DELL Technologies

Specification Sheet

DELL POWERMAX

Dell PowerMax 2500 and 8500

The most recent PowerMax models deliver unprecedented levels of performance at scale, alongside industry-leading cyber resiliency, intelligent automation, and remarkable efficiency, all aimed at unleashing the true potential of data. Built upon the foundation of PowerMaxOS 10, an innovative NVMe scale-out architecture, and incorporating cutting-edge global inline data reduction, PowerMax not only ensures extreme performance at scale but also offers heightened adaptability and unparalleled efficiency, ultimately boosting your competitive edge.

The PowerMax 2500 provides organizations with an attractive entry point into mission-critical storage with up to 7x[1] more storage capacity (8PBe) packaged in half the footprint vs. previous models. Combined with the industry's richest data services, the 2500 offers flexibility and agility to support demanding mixed workloads of block, file, and mainframe storage with the highest levels of availability and cyber resiliency. Both models come with a 4:1 data reduction guarantee for Open Systems and 3:1 for Mainframe.

Dell PowerMax Array

The PowerMax 8500 delivers extreme performance at scale for massive consolidation of block, file, and mainframe storage to reduce complexity and drive down TCO. Customers can start small with two nodes and grow large to 16 nodes and up to 18PBe of total capacity. The 8500 is ideal for the most demanding mixed workloads that require always-on operations with the industry's most advanced cyber resiliency including the PowerMax cyber vault solution.

Based on the powerful Dynamic Fabric architecture, the PowerMax offers a powerful yet flexible design to independently grow nodes and storage capacity in increments of a single drive. The PowerMax 2500 & 8500 utilize Intel® Xeon® Scalable processors and today's most advanced storage technologies including end-to-end NVMe, InfiniBand 100Gb/s, dual-ported NVMe flash drives, NVMe/TCP connectivity, and hardware-based data reduction. Each PowerMax model is designed for 6 nines of data availability and delivers continuously modern storage throughout its product lifecycle with Dell's Future-Proof program, seamless data mobility, and PowerMaxOS upgrades in under 6 seconds[2].

Specifications

Scale up and Scale out

PowerMax is built from modular storage components for compute and storage media. The compute modules are packaged as node pairs. Each node pair contains two PowerMax compute nodes, complete software and licensing, cache memory, redundant power, and connectivity modules. These are combined with 48-slot Dynamic Media Enclosures (DMEs) to configure NVMe flash drives. PowerMax arrays are delivered with all-inclusive software. NVMe drive capacity can be added to the system to scale up to a total effective capacity of 8 PBe on the PowerMax 2500 and up to 18 PBe on the PowerMax 8500.

Detailed specifications and a comparison of the PowerMax 2500 and 8500 arrays follow:

[1]Based on Dell's internal analysis comparing Effective Storage Capacity of the PowerMax 2500 compared with the PowerMax 2000, April 2023. Actual storage capacities will vary.

[2]Based on Dell's internal analysis measuring the time used to upgrade PowerMaxOS without disruption on PowerMax 2500/8500, April 2023.

