Dell PowerVault ME5 Series Storage System

Support Matrix

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DELL Technologies

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.

Contents

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Introduction

This document provides information about supported software and hardware for Dell PowerVault ME5012, ME5024, and ME5084 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 Dell support.

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Supported data protocols

This section lists the supported data protocols for ME5 Series storage systems.

NOTE: ME5 Series storage systems do not support changing or converting from one data protocol to another data protocol.

Table 1. ME5 Series storage systems and supported data protocols

ME5 Series storage system	Data protocol and drives
ME5012 (12G SAS)	12 Gbps direct attached SAS storage system with 12 drives (3.5 inch)
ME5024 (12G SAS)	12 Gbps direct attached SAS storage system with 24 drives (2.5 inch)
ME5084 (12G SAS)	12 Gbps direct attached SAS storage system with 84 drives (3.5 inch)
ME5012 10/1G Base-T (RJ45)	10/1 Gbps iSCSI network storage system with 12 drives (3.5 inch)
ME5024 10/1G Base-T (RJ45)	10/1 Gbps iSCSI network storage system with 24 drives (2.5 inch)
ME5084 10/1G Base-T (RJ45)	10/1 Gbps iSCSI network storage system with 84 drives (3.5 inch)
ME5012 (32/16G FC with transceivers)	32/16 Gbps Fibre Channel (FC) network storage system with 12 drives (3.5 inch)
ME5024 (32/16G FC with transceivers)	32/16 Gbps Fibre Channel (FC) network storage system with 24 drives (2.5 inch)
ME5084 (32/16G FC with transceivers)	32/16 Gbps Fibre Channel (FC) network storage system with 84 drives (3.5 inch)
ME5012 (25/10G iSCSI SFP+)	25 Gbps iSCSI network storage system with 12 drives (3.5 inch)
ME5024 (25/10G iSCSI SFP+)	25 Gbps iSCSI network storage system with 24 drives (3.5 inch)
ME5084 (25/10G iSCSI SFP+)	25 Gbps iSCSI network storage system with 84 drives (3.5 inch)

NOTE:

- ME5012 and ME5024 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.
- ME5084 storage systems support up to three ME484 expansion enclosures.
- ME5 Series storage systems do not support controller upgrades from ME4 Series storage systems.
- ME5 Series storage systems do not support drives that have already been deployed either internally on an ME4 Series base system or on an expansion enclosure that has been used on an ME4 Series storage system. Deploying a drive on a system writes metadata to the drive that is not compatible between ME Series storage systems.

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ME5 Series storage system rules

This section contains both general and model-specific connectivity and consideration rules for ME5 Series storage systems. The rules that are listed in the following table apply to all ME5 Series storage system models. Subsequent tablescontain rules specific to ME5012, ME5024, and ME5084.

Table 2. Rules for all ME5 Series storage systems

Rule	SAS	iSCSI	FC
Deploying a drive on a system writes metadata to the drive that is not compatible between ME Series storage systems. For this reason, ME5 Series storage systems do not support drives that have already been deployed. This applies to either internally on an ME4 Series base system or on an expansion enclosure that has been used on an ME4 Series storage system. The reverse is also true: a drive that has been deployed on an ME5 Series storage system (internally or on an expansion) cannot be used in an ME4 Series system.	✓	✓	✓
ME5 Series storage systems do not support controller upgrades from ME4 Series storage systems.	✓	✓	✓
Maximum number of host servers that a single storage system can connect to with one RAID controller module installed .	4	256	256
Maximum number of host servers that 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 SAS HBA cards that are supported in a single host server that is attached to single storage system. Dell recommends that you use two SAS HBA cards for all redundant cabling configurations.	2	N/A	N/A
Unused ports on a SAS HBA card already connected to an ME5 Series SAS storage system cannot connect to another device. This includes tape drive or other model storage system.	✓	N/A	N/A
Maximum number ME5 Series storage system to which a host server can connect.	2 (HA) with Dell 12 Gbps 4 (HA) with HBA355e 4(HA) with HBA465e	4	4
A hot spare for a disk group must be a 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 multipath drivers is not supported. For an ME5 Series storage system with Linux host servers, only the Linux Device Mapper failover driver is supported.	✓	✓	✓
Virtual disks on ME5 Series storage system cannot be used for booting.	✓	✓	✓
Disk Groups can be migrated between ME5 Series storage systems by following the appropriate disk pool migration procedure.	✓	✓	✓
Maximum SSD cache size that is allowed is two SSDs. (You cannot use SSDs that have previously been deployed on an ME4 system.)	✓	✓	✓
All iSCSI host ports on a controller must have the same port speed.	N/A	✓	✓

