

Dell EMC PowerVault MD34XX/38XX Series

Support Matrix

Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

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Introduction

This document provides information about supported software and hardware for Dell PowerVault MD3400, MD3420, MD3800i, MD3820i, MD3800f, MD3820f, MD3460, MD3860i, and MD3860f storage arrays, and usage considerations, recommendations, and rules. The information in this document pertains to RAID controller firmware version 8.25.14.60.

NOTE:

- **Unless specified, all information in this document is applicable to the latest RAID controller firmware version available at Dell.com/support.**
- **This Support Matrix contains the latest compatibility and interoperability information. If you observe inconsistencies between this information and other MD-series documentation, consider this document superseding.**

Topics:

- [Revision history](#)

Revision history

Date	Description
November 2018	Updated the supported physical disks section
June 2018	Updated the supported physical disks section
May 2018	Updated version of CFW Updated supported operating systems
April 2018	Updated the supported physical disks section Updated the supported management software section
February 2018	Updated the supported fibre channel host bus adapters section Updated the supported Operating Systems section
January 2018	Updated the supported expansion enclosures section Updated the supported Operating Systems section Updated the supported SAS host bus adapters section
September 2017	Updated the supported physical disks section Updated version of CFW Updated the supported Operating Systems section Updated supported SAS host bus adapters
May 2017	Updated the supported physical disks section Updated version of CFW Updated the supported Operating Systems section Updated storage array rules
February 2017	Updated version of CFW
December 2016	Updated supported physical disks section

Date	Description
	<p>Updated version of CFW and HSW</p> <p>Updated supported operating systems</p> <p>Updated storage array rules for dense array section</p>
October 2016	<p>Updated version of CFW</p> <p>Updated supported physical disks section</p>
July 2016	<p>Added support for VMware with Fibre Channel Direct Connect</p> <p>Updated version of CFW and HSW</p> <p>Updated supported physical disks section</p> <p>Updated supported operating systems</p>
March 2016	<p>Discontinued support of the VSS and VDS hardware providers.</p> <p>Updated version of CFW and HSW</p> <p>Updated supported physical disks section</p> <p>Updated supported operating systems</p>
November 2015	<p>Updated the Windows ODX support section</p>
October 2015	<p>Updated supported physical disks section</p> <p>Updated storage array rules for all models section</p> <p>Updated expansion enclosures section</p> <p>Updated the Windows ODX support section</p>
September 2015	<p>Updated AppAware section</p> <p>Added column to the HDD that specifies if a HDD is SED capable</p> <p>Updated version of CFW and HSW</p>
July 2015	<p>Updated supported physical disks section</p> <p>Updated supported Management Software</p> <p>Updated supported operating systems</p> <p>Updated Dell PowerVault MD-Series storage array rules</p>
June 2015	<p>Updated RAID controller NVSRAM and supported physical disk drive models</p>

Data protocols

Table 1. Dell EMC PowerVault MD-Series Models and supported Data protocols

Dell PowerVault MD Array Model ³	Data protocol
MD3400 ¹	12 Gbps direct attached SAS storage array with 12 drives (3.5 inch)
MD3420 ¹	12 Gbps direct attached SAS storage array with 24 drives (2.5 inch)
MD3800i ¹	10 Gbps iSCSI network storage array with 12 drives (3.5 inch)
MD3820i ¹	10 Gbps iSCSI network storage array with 24 drives (2.5 inch)
MD3800f ¹	16 Gbps Fibre Channel (FC) network storage array with 12 drives (3.5 inch)
MD3820f ¹	16 Gbps FC network storage array with 24 drives (2.5 inch)
MD3460 ²	12 Gbps direct attached SAS storage dense array
MD3860i ²	10 Gbps iSCSI network storage dense array
MD3860f ²	16 Gbps FC network storage dense array

NOTE:

1. Dell EMC PowerVault MD3400, MD3420, MD3800i, MD3820i, MD3800f, and MD3820f models support 120 physical disk drive slots in base configuration. With premium feature activation, 192 physical disk drive slots are supported.
2. Dell EMC PowerVault MD3x60i/MD3x60f dense array has default 120 drive slots support (with 20 drives minimum), and 180 drive slots support with PFK.
3. Premium Feature Key (PFK) is optional on all models.

Dell EMC PowerVault MD Series storage array rules

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

NOTE: Dell EMC PowerVault MD3460, MD3860i, and MD3860f platforms are supported in dual-RAID controller (duplex) configurations only.

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

Rule	MD34x0 series	MD38x0i series	MD38x0f series
	12 Gbps SAS	10 Gbps iSCSI	16 Gbps Fibre Channel
Maximum number of host servers a single storage array can connect to with one RAID controller module installed	4	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)	64	64
Maximum number of Dell 12 Gbps SAS HBA cards supported in a single host server attached to single array. (Dell recommends you to use two Dell 12 Gbps SAS HBA cards for all redundant cabling configurations.)	2 (each card has two ports)	N/A	N/A
Unused ports on a Dell 12 Gbps SAS HBA card already connected to a Dell PowerVault MD3460 cannot connect to another device (such as a tape drive or other model storage array).	Yes	N/A	N/A
Maximum number of Dell PowerVault MD Series Storage Arrays a host server may connect to	2 (HA)	4	4
A hot-spare for a disk group must be a physical disk drive of equal or greater size than any of the member disks.	Yes	Yes	Yes
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. Where applicable, it is a best practice to specify both management port IP addresses on the SMcli invocation:	Yes	Yes	Yes
<ul style="list-style-type: none"> • SMcli 192.168.129.101 192.168.129.102 -c (2U Array) • SMcli 192.168.128.101 192.168.128.102 -c (4U Dense Array) 			
On Linux systems, Device Mapper multipath drivers are required for multipath support.	Yes	Yes	Yes
Coexistence of several Linux multi-path drivers is not supported. When using a Dell PowerVault MD3400 or MD3800 series array with Linux host servers, only the Linux Device Mapper failover driver is supported.**	Yes	Yes	Yes
Virtual disks on Dell PowerVault MD Series Storage Arrays cannot be used for booting.	Yes	Yes	Yes
Disk Groups can be migrated between a Dell PowerVault MD3460/3860i/3860f by following the appropriate disk group migration procedure.***	Yes	Yes	Yes
Maximum size of a virtual disk in a dynamic disk pool: 64 TB	Yes	Yes	Yes
Disk pools cannot be migrated.	Yes	Yes	Yes

