

DELL POWERSTORE FOR EPIC

Dell PowerStore Scalable All-Flash Storage for Epic

Architect your EHR deployment to be future-ready with next-generation storage technology



HIGH TRUST

Trusted to support operational and relational databases, the presentation tier, and Web BLOB share



ADAPTABLE ARCHITECTURE

Scale-up, scale-out design evolves with the needs of your EHR workloads



BUILT-IN INTELLIGENCE

Self-optimizing system auto-tunes performance, efficiency and resiliency without manual intervention



CONTINUOUSLY MODERN

Easy, non-disruptive upgrades keep workloads highly available and running on the latest technology



Advancing patient care with modern, scalable storage designed to support your rapidly expanding deployment

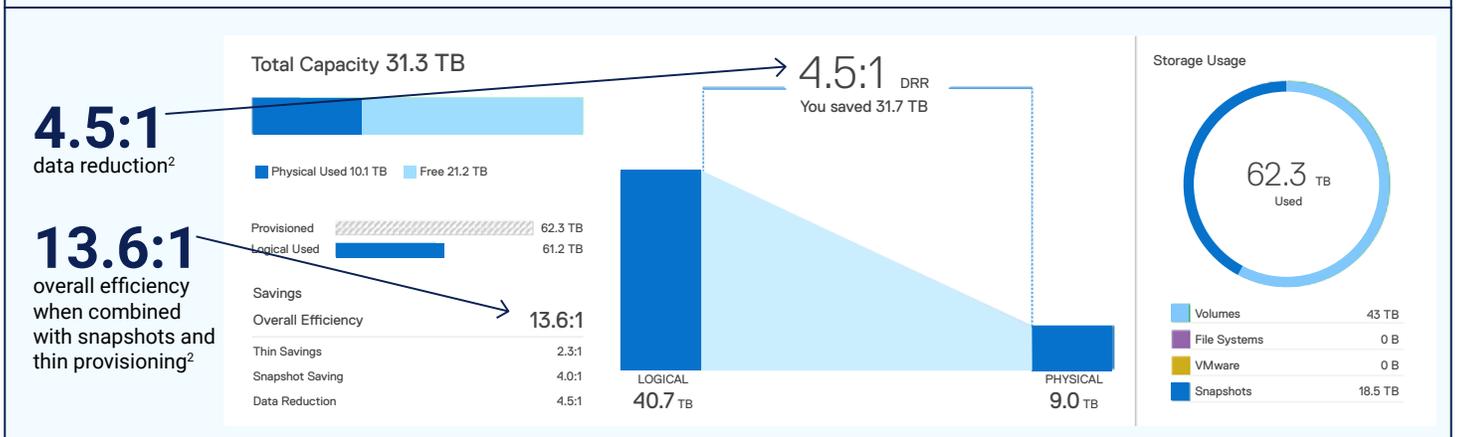
Data is the lifeblood of every organization, especially in healthcare. Securely streamlining access to that data for clinicians, staff, and patients is paramount, and IT teams are harnessing the transformative power of technology, building the secure digital foundation needed to support critical workloads.

With this objective in mind, healthcare organizations of all sizes leverage the power of electronic health records (EHR) and choose the best technology providers to store, manage and secure their data. Dell PowerStore has proven to be an effective platform and within a year became a standard platform for operational databases (ODB) and analytical databases. PowerStore is fast becoming an integral component in healthcare IT ecosystems due to its performance, data, cost efficiency, automation, and security. PowerStore helps organizations manage advancing technological changes and expanded workloads, ensuring healthcare providers can fully harness the power of technology to continuously improve patient outcomes.

Optimized for today's evolving healthcare organizations

PowerStore transforms EHR workloads with a flexible, automated storage solution that accelerates the performance of Epic systems while simplifying IT workflows. Built on an active/active, all-NVMe platform designed for 99.9999% availability,¹ PowerStore includes self-optimizing intelligence that auto-tunes speed, efficiency and resiliency in the background, allowing IT staff to focus on other priorities. PowerStore's advanced technology reduces overall cost while providing plenty of performance and expansion headroom to meet unpredictable needs in a constantly-changing healthcare landscape.