Table 2. Rules for all ME5 Series storage systems (continued)

Rule	SAS	iSCSI	FC
Maximum 12 Gbps SAS cable length that is supported is 4m.	✓	N/A	N/A
iSCSI network rules: ● If the iSCSI initiators are connected to ME5 Series storage systems through the network switches, ensure that your switches support IEEE 802.3x flow control. Also, ensure 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 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 that are connected to the iSCSI initiators and target storage systems. Dell also recommends turning on the "PortFast" mode of the spanning tree protocol (STP) on the switch ports that are connected to the iSCSI initiators and target system ● 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.	N/A	✓	N/A
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 hos5t NIC must connect to only one iSCSI target port on the storage subsystem	N/A	✓	N/A
The 32/16G FC controllers with transceivers can connect at either 16 Gbps or 32 Gbps, however 32 Gbps is recommended.	N/A	N/A	✓
The 10/1G Base-T (RJ45) iSCSI controller module can auto-negotiate to 1 Gbps.	N/A	✓ (10/1 Gbps)	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 ME5 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 ME5 Series storage systems is supported regardless of connection speed. Replication between iSCSI and FC topology is not supported	N/A	N/A	✓
Online Drive firmware upgrade is not supported and might cause hosts to lose connectivity with the storage system	✓	✓	✓
When using drives that are 6 TB or larger, it is recommended to use either a RAID 6 Disk Group or an ADAPT Disk Group. Due to the increased amount of time that is 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	✓	✓	✓
To create an NRAID, or RAID 0 disk group, you must use the CLI. For more information, see the *Dell PowerVault ME5 Series Storage System CLI Guide*.	✓	✓	✓

Table 2. Rules for all ME5 Series storage systems (continued)

Rule	SAS	iSCSI	FC
Disk groups and pools ● Maximum virtual pools per controller module = 1 ● Maximum usable virtual pool size per controller module = 4PB **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 disk group size = 4 PB (non-ADAPT); 1.5 PB (ADAPT) ● Maximum virtual disk groups per pool = 16 ● Maximum linear disk groups/pools per controller module = 32 ● Maximum dedicated spares per linear disk group = 4 ● Maximum global spares per system = 64 ● Maximum ADAPT disk groups per virtual pool/system = 8 (4 per controller) ● Maximum ADAPT single disk size = 64 TB ● ADAPT stripe width = 8+2 or 16+2	✓	✓	✓
Minimum and 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 5: 3/16 ● RAID 6: 4/16 ● RAID 10: 4/16 ● ADAPT: 12/128	✓	✓	✓
Minimum and maximum disks per linear disk group: ● NRAID (non-RAID):1/1 ● RAID 0: 2/16 ● RAID 1: 2/2 ● RAID 5: 3/16 ● RAID 6: 4/16 ● RAID 10: 4/16 ● ADAPT: 12/128	✓	✓	✓
Volumes, Initiators, hosts, and mapping: ● Maximum virtual volumes per system = 1024 ● Maximum linear volumes per system = 512 (recommended) ● Maximum virtual volume size = 128 TiB (approximately 140 TB) ● Maximum linear volume (LUN) size = 8 ZiB with 512-byte sectors (Only limited by 64-bit addressing) ● 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) **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.	✓	✓	✓

Table 2. Rules for all ME5 Series storage systems (continued)

Rule	SAS	iSCSI	FC
• Maximum linear volumes per pool = 1024 • Maximum virtual volumes per volume group = 1024 • Maximum volume groups per controller module = 256 • Maximum volumes per host port = 1024 (Microsoft Windows limits access to 256) • Maximum initiators per host port = 1024 • 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 module host-port configurations controller module: • 4 ports	✓	✓	✓

Virtual volume snapshots:
• Maximum snapshots per pool = 512
• Maximum base volumes per system = 1024
• Maximum base snapshots per volume
  ○ 254 in the volume snapshot tree
  ○ 8 in the volume snapshot tree
• Maximum mappable 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	✓	✓	✓

Table 3. Rules for ME5012 and ME5024 storage systems

Rule	SAS	iSCSI	FC
System maximum is up to 8 PB or 336 disk drives, whichever comes first. For example: 264 disk drives x 20TB = 5.28 PB	✓	✓	✓

