Dell EMC PowerVault ME4 Series Storage System

Support Matrix



Notes, cautions, and warnings

(i) 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 EMC PowerVault ME4012, ME4024, and ME4084 storage systems, and usage considerations, recommendations, and rules.

The Support Matrix contains the latest compatibility and interoperability information. If you observe inconsistencies between this information and other documentation, consider this document superseding.

() NOTE: Unless specified, all information in this document is applicable to the latest RAID controller firmware version available at www.dell.com/support.

Topics:

Changes to revision A13 of the Support Matrix

Changes to revision A13 of the Support Matrix

- Updated firmware versions for supported physical disk drives
- Updated supported management software

Supported data protocols

This section lists the PowerVault ME4 series models and supported data protocols.

NOTE: The PowerVault ME4 series does not support changing or converting from one data protocol to another data protocol.

Table 1. Dell EMC PowerVault ME4 Series models and supported data protocols

Dell EMC PowerVault ME4 model	Data protocol and drives
ME4012 (SAS)	12 Gbps direct attached SAS storage system with 12 drives (3.5 inch)
ME4024 (SAS)	12 Gbps direct attached SAS storage system with 24 drives (2.5 inch)
ME4084 (SAS)	12 Gbps direct attached SAS storage system with 84 drives (3.5 inch)
ME4012 (10GBase-T iSCSI)	10 Gbps iSCSI network storage system with 12 drives (3.5 inch)
ME4024 (10GBase-T iSCSI)	10 Gbps iSCSI network storage system with 24 drives (2.5 inch)
ME4084 (10GBase-T iSCSI)	10 Gbps iSCSI network storage system with 84 drives (3.5 inch)
ME4012 (CNC)	16 Gbps Fibre Channel (FC) and/or 10 Gbps iSCSI network storage system with 12 drives (3.5 inch)
ME4024 (CNC)	16 Gbps Fibre Channel (FC) and/or 10 Gbps iSCSI network storage system with 24 drives (2.5 inch)
ME4084 (CNC)	16 Gbps Fibre Channel (FC) and/or 10 Gbps iSCSI network storage system with 84 drives (3.5 inch)

() NOTE:

 Dell EMC PowerVault ME4012 and ME4024 storage systems support up to nine ME412/ME424 expansion enclosures or three ME484 expansion enclosures. A combination of ME412/ME424 and ME484 expansion enclosures is not supported.

• Dell EMC PowerVault ME4084 storage systems support up to three ME484 expansion enclosures.

3 Dell EMC PowerVault ME4 Series storage

system rules

This section contains both general and model-specific connectivity and consideration rules for Dell EMC PowerVault ME4 storage systems. The rules that are listed in the following table apply to all Dell EMC PowerVault models. For rules applying to specific Dell EMC PowerVault ME4 models, see Dell EMC PowerVault ME4 Series Storage System Rules for Non-dense, 2U Models Only (Dell EMC PowerVault ME4012 and ME4024) and Dell EMC PowerVault ME4 Series Storage System rules for dense, 5U models only (Dell EMC PowerVault ME4084).

(i) NOTE: The Dell EMC PowerVault ME4084 platform is supported in dual-controller module configurations only.

Table 2. Dell EMC PowerVault ME4 Series Storage System Rules for All Models

Rule	SAS	10GBase-T iSCSI	CNC
Maximum number of host servers a single storage system can connect to with one RAID controller module installed	4	256	256
Maximum number of host servers a single storage system can connect to with two RAID controller modules installed	8 (4, if using high availability or redundancy)	256	256
Maximum number of Dell 12 Gbps SAS HBA cards supported in a single host server attached to single system (Dell recommends that you use two Dell 12 Gb SAS HBA cards for all redundant cabling configurations)	2 (each card has two ports)	NZA	N/A
Unused ports on a Dell EMC 12 Gbps SAS HBA card already connected to a Dell EMC PowerVault ME4 SAS storage system cannot connect to another device (such as a tape drive or other model storage system)	~	N/A	N/A
Maximum number of Dell EMC PowerVault ME4 Series storage system 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	~	~	~
On Linux systems, Device Mapper multipath is required for multipath support	~	~	~
Coexistence of several Linux multi-path drivers is not supported. When using a Dell EMC PowerVault ME4 series storage system with Linux host servers, only the Linux Device Mapper failover driver is supported	~	~	~
Virtual disks on Dell EMC PowerVault ME4 Series storage system cannot be used for booting	~	~	~
Disk Groups can be migrated between a Dell EMC PowerVault ME4 Series storage systems by following the appropriate disk pool migration procedure	~	~	~
Maximum SSD cache size allowed is two SSDs	~	~	~
All iSCSI host ports on a controller must have the same port speed	N/A	~	~
Maximum 12 Gbps SAS cable length supported is 4 m	~	~	~

