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Wir unterstützen Sie kompetent und persönlich!

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PowerVault ME4 Series
Technical Overview

SIMPLE. FAST. AFFORDABLE.

Christian Stein
Adv. Systems Engineer
Christian.stein@dell.com

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Agenda

1	**Product Overview**
2	**Management Ecosystem**
3	**Software**
4	**Hardware**
5	**Solutions**
6	**SupportAssist**
7	**Resources**

Dell EMC Entry/Midrange storage around the globe

- **92% of the Fortune Global 100 Companies** use Dell EMC Entry and Midrange Storage

- Top **10 Largest Energy Companies** in the World use Dell EMC Entry and Midrange Storage

- Top **10 Largest Banks in the World** use Dell EMC Entry and Midrange Storage

PowerVault ME4 Series

SC Series

Unity XT Series

Based on Dell Technologies internal analysis, February 2020

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DELL EMC POWERVAULT ME4 SUCCESS SINCE FY Q319

CAPACITY

| RAW | 2,400 PB+ |
| FLASH | 70 PB+ |

SYSTEMS

| TOTAL | 19,700+ |
| AFA* | 2,100+ |

CUSTOMERS

| TOTAL | 9,400+ |

* AFA Array Count also included as part of Total

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Dell EMC PowerVault ME4 Series

Purpose-built and optimized storage for SAN & DAS

PowerVault Manager

ME4012 (2U)
Single/Dual

ME4024 (2U)
Single/Dual

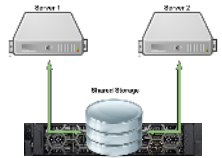**ME4084 (5U Dense)**
Dual Only

4PB
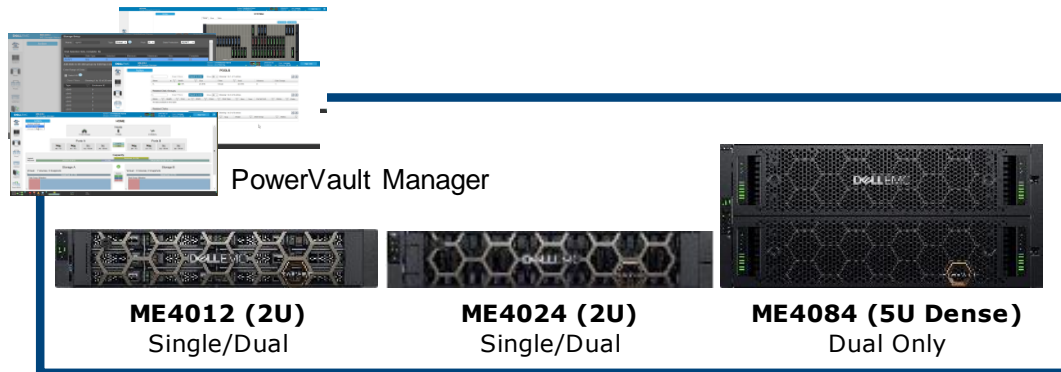
5-9's
99.999%

HIGH AVAILABILITY & HIGH CAPACITY

SERVER-ATTACH READY

SAN STORAGE-READY

SIMPLE.

– Web-based (HTML5) management
– Installs and configures in 15 minutes
– Extended management ecosystem

FAST.

– Bandwidth: 5.5GB/s Write & 7GB/s Read
– Performance: up to 320K1 IOPs
– Scale: 12G SAS backend

AFFORDABLE.

– Low-cost starting configurations
– Easy to own with all-inclusive software
– Modular pay as you grow model

1 AD# G18000167 Based on Seagate Technology's LX-3 Performance Characterization report, 2018 (Virtual Test Results)

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PowerVault ME4 Series

Entry level performance, scale and simplicity

ME4084

EBOD Expansion Enclosures[1]

ME484

RBOD Models with RAID Controllers:

ME4012 **ME4024** **ME412** **ME424**

Configurations:

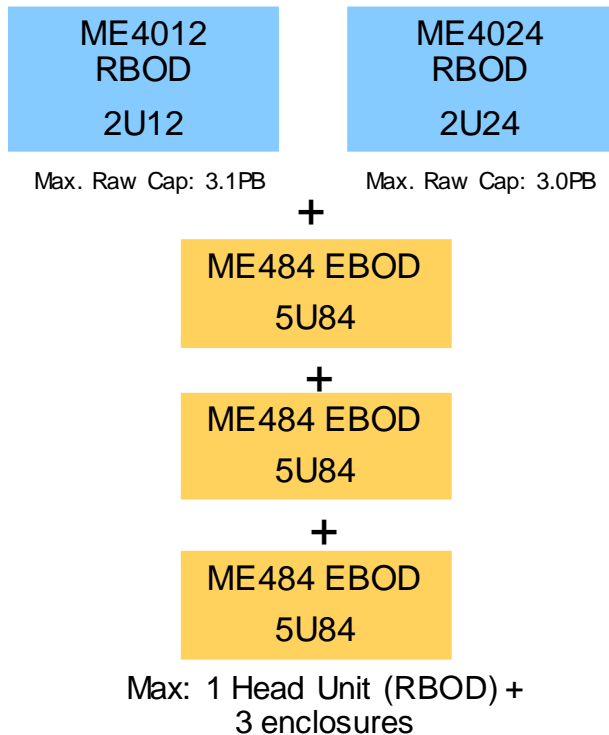|	ME4012	ME4024	ME4084	ME412	ME424	ME484
Configurations:	2U12 drives	2U24 drives	5U84 drives	2U12 drives	2u24 drives	5U84 drives
Max Raw Capacity[2]	3.1PB	3.0PB	4PB	9 x 2U enclosures (behind ME4012/ME4024)		
Min/Max Drives	2/264	2/276	28/336	3 x 5U enclosures (behind ME4012/ME4024/ME4084)		
Media	Hybrid (0-100% Flash)					
Protocols	8/16Gb FC, 1/10Gb iSCSI, 12Gb SAS			12Gb SAS Backend		
Data Protection	Virtual Copy, Snapshots, Async Replication, SEDs					
Performance	Tiering, SSD Read Cache					
Integration	vCenter vSphere Plugin, SRM Plugin					
Management	PowerVault Manager					
Architecture	ADAPT, Thin provisioning, Internal Key Manager (encryption)					

[1] ME Expansion Units (DAE) cannot be connected to a server directly (not a server-attached JBOD)
[2] Three ME484 enclosures as expansion; PB maximum per array determined by use of Virtual or Linear mode

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PowerVault ME4 Series capacity expansion options

Configuration Option 1

ME4012 RBOD 2U12	ME4024 RBOD 2U24
Max. Raw Cap: 1.4PB	Max. Raw Cap: 1.3PB

+

ME412 EBOD 2U12	ME424 EBOD 2U24

+

ME412 EBOD 2U12	ME424 EBOD 2U24

+

ME412 EBOD 2U12	ME424 EBOD 2U24

Max: 1 Head Unit (RBOD) + 9 enclosures

Configuration Option 2

ME4012 RBOD 2U12	ME4024 RBOD 2U24
Max. Raw Cap: 3.1PB	Max. Raw Cap: 3.0PB

+

ME484 EBOD 5U84

+

ME484 EBOD 5U84

+

ME484 EBOD 5U84

Max: 1 Head Unit (RBOD) + 3 enclosures

Configuration Option 3

ME4084 RBOD 5U84
Max. Raw Cap: 4.0PB

+

ME484 EBOD 5U84

+

ME484 EBOD 5U84

+

ME484 EBOD 5U84

Max: 1 Head Unit (RBOD) + 3 enclosures

→ Cannot mix 2U and 5U EBOD expansion enclosures
→ ME4084 must only use ME484 EBOD expansion enclosures
→ Expansion is not supported in single controller configurations

