



Dell™ PowerVault™ MD Series Support Matrix

This document describes the Dell PowerVault MD32XX/36XX Series RAID Controller
Firmware Version 08.20.24.60

Dell Engineering
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Reference Architecture

Revisions

Date	Description
June 2015	<ul style="list-style-type: none"> Updated RAID controller NVSRAM and supported physical disk drive models
July 2015	<ul style="list-style-type: none"> Updated information about supported physical disk drive models Updated Supported Management Software section Updated Supported Operating Systems section Updated Dell PowerVault MD-Series storage array rules section
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October 2015	<ul style="list-style-type: none"> Updated supported physical disks section Updated storage array rules for all models section Updated expansion enclosures section Updated the Windows ODX support section
November 2015	<ul style="list-style-type: none"> Updated the Windows ODX support section
April 2016	<ul style="list-style-type: none"> Updated the supported physical disks section Updated version of CFW
July 2016	<ul style="list-style-type: none"> Updated the supported physical disks section Updated version of CFW and HSW Updated supported operating systems section
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February 2017	<ul style="list-style-type: none"> Updated version of CFW
May 2017	<ul style="list-style-type: none"> Updated the supported physical disks section Updated version of CFW Updated the supported Operating Systems section Updated storage array rules



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Contents

Revisions	2
1 Introduction	6
2 Changes in Version A21	7
3 Supported data protocols	8
4 Dell PowerVault MD-Series storage array rules	9
5 Default IPv4 settings for the management ports on the Dell PowerVault MD Series storage arrays	16
5.1 Default IPv4 settings for the iSCSI ports on Dell PowerVault MD36x0i array	16
5.2 Default IPv4 settings for the iSCSI ports on Dell PowerVault MD32x0i storage array	16
6 Supported RAID controller firmware and NVSRAM	18
7 Supported SAS host bus adapters (HBAs)	19
8 Supported iSCSI software initiators	20
9 Supported protocol offload (TOE / iSCSI) adapters	21
10 Fibre Channel SFP+ transceiver support	22
11 Supported physical disks	23
12 Supported Expansion Enclosures	30
13 Supported management software	31
14 Supported operating systems	35
15 Windows ODX support	40
16 ALUA support on supported host operating systems	41
17 Supported device mapper software	42
18 Supported Fibre Channel host bus adapters	43
19 Required timeout settings for Fibre Channel host bus adapters	45
20 Supported Fibre Channel switches	46
21 Supported Dell M1000e Fibre Channel IOMs	49
22 Tested Brocade, Cisco, and Qlogic Fibre Channel routers	50



Notes, Cautions, and Warnings

Note: A note indicates important information that helps you make better use of your computer.

Caution: A caution indicates potential damage to hardware or loss of data, if instructions are not followed.

Warning: A warning indicates a potential for property damage, personal injury, or death.

Note: This Support Matrix contains the latest compatibility and interoperability information. If you encounter inconsistencies between this information and other MD-series documentation, consider this document superseding.



1 Introduction

This document provides information about supported software and hardware for Dell PowerVault MD3200, MD3220, MD3200i, MD3220i, MD3600i, MD3600f, MD3620i, MD3620f, MD3260, MD3260i, MD3660i, and MD3660f storage arrays, and usage considerations, recommendations, and rules.

Note: Unless specified, all information in this document is applicable to the latest RAID controller firmware version available at Dell.com/support.



2 Changes in Version A21

- Updated the supported physical disks section
- Updated version of CFW
- Updated the supported Operating Systems section
- Updated storage array rules



3 Supported data protocols

Table 1 Dell PowerVault MD-Series models and supported data protocols

Dell PowerVault MD Array Model ³	Data Protocol
MD3200 ¹	6 Gbps direct attached SAS storage array with 12 drives (3.5 inch)
MD3220 ¹	6 Gbps direct attached SAS storage array with 24 drives (2.5 inch)
MD3200i ¹	1 Gbps iSCSI network storage array with 12 drives (3.5 inch)
MD3220i ¹	1 Gbps iSCSI network storage array with 24 drives (2.5 inch)
MD3600i ¹	10 Gbps iSCSI network storage array with 12 drives (3.5 inch)
MD3620i ¹	10 Gbps iSCSI network storage array with 24 drives (2.5 inch)
MD3600f ¹	8 Gbps fibre channel network storage array with 12 drives (3.5 inch)
MD3620f ¹	8 Gbps fibre channel network storage array with 24 drives (2.5 inch)
MD3260 ²	6 Gbps direct Attached SAS storage dense array
MD3260i ²	1 Gbps iSCSI network storage dense array
MD3660i ²	10 Gbps iSCSI network storage dense array
MD3660f ²	8 Gbps fibre channel network storage dense array

Notes:

1 Dell PowerVault MD3200, MD3220, MD3200i, MD3220i, MD3600i, MD3620i, MD3600f, and MD3620f models support 120 physical disk drive slots in base configuration. With premium feature activation, 192 physical disk drive slots are supported.

2 Dell PowerVault MD3x60i/f dense array has default 120 drive slots support (with 20 drives minimum, four in first row of each drawer), and 180 drive slots support with PFK.

3 Premium Feature Key (PFK) is optional on all models.



4 Dell PowerVault MD-Series storage array rules

This section contains both general and model-specific connectivity and consideration rules for Dell PowerVault MD storage arrays. The rules listed in Table 2 apply only to all storage array models. For rules applying to specific Dell PowerVault MD models, see Table 3 and Table 4.

Note: Dell PowerVault MD3260, MD3260i, MD3660i, and MD3660f platforms are supported in dual-RAID controller (duplex) configurations only.

Table 2 Dell PowerVault MD-Series storage array rules for all models

Rule	Dell PowerVault MD32x0 series	Dell PowerVault MD32x0i series	Dell PowerVault MD36x0i series	Dell PowerVault MD36x0f series
	6 Gbps SAS	1 Gbps iSCSI	10 Gbps iSCSI	8 Gbps Fibre Channel
Maximum number of host servers a single storage array can connect to with one RAID controller module installed	4	32	64	64
Maximum number of host servers a single storage array can connect to with two RAID controller modules installed	8 (4, if using high availability)	32	64	64
Maximum number of Dell 6 Gb SAS HBA cards supported in a single host server attached to single array. (Dell recommends that you use two Dell 6 Gb SAS HBA cards for all redundant cabling configurations.)	2 (each card has two ports)	N/A	N/A	N/A
Unused ports on a Dell 6 Gb SAS HBA card already connected to a PowerVault MD3260 cannot connect to another device (such as a tape drive or other model storage array).	✓	N/A	N/A	N/A
Maximum number of PowerVault MD Series Storage Arrays a host server may connect to:	2 (HA)	4	4	4
A hot-spare for a disk group must be a physical disk drive of equal or greater disk space than any of the member drives.	✓	✓	✓	✓