Table 2. Dell EMC PowerVault ME4 Series Storage System Rules for All Models (continued)

Rule	SAS	10GBase-T iSCSI	CNC
iSCSI network rules:	N/A	\checkmark	~
• If the iSCSI initiators are connected to Dell EMC PowerVault ME4 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			
 If you do not enable the flow control, your iSCSI storage storage may experience 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 storage systems and turn on the "PortFast" mode of the spanning tree protocol (STP) on the switch ports connected to the iSCSI 			
 Note that 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	~	~
The FC can connect at either or 8 Gbps and 16 Gbps, however 16 Gbps is recommended	N/A	N/A	~
The 10GBaseT iSCSI controller module can auto-negotiate to 1 Gbps. The CNC requires a 10 Gbps connection	N/A	~	~
Remote replication is not supported when the replication connection is directly connected. It must be in a switch topology	N/A	~	~
Replication within iSCSI topology between ME4 series storage systems is supported regardless of connection speed. Replication between iSCSI and FC topology is not supported	N/A	~	N/A
Replication within FC topology between ME4 storage systems is supported regardless of connection speed. Replication between iSCSI and FC topology is not supported	N/A	N/A	~
Online Physical Disk Firmware Upgrade is not supported and might cause hosts to lose connectivity with the storage system.	~	\checkmark	~
When using physical disks of 6 TB or larger capacity, it is recommended to use either a RAID 6 Disk Group or an ADAPT Disk Pool. 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		~	~
Data Assurance capable drives are supported in the storage system, however the Data Assurance feature is not available for these storage systems	~	\checkmark	~
To create an NRAID, RAID-0, or RAID-3 (linear-only) disk group, you must use the CLI. For more information see the <i>Dell EMC PowerVault ME4 Series Storage System CLI</i> <i>Guide</i> .	~	~	~
Disk groups and pools	~	\checkmark	~
 Maximum virtual pools per controller module = 1 Maximum usable virtual pool size per controller module = 512 TiB with the large pools feature disabled in the CLI and 1 PB with the large pools feature enabled in the CLI NOTE: Active snapshots and replications use a substantial amount of the reserved space and undesired effects might occur if the reserved space is 			

Table 2. Dell EMC PowerVault ME4 Series Storage System Rules for All Models (continued)

Rule	SAS	10GBase-T iSCSI	CNC
 completely consumed. Use the CLI command show snapshot-space to monitor space usage. Maximum disk-group size = Unlimited (non-ADAPT); 1PB (ADAPT) Maximum disk groups per pool = 16 Maximum virtual disk groups per controller module = 16 Maximum linear disk groups per controller module = 32 Maximum dedicated spares per linear disk group = 4 Maximum global spares per system = 64 Maximum ADAPT groups per controller module = 4 Maximum ADAPT single disk size = 64TiB ADAPT stripe width = 8+2 			
 Minimum/maximum disks per virtual disk group: NRAID (non-RAID):1/1 (read cache only) RAID 0: 2/2 (read cache only) RAID 1: 2/2 RAID 3 Not supported RAID 5: 3/16 RAID 6: 4/16 RAID 10: 4/16 RAID 10: 4/16 RAID 50: Not supported ADAPT: 12/128 	~	~	~
Minimum/maximum disks per linear disk group: • NRAID (non-RAID):1/1 • RAID 0: 2/16 • RAID 1: 2/2 • RAID 3: 3/16 • RAID 5: 3/16 • RAID 6: 4/16 • RAID 10: 4/16 • RAID 10: 4/16 • RAID 50: 6/32 • ADAPT: 12/128	~	~	~
 Volumes, Initiators, hosts, and mapping: Maximum virtual volumes per system = 1024 Maximum linear volumes per system = 512 (recommended) Maximum volume size - 128 TiB (approximately 140 TB) Maximum mappable volumes (LUNs) per disk group = 128 Maximum mappable virtual volumes (LUNs) per pool = 512 Maximum mappable linear volumes (LUNs) per pool = 128 Maximum mappable volumes (LUNs) per controller module = 512 Maximum virtual volumes per pool = 1024 (512 base volumes and 512 snapshots) (i) NOTE: Active snapshots and replications use a substantial amount of the reserved space and undesired effects might occur if the reserved space is completely consumed. Use the CLI command show snapshot-space to monitor space usage. Maximum linear volumes per pool = 1024 Maximum virtual volumes per volume group = 1024 Maximum virtual volumes per pool = 1024 (Microsoft Windows limits access to 256) Maximum initiators per host port = 1024 	~	~	~

Table 2. Dell EMC PowerVault ME4 Series Storage System Rules for All Models (continued)

