-XPCIE2FCGBE-Q-Z	
	LP11000/LP11002/LP1150		SG-XPCIE2FCGBE-E-Z	
	LP9802/9802DC/982			
	LP952/LP9002/LP9002DC			
	10000/10000DC/LP1050			

* Refer to the HBA manufacturer's web site for support information.

TABLE 6 Supported HBAs for Linux Data Host Platforms

Host OS / Sun Servers	HBAs*	Sun 2-Gb HBAs	Sun 4-Gb HBAs	Sun 8-Gb HBAs
SLES 11.1, 11, 10.4, 10.1	QLogic:	SG-XPCI1FC-EM2	SG-XPCIE1FC-QF4	SG-XPCIE1FC-QF8-Z
	QLE 256x	SG-XPCI2FC-EM2	SG-XPCIE2FC-QF4	SG-XPCIE2FC-QF8-Z
	QLE246x	SG-XPCI1FC-QL2	SG-XPCIE1FC-EM4	SG-XPCIE1FC-EM8-Z
	QLA 246x	SG-XPCI2FC-QF2-Z	SG-XPCIE2FC-EM4	SG-XPCIE2FC-EM8-Z
	QLA 234x		SG-XPCI1FC-QF4	SG-XPCIEFCGBE-E8
	QLA 2310F		SG-XPCI2FC-QF4	SG-XPCIEFCGBE-Q8
	Emulex:		SG-XPCI1FC-EM4	
	LP982/LP9802/9802DC		SG-XPCI2FC-EM4	
	LP9002/LP9002DC/LP952		SG-XPCIE2FCGBE-Q-Z	
	LP10000/10000DC/LP1050		SG-XPCIE2FCGBE-E-Z	
	LP11000/LP11002/LP1150			
	Lpe11000/LPe11002/			
	LPe1150/Lpe12000/			
	LPe12002/Lpe1250			

TABLE 6 Supported HBAs for Linux Data Host Platforms (Continued)

Host OS / Sun Servers	HBAs*	Sun 2-Gb HBAs	Sun 4-Gb HBAs	Sun 8-Gb HBAs
Oracle Linux 6.0, 5.6, 5.5; Oracle VM 2.2.2; RHEL 6.0, 5.6, 5.5	QLogic: QLE 256x QLE 246x QLA 246x QLA 234x QLA 2310F Emulex: LP982/LP9802/9802DC LP9002/LP9002DC/LP952 LP10000/10000DC/LP1050 Lpe11000/LPe11002/LPe1150 Lpe12000/LPe12002/LPe1250	SG-XPCI1FC-EM2 SG-XPCI2FC-EM2 SG-XPCI1FC-QL2 SG-XPCI2FC-QF2-Z	SG-XPCIE1FC-QF4 SG-XPCIE2FC-QF4 SG-XPCIE1FC-EM4 SG-XPCIE2FC-EM4 SG-XPCI1FC-QF4 SG-XPCI2FC-QF4 SG-XPCI1FC-EM4-Z SG-XPCI2FC-EM4-Z SG-XPCIE2FCGBE-Q-Z SG-XPCIE2FCGBE-E-Z	SG-XPCIE1FC-QF8-Z SG-XPCIE2FC-QF8-Z SG-XPCIE1FC-EM8-Z SG-XPCIE2FC-EM8-Z SG-XPCIEFCGBE-Q8 SG-XPCIEFCGBE-E8
RHEL 4u7 RHEL 4.8	QLogic: QLE 256x QLE 246x QLA 246x QLA 234x QLA 2310F Emulex: LP982/LP9802/9802DC LP9002/LP9002DC/LP952 LP10000/10000DC/LP1050 Lpe11000/LPe11002/LPe1150 Lpe12000/LPe12002/LPe1250	SG-XPCI1FC-EM2 SG-XPCI2FC-EM2 SG-XPCI1FC-QL2 SG-XPCI2FC-QF2-Z	SG-XPCIE1FC-QF4 SG-XPCIE2FC-QF4 SG-XPCIE1FC-EM4 SG-XPCIE2FC-EM4 SG-XPCI1FC-QF4 SG-XPCI2FC-QF4 SG-XPCI1FC-EM4-Z SG-XPCI2FC-EM4-Z SG-XPCIE2FCGBE-Q-Z SG-XPCIE2FCGBE-E-Z	SG-XPCIE1FC-QF8-Z SG-XPCIE2FC-QF8-Z SG-XPCIE1FC-EM8-Z SG-XPCIE2FC-EM8-Z SG-XPCIEFCGBE-Q8 SG-XPCIEFCGBE-E8

* Refer to the HBA manufacturer's web site for support information.

TABLE 7 Other Supported Data Host Platforms

Host OS	Host Servers	HBAs*
HP-UX 11.31	HP RISC IA64	HP A6795A
		HP A6826A
		HP A6684A
		HP A6685A
		HP AB378A
		HP AB379A
		HP AD300A
		HP AD355A
		AH400A (IA64)
AH401A (IA64)		
HP-UX B.11.23	HP RISC IA64	HP A6795A
		HP A6826A
		HP A9784A
		HP AB378A
		HP AB379A
		HP AD300A
		HP AD355A
		IBM AIX 5.2, 5.3, 6.1
IBM 5758		
IBM 5759		
IBM 6228		
IBM 6239		

* Refer to the HBA manufacturer's web site for support information.