Rule	Dell PowerVault MD32x0 series	Dell PowerVault MD32x0i series	Dell PowerVault MD36x0i series	Dell PowerVault MD36x0f series
	6 Gbps SAS	1 Gbps iSCSI	10 Gbps iSCSI	8 Gbps Fibre Channel
<p>When using out-of-band management with SMcli by specifying the RAID Controller management port IP addresses on the Dell PowerVault MD Storage Array, SMcli commands that change the attributes of a virtual disk, virtual disk copy, or snapshot virtual disk, must have management access to the owning RAID Controller Module.</p> <p>Dell recommends that you specify both management port IP addresses on the SMcli invocation: SMcli 192.168.128.101 192.168.128.102 -c.</p>	✓	✓	✓	✓
On Linux systems Device Mapper, multipath drivers are required for multipath support	✓	✓	✓	✓
<p>Coexistence of several Linux multi-path drivers is not supported.</p> <p>When using a Dell PowerVault MD3200 or MD3600 series array with Linux host servers, only the Linux Device Mapper failover driver is supported.</p>	✓	✓	✓	✓
Virtual disks on Dell PowerVault MD Series storage arrays cannot be used for booting.	✓	✓	✓	✓
Disk Groups can be migrated between a Dell PowerVault MD3260/3260i/3660i/3660f by following the appropriate disk group migration procedure	✓	✓	✓	✓
Maximum size of a virtual disk in a dynamic disk pool is 64TB	✓	✓	✓	✓
Disk pools cannot be migrated.	✓	✓	✓	✓
Maximum disk space per array for dynamic disk pooling	1024 TB	256 TB	256 TB	1024 TB



Rule	Dell PowerVault MD32x0 series	Dell PowerVault MD32x0i series	Dell PowerVault MD36x0i series	Dell PowerVault MD36x0f series
	6 Gbps SAS	1 Gbps iSCSI	10 Gbps iSCSI	8 Gbps Fibre Channel
Maximum SSD cache size allowed depends on the installed RAM per controller: ∞ 2GB RAM per controller supports up to 2TB SSD read cache ∞ 4GB RAM per controller supports up to 4TB SSD read cache	✓	✓	✓	✓
All iSCSI Host ports on a controller have to be at the same port speed	N/A	Only 1Gbps Supported	✓	N/A
iSCSI Host ports will only auto-negotiate to the port speed set in MDSM	N/A	Only 1Gbps Supported	✓	N/A



Rule	Dell PowerVault MD32x0 series	Dell PowerVault MD32x0i series	Dell PowerVault MD36x0i series	Dell PowerVault MD36x0f series
	6 Gbps SAS	1 Gbps iSCSI	10 Gbps iSCSI	8 Gbps Fibre Channel
<p>If the iSCSI initiators are connected to Dell PowerVault MD3200i and/or MD3600i series through the network switches, ensure that your switches support IEEE 802.3x flow control, and the flow control is enabled for both sending and receiving on all switch ports and server NIC ports.</p> <p>If you do not enable the flow control, your iSCSI storage array may experience the degradation of the I/O performance.</p> <p>Alongside enabling the Ethernet IEEE 802.3x flow control, Dell recommends that you disable unicast broadcast storm control on the switch ports connected to the iSCSI initiators and target arrays and turn on the "PortFast" mode of the spanning tree protocol (STP) on the switch ports connected to the iSCSI initiators and target arrays.</p> <p>Note that turning on the "PortFast" mode is different from turning off the whole operation of STP on the switch. With "PortFast" on, the STP is still enabled on the switch ports. Turning STP off may affect the entire network and can leave the network vulnerable to physical topology loops.</p>	N/A	✓	✓	N/A
<p>For optimal I/O performance, avoid having more than one iSCSI session originating from one host iSCSI port to the same controller. Ideally, connect the iSCSI host NIC to only one iSCSI target port on the storage subsystem.</p>	N/A	✓	✓	N/A



Rule	Dell PowerVault MD32x0 series	Dell PowerVault MD32x0i series	Dell PowerVault MD36x0i series	Dell PowerVault MD36x0f series
	6 Gbps SAS	1 Gbps iSCSI	10 Gbps iSCSI	8 Gbps Fibre Channel
For Dell-Oracle tested and validated solutions on the Dell PowerVault MD arrays, visit the following site: http://en.community.dell.com/techcenter/enterprise-solutions/w/oracle_solutions/current-release.aspx	✓	✓	✓	✓
The number of VD copies is limited to a maximum of 511 with a maximum of 8 concurrent copies (applicable to RAID controller firmware version 07.84.xx.xx)	✓	✓	✓	✓
Remote Replication is not supported in simplex mode.	N/A	✓	✓	✓
Maximum number of iSCSI sessions.	N/A	192 per port	448 per port	N/A
Online Physical Disk Firmware Upgrade is supported	✓	✓	✓	✓
When using physical disks of 6 TB or larger capacity, it is recommended to use either a RAID 6 Disk Group or a Dynamic Disk Pool (DDP). Due to the increased amount of time taken to reconstruct and copy-back, the chances for a second drive failure increases on either a RAID 1/10 or a RAID 5 Disk Group.	✓	✓	✓	✓



Table 3 Dell PowerVault MD-Series storage array rules for non-dense, 2U models only (MD3200, MD3220, MD3200i, MD3220i, MD3600i, MD3620i, MD3600f and MD3620f)

Rule	Dell PowerVault MD3200 series	Dell PowerVault MD3200i series	Dell PowerVault MD3600i series	Dell PowerVault MD3600f series
	6 Gbps SAS	1 Gbps iSCSI	10 Gbps iSCSI	8 Gbps Fibre Channel
Support for up to 120 physical disk drive slots (system default configuration). You can attach up to nine Dell MD1200 and/or MD1220 series expansion enclosures to a Dell PowerVault MD storage array. Any mixture of MD1200 and MD1220 enclosures supports up to 120 physical slots.	✓	✓	✓	✓
Support for up to 192 physical slots through a premium feature option. You can attach up to 15 Dell MD1200 and/or MD1220 series expansion enclosures to a Dell PowerVault MD storage array. Any mixture of MD1200 and MD1220 enclosures for a total of 192 physical slots is supported.	✓	✓	✓	✓
Maximum number of physical disk drives in a RAID5 or RAID6 disk group is 30. There is no limitation with RAID0 and RAID10 disk groups.	✓	✓	✓	✓
Attached MD1200 series expansion enclosures must be run in unified mode.	✓	✓	✓	✓
The number of snapshots pre 07.80.xx.xx controller firmware is limited to: <ul style="list-style-type: none"> • Maximum of 256 snapshots per array • Maximum of 16 per VD 	✓	✓	✓	✓
The number of remote replicas (legacy) is limited to maximum of 16 pairs	N/A	N/A	N/A	✓
The number of snapshots starting with 07.84.xx.xx controller firmware code is limited to: <ul style="list-style-type: none"> • Maximum of 512 snapshots per array • Maximum of 128 snapshots per VD • Maximum of 32 snapshots per snapshot group 	✓	✓	✓	✓
The number of remote replicas is limited to the maximum of 32 for each array	N/A	✓	✓	✓



Table 4 Dell PowerVault MD-Series storage array rules for dense, 4U models only

Rule	MD3260 series	MD3260i series	MD3660i series	MD3660f series
	6Gbps SAS	1Gbps iSCSI	10Gbps iSCSI	8Gbps Fibre Channel
Support for up to 120 physical disk drive slots (system default configuration). You can attach one Dell MD3060e enclosure to a Dell PowerVault MD dense storage array.	✓	✓	✓	✓
Support for up to 180 physical slots through a premium feature option. You can attach up to two Dell MD3060e enclosures to a Dell PowerVault MD dense storage array, for a total of 180 physical slots.	✓	✓	✓	✓
Maximum number of physical disk drives in a RAID5 or RAID6 disk group is 30. There is no limitation with RAID0 and RAID10 disk groups.	✓	✓	✓	✓
A minimum of 20 SAS HDDs or SSDs are required in each MD3x60 enclosure (4 in front of each drawer)	✓	✓	✓	✓



5 Default IPv4 settings for the management ports on the Dell PowerVault MD Series storage arrays

Note: No default gateway is set.