Rule	MD34x0 series	MD38x0i series	MD38x0f series
	12 Gbps SAS	10 Gbps iSCSI	16 Gbps Fibre Channel
Maximum capacity (disk space) for each array for dynamic disk pooling	1024 TB	1024 TB	1024 TB
Maximum SSD cache size allowed depends on the installed RAM per controller:	Yes	Yes	Yes
<ul style="list-style-type: none"> 4 GB RAM per controller supports up to 4 TB SSD read cache 8 GB RAM per controller supports up to 5 TB SSD read cache 			
All iSCSI host ports on a controller must have the same port speed.	N/A	Yes	N/A
Maximum 12 Gbps SAS cable length supported is 6m.	Yes	Yes	Yes
If the iSCSI initiators are connected to Dell PowerVault MD3800i series through the network switches, make sure 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.	N/A	Yes	N/A
If you do not enable the flow control, your iSCSI storage array may experience the degradation of the I/O performance.			
In addition to 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.			
NOTE: Turning on the "PortFast" mode is different from turning off the whole operation of STP on the switch. With "PortFast" on, STP is still enabled on the switch ports. Turning off STP may affect the entire network and can leave the network vulnerable to physical topology loops.			
For optimal I/O performance, avoid having more than one iSCSI session originating from one host iSCSI port to the same controller. Ideally, the iSCSI host NIC must connect to only one iSCSI target port on the storage subsystem.	N/A	Yes	N/A
For Dell-Oracle Tested and Validated solutions on the Dell PowerVault MD arrays, see Dell.com/support .	Yes	Yes	Yes
The number of Virtual Disk (VD) copies is limited to a maximum of 511 with a maximum of 8 concurrent copies (applicable to RAID controller firmware version 08.10.05.60 or later).	Yes	Yes	Yes
Remote replication is not supported in simplex mode.	N/A	Yes	Yes
For Fibre Channel and iSCSI controllers, if you use the SAS host ports, they must be connected to a SAS HBA on a separate host.	N/A	Yes	Yes
Maximum number of iSCSI sessions	N/A	512 per port	N/A
Replication within iSCSI topology between MD32x0i, MD36x0i, or MD38x0i arrays is supported regardless of connection speed. Replication between iSCSI and FC topology is not supported.	N/A	Yes	N/A
Replication within FC topology between MD36x0f or MD38x0f arrays is supported regardless of connection speed. Replication between iSCSI and FC topology is not supported.	N/A	N/A	Yes
Online Physical Disk Firmware Upgrade is supported.	Yes	Yes	Yes
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.	Yes	Yes	Yes

Rule	MD34x0 series	MD38x0i series	MD38x0f series
	12 Gbps SAS	10 Gbps iSCSI	16 Gbps Fibre Channel
Data Assurance capable drives are supported in the array, however the Data Assurance feature is not an available option for these arrays.	Yes	Yes	Yes

Table 3. Dell EMC PowerVault MD-Series storage array rules for non-dense 2U models

Rule	MD3400 series	MD3800i series	MD3800f series
	12 Gbps SAS	10 Gbps iSCSI	16 Gbps Fibre Channel
Support for up to 120 physical disk drive slots (system default configuration).	Yes	Yes	Yes
Up to nine MD1200 and/or MD1220 series expansion enclosures can be attached to a Dell PowerVault MD storage array. Any mixture of MD1200 and MD1220 enclosures for 120 physical slots is supported.			
Support for up to 192 physical disk drive slots using a premium feature option.	Yes	Yes	Yes
Up to 15 MD1200 and/or MD1220 series expansion enclosures can be attached 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.	Yes	Yes	Yes
Attached MD1200 series expansion enclosures must be run in unified mode.	Yes	Yes	Yes
The number of snapshots is limited to:	Yes	Yes	Yes
<ul style="list-style-type: none"> • Maximum of 512 snapshots per array Maximum of 128 snapshot per VD • Maximum of 32 snapshots per snapshot group 			
The number of remote replicas is limited to a maximum of 32 for each array.	N/A	Yes	Yes

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

Rule	MD3400 series	MD3800i series	MD3800f series
	12 Gbps SAS	10 Gbps iSCSI	16 Gbps Fibre Channel
Support for up to 120 physical disk drive slots (system default configuration).	Yes	Yes	Yes
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.	Yes	Yes	Yes
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.	Yes	Yes	Yes
A minimum of 20 SAS HDDs or SSDs are required in each Dell PowerVault MD3x60 enclosure (4 in front slots of each drawer)	Yes	Yes	Yes

Default IPv4 settings for management ports on Dell EMC 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

MD3400/MD3420/MD3800x/MD3820x

Controller/port	IPv4 address	Subnet mask
Controller 0, Port 1	192.168.129.101	255.255.255.0
Controller 1, Port 1	192.168.129.102	255.255.255.0

MD3460/MD3860x

Controller/port	IPv4 address	Subnet mask
Controller 0, Port 0	192.168.128.101	255.255.255.0
Controller 1, Port 0	192.168.128.102	255.255.255.0

Default IPv4 settings for the iSCSI ports on PowerVault MD38x0i Storage Arrays

NOTE: No default gateway is set.

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

RAID controller firmware and NVSRAM

NOTE:

- Dell EMC recommends that you collect support information before performing any firmware upgrade.
- Drivers and firmware released only by Dell EMC are supported. For the latest driver and firmware that is releases, see the downloads section at Dell.com/support.

Table 6. Latest RAID controller firmware and NVSRAM versions

Software	Version
RAID controller firmware	08.25.14.60
RAID controller NVSRAM	N2701-825890-004

iSCSI software initiators

Table 7. 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

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

Protocol (TOE/iSCSI) offload 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 Dell PowerVault 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 Dell PowerVault does not endorse or support initiators directly, this support matrix provides some useful configuration information for common initiators

Dell 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

 **NOTE: Hardware initiators are not supported by Dell.**

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.

Fibre Channel SFP+ Transceiver support

Table 8. Supported Fibre Channel SFP+ transceivers

Description	Manufacturer	Mfr. Part number	Dell P/N
16G SFP (FC) Short wave	Finisar	FTLF8529P3BCVA	TDTCP

Physical disks

Only physical disk drives with a Dell EMC part number listed in [Table 9. Supported physical disk drive models](#) are supported. All other physical disk drives purchased from the Dell Software and Peripheral store with a part number other than specified in the list are not supported.

Table 9. Supported physical disk drive models

Dell EMC Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
6R5R8	2.5"	LB206M	200 GB	SSD	Pliant (SanDisk)	No	D339
8C38W	2.5"	LB406M	400 GB	SSD	Pliant (SanDisk)	No	D339
DPF1J	2.5"	LB806M	800 GB	SSD	Pliant (SanDisk)	No	D339
D3K4J	2.5"	LB406R	400 GB	SSD	Pliant (SanDisk)	No	D339
5Y05N	2.5"	LB806R	800 GB	SSD	Pliant (SanDisk)	No	D339
F06P1	2.5"	LB1606R	1.6 TB	SSD	Pliant (SanDisk)	No	D339
TPWNJ	2.5"	LB206S	200 GB	SSD	Pliant (SanDisk)	No	D339
8NW1H	2.5"	LB406S	400 GB	SSD	Pliant (SanDisk)	No	D339
2XR0K	2.5"	LT0200MO	200 GB	SSD	SanDisk	No	D416
C06VX	2.5"	LT0400MO	400 GB	SSD	SanDisk	No	D416
989R8	2.5"	LT0800MO	800 GB	SSD	SanDisk	No	D416
JDTGX	2.5"	LT1600MO	1.6 TB	SSD	SanDisk	No	D416
J19XM	2.5"	LT0800RO	800 GB	SSD	SanDisk	No	D416
2M61G	2.5"	LT1600RO	1.6 TB	SSD	SanDisk	No	D416
M7KYX	2.5"	LT0200WM	200 GB	SSD	SanDisk	No	D416
T2TPF	2.5"	LT0400WM	400 GB	SSD	SanDisk	No	D416
FHFNJ	2.5"	LT0800WM	800 GB	SSD	SanDisk	No	D416
MFC6G	2.5"	MZILS400HEGR0D3	400 GB	SSD	Samsung	No	DWL8
HF06W	2.5"	MZILS800HEHP0D3	800 GB	SSD	Samsung	No	DWL8
W5PP5	2.5"	MZILS1T6HEJH0D3	1.6 TB	SSD	Samsung	No	DWL8
8RC8K	2.5"	MZILS3T2HMLH0D3	3.2 TB	SSD	Samsung	No	DWL8
8Y64H	2.5"	MZILS480HEGR0D3	480 GB	SSD	Samsung	No	DSL8
7FNRX	2.5"	MZILS960HEGR0D3	960 GB	SSD	Samsung	No	DSL8
086DD	2.5"	MZILS1T9HEJH0D3	1.92 TB	SSD	Samsung	No	DSL8
JR1HP	2.5"	MZILS3T8HMLH0D3	3.84 TB	SSD	Samsung	No	DSL8
D9NCK	2.5"	MZILT800HAHQ0D3	800 GB	SSD	Samsung	No	DWF8
DR0HX	2.5"	MZILT1T6HAJQ0D3	1.6 TB	SSD	Samsung	No	DWF8
5H9RV	2.5"	MZILT3T2HALS0D3	3.2 TB	SSD	Samsung	No	DWF8
R1ND2	2.5"	MZILT960HAHQ0D3	960 GB	SSD	Samsung	No	DSF8
F0V FY	2.5"	MZILT1T9HAJQ0D3	1.92 TB	SSD	Samsung	No	DSF8
X8F87	2.5"	MZILT3T8HALS0D3	3.84 TB	SSD	Samsung	No	DSF8

