DELL Technologies

Spec Sheet

DELL EMC POWERSTORE STORAGE FAMILY

The ground-breaking Dell EMC PowerStore achieves new levels of operational simplicity and agility, utilizing a container-based architecture, advanced storage technologies, and intelligent automation to unlock the power of your data. Based on a scale-out architecture and hardware-accelerated advanced data reduction, PowerStore is designed to deliver enhanced resource utilization and performance that keeps pace with application and system growth. Utilizing the proven capabilities of VMware ESXi, PowerStore X models with AppsON provide the unique ability to host data-intensive and storage applications directly on the PowerStore system with a storage-based virtualization environment, with the flexibility of seamless movement of applications between the storage system and external VMware servers. PowerStore T models provide organizations with all the benefits of an enterprise unified storage platform for block, file and vVol data, while enabling flexible growth with the intelligent scale-up AND scale-out capability of appliance clusters.

Architecture

Based on a versatile scale-up and out platform utilizing Intel® Xeon® Scalable processors and today's most advanced storage technologies, including end-to-end NVMe Flash, dual-ported Intel® Optane™ SSDs, NVMe-FC and always-on data reduction, PowerStore uses powerful analytics, automation and active resource balancing to optimize performance and eliminate management overhead. Each appliance utilizes dual active-active storage nodes and a container-based software architecture to provide maximum adaptability.

Physical Specifications

PER APPLIANCE	500	1000	3000	5000	7000	9000
Max Drives	25	96	96	96	96	96
NVRAM per Appliance	N/A	2	2	4	4	4
Base Enclosure	A 2U, 2 node enclosure with twenty-five 2.5" NVMe drive slots					
Expansion Enclosure	N/A	A 2U enclosure attached to a PowerStore base enclosure with twenty-five 2.5" SAS drives slots (3 max per appliance)				
Power Supplies	PowerStore appliances are powered by 2 redundant power supplies (PS) per enclosure.					
Data Resiliency	Dynamic Resiliency Engine (DRE)					
CPUs per Appliance	2 x Intel CPUs, 24 cores, 2.2GHz	4 x Intel CPUs, 32 cores, 1.8GHz	4 x Intel CPUs, 48 cores, 2.1GHz	4 x Intel CPUs, 64 cores, 2.1GHz	4 x Intel CPUs, 80 cores, 2.4GHz	4 x Intel CPUs, 112 cores, 2.1GHz
System Cache / Memory	192 GB	384 GB	768 GB	1,152 GB	1,536 GB	2,560 GB
Max Mezzanine cards per Appliance*	2	2	2	2	2	2
Max IO Modules per Appliance**	4	4	4	4	4	4
Embedded SAS IO Ports per Appliance	N/A	4 x 4 lane 12Gb/s SAS ports for back end connection				

PER APPLIANCE	500	1000	3000	5000	7000	9000
Max front end Ports per Appliance (all types)	24	24	24	24	24	24
Max 16/32Gb FC Ports per Appliance	16	16	16	16	16	16
Max 10 Gbase-T/iSCSI Ports per Appliance	24	24	24	24	24	24
Max 10/25 GbE/iSCSI Ports per Appliance	24	24	24	24	24	24
Max Raw Capacity***	384 TB	898.56 TB	898.56 TB	898.56 TB	898.56 TB	898.56 TB
	349.25 TiB	817.36 TiB	817.36 TiB	817.36 TiB	817.36 TiB	817.36 TiB

* One Mezzanine card per node, mirrored.
** Two IO Modules per node, mirrored.
*** Value shown is vendor raw base capacity. TB is base-10 decimal (1000x1000x1000x1000). TiB is base-2 binary (1024x1024x1024x1024). For true appliance useable capacity data refer to Power Sizer.
Maximum raw capacity may vary based on drive sizes available at time of purchase.
Maximum logical capacity supported per appliance is 8 exabytes (EB).