Rule	SAS	10GBase-T iSCSI	CNC
 Maximum initiators per controller module = 4096 Maximum initiators per host = 128 Maximum hosts per host group = 256 Maximum host groups per system = 32 Maximum commands per LUN (preferred path = 4096 Maximum queue depth per host port = 1024 			
 Supported FC/iSCSI module host-port configurations per controller module: 4 ports FC 4 ports iSCSI 2 ports FC and 2 port iSCSI 	N/A	N/A	~
 Virtual volume snapshots: Maximum snapshots per pool = 512 Maximum base volumes per system = 1024 Maximum base snapshots per snappable volume 254 in the volume snapshot tree with a license and the large pools feature disabled in the CLI 8 in the volume snapshot tree with the large pools feature enabled in the CLI 8 in the volume snapshots per system = 1024 NOTE: Active snapshots and replications use a substantial amount of the reserved space and undesired effects might occur if the reserved space is completely consumed. Use the CLI command show snapshot-space to monitor space usage. 	~	~	~
 Virtual volume replication: Maximum number of peer connections per system = 4 Maximum number of replicated volumes per system = 32 Maximum number of replicated sets for a volume = 1 Maximum number of volumes for a replicated volume group = 16, if no other volumes belong to a replication set Minimum replication frequency that can be scheduled = 1 	N/A	~	~
Maximum SCSI reservations Per controller module = 1024 Per LUN = 1 	~	~	~
 Maximum SCSI registrations for virtual storage Per system: 32768 Per LUN: 4096 	~	~	~
 Maximum SCSI registrations for linear storage Per system: 32768 Per FC LUN: 128 Per iSCSI LUN: 85-128 depending on IQN length Per SAS LUN: 128 	~	~	~
 Presenting the same volume (LUN) through FC AND iSCSI to one or more hosts or host groups is not supported. 	N/A	N/A	~

Table 3. Dell EMC PowerVault ME4 Series Storage System Rules for Non-dense, 2U Models Only (Dell EMC PowerVault ME4012 and ME4024)

Rule		10GBaseT iSCSI	CNC
System maximum is up to 4 PB or 336 disk drives, whichever comes first. For example:	~	~	~
 336 disk drives x 12 TB = 4 PB 252 disk drives x 16 TB = 4 PB 			
Up to nine additional ME412/ME424 expansion enclosures or three ME484 expansion enclosures. A combination of ME412/ME424 and ME484 expansion enclosures is not supported.	~	~	~
 2U12 storage system + nine 2U12 expansion enclosures = 120 disk drives 2U12 storage system + nine 2U24 expansion enclosures = 228 disk drives 2U12 storage system + three 5U84 expansion enclosures = 264 disk drives 2U24 storage system + nine 2U12 expansion enclosures = 132 disk drives 2U24 storage system + nine 2U24 expansion enclosures = 240 disk drives 2U24 storage system + three 5U84 expansion enclosures = 276 disk drives 			
Embedded SMI-S provider:	~	~	~
 Maximum mapping paths (where a path is a volume that is presented through a host port to an initiator) = 250 SMI-S is not supported for a system with 5U84 enclosures 			
 Presenting the same volume (LUN) through FC AND iSCSI to one or more hosts or host groups is not supported. 	N/A	N/A	~

Table 4. Dell EMC PowerVault ME4 Series Storage System rules for dense, 5U models only (Dell EMC PowerVault ME4084)

Rule	SAS	10GBaseT iSCSI	CNC
System maximum is up to 4 PB or 336 disk drives, whichever comes first. For example:	~	~	~
 336 disk drives x 12 TB = 4 PB 252 disk drives x 16 TB = 4 PB 			
Support for up to three ME484 additional expansion enclosures:	~	~	~
• 5U84 storage systems + three 5U84 expansion enclosures = 336 disk drives			
Disk drive blanks are not required for empty drive slots	~	~	~
Minimum number of disks in an enclosure is 28	~	~	~
• The number of rows must not differ by more than 1 between the top and bottom drawers.			
 The rows should be populated from front to rear of drawer 			
SMI-S is not supported for a system with 5U84 expansion enclosures	~	~	~

Default IPv4 Settings for management ports

(i) **NOTE:** No default gateway is set.

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

Table 5. Default IPv4 Management Port Addresses

Controller/Port	IPv4 Address	Subnet Mask
Controller 0	10.0.0.2	255.255.255.0
Controller 1	10.0.0.3	255.255.255.0

Default IPv4 settings for iSCSI ports

By default, the iSCSI ports on the storage system are set to 0.0.0.0 static IP address.