Figure 1. Always-on data reduction: The dashboard is from an array at a children's hospital in the United States running multiple operational databases (IRIS). The customer appliance achieved a 4.5:1 data-reduction ratio (DRR). When combined with snapshots and thin provisioning, data efficiency increased to 13.6:1.²



Efficiency to streamline EHR workloads

EHR workloads are increasingly inputting massive amounts of data from various edge devices and systems. The ability to store the most amount of data in the smallest footprint possible is paramount. Deduplication and compression can help to maximize capacity, but the process must not compromise data integrity or result in downtime, especially in mission-critical healthcare environments.

PowerStore's fully automated data services in a small 2U initial footprint consolidate the tremendous influx of data to streamline EHR workflows efficiently, without interruptions. PowerStore features intelligent deduplication and hardware-based compression to maximize storage efficiency automatically, with guaranteed 4:1 data reduction.² That rate is often higher. In fact, a PowerStore array in operation at a children's hospital in the U.S. running multiple operational databases (IRIS) demonstrated a data-reduction ratio (DRR) of 4.5:1 (Figure 1).² Efficiency increased to 13.6:1 when combining intelligent deduplication and compression with snapshots and thin provisioning.² For those supporting virtual workloads, the standalone data efficiency of PowerStore is even greater.

Trusted platform for mission-critical Epic environments

In addition to always-on data efficiency, PowerStore has many other features that make it the go-to storage choice for Epic systems. Key advantages include:

- Unified architecture supports file, block and vVols in a single convenient platform
- End-to-end NVMe keeps performance high and latency low, even as configurations change over time

¹ Based on Bellcore component reliability modeling for common configurations of all PowerStore models.

² Live Epic customer hosting multiple operational databases (IRIS) achieved 4.5:1 data reduction (compression and dedupe) and 13.6:1 overall efficiency inclusive of snapshot savings. A 4:1 average rate is guaranteed across customer applications. Rates for individual applications may vary. See Future-Proof Program terms and conditions for details.

- All models scale up and out to 18 PBe per cluster,³ with single-drive granularity for expansion as well as the ability to mix drive sizes. Expand capacity and performance independently to target your unique needs.
- Dynamic Resiliency Engine (DRE) automatically protects, replenishes, and rebalances data protection within the appliance, even in the unlikely event of multiple simultaneous drive failures.
- Policy-based file, block, and vVols async replication, plus native synchronous replication over metro distances (Zero RTO/RPO), protects any workload
- Up to 60% more power-efficient,⁴ 61% more data density per rack unit.⁵
- Advanced cybersecurity, including data-at-rest encryption (D@RE), hardware root of trust (HWRoT), multi-factor authentication, secure and immutable snapshots, ransomware protection and more.
- Included CloudIQ AIOps application leverages machine learning and predictive analytics to proactively monitor system health and cybersecurity, enabling users to resolve issues up to 10X faster.⁶
- Deep DevOps and VMware ecosystem integrations let you provision PowerStore services from your management platform of choice.
- Anytime Upgrade provides streamlined, cost-effective access to ongoing PowerStore innovation, so you'll always know your workloads are running on the latest technology.
- Flexible CAPEX-to-OPEX purchase options
- World-class Dell service and support

³ Assumes average 4:1 data reduction. Actual results vary.

⁴ Based on Dell analysis comparing maximum IOPS per watt for PowerStore 1200 base appliance configurations with PowerStoreOS 3.0 vs. PowerStore 1000 base appliance configuration with PowerStoreOS 2.0. Actual results vary.