Dell EMC Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
6K55X	2.5"	MK2001GRZB	200 GB	SSD	Toshiba	No	A008
R2PJ7	2.5"	MK4001GRZB	400 GB	SSD	Toshiba	No	A008
K41XJ	2.5"	PX02SMF020	200 GB	SSD	Toshiba	No	A3B3
HKK8C	2.5"	PX02SMF040	400 GB	SSD	Toshiba	No	A3B3
TC2MH	2.5"	PX02SMF080	800 GB	SSD	Toshiba	No	A3B3
G4V45	2.5"	PX02SMB160	1.6 TB	SSD	Toshiba	No	A3B3
CV6W8	2.5"	PX02SSF020	200 GB	SSD	Toshiba	No	A4B3
2H9WV	2.5"	PX02SSF040	400 GB	SSD	Toshiba	No	A4B3
PG19T	2.5"	PX02SSB080	800 GB	SSD	Toshiba	No	A4B3
N9PTK	2.5"	PX03SNF080	800 GB	SSD	Toshiba	No	A5B3
0MXR2	2.5"	PX03SNB160	1.6 TB	SSD	Toshiba	No	A5B3
GM5R3	2.5"	PX04SMB040	400 GB	SSD	Toshiba	No	AM07
M91TJ	2.5"	PX04SMB080	800 GB	SSD	Toshiba	No	AM07
77K16	2.5"	PX04SMB160	1.6 TB	SSD	Toshiba	No	AM07
63GYR	2.5"	PX04SMB320	3.2 TB	SSD	Toshiba	No	AM07
N5Y85	2.5"	PX04SVB048	480 GB	SSD	Toshiba	No	AM07
YYC10	2.5"	PX04SVB096	960 GB	SSD	Toshiba	No	AM07
4XC39	2.5"	PX04SVB192	1.92 TB	SSD	Toshiba	No	AM07
GYMY9	2.5"	PX04SVB384	3.84 TB	SSD	Toshiba	No	AM07
06VJ7	2.5"	PX04SRB048	480 GB	SSD	Toshiba	No	AM07
4KG4X	2.5"	PX04SRB096	960 GB	SSD	Toshiba	No	AM07
R87FK	2.5"	PX04SRB192	1.92 TB	SSD	Toshiba	No	AM07
M09K5	2.5"	PX04SRB384	3.84 TB	SSD	Toshiba	No	AM07
HPNDJ	2.5"	PX04SHB020	200 GB	SSD	Toshiba	No	AM07
YT53C	2.5"	PX04SHB040	400 GB	SSD	Toshiba	No	AM07
RVCY3	2.5"	PX04SHB080	800 GB	SSD	Toshiba	No	AM07
Y9VX5	2.5"	PX04SHB160	1.6 TB	SSD	Toshiba	No	AM07
43PCJ	2.5"	PX05SVB048Y	480 GB	SSD	Toshiba	No	AS10
503M7	2.5"	PX05SVB096Y	960 GB	SSD	Toshiba	No	AS10
V0K7V	2.5"	PX05SVB192Y	1.92 TB	SSD	Toshiba	No	AS10
3DDFT	2.5"	PX05SVB384Y	3.84 TB	SSD	Toshiba	No	AS10
JG XK2	2.5"	PX05SRB048Y	480 GB	SSD	Toshiba	No	AS10
MWGK7	2.5"	PX05SRB096Y	960 GB	SSD	Toshiba	No	AS10
0FYFW	2.5"	PX05SRB192Y	1.92 TB	SSD	Toshiba	No	AS10
XCRDV	2.5"	PX05SRB384Y	3.84 TB	SSD	Toshiba	No	AS10
5VHHG	2.5"	PX05SMB040Y	400 GB	SSD	Toshiba	No	AS10
CN3JH	2.5"	PX05SMB080Y	800 GB	SSD	Toshiba	No	AS10
GVTYD	2.5"	PX05SMB160Y	1.6 TB	SSD	Toshiba	No	AS10
R1YFC	2.5"	PX05SMB320Y	3.2 TB	SSD	Toshiba	No	AS10
3YPRY	2.5"	KPM5XVUG400G	400 GB	SSD	Toshiba	No	B01C