Appliance System Limits

PER APPLIANCE	500	1000	3000	5000	7000	9000
Max Initiators	1,000	2,000	2,000	2,000	2,000	2,000
Max Block Volumes/Clones	1,000	2,000	2,000	2,000	2,000	2,000
Max Volumes per Volume Group	75	75	75	75	75	75
Max Volume Groups	125	125	125	125	125	125
Max Volume Size	256 TB	256 TB	256 TB	256 TB	256 TB	256 TB
Max Snapshots (Block)	50,000	100,000	100,000	100,000	100,000	100,000
Max User File Systems *	500	500	500	500	500	500
Max NAS Servers *	50	50	50	50	50	50
Max File System Size *	256 TB	256 TB	256 TB	256 TB	256 TB	256 TB
Max vVol Storage Containers	50	50	50	50	50	50
Max vVols	14,200	19,000	19,000	19,000	19,000	19,000
OS Support	See the Dell EMC Simple Support Matrix on delltechnologies.com					
	* Available for PowerStore T models only					

Cluster System Limits

PER CLUSTER			
Max. Appliances	4	Max Initiators	2,000
Max. Front End Ports	96	Max Initiators in an Initiator Group	1,024
Max. iSCSI sessions	2,048		

Maximum number of drives & maximum raw capacity of a PowerStore cluster will depend on the appliance level limits mentioned above.

Connectivity

Connectivity options via Mezzanine cards and IO modules for file, for NFS/SMB connectivity, and block storage for FC and iSCSI host connectivity (see above table for number of modules supported per node).

Connectivity Options		
Type	**Description**	**Details**
Mezzanine card / IO Module ▪▪	Two-Port 10 Gb/s Optical Module (Block)	Two port 10GbE IP/iSCSI module. Uses SFP+ optical connection or active/passive twinax copper connection to Ethernet switch
Mezzanine card / IO Module ▪▪▪	Four-Port 10Gbase-T Module (File & Block)	Four port 10Gbase-T Ethernet IP/iSCSI module with copper connection to Ethernet switch
Mezzanine card / IO Module	Four-Port 25 Gb/s Optical Module (File & Block)	Four port IP/iSCSI module with choice of 25GbE or 10GbE. Uses SFP+ optical connection or active/passive twinax copper connection to Ethernet switch
IO Module	Four-Port 32 Gb/s Fibre Channel Module (Block only)	Four port FC module with choice of 16Gb/s or 32Gb/s connectivity. Uses multimode optical SFP and OM2/OM3/OM4 cabling to connect directly to host HBA or FC switch
IO Module	Four-Port 10Gbase-T Module (Block Only) *	Four port 10Gbase-T Ethernet IP/iSCSI module with copper connection to Ethernet switch
IO Module	Four-Port 25 Gb/s Optical Module (Block Only) *	Four port IP/iSCSI module with choice of 25GbE or 10GbE. Uses SFP+ optical connection or active/passive twinax copper connection to Ethernet switch
	▪▪ Only available for PowerStore 500 ▪▪▪ Not available for PowerStore 500 * IO module type only available for PowerStore T models	

Back-end (Drive) Connectivity▪

Each node connects to one side of each of two redundant pairs of four-lane x 12 Gb/s Serial Attached SCSI (SAS) ports, providing continuous drive access to hosts in the event of a node or port fault.

Disk Expansion Enclosure	
25 X 2.5” Drive Enclosure	
Drive Types Supported	SAS SSD
Controller Interface	12 Gb SAS

▪ Not available for PowerStore 500

Supported Media					
Drive Type	**Interface**	**Raw base-10 Capacity ***	**Raw base-2 Capacity ****	**Base Enclosure**	**Expansion Enclosure**
NVMe SSD	PCIe	1.92 TB	1.7466 TiB	✓	
NVMe SSD	PCIe	3.84 TB	3.4931 TiB	✓	
NVMe SSD	PCIe	7.68 TB	6.9863 TiB	✓	
NVMe SSD	PCIe	15.36 TB	13.9707 TiB	✓	
NVMe Optane SCM SSD	PCIe	375 GB	349.3 GiB	✓	
NVMe Optane SCM SSD	PCIe	750 GB	698.6 GiB	✓	
NVMe Optane SCM SSD	PCIe	1.50TB	1.3645 TiB	✓	
SAS SSD ▪	12 Gb SAS	1.92 TB	1.7466 TiB		✓
SAS SSD ▪	12 Gb SAS	3.84 TB	3.4931 TiB		✓
SAS SSD ▪	12 Gb SAS	7.68 TB	6.9863 TiB		✓
* Base-10 vendor raw TB (bytes X (1000 x 1000 x 1000 x 1000)) ** Base-2 vendor raw TiB (bytes X (1024 x 1024 x 1024 x 1024)) All drives are 512 bytes/sector. All drives are FIPS 140-2 certified TCG SED ▪ Not available for PowerStore 500					

OE Protocols and Software Facilities

Support is provided for a wide variety of protocols and advanced features available via various software suites, plug-ins, drivers and packs.