Table 3. Rules for ME5012 and ME5024 storage systems (continued)

Rule	SAS	iSCSI	FC
Up to nine additional ME412/ME424 expansion enclosures or three ME484 expansion enclosures are supported. 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	✓	✓	✓
SMI-S is not supported	✓	✓	✓

Table 4. Rules for ME5084 storage systems

Rule	SAS	iSCSI	FC
System maximum is up to 8 PB or 336 disk drives, whichever comes first. For example: ● 336 disk drives x 12 TB = 4 PB ● 336 disk drives x 16 TB = 5 PB ● 336 disk drives x 18 TB = 6 PB ● 336 disk drives x 20 TB = 6.72 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.	✓	✓	✓

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Default IPv4 Settings for management ports

By default, the management ports on the storage system are set to manual. The following IPv4 settings are used:

Table 5. Default IPv4 Management Port Addresses

Controller or 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
Gateway	10.0.0.1	N/A

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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.

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Supported RAID controller firmware

NOTE:

- Dell Technologies recommends gathering support information before performing any firmware update.
- Only drivers and firmware that are released by Dell are supported. For the latest driver and firmware releases, see the Drivers & Downloads section on Dell Support.

Table 6. Latest RAID controller firmware version

Software	Version
RAID controller firmware	1.2.1.1

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Supported iSCSI software initiators

Table 7. Supported iSCSI Initiators

Operating System	SW Initiator Vendor	SW Initiator Version	Notes
Windows Server operating system	Microsoft	RTM or later	Included with operating system
Citrix XenServer	Citrix	RTM or later	Included with operating system
Red Hat Enterprise Linux	Red Hat	RTM or later	Included with operating system
SUSE Linux Enterprise Server	SUSE	RTM or later	Included with operating system
VMware vSphere	VMware	RTM or later	Included with operating system

NOTE: For more information about operating system support, see Supported operating systems.

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Supported protocol offload (TOE/iSCSI) adapters

Standard Gigabit, 10 Gigabit, and 25-Gigabit Ethernet adapters are supported when used with supported software iSCSI initiators. Hosts must have a standards compliant iSCSI initiator to access ME5 Series storage. The initiator or operating system vendor provides Initiator support. However, ME5 Series storage systems do not support Converged Network Adapters (CNA) in Converged mode.

Dell does not endorse or support initiators directly, but this support matrix does provide some useful configuration information for common initiators. ME5 Series storage systems work with any RFC 3720 iSCSI compliant initiators. The initiator must support all mandatory iSCSI features. This information is subject to change without notice. Dell is not responsible for any errors in this information.

CAUTION: ME5 Series Storage systems do not support Hardware initiators.

Read the initiator documentation and Release Notes from the specific vendors, and the *Dell PowerVault ME5 Series Storage System Release Notes* for up-to-date configuration recommendations.

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Supported Fibre Channel and iSCSI transceivers

This following table lists the Fibre Channel and iSCSI transceivers that have been tested for use with ME5 Series storage systems. Transceivers are not required if you use a direct-attach cable.

NOTE: The speed of the transceiver determines the maximum speed of the protocol.

Table 8. Supported Fibre Channel, iSCSI SFP+, and iSCSI SFP28 transceivers

Description	Manufacturer Part Number	Dell Part Number
16 Gb SFP+ short-wavelength transceiver (FC)	FTLF8529P4BCV-D2	NKX77
16 Gb SFP+ short-wavelength transceiver (FC)	AFBR-57F5MZ-FT2	NKX77
16 Gb SPF+ short-wavelength transceiver (FC	FTLF8529P4BCVFC1	NHPNF
16 Gb SPF+ short-wavelength transceiver (FC)	AFBR-57F5MZ-FT1	NHPNF
32 Gb SFP28 short-wavelength transceiver (FC)	FTLF8532P4BNV-FC	WKX2T
32 Gb SFP28 short-wavelength transceiver (FC)	LTF8508-BE+-DEN1	WKX2T
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
10GBASE-SR 850 nm SFP+ short-range transceiver (iSCSI)	LTF8502-BC+-DEN1	C5RNH
10/25GBASE-SR 850 nm SFP28 short-range transceiver (iSCSI)	FTLF8536P4BNV-FC	M14MK
10/25GBASE-SR 850 nm SFP28 short-range transceiver (iSCSI)	LTF8505-BE+-DEN	M14MK
10/25GBASE-SR 850 nm SFP28 short-range transceiver (iSCSI)	AFBR-735ASMZ-FT2	M14MK
10/25GBASE-SR 850 nm SFP28 short-range transceiver (iSCSI)	XP-85B1-02DE-DE	M14MK

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Supported cables

The following tables list the SAS and direct-attach cables that have been tested for use with ME5 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

If you use a direct-attach cable, a transceiver is not required.