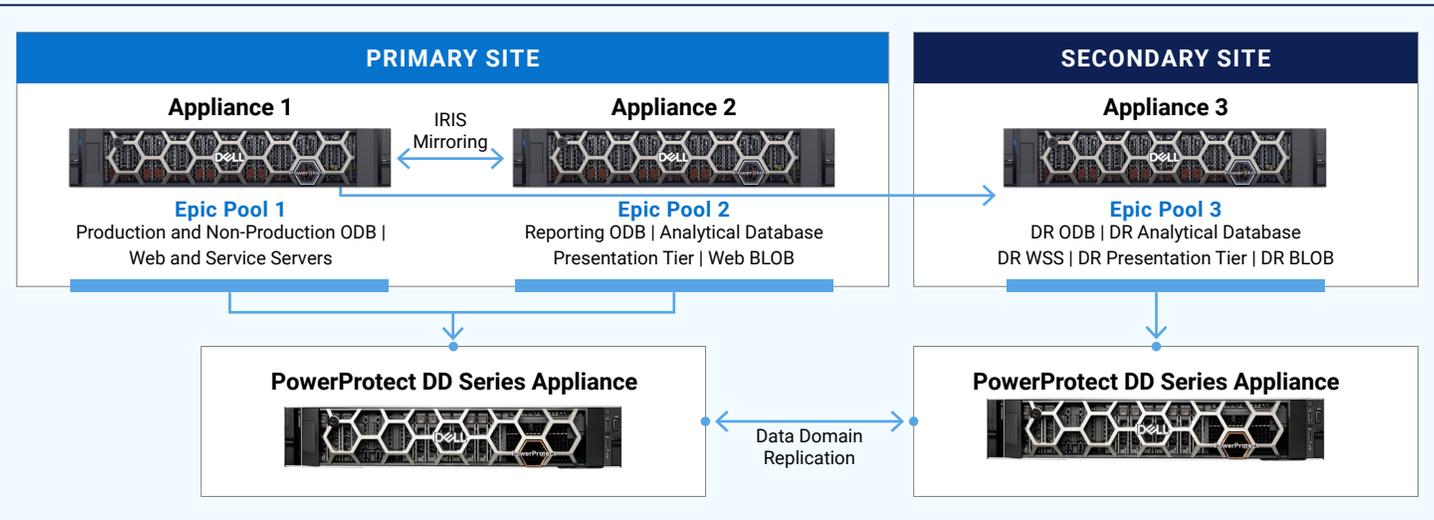
⁵ Based on Dell analysis comparing maximum effective capacity for largest PowerStore configurations with PowerStoreOS 3.0 vs. PowerStoreOS 2.0. Assumes average 4:1 data reduction. Actual results vary.

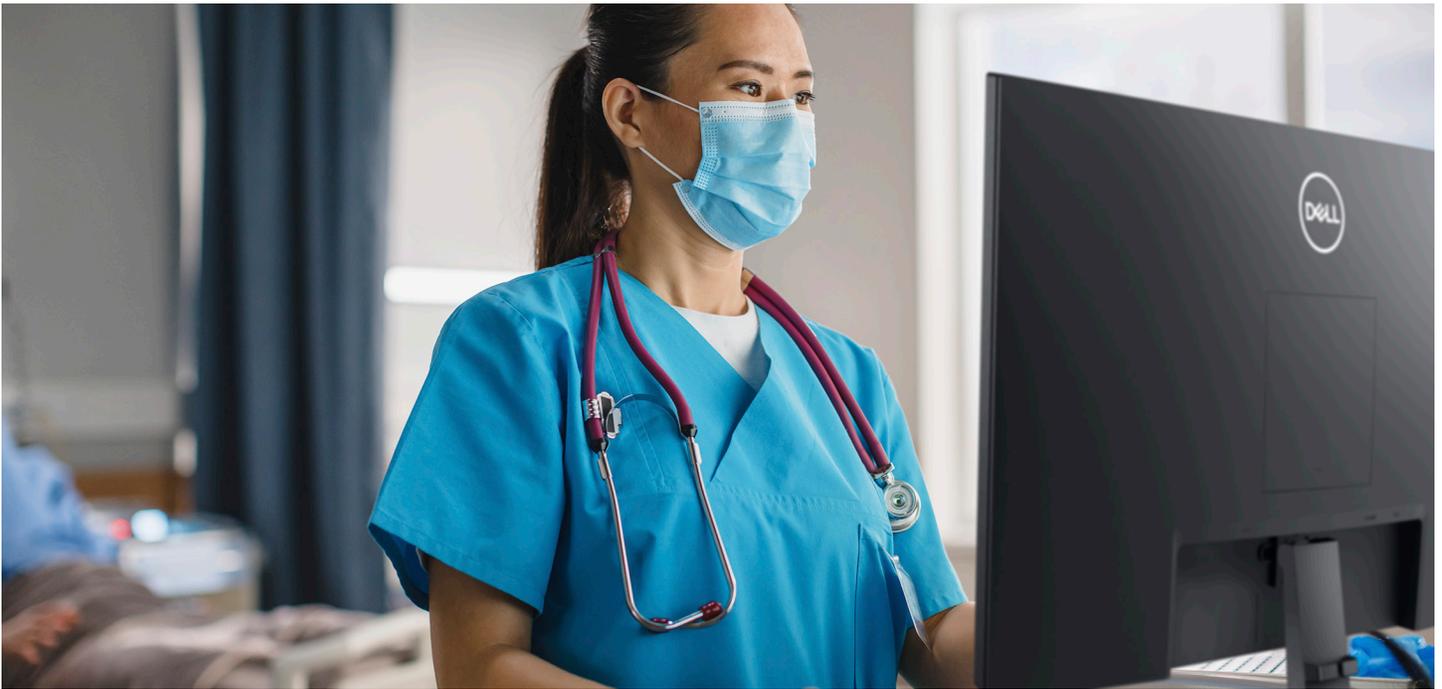
⁶ Principled Technologies lab report based on an April 2020 Principled Technologies report commissioned by Dell EMC, "Dell EMC CloudIQ streamlined the user experience in five cloud-based storage preventative management tasks."