Dell EMC Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
JG6X1	2.5"	KPM5XVUG800G	800 GB	SSD	Toshiba	No	B01C
GT1JH	2.5"	KPM5XVUG1T60	1.6 TB	SSD	Toshiba	No	B01C
X8HTD	2.5"	KPM5XVUG3T20	3.2 TB	SSD	Toshiba	No	B01C
3PR5C	2.5"	KPM5XVUG480G	480 GB	SSD	Toshiba	No	B01C
WFGTH	2.5"	KPM5XVUG960G	960 GB	SSD	Toshiba	No	B01C
2WVYG	2.5"	KPM5XVUG1T92	1.92 TB	SSD	Toshiba	No	B01C
91W3V	2.5"	KPM5XVUG3T84	3.84 TB	SSD	Toshiba	No	B01C
9YWG8	2.5"	KPM5XRUG480G	480 GB	SSD	Toshiba	No	B01C
H8X3X	2.5"	KPM5XRUG960G	960 GB	SSD	Toshiba	No	B01C
TDNP7	2.5"	KPM5XRUG1T92	1.92 TB	SSD	Toshiba	No	B01C
N85XX	2.5"	KPM5XRUG3T84	3.84 TB	SSD	Toshiba	No	B01C
WGP72	2.5"	KPM5XMUG400G	400 GB	SSD	Toshiba	No	B01C
DHRVV	2.5"	KPM5XMUG800G	800 GB	SSD	Toshiba	No	B01C
W9G88	2.5"	KPM5XMUG1T60	1.6 TB	SSD	Toshiba	No	B01C
8038H	2.5"	KPM5XMUG3T20	3.2 TB	SSD	Toshiba	No	B01C
T6TWN	2.5"	HUC101212CSS600	1.2 TB	10K	HGST	No	U850
K9VCF	2.5"	HUC101830CSS204	300 GB	10K	HGST	No	FJ40
10DR3	2.5"	HUC101860CSS204	600 GB	10K	HGST	No	FJ40
87GNY	2.5"	HUC101812CSS204	1.2 TB	10K	HGST	No	FJ40
RF9T8	2.5"	HUC101818CS4204	1.8 TB	10K	HGST	No	FK40
VTHDD	2.5"	HUC101818CS4204	1.8 TB	10K	HGST	No	FK40
RDKH0	2.5"	HUC101830CSS204	300 GB	10K	HGST	No	FJ40
P6GJX	2.5"	HUC101860CSS204	600 GB	10K	HGST	No	FJ40
9XNF6	2.5"	HUC101812CSS204	1.2 TB	10K	HGST	No	FJ40
5VNKK	2.5"	HUC101830CSS200	300 GB	10K	HGST	No	FU40
6DWVP	2.5"	HUC101860CSS200	600 GB	10K	HGST	No	FU40
OKV02	2.5"	HUC101812CSS200	1.2 TB	10K	HGST	No	FU40
851GV	2.5"	HUC156030CSS204	300 GB	15K	HGST	No	EJ40
4J5P1	2.5"	HUC156060CSS204	600 GB	15K	HGST	No	EJ40
0N0T4	2.5"	HUC156030CSS204	300 GB	15K	HGST	No	EJ40
TRCN6	2.5"	HUC156060CSS204	600 GB	15K	HGST	No	EJ40
1P08J	2.5"	HUC156030CSS200	300 GB	15K	HGST	No	EU40
5PNGD	2.5"	HUC156060CSS200	600 GB	15K	HGST	No	EU40
T855K	2.5"	HUC103014CSS600	146 GB	10K	Hitachi	No	J516
U709K	2.5"	HUC103030CSS600	300 GB	10K	Hitachi	No	J516
YJ0GR	2.5"	HUC106030CSS600	300 GB	10K	Hitachi	No	A440
8WP8W	2.5"	HUC106060CSS600	600 GB	10K	Hitachi	No	A440
CXF82	2.5"	HUC109030CSS600	300 GB	10K	Hitachi	No	N440
G76RF	2.5"	HUC109060CSS600	600 GB	10K	Hitachi	No	N440
H5WGN	2.5"	HUC109090CSS600	900 GB	10K	Hitachi	No	N440

Dell EMC Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
R730K	2.5"	HUC151473CSS600	73 GB	15K	Hitachi	No	K774
W330K	2.5"	HUC151414CSS600	146 GB	15K	Hitachi	No	K774
W345K	2.5"	ST973452SS	73 GB	15K	Seagate	No	HT66
X162K	2.5"	ST9146852SS	146 GB	15K	Seagate	No	HT66
89TH4	2.5"	ST9146752SS	146 GB	15K	Seagate	Yes	HTF6
5JDD1	2.5"	ST9146853SS	146 GB	15K	Seagate	No	YS0D
61XPF	2.5"	ST9146853SS	146 GB	15K	Seagate	No	YS0D
H8DVC	2.5"	ST9300653SS	300 GB	15K	Seagate	No	YS0D
81N2C	2.5"	ST9300453SS	300 GB	15K	Seagate	Yes	YSFD
6WC9D	2.5"	ST300MP0005	300 GB	15K	Seagate	No	VS0B
V5300	2.5"	ST600MP0005	600 GB	15K	Seagate	No	VS0B
7FJW4	2.5"	ST300MP0005	300 GB	15K	Seagate	No	VT33
4HGTJ	2.5"	ST600MP0005	600 GB	15K	Seagate	No	VT33
4X0XG	2.5"	ST600MP0025	600 GB	15K	Seagate	Yes	VSC6
NCT9F	2.5"	ST300MP0026	300 GB	15K	Seagate	No	KT39
FPW68	2.5"	ST600MP0036	600 GB	15K	Seagate	No	KT39
XTH17	2.5"	ST900MP0026	900 GB	15K	Seagate	No	KT39
RT8MY	2.5"	DL900MP0136	900 GB	15K	Seagate	No	KT57
N9WXC	2.5"	ST900MP0126	900 GB	15K	Seagate	No	KSC8
X160K	2.5"	ST9146803SS	146 GB	10K	Seagate	No	FS66
T871K	2.5"	ST9300603SS	300 GB	10K	Seagate	No	FS66
148J7	2.5"	ST9300503SS	300 GB	10K	Seagate	Yes	FSF9
7T0DW	2.5"	ST9600204SS	600 GB	10K	Seagate	No	FM0C
8MP93	2.5"	ST9600104SS	600 GB	10K	Seagate	Yes	FMF5
745GC	2.5"	ST9300605SS	300 GB	10K	Seagate	No	CS0C
R72NV	2.5"	ST9600205SS	600 GB	10K	Seagate	No	CS0C
8JRN4	2.5"	ST9900805SS	900 GB	10K	Seagate	No	CS0C
XRRVX	2.5"	ST9900605SS	900 GB	10K	Seagate	Yes	CSFB
PGHJG	2.5"	ST300MM0006	300 GB	10K	Seagate	No	LS0C
7YX58	2.5"	ST600MM0006	600 GB	10K	Seagate	No	LS0C
2RR9T	2.5"	ST900MM0006	900 GB	10K	Seagate	No	LS0C
TNX32	2.5"	ST900MM0036	900 GB	10K	Seagate	Yes	LSF7
3P3DF	2.5"	ST900MM0007	900 GB	10K	Seagate	No	IS06
RMCP3	2.5"	ST1200MM0007	1.2 TB	10K	Seagate	No	IS06
4RYFR	2.5"	ST1200MM0027	1.2 TB	10K	Seagate	Yes	ISF5
K1JY9	2.5"	ST600MM0088	600 GB	10K	Seagate	No	TS05
36RH9	2.5"	ST1200MM0088	1.2 TB	10K	Seagate	No	TS05
43N12	2.5"	ST1800MM0018	1.8 TB	10K	Seagate	No	TS27
YJ2KH	2.5"	ST300MM0088	300 GB	10K	Seagate	No	TT31
R95FV	2.5"	ST600MM0088	600 GB	10K	Seagate	No	TT31