NOTE: The speed of the direct-attach cable determines the maximum speed of the protocol.

Table 10. Supported passive direct-attach cables

Vendor	Model	Dell Part Number
LUXSHARE	Dell Networking Cable, SFP28 to SFP28, 25 GbE, Passive Copper Twinax Direct Attach Cable, 0.5 Meters	58KM3
AMPHENOL LUXSHARE	Dell Networking Cable, SFP28 to SFP28, 25 GbE, Passive Copper Twinax Direct Attach Cable, 1 Meter	2JVDD
LUXSHARE	Dell Networking Cable, SFP28 to SFP28, 25 GbE, Passive Copper Twinax Direct Attach Cable, 1.5 Meters	KVGV7
AMPHENOL LUXSHARE	Dell Networking, Cable, SFP28 to SFP28, 25 GbE, Passive Copper Twinax Direct Attach Cable, 2 Meters	D0R73
LUXSHARE	Dell Networking Cable, SFP28 to SFP28, 25 GbE, Passive Copper Twinax Direct Attach Cable, 2.5 Meters	0DF77
AMPHENOL LUXSHARE	Dell Networking, Cable, SFP28 to SFP28, 25 GbE, Passive Copper Twinax Direct Attach Cable, 3 Meters	VXFJY
AMPHENOL LUXSHARE	Dell Networking, Cable, SFP28 to SFP28, 25 GbE, Passive Copper Twinax Direct Attach Cable, 5 Meters	9X8JP
AMPHENOL LUXSHARE	Dell Networking, Cable, SFP+ to SFP+, 10 GbE, Copper Twinax Direct Attach Cable, 0.5 Meters	C6Y7M
AMPHENOL LUXSHARE	Dell Networking, Cable, SFP+ to SFP+, 10 GbE, Copper Twinax Direct Attach Cable, 1 Meter	V250M
AMPHENOL LUXSHARE	Dell Networking, Cable, SFP+ to SFP+, 10 GbE, Copper Twinax Direct Attach Cable, 3 Meters	53HVN
AMPHENOL LUXSHARE	Dell Networking, Cable, SFP+ to SFP+, 10 GbE, Copper Twinax Direct Attach Cable, 5 Meters	358VV

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Supported hard drives

ME5 Series storage systems support the hard drives that are listed in the following table.

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

NOTE: ME5 Series storage systems do not support 4Kn, SATA, or vSAS drives.

CAUTION: ME5 Series storage systems only support hard drives with the Dell part numbers that are listed in table. Hard drives purchased from Dell with part numbers that are not listed in the table are not supported. To access the latest available hard drive firmware, search for the hard drive model and firmware version on Dell support.

CAUTION: ME5 Series storage systems do not support drives that have already been deployed either internally on an ME4 Series base system or on an expansion enclosure that has been used on an ME4 Series storage system. Deploying a drive on a system writes metadata to the drive that is not compatible between ME Series storage systems.

