Dell PowerMax

Industry's most secure and energy-efficient mission-critical storage[1]

ESSENTIALS

✓ New trusted, intelligent, continuously modern storage powers performance demanding mission-critical workloads while simplifying operations with breakthrough energy-efficiency.

✓ End-to-end NVMe and next-generation Dynamic Fabric architecture eliminates traditional storage boundaries, delivers massive scalability, low latency, and high availability

✓ Modernize and ensure sustainability without disruption with Dell's Future-Proof Program

Trusted Innovation

- **Consolidate all workloads** – multi-node NVMe scale-out architecture consolidates open systems, mainframe, file, and IBM i storage.

- **Breakthrough efficiency** – up to 2.8x more IOPS/watt[3], up to 82% reduction in greenhouse gases[4], inline data reduction with 5:1 data reduction guarantee[5] and 3:1 DRR guarantee for mainframe[6]

- **Performance optimized** – new Dynamic Fabric technology with NVMe/RDMA, 2x faster performance[7], 50% better response times.[8]

- **Always-on availability** – eliminates unplanned downtime/data loss with unmatched async, sync, metro, multi-site remote replication, and SmartDR

Intelligent Automation

- **AI-driven workload optimization** – automates storage resource optimization across arrays

- **Streamlined NVMe/TCP setup** – up to 44% less time to configure NVMe/TCP resources[9], support for VMware vVols on NVMe/TCP networks

- **Integrated management** – fully integrated File management for setup, changes, replication tasks

Cyber Resiliency

- **Most secure storage** – designed to accelerate Zero Trust adoption[10], built-in hardware root of trust, secure boot, digitally signed firmware updates

- **Intrinsic protection** – from unauthorized access via multi-factor authentication via RSA SecureID

- **Anomaly detection** – continuous cyberattack anomaly detection with the industry's first cyber intrusion detection for mainframe[11] (zCID)

- **Cyber recovery** – most granular cyber recovery at scale recovers more data from cyberattacks, enabled by up to 65M secure snaps per array[12]

- **Cyber vault** – SRDF air-gap solution isolates data from the production network in a secure vault

Today's mission-critical applications require an innovative approach to enterprise storage infrastructure

In today's digital economy, unparalleled software innovation, multi-cloud agility and advancements in workflow automation have given organizations the opportunity to leverage data to become disruptive and innovative. Organizations need to reduce the time between data creation and innovation to keep pace with business demands and capitalize on opportunities. However, they face numerous headwinds. Data is growing exponentially and is more diverse and distributed than ever before. In addition, organizations are struggling to breakdown internal operational silos while protecting their IT infrastructure from sophisticated cyber security threats and increase developer productivity.

To address these challenges, organizations need trusted, innovative, and efficient enterprise storage that provides unparalleled performance, scalability, and security at scale without compromise. Dell's next-gen PowerMax is designed to be secure, intelligent, and always modern so that businesses can fully unlock the power of data.

The latest PowerMaxOS 10 release builds on decades of software innovation to provide trusted, intelligent, and secure storage for the most demanding mission-critical workloads while simplifying operations. Based on NVMe Dynamic Fabric technology, the new PowerMax systems eliminate traditional storage boundries in every dimension—performance, scalability, capacity, energy-efficiency, and security—to meet the increasing demands of traditional workloads and next generation cloud-based applications.

Built to consolidate

PowerMax is designed to consolidate demanding mixed workloads through extreme levels of performance and unprecedented response times. It is modern scale-up and scale-out architecture is ideal for relational databases, real-time analytics, demanding transaction processing workloads and big data applications that require uncompromising uptime and extremely low latency.

Dell's newest PowerMax systems consist of two models, the PowerMax 2500 and 8500, that are offered with an inclusive software bundle to simplify ordering and have built-in power monitoring and alerting. The PowerMax 2500 delivers high performance in a compact package storing up to 7x more capacity (8PBe) in half the rack space[13] compared with previous models. Along with its high efficiency design, the 2500 supports the full complement of rich data services for open systems, mainframe, file, and virtual environments.