Dell EMC Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
WXPCX	2.5"	ST1200MM0088	1.2 TB	10K	Seagate	No	TT31
FR6W6	2.5"	ST1200MM0198	1.2 TB	10K	Seagate	No	UT71
V2KWT	2.5"	ST1200MM0108	1.2 TB	10K	Seagate	Yes	TSC9
WHR0G	2.5"	ST1800MM0078	1.8 TB	10K	Seagate	Yes	TSE2
VJ7CD	2.5"	ST1800MM0168	1.8 TB	10K	Seagate	No	2S24
RVDCJ	2.5"	ST1800MM0198	1.8 TB	10K	Seagate	No	2T51
2M5JK	2.5"	ST300MM0078	300 GB	10K	Seagate	No	BS05
D1F14	2.5"	ST600MM0238	600 GB	10K	Seagate	No	BS05
XXTRP	2.5"	ST600MM0069	600 GB	10K	Seagate	No	ST33
G2G54	2.5"	ST1200MM0099	1.2 TB	10K	Seagate	No	ST33
JY57X	2.5"	DL1800MM0159	1.8 TB	10K	Seagate	No	ST53
DMP3R	2.5"	ST1200MM0069	1.2 TB	10K	Seagate	Yes	SSC3
R734K	2.5"	ST9500430SS	500 GB	7.2K	Seagate	No	DS67
NVOG9	2.5"	ST9500431SS	500 GB	7.2K	Seagate	Yes	DSF4
9W5WV	2.5"	ST9500620SS	500 GB	7.2K	Seagate	No	AS0D
55RMX	2.5"	ST91000640SS	1 TB	7.2K	Seagate	No	AS0D
XKGH0	2.5"	ST91000642SS	1 TB	7.2K	Seagate	Yes	ASFE
XY986	2.5"	ST2000NX0273	2 TB	7.2K	Seagate	No	NS29
56M6W	2.5"	ST1000NX0453	1 TB	7.2K	Seagate	No	NS02
FVX7C	2.5"	ST2000NX0433	2 TB	7.2K	Seagate	No	NS02
D4N7V	2.5"	ST1000NX0473	1 TB	7.2K	Seagate	No	NT32
TMVN7	2.5"	ST2000NX0463	2 TB	7.2K	Seagate	No	NT32
Y6W8N	2.5"	ST2000NX0453	2 TB	7.2K	Seagate	Yes	NSF2
6DFD8	2.5"	MK1401GRRB	146 GB	15K	Toshiba	No	DB08
NWH7V	2.5"	MK3001GRRB	300 GB	15K	Toshiba	No	DB08
4GN49	2.5"	AL13SXB300N	300 GB	15K	Toshiba	No	DF0B
990FD	2.5"	AL13SXB600N	600 GB	15K	Toshiba	No	DF0B
ORVDT	2.5"	AL13SXB30EN	300 GB	15K	Toshiba	No	DK05
DYDW0	2.5"	AL13SXB60EN	600 GB	15K	Toshiba	No	DK05
YFKXK	2.5"	AL13SXB30ENY	300 GB	15K	Toshiba	No	EC02
GK6JN	2.5"	AL13SXB60ENY	600 GB	15K	Toshiba	No	EC02
377CF	2.5"	AL14SXB30ENY	300 GB	15K	Toshiba	No	EE05
1W7HC	2.5"	AL14SXB60ENY	600 GB	15K	Toshiba	No	EE05
YKT0W	2.5"	AL14SXB90ENY	900 GB	15K	Toshiba	No	EE05
740Y7	2.5"	MBF2300RC	300 GB	10K	Toshiba	No	DA0B
5R6CX	2.5"	MBF2600RC	600 GB	10K	Toshiba	No	DA0B
MTV7G	2.5"	AL13SEB300	300 GB	10K	Toshiba	No	DE11
5TFDD	2.5"	AL13SEB600	600 GB	10K	Toshiba	No	DE11
RC34W	2.5"	AL13SEB900	900 GB	10K	Toshiba	No	DE11
GP3FR	2.5"	AL14SEB18EQ	1.8 TB	10K	Toshiba	No	DN03

Dell EMC Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
2TRM4	2.5"	AL14SEB18EQY	1.8 TB	10K	Toshiba	No	EB02
3NKW7	2.5"	AL14SEB030N	300 GB	10K	Toshiba	No	DM06
453KG	2.5"	AL14SEB060N	600 GB	10K	Toshiba	No	DM06
N9VVV	2.5"	AL14SEB090N	900 GB	10K	Toshiba	No	DM06
89D42	2.5"	AL14SEB120N	1.2 TB	10K	Toshiba	No	DM06
KT5V6	2.5"	AL14SEB030N	300 GB	10K	Toshiba	No	DH01
GTYCR	2.5"	AL14SEB060N	600 GB	10K	Toshiba	No	DH01
ROMWH	2.5"	AL14SEB120N	1.2 TB	10K	Toshiba	No	DH01
FF02R	2.5"	AL14SEB030NY	300 GB	10K	Toshiba	No	EA04
G3MWJ	2.5"	AL14SEB060NY	600 GB	10K	Toshiba	No	EA04
3K30N	2.5"	AL14SEB120NY	1.2 TB	10K	Toshiba	No	EA04
GWFRY	2.5"	AL15SEB030NY	300 GB	10K	Toshiba	No	EF04
4WX8Y	2.5"	AL15SEB060NY	600 GB	10K	Toshiba	No	EF04
01MOD	2.5"	AL15SEB120NY	1.2 TB	10K	Toshiba	No	EF04
0WRRF	2.5"	AL15SEB18EQY	1.8 TB	10K	Toshiba	No	EF04
X79H3	2.5"	WD3000BKHG	300 GB	10K	Western Digital	No	D1VD
C5R62	2.5"	WD6000BKHG	600 GB	10K	Western Digital	No	D1VD
CWHNN	2.5"	WD3001BKHG	300 GB	10K	Western Digital	No	D1S6
96G91	2.5"	WD6001BKHG	600 GB	10K	Western Digital	No	D1S6
4X1DR	2.5"	WD9001BKHG	900 GB	10K	Western Digital	No	D1S6
F9KW8	2.5"	WD3002BKTG	300 GB	10K	Western Digital	No	D1P3
V1TX2	2.5"	WD6002BKTG	600 GB	10K	Western Digital	No	D1P3
99NCV	2.5"	WD9002BKTG	900 GB	10K	Western Digital	No	D1P3
WTJVY	3.5"	HUS724020ALS640	2 TB	7.2K	HGST	No	W350
MY58D	3.5"	HUS724030ALS640	3 TB	7.2K	HGST	No	W350
7J9RN	3.5"	HUS724040ALS640	4 TB	7.2K	HGST	No	W350
XP99D	3.5"	HUS726020ALS214	2 TB	7.2K	HGST	No	KJ43
TX8WW	3.5"	HUS726040ALS214	4 TB	7.2K	HGST	No	KJ43
VH6FW	3.5"	HUS726020ALS210	2 TB	7.2K	HGST	No	KU36
X4FKY	3.5"	HUS726040ALS210	4 TB	7.2K	HGST	No	KU36
PYM8J	3.5"	HUS726060AL5214	6 TB	7.2K	HGST	No	KK34
43V7V	3.5"	HUH728080AL5204	8 TB	7.2K	HGST	No	GK23
KRDKK	3.5"	HUH721008AL5200	8 TB	7.2K	HGST	No	LS17
07FPR	3.5"	HUH721010AL5200	10 TB	7.2K	HGST	No	LS17
NT1X2	3.5"	HUS726T4TALS200	4 TB	7.2K	HGST	No	PU03
XDN2G	3.5"	HUS726T6TAL5200	6 TB	7.2K	HGST	No	PS03
44YFV	3.5"	HUS728T8TAL5200	8 TB	7.2K	HGST	No	RS03
X150K	3.5"	HUS156030VLS600	300 GB	15K*	Hitachi	No	E820
T857K	3.5"	HUS156045VLS600	450 GB	15K*	Hitachi	No	E820
W348K	3.5"	HUS156060VLS600	600 GB	15K*	Hitachi	No	E820