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Array family	PowerMax 2500	PowerMax 8500
Node Pairs		
NUMBER OF NODE PAIRS	1 to 2	1 to 8
NODE PAIR MODULE	3U	3U
CPU	Memory config 1-3: Intel Xeon Gold 5218 2.8 GHz with 16 core[1] Memory config 4: Intel Xeon Gold 6240L	Memory config 2-3: Intel Xeon Gold 6254 3.9 GHz with 18 core[1] Memory Config 4: Intel Xeon Gold 8280L
CORE NUMBER PER CPU/PER NODE PAIR/PER SYSTEM	16/64/128	18/72/576
DYNAMIC FABRIC	Direct Connection InfiniBand: 100 Gbps per port	InfiniBand Dual Redundant Fabric: 100 Gbps per port
CACHE		
CACHE-SYSTEM MIN (RAW)	896GB	1792GB
CACHE-SYSTEM MAX (RAW)	15.36TB	45.056TB[4]
CACHE-PER NODE PAIR OPTIONS	896GB, 1.792TB, 3.584TB, 7.680TB	1.792TB, 3.584TB, 7.680TB
VAULT		
VAULT STRATEGY	Vault to Flash	Vault to Flash
VAULT IMPLEMENTATION	2 to 4 NVMe SED Flash Module/Node Pair[3]	4 NVMe SED Flash Module /Node Pair[3]
FRONT-END I/O MODULES		
MAX. FRONT-END I/O MODULES/NODE PAIR	8	8
FRONT-END I/O MODULES AND PROTOCOLS SUPPORTED	4 x 32Gbs (FC, FICON, SRDF) 4 x 25GbE (iSCSI, SRDF, NVMe/TCP) 4 x 10GbE (iSCSI, SRDF, NVMe/TCP) 1 x zHyperlink Port (MF, zHyperlink)	4 x 32Gbs (FC, FICON, SRDF) 4 x 25GbE (iSCSI, SRDF, NVMe/TCP) 4 x 10GbE (iSCSI, SRDF, NVMe/TCP) 1 x zHyperlink Port (MF, zHyperlink)
POWERMAX FILE MODULES		
MAX FILE I/O MODULES/SOFTWARE NODES	4	4
FILE I/O MODULES SUPPORTED	10 GbE: 4 x 10GbE File 25 GbE: 4 x 25GbE File	10 GbE: 4 x 10GbE File 25 GbE: 4 x 25GbE File
POWERMAX FILE SOFTWARE NODES		
MAX SOFTWARE FILE NODES	4 (1 per Node, 2 per Node pair)	8 (1 per Node, 2 per Node pair)
MAX FILE CAPACITY/ARRAY (PETABYTES USABLE)	8PiBe	18PiBe
CLOUD MOBILITY MODULES FOR DELL POWERMAX		
CLOUD MOBILITY I/O MODULES SUPPORTED	25GbE: 2 x 25GbE	25GbE: 2 x 25GbE
MINIMUM REQUIRED TO SUPPORT CLOUD MOBILITY	2 x 25GbE: 2 ports out of each 25GbE SLiC[2]	2 x 25GbE: 2 ports out of each 25GbE SLiC[2]

[1] CPUs run continuously in turbo mode, except at significantly high ambient temperatures.

[2] The 2 remaining ports can be allocated for PowerMax File.

[3] Encryption will be disabled if not ordered.

[4] Memory Config 4 is limited to a maximum of 4 node pairs in PowerMax 8500.

Array family	PowerMax 2500	PowerMax 8500
CAPACITY, DRIVES		
Max Capacity per Array (Open)[1,7]	8PiBe / 8.8 PBe	18 PiBe / 20 PBe
Base capacity (Open)	15.36TBu	30.71TBu
Max Capacity per Array (Mainframe)[7, 8]	3.8PiBe / 4.1PBe	9.8 PiBe / 10.7PBe
Base capacity (Mainframe)	15.36TBu	15.36TBu
Incremental Flash Capacity Upgrades	3.84TB, 7.68TB, 15.36TB, 30.72TB[3]	3.84TB, 7.68TB, 15.36TB[3]
Maximum Drives per Array	96	384
Maximum Drives per System Bay	96/192/288[2]	192/384
Minimum Drive Count per System	10	10
NVMe DRIVES		
NVMe units accepted (2.5 in.)	3.84TB, 7.68TB, 15.36TB, 30.72TB[3]	3.84TB, 7.68TB, 15.36TB[3]
Interface BE	NVMe/NVMeoF via InfiniBand fabric	NVMe/NVMeoF via InfiniBand fabric
Flexible Raid options with support	RAID1 (1+1) RAID 5(4+1)[6] RAID 5(8+1) RAID 5(12+1) RAID 6(12+2)	RAID1 (1+1) RAID 5(8+1) RAID 5(12+1) RAID 6(12+2)
Mixed RAID group support	No	No
Support for Mixed Drive Capacities	Yes[3]	Yes[3]
NVMe DYNAMIC MEDIA ENCLOSURE		
48 x 2.5” Drive DME	Yes	Yes
CABINET SETTINGS		
Standard 19" bays	Yes	Yes
System Bay configurations	Up to 3 Systems/Bay	Up to 6 Node Pairs/Bay[4,5]
Third-party rack mount option	Yes	Yes
DISPERSION		
Standard and third-party enclosures	N/A — single floor tile system	Yes
PRE-CONFIGURATION FROM FACTORY		
100% Thin Provisioned	Yes	Yes
HOST SUPPORT		
Open Systems	Yes	Yes
Mainframe	Yes	Yes
Mixed Mainframe and Open Systems	Yes	Yes
POWER OPTIONS		
Input power options	Single phase or three-phase Delta or Wye	Single phase or three-phase Delta or Wye

[1] Maximum capacity per array based on 4:1 Data Reduction.

[2] 288 drives can be supported in a single cabinet when three systems are packaged in the same rack.

[3] Up to two consecutive compatible drive capacities, e.g. 3.84TB and 7.68TB are supported per storage resource pool (SRP.)