By default, the management ports on the storage array are set to DHCP. If DHCP fails, the following IPv4 settings are used:

Table 5 Default IPv4 management port addresses

Controller	IPv4 address	Subnet mask
Controller 0	192.168.128.101	255.255.255.0
Controller 1	192.168.128.102	255.255.255.0

5.1 Default IPv4 settings for the iSCSI ports on Dell PowerVault MD36x0i array

Note: No default gateway is set.

By default, the iSCSI ports on the storage array are set to the static IPv4 settings listed in Table 6.

Table 6 Default iSCSI Port IPv4 Addresses on MD36x0i Storage Arrays

Controller/port	IPv4 address	Subnet mask	Port #
Controller 0, Port 0	192.168.130.101	255.255.255.0	3260
Controller 0, Port 1	192.168.131.101	255.255.255.0	3260
Controller 1, Port 0	192.168.130.102	255.255.255.0	3260
Controller 1, Port 1	192.168.131.102	255.255.255.0	3260

5.2 Default IPv4 settings for the iSCSI ports on Dell PowerVault MD32x0i storage array

Table 7 Default iSCSI Port IPv4 addresses on Dell PowerVault MD32x0i storage arrays

Controller/Port	IPv4 address	Subnet mask	Port #
Controller 0, Port 0	192.168.130.101	255.255.255.0	3260
Controller 0, Port 1	192.168.131.101	255.255.255.0	3260



Controller/Port	IPv4 address	Subnet mask	Port #
Controller 0, Port 2	192.168.132.101	255.255.255.0	3260
Controller 0, Port 3	192.168.133.101	255.255.255.0	3260
Controller 1, Port 0	192.168.130.102	255.255.255.0	3260
Controller 1, Port 1	192.168.131.102	255.255.255.0	3260
Controller 1, Port 2	192.168.132.102	255.255.255.0	3260
Controller 1, Port 3	192.168.133.102	255.255.255.0	3260



6 Supported RAID controller firmware and NVSRAM

Note: Dell recommends that you collect support information before performing any firmware upgrade.

Note: Drivers and firmware released only by Dell are supported. For the latest driver and firmware releases, see the Downloads section at Dell.com/support.

Table 8 Latest RAID controller firmware and NVSRAM versions

Software	Version
RAID controller firmware	08.20.24.60
RAID controller NVSRAM	N26X0-820890-008 for Dell PowerVault MD32xx and MD32xxi(SAS and 1Gbps iSCSI storage arrays) N26X0-820890-908 for Dell PowerVault MD36xxi and MD36xxf (10Gbps iSCSI and Fibre Channel storage arrays)



7

Supported SAS host bus adapters (HBAs)

Go to [Dell.com/support](https://www.dell.com/support) to download the latest supported version of the 6 Gbps SAS HBA firmware and drivers for your specific server hardware platform.

Table 9 Supported SAS HBAs

Vendor	Model	Notes
Dell	6 Gbps SAS HBA	This HBA is not supported in Dell PowerEdge 13 th generation servers.
Dell	12 Gbps SAS HBA	This HBA is only supported in Dell PowerEdge 13 th generation servers.

Note: Dell 12 Gbps SAS HBA auto-negotiates to 6 Gbps speeds when connected to a Dell PowerVault MD32xx series SAS array.



8 Supported iSCSI software initiators

Table 10 Supported iSCSI initiators

Operating system	SW initiator vendor	SW initiator version	Notes
Windows Server OS	Microsoft	RTM or later	Included with OS
Red Hat Enterprise Linux	Red Hat	RTM or later	Included with OS
SUSE Linux Enterprise Server	SUSE	RTM or later	Included with OS
VMware vSphere	VMware	RTM or later	Included with OS
Citrix XenServer	Citrix	RTM or later	Included with OS

Note: For more information about OS support, refer to the Supported operating systems section of this document.



9 Supported protocol offload (TOE / iSCSI) adapters

Standard Gigabit and 10 Gigabit Ethernet adapters are supported when used with supported software iSCSI initiators. Hosts must have a standards compliant iSCSI initiator to access MD Series storage. Initiator support is provided by the initiator or operating system vendor. Dell PowerVault does not support Converged Network Adapters (CNA) in Converged mode. Although PowerVault does not endorse or support initiators directly, this support matrix provides some useful configuration information for common initiators.

Dell's PowerVault MD Series Arrays work with any RFC 3720 iSCSI compliant initiators. The initiator must support all mandatory iSCSI features (IPsec is not required). This information is subject to change without notice. Dell is not responsible for any errors in this information. Hardware initiators are not supported by Dell.

Also, ensure you read the initiator documentation and release notes from the particular vendors, and the Dell PowerVault MD Series release notes for up-to-date configuration recommendations.



10 Fibre Channel SFP+ transceiver support

Table 11 Supported Fibre Channel SFP+ transceivers

Description	Manufacturer	Mfr. part number
8G FC SFP+	JDSU	PLRXPL-VC-SH4-23-N
8G FC SFP+	Finisar	FTLF8528P2BCV-LS
8G FC SFP+	Avago	AFBR-57D7APZ



11 Supported physical disks

Note: Only the physical disk drives with a Dell part number listed in Table 12 are supported.

For the latest available physical disk drive firmware, refer to the Dell PowerVault MD3200/MD3600/MD3660i/MD3660f “Drivers and Downloads” section on Dell.com/support.

Table 12 Supported physical disk drive models

Dell P/N	Form Factor	Model	Capacity	Speed	Vendor	SED
X1MCH	2.5"	LB150S	149GB	SSD	Pliant (SanDisk)	No
6R5R8	2.5"	LB206M	200GB	SSD	Pliant (SanDisk)	No
8C38W	2.5"	LB406M	400GB	SSD	Pliant (SanDisk)	No
DPF1J	2.5"	LB806M	800GB	SSD	Pliant (SanDisk)	No
D3K4J	2.5"	LB406R	400GB	SSD	Pliant (SanDisk)	No
5Y05N	2.5"	LB806R	800GB	SSD	Pliant (SanDisk)	No
F06P1	2.5"	LB1606R	1.6TB	SSD	Pliant (SanDisk)	No
TPWNJ	2.5"	LB206S	200GB	SSD	Pliant (SanDisk)	No
8NW1H	2.5"	LB406S	400GB	SSD	Pliant (SanDisk)	No
2XR0K	2.5"	LT0200MO	200GB	SSD	SanDisk	No
C06VX	2.5"	LT0400MO	400GB	SSD	SanDisk	No
989R8	2.5"	LT0800MO	800GB	SSD	SanDisk	No
JDTGX	2.5"	LT1600MO	1.6TB	SSD	SanDisk	No
J19XM	2.5"	LT0800RO	800GB	SSD	SanDisk	No
2M61G	2.5"	LT1600RO	1.6TB	SSD	SanDisk	No
M7KYX	2.5"	LT0200WM	200GB	SSD	SanDisk	No
T2TPF	2.5"	LT0400WM	400GB	SSD	SanDisk	No
FHFNJ	2.5"	LT0800WM	800GB	SSD	SanDisk	No
MFC6G	2.5"	MZILS400HEGR0D3	400GB	SSD	Samsung	No
HF06W	2.5"	MZILS800HEHP0D3	800GB	SSD	Samsung	No
W5PP5	2.5"	MZILS1T6HEJH0D3	1.6TB	SSD	Samsung	No
8RC8K	2.5"	MZILS3T2HMLH0D3	3.2TB	SSD	Samsung	No
8Y64H	2.5"	MZILS480HEGR0D3	480GB	SSD	Samsung	No
7FNRX	2.5"	MZILS960HEHP0D3	960GB	SSD	Samsung	No
086DD	2.5"	MZILS1T9HEJH0D3	1.92TB	SSD	Samsung	No
JR1HP	2.5"	MZILS3T8HMLH0D3	3.84TB	SSD	Samsung	No
6K55X	2.5"	MK2001GRZB	200GB	SSD	Toshiba	No
R2PJ7	2.5"	MK4001GRZB	400GB	SSD	Toshiba	No