PowerStore Reference Architecture for Epic

In alignment with the Epic Hardware Configuration Guide, the PowerStore for Epic reference architecture spans the primary data center and the disaster-recovery data center to deliver the needed high availability and reliability to keep your deployment up and running (Figure 2).

Figure 2. Example Workload—Epic Reference Architecture for PowerStore: Dell Technologies has developed an Enterprise Reference Architecture based on optimal storage and backup-and-recovery configurations to meet Epic's availability and performance requirements. This reference architecture provides healthcare providers with the flexibility to select customized configurations that address their specific workload requirements.





Cloud-adjacent model for Epic workloads

Healthcare organizations are expecting flexibility as they transform and take advantage of public cloud offerings, deploy in edge or on-premises data centers, and expand storage capacity and performance on demand. PowerStore offers ways to support these choices—utilizing **Dell Alliances Healthcare Cloud** or supplementing storage scaling for data-intensive compute with enterprise-level arrays as well as providing both compute and storage at edge locations. Integration of databases running on Dell PowerEdge and PowerStore and across front-end workloads in the cloud is simplified with a cloud infrastructure platform for both on- and off-premises (Figure 3).

Figure 3. Cloud-adjacent model for Epic workloads: Dell Technologies portfolio of storage appliances along with edge solutions enables seamless integration of databases on PowerEdge and PowerStore and front-end workloads in the cloud.

