



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



Data-centric design

Performance-optimized, unified architecture, for any EHR workload



Intelligent automation

Programmable infrastructure simplifies management, DevOps, and automates workflows



Adaptable architecture

Speed and workload mobility offer choice, predictability, and investment protection

Dell EMC PowerStore Scalable All-Flash Storage for Epic

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

Healthcare digital transformation continues to accelerate in response to the need to expand efficiencies and drive down costs. AI, machine learning, automation and other data-driven technologies are reshaping both patient-facing clinical processes and internal systems.

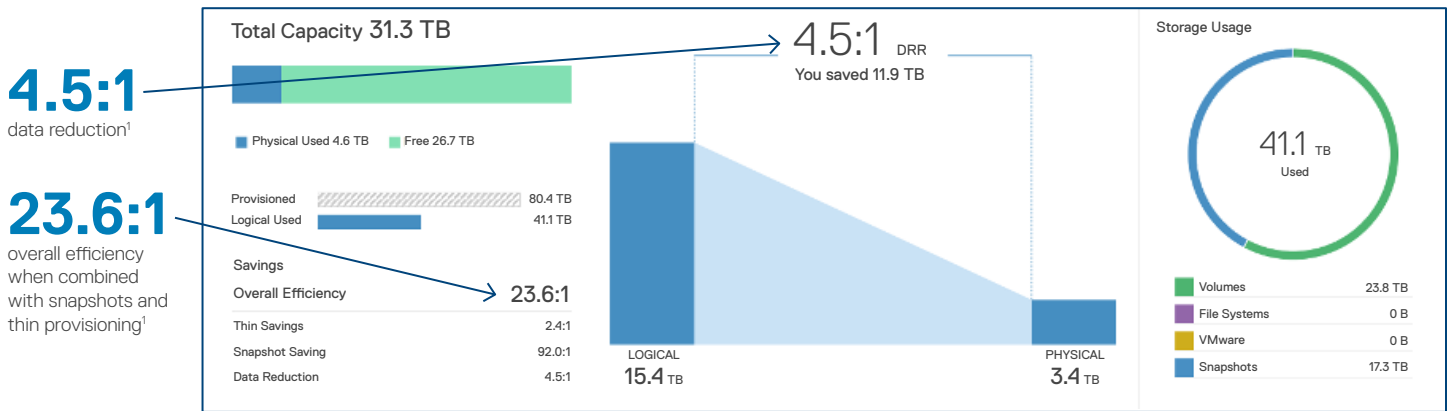
Being able to harness the potential of data from these technologies is a necessary step towards realizing the promise of better, more personalized care. To do so, however, IT must be able to effectively manage, secure, and store this data while ensuring the right patient information and insights are readily accessible in real time, especially at the point of care.

Electronic health records (EHR) can provide patient data when and where it is needed with the proper IT infrastructure. To support their EHR deployments, healthcare organizations of all sizes require an agile, secure, and efficient data storage platform—enter Dell EMC PowerStore. Recently rated with a comfort level of “Medium” from Epic for Operational Databases (ODB) and Analytical Databases within just a year of its release, PowerStore is fast becoming an integral component in healthcare IT ecosystems. These organizations choose PowerStore because of its performance, data efficiency, automation, cost efficiency, and security to keep pace with the rate of technological change and expanding workloads.

Storage optimized for today’s data-driven healthcare organizations

PowerStore addresses the performance and reliability requirements of Epic by providing a data-centric, intelligent, and adaptable infrastructure that transforms and mobilizes both traditional and modern EHR workloads. Designed for the data era, this next-generation storage solution is engineered for value, flexibility, and simplicity. As it eliminates traditional tradeoffs in performance, scalability, and storage efficiency, healthcare teams benefit by always having ready access to patient data at the point of care. At the same time, healthcare IT benefits from PowerStore’s adaptable and flexible architecture, which facilitates deploying EHR applications at the edge as needed.

Figure 1. Always-on data reduction: The dashboard is from an array at a children’s hospital in the United States running multiple Caché/IRIS instances. The customer appliance achieved a 4.5:1 data-reduction ratio (DRR). When combined with snapshots and thin provisioning, data efficiency increased to 23.6:1¹



High data 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 nor 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 automatically maximize storage efficiency, with guaranteed 4:1 data reduction.¹ That rate is often higher. In fact, a PowerStore array in operation at a children’s hospital in the U.S. running multiple Caché/IRIS instances demonstrated a data-reduction ratio (DRR) of 4.5:1 (Figure 1).¹ Efficiency increased to 23.6:1 when combining intelligent deduplication and compression with snapshots and thin provisioning.¹ For those supporting virtual workloads, the standalone data efficiency of PowerStore is even greater.