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PowerVault JBOD Series expansion enclosures

PowerVault JBOD Models:

	MD1400	MD1420	ME484
Value:	**High-density**	**Performance-optimized**	**Performance & density-optimized**

Max Raw Capacity	1.15PB	460.8TB	4PB
Max Drives	2/96	2/192	28/336
Max Enclosures	8	8	4
Configuration	2U12	2U24	5U84
Drives	SSD, SAS, NLSAS, SED		
Drive Bays	12x3.5"	24x2.5"	84x3.5" & 2.5"
Host Interface	12Gb SAS	12Gb SAS	12Gb SAS
Management	Dell OpenManage Enterprise		PowerTools Server Hardware Manger

All three JBOD models support 13G and 14G Dell PowerEdge Servers

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Connecting up PowerVault ME4 Series

Flexible expansion options for PowerEdge Servers

> **RBOD:** Connects to servers & <u>contains RAID Controllers</u>
> **EBOD:** Directly connects to RBODs
> **JBOD:** Directly connects to servers

Server-Attach
Low Latency

PowerEdge Server

SAS

MD1400 / MD1420 JBOD

PowerVault ME484 JBOD

Shared Storage
Performance

PowerEdge Server

FC/iSCSI SAN

PowerVault ME4 RBOD*

PowerVault ME4 EBOD*

Shared Storage
Density

PowerEdge Server

SAS

PowerVault ME4 RBOD*

PowerVault ME4 EBOD*

*RBOD & EBOD "skinny & fat" enclosures can be intermixed

- Simplify challenges of server capacity expansion

- Business applications get high-speed access to data

- Supports PowerEdge Servers

- One ME4 is like having 2 MD3's

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PowerVault ME4 Series specs

Increased Performance

- Read IOPS: 320K[1] (4X over MD3)
- Backend Interface: 12Gb SAS (100% increase)
- Sequential Writes: 5500 MB/s (2.6X over MD3)
- Sequential Reads: 7000 MB/s[2]

Improved Scalability

- Raw Capacity: 4PB (122% more than MD3)
- Total system drive count: 336 (1.75x over MD3)
- Dense Expansion: 5U84 drives (40% over MD3)

More Connectivity

- 4 ports 10Gb iSCSI SFP+4, 4 ports 1/10Gb iSCSI BaseT, 4 ports 8/16Gb FC, 4 ports 12Gb SAS – per controller
- Single or Dual controller (8Gb cache per controller)
- Multi-protocol support (16Gb FC/10Gb iSCSI SFP+)
- Direct connect SAS/iSCSI and FC support

Simple Management

- Web-based GUI: PowerVault Manager
- All inclusive software; no software licenses

- ME4012: 12-drive RBOD (DPE)
- ME4024: 24-drive RBOD (DPE)
- ME4084: 84-drive RBOD (DPE)
- ME412:   12-drive Expansion (DAE)
- ME424:   24-drive Expansion (DAE)
- ME484:   84-drive Expansion (DAE)

Note: ME Expansion Units (DAE) cannot be connected to a server directly (not a server-attached JBOD)

Legal claim AD#_G18000167

[1] ME4 = 8K Blocks; MD3 = 80K, 4K Blocks
[2] MD3 sequential read = 7700 MB/s
[3] 336 x 3.5" 12TB drives
[4] iSCSI SFP+ new vs. MD3

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Management Ecosystem

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# PowerVault Manager web-based management

Manage ME4 storage simply, intuitively from anywhere

- Single-array HTML5 management interface
- Use common management tasks from convenient locations
- Manage storage profiles, network connections, alerts, more
- Easily connect to SupportAssist and onboard CloudIQ
- CLI support
- Configure in 15 minutes

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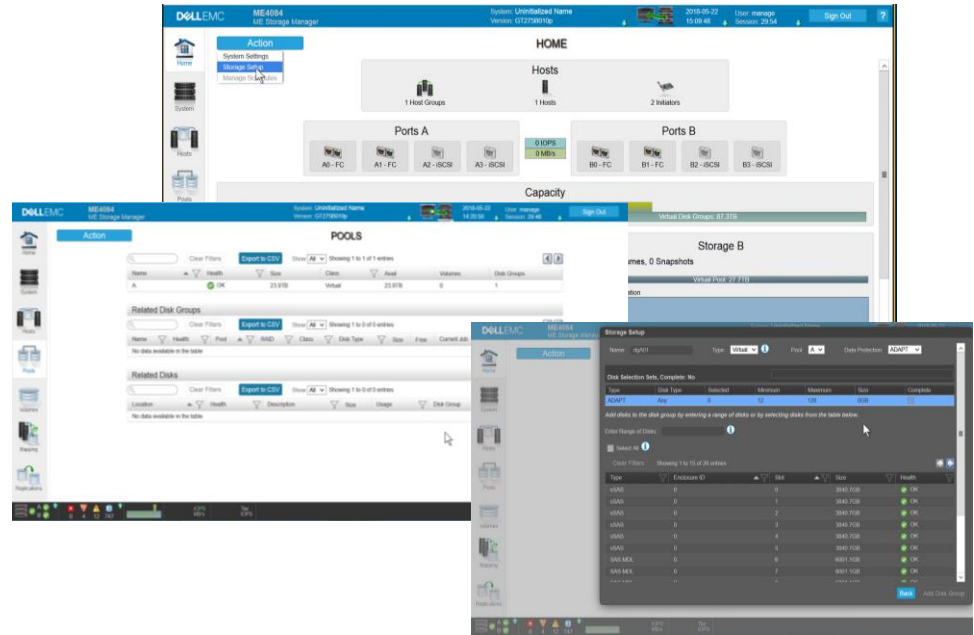
CloudIQ

Intelligently answering questions about your data center

NEW
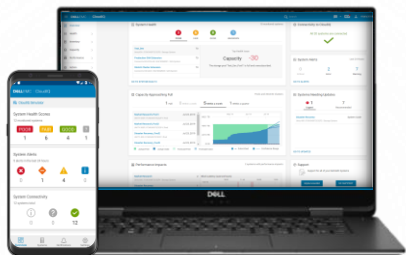
Reduce Risk
Monitor potential vulnerabilities across your data center and virtual infrastructure with proactive health scores

Spot Trouble
Pinpoint deviations in your environment to focus and expedite trouble-shooting

Plan Ahead
Anticipate business needs with capacity forecasting and anomaly detection

CLOUD-BASED MONITORING AND PREDICTIVE ANALYTICS FOR YOUR DATA CENTER

CloudIQ

Data Center

Available with:

PowerMax
Isilon
XtremIO
Unity XT
SC Series
PowerVault
Connectrix
VxBlock
VMware

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Easy system setup

- Simple interface to provision the system quickly with minimal user input
  - Scans system to determine best possible layout containing disk groups, spares and unused disk
  - Once user accepts the layout, PowerVault Manager will provision
  - Decisions:
    - **Virtual or Linear (recommendation is Virtual)**
    - RAID level
    - Balanced pools or add storage to alternating pools
    - Acceptable tolerance (default is 5%) – note: ADAPT will use all available space regardless of disk size
    - Can disk groups span multiple drawers
    - Can FIPs and non-FIPs disks be mixed in a disk group
    - Should spares be added after provisioning the system