Supported FC and Multilayer Switches

The following FC fabric and multilayer switches are compatible for connecting data hosts and Sun Storage 6180 array:

- Sun StorEdge Network 2 Gb FC Switch - 8, 16, and 64
- Brocade SilkWorm 200E/300/4100/4900/5000/5100/5300/7500/48000/DCX
- Cisco 9124/9134/9216/9216i/9222i/9506/9509/9513
- McDATA 6140/i10K/QPM 4 Gb blade for 6140
- QLogic SANBox 5602/9000

Supported Premium Features

Tier 1 Support

The Sun Storage 6180 arrays support the Tier 1 classified licensable features. Tier 1 classified arrays include the StorageTek 6140 and Sun Storage 6180 arrays.

Available licenses for the Sun Storage 6180:

- Domains: Base 8 domains
- Domains Upgrade: Upgrade from 8 to 128 domains
- Copy Services: Snapshot and Volume Copy
- Disk Encryption Service
- Remote Volume Mirroring

Tier 2 Support

The Sun Storage 6580 and 6780 arrays support the below Tier 2 classified arrays licensable features. Tier 2 classified arrays include the StorageTek 6540, Sun Storage 6580, and Sun Storage 6780 arrays.

Available licenses for the Sun Storage 6580 and 6780 arrays:

- Domains: Base 16 domains
- Domains Upgrade: Upgrade from 16 to 256 domains
- Domains Upgrade: Upgrade from 256 to 512 domains
- Copy Services: Snapshots and Volume Copy
- Disk Encryption Service
- Remote Volume Mirroring

Device Mapper Multipath (DMMP) for the Linux Operating System

Device Mapper (DM) is a generic framework for block devices provided by the Linux operating system. It supports concatenation, striping, snapshots, mirroring, and multipathing. The multipath function is provided by the combination of the kernel modules and user space tools.

The DMMP is supported on SUSE Linux Enterprise Server (SLES) Version 11 and 11.1. The SLES installation must have components at or above the version levels shown in the following table before you install the DMMP.

TABLE 8 Minimum Supported Configurations for the SLES 11 Operating System

Version	Component
Kernel version	kernel-default-2.6.27.29-0.1.1
Scsi_dh_rdac kmp	lsi-scsi_dh_rdac-kmp-default-0.0_2.6.27.19_5-1
Device Mapper library	device-mapper-1.02.27-8.6
Multipath-tools	multipath-tools-0.4.8-40.6.1

To update a component, download the appropriate package from the Novell website at <http://download.novell.com/patch/finder>. The Novell publication, *SUSE Linux Enterprise Server 11 Installation and Administration Guide*, describes how to install and upgrade the operating system.

Device Mapper Features

- Provides a single block device node for a multipathed logical unit
- Ensures that I/O is re-routed to available paths during a path failure
- Ensures that the failed paths are revalidated as soon as possible
- Configures the multipaths to maximize performance
- Reconfigures the multipaths automatically when events occur
- Provides DMMP features support to newly added logical unit
- Provides device name persistency for DMMP devices under `/dev/mapper/`
- Configures multipaths automatically at an early stage of rebooting to permit the OS to install and reboot on a multipathed logical unit

Known Limitations and Issues of the Device Mapper

- When storage is configured with AVT mode, delays in device discovery might occur. Delays in device discovery might result in long delays when the operating system boots.
- In certain error conditions with `no_path_retry` or `queue_if_no_path` feature set, applications might hang forever. To overcome these conditions, you must enter the following command to all the affected multipath devices: `dmsetup message device 0 "fail_if_no_path"`, where `device` is the multipath device name (for example, `mpath2`; do not specify the path).
- An I/O hang might occur when a volume is unmapped without first deleting the DM device. **Note:** This limitation applies to only the SUSE 11 OS.
- Stale entries might not be noticed in `multipath -ll` output if the volumes are unmapped or deleted without first deleting the DM device and its underlying paths. **Note:** This limitation applies to only the SUSE 11 OS.
- Currently, the `mode select` command is issued synchronously for each LUN. With large LUN configurations, slower failovers for DM multipath devices might occur if there is any delay in completing of the `mode select` command. **Note:** This limitation applies to only the SUSE 11 OS.
- If the `scsi_dh_rdac` module is not included in `initrd`, slower device discovery might occur, and the `syslog` might get populated with buffer I/O error messages.
- If the storage vendor and model are not included in `scsi_dh_rdac` device handler, slower device discovery might be seen, and the `syslog` might get populated with buffer I/O error messages.
- Use of the DMMP and RDAC failover solutions together on the same host is not supported. Use only one solution at a time.