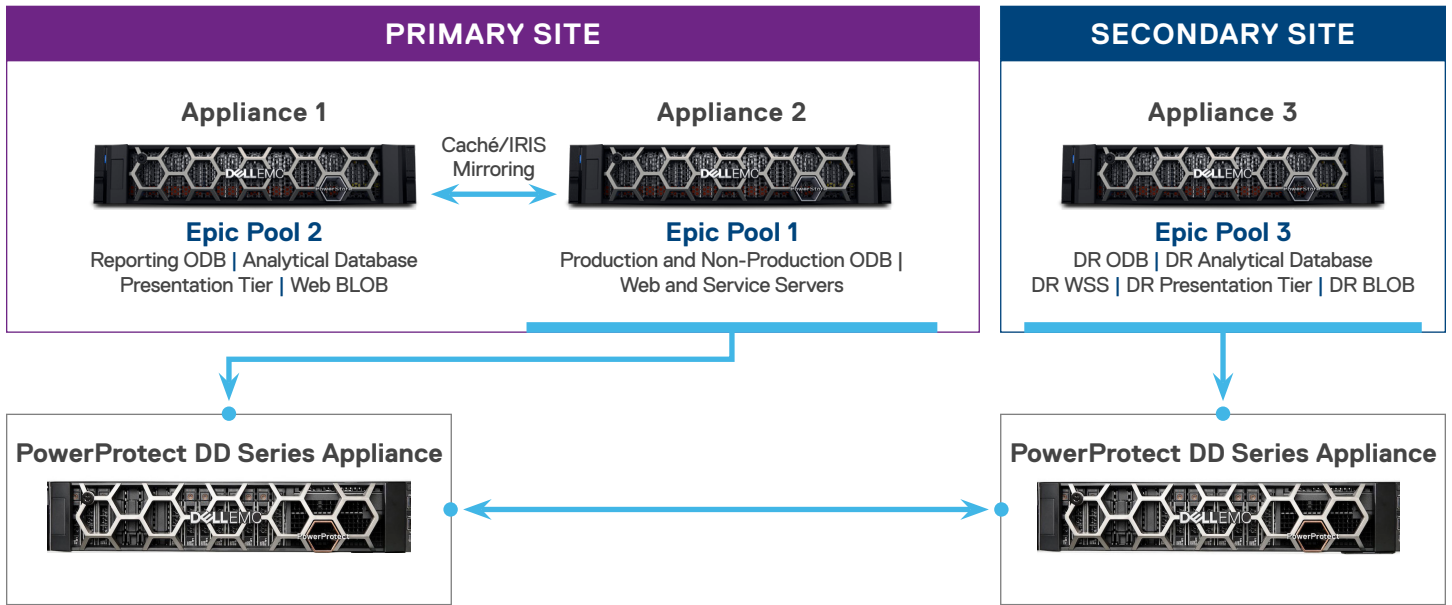
A data-centric, intelligently automated, adaptable design for Epic environments

In addition to always-on data efficiency, Dell EMC PowerStore is performance-optimized featuring a unified architecture for any workload to help keep pace with the demands of healthcare environments. Features include:

- A unified block and file architecture to accelerate performance for all types of workloads from EHR to ERP to relational databases resulting in up to seven times the performance of previous platforms in Epic load testing.²
- Consistency of read and write environments with little to no latency with nodes that are active-active, architected for 99.9999% availability³

- Data that is always protected by the included Dynamic Resiliency Engine (DRE), even as configurations change over time
- A scale up, scale out architecture using clustering technology to independently scale up system processing power up to 2.8 PBe per appliance, and scale out in a single management domain to eight nodes for up to 11.3 PBe per cluster⁴
- Isolation of individual components of the operating system as microservices to improve performance, fault tolerance, and security simultaneously, ensuring that health information is accessible to the right people, hardened against errors, and protected from unauthorized access
- Always-on Data at Rest Encryption (D@RE) to protect confidential information by restricting access only to those with valid keys and by enabling secure cryptographic erasure when data is no longer needed
- Intelligent automation featuring autonomous, consistent operations including a programmable infrastructure designed to simplify management, streamline DevOps, and automate workflows
- CloudIQ – A cloud-based monitoring and analytics platform for your Dell Technologies storage environment
- A modern and highly adaptable architecture for both speed and application mobility, with flexible deployment options and data-in-place upgrades—performed on any PowerStore appliance with no downtime and no outage to service

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.



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).

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 Technologies Cloud Storage Services or supplement 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 EMC 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. A cloud-adjacent model for Epic workloads. Dell Technologies portfolio of storage appliances along with edge-to-core-to-cloud solutions enable seamless integration of databases on PowerEdge and PowerStore, and front-end workloads in the cloud.