Dell P/N	Form Factor	Model	Capacity	Speed	Vendor	SED
K41XJ	2.5"	PX02SMF020	200GB	SSD	Toshiba	No
HKK8C	2.5"	PX02SMF040	400GB	SSD	Toshiba	No
TC2MH	2.5"	PX02SMF080	800GB	SSD	Toshiba	No
G4V45	2.5"	PX02SMB160	1.6TB	SSD	Toshiba	No
CV6W8	2.5"	PX02SSF020	200GB	SSD	Toshiba	No
2H9WV	2.5"	PX02SSF040	400GB	SSD	Toshiba	No
PG19T	2.5"	PX02SSB080	800GB	SSD	Toshiba	No
N9PTK	2.5"	PX03SNF080	800GB	SSD	Toshiba	No
0MXR2	2.5"	PX03SNB160	1.6TB	SSD	Toshiba	No
GM5R3	2.5"	PX04SMB040	400GB	SSD	Toshiba	No
M91TJ	2.5"	PX04SMB080	800GB	SSD	Toshiba	No
77K16	2.5"	PX04SMB160	1.6TB	SSD	Toshiba	No
63GYR	2.5"	PX04SMB320	3.2TB	SSD	Toshiba	No
N5Y85	2.5"	PX04SVB048	480GB	SSD	Toshiba	No
YYC10	2.5"	PX04SVB096	960GB	SSD	Toshiba	No
4XC39	2.5"	PX04SVB192	1.92TB	SSD	Toshiba	No
GYMY9	2.5"	PX04SVB384	3.84TB	SSD	Toshiba	No
06VJ7	2.5"	PX04SRB048	480GB	SSD	Toshiba	No
4KG4X	2.5"	PX04SRB096	960GB	SSD	Toshiba	No
R87FK	2.5"	PX04SRB192	1.92TB	SSD	Toshiba	No
M09K5	2.5"	PX04SRB384	3.84TB	SSD	Toshiba	No
HPNDJ	2.5"	PX04SHB020	200Gb	SSD	Toshiba	No
YT53C	2.5"	PX04SHB040	400GB	SSD	Toshiba	No
RVCY3	2.5"	PX04SHB080	800GB	SSD	Toshiba	No
Y9VX5	2.5"	PX04SHB160	1.6TB	SSD	Toshiba	No
43PCJ	2.5"	PX05SVB048Y	480GB	SSD	Toshiba	No
503M7	2.5"	PX05SVB096Y	960GB	SSD	Toshiba	No
V0K7V	2.5"	PX05SVB192Y	1.92TB	SSD	Toshiba	No
3DDFT	2.5"	PX05SVB384Y	3.84TB	SSD	Toshiba	No
JGXK2	2.5"	PX05SRB048Y	480GB	SSD	Toshiba	No
MWGK7	2.5"	PX05SRB096Y	960GB	SSD	Toshiba	No
0FYFW	2.5"	PX05SRB192Y	1.92TB	SSD	Toshiba	No
XCRDV	2.5"	PX05SRB384Y	3.84TB	SSD	Toshiba	No
5VHHG	2.5"	PX05SMB040Y	400GB	SSD	Toshiba	No
CN3JH	2.5"	PX05SMB080Y	800GB	SSD	Toshiba	No
GVTYD	2.5"	PX05SMB160Y	1.6TB	SSD	Toshiba	No
R1YFC	2.5"	PX05SMB320Y	3.2TB	SSD	Toshiba	No
X143K	2.5"	MBD2147RC	146GB	10K	Fujitsu	No
U706K	2.5"	MBD2300RC	300GB	10K	Fujitsu	No
R727K	2.5"	MBE2073RC	73GB	15K	Fujitsu	No



Dell P/N	Form Factor	Model	Capacity	Speed	Vendor	SED
W328K	2.5"	MBE2147RC	146GB	15K	Fujitsu	No
T6TWN	2.5"	HUC101212CSS600	1.2 TB	10K	HGST	No
K9VCF	2.5"	HUC101830CSS204	300GB	10K	HGST	No
10DR3	2.5"	HUC101860CSS204	600GB	10K	HGST	No
87GNY	2.5"	HUC101812CSS204	1.2TB	10K	HGST	No
RF9T8	2.5"	HUC101818CS4204	1.8TB	10K	HGST	No
VTHDD	2.5"	HUC101818CS4204	1.8TB	10K	HGST	No
RDKH0	2.5"	HUC101830CSS204	300GB	10K	HGST	No
P6GJX	2.5"	HUC101860CSS204	600GB	10K	HGST	No
9XNF6	2.5"	HUC101812CSS204	1.2TB	10K	HGST	No
5VNKK	2.5"	HUC101830CSS200	300GB	10K	HGST	No
6DWVP	2.5"	HUC101860CSS200	600GB	10K	HGST	No
0KV02	2.5"	HUC101812CSS200	1.2TB	10K	HGST	No
851GV	2.5"	HUC156030CSS204	300GB	15K	HGST	No
4J5P1	2.5"	HUC156060CSS204	600GB	15K	HGST	No
0N0T4	2.5"	HUC156030CSS204	300GB	15K	HGST	No
TRCN6	2.5"	HUC156060CSS204	600GB	15K	HGST	No
T855K	2.5"	HUC103014CSS600	146GB	10K	Hitachi	No
U709K	2.5"	HUC103030CSS600	300GB	10K	Hitachi	No
YJ0GR	2.5"	HUC106030CSS600	300GB	10K	Hitachi	No
8WP8W	2.5"	HUC106060CSS600	600GB	10K	Hitachi	No
CXF82	2.5"	HUC109030CSS600	300GB	10K	Hitachi	No
G76RF	2.5"	HUC109060CSS600	600GB	10K	Hitachi	No
H5WGN	2.5"	HUC109090CSS600	900GB	10K	Hitachi	No
R730K	2.5"	HUC151473CSS600	73GB	15K	Hitachi	No
W330K	2.5"	HUC151414CSS600	146GB	15K	Hitachi	No
745GC	2.5"	ST9300605SS	300GB	10K	Seagate	No
R72NV	2.5"	ST9600205SS	600GB	10K	Seagate	No
8JRN4	2.5"	ST9900805SS	900GB	10K	Seagate	No
XRRVX	2.5"	ST9900605SS	900GB	10K	Seagate	Yes
7T0DW	2.5"	ST9600204SS	600GB	10K	Seagate	No
8MP93	2.5"	ST9600104SS	600GB	10K	Seagate	Yes
X160K	2.5"	ST9146803SS	146GB	10K	Seagate	No
T871K	2.5"	ST9300603SS	300GB	10K	Seagate	No
148J7	2.5"	ST9300503SS	300GB	10K	Seagate	Yes
PGHJG	2.5"	ST300MM0006	300GB	10K	Seagate	No
7YX58	2.5"	ST600MM0006	600GB	10K	Seagate	No
2RR9T	2.5"	ST900MM0006	900GB	10K	Seagate	No
TNX32	2.5"	ST900MM0036	900GB	10K	Seagate	Yes