Protocols and Facilities Supported		
Access-based Enumeration (ABE) for SMB protocol	Lock Manager (NLM) v1, v2, v3, and v4	REST API: Open API that uses HTTP requests to provide management
Address Resolution Protocol (ARP)	Management & Data Ports IPv4 or IPv6	RSVD v1 for Microsoft Hyper-V (SMB3)
Block Protocols: iSCSI, Fibre Channel (FCP SCSI-3), NVMe-FC	NAS Servers Multi-protocol for UNIX and SMB clients (Microsoft, Apple, Samba)	Simple Home Directory access for SMB protocol
DFS Distributed File System (Microsoft) as Standalone Root Server	Network Data Management Protocol (NDMP) v1-v4, 3-way	Simple Mail Transfer Protocol (SMTP)
Direct Host Attach for Fibre Channel	Network Information Service (NIS) Client	Simple Network Management Protocol v2c & v3 (SNMP) Trap support
Dynamic Access Control (DAC) with claims support	Network Status Monitor (NSM)	Virtual LAN (IEEE 802.1q)
Internet Control Message Protocol (ICMP)	Network Time Protocol (NTP) Client	VMware Virtual Volumes (vVols) 2.0
Kerberos Authentication	NFS v3/v4 Secure Support	vStorage APIs for Array Integration (VAAI)
LDAP (Lightweight Directory Access Protocol)	NT LAN Manager (NTLM)	vStorage APIs for Storage Awareness (VASA)

Security & Compliance
Common Criteria (in process)
Data at Rest Encryption (D@RE) in PowerStore utilizes FIPS 140-2 validated Self-Encrypting Drives (SEDs) by respective drive vendors for primary storage (NVMe SSD, NVMe SCM and SAS SSD). The NVRAM caching device is encrypted but not FIPS 140-2 validated at this time.
IPv6 certification
Native SHA2 certificate
Restriction of Hazardous Substances (RoHS) compliance
TLS 1.2 support by default, TLS 1.1 and older are disabled by default. TLS 1.1 can be optionally enabled.

Service and Support

World-Class Dell Technologies Services	
Deployment Services	• Dell EMC ProDeploy Enterprise Suite • Dell EMC Migration Services • Dell EMC Residency Services
Support Services	• Dell EMC ProSupport Enterprise Suite • Anytime Upgrades • Dell EMC Optimize for Storage
Services & Support Technologies	• MyService360 • SupportAssist Enterprise

Software	
All Inclusive Base Software	Management Software: • PowerStore Manager • CloudIQ: Cloud-based storage analytics • Thin Provisioning • Dynamic Resiliency Engine (DRE) – Single & Dual parity • Data Reduction: Zero Detect/Deduplication/Compression • Proactive Assist: Configure remote support, online chat, open a service request, etc. • Quality of Service (Block and vVols) Protocols: PowerStore T Models • Block • vVols • File Protocols: PowerStore X Models • Block • vVols Local Protection: • SED Based Encryption with self-managed key management • Local Point-In-Time Copies (Snapshots and Thin Clones) • AppSync Basic • Dell EMC Common Event Enabler; AntiVirus Agent Remote Protection: • Native Asynchronous Block Migration: • Native Block migration from Dell EMC Unity, VNX, SC Series, PS Series
Interface Protocols	Block: FC, NVMe-FC, iSCSI and VMware Virtual Volumes (vVols) 2.0 File: NFSv3, NFSv4, NFSv4.1; CIFS (SMB 1), SMB 2, SMB 3.0, SMB 3.02, and SMB 3.1.1; FTP and SFTP
Optional Solutions	• AppSync Advanced • Connectrix SAN • Data Protection Suite: Backup, Archive and Collaboration Software • Dell EMC RP4VM • PowerPath Migration Enabler • PowerPath Multipathing • PowerStore metro node (block synchronous metro Active/Active, zero RPO/RTO) • VPLEX
Note: For more details on software licensing, please contact your sales representative	

Virtualization and Container Solutions

PowerStore offers support for a wide variety of protocol and advanced features available via various software suites and packs including but not limited to:

- Dell EMC Virtual Storage Integrator (VSI) for VMware vSphere™: For provisioning, management, and cloning
- OpenStack Cinder Driver: For provisioning and managing block volumes within an OpenStack environment
- VMware Site Recovery Manager (SRM) Integration: Managing failover and failback making disaster recovery rapid and reliable
- Virtualization API Integration: VMware: VAAI and VASA.
- vRO Plugin for PowerStore
- Container Storage Interface (CSI) Plugin for PowerStore
- Ansible Module for PowerStore

Electrical Specifications

All power figures shown represent a worst-case product configuration with max normal values operating in an ambient temperature environment of 40°C.