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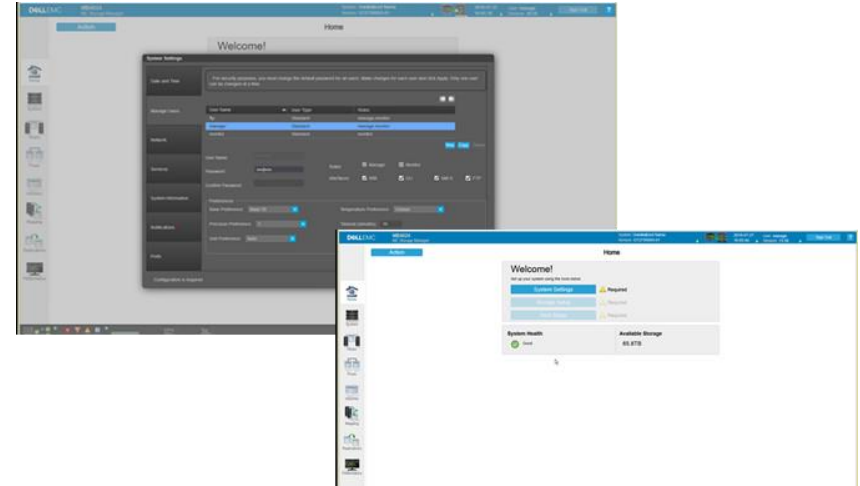
PowerVault ME4 Series and OpenManage Enterprise

Increased scalability for unified data center management

OpenManage Enterprise Modular

PowerEdge MX

NEW

PowerVault ME4 Series

PowerEdge FX2

PowerEdge Rack/Tower

PowerEdge VRTX

- Monitor ME4 storage and Dell EMC hardware for a single-view of the infrastructure

- Scales to manage up to 8,000 server, storage and network devices

- One console can support devices spread across the globe

D&LL Technologies
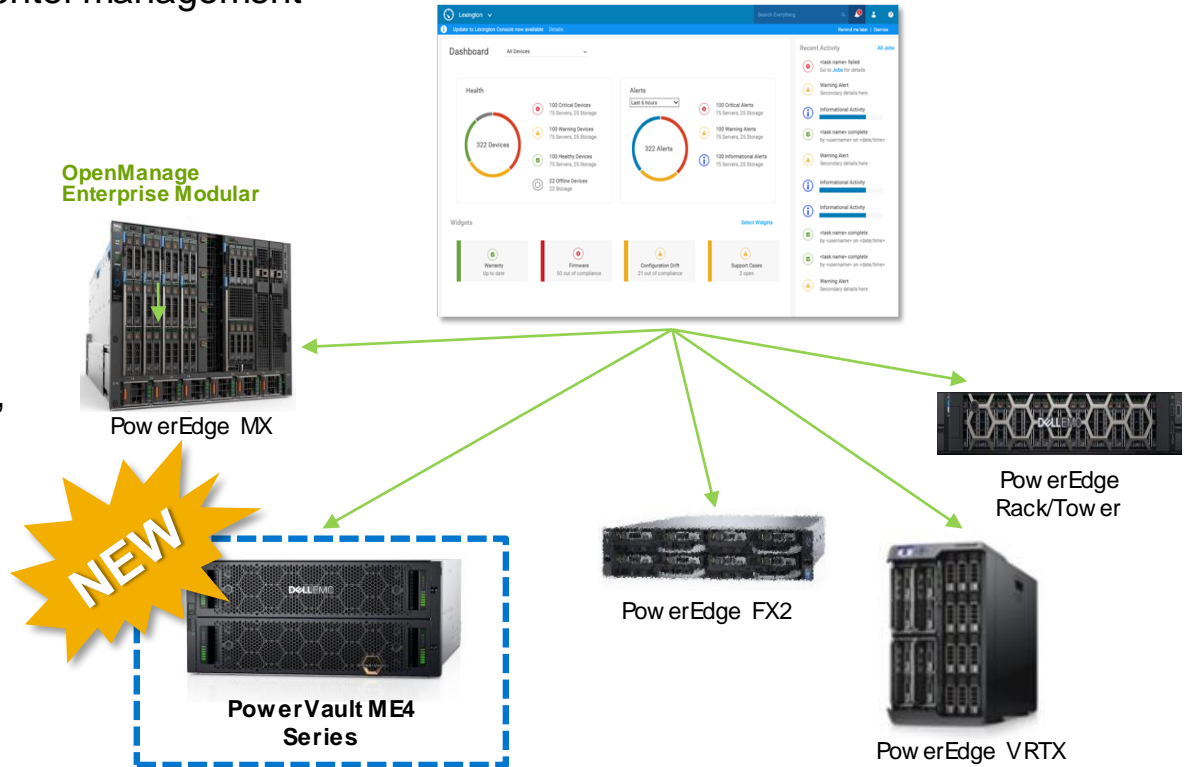
Monitor Dell EMC storage with Nagios Core/XI

OPEN SOURCE

NEW

Nagios 3.1 storage features include:

- Auto-discovery, inventory and monitoring

- Overall storage array health and component-level health monitoring

- SNMP Trap monitoring support

- H/W warranty monitoring

- Launch 1:1 element management consoles directly from Nagios-Core and XI

PowerVault ME4 Series

Dell EMC storage arrays already supported

SC-Series

PS-Series   PowerVault MD 34/38-Series

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Software Technologies

D&LL Technologies

PowerVault ME4 Series all-inclusive software

No hidden costs make PowerVault easier to own, deploy and use

ADAPT	Thin Provisioning	SSD Read Cache
Functionality enabling affordable capacity expansion & faster drive rebuild times.	Allocate and consume physical storage capacity as needed in disk pools	Increase execution speed of applications by caching previously read data

IP Remote Replication	FC Remote Replication	Snapshots	Auto-Tiering
Replicate data to any global location that includes mirroring thin provisioned pools	Replicate data to any global location that includes mirroring thin provisioned pools	Recover files after accidental delete/alteration with point-in-time copies	Improve performance and efficiency with less hardware expense

Volume Copy	SED Drive Encryption	vCenter/SRM; SMI-S with SCVMM
Seamlessly clone volumes for re-purposing on different spindles and drives	Render data useless to unauthorized users with drive-level encryption even if the drive has been removed from the enclosure	vCenter & SRM integration to move live VMs at scale between sites; Easily automate storage management running Hyper-V VMs

PowerVault Manager	CloudIQ
Native HTML5 management interface for configuring, provisioning, managing, monitoring and supporting a single PowerVault ME4 array	Cloud-native monitoring application that uses ML/AI and predictive analytics from telemetry gathered across thousands of systems to provide system health scores

Management Ecosystem	SupportAssist
Integrate with Nagios Core/XI for auto-discovery, inventory and monitoring and provide increased scalability for unified datacenter management with OpenManage Enterprise integration	An embedded protocol connected to Dell EMC to help you proactively maintain the health of your PowerVault ME4 storage array or other Dell EMC device.