Dell EMC Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
VYRKH	3.5"	HUS723020ALS640	2 TB	7.2K	Hitachi	No	M440
CWJ92	3.5"	HUS723030ALS640	3 TB	7.2K	Hitachi	No	M440
F617N	3.5"	ST3300657SS	300 GB	15K*	Seagate	No	ES68
R749K	3.5"	ST3450857SS	450 GB	15K*	Seagate	No	ES68
W347K	3.5"	ST3600057SS	600 GB	15K*	Seagate	No	ES68
D32VD	3.5"	ST3450757SS	450 GB	15K*	Seagate	Yes	ESF7
5XTFH	3.5"	ST3600957SS	600 GB	15K*	Seagate	Yes	ESF7
R752K	3.5"	ST3600002SS	600 GB	10K*	Seagate	No	ER66
U717K	3.5"	ST3500414SS	500 GB	7.2K	Seagate	No	KS6B
U738K	3.5"	ST31000424SS	1 TB	7.2K	Seagate	No	KS6B
R755K	3.5"	ST32000444SS	2 TB	7.2K	Seagate	No	KS6B
X164K	3.5"	ST31000425SS	1 TB	7.2K	Seagate	Yes	KSF4
W350K	3.5"	ST32000445SS	2 TB	7.2K	Seagate	Yes	KSF4
6VNCJ	3.5"	ST500NM0001	500 GB	7.2K	Seagate	No	PS0B
740YX	3.5"	ST1000NM0001	1 TB	7.2K	Seagate	No	PS0B
67TMT	3.5"	ST2000NM0001	2 TB	7.2K	Seagate	No	PS0B
02DK1	3.5"	ST2000NM0041	2 TB	7.2K	Seagate	Yes	PSF9
1D9NN	3.5"	ST32000645SS	2 TB	7.2K	Seagate	No	RS17
91K8T	3.5"	ST33000650SS	3 TB	7.2K	Seagate	No	RS17
698PM	3.5"	ST33000652SS	3 TB	7.2K	Seagate	Yes	RSFF
FNW88	3.5"	ST1000NM0023	1 TB	7.2K	Seagate	No	GS15
1P7DP	3.5"	ST2000NM0023	2 TB	7.2K	Seagate	No	GS15
55H49	3.5"	ST3000NM0023	3 TB	7.2K	Seagate	No	GS15
529FG	3.5"	ST4000NM0023	4 TB	7.2K	Seagate	No	GS15
6P85J	3.5"	ST4000NM0063	4 TB	7.2K	Seagate	Yes	GSFB
GWD7D	3.5"	ST1000NM0005	1 TB	7.2K	Seagate	No	MS06
R7FKF	3.5"	ST2000NM0005	2 TB	7.2K	Seagate	No	MS06
XWM1W	3.5"	ST4000NM0005	4 TB	7.2K	Seagate	No	MS06
NWCCG	3.5"	ST6000NM0034	6 TB	7.2K	Seagate	No	MS2E
W1C90	3.5"	ST6000NM0034	6 TB	7.2K	Seagate	No	MS85
PRNR6	3.5"	ST6000NM0034	6 TB	7.2K	Seagate	No	MS85
DGNTV	3.5"	ST1000NM0045	1 TB	7.2K	Seagate	No	DS04
K7VW5	3.5"	ST2000NM0045	2 TB	7.2K	Seagate	No	DS04
YXG4K	3.5"	ST4000NM0025	4 TB	7.2K	Seagate	No	DS04
H0R8N	3.5"	ST1000NM0085	1 TB	7.2K	Seagate	No	DT34
7RCGV	3.5"	ST2000NM0155	2 TB	7.2K	Seagate	No	DT34
5JH5X	3.5"	ST4000NM0295	4 TB	7.2K	Seagate	No	DT34
98XDP	3.5"	ST1000NM0085	1 TB	7.2K	Seagate	No	DT34
X2K8W	3.5"	ST2000NM0155	2 TB	7.2K	Seagate	No	DT34
W5M2R	3.5"	ST4000NM0295	4 TB	7.2K	Seagate	No	DT34

Dell EMC Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
RHVWG	3.5"	ST6000NM0095	6 TB	7.2K	Seagate	No	DS23
FCHXF	3.5"	ST4000NM0135	4 TB	7.2K	Seagate	Yes	DSF2
GKWHP	3.5"	ST8000NM0075	8 TB	7.2K	Seagate	No	PS26
M40TH	3.5"	ST8000NM0185	8 TB	7.2K	Seagate	No	PT54
VFP4M	3.5"	ST8000NM0185	8 TB	7.2K	Seagate	No	PT54
PDFHC	3.5"	ST8000NM0135	8 TB	7.2K	Seagate	Yes	PSE6
V7RN3	3.5"	ST8000NM0135	8 TB	7.2K	Seagate	Yes	PSE6
YF87J	3.5"	ST10000NM0256	10 TB	7.2K	Seagate	No	TT55
HV5CH	3.5"	ST10000NM0598	10 TB	7.2K	Seagate	No	RSL2
7KXJR	3.5"	MK1001TRKB	1 TB	7.2K*	Toshiba	No	DCAD
WDC07	3.5"	MK2001TRKB	2 TB	7.2K*	Toshiba	No	DCAD
GPP3G	3.5"	MG03SCA100	1 TB	7.2K	Toshiba	No	DG09
829T8	3.5"	MG03SCA200	2 TB	7.2K	Toshiba	No	DG09
14X4H	3.5"	MG03SCA300	3 TB	7.2K	Toshiba	No	DG09
12GYG	3.5"	MG03SCA400	4 TB	7.2K	Toshiba	No	DG09
GDM8H	3.5"	MG04SCA20EN	2 TB	7.2K	Toshiba	No	DS07
0F9W8	3.5"	MG04SCA40EN	4 TB	7.2K	Toshiba	No	DS07
HHX14	3.5"	MG04SCA20ENY	2 TB	7.2K	Toshiba	No	EG03
1MVTT	3.5"	MG04SCA40ENY	4 TB	7.2K	Toshiba	No	EG03
M7D8Y	3.5"	MG04SCA20EN	2 TB	7.2K	Toshiba	No	DJ01
HNX0W	3.5"	MG04SCA40EN	4 TB	7.2K	Toshiba	No	DJ01
3PRF0	3.5"	MG04SCA60EE	6 TB	7.2K	Toshiba	No	DR07
XXPPV	3.5"	MG06SCA600EY	6 TB	7.2K	Toshiba	No	EH06
FV725	3.5"	MG06SCA800EY	8 TB	7.2K	Toshiba	No	EH06
0V8G9	3.5"	WD1000FYYG	1 TB	7.2K	Western Digital	No	D1BH
YY34F	3.5"	WD2000FYYG	2 TB	7.2K	Western Digital	No	D1BH
440RW	3.5"	WD1001FYYG	1 TB	7.2K	Western Digital	No	D1R7
37MGT	3.5"	WD2001FYYG	2 TB	7.2K	Western Digital	No	D1R7
DPTW9	3.5"	WD3001FYYG	3 TB	7.2K	Western Digital	No	D1R7
202V7	3.5"	WD4001FYYG	4 TB	7.2K	Western Digital	No	D1R7

NOTE:

- **3.5" 15 K RPM drives, 3.5" 10 K RPM drives, and 3.5" 7.2 K RPM utility drives marked with (*) are not supported on Dell EMC PowerVault MD dense arrays such as Dell EMC PowerVault MD3460, MD3860i, and MD3860.**
- **The MD34/MD38 series arrays can utilize 12 GBps HDD or SSD, but will negotiate to a speed of 6 GBps.**
- **Encrypted SSD drives (SED-SSD) and 4 Kn Sector drives are not supported on the MD34/MD38 series arrays.**

Expansion enclosures

Dell PowerVault MD3x60 Series Dense Storage Arrays support a maximum of 180 physical disk drive slots (with premium feature activation). These additional slots support is provided only by up to two Dell PowerVault MD3060e expansion enclosures. For a system without premium feature activation, the physical disk drive slot limit is 120.