The enclosure power numbers provided may increase when operating in a higher ambient temperature environment.

PowerStore Base System Enclosures						
	500	1000 Base	3000 Base	5000 Base	7000 Base	9000 Base
	25x2.5” drives, four IO modules	21x2.5” drives, 2xNVRAM modules four IO modules	21x2.5” drives, 2xNVRAM modules four IO modules	21x2.5” drives, 4xNVRAM modules four IO modules	21x2.5” drives, 4xNVRAM modules four IO modules	21x2.5” drives, 4xNVRAM modules four IO modules
POWER						
AC Line Voltage	240 VAC ± 10%, single phase, 47 to 63 Hz					
AC Line Current (operating maximum)	5.3 A max at 200V-240V (+/- 10%)	8.1 A max at 200V-240V (+/- 10%)	8.1 A max at 200V-240V (+/- 10%)	9.0 A max at 200V-240V (+/- 10%)	9.3 A max at 200V-240V (+/- 10%)	10.4 A max at 200V-240V (+/- 10%)
Power Consumption (operating maximum)	1061 VA (1040 W) max at 200V-240V (+/- 10%)	1629.6 VA (1597 W) max at 200V-240V (+/- 10%)	1629.6 VA (1597 W) max at 200V-240V (+/- 10%)	1792.9. VA (1757.96 W) max at 200V-240V (+/- 10%)	1868.4 VA (1831 W) max at 200V-240V (+/- 10%)	2088.8 VA (2047 W) max at 200V-240V (+/- 10%)
Power Factor	0.95 minimum at full load, @ 200 VAC					
Heat Dissipation (operating maximum)	3.74 x 106 J/hr (3,549 Btu/hr) max 200VAC	5.74 x 10^6 J/hr, (5,449 Btu/hr) max 200VAC	5.74 x 10^6 J/hr, (5,995 Btu/hr) max 200VAC	6.32 x 10^6 J/hr, (5,995 Btu/hr) max 200VAC	6.59 x 10^6 J/hr, (6,248 Btu/hr) max 200VAC	7.37 x 10^6 J/hr, (6,985 Btu/hr) max 200VAC
In-rush Current	45 Apk “cold” per line cord, at any line voltage					
Startup Surge Current	120 Apk “hot” per line cord, at any line voltage					
AC Protection	20 A fuse on each power supply, single line					
AC Inlet Type	IEC320-C14 or IEC320-C20	IEC320-C14 or IEC320-C20	IEC320-C14 or IEC320-C20	PowerStore 5000T IEC320-C14 or IEC320-C20 PowerStore 5000X IEC320-C20	IEC320-C20	IEC320-C20
Ride-through Time	10 ms min					
Current Sharing	± 5 percent of full load, between power supplies					
	Note: Power consumption values for enclosures are based on fully populated enclosures (power supplies, drives and I/O modules).					
WEIGHT AND DIMENSIONS						
Weight kgs/lbs	empty 30.38/66.97 full 37.4/82.4	empty 35.80/79 full 41.7/92	empty 35.80/79 full 41.7/92	empty 35.80/79 full 41.7/92	empty 35.80/79 full 41.7/92	empty 35.80/79 full 41.7/92
Vertical size	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units	2 NEMA units
Height cm/inches	8.72/3.43	8.72/3.43	8.72/3.43	8.72/3.43	8.72/3.43	8.72/3.43
Width cm/inches	44.72/17.61	44.72/17.61	44.72/17.61	44.72/17.61	44.72/17.61	44.72/17.61
Depth cm/inches	79.55/31.32	79.55/31.32	79.55/31.32	79.55/31.32	79.55/31.32	79.55/31.32