Dell P/N	Form Factor	Model	Capacity	Speed	Vendor	SED
3P3DF	2.5"	ST900MM0007	900GB	10K	Seagate	No
RMCP3	2.5"	ST1200MM0007	1.2TB	10K	Seagate	No
4RYFR	2.5"	ST1200MM0027	1.2TB	10K	Seagate	Yes
W345K	2.5"	ST973452SS	73GB	15K	Seagate	No
X162K	2.5"	ST9146852SS	146GB	15K	Seagate	No
89TH4	2.5"	ST9146752SS	146GB	15K	Seagate	Yes
YJ2KH	2.5"	ST300MM0088	300GB	15K	Seagate	No
R95FV	2.5"	ST600MM0088	600GB	15K	Seagate	No
WXPCX	2.5"	ST1200MM0088	1.2TB	15K	Seagate	No
NCT9F	2.5"	ST300MP0026	300GB	15K	Seagate	No
FPW68	2.5"	ST600MP0036	600GB	15K	Seagate	No
XTH17	2.5"	ST900MP0026	900GB	15K	Seagate	No
RT8MY	2.5"	DL900MP0136	900GB	15K	Seagate	No
V2KWT	2.5"	ST1200MM0108	1.2TB	10K	Seagate	Yes
43N12	2.5"	ST1800MM0018	1.8TB	10K	Seagate	No
WHR0G	2.5"	ST1800MM0078	1.8TB	10K	Seagate	Yes
VJ7CD	2.5"	ST1800MM0168	1.8TB	10K	Seagate	No
2M5JK	2.5"	ST300MM0078	300GB	10K	Seagate	No
D1F14	2.5"	ST600MM0238	600GB	10K	Seagate	No
FR6W6	2.5"	ST1200MM0198	1.2TB	10K	Seagate	No
RVDCJ	2.5"	ST1800MM0198	1.8TB	10K	Seagate	No
7FJW4	2.5"	ST300MP0005	300GB	15K	Seagate	No
4HGTJ	2.5"	ST600MP0005	600GB	15K	Seagate	No
4X0XG	2.5"	ST600MP0025	600GB	15K	Seagate	Yes
61XPF	2.5"	ST9146853SS	146GB	15K	Seagate	No
H8DVC	2.5"	ST9300653SS	300GB	15K	Seagate	No
81N2C	2.5"	ST9300453SS	300GB	15K	Seagate	Yes
55RMX	2.5"	ST91000640SS	1TB	7.2K	Seagate	No
9W5WV	2.5"	ST9500620SS	500GB	7.2K	Seagate	No
XKGH0	2.5"	ST91000642SS	1TB	7.2K	Seagate	Yes
R734K	2.5"	ST9500430SS	500GB	7.2K	Seagate	No
NV0G9	2.5"	ST9500431SS	500GB	7.2K	Seagate	Yes
XY986	2.5"	ST2000NX0273	2TB	7.2K	Seagate	No
56M6W	2.5"	ST1000NX0453	1TB	7.2K	Seagate	No
Y6W8N	2.5"	ST2000NX0453	2TB	7.2K	Seagate	Yes
D4N7V	2.5"	ST1000NX0473	1TB	7.2K	Seagate	No
TMVN7	2.5"	ST2000NX0463	2TB	7.2K	Seagate	No
3NKW7	2.5"	AL14SEB030N	300GB	7.2K	Toshiba	No
453KG	2.5"	AL14SEB060N	600GB	7.2K	Toshiba	No
N9VVV	2.5"	AL14SEB090N	900GB	7.2K	Toshiba	No



Dell P/N	Form Factor	Model	Capacity	Speed	Vendor	SED
89D42	2.5"	AL14SEB120N	1.2TB	7.2K	Toshiba	No
740Y7	2.5"	MBF2300RC	300GB	10K	Toshiba	No
5R6CX	2.5"	MBF2600RC	600GB	10K	Toshiba	No
MTV7G	2.5"	AL13SEB300	300GB	10K	Toshiba	No
5TFDD	2.5"	AL13SEB600	600GB	10K	Toshiba	No
RC34W	2.5"	AL13SEB900	900GB	10K	Toshiba	No
GP3FR	2.5"	AL14SEB18EQ	1.8TB	10K	Toshiba	No
2TRM4	2.5"	AL14SEB18EQY	1.8TB	10K	Toshiba	No
6DFD8	2.5"	MK1401GRRB	146GB	15K	Toshiba	No
NWH7V	2.5"	MK3001GRRB	300GB	15K	Toshiba	No
4GN49	2.5"	AL13SXB300N	300GB	15K	Toshiba	No
990FD	2.5"	AL13SXB600N	600GB	15K	Toshiba	No
0RVDT	2.5"	AL13SXB30EN	300GB	15K	Toshiba	No
DYDW0	2.5"	AL13SXB60EN	600GB	15K	Toshiba	No
X79H3	2.5"	WD3000BKHG	300GB	10K	Western Digital	No
C5R62	2.5"	WD6000BKHG	600GB	10K	Western Digital	No
CWHNN	2.5"	WD3001BKHG	300GB	10K	Western Digital	No
96G91	2.5"	WD6001BKHG	600GB	10K	Western Digital	No
4X1DR	2.5"	WD9001BKHG	900GB	10K	Western Digital	No
F9KW8	2.5"	WD3002BKTG	300GB	10K	Western Digital	No
V1TX2	2.5"	WD6002BKTG	600GB	10K	Western Digital	No
99NCV	2.5"	WD9002BKTG	900GB	10K	Western Digital	No
WTJVY	3.5"	HUS724020ALS640	2TB	7.2K	HGST	No
MY58D	3.5"	HUS724030ALS640	3TB	7.2K	HGST	No
7J9RN	3.5"	HUS724040ALS640	4TB	7.2K	HGST	No
XP99D	3.5"	HUS726020ALS214	2TB	7.2K	HGST	No
TX8WW	3.5"	HUS726040ALS214	4TB	7.2K	HGST	No
VH6FW	3.5"	HUS726020ALS210	2TB	7.2K	HGST	No
X4FKY	3.5"	HUS726040ALS210	4TB	7.2K	HGST	No
PYM8J	3.5"	HUS726060AL5214	6TB	7.2K	HGST	No
43V7V	3.5"	HUH728080AL5204	8TB	7.2K	HGST	No
KRDKK	3.5"	HUH721008AL5200	8TB	7.2K	HGST	No
07FPR	3.5"	HUH721010AL5200	10TB	7.2K	HGST	No
X150K	3.5"	HUS156030VLS600	300GB	15K*	Hitachi	No
T857K	3.5"	HUS156045VLS600	450GB	15K*	Hitachi	No