The PowerMax 8500 delivers leading performance at scale for the most demanding mixed workloads requiring predictable performance with always-on availability. The 8500 delivers up to 2x faster performance and 50% lower response times with up to 18PBe of capacity compared with previous models. Like the PowerMax 2500, the 8500 can easily consolidate open systems, mainframe, file, and virtualized storage to simplify operations, significantly reduce TCO, and increase return on investment.

Both models incorporate the latest technologies needed to meet stringent service levels and gain a competitive advantage – powerful Intel® Xeon® Scalable processors, high-speed cache, NVMe/RDMA, 100Gb InfiniBand, and the new intelligent power distribution units with power monitoring/altering to name a few.

The 2500 and 8500 offer several advantages for delivering the highest storage performance, resiliency, and energy-efficiency through innovative flexible RAID technology. Flexible RAID provides more usable storage capacity by leveraging granular storage media, load balancing, and several RAID options – RAID 1, 5, 6.

3:1 DRR Guarantee (Mainframe)

Intelligent Dedupe + Compression

5:1 DRR Guarantee (Open Systems)

The combination of Dynamic Fabric technology along with flexible RAID allows every node to access every drive offering single-drive upgrades to increase storage capacity at your pace.

Both models support mainframe workloads and 32Gb FICON connectivity. An industry first, Cyber Intrusion Detection for mainframe (zCID), continuously monitors IBM z/OS data access rates relative to a user-managed rule set, issuing alerts if an intrusion is detected. PowerMax 8500 also supports IBM zHyperlink reads[14].

Breakthrough Efficiency

The latest PowerMaxOS 10 release adds real-time power and environmental monitoring and alerting based on usage. The new intelligent power distribution units (iPDUs) ship standard with each 2500 and 8500 tracking power for all components in the rack (storage, switches, and servers). And customers can use the latest dynamic data mobility software to easily move workloads across data center locations to maximize power efficiency and reduce electricity costs.

PowerMax delivers leading data efficiency with global inline deduplication and compression, space-efficient secure snapshots, up to 80% power savings per terabyte (TBe), and thin provisioning. Its inline deduplication and compression have virtually zero impact on performance, can be used with all PowerMax data services, and can be turned off by application (volume) for maximum flexibility.

PowerMax 2500 and 8500 ships with Dell's unmatched 5:1 data reduction guarantee for open systems workloads and 3:1 data reduction guarantee for mainframe storage (an industry-first) to maximize efficiency in any environment.

Integrated File

PowerMax 2500 and 8500 systems incorporate the latest 64-bit file services and active-active nodes along with new levels of resiliency and seamless Unisphere management integration. The new models boost resiliency by adding SRDF/S (synchronous) remote replication for high availability File services.

Intelligent Automation

PowerMax systems are designed with AI-driven intelligent automation in mind. They support advanced AIOps, DevOps and containers to streamline operations and eliminate redundancy, so IT practitioners can focus on strategic initiatives.

Each system brings autonomous storage to life with built-in machine learning that uses pattern recognition and predictive analytics to maximize performance with no management overhead. Automated storage provisioning for open systems workloads is accomplished by using a simple REST API saving considerable time and effort. PowerMaxOS 10 provides the industry's first software-defined NVMe/TCP utility for storage resource automation, resulting in 44% less time to set up NVMe/TCP resources. NVMe/TCP helps lower deployment costs, reduces SAN design complexity, and allows for building a highly scalable PowerMax storage environment for mission-critical workloads.

Multi-Array Workload Optimization

Multi-array workload planner analyzes the storage infrastructure across multiple PowerMax arrays and recommends the best place to host workloads for optimal performance and resource utilization. Dynamic data mobility technology provides seamless data mobility across PowerMax and VMAX arrays by using array-based orchestration and replication services to automatically discover, configure, and migrate data online.