Installing the Device Mapper Multi-Path

1. Use the media supplied by your operating system vendor to install SLES 11.
2. Install the errata kernel 2.6.27.29-0.1.
Refer to the *SUSE Linux Enterprise Server 11 Installation and Administration Guide* for the installation procedure.
3. To boot up to 2.6.27.29-0.1 kernel, reboot your system.
4. On the command line, enter `rpm -qa |grep device-mapper`, and check the system output to see if the correct level of the device mapper component is installed.
 - If the correct level of the device mapper component is installed—Go to [Step 5](#).

- If the correct level of the device mapper component is not installed, install the correct level of the device mapper component or update the existing component. Then, go to [Step 5](#).
5. **On the command line, enter `rpm -qa |grep multipath-tools` and check the system output to see if the correct level of the multipath tools is installed.**
 - If the correct level of the multipath tools is installed, go to [Step 6](#).
 - If the correct level of the multipath tools is not installed, install the correct level of the multipath tools or update the existing multipath tools. Then, go to [Step 6](#).
 6. **Update the configuration file `/etc/multipath.conf`.**

See “[Setting Up the multipath.conf File](#)” on page 17 for detailed information about the `/etc/multipath.conf` file.
 7. **On the command line, enter `chkconfig multipathd on`.**

This command enables multipathd daemon when the system boots.
 8. **Edit the `/etc/sysconfig/kernel` file to add directive `scsi_dh_rdac` to the `INITRD_MODULES` section of the file.**
 9. **Download the KMP package for `scsi_dh_rdac` for the SLES 11 architecture from the website <http://forgeftp.novell.com/driver-process/staging/pub/update/lsi/sle11/common/>, and install the package on the host.**
 10. **Update the boot loader to point to the new initrd image, and reboot the host with the new initrd image.**

Setting Up the multipath.conf File

The `multipath.conf` file is the configuration file for the multipath daemon, `multipathd`. The `multipath.conf` file overwrites the built-in configuration table for `multipathd`. Any line in the file whose first non-white-space character is `#` is considered a comment line. Empty lines are ignored.

Installing the Device Mapper Multi-Path for SLES 11.1

All of the components required for DMMP are included in SUSE Linux Enterprise Server (SLES) version 11.1 installation media. However, users might need to select the specific component based on the storage hardware type. By default, DMMP is disabled in SLES. You must follow the following steps to enable DMMP components on the host.

1. **On the command line, type `chkconfig multipath on`.**
The multipathd daemon is enabled with the system starts again.
2. **Edit the `/etc/sysconfig/kernel` file to add the directive `scsi_dh_rdac` to the `INITRD_MODULES` section of the file.**
3. **Create a new initrd image using the following command to include `scsi_dh_rdac` into ram disk:**

```
mkinitrd -i /boot/initrd-r -rdac -k /bootvmlinuz
```
4. **Update the boot loader to point to the new initrd image, and reboot the host with the new initrd image.**

Copy and Rename the Sample File

Copy and rename the sample file located at `/usr/share/doc/packages/multipath-tools/multipath.conf.synthetic` to `/etc/multipath.conf`. Configuration changes are now accomplished by editing the new `/etc/multipath.conf` file. All entries for multipath devices are commented out initially. The configuration file is divided into five sections:

- **defaults** – Specifies all default values.
- **blacklist** – All devices are blacklisted for new installations. The default blacklist is listed in the commented-out section of the `/etc/multipath.conf` file. Blacklist the device mapper multipath by WWID if you do not want to use this functionality.
- **blacklist_exceptions** – Specifies any exceptions to the items specified in the section blacklist
- **devices** – Lists all multipath devices with their matching vendor and product values
- **multipaths** – Lists the multipath device with their matching WWID values

Determine the Attributes of a MultiPath Device

To determine the attributes of a multipath device, check the multipaths section of the `/etc/multipath.conf` file, then the devices section, then the defaults section. The model settings used for multipath devices are listed for each storage array and include matching vendor and product values. Add matching storage vendor and product values for each type of volume used in your storage array.

For each UTM LUN mapped to the host, include an entry in the blacklist section of the `/etc/multipath.conf` file. The entries should follow the pattern of the following example.

```

blacklist {
device {
    vendor "*"
    product "Universal Xport"
}
}

```

The following example shows the devices section for LSI storage from the sample `/etc/multipath.conf` file. Update the vendor ID, which is LSI in the sample file, and the product ID, which is INF-01-00 in the sample file, to match the equipment in the storage array.

```

devices {
    device {
        vendor                "LSI"
        product                "INF-01-00"
        path_grouping_policy  group_by_prio
        prio                  rdac
        getuid_callout        "/lib/udev/scsi_id -g -u -d /dev/%n"
        polling_interval      5
        path_checker          rdac
        path_selector         "round-robin 0"
        hardware_handler      "1 rdac"
        failback              immediate
        features              "2 pg_init_retries 50"
        no_path_retry         30
        rr_min_io             100
    }
}

```

The following table explains the attributes and values in the devices section of the `/etc/multipath.conf` file.