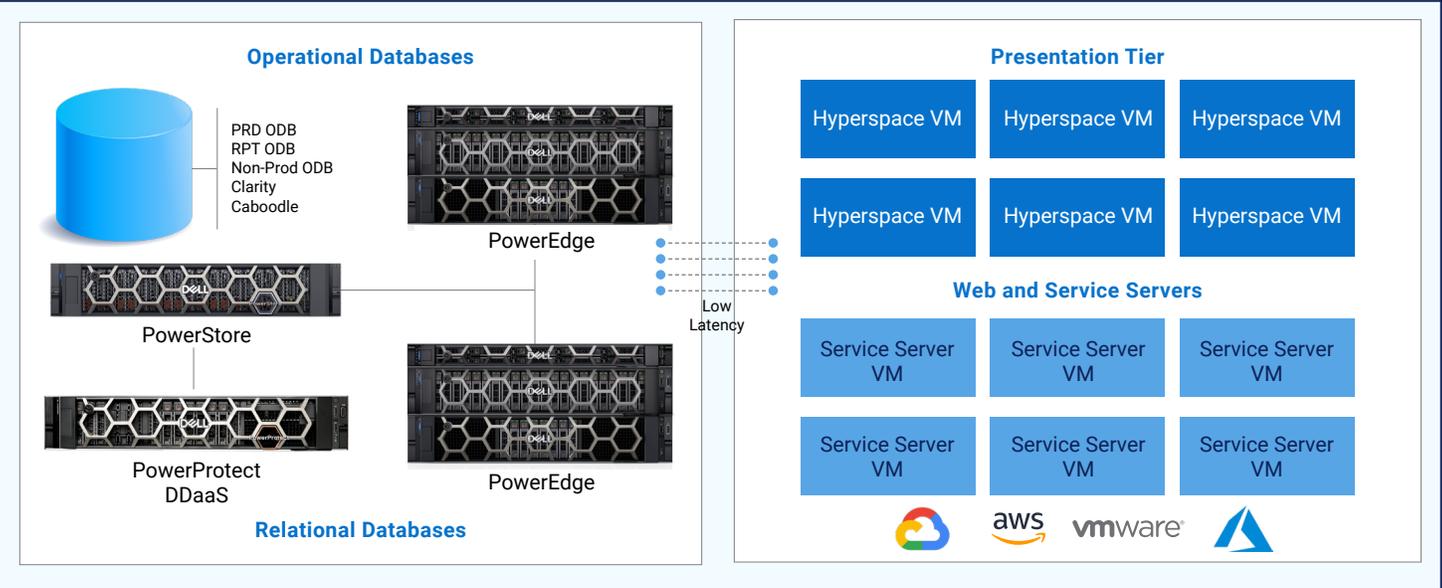
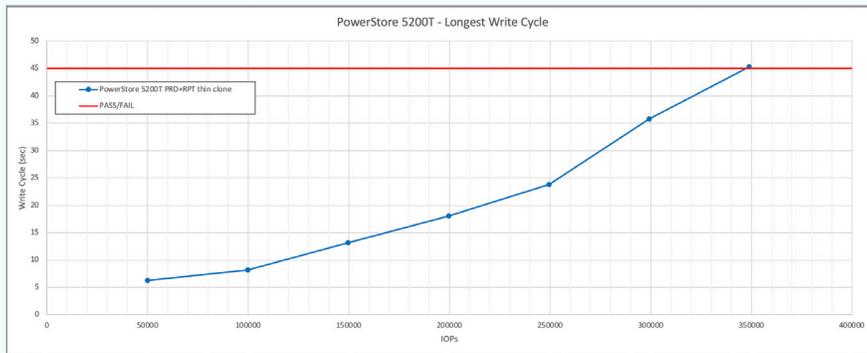
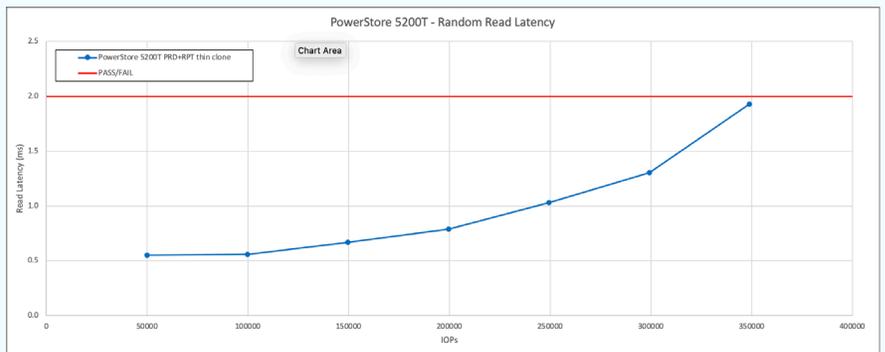


Figure 4. PowerStore GenIO Testing Results: Dell Technologies conducted internal load testing with Epic GenerateIO, charting the longest write cycle (A) and random-read response time (B). The red line indicates the Epic PASS/FAIL criteria for each metric.



A



B

Achieve desired outcomes for your Epic environment with PowerStore

Dell Technologies conducts internal testing to ensure Epic workloads have consistent and predictable performance in a typical healthcare environment. In accordance with guidance from Epic, internal testing was done on the Dell PowerStore 5200T array using GenerateIO, the synthetic load generation tool written by Epic for assessing operational database (ODB) performance characteristics. Results are shown in Figure 4. These results were obtained with all data services enabled—encryption, deduplication, compression and snapshots.

PowerStore provides optimal performance, the reliability needed for clinical workflows, critical efficiency for patient information, excellent scalability, robust security, and easy management. With PowerStore, you gain a modern storage infrastructure capable of meeting the data-intensive demands of today's healthcare environments while providing the essential foundation to be able to adapt to what comes next.

Learn more at Dell.com/healthcare and [@DellTechHealth](https://twitter.com/DellTechHealth) | [#TransformHIT](https://hashtage.com/#TransformHIT)