



Modern and secure architecture for Cerner Millennium

Hospitals and health systems are modernizing their data centers to help drive value-based care initiatives leveraging the capabilities provided by the Cerner *Millennium*® Electronic Health Record (EHR) platform and supporting IT Infrastructure. Cerner® provides a unified suite of digital solutions that help streamline administration, reduce costs, and enhance patient safety as physicians, nurses and other authorized users provide patient care delivery across the continuum of care.

Cerner *Millennium* plays a primary role in providing near real-time, updated information to the care team to help make fast and effective decisions. In order to deliver these outcomes, its underlying Oracle database and *Millennium* applications require the highest levels of availability, performance, and protection. At the same time, clinicians require secure access to patient information from wherever and whenever it is most convenient for the care team.

With many legacy IT infrastructures not currently optimized to support the demands of EHR environments like Cerner *Millennium*, planning and configuring of the IT infrastructure requires close attention to the unique requirements of Oracle databases.

Dell Technologies collaborates with Cerner to develop and deliver solutions that help care teams meet the most rigorous application user and business demands of today's modern healthcare customer. Our combined solutions speed performance, help simplify management, aid in enhancing data protection, and increase productivity while delivering the “always-on” availability required to support patient care delivery. The Dell Technologies portfolio of solutions—from storage, data protection, servers, end user devices to cloud and hyper-converged infrastructure support Cerner *Millennium* customers at every stage of their IT transformation.

MINIMIZE RISK WITH TESTED SOLUTIONS

As healthcare providers invest in new technologies, they want to ensure these solutions can be integrated quickly with their existing IT infrastructure without impacting day-to-day hospital operations. The long-standing relationship between Dell Technologies and Cerner Corporation enables comprehensive testing of Dell Technologies hardware, software, and services in Cerner application environments. This includes:

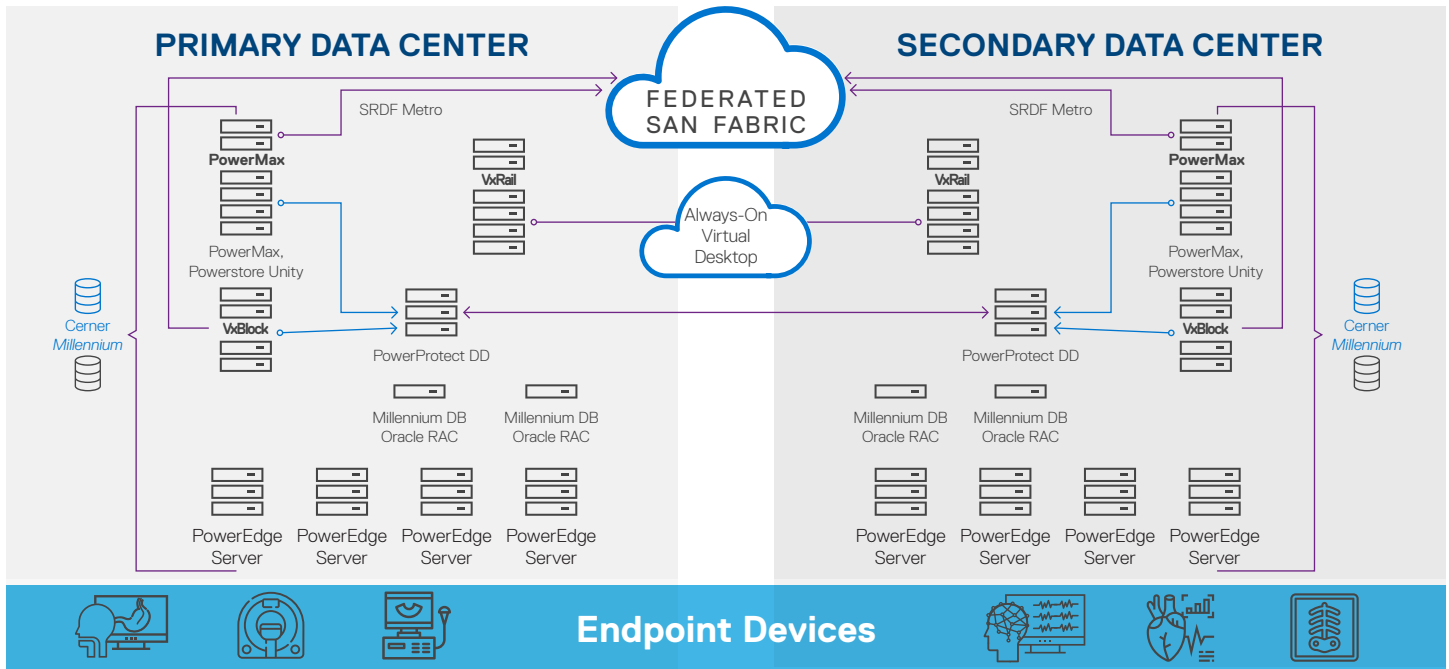
- Testing solution compatibility with the Cerner application environment
- Verifying our solutions perform the required functions within the Cerner application environment
- Evaluating the installation and set-up requirements, as well as preventative maintenance and ease of problem diagnosis
- Using Cerner Consulting to validate implementations in Dell Technologies environments

In addition, Dell Technologies develops best practices documentation to simplify implementation and accelerate time to solution impact.