TABLE 9 Attributes and Values in the `multipath.conf` File

Attribute	Parameter Value	Description
<code>path_grouping_policy</code>	<code>group_by_prio</code>	The path grouping policy to be applied to this specific vendor and product storage.
<code>prio</code>	<code>rdac</code>	The program and arguments to determine the path priority routine. The specified routine should return a numeric value specifying the relative priority of this path. Higher numbers have a higher priority.
<code>getuid_callout</code>	<code>"/lib/udev/scsi_id -g -u -d /dev/%n"</code>	The program and arguments to call out to obtain a unique path identifier.

TABLE 9 Attributes and Values in the `multipath.conf` File (Continued)

Attribute	Parameter Value	Description
<code>polling_interval</code>	5	The interval between two path checks, in seconds.
<code>path_checker</code>	<code>rdac</code>	The method used to determine the state of the path.
<code>path_selector</code>	"round-robin 0"	The path selector algorithm to use when there is more than one path in a path group.
<code>hardware_handler</code>	"1 rdac"	The hardware handler to use for handling device-specific knowledge.
<code>failback</code>	10	A parameter to tell the daemon how to manage path group failback. In this example, the parameter is set to 10 seconds, so failback occurs 10 seconds after a device comes online. To disable the failback, set this parameter to <code>manual</code> . Set it to <code>immediate</code> to force failback to occur immediately.
<code>features</code>	"2 <code>pg_init_retries</code> 50"	Features to be enabled. This parameter sets the kernel parameter <code>pg_init_retries</code> to 50. The <code>pg_init_retries</code> parameter is used to retry the mode select commands.
<code>no_path_retry</code>	30	Specify the number of retries before queuing is disabled. Set this parameter to <code>fail</code> for immediate failure (no queuing). When this parameter is set to <code>queue</code> , queuing continues indefinitely.
<code>rr_min_io</code>	100	The number of I/Os to route to a path before switching to the next path in the same path group. This setting applies if there is more than one path in a path group.

Using the Device Mapper Devices

Multipath devices are created under `/dev/` directory with the prefix `dm-`. These devices are the same as any other block devices on the host. To list all of the multipath devices, run the `multipath -ll` command. The following example shows system output from the `multipath -ll` command for one of the multipath devices.


```

mpathp (3600a0b80005ab177000017544a8d6b92) dm-0 LSI,INF-01-00
[size=5.0G][features=3 queue_if_no_path
pg_init_retries 50][hwhandler=1 rdac][rw]
\_ round-robin 0 [prio=6][active] \_ 5:0:0:0
sdc 8:32 [active][ready] \_
round-robin 0 [prio=1][enabled] \_ 4:0:0:0 sdb 8:16
[active][ghost]

```

In this example, the multipath device node for this device is `/dev/mapper/mpathp` and `/dev/dm-0`. The following table lists some basic options and parameters for the multipath command.

TABLE 10 Options and Parameters for the multipath Command

Command	Description
<code>multipath -h</code>	Prints usage information
<code>multipath -ll</code>	Shows the current multipath topology from all available information (sysfs, the device mapper, path checkers, and so on)
<code>multipath -f map</code>	Flushes the multipath device map specified by the map option, if the map is unused
<code>multipath -F</code>	Flushes all unused multipath device maps

Troubleshooting the Device Mapper

TABLE 11 Troubleshooting the Device Mapper

Situation	Resolution
Is the multipath daemon, <code>multipathd</code> , running?	At the command prompt, enter the command: <code>/etc/init.d/multipathd status</code> .
Why are no devices listed when you run the <code>multipath -ll</code> command?	At the command prompt, enter the command: <code>#cat /proc/scsi/scsi</code> . The system output displays all of the devices that are already discovered. Verify that the <code>multipath.conf</code> file has been updated with proper settings.

Restrictions and Known Issues

The following sections provide information about restrictions, known issues, and bugs (or CRs) filed against this product release. If a recommended workaround is available for a bug, it follows the bug description.

- [“Controller Issues” on page 22](#)
- [“Linux Issues” on page 26](#)
- [“Windows Issues” on page 32](#)
- [“Documentation Issues” on page 33](#)

For information about bug fixes in this release, see the *Sun Storage Common Array Manager Software Release Notes*.

Controller Issues

I/O Errors Occur During Controller Firmware Download

Configuration:

- Red Hat Enterprise Linux (RHEL) version 6 with kernel 2.6.32 only.
- PowerPC
- Emulex 10N9824 HBA
- Device Mapper Multipath (DMMP) failover driver
- Sun Storage 2500-M2 controller tray
- Sun Storage 6180 controller tray

Note – This problem does not occur in RHEL version 6.0 with kernel 2.6.33.

Problem or Restriction: An I/O error occurs during an online controller firmware upgrade.

Workaround: To avoid this problem, quiesce the host I/O before the performing controller firmware upgrades. To recover from this problem, make sure that the host reports that it has optimal paths available to the storage array controllers, and then resume I/O.