Dell P/N	Form Factor	Model	Capacity	Speed	Vendor	SED
W348K	3.5"	HUS156060VLS600	600GB	15K*	Hitachi	No
VYRKH	3.5"	HUS723020ALS640	2TB	7.2K	Hitachi	No
CWJ92	3.5"	HUS723030ALS640	3TB	7.2K	Hitachi	No
R752K	3.5"	ST3600002SS	600GB	10K*	Seagate	No
M525M	3.5"	ST3300657SS	300GB	15K*	Seagate	No
H995N	3.5"	ST3450857SS	450GB	15K*	Seagate	No
J762N	3.5"	ST3600057SS	600GB	15K*	Seagate	No
D32VD	3.5"	ST3450757SS	450GB	15K*	Seagate	Yes
5XTFH	3.5"	ST3600957SS	600GB	15K*	Seagate	Yes
U717K	3.5"	ST3500414SS	500GB	7.2K	Seagate	No
U738K	3.5"	ST31000424SS	1TB	7.2K	Seagate	No
R755K	3.5"	ST32000444SS	2TB	7.2K	Seagate	No
X164K	3.5"	ST31000425SS	1TB	7.2K	Seagate	Yes
W350K	3.5"	ST32000445SS	2TB	7.2K	Seagate	Yes
6VNCJ	3.5"	ST500NM0001	500GB	7.2K	Seagate	No
740YX	3.5"	ST1000NM0001	1TB	7.2K	Seagate	No
67TMT	3.5"	ST2000NM0001	2TB	7.2K	Seagate	No
1D9NN	3.5"	ST32000645SS	2TB	7.2K	Seagate	No
91K8T	3.5"	ST33000650SS	3TB	7.2K	Seagate	No
698PM	3.5"	ST33000652SS	3TB	7.2K	Seagate	Yes
FNW88	3.5"	ST1000NM0023	1TB	7.2K	Seagate	No
1P7DP	3.5"	ST2000NM0023	2TB	7.2K	Seagate	No
55H49	3.5"	ST3000NM0023	3TB	7.2K	Seagate	No
529FG	3.5"	ST4000NM0023	4TB	7.2K	Seagate	No
6P85J	3.5"	ST4000NM0063	4TB	7.2K	Seagate	Yes
NWCCG	3.5"	ST6000NM0034	6TB	7.2K	Seagate	No
PRNR6	3.5"	ST6000NM0034	6TB	7.2K	Seagate	No
GWD7D	3.5"	ST1000NM0005	1TB	7.2K	Seagate	No
R7FKF	3.5"	ST2000NM0005	2TB	7.2K	Seagate	No
XWM1W	3.5"	ST4000NM0005	4TB	7.2K	Seagate	No
H0R8N	3.5"	ST1000NM0085	1TB	7.2K	Seagate	No
7RCGV	3.5"	ST2000NM0155	2TB	7.2K	Seagate	No
5JH5X	3.5"	ST4000NM0295	4TB	7.2K	Seagate	No
GKWHP	3.5"	ST8000NM0075	8TB	7.2K	Seagate	No
PDFHC	3.5"	ST8000NM0135	8TB	7.2K	Seagate	Yes
DGNTV	3.5"	ST1000NM0045	1TB	7.2K	Seagate	No
K7VW5	3.5"	ST2000NM0045	2TB	7.2K	Seagate	No
YXG4K	3.5"	ST4000NM0025	4TB	7.2K	Seagate	No
RHVWG	3.5"	ST6000NM0095	6TB	7.2K	Seagate	No
FCHXF	3.5"	ST4000NM0135	4TB	7.2K	Seagate	Yes



Dell P/N	Form Factor	Model	Capacity	Speed	Vendor	SED
M40TH	3.5"	ST8000NM0185	8TB	7.2K	Seagate	No
GPP3G	3.5"	MG03SCA100	1TB	7.2K	Toshiba	No
829T8	3.5"	MG03SCA200	2TB	7.2K	Toshiba	No
14X4H	3.5"	MG03SCA300	3TB	7.2K	Toshiba	No
12GY Y	3.5"	MG03SCA400	4TB	7.2K	Toshiba	No
7KXJR	3.5"	MK1001TRKB	1TB	7.2K*	Toshiba	No
WDC07	3.5"	MK2001TRKB	2TB	7.2K*	Toshiba	No
GDM8H	3.5"	MG04SCA20EN	2TB	7.2K	Toshiba	No
0F9W8	3.5"	MG04SCA40EN	4TB	7.2K	Toshiba	No
3PRF0	3.5"	MG04SCA60EE	6TB	7.2K	Toshiba	No
HHX14	3.5"	MG04SCA20ENY	2TB	7.2K	Toshiba	No
1MVT T	3.5"	MG04SCA40ENY	4TB	7.2K	Toshiba	No
0V8G9	3.5"	WD1000FYYG	1TB	7.2K	Western Digital	No
YY34F	3.5"	WD2000FYYG	2TB	7.2K	Western Digital	No
440RW	3.5"	WD1001FYYG	1TB	7.2K	Western Digital	No
37MGT	3.5"	WD2001FYYG	2TB	7.2K	Western Digital	No
DPTW9	3.5"	WD3001FYYG	3TB	7.2K	Western Digital	No
202V7	3.5"	WD4001FYYG	4TB	7.2K	Western Digital	No

Note:

- 3.5" 15K rpm drives, 3.5" 10K rpm drives, and 3.5" 7.2K rpm drives marked with (*) are not supported on Dell PowerVault MD dense arrays such as Dell PowerVault MD3260, MD3260i, MD3660i, and MD3660f.
- The MD32/MD36 series arrays can utilize 12Gbps HDD or SSD, but will negotiate to a speed of 6 Gbps.
- Encrypted SSD drives (SED-SSD) and 4Kn Sector drives are not supported on the MD32/MD36 series arrays.



12 Supported Expansion Enclosures

Dell PowerVault MD 3x60 Series Dense Storage Arrays support a maximum of 180 physical disk drive slots (with premium feature activation). For a system without premium feature activation, the physical disk drive slots limit is 120. The additional slot support can only be provided by up to two Dell PowerVault MD3060e expansion enclosures.

Table 13 Expansion enclosures supported on dense (4U) storage arrays

Enclosure model	Minimum firmware version
Dell PowerVault MD3060e	03.9D

Dell PowerVault MD32xx/36xx series storage arrays support a maximum of 192 physical disk drive slots (with premium feature activation). For a system without premium feature activation, the physical disk drive limit is 120. You can provide the additional slots with up to 15 MD1200 expansion enclosures, seven MD1220 expansion enclosures, or a combination of both. When you use a combination of expansion enclosures, the total number of physical disk drive slots in the system cannot exceed 192.

Table 14 Expansion enclosures supported on non-dense (2U) storage arrays

Enclosure Model	Minimum Firmware Version
Dell PowerVault MD1200	1.06
Dell PowerVault MD1220	1.06

Note: Attaching a 4U (dense) expansion enclosure to a 2U (non-dense) RAID storage array is not supported. Alternately, you cannot attach a 2U expansion enclosure to a 4U RAID storage array. All EMMs in an expansion stack must be at the same firmware level.



13 Supported management software

The Dell PowerVault MD Storage software is composed of the Modular Disk Storage Manager (MDSM) and the Modular Disk Configuration Utility (MDCU). These management utilities are available on the Resource DVD provided with your system and online at dell.com/support. The Dell PowerVault MD storage software is supported on all operating systems and guest operating systems listed in the Supported operating systems section. The management station must meet the following minimum requirements:

- 2 GB of free disk space
- For MDSM and MDCU, a graphical user interface (GUI) is required

The Dell PowerVault MD-Series Resource DVD and other supported management software details are shown in the following tables:

Table 15 Supported management software (Windows)

Software component	Version	Notes
Dell PowerVault MD32/36 Series Storage Arrays Resource DVD	6.5.0.1	
Modular Disk Storage Manager	11.25.0306.0026	
Modular Disk Configuration Utility	2.1.0.68	Supported on iSCSI only
Dell PowerVault MD32/36 series hardware provider VDS/VSS Providers*	D1.20.0G06.0004/S1.20.0G06.0004	Dell is discontinuing support of the VSS and VDS hardware providers. For information about deprecation, see the <i>Dell MD Series Storage Arrays Information Update</i> .
Dell PowerVault MD Storage Array vCenter Plug-in	See Supported management software (VMware vCenter Plug-in).	



Software component	Version	Notes
Dell PowerVault MD Storage Array VASA Provider (iSCSI and Fibre -Channel only)	See Supported management software (VASA provider support).	Supported on: <ul style="list-style-type: none"> • Windows Server® 2008 R2 SP1(64-bit version only) • Windows Server 2012 Windows Server 2012 R2
Dell PowerVault MD Storage Array Storage Replication Adapter (SRA) (Fibre Channel only)	See Supported management software (Storage Replication Adapter Support)	

* Maximum number of concurrent backups supported while using the hardware provider VSS provider with clustered shared volumes is two.