Table 11. Supported hard drives

Dell part number	Form factor	Model	Capacity	Speed	Sector	Vendor	Firmware	SED
84C40	2.5"	MZILT7T6HALA0D3	7.68TB	SSD	512e	Samsung	DSA4	No
3TCV6	2.5"	MZILT1T6HBJR0D3	1.6TB	SSD	512e	Samsung	DWA4	No
H8DG4	2.5"	MZILG960HCHQAD3	960GB	SSD	512e	Samsung	DSG9	No
NRR34	2.5"	MZILG1T9HCJRAD3	1.92TB	SSD	512e	Samsung	DSG9	No
9N32F	2.5"	MZILG3T8HCLSAD3	3.84TB	SSD	512e	Samsung	DSG9	No
5RJND	2.5"	MZILG1T6HCJRAD3	1.6TB	SSD	512e	Samsung	DWG9	No
88YMD	2.5"	XS960SE70114	960GB	SSD	512e	Seagate	3D03	No
D4VFW	2.5"	XS1920SE70114	1.92TB	SSD	512e	Seagate	3D03	No
KXDCD	2.5"	XS3840SE70114	3.84TB	SSD	512e	Seagate	3D03	No
0MK61	2.5"	XS7680SE70114	7.68tb	SSD	512e	Seagate	3D03	No
6N7KY	2.5"	KPM6XRUG960G	960GB	SSD	512e	Kioxia	BA0D	No
4CN85	2.5"	KPM6XRUG1T92	1.92TB	SSD	512e	Kioxia	BA0D	No
H9TT5	2.5"	KPM6XRUG3T84	3.84TB	SSD	512e	Kioxia	BA0D	No
PD02Y	2.5"	KPM6XRUG7T68	7.68TB	SSD	512e	Kioxia	BA0D	No
81H9C	2.5"	KPM6WVUG3T84	3.84TB	SSD	512e	Kioxia	BD0D	Yes
GD3N0	2.5"	KPM6XVUG1T60	1.6TB	SSD	512e	Kioxia	BA0D	No
C9R60	2.5"	KPM6XRUG960G	960GB	SSD	512e	Kioxia	BA48	No
VRTN9	2.5"	KPM6XRUG1T92	1.92TB	SSD	512e	Kioxia	BA48	No
2XVX2	2.5"	KPM6XRUG3T84	3.84TB	SSD	512e	Kioxia	BA48	No
YM0T1	2.5"	KPM6XRUG7T68	7.68TB	SSD	512e	Kioxia	BA48	No
MD4YN	2.5"	KPM6WVUG3Y84	3.84TB	SSD	512e	Kioxia	BD48	Yes
6K35K	2.5"	KPM7XRUG1T92	1.92TB	SSD	512e	Kioxia	C10E	No

Table 11. Supported hard drives (continued)

Dell part number	Form factor	Model	Capacity	Speed	Sector	Vendor	Firmware	SED
MT0R5	2.5"	KPM7XRUG3T84	3.84TB	SSD	512e	Kioxia	C10E	No
7N1WT	2.5"	KPM7XRUG7T68	7.68TB	SSD	512e	Kioxia	C10E	No
4TRHM	2.5"	KPM7XVUG1T60	1.6TB	SSD	512e	Kioxia	C10E	No
YTVTF	2.5"	KPM7WRUG3T84	3.84TB	SSD	512e	Kioxia	C40E	Yes
RGP9J	2.5"	KPM7WVUG3T20	3.2TB	SSD	512e	Kioxia	C40E	Yes
G2G54	2.5"	ST1200MM0099	1.2TB	10K	512n	Seagate	ST38	No
RWR8F	2.5"	DL2400MM0159	2.4TB	10K	512e	Seagate	ST5E	No
8YWH3	2.5"	ST2400MM0149	2.4TB	10K	512e	Seagate	SSEE	Yes
1D0F5	2.5"	BL2400MM0159	2.4TB	10K	512e	Seagate	SBS6	No
01M0D	2.5"	AL15SEB120NY	1.2GB	10K	512n	Toshiba	EF09	No
9HXK6	3.5"	HUH721212AL5200	12TB	7.2K	512e	HGST	NS11	No
NT1X2	3.5"	HUS726T4TALS200	4TB	7.2K	512n	HGST	PU09	No
44YFV	3.5"	HUS728T8TAL5200	8TB	7.2K	512n	HGST	RS09	No
KRM6X	3.5"	ST4000NM017A	4TB	7.2K	512n	Seagate	CSJA	No
0N660	3.5"	ST8000NM014A	8TB	7.2K	512e	Seagate	CSLE	No
10N7R	3.5"	ST4000NM019B	4TB	7.2K	512n	Seagate	LW0B	No
F7DTR	3.5"	DL4000NM019B	4TB	7.2K	512n	Seagate	LBW3	No
C5HD0	3.5"	ST8000NM024B	8TB	7.2K	512e	Seagate	LS0C	No
7KT9W	3.5"	ST12000NM009G	12TB	7.2K	512e	Seagate	ESL8	No
CNXPV	3.5"	ST16000NM010G	16TB	7.2K	512e	Seagate	ESL8	No
M1C0T	3.5"	ST12000NM006J	12TB	7.2K	512e	Seagate	PSLB	No
41DXR	3.5"	ST16000NM006J	16TB	7.2K	512e	Seagate	PSLB	No
5HYG2	3.5"	ST18000NM006J	18TB	7.2K	512e	Seagate	PSLB	No
0J4R9	3.5"	ST18000NM007D	18TB	7.2K	512e	Seagate	GS07	No
R3G03	3.5"	ST20000NM004D	20TB	7.2K	512e	Seagate	GS07	No
24HF9	3.5"	MG08SCA16TEY	16TB	7.2K	512e	Toshiba	EJ09	No
4N7V0	3.5"	MG08SCA16TEY	16TB	7.2K	512e	Toshiba	EJ09	No
VF206	3.5"	WUH721816AL5200	16TB	7.2K	512e	WD	US07	No
R20GG	3.5"	WUH721818AL5200	18TB	7.2K	512e	WD	US07	No
HNHWC	3.5"	WUH721816AL5205	16TB	7.2K	512e	WD	UM08	Yes
1D4CR	3.5"	WUH722020AL5200	20TB	7.2K	512e	WD	VS18	No
DC2GD	3.5"	WUH722222AL5200	22TB	7.2K	512e	WD	WS03	No
FN7VR	3.5"	ST12000NM007H	12TB	7.2K	512e	Seagate	SWS9	No
R0G8W	3.5"	ST16000NM007H	16TB	7.2K	512e	Seagate	SYS9	No
R5KP7	3.5"	ST20000NM007H	20TB	7.2K	512e	Seagate	SYS9	No
GPP63	3.5"	ST24000NM007H	24TB	7.2K	512e	Seagate	SUS9	No
Y8H7M	2.5"	MZILG7T6HBLAAD3	7.68TB	SSD	512e	Samsung	DSG9	No