Both RAID Controllers Reboot After 828.5 Days—2500/6000 Arrays

CR 6872995, 6949589—Both RAID controllers reboot after 828.5 days of continuous operation. A timer in the firmware (vxWorks) called “vxAbsTicks” is a 32-bit (double word) integer that keeps count in the 0x0000 0000 format. When this timer rolls over from 0xffffffff to 0x00000000 (after approximately 828.5 days), if there is host I/O to volumes, the associated drives fail with a write failure.

Original Resolution: Every 24 hours, firmware spawns a task--cfgMonitorTask--that checks the value of the vxworks kernel timing counter. For controllers with 03.xx-06.60 firmware (6000 series) and 03.xx-6.70 firmware (2500 series): Both controllers reboot if counter is greater than 825 days.

Final Resolution: Every 24 hours, firmware spawns a task--cfgMonitorTask--that checks the value of the vxworks kernel timing counter.

This fix staggers the reboots of the controllers for approximately five days so the only impact is a small performance degradation while the reboot occurs.

For controllers with firmware 07.15.11.12 or later (6000 series) and firmware 07.35.10.10 or later (2500 series): Controller A reboots if counter is greater than 820 days. Controller B reboots if counter is greater than 825 days.

Note – There is no redundancy for failover in a simplex 2500 configuration or *any duplex configuration* where a controller is already offline for any reason.

Controller Panics After Removing the Last I/O Module

Problem or Restriction: After removing a second I/O Module from a storage array, the controller panics.

Workaround: After removing an I/O Module, wait at least 10 minutes before removing another I/O Module from the same storage array.

Cache Attempts to Restore the Backup Data on Foreign Devices

Problem or Restriction: Cache restore is attempted when the controller is attached to foreign drive modules, and there is data on the USB devices that the cache has not written to the drive modules.

Workaround:



Caution – Possible loss of data—Failure to perform this workaround could result in data loss.

Before the power is turned off to the system, quiesce the system. You should quiesce the system before the controller or the drive module is moved. This process does not back up the cache, and it does not attempt to restore the data from the USB devices to the foreign drive modules.

Controller Does Not Detect All Hardware Defects on a Newly Replaced Host Interface Card

Problem or Restriction: With power-on diagnostics, some host interface card hardware defects are not found, including problems transferring data across the PCI express bus, interrupt failures, and issues with the internal buffers in the chip.

Workaround: Verify that the host interface cable connections into the Small Form-factor Pluggable (SFP) transceivers are secure. If the problem remains, replace the host interface card.

Unable to Load a Previous Firmware Version

Problem or Restriction: If the controllers are running firmware that uses 64-bit addressing, you cannot load firmware that uses 32-bit addressing if your storage array has these conditions:

- 2-TB volumes
- Snapshots of any size

Recent code changes have been implemented to fix a 32-bit addressing issue by using 64-bit addressing. After you have updated to a firmware version that uses the 64-bit addressing, do not attempt to reload firmware version that uses 32-bit addressing.

Workaround: If you must replace a firmware version that uses 64-bit addressing with a firmware version that uses 32-bit addressing, contact a Sun Technical Support representative. The Technical Support representative will delete all snapshots before starting the downgrade process. Snapshots of any size will not survive the downgrade process. After the firmware that uses 32-bit addressing boots and runs, no snapshot records will be available to cause errors. After the 32-bit addressing firmware is running, you can re-create the snapshots.

Controller Registers Disabled IPV6 Addresses When Using iSNS with DHCP

Problem or Restriction: This problem occurs when Internet Protocol Version 6 (IPV6) addresses have been disabled on a Sun Storage 6180 array. If the Internet Storage Name Service (iSNS) is enabled and set to obtain configuration data

automatically from the Dynamic Host Configuration Protocol (DHCP) server, the IPV6 addresses will be discovered even though they were disabled on the ports of the controllers in the Sun Storage 6180 array.

Workaround: None.

iSNS Does Not Update the iSNS Registration Data When You Change the iSCSI Host Port IP Addresses

Problem or Restriction: This problem occurs when you change the configuration for all of the ports in a storage array from using Dynamic Host Configuration Protocol (DHCP) to using static IP addresses or vice versa. If you are using Internet Storage Name Service (iSNS), the registration of the IP addresses for the ports will be lost.

Workaround: Use one of the following workarounds after you change the IP addresses:

- Disable and then enable iSNS service on the controllers.
- Reboot the controllers.

Single Path Data Connections

In a single path data connection, a group of heterogeneous servers is connected to an array through a single connection. Although this connection is technically possible, there is no redundancy, and a connection failure will result in loss of access to the array.

Caution – Because of the single point of failure, single path data connections are not recommended.

Drive Module ID of 0 (Zero) Is Restricted

Problem or Restriction: Because of the potential conflict between a drive module intentionally set to 0 (zero) and a drive module ID switch error that causes a drive module ID to be accidentally set to 0, do not set your drive module ID to 0.

Workaround: Change drive module ID to a value other than zero.

Drives Cannot Be Removed During a Drive Firmware Download

Problem or Restriction: Removing and reinserting drives during the drive firmware download process might cause the drive to be shown as unavailable, failed, or missing.

Workaround: Remove the drive, and either reinsert it or reboot the controllers to recover the drive.