Supported RAID controller firmware

() NOTE:

- Dell EMC recommends gathering support information before performing any firmware update.
- Only drivers and firmware released by Dell are supported. For the latest driver and firmware releases, see the Drivers & Downloads section at www.dell.com/support.

Table 6. Latest RAID controller firmware version

Software	Version
RAID controller firmware	GT280R008-01

Supported 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
Citrix XenServer	Citrix	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

(i) NOTE: For more information about OS support, see Supported operating systems.

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 Dell EMC PowerVault ME4 Series storage. Initiator support is provided by the initiator or operating system vendor.

Dell EMC PowerVault does not support Converged Network Adapters (CNA) in Converged mode. Although Dell EMC PowerVault does not endorse or support initiators directly, this support matrix provides some useful configuration information for common initiators.

Dell EMC PowerVault ME4 Series Storage Systems 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 EMC is not responsible for any errors in this information.

CAUTION: Hardware initiators are not supported by Dell EMC PowerVault ME4 Series Storage Systems.

Read the initiator documentation and Release Notes from the particular vendors, and the *Dell EMC PowerVault ME4 Series Storage System Release Notes* for up-to-date configuration recommendations.

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Supported Fibre Channel and iSCSI SFP+ transceivers

This following table lists the Fibre Channel and iSCSI transceivers that have been tested for use with Dell EMC PowerVault ME4 Series Storage Systems:

Table 8. Supported Fibre Channel and iSCSI SFP+ transceivers

Description	Manufacturer Part Number	Dell Part Number
16 Gb SFP+ short-wavelength transceiver (FC)	FTLF8529P3BCVA	TDTCP
16 Gb SFP+ short-wavelength transceiver (FC)	FTLF8529P4BCV-D2	NKX77
16 Gb SFP+ short-wavelength transceiver (FC)	AFBR-57F5MZ-FT2	NKX77
10GBASE-SR 850 nm SFP+ short-range transceiver (iSCSI)	FTLX8574D3BCL-DL	C5RNH
10GBASE-SR 850 nm SFP+ short-range transceiver (iSCSI)	AFBR-709SMZ-FT2	C5RNH

Supported SAS and Twinax direct-attach cables

The following tables list the SAS and Twinax direct-attach cables that have been tested for use with Dell EMC PowerVault ME4 Series Storage Systems:

Table 9. Supported 12 Gbps SAS cables

Vendor	Model	Dell Part Number
Dell	12 Gb HD-Mini to HD-Mini SAS Cable, 0.5 M	WTCFX
Dell	12 Gb HD-Mini to HD-Mini SAS Cable, 2 M	GYK61
Dell	12 Gb HD-Mini to HD-Mini SAS Cable, 4 M	85W3R

CAUTION: ME4 Series storage systems only support passive Twinax direct-attach cables. ME4 Series storage systems do not support active Twinax direct-attach cables.

Table 10. Supported Passive Twinax direct-attach cables

Vendor	Model	Dell Part Number
Dell	Dell Networking, Cable, SFP+ to SFP+, 10 GbE, Copper Twinax Direct Attach Cable, 0.5 M	C6Y7M
Dell	Dell Networking, Cable, SFP+ to SFP+, 10 GbE, Copper Twinax Direct Attach Cable, 1 M	V250M
Dell	Dell Networking, Cable, SFP+ to SFP+, 10 GbE, Copper Twinax Direct Attach Cable, 3 M	53HVN
Dell	Dell Networking, Cable, SFP+ to SFP+, 10 GbE, Copper Twinax Direct Attach Cable, 5 M	358VV

Supported physical disk drives

Dell EMC PowerVault ME4 Series Storage Systems support the physical disk drives listed in the following table:

CAUTION: ME4 Series Storage Systems only support physical disk drives with the Dell part numbers that are listed in Supported physical disk drives on page 18. Physical disk drives purchased from Dell with part numbers that are not listed in the table are not supported. To access the latest available physical disk drive firmware, search for the disk drive model and firmware version on www.dell.com/support.