[4] This is based off a dense configuration. System bay configuration can also support a balanced configuration.

[5] Dense configurations allow 6 node pairs in System Bay 1 and 2 additional node pairs in System Bay 2.

[6] Only supports 3.84TB drives.

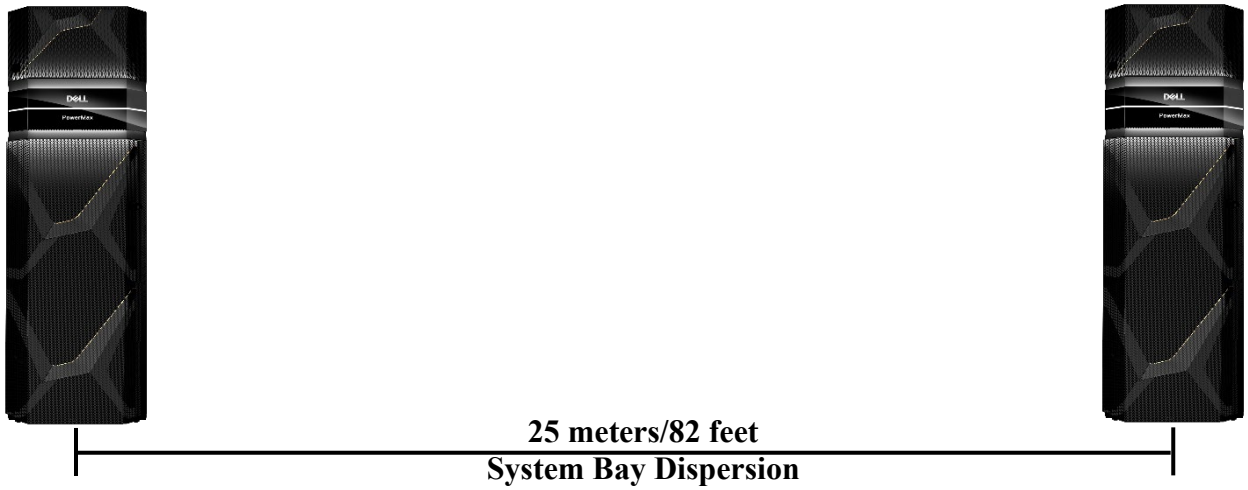
[7] PB is base-10 decimal notation (1000x1000x1000x1000x1000). PiB is base-2 binary notation (1024x1024x1024x1024x1024).

[8]Maximum mainframe capacity is based on 3:1 Data Reduction.

Array family	PowerMax 2500	PowerMax 8500
SRDF AND FRONT-END I/O PROTOCOLS COMPATIBLE		
32 Gb/s FC Host Ports		
Maximum/Node Pair	32	32
Maximum number per array	64	256
32 Gb/s FICON Ports		
Maximum/ Node Pair	32	32
Maximum number per array	64	256
32 Gb/s SRDF Ports		
Maximum/ Node Pair	32	32
Maximum number per array	64	256
25 GbE iSCSI Ports (Optical)		
Maximum/Node Pair	32	32
Maximum number per array	64	256
25 GbE SRDF Ports (Optical)		
Maximum/Node Pair	32	32
Maximum number per array	64	256
25 GbE NVMe/TCP Ports (Optical)		
Maximum/Node Pair	32	32
Maximum number per array	64	256
10 GbE iSCSI Ports (Optical)		
Maximum/Node Pair	32	32
Maximum number per array	64	256
10 GbE SRDF Ports (Optical)		
Maximum/Node Pair	32	32
Maximum number per array	64	256
10 GbE NVMe/TCP Ports (Optical)		
Maximum/Node Pair	32	32
Maximum number per array	64	256
zHyperlink ports		
Maximum number of ports/Node Pair	2	2
Maximum number of ports per array	4	4
EMBEDDED File Ports		
25 GbE File ports		
Maximum number of software data transfer/ports	4	4
Maximum number of ports per array	16	32

System bay dispersion

System Bay Dispersion allows customers to separate any individual or contiguous group of system bays by up to a distance of 82 feet (25 meters) from System Bay 1. This provides unsurpassed datacenter flexibility in solving floor loading constraints or working around obstacles that might preclude fully contiguous configurations. This is applicable only to the PowerMax 8500, as the PowerMax 2500 is a single-bay solution.