Drive Modules Cannot Be Added During an I/O Module Firmware Download

Problem or Restriction: If you add a drive module using the loop topology option during Environmental Services Monitor (I/O Module) firmware download, the I/O Module firmware download process might fail due to a disconnected loop.

Workaround: When adding the drive module, do not follow the loop topology option. If you add the drive module by connecting the ports to the end of the storage array without disconnecting the loop, the I/O Module firmware download is successful.

Drives Fail to Spin Up if Inserted While the Storage Array Reboots

Problem or Restriction: Removing drives while a storage array is online and then waiting to reinsert the drives until the storage array is starting after a reboot might cause the drives to be marked as failed after the storage array comes back online.

Workaround: Wait until the storage array is back online before reinserting the drives. If the storage array still does not recognize the drives, reconstruct the drives using Sun Storage Manager Common Array Manager software.

Linux Issues

Linux RDAC 09.03.0C02.0453 - Make Install Dependencies

Configuration:

- Red Hat Enterprise Linux (RHEL) or Oracle Linux version 5.5 or 5.6
- RDAC driver version 09.03.0C02.0453

Problem or Restriction: CR 7042297—Before running a "make" on the RDAC driver, the following kernel packages are required:

- kernel-2.6.18-194.el5
- kernel-devel-2.6.18-194.el5.x86_64.rpm
- kernel-headers-2.6.18-194.el5.x86_64.rpm
- glibc-headers-2.5-49.x86_64.rpm
- glibc-devel-2.5-49.x86_64.rpm
- libgomp-4.4.0-6.el5.x86_64.rpm
- gcc-4.1.2-48.el5.x86_64.rpm

DMMP Device Handler scsi_dh_rdac.c Missing SUN, SUN_6180

Operating System: SUSE Linux Enterprise Server 11.1 SP1

Problem or Restriction: CR 7026018—Support for SUN and SUN_6180 is missing from the `rdac_dev_list` in the device handler `scsi_dh_rdac.c` file. For more information, refer to https://bugzilla.novell.com/show_bug.cgi?id=682738.

Workaround:

1. **Verify DMMP is installed** (see “Installing the Device Mapper Multi-Path” on page 16).
2. **Download the `scsi_dh_rdac` KMP package for the SLES 11 architecture:**
<http://drivers.suse.com/driver-process/pub/update/LSI/sle11spl/common/>
3. **Add the vendor ID and product ID to the `/etc/multipath.conf` file:**
 - a. **Open `/etc/multipath.conf`.**
 - b. **Copy a device block of code starting with "device {" and ending with "}" and paste a copy of it at the end of the file, within the "devices {" and "}" block.**
 - c. **Change the vendor ID and product ID to the values "SUN" and "SUN_6180", as shown in the following example:**

```

vendor      "SUN"
product     "SUN_6180"

```
 - d. **Save your changes and exit the file.**
4. **Reboot the host.**

For more information about the DMMP device handler, see “Device Mapper Multipath (DMMP) for the Linux Operating System” on page 15.

I/O FAILURE Messages and Illegal Requests in Logs

Operating System: SUSE Linux Enterprise Server 11.1 SP1

Problem or Restriction: Several IO FAILURE and Illegal Requests log events with ASC/ASQ SCSI errors appear in `/var/log/messages` while running `vdbench` on 25 LUNs.

An application client may request any one or all of the supported mode pages from the device server. If an application client issues a MODE SENSE command with a page code or subpage code value not implemented by the logical unit, the command shall be terminated with CHECK CONDITION status, with the sense key set to ILLEGAL REQUEST, and the additional sense code set to INVALID FIELD IN CDB.

The controller responds correctly (05h/24h/00h -INVALID FIELD IN CDB). The `smartctl` tool may need to ask all supported mode pages first before sending a unsupported mode page request.

Workaround: Disable SLES11 `smartd` monitoring service to stop these messages.

```
System Services (Runlevel) > smartd Disable
```

Cluster Startup Fails When Devices Are in a Unit Attention State

Configuration:

- Red Hat Enterprise Linux (RHEL) version 6.0 with Native Cluster
- Device Mapper Multipath (DMMP) failover driver

Problem or Restriction: This problem occurs when the DMMP failover driver is used with the RHEL version 6.0 OS. If you try to set up a Red Hat cluster with the DMMP failover driver, cluster startup might fail during the unfencing stage, where each host registers itself with the SCSI devices. The devices are in a Unit Attention state, which causes the SCSI registration command issued by the host during startup to fail. When the cluster manager (`cman`) service starts, the logs show that the nodes failed to unfence themselves, which causes the cluster startup to fail.

Workaround: To avoid this problem, do not use the DMMP failover driver with RHEL version 6.0. To recover from this problem, open a terminal window, and run:

```
sg_turs -n 5 <device>
```

where `<device>` is a SCSI device that is virtualized by the DMMP failover driver. Run this command on every `/dev/sd` device that the DMMP failover driver manages. It issues a Test Unit Ready command to clear the Unit Attention state and allow node registration on the device to succeed.