Table 10. Expansion enclosures supported on dense (4U) storage arrays

Enclosure model	Minimum firmware version
MD3060e	03.9F

Dell PowerVault MD34xx/38xx series storage arrays support a maximum of 192 physical disk drive slots (with premium feature activation). These additional slots can be provided by up to 15 MD1200 expansion enclosures, seven MD PowerVault MD1220 expansion enclosures, or a combination of both. When a combination of expansion enclosures is used, the total number of physical disk drive slots in the system cannot exceed 192. For a system without premium feature activation, the physical disk drive limit is 120.

Table 11. 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.**
- **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.**

Management software

The Dell EMC 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 EMC PowerVault MD storage software is supported on all operating systems and guest operating systems listed in the Error! Reference source not found. section. The management station must meet the following minimum requirements:

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

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

Table 12. Supported management software (Windows)

Software component	Version	Notes
Dell EMC PowerVault MD34/38 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 EMC PowerVault MD34/38 series hardware provider VDS/VSS Providers*	D1.20.0G06.0004/S1.20.0G06.0004	Dell EMC is discontinuing support of the VSS and VDS hardware providers. For information about deprecation, see the <i>Dell EMC MD Series Storage Arrays Information Update</i> .
Dell EMC PowerVault MD Storage Array vCenter plug-in	See Supported management software (VMware vCenter plug-in).	
Dell EMC 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 EMC PowerVault MD Storage Array Storage Replication Adapter (SRA) (Fibre Channel only)	See Supported management software (Storage Replication Adapter Support).	

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

Table 13. Supported management software (Linux)

Software Component	Version	Notes
Dell EMC 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 14. Supported management software (VMware vCenter plug-in)

vCenter plug-in version	VMware version supported	Notes
3	All protocols: <ul style="list-style-type: none"> • vSphere 6.5 	This is compatible only with firmware 08.20.11.60 or later.

vCenter plug-in version	VMware version supported	Notes
	<ul style="list-style-type: none"> vSphere 6.0 vSphere 5.5 U2 	The Host to Storage Wizard that is used to automatically discover the HBA WWNs is not supported after VMware vCenter server 6.0 Update2 Build 3620759 or on any of the VMware vCenter server 6.5 releases.
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 15. 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 16. Supported management software (Storage Replication Adapter Support)

SRA Version	VMware version supported	Notes
5.1	<ul style="list-style-type: none"> vSphere Client 5.0/ 5.1/5.5 vCenter Server 5.0/5.1/5.5 Site Recovery Manager (SRM) 5.1/5.5 	Supported on 08.10.05.60 firmware or later for the following storage arrays: MD38xxi and MD38xxf

 **NOTE: Supported on Fibre Channel and iSCSI arrays only.**

Operating systems

Where clustering is supported by the operating system, it is also supported on the PowerVault MD34xx, MD38xxi, and MD38xxf series storage arrays, subject to the following limitations:

Windows Server 2008 R2 - Windows Server 2016:

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

Table 17. Dell EMC PowerVault MD-Series operating system support

Operating system	Management station	SAS host server	iSCSI host server	Fibre Channel host server	Notes & required hotfixes
Windows Server 2016*					
Standard server (core and desktop experience)	Yes	Yes	Yes	Yes	The Microsoft MPIO feature must be installed prior to installing the Module Disk Storage Manager (MDSM) located on the resource DVD available on Dell.com/support . Failure to do so will require MDSM to be installed a second time.
Data center server (core and desktop experience)	Yes	Yes	Yes	Yes	The Microsoft MPIO feature must be installed prior to installing the Module Disk Storage Manager (MDSM) located on the resource DVD available on Dell.com/support . Failure to do so will require MDSM to be installed a second time.
Windows Server 2012 R2 (U1)*					
Standard server and core	Yes	Yes	Yes	Yes	KB2966870
Data center server and core	Yes	Yes	Yes	Yes	KB2966870
Foundation server and core	Yes	Yes	Yes	Yes	KB2966870
Windows Server 2008 R2 SP1*					
Windows 2008 R2 SP1 Enterprise and Core	Yes	Yes	Yes	Yes	KB2522766, KB2637197
Windows 2008 R2 SP1 Data center and Core	Yes	Yes	Yes	Yes	KB2522766, KB2637197
Windows 2008 R2 SP1 Foundation and Core	Yes	Yes	Yes	Yes	KB2522766, KB2637197
Windows 2008 R2 SP1 Web and Core	Yes				KB2522766, KB2637197
Windows 2008 Storage Server R2 SP1 all editions	Yes	Yes	Yes	Yes	KB2522766, KB2637197
Windows 2008 R2 SP1 HPC Server	Yes	Yes	Yes	Yes	KB2522766, KB2637197
Red Hat Enterprise Linux (RHEL)					
Red Hat Enterprise Linux 7.4 (x64 only)	Yes	Yes	Yes	Yes	Basic Server install (Minimum)
Red Hat Enterprise Linux 7.3 (x64 only)	Yes	Yes	Yes	Yes	Basic Server install (Minimum)

Operating system	Management station	SAS host server	iSCSI host server	Fibre Channel host server	Notes & required hotfixes
Red Hat Enterprise Linux 7.2 (x64 only)	Yes	Yes	Yes	Yes	Basic Server install (Minimum)
Red Hat Enterprise Linux 7.1 (x64 only)	Yes	Yes	Yes	Yes	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 workaround 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 <i>RHEL 7.1 Release Notes</i> , issue BZ#1186462.
Red Hat Enterprise Linux 7 (x64 only)	Yes	Yes	Yes	Yes	Basic Server install (Minimum)
Red Hat Enterprise Linux 6.9 (x64 only)	Yes	Yes	Yes	Yes	Basic Server install (Minimum)
Red Hat Enterprise Linux 6.8 (x64 only)	Yes	Yes	Yes	Yes	Basic Server install (Minimum)
Red Hat Enterprise Linux 6.7 (x64 only)	Yes	Yes	Yes	Yes	Basic Server install (Minimum)
Red Hat Enterprise Linux 6.6 (x64 only)	Yes	Yes	Yes	Yes	Basic Server install (Minimum)
Red Hat Enterprise Linux 6.5 (x64 only)	Yes	Yes	Yes	Yes	Basic Server install (Minimum)
SUSE Linux Enterprise Server (SLES)					
SUSE@ Linux Enterprise Server 12.3 (x64 only)	Yes	Yes	Yes	Yes	
SUSE@ Linux Enterprise Server 12.2 (x64 only)	Yes	Yes	Yes	Yes	
SUSE@ Linux Enterprise Server 12.1 (x64 only)	Yes	Yes	Yes	Yes	
SUSE@ Linux Enterprise Server 12 (x64 only)	Yes	Yes	Yes	Yes	
SUSE@ Linux Enterprise Server 11.4 (x64 only)	Yes	Yes	Yes	Yes	
Virtualization Hosts / Hypervisors					
VMware vSphere 6.5 (U1)		Yes	Yes	Yes	<ul style="list-style-type: none"> For supported array firmware versions, see VMware Compatibility Guide Supported path policies: MRU and RR Direct attached iSCSI connection is not supported with VMware vSphere
VMware vSphere 6.5		Yes	Yes	Yes	<ul style="list-style-type: none"> For supported array firmware versions, see VMware Compatibility Guide Supported path policies: MRU and RR Direct attached iSCSI connection is not supported with VMware vSphere
VMware vSphere 6.0 (U3)		Yes	Yes	Yes	<ul style="list-style-type: none"> For supported array firmware versions, see VMware Compatibility Guide Supported path policies: MRU and RR Direct attached iSCSI connection is not supported with VMware vSphere