Support for flash drives

The PowerMax 2500 and PowerMax 8500 support the latest dual-ported native NVMe Flash units. All drives support two independent I/O channels with automatic failover fault isolation. Consult your Dell sales representative for the latest list of supported drives and types. All capacities are based on 1 GB = 1,000,000,000 bytes. Actual usable capacity may vary by configuration.

2.5" NVMe flash drives used in base systems and capacity pack upgrades

Platform support	PowerMax 2500/8500	PowerMax 2500/8500	PowerMax 2500/8500	PowerMax 2500 Mem Config 4 Only
Nominal capacity (GB)	3840[1]	7680[1]	15360[1]	30720[1]
Type	NVMe Flash	NVMe Flash	NVMe Flash	NVMe Flash
Raw capacity (GB)	3840	7680	15360	30720
Open systems formatted capacity (GB)[2]	3840.30	7680.61	15047.65	30095.05
Mainframe 3390 formatted capacity (GB)[2]	3840.30	7680.61	15047.65	30095.05

[1] In any configuration, capacity upgrades can contain a maximum of two different underlying drive sizes to achieve the best useful capacity desired. This is automatically optimized by the configuration tools.

[2] Formatted capacities shown are for RAID 5 (12+1). Values vary slightly with different RAID types.

Energy consumption and heat dissipation at <26°C and >35°C

Component	PowerMax 2500				PowerMax 8500			
Maximum power and heat dissipation at temperatures < 26°C [2] and > 35°C [3]	Maximum total power consumption (kVA)		Maximum heat dissipation (Btu/h)		Maximum total power consumption (kVA)		Maximum heat dissipation (Btu/h)	
	< 26°C	> 35°C	< 26°C	> 35°C	< 26°C	> 35°C	< 26°C	> 35°C
System Cabinet 1, Single (Node Pair, Single DME) PowerMax 2500	2.213	3.131	7,551	10.683	N/A	N/A	N/A	N/A
System Cabinet 1, Two (Single Node Pair, Single DME) PowerMax 2500	4.426	6.262	15,102	21,366	N/A	N/A	N/A	N/A
System Cabinet 1, Three (Single Node Pair, Single DME) PowerMax 2500	6.639	9.393	22,654	32,049	N/A	N/A	N/A	N/A
System Cabinet 1, One (Dual Node Pair, Dual DME) PowerMax 2500	4.426	6.262	15,102	21,366	N/A	N/A	N/A	N/A
System Cabinet 1, Two (Dual Node Pair, Dual DME) PowerMax 2500	8.852	12.524	30,205	42,732	N/A	N/A	N/A	N/A
System Cabinet 1, Three (Dual Node Pair, Dual DME) PowerMax 2500	13.278	18.785	45,307	64,099	N/A	N/A	N/A	N/A
System Cabinet 1, Balanced (Four Node Pair, Four DME) PowerMax 8500	N/A	N/A	N/A	N/A	11.178	14.736	38,140	50,281
System Cabinet 2, Balanced (Four Node Pair, Four DME) PowerMax 8500	N/A	N/A	N/A	N/A	10.846	14.404	37,007	49,148
System Cabinet 1, Dense (Six Node Pair, Four DME) PowerMax 8500	N/A	N/A	N/A	N/A	14.899	19.376	50,839	66,115
System Cabinet 2, Balanced (Two Node Pair, Four DME) PowerMax 8500	N/A	N/A	N/A	N/A	7.124	9.764	24,308	33,315

[1] Power values for configurations with two, three, and four node pairs, placed in the System 2 Enclosure (PowerMax 8500 only)

[2] Values at <26 °C reflect the maximum values in a more stable state during normal operation

[3] Power values and heat dissipations are shown at >35 °C to reflect the higher power levels associated with both the battery recharge cycle and the initiation of high ambient temperature Adaptive Cooling algorithms.

Physical specifications

Component	Height (in./cm)	Width (in./cm)	Depth (in./cm)	Weight (maximum lb/kg)
System Bay 1, Four Node Pair, Four DME (Balanced) PowerMax 8500	78.4/199.2	23.5/60	47.3/120	1537/697
System Bay 2, Four Node Pair, Four DME (Balanced) PowerMax 8500	78.4/199.2	23.5/60	47.3/120	1410/640
System Bay 1, Six Node Pair, Four DME (Dense) PowerMax 8500	78.4/199.2	23.5/60	47.3/120	1806/819
System Bay 2, Dual Node Pair, Four DME (Dense) PowerMax 8500	78.4/199.2	23.5/60	47.3/120	1136/515
System Bay 1, Single Node Pair, Single DME PowerMax 2500	78.4/199.2	23.5/60	45.2/114.8	675/306
System Bay 1, Dual Node Pair, Dual DME PowerMax 2500	78.4/199.2	23.5/60	45.2/114.8	900/408
System Bay 1, Three Node Pair, Three DME PowerMax 2500	78.4/199.2	23.5/60	45.2/114.8	1125/510
System Bay 1, Four Node Pair, Four DME PowerMax 2500	78.4/199.2	23.5/60	45.2/114.8	1375/624
System Bay 1, Six Node Pair, Six DME PowerMax 2500	78.4/199.2	23.5/60	45.2/114.8	1838/834