Node Unfencing Fails when Automatically Generated Host Keys Are Used during a Red Hat Cluster Suite Services Startup

Operating System: Red Hat Enterprise Linux 6 with Native Cluster

Problem or Restriction: This problem occurs the first time a cluster is set up when the cluster.conf file does not have manually defined host keys. When the cluster.conf file was first defined to set up a cluster with SCSI reservation fencing, the cluster services were started on the nodes. With SCSI reservation fencing, the hosts try to generate and register a key on the clustered devices as part of the cluster manager's startup. The cluster manager service (cman) fails to start, and the key cannot be zero error message appears in the host log.

Workaround: To avoid this problem, use only power fencing. Do not use SCSI reservation fencing. To recover from this problem, change to manually defined host keys, and restart the cluster services.

Red Hat Cluster Suite Services with GFS2 Mounts Cannot Transfer Between Nodes when the Client Mounts with NFSv4

Operating System: Red Hat Enterprise Linux 6 Native Cluster

Problem or Restriction: This problem occurs during an attempt to transfer a cluster service manually when a client is connected using NFSv4. The Global File System (GFS) 2 mount points failed to unmount, which caused the Red Hat Cluster Suite Services to go to the Failed state. The mount point, and all other mount points exported from the same virtual IP address, becomes inaccessible.

Workaround: To avoid this problem, configure the cluster nodes to not allow mount requests from NFS version 4 (NFSv4) clients. To recover from this problem, restart the failed service on the node that previously owned it.

Host Aborts I/O Operations

Operating System: Red Hat Enterprise Linux version 6.0

Problem or Restriction: This problem occurs during an online controller firmware upgrade. The controller is not responding quickly enough to a host read or write to satisfy the host. After 30 seconds, the host sends a command to abort the I/O. The I/O aborts, and then starts again successfully.

Workaround: Quiesce the host I/O before performing the controller firmware upgrade. To recover from this problem, either reset the server, or wait until the host returns an I/O error.

Host Attempts to Abort I/O Indefinitely

Operating System: Red Hat Enterprise Linux version 6.0 with kernel 2.6.32

Red Hat Bugzilla Number: 620391

Note – This problem does not occur in Red Hat Enterprise Linux version 6.0 with kernel 2.6.33.

Problem or Restriction: This problem occurs under situations of heavy stress when storage arrays take longer than expected to return the status of a read or write. The storage array must be sufficiently stressed that the controller response is more than 30 seconds, at which time a command is issued to abort if no response is received. The abort will be retried indefinitely even when the abort is successful. The application either times out or hangs indefinitely on the read or write that is being aborted. The messages file reports the aborts, and resets might occur on the LUN, the host, or the bus.

Factors effecting controller response include Remote Volume Mirroring, the controller state, the number of attached hosts, and the total throughput.

Workaround: To recover from this problem, reset the power on the server.

Linux Host Hangs During Reboot After New Volumes Are Added

Problem or Restriction: When a Red Hat Enterprise Linux 5.1 host has more than two new volumes mapped to it, it hangs during reboot.

Workaround: Try one of the following options:

- After you add the new volumes, run the `hot_add` utility before rebooting the host.
- Upgrade the QLogic driver with driver version `qla2xxx-v8.01.07.15-2` (or later). This option does not require that you run the `hot_add` utility.
- Perform multiple reboots of the host.

Linux I/O Timeout Error Occurs After Enabling a Switch Port

Problem or Restriction: An I/O timeout error occurs after you enable a switch port. This problem occurs when two or more Brocade switches are used, and both the active and the alternative paths from the host are located on one switch, and both the active path and the alternative path from the storage array are located on another switch. For the host to detect the storage array on the other switch, the switches are cascaded, and a shared zone is defined between the switches. This problem occurs on fabrics managing high I/O traffic.

Workaround: Reconfigure the switch zoning to avoid the need for cascading. Limit the zones within each switch, and do not create zones across the switches. Configure the active paths from the host and the storage array on one switch, and all of the alternative paths from the host and the storage array on the other switch.

Note – Configuring the active paths from all of the hosts on one switch will not provide optimal performance. To resolve this performance issue, alternate the hosts in terms of using active and alternative paths.

For switch 1, connect to storage array 1, and use the following arrangement: Host A_Active port, Host B_Alternative port, Host C_Active port, Host D_Alternative port.

For switch 2, connect to storage array 2, and use the following arrangement: Host A_Alternative port, Host B_Active port, Host C_Alternative port, Host D_Active port.

Linux Host Hangs During Reboot

Problem or Restriction: Red Hat Enterprise Linux 5.2 PowerPC (PPC) only. On rare occasions, the host hangs during reboot.

Workaround: Reset the host.

Cannot Find an Online Path After a Controller Failover

Problem or Restriction: Linux Red Hat 5 and Linux SLES 10 SP1 only. After a controller failover in an open SAN environment, a controller comes back online, but the path is not rediscovered by the multi-path proxy (MPP). After a controller comes online in a fabric connection (through a SAN switch), it is possible that a link will not be established by the Emulex HBA driver. This behavior is seen only if the SAN switch is “default” zoned (all ports see all other ports). This condition can result in an I/O error if the other path is taken offline.