Table 11. Supported physical disk drives

Dell Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
R1ND2	2.5"	MZILT960HAHQ0D3	960 GB	SSD	Samsung	No	DSF8
FOVFY	2.5"	MZILT1T9HAJQ0D3	1.92 TB	SSD	Samsung	No	DSF8
K74WN	2.5"	MZILT960HBHQ0D3	960 GB	SSD	Samsung	No	DSA3
TMTW9	2.5"	MZILT1T9HBJR0D3	1.92 TB	SSD	Samsung	No	DSA3
43PCJ	2.5"	PX05SVB048Y	480 GB	SSD	Toshiba	No	AS10
N5PK6	2.5"	PX05SVB048Y	480 GB	SSD	Toshiba	No	AS10
MWGK7	2.5"	PX05SRB096Y	960 GB	SSD	Toshiba	No	AS10
24YF3	2.5"	PX05SRB096Y	960 GB	SSD	Toshiba	No	AS10
OFYFW	2.5"	PX05SRB192Y	1.92 TB	SSD	Toshiba	No	AS10
HDGG4	2.5"	PX05SRB192Y	1.92 TB	SSD	Toshiba	No	AS10
1N61H	2.5"	PX05SVQ192B	1.92 TB	SSD	Toshiba	Yes	AX0B
6K9P2	2.5"	PX05SVQ192B	1.92 TB	SSD	Toshiba	Yes	AX0B
3PR5C	2.5"	KPM5XVUG480G	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
DJY51	2.5"	KPM5WVUG1T92	1.92 TB	SSD	Toshiba	Yes	B318
XTH17	2.5"	ST900MP0026	900 GB	15K	Seagate	No	КТ39
N9WXC	2.5"	ST900MP0126	900 GB	15K	Seagate	Yes	KSC8
G2G54	2.5"	ST1200MM0099	1.2 TB	10K	Seagate	No	ST33
JY57X	2.5"	DL1800MM0159	1.8 TB	10K	Seagate	No	ST58
RWR8F	2.5"	DL2400MM0159	2.4 TB	10K	Seagate	No	ST58
8YWH3	2.5"	ST2400MM0149	2.4 TB	10K	Seagate	Yes	SSE8
TMVN7	2.5"	ST2000NX0463	2 TB	7.2K	Seagate	No	NT32
Y6W8N	2.5"	ST2000NX0453	2 TB	7.2K	Seagate	Yes	NSF2
YKTOW	2.5"	AL14SXB90ENY	900 GB	15K	Toshiba	No	EE07
01M0D	2.5"	AL15SEB120NY	1.2 TB	10K	Toshiba	No	EF06

Dell Part Number	Form Factor	Model	Capacity	Speed	Vendor	SED	Firmware
OWRRF	2.5"	AL15SEB18EQY	1.8 TB	10K	Toshiba	No	EF06
F9NWJ	2.5"	AL15SEB24EQY	2.4 TB	10K	Toshiba	No	EF06
NT1X2	3.5"	HUS726T4TALS200	4 TB	7.2K	HGST	No	PU05
44YFV	3.5"	HUS728T8TAL5200	8 TB	7.2K	HGST	No	RS05
07FPR	3.5"	HUH721010AL5200	10 TB	7.2K	HGST	No	LS17
9HXK6	3.5"	HUH721212AL5200	12 TB	7.2K	HGST	No	NS07
OJHTD	3.5"	HUH721212AL5205	12 TB	7.2K	HGST	Yes	NM07
5JH5X	3.5"	ST4000NM0295	4 TB	7.2K	Seagate	No	DT34
W5M2R	3.5"	ST4000NM0295	4 TB	7.2K	Seagate	No	DT34
M40TH	3.5"	ST8000NM0185	8 TB	7.2K	Seagate	No	PT54
VFP4M	3.5"	ST8000NM0185	8 TB	7.2K	Seagate	No	PT54
0N660	3.5"	ST4000NM017A	4 TB	7.2K	Seagate	No	CSL9
KRM6X	3.5"	ST8000NM014A	8 TB	7.2K	Seagate	No	CSJ7
YF87J	3.5"	ST10000NM0256	10 TB	7.2K	Seagate	No	TT56
HV5CH	3.5"	ST10000NM0598	10 TB	7.2K	Seagate	No	RSL3
RJT6H	3.5"	ST10000NM011G	10 TB	7.2K	Seagate	No	ESL3
YMN53	3.5"	ST12000NM0158	12 TB	7.2K	Seagate	No	RSL3
7KT9W	3.5"	ST12000NM009G	12 TB	7.2K	Seagate	No	ESL3
CNXPV	3.5"	ST16000NM010G	16 TB	7.2K	Seagate	No	ESL3
1MVTT	3.5"	MG04SCA40ENY	4 TB	7.2K	Toshiba	No	EG03
FV725	3.5"	MG06SCA800EY	8 TB	7.2K	Toshiba	No	EHOA
24HF9	3.5"	MG08SCA16TEY	16 TB	7.2K	Toshiba	No	EJ06

Table 11. Supported physical disk drives (continued)

(i) NOTE: ME4 Series Storage Systems do not support 4Kn sector size disk drives.

(i) NOTE: To use self-encrypting drive (SED) functionality, all the disk drives in the storage system must be SEDs.

Supported expansion enclosures

Dell EMC PowerVault ME4 Series Storage Systems can support a maximum of 336 physical disk drive slots depending on the base system and the additional expansion enclosures.