Input power requirements

Single phase North American, International and Australian

Specification	North American 3-wire connection (2 L and 1 G)[1]	International and Australian 3-wire connection (1 L, 1 N and 1 G)[1]
Input nominal voltage	200 - 240 VAC +/- 10% L – L nom	220 - 240 VAC +/- 10% L – N nom
Frequency	50 - 60 Hz	50 - 60 Hz
Circuit Breakers	30 A	30 or 32 A
Power zones	Two	Two
PowerMax 2500 minimum input line cord requirements per system	One-Node Pair, one-DME system: One 30 A or 32 A single-phase line cord per power zone for each system.	
PowerMax 2500 maximum input line cord requirements per system	Two-Node Pair, two-DME system: Two 30 A or 32 A single-phase line cords per power zone.	
PowerMax 8500 minimum input line cord requirements per system	One-Node Pair, one-DME system: One 30 A or 32 A single-phase line cord per power zone.	
PowerMax 8500 maximum input line cord requirements per system	Six-Node Pair, four-DME system in one rack: Six 30 A or 32 A single-phase line cords per power zone.	

[1] L = line or phase, N = neutral, G = ground

Three-phase North American, International, Australian

Specification	North American (DELTA) 4-wire connection (3 L and 1 G)[1]	International (WYE) 5-wire connection (3 L, 1 N and 1 G)[1]
Input voltage [2]	200 - 240 VAC +/- 10% L – L nom	220 - 240 VAC +/- 10% L – N nom
Frequency	50 - 60 Hz	50 - 60 Hz
Circuit Breakers	50 A	30/32 A
Power zones	Two	Two
Minimum power requirements at customer site	One 50 A three-phase line cord per power zone.	One 30 A or 32 A three-phase line cord per power zone.
Maximum power requirements at customer site[3]	Two 50 A three-phase line cords per power zone.	Two 30 A or 32 A three-phase line cords per power zone.

[1]L = line or phase, N = neutral, G = ground

[2]An imbalance of AC input currents may exist on the three-phase power source feeding the array, depending on the configuration. The customer's electrician must be alerted to this possible condition to balance the phase-by-phase loading conditions within the customer's data center

[3]A second input AC line cord must be added for each power zone when the total number of Node Pairs and DAEs (combined) in a rack reaches seven.

Radio frequency interference

Electro-magnetic fields which include radio frequencies can interfere with the operation of electronic equipment. Dell products have been certified to withstand radio frequency interference in accordance with EN61000-4-3. In Data Centers that employ intentional radiators, such as cell phone repeaters, the maximum ambient RF field strength should not exceed 3 volts/meter.

Repeater power level (watts)	Recommended minimum distance (feet/meters)
1	9.84 FT (3 M)
2	13.12 (4 M)
5	19.69 FT (6 M)
7	22.97 FT (7 M)
10	26.25 FT (8 M)
12	29.53 FT (9 M)
15	32.81 FT (10 M)

Dell Technologies global services

Dell Technologies World Class Services	
Implementation services	• Dell ProDeploy Enterprise Suite • Dell Data Migration Services • Dell Residency Services • Dell Data Sanitization Services for Enterprise
Support services	• Dell ProSupport Enterprise Suite • Dell Keep Your Hard Drive for Enterprise
Managed services	• Dell Managed Services for Storage
Dell Technologies Consulting Services	• Advisory Services workshops
Dell Technologies Education Services	• PowerMax technical training courses and certifications
Support technology and services	• MyService360 • Secure Remote Services, SupportAssist Enterprise

DECLARATION OF CONFORMITY

Dell Technologies IT equipment complies with all applicable regulatory requirements for electromagnetic compatibility, product safety, and environmental standards when placed on the market. Detailed regulatory information and compliance verification are available on the Dell standards compliance website. http://dell.com/regulatory_compliance

This product has been tested and verified whether it will work within the permitted range of environmental attributes of ashrae's 2-level operating condition class between 10°C and 35°C and within the corresponding relative humidity range.

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