Table 16 Supported management software (Linux)

Software Component	Version	Notes
Dell PowerVault MD Series Dense Storage Arrays Resource DVD	6.5.0.1	
Modular Disk Storage Manager	11.25.0A06.0026	
Modular Disk Configuration Utility	2.1.0.68	Supported with iSCSI storage arrays only.

Table 17 Supported management software (VMware vCenter Plug-in)

vCenter Plug-in version	VMware version supported	Notes
3.0	All protocols: <ul style="list-style-type: none"> • vSphere 6.5 • vSphere 6.0 • vSphere 5.5 U2 	This is compatible only with firmware 08.20.11.60 or later.
2.7	All protocols: <ul style="list-style-type: none"> • vSphere 5.5 • vSphere 5.1 	This is compatible only with firmware 7.84.56.60 or later.

Table 18 Supported management software (VASA provider support)

VASA version	VMware supported version	Notes
5.5	vSphere™ Client 5.5/6.0/6.5 vCenter Server 5.5/6.0/6.5 Site Recovery Manager (SRM) 5.1 or later	Supported on 08.20.05.60 firmware or later.



Note: Supported on Fibre Channel and iSCSI arrays only.

Table 19 Supported management software (Storage Replication Adapter Support)

SRA Version	VMware version supported	Notes
5.6	vSphere™ Client 5.1/ 5.5/6.0/6.5 vCenter Server 5.0/5.1/5.5 Site Recovery Manager (SRM) 5.1/5.5/6.0/6.1	This is compatible only with firmware 08.20.11.60 or later.
5.5	vSphere Client 5.1/5.5 vCenter Server 5.1 Site Recovery Manager (SRM) 5.1/5.5	For more information, see the <i>MD Storage Array VMware Storage Replication Adapter 5.0 Installation and Configuration Guide</i> .

Note: Supported on Fibre Channel and iSCSI arrays only.



14 Supported operating systems

Where clustering is supported by the operating system, it is also supported on the Dell PowerVault MD3200, MD3200i, MD3600i, MD3600f, MD3260, MD3260i, MD3660i, and MD3660f series storage arrays, subject to the following limitations:

Windows Server 2008 R2 – Windows Server 2016:

- Maximum iSCSI nodes is 16
- Maximum SAS nodes is 4
- Maximum FC nodes is 16

Table 20 Dell PowerVault MD-Series operating system support

Operating system	SAS host server	iSCSI host server	Mgmt. station	Fibre Channel host server	Notes & required hotfixes
Windows Server 2016*					
Standard server	✓	✓	✓	✓	
Datacenter server	✓	✓	✓	✓	
Windows Server 2012 R2 (U1)*					
Standard server and core	✓	✓	✓	✓	KB2966870
Datacenter server and core	✓	✓	✓	✓	KB2966870
Foundation server and core	✓	✓	✓	✓	KB2966870
Windows Server 2008 R2 SP1*					
Windows 2008 R2 SP1 Standard and Core	✓	✓	✓	✓	KB2522766 KB2637197
Windows 2008 R2 SP1 Enterprise and Core	✓	✓	✓	✓	KB2522766 KB2637197
Windows 2008 R2 SP1 Datacenter and Core	✓	✓	✓	✓	KB2522766 KB2637197



Operating system	SAS host server	iSCSI host server	Mgmt. station	Fibre Channel host server	Notes & required hotfixes
Windows 2008 R2 SP1 Foundation and Core	✓	✓	✓	✓	KB2522766 KB2637197
Windows 2008 R2 SP1 Web and Core			✓		KB2522766 KB2637197
Windows 2008 Storage Server R2 SP1 all editions	✓	✓	✓	✓	KB2522766 KB2637197
Windows 2008 R2 SP1 HPC Server	✓	✓	✓	✓	KB2522766 KB2637197
Red Hat Enterprise Linux (RHEL)					
Red Hat Enterprise Linux 7.3 (x64 only)	✓	✓	✓	✓	Basic Server install (Minimum)
Red Hat Enterprise Linux 7.2 (x64 only)	✓	✓	✓	✓	Basic Server install (Minimum)
Red Hat Enterprise Linux 7.1 (x64 only)	✓	✓	✓	✓	Basic Server install (Minimum) The Linux sg driver has been disabled by default in RHEL 7.1 and is required for in-band management. To work around this, manually issue <code>modprobe sg</code> or add it to an init script. After the driver is loaded, in-band management will be available. For more information about this issue, refer to RHEL 7.1 Release Notes, issue BZ#1186462.
Red Hat Enterprise Linux 7 (x64 only)	✓	✓	✓	✓	Basic Server install (Minimum)
Red Hat Enterprise Linux 6.9 (x64 only)	✓	✓	✓	✓	Basic Server install (Minimum)
Red Hat Enterprise Linux 6.8 (x64 only)	✓	✓	✓	✓	Basic Server install (Minimum)



Operating system	SAS host server	iSCSI host server	Mgmt. station	Fibre Channel host server	Notes & required hotfixes
Red Hat Enterprise Linux 6.7 (x64 only)	✓	✓	✓	✓	Basic Server install (Minimum)
Red Hat Enterprise Linux 6.6 (x64 only)	✓	✓	✓	✓	Basic Server install (Minimum)
Red Hat Enterprise Linux 6.5 (x64 only)	✓	✓	✓	✓	Basic Server install (Minimum)
SUSE Linux Enterprise Server (SLES)					
SUSE [®] Linux Enterprise Server 12.2 (x64 only)	✓	✓	✓	✓	
SUSE [®] Linux Enterprise Server 12.1 (x64 only)	✓	✓	✓	✓	
SUSE [®] Linux Enterprise Server 12 (x64 only)	✓	✓	✓	✓	
SUSE [®] Linux Enterprise Server 11.4(x64 only)	✓	✓	✓	✓	
Virtualization Hosts / Hypervisors**					
VMware vSphere 6.5	✓	✓		✓	<ul style="list-style-type: none"> • For supported array firmware versions, see VMware HCL • Direct attached iSCSI connection is not supported with VMware vSphere • Supported path policies: <ul style="list-style-type: none"> -MRU -RR



Operating system	SAS host server	iSCSI host server	Mgmt. station	Fibre Channel host server	Notes & required hotfixes
VMware vSphere 6.0 (U1, U2, U3)	✓	✓		✓	<ul style="list-style-type: none"> • For supported array firmware versions, see VMware HCL • Direct attached iSCSI connection is not supported with VMware vSphere • Supported path policies: -MRU -RR
VMware vSphere 5.5 (U3)	✓	✓		✓	<ul style="list-style-type: none"> • For supported array firmware versions, see VMware HCL • Direct attached iSCSI connection is not supported with VMware vSphere • Supported path policies: -MRU -RR
VMware vSphere 5.1 (U3)	✓	✓		✓	<ul style="list-style-type: none"> • For supported array firmware versions, see VMware HCL • Direct attached iSCSI connection is not supported with VMware vSphere • Supported path policies: -MRU -RR
Citrix XenServer	✓	✓		✓	For supported XS releases see http://hcl.xensource.com/
Microsoft Hyper-V Server 2016	✓	✓	✓	✓	
Microsoft Hyper-V Server 2012 R2	✓	✓	✓	✓	
Microsoft Hyper-V Server 2008 R2 SP1	✓	✓	✓	✓	
Windows Server 2008 R2 SP1 with Hyper-V	✓	✓	✓	✓	
Windows Desktop Operating Systems					



Operating system	SAS host server	iSCSI host server	Mgmt. station	Fibre Channel host server	Notes & required hotfixes
Windows 10 (x64 only) Pro Enterprise			✓		
Windows 8.1 (x64 only) Pro Enterprise			✓		
Windows 8 (x64 only) Pro Enterprise			✓		
Windows 7 (x86, x64)			✓		

***Note:** Core editions Windows servers can only manage storage arrays by using the SMcli client.
**** Note:** The VMware Hardware Compatibility List only shows support for RAID controller firmware version 07.84. However, this indicates support for all firmware versions 07.84.xx.xx or later.