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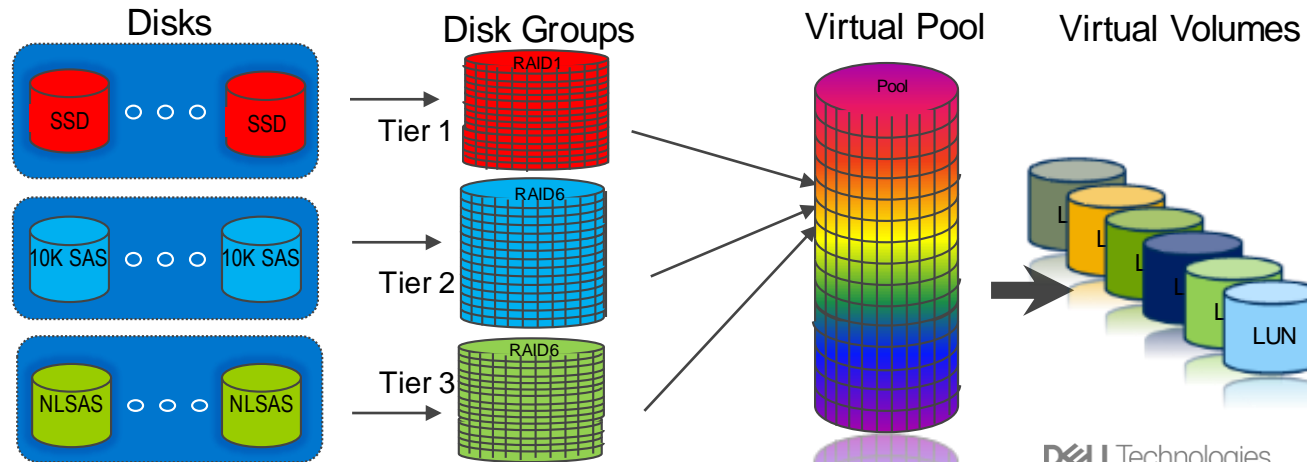# PowerVault ME4 Series: Linear and Virtual Volumes

Linear Storage:

- Physical disks are grouped into a RAID Disk Group
- Volumes are carved from the Disk Group
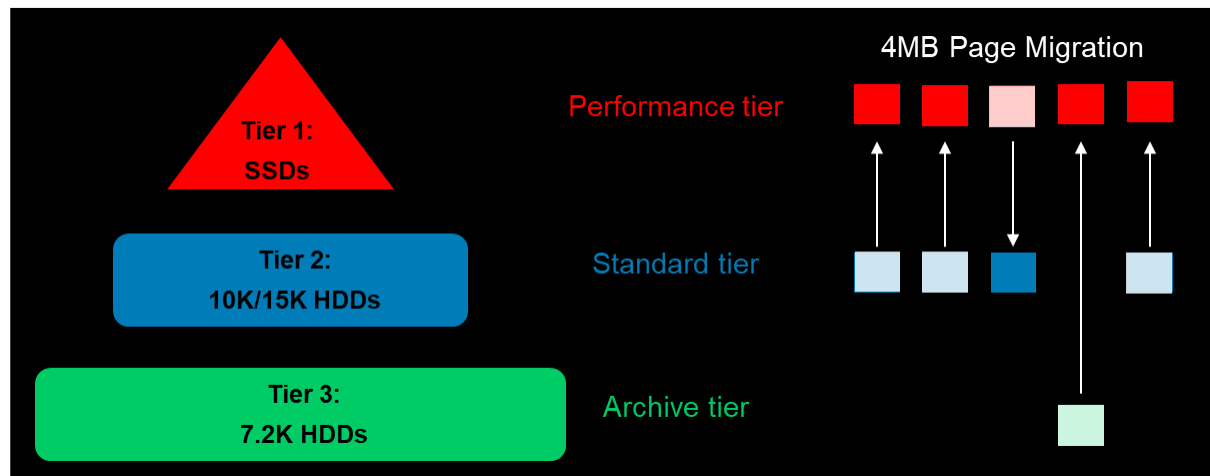- Volumes can only grow to the size of the available space in the Disk Group

Disk Group

Linear Volumes

SSD ● ● ● SSD → RAID1 → LUN / LUN

Disk Group

10K SAS ● ● ● 10K SAS → RAID6 → LUN / LUN

Disk Group

NLSAS ● ● ● NLSAS → RAID6 → LUN / LUN
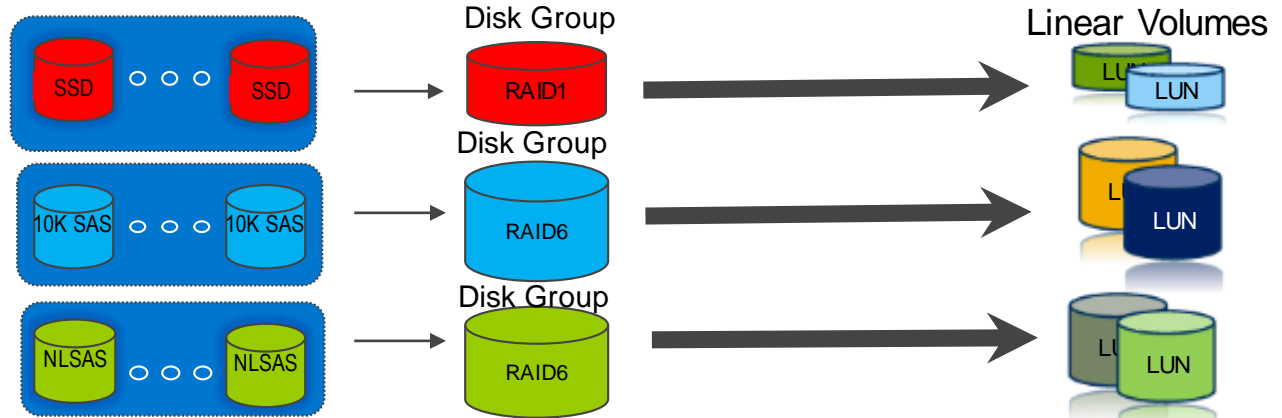
Virtual Storage:

- Physical disks grouped into RAID by Disk Group
- All virtual disk groups **in same tier** should be same RAID level, capacity and number of disks
- Disk Groups are inserted into Pools
- Volumes written/read in 4MB blocks to/from the pool
- Volumes are carved from the Pool
- Volumes can grow to size of the pool
- Data services

Disks

Disk Groups

Virtual Pool

Virtual Volumes

SSD ○ ○ ○ SSD → Tier 1 RAID1

10K SAS ○ ○ ○ 10K SAS → Tier 2 RAID6 → Pool → LUN ... LUN

NLSAS ○ ○ ○ NLSAS → Tier 3 RAID6

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PowerVault ME4 Series Auto-Tiering

Great performance with less hardware expense

- Volumes logically broken into 4MB pages

- Tiering algorithm runs every 5 seconds to rank pages and limited to 20 4MB pages if tiering required

- Frequently accessed data moved up to higher performance disks

- Infrequently access data moved down to lower performance disks

- Pages only migrated down if room needed for higher ranked page

4MB Page Migration

Tier 1: SSDs

Tier 2: 10K/15K HDDs

Tier 3: 7.2K HDDs

Performance tier

Standard tier

Archive tier

1. Three pages moved up from **Standard Tier** to **Performance Tier**
2. One page **moved** up from **Archive Tier** to **Performance Tier**
3. One page moved down from **Performance Tier** Tier to **Standard Tier**

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PowerVault ME4 Series ADAPT software

Two drive failure protection with fast rebuilds, allows different drive sizes and easy capacity expansion

Faster rebuilds, better data protection and good performance

- Reduce exposure to device failure-related data loss (from hours/days to minutes)
- Benefits start even with minimal configurations (12 drives)
- Self healing, easy to use storage
- High performance I/O

Simplified user experience

- No spare disks, only spare capacity distributed across all drives (self healing disk groups)
- Reduced service actions (no rush to replace failed disks); Automatically handles addition/removal of pool disks with self-healing capabilities
- Allows mixed drive sizes and easy capacity expansion
- Up to 128 drives or 1PB usable per disk group (but benefits small disk groups too)
- RAID level for ADAPT is 8+2 RAID 6

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Writing to an ADAPT disk group

- File divided into stripes of 4 chunks each
- Stripes dispersed across 24 devices comprising this ADAPT Disk group (HDDs or SSDs)
- Redundancy information generated for each one: P+Q.