Table 11. Supported hard drives (continued)

Dell part number	Form factor	Model	Capacity	Speed	Sector	Vendor	Firmware	SED
4GDNY	2.5"	CL2400MM0149	2.4TB	10K	512e	Seagate	SBT6	Yes
MTTCF	3.5"	WUH722420AL5200	20TB	7.2K	512e	WD	YS01	No
J0PVX	3.5"	WUH722424AL5200	24TB	7.2K	512e	WD	YS01	No

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Supported expansion enclosures

ME5 Series storage systems can support a maximum of 336 drive slots depending on the base system and the additional expansion enclosures.

- ME5012 and ME5024 storage systems support up to nine additional 2U (non-dense) ME412/ME424 expansion enclosures or three 5U (dense) ME484 expansion enclosures.
- ME5012 and ME5024 storage systems do not support a combination of ME412/ME424 and ME484 expansion enclosures.
- ME5084 storage systems support up to three 5U (dense) ME484 expansion enclosures.

ME5 Series storage systems do not support drives that have already been deployed either internally on an ME4 Series base system or on an expansion enclosure that has been used on an ME4 Series storage system. Deploying a drive on a system writes metadata to the drive that is not compatible between ME Series storage systems.

Table 12. Supported 2U (non-dense) expansion enclosures

Enclosure Model	Minimum Firmware Version
ME412	5368
ME424	5368

Table 13. Supported 5U (dense) expansion enclosures

Enclosure Model	Minimum Firmware Version
ME484	5368

NOTE: Expansion enclosures are not supported on ME5 Series storage systems with a single controller module.

NOTE: Expansion enclosure firmware is updated by the ME5 RAID controllers to the latest ME5 supported version.

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Supported management software

ME5 Series management software is built into the storage system and is accessible by using a web browser that is connected to the Management Ethernet port.

The ME5 Series management software details are shown in the following tables:

Table 14. Supported web browsers for the ME5 Series management software

Software component	Minimum Firmware Version	Notes
Microsoft Internet Explorer	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	70 (64-bit) or later	-
Mozilla Firefox	68 (64-bit) or later	-

NOTE: Microsoft Edge is not supported.

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

vCenter Plug-in version	VMware version supported	Notes
1.2.1.26	• VMware vSphere 6.7, 7.0 • vCenter Server 6.7U2	Linux support only
1.3.0.17	• VMware vSphere 8.0 U1 • vCenter Server 8.0 U1	Linux support only

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

SRA version	VMware version supported	Notes
8.3.0.9	• VMware vSphere 6.7, 7.0, 8.0 U1 • vCenter Server 6.7U2 • Site Recovery Manager (SRM) 6.5, 8.1, 8.2	Fibre Channel and iSCSI support only

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Supported operating systems

ME5 Series storage systems support Windows, Red Hat Enterprise Linux, and SUSE Linux Enterprise Server.