Workaround: Set all of the SAN switches to be “default” zoned.

I/O Errors Occur During a Linux System Reboot

Problem or Restriction: SLES 10 SP2 only. I/O errors occur during a system reboot, and the host resets.

Workaround: None.

MEL Events Occur During the Start-of-Day Sequence

Problem or Restriction: Red Hat Enterprise Linux 4.7 only. When the controller is going through the start-of-day sequence, the drive channel does not achieve link speed detection and logs a Major Event Log (MEL) event. This event recovers within a few seconds, and a second MEL event occurs. The second MEL event indicates that the link speed detection was achieved.

Workaround: None.

Windows Issues

Hibernate Does Not Work in a Root Boot Environment for Windows Server 2003

Problem or Restriction: Windows Server 2003 only. When you configure a storage array as a boot device, the system shows a blue screen and does not respond when it is manually or automatically set to hibernate.

Workaround: If you use a storage array as a boot device for the Windows Server 2003 operating system, you cannot use the hibernation feature.

No Automatic Synchronization MEL Events on ACS and Deferred Lockdown

Problem or Restriction: Windows Server 2003 only. No Automatic Synchronization MEL events are received when the controllers go through autocode synchronization (ACS) and a deferred lockdown.

Workaround: You must verify the firmware on the controllers.

AIX Issues

Volume Transfer Fails

Problem or Restriction: AIX only. When you perform a firmware download with aMEL heavy load, the download fails because the volumes take too long to transfer to the alternate controller.

Workaround: Execute the download again. To avoid this problem, perform the firmware updates during non-peak I/O activity times.

Documentation Issues

Sun Storage 6180 Site Preparation Guide

Problem: The *Sun Storage 6180 Site Preparation Guide* contains discrepancies for certain array specifications.

Workaround: Note the following corrected capacity, environment, and physical values.

TABLE 12 Hardware Specifications

	Correct Specification
Capacity	<ul style="list-style-type: none">• For controller trays with four host ports, up to three expansion trays can be added.• For controller trays with eight host ports, up to six expansion trays can be added.• The array configuration supports unlimited global hot-spare drives, and each spare can be used for any disk in the array configuration.
Environment	<ul style="list-style-type: none">• Controller tray AC input: 50/60 Hz, 3.96 A max. operating @ 115 VAC, 2.06A max. operating @ 230 VAX (115 to 230 VAC range).• Expansion tray AC input: 50/60 Hz, 3.90 A max. operating @ 115 VAC, 2.06A max. operating @ 230 VAX (90 to 264 VAC range)
Tray Dimensions	5.1 in. x 17.6 in. x 22.5 in 12.95 cm x 44.7 cm x 57.15 cm
Weight	The maximum weight of a fully populated controller or expansion tray is 93 pounds (42.18 kilograms).

Sun Storage 6180 Array Hardware Installation Guide

Problem: The Note on page 15 of the *Sun Storage 6180 Array Hardware Installation Guide* incorrectly references the Common Array Manager Release Notes for information about Installing Firmware for Additional Expansion Modules.

Correction: Refer to the “Adding Expansion Trays” procedure in Service Advisor. If you need to upgrade to the latest firmware revision, see “Upgrade Firmware” in Service Advisor.

Product Documentation

Related product documentation is available at:

<http://download.oracle.com/docs/cd/E19373-01/index.html>

Application	Title
Site planning information	<i>Sun Storage 6180 Array Site Planning Guide</i>
Regulatory and safety information	<i>Sun Storage 6180 Array Safety and Compliance Manual</i>
Installation overview for rack-mounted arrays	<i>Getting Started Guide for Sun Storage 6180 Rack Ready Arrays</i>
Array installation instructions	<i>Sun Storage 6180 Array Hardware Installation Guide</i>
Rack installation instructions	<i>Sun Rack II User's Guide</i>
Rail kit installation instructions	<i>Sun Modular Storage Rail Kit Installation Guide</i>
PDU installation instructions	<i>Sun Cabinet Power Distribution Unit (PDU) Installation Guide</i>
CAM software installation and initial configuration instructions	<i>Sun Storage Common Array Manager Quick Start Guide</i> <i>Sun Storage Common Array Manager Software Installation and Setup Guide</i>
Command line management interface reference	<i>Sun Storage Common Array Manager CLI Guide</i>
Release-specific information for the Sun Storage Common Array Manager	<i>Sun Storage Common Array Manager Release Notes</i>
Multipath failover driver installation and configuration	<i>Sun StorageTek MPIIO Device Specific Module Installation Guide For Microsoft Windows OS</i> <i>Sun StorageTek RDAC Multipath Failover Driver Installation Guide For Linux OS</i>

Documentation, Support, and Training

These web sites provide additional resources:

- Documentation <http://www.oracle.com/technetwork/documentation/oracle-unified-ss-193371.html>
- Software licensing <http://licensecodes.oracle.com/>
- Support <https://support.oracle.com>
- Training <https://education.oracle.com>