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D&LL Technologies

Writing to an ADAPT disk group

- File divided into stripes of 4 chunks each
- Stripes dispersed across 24 devices comprising this ADAPT Disk group (HDDs or SSDs)
- Redundancy information generated for each one: P+Q.

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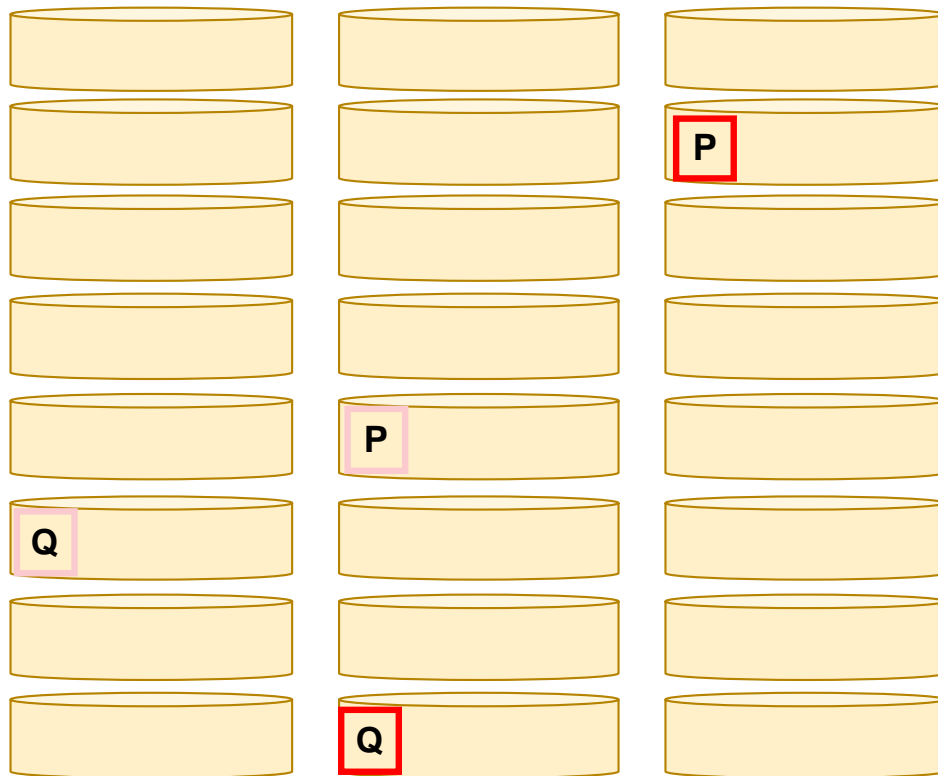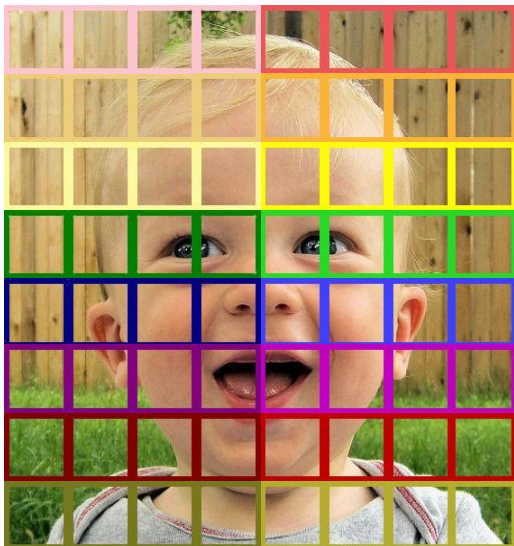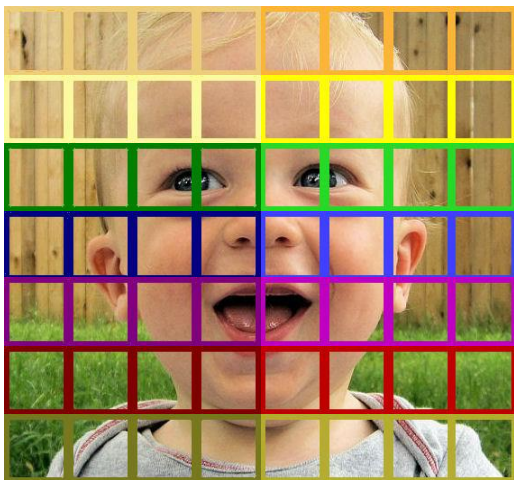
Expanding the ADAPT disk group

Handling an ADAPT disk group drive failure

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ADAPT measured rebuild times

ADAPT groups with 8TB drives

After 2 disk failures, time to recover fault tolerance	
Number of drives	Hours:Minutes
12	17:42 Note: 12-drive R6 takes 24 hours
42	2:44
84	1:29

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ADAPT rebuild time and performance under failure

Increased benefits as ADAPT disk group size increases

Metric	Traditional RAID6 8+2	24 Drive ADAPT	56 Drive ADAPT	106 Drive ADAPT
Performance impact*, 1 drive down	-41%	-23%	-11%	-6%
Performance impact*, 2 drives down	-62%	-37%	-20%	-12%
Rebuild 1 drive	55.5 hours	24 hours	10 hours	5.3 hours
Fault Tolerance: 3rd drive failure	55.5 hours	9 hours	1.5 hours	25 minutes

- 10 TB drives, Rebuild times assume rebuild I/O (RW) at 50MB/s per drive
- *Read IOPs performance impact under failure assumes no rebuild I/O

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PowerVault ME4 Series SSD Read Cache

What Is It?

- Special-purpose disk group dedicated to hold volatile copies of data within one or more SSDs
  - Moves data from an HDD virtual disk to SSDs following a host read or write

- Subsequent host read of the same LBAs can be read directly from the SSDs <u>with a much lower response time</u> than re-reading the data from the HDD virtual disk

Workload characteristics that benefit:

- Performance limited by HDD IOPs

- High percentage of reads relative to writes

- Large number of reads that are repeat reads to the same or adjacent areas of the drive

- The working size set that is repeatedly accessed is smaller than the SSD cache capacity

→ Each read cache disk consists of 1 or 2 SSDs with maximum usable capacity of 4TB
→ SSD Read Cache cannot be used with Tiering
→ Only a single read cache group can exist within a pool

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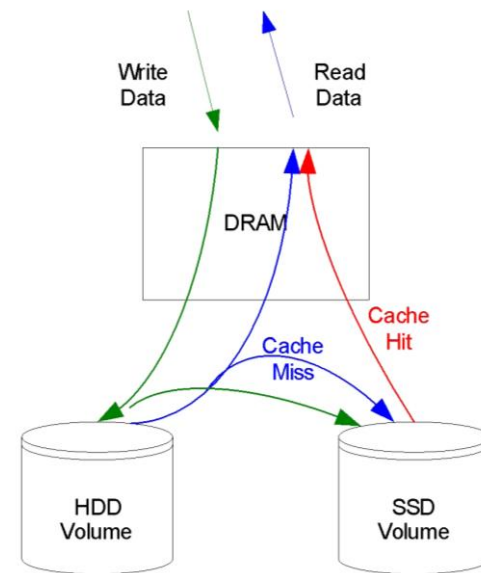
Key limits

