



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) | | | | | |
| 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 | | | | |
| Max front end Ports per Appliance (all types) | 28 | 24 | 24 | 24 | 24 | 24 |
| Max 16/32Gb FC Ports per Appliance | 16 | 16 | 16 | 16 | 16 | 16 |

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| PER APPLIANCE | 500 | 1000 | 3000 | 5000 | 7000 | 9000 |
|--|------------|------------|------------|------------|------------|------------|
| Max 10 Gbase-T/iSCSI Ports per Appliance | 24 | 24 | 24 | 24 | 24 | 24 |
| Max 10/25 GbE/iSCSI Ports per Appliance | 28 | 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 |
| <p>* One Mezzanine card per node, mirrored.</p> <p>** Two IO Modules per node, mirrored.</p> <p>*** 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.</p> <p>Maximum raw capacity may vary based on drive sizes available at time of purchase.</p> <p>Maximum logical capacity supported per appliance is 8 exabytes (EB).</p> <p>**** 4 Onboard ports by default</p> | | | | | | |

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 **** Ports 2 and 3 on the 4-Port Mezzanine card on 500T are reserved for future use * 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 | 750 GB | 698.6 GiB | ✓ | |
| 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, NVMe/TCP | 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 | <ul style="list-style-type: none"> Dell EMC ProDeploy Enterprise Suite Dell EMC Migration Services Dell EMC Residency Services |
| Support Services | <ul style="list-style-type: none"> Dell EMC ProSupport Enterprise Suite Anytime Upgrades Dell EMC Optimize for Storage |
| Services & Support Technologies | <ul style="list-style-type: none"> MyService360 SupportAssist Enterprise |

| Software | |
|---|---|
| All Inclusive Base Software | <p>Management Software:</p> <ul style="list-style-type: none"> • 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) <p>Protocols: PowerStore T Models</p> <ul style="list-style-type: none"> • Block • vVols • File <p>Protocols: PowerStore X Models</p> <ul style="list-style-type: none"> • Block • vVols <p>Local Protection:</p> <ul style="list-style-type: none"> • 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 <p>Remote Protection:</p> <ul style="list-style-type: none"> • Native Asynchronous Block <p>Migration:</p> <ul style="list-style-type: none"> • Native Block migration from Dell EMC Unity, VNX, SC Series, PS Series |
| Interface Protocols | <p>Block: FC, NVMe/FC, iSCSI and VMware Virtual Volumes (vVols) 2.0</p> <p>File: NFSv3, NFSv4, NFSv4.1; CIFS (SMB 1), SMB 2, SMB 3.0, SMB 3.02, and SMB 3.1.1; FTP and SFTP</p> |
| Optional Solutions | <ul style="list-style-type: none"> • 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 |
| <p>Note: For more details on software licensing, please contact your sales representative</p> | |

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 | 100- 240 VAC ± 10%, single phase, 47 to 63 Hz (500T) 240 VAC ± 10%, single phase, 47 to 63 Hz (1000-9000) | | | | | |
| AC Line Current (operating maximum) | 10.6 A max at 100V 5.3 A max at 200V | 8.1 A max at 200V | 8.1 A max at 200V | 9.0 A max at 200V | 9.3 A max at 200V | 10.4 A max at 200V |
| Power Consumption (operating maximum) | 1061 VA (1040 W) max at 200V-240V | 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 10 ⁶ 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-C20 (100VAC) (500T Low line) EC320-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 |
| * PowerStore 500T supports running native low line power (100-120VAC +/- 10%) | | | | | | |

| 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 42U 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 | 20 A site circuit breakers on each power branch |
| 42U Cabinet Dimensions | Height – 78.4 in (199.1 cm); Width - 23.6 in (60.0 cm); Depth - 39.3 in (99.8 cm); Weight Empty – 387 lb (176 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.



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