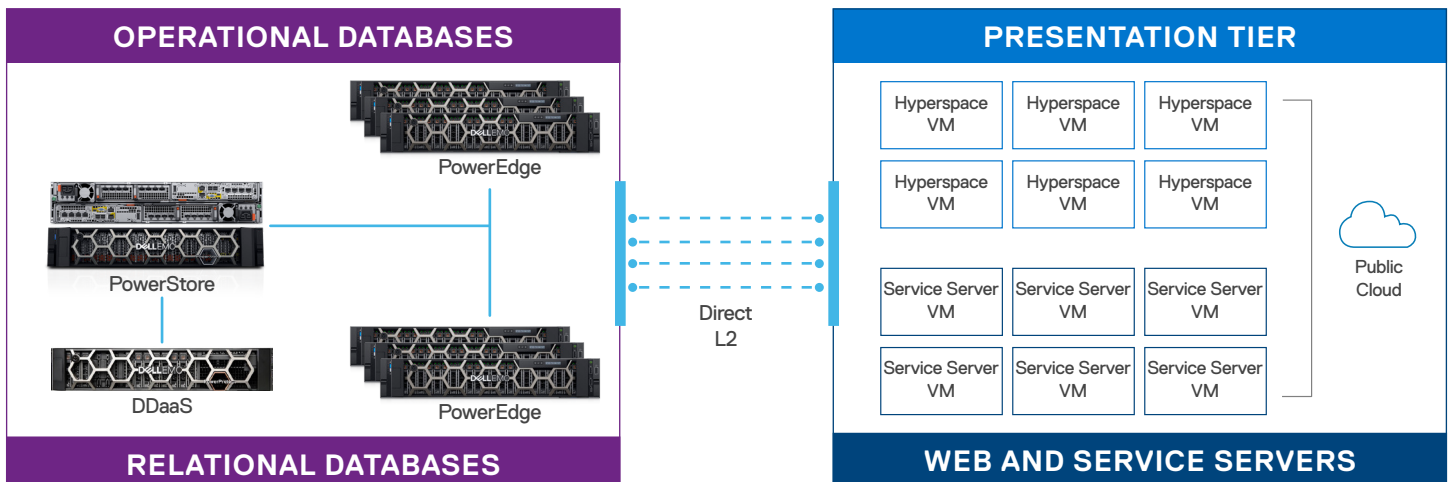
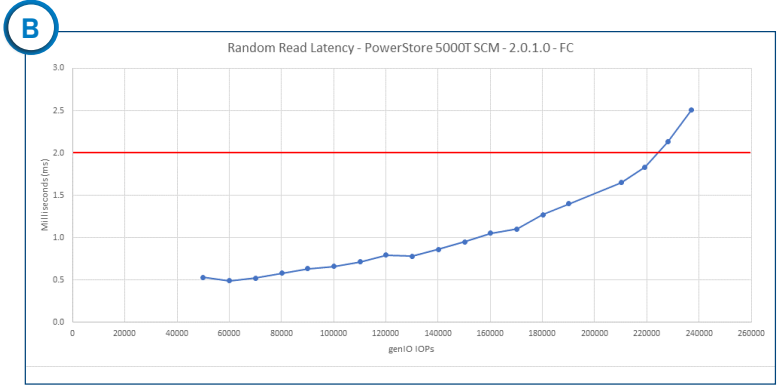
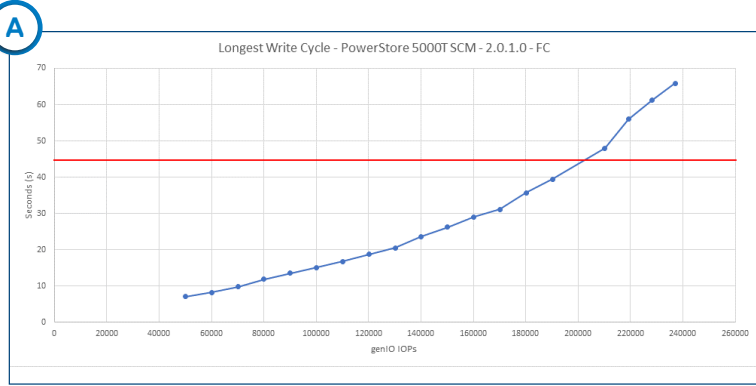


Figure 4. PowerStore genIO Testing Results: Dell Technologies conducted internal load testing with Epic GenerateIO, charting the longest write cycle (A), and random read response time (B). The red line indicates the Epic PASS/FAIL criteria for each metric.



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 EMC PowerStore 5000T 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 real-time performance, the reliability needed for clinical workflows, critical efficiency for patient information, excellent scalability, robust security, and easy manageability. 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 about our solutions for healthcare



Contact one of our healthcare experts



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1. Live Epic customer hosting multiple Caché databases achieved 4.5:1 data reduction (compression and dedupe) and 23.6:1 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.
2. Based on Dell analysis comparing PowerStore 9000 4x cluster to Unity XT 880 running 70/30 random read/write mix, 8K block size with compression and deduplication active, March 2020. Actual performance will vary based on configurations and usage and manufacturing variability.

3. Based on the Dell Technologies specification for Dell EMC PowerStore, April 2020. Actual system availability may vary.
4. Assumes a 4:1 average data reduction. Actual results may vary, depending on data types.

*Epic does not certify storage products or technologies. Instead, they provide feedback on storage products and technologies based on both results in the test lab and customer experience. The information Epic gathers does not guarantee that a particular product or technology will or will not work. It is also important to note that lab testing and the size of their existing customer base is generally insufficient to be able to judge a technology or product as being reliable. However, in some cases, lab testing and design review can be used to judge a technology as unsuitable. In addition, Epic does not have data for all possible features that can be used in a given product, for example, SAN replication.