	Feature	Maximum		
Drives	Supported Drives (RBOD + max expansion)	ME4012: 264	ME4024: 276	ME4084: 336
	Supported expansion modules	9 x ME412 *or* 9 x ME424 *or* 3 x ME484		3 x ME484
Disk Groups and Pools	Virtual Pools per controller	1 (2 with dual)		
	Max raw virtual pool size per controller	2PB (with RAID 10) - 4PB total raw per array		
	Disk-group size	Unlimited (non-ADAPT); 1PB (ADAPT)		
	Disk groups per pool	16		
	Disk groups per controller	Virtual - 16	Linear - 32	
	Disks per disk group (min/max)	**Virtual** RAID 0 2 / 2 (read cache only)[1] RAID 1 2 / 2 RAID 5 3 / 16 RAID 6 4 / 16 RAID 10 4 / 16 ADAPT 12 / 128 (R3 & R50 not supported)	**Linear** RAID 0 2 / 16[1] RAID 1 2 / 2 RAID 3 3 / 16[1] RAID 5 3 / 16 RAID 6 4 / 16 RAID 10 4 / 16 RAID 50 6 / 32 ADAPT 12 / 128	
	Dedicated spares per linear disk group	Linear - 4 (N/A for Virtual)		
	Global spares per system	64		
	ADAPT	Groups per controller: 4	Single disk size: 64 TiB (~70TB)	Stripe width: 8+2
Volumes	Volumes per system	Virtual - 1024	Linear - 512	
	Volumes per pool	Virtual - 1024 (512 base, 512 snapshots)	Linear - 1024	
	Max volume size	128 TiB (~140TB)		
	Mappable volumes (LUNs)	Per disk group: 128	Per pool: Virtual – 512; Linear - 128	Per controller: 512
	Base volumes per system	1024		
	Number of replicated volumes per system	32		
	Volumes for replicated volume group	16 if no other volumes belong to replication set		
Virtual Volume Snap-shots	Snapshots per pool	512		
	Base volumes per system	1024		
	Mappable snapshots per system	1024		

[1] CLI command only

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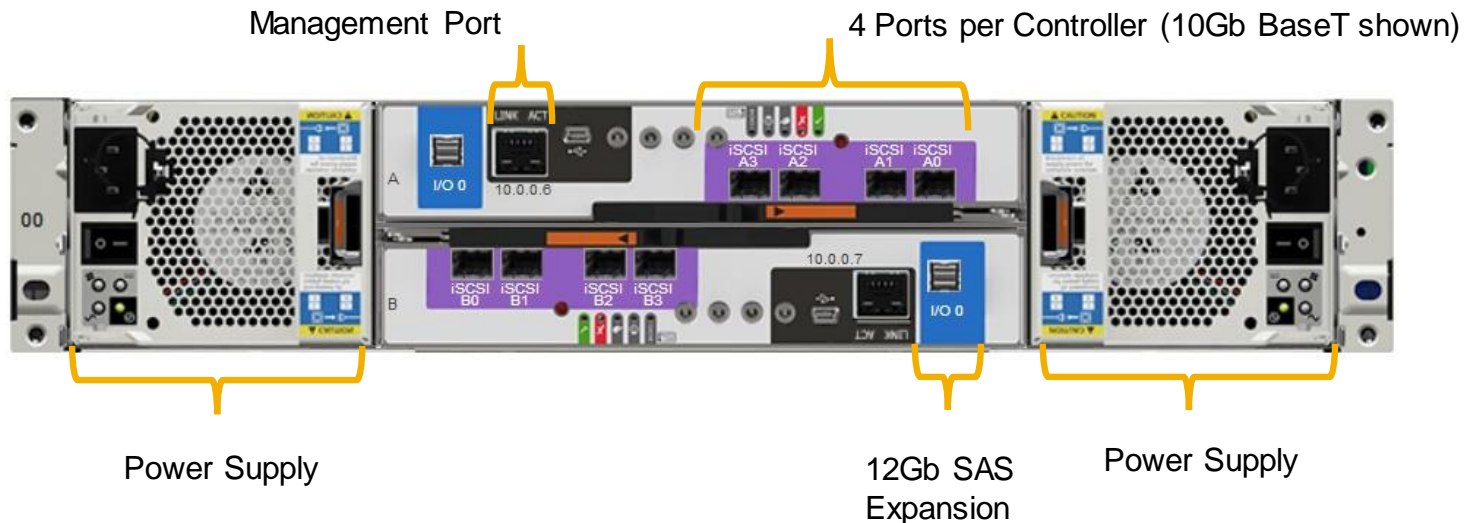# OS, Certs, Manage, Compliance

Servers	• DAS: 13G and 14G (with supported HBAs); SAN: with supported switches and HBAs (refer to ME4 Support Matrix)	
Operating System / Plug-ins	• Windows 2019, 2016 and 2012 R2 • RHEL 8, 7.4, 6.9 • SLES 12.3 • VMware ESXi 6.7 U2, 6.5, 6.0 Note: FC/iSCSI direct connect supported for: • VMware SRM 8.2.x, 6.5 • vSphere Client plug-in for vCenter 6.7 U2, 6.7 U1, 6.5 Ui, 6.5, 6.0 U3 • RHEL 8.0, 7.6, 7.5, 7.4, 6.9 • SLES 12.3 • Citrix XenServer 7.6, 7.5, 7.1 CU2	
Compliance	All ship to countries as in CSTL	

Certifications	• Energy Star 1.1
	• TAA
	• IPv6 (USGv6)
	    • RTS: IPv6 support on management & data path
	    • USGv6 planned for Q4FY20 certification for both data path and management path
	• Data @ Rest Encryption – at drive level
	
	Note: TPM – TCG and TPM-FIPS 140-2 are not applicable for storage (encryption is supported for FIPS SED drives; no other encryption in the system)	

	Post-RTS	• VPAT (RTS+30)
OpenManage	• OME 3.2 Support	

→ Refer to ME4 Support Matrix (dell.com/support) for status and updates

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Hardware

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PowerVault ME4 Series interface
Dual controller 2U rear view