Dell EMC PowerVault ME4012 and ME4024 models support up to nine additional ME412/ME424 expansion enclosures or three ME484 expansion enclosures. A combination of ME412/ME424 and ME484 expansion enclosures is not supported.

Dell EMC PowerVault ME4084 dense systems support up to three ME484 expansion enclosures.

Table 12. Non-Dense (2U) Supported Expansion Enclosures

Enclosure Model	Minimum Firmware Version		
ME412	526E		
ME424	526E		

Table 13. Dense (5U) Supported Expansion Enclosures

Enclosure Model	Minimum Firmware Version		
ME484	526E		

(i) NOTE: Expansion enclosures are not supported on single-controller module storage systems.

Supported management software

The Dell EMC PowerVault M4E Series software is built into the storage system and is accessible by using a web interface through the Management Ethernet port.

The Dell EMC PowerVault ME4 Series management software details are shown in the following tables:

Software component	Minimum Firmware Version	Notes
Microsoft Internet Explorer	10 or 11	 Set the local-intranet security option in the browser to medium or medium-low Add the management network IP address of each controller as a trusted site Ensure that security is set to use TLS 1.2
Google Chrome	57.x.x.x (64-bit) or later	
Mozilla Firefox	57.x.x (64-bit) or later	
Apple Safari	10.1 or later	

i NOTE: Microsoft Edge is not supported.

Table 15. Supported version of the VMware vCenter Plug-in

vCenter Plug-in version	VMware version supported	Notes
1.1.0.10	 VMware vSphere 6.5, 6.7, and 7.0 vCenter Server 6.7U2 	Linux support only

Table 16. Supported version of the Storage Replication Adapter (SRA)

SRA version	VMware version supported	Notes
8.1.1.36	 VMware vSphere 6.5, 6.7, and 7.0 vCenter Server 6.7U2 Site Recovery Manager (SRM) 6.5, 8.1, 8.2 	FC and iSCSI support only.

Supported operating systems

Where clustering is supported by the operating system, it is also supported on Dell EMC PowerVault ME4 Series Storage Systems, subject to the following limitations:

Windows Server 2012 R2 through Windows Server 2019

- Maximum iSCSI hosts is 64
- Maximum SAS hosts is 4
- Maximum FC hosts is 64

Table 17. Dell EMC PowerVault ME4 Series Operating System Support

Operating System	SAS host server	Fibre Channel host server	iSCSI host server	Notes & required hotfixes
Windows Server 2019*	<u>.</u>	•		-
Standard server (core and desktop experience)	*	~	~	The Microsoft MPIO feature needs to be installed prior to connecting to ME4 Series Storage Systems.
				BitLocker Drive Encryption is not supported.
Datacenter server (core and desktop experience)	~	~	V	The Microsoft MPIO feature needs to be installed prior to connecting to ME4 Series Storage Systems.
				BitLocker Drive Encryption is not supported.
Windows Server 2016*		·		
Standard server (core and desktop experience)	~	~	~	The Microsoft MPIO feature needs to be installed prior to connecting to ME4 Series Storage Systems.
				BitLocker Drive Encryption is not supported.
Datacenter server (core and desktop experience)	~	~	~	The Microsoft MPIO feature needs to be installed prior to connecting to ME4 Series Storage Systems.
				BitLocker Drive Encryption is not supported.
Windows Server 2012 R2 (U1)*		•	•	
Standard server and core	~	~	~	The Microsoft MPIO feature needs to be installed prior to connecting to ME4 Series Storage Systems.
				BitLocker Drive Encryption is not supported.
Datacenter server and core	~	~	~	The Microsoft MPIO feature needs to be installed prior to

Table 17. Dell EMC PowerVault ME4 Series Operating System Support (continued)

Operating System	SAS host server	Fibre Channel host server	iSCSI host server	Notes & required hotfixes
				connecting to ME4 Series Storage Systems. BitLocker Drive Encryption is not supported.
Foundation server and core	~	~	~	The Microsoft MPIO feature needs to be installed prior to connecting to ME4 Series Storage Systems.
Red Hat Enterprise Linux (RHEL)				
Red Hat Enterprise Linux 8.0 (x64 only)	~	~	~	 Basic Server install (Minimum) Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 7.6 (x64 only)	~	~	~	 Basic Server install (Minimum) Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 7.5 (x64 only)	~	~	V	 Basic Server install (Minimum) Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 7.4 (x64 only)	~	~	~	 Basic Server install (Minimum) Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 6.9 (x64 only)	~	~	~	 Basic Server install (Minimum) Device Mapper multipath is required for multipath support.
SUSE Linux Enterprise Server (SL	ES)	·	•	
SUSE Linux Enterprise Server 15.0 (x64 only)	~	~	~	 Basic Server install (Minimum) Device Mapper multipath is required for multipath support
SUSE Linux Enterprise Server 12.3 (x64 only)	~	~	~	 Basic Server install (Minimum) Device Mapper multipath is required for multipath support
Virtualization Hosts / Hypervisors				