Drive Expansion Enclosure ▪	
	25 X 2.5” Drive Expansion Enclosure
POWER	
AC Line Voltage	100 to 240 VAC ± 10%, single phase, 47 to 63 Hz
AC Line Current (operating maximum)	4.50 A max at 100 VAC, 2.40 A max at 200 VAC
Power Consumption (operating maximum)	453.0 VA/ 432.0 W max at 100 VAC 485.0 VA/ 427.0 W max at 200VAC
Power Factor	0.95 minimum at full load, @ 100V/200V
Heat Dissipation (operating maximum)	1.56 x 10^6 J/hr, (1,474 Btu/hr) max at 100 VAC 1.54 x 10^6 J/hr, (1,457 Btu/hr) max at 200 VAC
In-rush Current	30 Apk “cold” per line cord, at any line voltage
Startup Surge Current	40 Apk “cold” per line cord, at any line voltage
AC Protection	15 A fuse on each power supply, single line
AC Inlet Type	IEC320-C14 appliance coupler, per power zone
Ride-through Time	12 ms minimum
Current Sharing	± 5 percent of full load, between power supplies
WEIGHT AND DIMENSIONS	
Weight kg/lbs	Empty: 10.0/22.1 Full: 20.23/44.61
Vertical size	2 NEMA units
Height cm/inches	8.64/3.40
Width cm/inches	44.45/17.5
Depth cm/inches	33.02/13
Note: Power consumption values for Base Enclosure and Expansion Enclosures are based on fully populated enclosures (power supplies, drives and I/O modules). ▪ Not available for PowerStore 500	

Cabinets	
	Standard 40U Cabinet
AC Line Voltage	200 to 240 VAC ± 10%, single-phase, 47 to 63 Hz
Power Configuration	One, two, three, four, five, six power domains, each redundant
Power Inlet Count	Two, four, six, eight, ten, or twelve (two per domain)
Plug Types	NEMA L6-30P or IEC309-332 P6 or IP57 (Australia)
Input Power Capacity	1 Domain: 4,800 VA @ 200 VAC, 5,760 VA @ 240 VAC 2 Domain: 9,600 VA @ 200 VAC, 11,520 VA @ 240 VAC 3 Domain: 14,400 VA @ 200 VAC, 17,280 VA @ 240 VAC 4 Domain: 19,200 VA @ 200 VAC, 23,040 VA @ 240 VAC 5 Domain: 24,000 VA @ 200 VAC, 28,800 VA @ 240 VAC 6 Domain: 28,800 VA @ 200 VAC, 34,560 VA @ 240 VAC
AC Protection	30 A site circuit breakers on each power branch
40U Cabinet Dimensions	Height - 75 in (190.8 cm); Width - 24.0 in (61.1 cm); Depth - 39.0 in (99.2 cm); Weight Empty – 380 lb (173 kg)

Operating Environment

	Description	Specification
Recommended Range Operation	The limits under which equipment will operate the most reliably while still achieving reasonably energy-efficient data center operation.	18°C to 27°C (64.4°F to 80.6°F) and 15°C (59°F) dew point
Continuous Allowable Range Operation	Data center economization techniques (e.g. free cooling) may be employed to improve overall data center efficiency. These techniques may cause equipment inlet conditions to fall outside the recommended range but still within the continuously allowable range. Equipment may be operated without any hourly limitations in this range.	5°C to 35°C (50°F to 95°F) at 20% to 80% relative humidity with 21°C (69.8°F) maximum dew point (maximum wet bulb temperature). De-rate maximum allowable dry bulb temperature at 1°C per 300m above 950m (1°F per 547 ft above 3117 ft).
Improbable Operation (Excursion Limited)	During certain times of the day or year, equipment inlet conditions may fall outside the continuously allowable range but still within the expanded improbable range. Equipment operation is limited to ≤ 10% of annual operating hours in this range.	35°C to 40°C (with no direct sunlight on the equipment) at -12°C minimum dew point and 8% to 85% relative humidity with 24°C maximum dew point (wet bulb temperature). Outside the continuously allowable range (10°C to 35°C), the system can operate down to 5°C or up to 40°C for a maximum of 10% of its annual operating hours. For temperatures between 35°C and 40°C (95°F to 104°F), de-rate maximum allowable dry bulb temperature by 1°C per 175m above 950m (1°F per 319 ft above 3117 ft).
Temperature Gradient		20°C / hour (36°F / hour)
Altitude	Max Operating	3050m (10,000ft)

Statement of Compliance

Dell EMC Information Technology Equipment is compliant with all currently applicable regulatory requirements for Electromagnetic Compatibility, Product Safety, and Environmental Regulations where placed on market.

Detailed regulatory information and verification of compliance is available at the Dell Regulatory Compliance website. http://dell.com/regulatory_compliance.

Learn more about Dell EMC PowerStore solutions

Contact a Dell EMC Expert