CloudIQ Health Checks

Dell's CloudIQ mobile application gives administrators faster time to insight; with all the information needed to take quick action and efficiently manage their storage environment. It enables proactive monitoring and predictive analytics to deliver alerts, aggregate PowerMax health scores, and provide proactive assistance with actionable insights and recommended remediation – all from the cloud and available from your mobile devices free of charge.
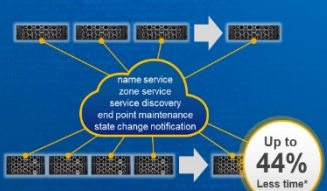
The latest PowerMaxOS 10 release adds AI-driven autonomous health checks using predictive analytics to identify potential challenges in the system before they occur. Once an issue is identified, approaching full capacity or loose cabling, proactive remediation recommendations are sent for corrective action.
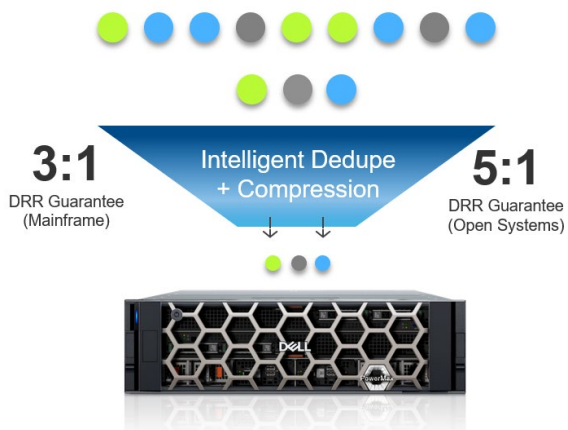
NVMe/TCP with SFSS

SmartFabric Storage Software

Industry's first automated end-to-end NVMe/TCP deployment

name service
zone service
service discovery
end point maintenance
state change notification

Up to **44%** Less time*

* Based on Dell analysis, compared to iSCSI configuration, March 2022

End-to-end Automation
Compute-Network-Storage

Ease of Use
Capabilities similar to FC

Standards Based
Enhancements to NVMe standards

Simplify NVMe Adoption
Migration path from iSCSI

Broad Ecosystem
Dell & 3rd party infrastructure, OS

Automated, end-to-end workflows

Broad plug-in support

PowerMax
Protect against ransomware and malware

Prevent Unauthorized Access
Automated compliance monitoring of self-defined secure configurations

Protect using Secure Snapshots
Provides millions of secure snaps per array
Up to 65 million

Detect Cyberattacks Early
Monitor, detect and notify of unexpected and rapid data encryption changes

Cyber Recovery Vault
Isolates data from the production network

DevOps Automation and Containers

PowerMax customers can seamlessly consume storage infrastructure as code in a variety of development and automation environments using powerful APIs, SDKs, plugins for VMware automation tools like vRO and vRA, and modules for the most popular configuration management tools like Ansible.

PowerMax supports a major shift in software development by being the first major enterprise storage solution to implement the Container Storage Interface (CSI) driver standard to enable containerized storage workloads to optimize productivity.

Cyber Resiliency

PowerMax is equipped with unmatched cyber resiliency to ensure always-on operations that prevent, detect, and recover from possible cyberattacks. It is engineered to accelerate Zero Trust adoption, adheres to STIG standards, appears on the U.S. DoD Approved Products list, supports TLS 1.3, and safeguards sensitive data at every stage in the event of a potential breach.

Prevent

PowerMax is purpose-built to prevent unauthorized access to system resources. Each model incorporates intrinsic security features and comprehensive access controls to safeguard company data including:

- *Hardware root of trust (HWRoT)* represents the foundation on which all secure operations of PowerMax depend. HWRoT contains the keys used for cryptographic functions and enables a secure boot process, preventing system boot if firmware is tampered with.

- *Firmware updates* require a digital signature before updates can be applied.

- *Hardware-based data encryption* through self-encrypting drives (SEDs) ensures protection in case a drive is removed from the system.

- *Secure access controls and tamper-proof audit logs* protect from unauthorized access through secure logs of all events on PowerMax.

- *Multi-factor authentication for Admin Access (MFA)* provides 2-factor authentication to management access using RSA SecureID.

Detect

CloudIQ is a powerful application used to track system health through pattern recognition and advanced analytics. Through CloudIQ's Cybersecurity tab, users can define legal configurations for PowerMax, monitor the system, and receive alerts if the array is out of compliance.

PowerMax tracks data patterns and detects anomalies, including changes to data reduction rates and unusual access patterns, to establish if ransomware or malware may have infected the system. After detecting suspicious anomalies, IT personnel can promptly implement corrective measures.