NOTE: Where clustering is supported by the operating system, it is also supported on ME5 Series storage systems, subject to the following limitations:

Windows Server 2016 through Windows Server 2025

- The maximum number of FC hosts is 64
- The maximum number of iSCSI hosts is 64
- The maximum number of SAS hosts is 4

Table 17. Supported ME5 Series operating systems

Operating System	SAS host server	FC host server	iSCSI host server	Notes & required hotfixes
Windows server 2025				
Standard server (Server Core* and Desktop Experience)	✓	✓	✓	The Microsoft MPIO feature needs to be installed prior to connecting to ME5 Series storage systems. BitLocker Drive Encryption is not supported.
Datacenter server (Server Core* and Desktop Experience)	✓	✓	✓	The Microsoft MPIO feature needs to be installed prior to connecting to ME5 Series storage systems. BitLocker Drive Encryption is not supported.
Windows Server 2022				
Standard server (Server Core* and Desktop Experience)	✓	✓	✓	The Microsoft MPIO feature needs to be installed prior to connecting to ME5 Series storage systems. BitLocker Drive Encryption is not supported.
Datacenter server (Server Core* and Desktop Experience)	✓	✓	✓	The Microsoft MPIO feature needs to be installed prior to connecting to ME5 Series storage systems. BitLocker Drive Encryption is not supported.
Windows Server 2019				
Standard server (Server Core* and Desktop Experience)	✓	✓	✓	The Microsoft MPIO feature needs to be installed prior to connecting to ME5 Series storage systems. BitLocker Drive Encryption is not supported.
Datacenter server (Server Core* and Desktop Experience)	✓	✓	✓	The Microsoft MPIO feature needs to be installed prior to connecting to ME5 Series storage systems. BitLocker Drive Encryption is not supported.
Windows Server 2016				

Table 17. Supported ME5 Series operating systems (continued)

Operating System	SAS host server	FC host server	iSCSI host server	Notes & required hotfixes
Standard edition (Server Core* mode supported)	✓	✓	✓	The Microsoft MPIO feature needs to be installed prior to connecting to ME5 Series storage systems. BitLocker Drive Encryption is not supported.
Datacenter edition (Server Core* mode supported)	✓	✓	✓	The Microsoft MPIO feature needs to be installed prior to connecting to ME5 Series storage systems. BitLocker Drive Encryption is not supported.
Foundation edition	✓	✓	✓	The Microsoft MPIO feature needs to be installed prior to connecting to ME5 Series storage systems.
Red Hat Enterprise Linux (RHEL)				
Red Hat Enterprise Linux 9.3 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 9.2 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 9.0 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 8.8 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 8.6 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 8.5 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 8.4 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 8.2 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 8.1 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 8.0 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 7.9 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support.
Red Hat Enterprise Linux 7.8 (x64 only)	✓	✓	✓	• Basic Server install (Minimum)

Table 17. Supported ME5 Series operating systems (continued)

Operating System	SAS host server	FC host server	iSCSI host server	Notes & required hotfixes
				• Device Mapper multipath is required for multipath support.
SUSE Linux Enterprise Server (SLES)				
SUSE Linux Enterprise Server 15 SP5 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support
SUSE Linux Enterprise Server 15 SP4 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support
SUSE Linux Enterprise Server 15 SP3 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support
SUSE Linux Enterprise Server 15 SP2 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support
SUSE Linux Enterprise Server 15 SP1 (x64 only)	✓	✓	✓	• Basic Server install (Minimum) • Device Mapper multipath is required for multipath support
SUSE Linux Enterprise Server 15 (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				
Citrix XenServer 8.x	✓	✓	✓	Dynamic multipathing support is available for Fibre Channel and iSCSI hosts
VMware vSphere 8.0	✓	✓	✓	For supportd firmware versions see VMware HCL supported path policies MRU and RR.
Citrix XenServer 7.x	✓	✓	✓	Dynamic multipathing support is available for Fibre Channel and iSCSI hosts
VMware vSphere 7.0 U3	✓	✓	✓	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR
VMware vSphere 7.0 U2	✓ ✓	✓	✓	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR **NOTE:** For information about ATS Initialization failing for SAS Storage using 7.0 U2, see VMware KB article 83249.
VMware vSphere 7.0 U1	✓	✓	✓	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR
VMware vSphere 7.0	✓	✓	✓	For supported firmware versions, see VMware HCL Supported path policies: MRU and RR

Table 17. Supported ME5 Series operating systems (continued)

Operating System	SAS host server	FC host server	iSCSI host server	Notes & required hotfixes
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

NOTE: Server Core editions of Windows server can only manage ME5 Series storage systems using the CLI client.