Operating system	Management station	SAS host server	iSCSI host server	Fibre Channel host server	Notes & required hotfixes
VMware vSphere 6.0 (U2)		Yes	Yes	Yes	<ul style="list-style-type: none"> For supported array firmware versions, see VMware Compatibility Guide Supported path policies: MRU and RR Direct attached iSCSI connection is not supported with VMware vSphere
VMware vSphere 6.0 (U1)		Yes	Yes	Yes	<ul style="list-style-type: none"> For supported array firmware versions, see VMware Compatibility Guide Supported path policies: MRU and RR Direct attached iSCSI connection is not supported with VMware vSphere
VMware vSphere 5.5 (U3)		Yes	Yes	Yes	<ul style="list-style-type: none"> For supported array firmware versions, see VMware Compatibility Guide Supported path policies: MRU and RR Direct attached iSCSI connection is not supported with VMware vSphere
VMware vSphere 5.1 (U3)		Yes	Yes	Yes	<ul style="list-style-type: none"> For supported array firmware versions, see VMware Compatibility Guide Supported path policies: MRU and RR Direct attached iSCSI connection is not supported with VMware vSphere
Microsoft Hyper-V Server 2016	Yes	Yes	Yes	Yes	
Microsoft Hyper-V Server 2012 R2	Yes	Yes	Yes	Yes	
Microsoft Hyper-V Server 2008 R2 SP1		Yes	Yes		
Windows Server 2008 R2 SP1 with Hyper-V	Yes	Yes	Yes	Yes	
Windows Desktop operating systems					
Windows 10 (x64 only) Pro Enterprise	Yes				
Windows 8.1 (x64 only) Pro Enterprise	Yes				
Windows 8 (x64 only) Pro Enterprise	Yes				
Windows 7 (x86, x64)	Yes				

NOTE:

- **Core editions Windows servers can only manage storage arrays by using the SMcli client.**
- **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.**

Windows ODX

The MD34XX or MD38XX Series Storage Arrays support Windows ODX for Windows Server 2012 R2 or later.

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

ALUA support on 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.

Device mapper software

Table 18. 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 7.4	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

SAS host bus adapters

Go to Dell.com/support to download the latest supported version of the 12 Gbps SAS HBA firmware and drivers for your specific server hardware platform.

NOTE:

- The LSI 9300-8e HBA is compatible only on the Dell PowerEdge 11th, 12th, and 13th generation servers that have a PCI Express (PCIe) x8 slot.
- The Dell 12 Gbps SAS HBA is compatible only on the Dell PowerEdge 13th and 14th generation servers that have a PCI Express (PCIe) x8 slot.


 **CAUTION:** Do not connect the SAS HBA cables to the connectors on a Dell PowerEdge 11th and 12th generation servers, when the servers are powered on. The cables may be difficult to insert into the HBA connectors and might need some manipulation.

Table 19. Supported 12 Gbps SAS HBAs

Vendor	Model	Dell P/N
LSI	9300-8e	156NC J91FN
Dell	12 Gbps SAS HBA	2PHG9 (Full Height) T93GD (Low profile)

Fibre Channel host bus adapters

Table 20. Supported Fibre Channel HBAs

Host bus adapter name	Direct- attach config**	Fabric config	Dell P/N	Available from
Qlogic*				
QLE2660	Yes	Yes	0187V (full height) TC40H (low-profile)	Dell
QLE2662	Yes	Yes	9J1RG (full height) 7JKH 4 (low-profile)	Dell
QLE2660v2	Yes	Yes	H28RN (full height) 4MNKF (low-profile)	Dell
QLE2662v2	Yes	Yes	H8T43 (full height) 3PCN3 (low-profile)	Dell
QLE2690	Yes	Yes	P8PCK (full height) P3T0T (low-profile)	Dell
QLE2692	Yes	Yes	CK9H1 (full height) WVT0T (low-profile)	Dell
QLE2670	Yes	Yes		www.qlogic.com
QLE2672	Yes	Yes		www.qlogic.com
QLE2560	Yes	Yes		www.qlogic.com
QLE2562	Yes	Yes		www.qlogic.com
Emulex*				
LPe16000v2	Yes	Yes	W12YJ (full height) XRNN5 (low-profile)	Dell EMC
LPe16002v2	Yes	Yes	4G6WF (full height) HD2MG (low-profile)	Dell EMC
LPe16000v3	Yes	Yes	61M2K (full height) 11H8D (low-profile)	Dell EMC
LPe16002v3	Yes	Yes	F3VJ6 (full height) 6VK2R (low-profile)	Dell EMC
LPe31000	Yes	Yes	3T3T7 (full height) 6CWM6	Dell EMC

Host bus adapter name	Direct- attach config**	Fabric config	Dell P/N	Available from
LPe31002	Yes	Yes	(low-profile) RXNT1 (full height) VGJ12 (low-profile)	Dell EMC
LPe 12000	Yes	Yes		www.broadcom.com
LPe 12002	Yes	Yes		www.broadcom.com

* See Required Timeout Settings for Fibre Channel host bus adapters for required timeout settings by manufacturer.

**Only certain OSs support direct attach configurations. See [Fibre Channel direct-attach configuration operating systems](#) for a detailed list.

Fibre Channel direct-attach configuration operating systems

This solution supports the following list of direct-attached configuration operating systems:

- Microsoft Windows Server 2016
- Microsoft Windows Server 2012 R2
- Microsoft Windows Server 2008 R2 SP1
- Red Hat Enterprise Linux 7.0 or later
- Red Hat Enterprise Linux 6.5 or later
- SUSE Linux Enterprise Server 12.0 or later
- VMware vSphere 5.5 (U3) or later
- VMware vSphere 6.0 or later
- VMware vSphere 6.5 or later

Required timeout settings for Fibre Channel host bus adapters

Table 21. Fibre Channel HBA timeout values (by Manufacturer) shows required timeout settings for all Dell-supported Fibre Channel (FC) HBAs, by manufacturer, and OS. Ensure that any FC HBA connected to your PowerVault MD3860f storage array has these timeout values set as listed in Table 21. Fibre Channel HBA timeout values (by Manufacturer).

Table 21. 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

Supported Fibre Channel switches

The following switches are supported only on Fibre Channel (FC) storage arrays running the most current RAID firmware versions

Table 22. Supported Fibre Channel switches

Switches	Description
Dell EMC	
S5000	48 port unified switch
Brocade	
300	8 Gbps 24 port FC switch
5100	8 Gbps 40 port FC switch
5300	8 Gbps 80 port FC switch
8000	8 Gbps 8 port FC switch
6505	16 Gbps 24 port FC switch
6510	16 Gbps 48 port FC switch
6520	16 Gbps 96 port FC switch
DCX	Director class switch chassis
DCX-4S	Director class switch chassis
48000	Director class switch chassis
DCX8510-x	Director class switch chassis
Qlogic SANbox	
3800	8 Gbps 8 port FC switch
5800	8 Gbps scalable up to 120 ports FC switch stack
Cisco	

Switches	Description
Nexus 5548UP	8 Gbps 48 port FC switch
Nexus 5596UP	8 Gbps 96 port 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