Cyber intrusion detection for z systems (zCID), an industry first, enables continuous monitoring and inspection of data access rates, then alerts and triggers actions if a limit is exceeded. zCID works in concert with SnapVX and zDP to ensure that if an intrusion is suspected, data that is being snapped and therefore, protected, can easily be recovered.

Recover

PowerMax utilizes secure, immutable snapshots to provide the industry's most granular cyber recovery at scale, maximizing data recovery in seconds from a cyberattack. Administrators can set snapshot policies for up to 65 million secure snapshots to optimize recovery point objectives (RPO) and minimize data loss. Several options also exist for native cyber recovery from a secure vault for open systems and mainframe storage on PowerMax. PowerMax cyber vault isolates open systems data from the production network in a secure vault by implementing an SRDF airgap solution with secure snapshots.

Mission-critical availability

PowerMax sets the standard for mission-critical availability. Whether it is proven active-active data center replication to comply with stringent BC/DR requirements, non-disruptive PowerMaxOS upgrades in under six seconds, or

continuous data integrity checks, PowerMax delivers the highest levels of data availability for your mission-critical applications.

SRDF software, the gold standard in disaster recovery, provides unmatched flexibility and massive scalability (supporting up to 2,000 replication groups) to deliver remote replication over extended distances or across multiple sites. VPLEX offers additional levels of data availability for PowerMax 2500 and 8500 deployments requiring VPLEX replication solutions.

Reliable data protection

SnapVX provides space-efficient local snapshots that can be used for localized protection and recovery and other use cases including development/test, analytics, backups, and software patching. SnapVX secure immutable snapshots prevent accidental or malicious deletion, retaining them for a specified period. Integrated copy data management enables application-consistent, on-array copy orchestration with critical applications like Oracle, SQL, and VMware enabling operational recovery and copy repurposing.

Mainframe environments can leverage the power of the Dell's GDDR Cyber Protection Automation (zCPA) feature and SRDF with PowerMax snapshots to automate copy creation and preservation of data being protected in any mainframe cyber vault.

Continuously modern storage with as-a-service flexibility

Dell's Future-Proof Program takes the worry out of buying storage. Purchasing PowerMax qualifies for the 3-Year Satisfaction Guarantee, Hardware Investment Protection, 5:1 Data Reduction Guarantee for open systems, and 3:1 Data Reduction Guarantee for mainframe storage with no assessment required.

Storage as-a-service Infrastructure

Dell's APEX Flex on Demand provides you with elastic capacity, where we work with you to right-size capacity for your workloads as they shrink and grow over time. You gain immediate access to buffer capacity on PowerMax should you need it, while only paying for the technology you use. And your payment adjusts up or down to match your actual usage. Combine the scale and cyber resiliency of PowerMax with the agility and flexibility of Dell APEX Flex on Demand.

Backed by experts

Dell's consulting services experts know what it takes to harmonize business and IT needs. Our outcome focused approach accelerates your ability to deliver cloud platforms, workforce experiences, advanced applications, and achieve a resilient business. Dell Technologies ProConsult Advisory Services facilitate a plan for beneficial and lasting change. Our AS-IS/TO-BE methodology, the foundation of our services, deeply analyze your current and desired state. Having a clearer understanding of these can help you realize the business benefits of modernization faster, more reliably and with lower risk. Our services are designed to develop and execute strategies that achieve measurable outcomes aligned to your vision, in six weeks or less.

FUTURE-PROOF PROGRAM

Guarantee Outcomes | Maximize Investments | Navigate IT Futures

Dell APEX custom solutions
Create your own on-demand as-a-Service environment and view invoices and usage.

Dell APEX FLEX ON DEMAND
Pay-per-use flexible consumption model for all Dell Technologies infrastructure.

Dell APEX DATA CENTER UTILITY
Usage-based solution to enable a managed utility service at enterprise scale.

Elastic capacity
Dynamically scale up or down.

Metered usage
Monthly payments with predictable rates.

Reduced costs
Align investment with resource usage.

Value-added services
Agreement can include needed services.

Learn More about PowerMax

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