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Operating systems with ALUA support

ALUA is supported natively on the following operating systems:

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

- Windows Server 2025
- Windows Server 2022
- Windows Server 2019
- Windows Server 2016
- Citrix XenServer 7.1 CU2 or later
- Red Hat Enterprise Linux 8.0 or later
- Red Hat Enterprise Linux 7.4 or later
- SUSE Linux Enterprise Server 15.0 or later
- SUSE Linux Enterprise Server 12.3 or later
- VMware vSphere 7.0 or later
- VMware vSphere 6.7 or later

NOTE: For more information about the ALUA configuration, see the *Dell PowerVault Storage System Administrator's Guide*.

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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 8.0 or later	Native	Native
Red Hat Enterprise Linux 7.4 or later	Native	Native
Red Hat Enterprise Linux 6.9 or later	Native	Native

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Supported SAS host bus adapters

This chapter lists the server HBAs that have been tested for use with ME5 Series storage systems. However, it does not imply that these HBAs are supported by any or all server vendors.

ME5 Series storage systems support the following HBAs:

- Dell HBA355e for PowerEdge 14th, 15th, and 16th generation servers
- Dell 12 Gbps SAS HBA for PowerEdge 14th and 15th generation servers
- Dell HBA465e for PowerEdge 16^{th}generation servers

You can download the supported drivers and firmware for the HBAs from Dell Support. To determine if a Dell PowerEdge server supports an adapter, see the support matrix for that server.

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Supported Fibre Channel host bus adapters

The following table lists the HBAs that have been tested for use within ME5 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 PowerEdge server products. Inclusion in this HBA compatibility table should not be interpreted as the HBA and driver/firmware combination as being supported by any vendor for use with their server products.

Table 19. ME5 Series Fibre Channel HBAs

Host bus adapter name	Direct-attach configuration	Fabric configuration	Dell Part Number	Available From
QLogic				
QLE2772	✓	✓	YM4FH (full height) JJW53 (low-profile)	Dell
QLE2770	✓	✓	N/A	QLogic
QLE2742	✓	✓	T3TK5 (full height) 5H4YH (low-profile)	Dell
QLE2690	✓	✓	P8PCK (full height) P3T0T (low-profile)	Dell
QLE2692	✓	✓	CK9H1 (full height) WVT0T (low-profile)	Dell
Emulex				
LPe35002	✓	✓	JYGG6 (full height) 4VDY3 (lo-profile)	Dell
LPe35000	✓	✓	N/A	Emulex
LPe31000	✓	✓	3T3T7 (full height) 6CWM6 (low-profile)	Dell
LPe31002	✓	✓	RXNT1 (full height) VGJ12 (low-profile)	Dell

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Supported Fibre Channel and iSCSI direct-attach configuration operating systems

ME5 Series storage systems support Fibre Channel and iSCSI direct-attached configurations on the following operating systems:

- Windows Server 2025
- Windows Server 2022
- Windows Server 2019
- Windows Server 2016
- Citrix XenServer 7.1 CU2 or later
- Red Hat Enterprise Linux 8.2 or later
- Red Hat Enterprise Linux 7.8 or later
- SUSE Linux Enterprise Server 15.2 or later
- SUSE Linux Enterprise Server 12.5 or later
- VMware vSphere 8.0 or later
- VMware vSphere 7.0 or later
- VMware vSphere 6.7 or later

NOTE: Hyper-V supports direct-attach configurations if Hyper-V is installed as an application on Windows Server 2019. Hyper-V Server 2019 does not support direct-attach configurations.

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VSS hardware writer support

VSS Hardware Writer is not supported or tested for ME5.

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Dell Storage Support Policy

Level 1: Full Contractual Support

For tested devices listed in this Support Matrix, (and for the specific version listed), Dell 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 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 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's control. In such cases, these issues will need to be addressed by the applicable device or software/firmware vendor. Dell 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 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 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 will provide storage solution support for any untested component of the configuration, until such time as it is determined, in Dell's sole discretion, that a problem lies within the untested component(s) or the way they interoperate with Dell.

Once an untested component has been determined to be the source of the issue, Dell 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 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.