Management Port

4 Ports per Controller (10Gb BaseT shown)

Power Supply

12Gb SAS Expansion
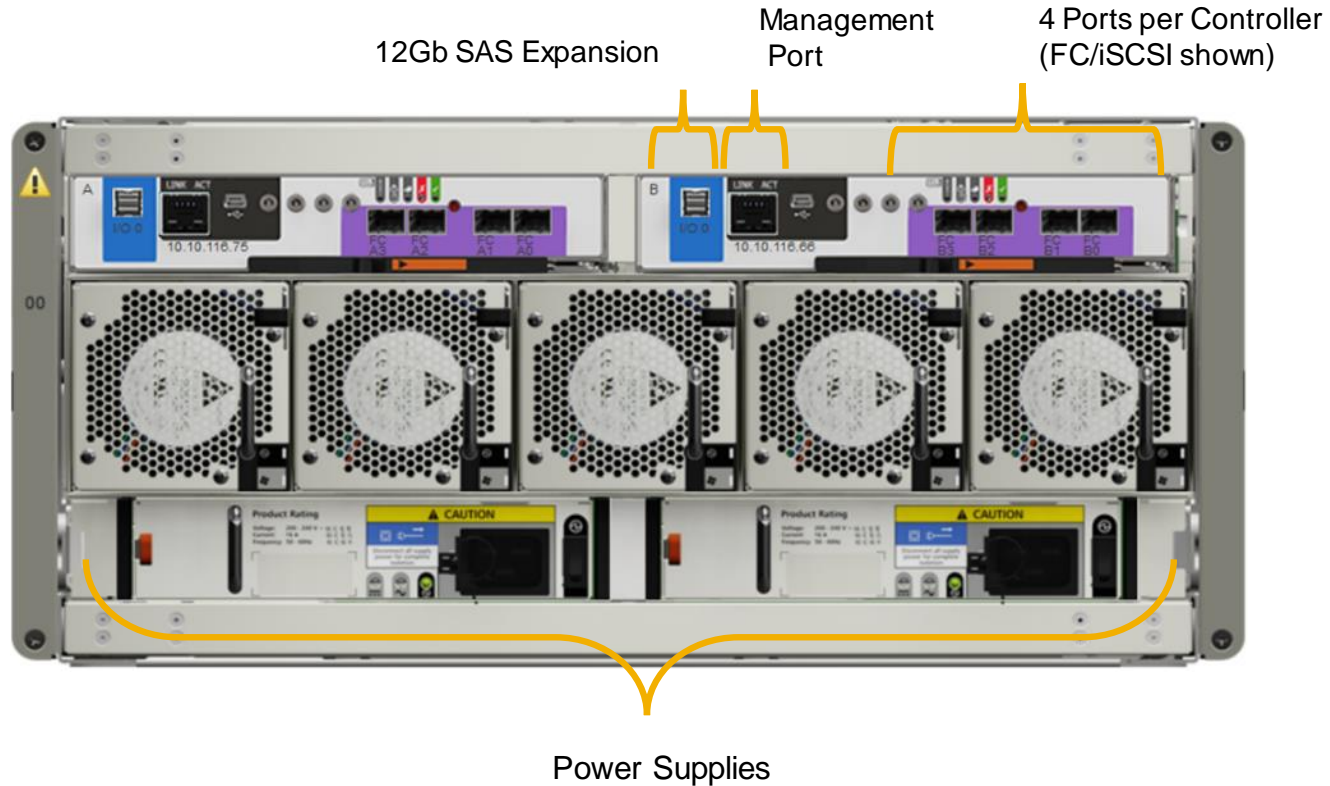
Power Supply

- 4 ports 10Gb iSCSI SFP+
- 4 ports 1/10Gb iSCSI BaseT
- 4 ports 8/16Gb FC
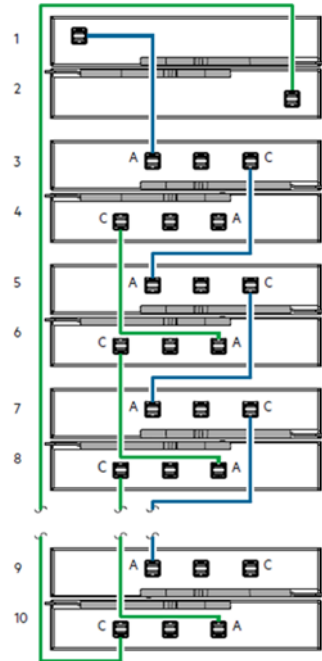- 4 ports 12Gb SAS
- 2 ports 8/16Gb FC and 2 ports 10G iSCSI SFP+

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PowerVault ME4 Series interface
Dual controller 5U rear view

12Gb SAS Expansion

Management Port

4 Ports per Controller (FC/iSCSI shown)

Power Supplies

D&LL Technologies

SAS expansion cabling

2U Controller and 2U Expansion

5U Controller and 5U Expansion

1   Controller module A (0A)
2   Controller module B (0B)
3   Expansion module 1A
4   Expansion module 1B
5   Expansion module 2A
6   Expansion module 2B
7   Expansion module 3A
8   Expansion module 3B
9   Expansion module 9A
10   Expansion module 9B

1   Controller module A (0A)
2   Controller module B (0B)
3   Expansion module 1A
4   Expansion module 1B
5   Expansion module 2A
6   Expansion module 2B
7   Expansion module 3A
8   Expansion module 3B

2U: Add up to 9 enclosures up to maximum
5U: Add up to 3 enclosures up to maximum

→   Refer to ME4 Series Placement and Dell EMC Deployment Guide (dell.com/support) for details and any updates

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PowerVault ME4 drive matrix

Drives		ME4012	ME4024	ME4084	ME412	ME424	ME484
		RBOD			**EBOD**		
7.2K NLSAS 3.5"	4TB	✓	N/A	✓	✓	N/A	✓
	8TB	✓	N/A	✓	✓	N/A	✓
	12TB	✓	N/A	✓	✓	N/A	✓
	12TB FIPS	✓	N/A	✓	✓	N/A	✓
	16TB	✓	N/A	✓	✓	N/A	✓
10K SAS 2.5"	1.2TB	✓	✓	✓	✓	✓	✓
	1.8TB	✓	✓	✓	✓	✓	✓
	2.4TB	✓	✓	✓	✓	✓	✓
	2.4TB FIPS	✓	✓	✓	✓	✓	✓
15K SAS 2.5"	900GB	✓	✓	✓	✓	✓	✓
SSD	480GB	✓	✓	✓	✓	✓	✓
	960GB	✓	✓	✓	✓	✓	✓
	1.92TB	✓	✓	✓	✓	✓	✓
	1.92TB FIPS	✓	✓	✓	✓	✓	✓
	3.84TB	✓	✓	✓	✓	✓	✓

Only these specific drives can be used in ME4 arrays and expansion chassis
336 drives x 12TB = 4PB
252 drives x 16TB = 4PB

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Solutions

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PowerVault ME4 Series solution stack flexibility

At-a-glance access to affordable technology options with radical simplicity

SOLUTION	HPC Parallel File Systems	Surveillance	Virtualization, VDI & Backup
BENEFIT	Throughput, Performance, Capacity Expansion	Archive; High Capacity/Density	Simple, Affordable, Fast, Flexible
VIRTUALIZATION	VMware vSphere; VMware Horizon View; Microsoft Hyper-V; Citrix XenServer		
MANAGEMENT	PowerVault Manager; CloudIQ; VMware SRM; OME; Nagios Core & XI		
INTEGRATIONS	SupportAssist; vSphere Plug-in; SRA Adapter; SMI-S integration with SCVMM		
PROTECTION	Snapshots; Replication; ADAPT; SED Drives		
INFRASTRUCTURE	PowerVault; PowerEdge; Networks; Monitoring Systems		

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PowerVault ME4 Series for HPC

Modular building blocks for scale-out storage with predictable performance/low latency

Scale Throughput:
to 21.3GB/s Writes
to 22.5GB/s Reads
(sequential)

Scale Capacity:
from
100's TBs
to 100's PBs

Scale Performance:
to 28.5K Write IOPS
to 34.06K Read IOPS

Ideal solution for BeeGFS (Linux), PixStor (SDS), more

BeeGFS®

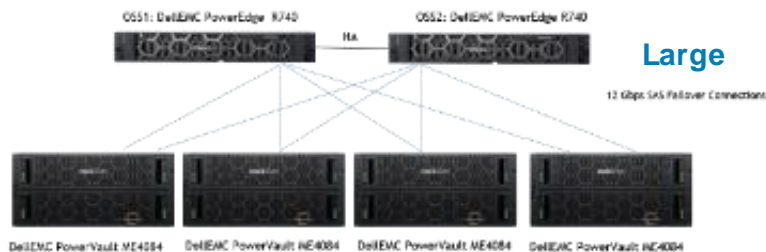PixStor: https://www.dell.com/support/article/en-us/sln318841/dell-emc-ready-solution-for-hpc-pixstor-storage?lang=en

BeeGFS: https://www.dell.com/support/article/us/en/19/sln319381/dell-emc-ready-solutions-for-hpc-beegfs-storage?lang=en
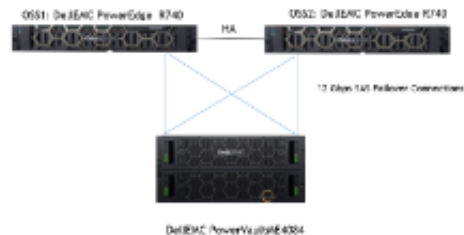
Small