15 Windows ODX support

The MD32XX or MD36XX Series Storage Arrays support Windows ODX for Windows Server 2012 or later.

Note: ODX is disabled by default and must be enabled using a SMcli command. For more information, refer to the *Dell PowerVault MD 32XX/34XX/36XX/38XX Series Storage Arrays CLI Guide* on Dell.com/support.



16 ALUA support on supported host operating systems

The following operating systems supported by your MD Series storage arrays support ALUA natively. Configuration steps are not required to enable ALUA on these operating systems.

- Microsoft Windows 2008 R2 SP1 and later
- Microsoft Windows 2012 R2 and later
- Microsoft Windows 2016 and later
- Red Hat Enterprise Linux 6.5 and later
- SUSE Linux Enterprise Server 11.4 and later
- VMware vSphere ESXi 5.1 and later

For more information about the ALUA configuration, see the *MD Series Administrator's Guide* available at Dell.com/support.



17 Supported device mapper software

Table 21 Supported device mapper software

Operating system	Component	Supported version
SUSE Linux Enterprise Server 12.2	Native	Native
SUSE Linux Enterprise Server 12.1	Native	Native
SUSE Linux Enterprise Server 12	Native	Native
SUSE Linux Enterprise Server 11.4	Native	Native
Red Hat Enterprise Linux 7.3	Native	Native
Red Hat Enterprise Linux 7.2	Native	Native
Red Hat Enterprise Linux 7.1	Native	Native
Red Hat Enterprise Linux 7	Native	Native
Red Hat Enterprise Linux 6.9	Native	Native
Red Hat Enterprise Linux 6.8	Native	Native
Red Hat Enterprise Linux 6.7	Native	Native
Red Hat Enterprise Linux 6.5	Native	Native



18 Supported Fibre Channel host bus adapters

Table 22 Supported Fibre Channel HBAs

Host bus adapter name	Fabric configuration	Direct-attach configuration
Qlogic*		
QLE2660/62	✓	✓
QLE2560/62	✓	✓
QLE2460/62/64	✓	✓
QLE220**	✓	✓
QME2662	✓	✓
QME2572	✓	✓
QME2472	✓	✓
Emulex*		
LPe16000/2	✓	
LPe12000/2	✓	✓
LPe 11002	✓	✓
LPe 1150	✓	✓
LPe 1105-M4	✓	✓
LPe 1205-M	✓	✓
LPe 16002-M	✓	✓



Host bus adapter name	Fabric configuration	Direct-attach configuration
Brocade*		
BR815/BR825	✓	✓

* See Required Timeout Settings for Fibre Channel Host Bus Adapters for required timeout settings by manufacturer.



19 Required timeout settings for Fibre Channel host bus adapters

This table lists required timeout settings for all Dell-supported fibre channel (FC) HBAs, by manufacturer and OS. Make sure that any FC HBA connected to your MD36xxf storage array has these timeout values set as listed in Table 23.

Use one of these manufacturer utilities to set these values on your HBA:

- Brocade® Command Line Utility (BCU)
- Emulex® HBAnyware® or OneCommand™ Manager
- QLogic SANsurfer FC HBA Manager

Table 23 Fibre Channel HBA timeout values (by manufacturer)

HBA manufacturer	Timeout parameter	Required value (in seconds)
Qlogic		
Windows Server 2008 R2 SP1	LinkDownTimeout	10
	PortDownRetryCount	10
Linux only	qlport_down_retry	10
Emulex		
Windows only	LinkTimeout	10
	NodeTimeout	10
Linux only	lpfc_devloss_tmo	10
Brocade		
Windows and Linux	pathtov	10



20 Supported Fibre Channel switches

Supported only on Fibre Channel storage arrays running the most current RAID firmware versions.

Table 24 Supported Fibre Channel switches

Switches	Description
Brocade	
200E	Brocade 4 Gb 16-port FC switch
4100	Brocade 4 Gb 32-port FC switch
4100	Brocade 4 Gb 64-port FC switch
4900	Brocade 4 Gb 64-port FC switch
4900	Brocade 4 Gb 64-port FC switch
5000	Brocade 4 Gb 32-port FC switch
5000	Brocade 4 Gb 32-port FC switch
300	Brocade 8 Gb 24-port FC switch
5100	Brocade 8 Gb 40-port FC switch
5300	Brocade 8 Gb 80-port FC switch
6505	Brocade 16 Gb 24-port FC switch
6510	Brocade 16 Gb 48-port FC switch
DCX & DCX-4S	Director class switch chassis
DCX8510-4	Director class switch chassis
DCX8510-8	Director class switch chassis



Switches	Description
FC8-48	48-port 8 Gb FC blade module for DCX an DCX8510 chassis
FC8-32	32-port 8 Gb FC blade module for DCX an DCX8510 chassis
FC8-16	16-port 8 Gb FC blade module for DCX an DCX8510 chassis
FC16-32	32-port 16 Gb FC blade module for DCX8510 chassis
FC16-48	48-port 16 Gb FC blade module for DCX8510 chassis
Dell	
Dell PowerConnect B-DCX-4S	Dell PowerConnect Director class switch chassis
Dell PowerConnect DCX8510-4	Director class switch chassis
Dell PowerConnect DCX8510-8	Director class switch chassis
Dell Networking S5000	48-port unified switch
FC8-48	48-port 8 Gb FC blade module
FC8-16	16-port 8 Gb FC blade module
FC16-32	32-port 16 Gb FC blade module
FC16-48	48-port 16 Gb FC blade module
Cisco	
Nexus 5548UP	8 Gbps 48-port FC switch
Nexus 5596UP	8 Gbps 96-port FC switch
Nexus 5010	8 Gbps FC switch



Switches	Description
Nexus 5020	8 Gbps FC switch
9148	8 Gbps 48-port FC switch
9506	8 Gbps 192-port FC switch
9509	8 Gbps 48-port FC switch
9513	8 Gbps 528-port FC switch
9710	Director class switch chassis



21 Supported Dell M1000e Fibre Channel IOMs

Table 25 Supported Fibre Channel I/O modules

Fibre Channels IOMs	Firmware	Description
M6505	FOS 7.0.1	Brocade 16 Gb 24-port FC switch module
M5424	FOS 6.4.1a	24-port 8 Gb or 4 Gb FC blade switch module
	FOS 6.4.2	
	FOS 7.0.1	
M5424-N	FOS 6.4.1a	24- port 8 Gb or 4 Gb FC SAN module
	FOS 7.0.1	
FC8PT		16-port 8Gb FC pass-through module



22 Tested Brocade, Cisco, and Qlogic Fibre Channel routers

Table 26 Supported Fibre Channel routers

FCIP routers	Description
Brocade	
7500	Brocade 7500 Extension switch
7800	Brocade 7800 Extension switch
Cisco	
9216i	MDS 9216i Multilayer Fabric Switch
Qlogic	
6142	SANbox 6142