Table 17.	Dell EMC	PowerVault	ME4 Series	Operating	System	Support	(continued)
		i ower vaure	WE - Cerres	operating	Oystem	oupport	(continueu)

Operating System	SAS host server	Fibre Channel host server	iSCSI host server	Notes & required hotfixes
Citrix XenServer 7.6	~	~	~	Dynamic multipathing support is available for Fibre Channel and iSCSI hosts
Citrix XenServer 7.5	~	~	~	Dynamic multipathing support is available for Fibre Channel and iSCSI hosts
Citrix XenServer 7.1 CU2	~	~	~	Dynamic multipathing support is available for Fibre Channel and iSCSI hosts
VMware vSphere 7.0	~	~	~	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR
VMware vSphere 6.7 U3	~	~	~	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR
VMware vSphere 6.7 U2	~	~	~	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR
VMware vSphere 6.7 U1	~	~	~	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR
VMware vSphere 6.7	~	~	~	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR
VMware vSphere 6.5 U1	~	~	~	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR
VMware vSphere 6.5	~	~	~	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR

(i) NOTE: Core editions of Windows server can only manage ME4 Series Storage Systems using the CLI client.

Operating systems with ALUA support

ALUA is supported natively on the following operating systems:

(i) NOTE: Configuration steps are not required to enable ALUA on these operating systems.

- Microsoft Windows Server 2019
- Microsoft Windows Server 2016
- Microsoft Windows Server 2012 R2
- Citrix XenServer 7.1 CU2 or later
- Red Hat Enterprise Linux 7.4 or later
- Red Hat Enterprise Linux 6.9 or later
- SUSE Linux Enterprise Server 12.3 or later
- VMware vSphere 7.0
- VMware vSphere 6.7
- VMware vSphere 6.5

NOTE: For more information about the ALUA configuration, see the *Dell EMC PowerVault ME4 Series Storage System Administrator's Guide* available at www.dell.com/support.

Supported device mapper software

Table 18. Supported device mapper software

Operating System	Component	Supported Version
SUSE Linux Enterprise Server 15.0 or later	Native	Native
SUSE Linux Enterprise Server 12.3 or later	Native	Native
Red Hat Enterprise Linux 7.5 or later	Native	Native
Red Hat Enterprise Linux 7.4 or later	Native	Native
Red Hat Enterprise Linux 6.9 or later	Native	Native

Supported SAS host bus adapters

To download the latest supported version of the 12Gbps SAS HBA firmware and drivers for your specific server hardware platform, go to www.dell.com/support.

() NOTE:

- The Dell 12 Gbps SAS HBA is compatible only on the Dell PowerEdge 13th,14th, and 15th generation servers that have a PCI Express (PCIe) x8 slot.
- This matrix lists HBAs that have been tested for use within the Dell EMC PowerVault ME4 Series Storage System family
 environment. It is not implied that all of these HBAs and their driver/firmware stacks are supported by any or all server
 vendors. You must ensure that the HBA and its associated drivers are included on the vendor's hardware compatibility
 list. This recommendation also applies to Dell EMC PowerEdge server products. Inclusion in this document's HBA
 compatibility tables should not be interpreted as that HBA and driver/firmware combination as being supported by any
 vendor for use with their server products.

Table 19. Supported 12Gbps SAS HBAs

Vendor	Model	Dell Part Number
Dell	12 Gbps SAS HBA	2PHG9 (Full Height) T93GD (Low profile)

Supported Fibre Channel host bus adapters

The following table lists the HBAs that have been tested for use within Dell EMC PowerVault ME4 Series Storage Systems:

() NOTE: This table does not imply that all of the HBAs and their driver/firmware stacks are supported by any or all server vendors. You must ensure that the HBA and its associated drivers are included on the hardware compatibility list of the vendor. This recommendation also applies to Dell EMC PowerEdge server products. Inclusion in this HBA compatibility tables should not be interpreted as that the HBA and driver/firmware combination as being supported by any vendor for use with their server products.