Medium

Large

DELLTechnologies
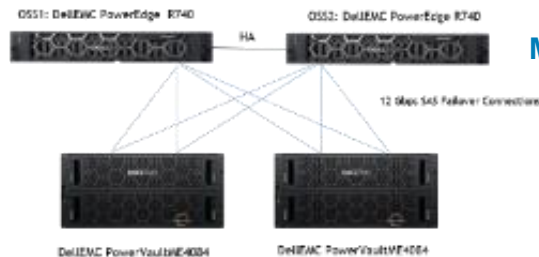
PowerVault ME4 Series for Virtual Desktops

Optimized virtual desktop experience for SMBs

| Linked Clone | Linked Clone | Linked Clone | Linked Clone |

vmware Horizon View

VMware vSphere

- Support up to **1300** persistent virtual desktops
  - PowerVault ME4024 & PowerEdge M620 Blade Server
- **1300** sessions launched in **<22** minutes
- Centralized desktop management
- Optimize user experiences & increase adoption

VDI Infrastructure

SAN/DAS

FC, iSCSI, SAS

PowerVault ME4 Series
Primary Storage

White paper: https://downloads.dell.com/manuals/common/powervault-me4024-vmware-horizon-reference-architecture-1300-users-3919-ra-vdi_en-us.pdf

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Integrations

PowerVault ME4 Series for Virtualization

Affordable virtualization for SMBs

VM **VM** **VM** **VM**

VMware

PowerEdge Virtualized App Server

VM **VM** **VM** **VM**

Hyper-V

PowerEdge Virtualized App Server
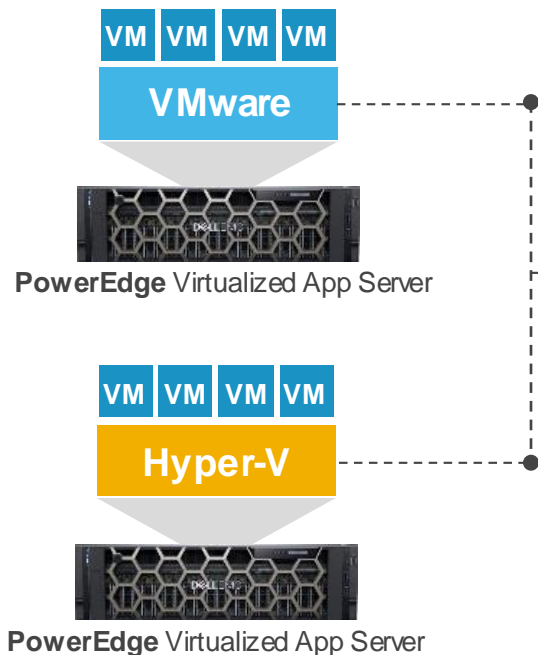
- Support/store **100's of VMs**[1]
- vSphere and Hyper-V hypervisors
- Integrates with SMI-S / MS SCVMM Supports PowerEdge Servers

PowerVault ME4 Production Storage

VMware Compatibility Guide

1 Variables such as volumes, RAID, configuration, cores, server, etc. will ultimately determine the actual value

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PowerVault ME4 Series: vSphere Plug-In & SRA Adapter

- Browser-based tool that integrates with the VMware vSphere 6.5+ Web Client

- Alternative interface that lets users monitor and manage a PowerVault ME4

For further information, download the Dell EMC PowerVault ME4 Series vSphere Client Plug-in User's Guide

- Storage Replication Adapter (SRA) for vSphere:
  - Enables full-featured use of VMware vCenter Site Recovery Manager (SRM) v6.5+
- Combine PowerVault replication with vCenter SRM:
  - SRA provides users with an automated solution for implementing and testing disaster recovery between geographically separated sites
  - Enables users to use SRM for planned migrations between two sites
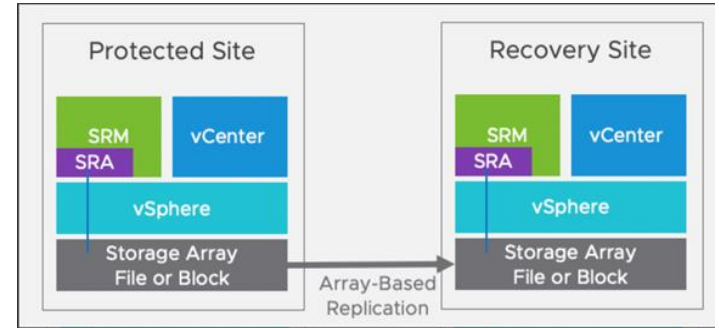
For further information, download the Dell EMC ME4 Series Storage Replication Adapter for vSphere User's Guide

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SupportAssist

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PowerVault with SupportAssist Enterprise & leading system management consoles

Support Automation

Automate your support experience with predictive, data-driven technology & **resolve issues up to 72%* faster**

SupportAssist Enterprise

- ✓ Automated issue detection, case creation, & system state information collection
- ✓ Proactive and predictive alerts
- ✓ On-demand reporting

* When combined with ProSupport Plus

Systems Management

Manage up to 15K server, storage or networking devices with management consoles to simplify and automate essential HW management tasks

OpenManage Enterprise

OpenManage Enterprise – Modular

OpenManage Essentials

Microsoft System Center Operations Manager

- ✓ Device discovery & Inventory
- ✓ Device monitoring and management
- ✓ Alert processing
- ✓ Bare-metal server deployment
- ✓ Server configuration maintenance
- ✓ Server firmware updates
- ✓ On-premise reporting

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Dell Technologies Services | PowerVault ME4 Series

Ultimate Choice & Flexibility
for the life of your system

Dell EMC ProDeploy Enterprise Suite

Dell EMC Data Migration Services

Dell EMC ProSupport Enterprise Suite

Plan, install & configure with confidence

Move data efficiently with minimal disruption

Get ahead of problems before they happen

With data-driven technologies to connect and manage your service experience

Resources

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Resources

- Materials in the [Dell EMC Sales Portal & Knowledge Center](#)
  - Spec and Data Sheets
  - Customer presentation
  - Sales Training; Quick Selling Guide
  - Internal and External Launch Videos

- [Dell EMC Virtual Rack](#)

- Sales Questions
  - Regional Leads
  - [Dell Pre-sales](#)
  - [PV-Tech](#) [PV-Tech@Dell.com](#)

- Online Documentation (dell.com/support) including:
  - Administrator's Guide; Owner's Manual; Deployment Guide

- StorageReview Review: [https://www.storagereview.com/dell_emc_powervault_me4_series_review](#)

- Product Video: [https://www.dellemc.com/resources/en-us/asset/presentations/products/storage/powervault_overview_video.mp4](#)

Technical Solutions

Technical Solution	Type	Technology
CCTV solution with ME4[1]	Solution Brief and Certification	Video surveillance
ESRP with 10K drives[1]	White Paper	Exchange Server
Data Warehouse Fast Track for SQL Server 2017	Ref Architecture and Deployment Guide	SQL Server
VDI ESX 6.5, Horizon View, max desktops[1]	Best Practices	Virtualization
OLTP SQL Solution[1]	White Paper	SQL Server
Microsoft Hyper-V	Best Practices	Windows Server
VMware vSphere	Best Practices	Virtualization
Microsoft SQL Server	Best Practices	SQL Server
Linux	Best Practices	Linux/Unix
Microsoft Exchange Server 2016	Best Practices	Exchange Server
HPC Lustre	Solution Brief, configurations and benchmarks	HPC

NEW: PowerVault ME4 Hands on Lab: [http://democenter.dell.com](#)

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