Host bus adapter name	Direct-attach configuration	Fabric configuration	Dell Part Number	Available From	
QLogic					
QLE2660v2	~	\checkmark	H28RN (full height)	Dell	
			4MNKF (low-profile)		
QLE2662v2	\checkmark	\checkmark	H8T43 (full height)	Dell	
			3PCN3 (low-profile)		
QLE2690	~	1	P8PCK (full height)	Dell	
		100	P3T0T (low-profile)		
QLE2692	~	1	CK9H1 (full height)	Dell	
		100	WVT0T (low-profile)		
QLE2670	\checkmark	~	N/A	https://driverdownloads.qlogic.com/	
QLE2672	~	~	N/A	https://driverdownloads.qlogic.com/	
QLE2560	~	~	N/A	https://driverdownloads.qlogic.com/	
QLE2562	~	~	N/A	https://driverdownloads.qlogic.com/	
Emulex	·	•	_	·	
LPe16000v3	~	\checkmark	61M2K (full height)	Dell	
			11H8D (low-profile)		
LPe16002v3	~	~	F3VJ6 (full height)	Dell	
			6VK2R (low-profile)		
LPe31000	\checkmark	\checkmark	3T3T7 (full height)	Dell	
			6CWM6 (low-profile)		
LPe31002	\checkmark	\checkmark	RXNT1 (full height)	Dell	
			VGJ12 (low-profile)		
LPe12000	~	~	N/A	https://www.broadcom.com/support/ emulex	

Table 20. Dell EMC PowerVault ME4 Series Fibre Channel HBAs

Host bus adapter name	Direct-attach configuration	Fabric configuration	Dell Part Number	Available From
LPe12002	\checkmark	\checkmark	N/A	https://www.broadcom.com/support/ emulex

Table 20. Dell EMC PowerVault ME4 Series Fibre Channel HBAs (continued)

Supported Fibre Channel and iSCSI directattach configuration operating systems

The storage system supports Fibre Channel and iSCSI direct-attached configurations on the following operating systems:

- Microsoft Windows Server 2019
- Microsoft Windows Server 2016
- Microsoft Windows Server 2012 R2
- Citrix XenServer 7.1 CU2 or later
- Red Hat Enterprise Linux 7.4 or later
- Red Hat Enterprise Linux 6.9 or later
- SUSE Linux Enterprise Server 12.3 or later
- VMware vSphere 7.0
- VMware vSphere 6.7
- VMware vSphere 6.5

NOTE: Direct-attach configurations are supported by Hyper-V if it is installed as an application on Windows Server 2019. Direct-attach configurations are not supported by Hyper-V Server 2019.

Dell EMC Storage Support Policy

Level 1: Full Contractual Support

For tested devices listed in this Support Matrix, (and for the specific version listed), Dell EMC will provide solution support, under an active support contract assuming that all other components in the storage solution are also under contracted support with their respective manufacturers and that documented recommended design best practices are followed.

Level 2: Conditional Support

In addition to the product versions tested by Dell EMC and listed in this Support Matrix, the compatibility of comparable hardware models and newer firmware versions can be projected based upon the results for the systems actually tested and will be designated as "conditionally supported".

Dell EMC will provide full contractual support for the storage solution under an active support contract, assuming that all components in the storage solution are also under contracted support with their respective manufacturers and that documented recommended design best practices are followed.

Resolution of functional and/or performance issues may be out of Dell EMC's control. In such cases, these issues will need to be addressed by the applicable device or software/firmware vendor. Dell EMC may require, in its sole discretion, as a condition of continuing support, that the customer replace the component with one that was tested and/or upgrade/downgrade to a supported software version.

Examples of Conditional Support situations include, but are not limited to:

- If a switch or server adapter shares the same underlying ASIC or chipset and is from the same vendor as a tested configuration, then it may produce similar results.
- If a component is an identical model of a component listed, but differs in firmware version, then it may produce similar results for any firmware and/or drivers that are newer than those listed. For example, if version X of firmware has been tested and is listed as compatible, then versions newer than version X are expected to continue to work.

Failure of a "**conditionally supported**" component to provide the same service level as the similar device listed, unless Dell EMC has communicated end of support or a specific incompatibility for a particular product, firmware or software version, would be treated as a bug that needs to be fixed by the device or software/firmware vendor.

Level 3: Commercially Reasonable Effort

For components not listed within this Support Matrix, OR where customer has not, or is not willing to apply accepted Dell EMC recommended best practices for the specific storage family's SAN design and implementation, as long as the customer has an active support contract with the appropriate vendor(s), and an active support contract, Dell EMC will provide storage solution support for any untested component of the configuration, until such time as it is determined, in Dell EMC's sole discretion, that a problem lies within the untested component(s) or the way they interoperate with Dell EMC.

Once an untested component has been determined to be the source of the issue, Dell EMC will only provide support for the storage solution on a Commercially Reasonable Effort (CRE) basis. CRE support may be limited to certain days of the week and during normal business hours only.

Dell EMC does not guarantee that issues undertaken on a CRE basis will be resolved in a timely fashion, or at all. There is a possibility that the customer would need to replace an untested component or take the affected system out of production to resolve the issues.