CUSTOMER SUCCESS METRICS

- Always available EHR by leveraging SRDF Metro
- Reduce overall storage costs with AI-driven tiering and volume provisioning¹
- Improve application performance with flash storage¹
- Encrypt data at rest with little to no performance penalty²
- Backup and restore Cerner and all other critical apps with a unified, automated process
- Move applications, virtual machines, and data in and between data centers without impacting users
- Reduce backup storage requirements with greater than 65:1 deduplication rate³

Figure 1: Dell Technologies Reference Architecture for Cerner Millennium



Dell Technologies Solutions for Safety and Security Workflows

Dell Technologies industry-leading storage and flash platforms deliver both the high performance and the reliability required to support the intensive I/O workloads characteristics of the Cerner EHR environment and beyond.

The performance and efficiency gains enabled by all-flash arrays help healthcare organizations improve their clinical productivity. By reducing the number of drives required to meet the needed IOPS, NVMe, and flash technology are designed to reduce the cost of delivering consistent and predictable low-latency performance.⁴ These offerings help reduce the floor space, power consumption and cooling requirements needed to deliver day-to-day storage services.

Cerner customers can choose from a variety of data services, including data reduction, thin provisioning, advanced encryption, and industry-leading security features, such as automated [air gap vaults](#).

POWERMAX

Deliver the highest levels of performance for six 9s availability⁵ using Symmetrix Remote Data Facility (SRDF), providing the business continuity and resiliency that Cerner *Millennium* environments demand. Dynamic cache partitioning for PowerMax allows Cerner users to prioritize I/O's so the production database delivers a consistent performance.

- Scale out or scale up to 4 PB with \approx 100 microsecond response times⁵
- Designed for six-nines of availability⁵
- Simplify planning and deployment with a modern licensing and deployment model

POWERSTORE

Provides NVMe all flash performance, with active-active HA in a midrange storage solution.

- Ultra-low latency ensures *Millennium*, and the applications that run

alongside it, have expedited faster response time for your clinicians.

- Automated data lifecycle management to help lower cost, integrated copy data management, point-in-time snapshots, built-in encryption, remote replication and deep ecosystem integration with VMWare.

HYPER-CONVERGED INFRASTRUCTURE

Dell Technologies VxRail—the hyperconverged appliance co-developed by Dell Technologies and VMWare is the market leader in hyper-converged infrastructure (HCI) for healthcare organizations. HCI provides pre-integrated, validated and workload-optimized technology that frees up your IT team, so they can focus on delivering IT services instead of maintaining infrastructure.

Studies show that deploying Dell Technologies VxRail HCI systems can reduce unplanned downtime by up to 88%,⁵ can lower costs by 47% compared to similar public cloud solutions,⁷ and by 52% compared with refreshing legacy environments.⁶ Deployment can be as fast as one day for up to 6 nodes.

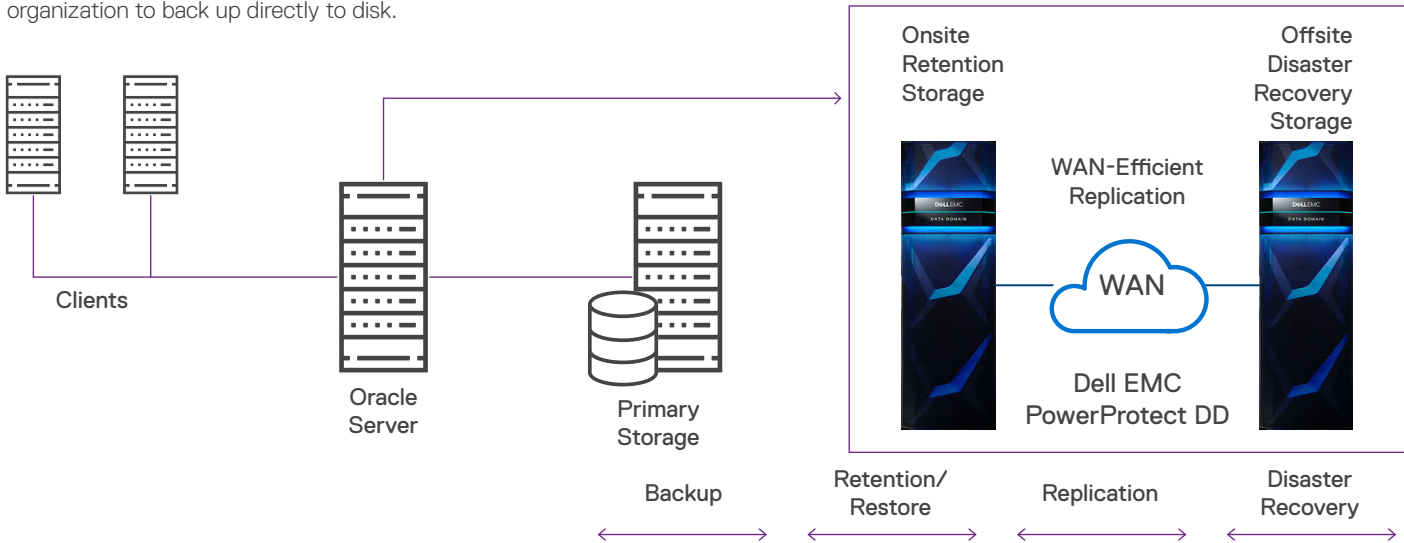
Continuous availability for Cerner Millennium

Healthcare providers demand always-on application and information availability, particularly from their EHR applications as they determine patient care diagnosis and treatment. To deliver the aggressive RTOs and RPOs required for Cerner *Millennium*, single points of failure must be eliminated with the number of available points-in-time for disaster recovery maximized—all while reducing infrastructure costs and increasing resource utilization.

Dell Technologies and Cerner set up an in-house infrastructure to test the *Millennium* stretch cluster configuration and train the Cerner consulting team. More Cerner customers use SRDF Metro and VPLEX technologies than any other block-based HA solution.⁸

Active/active remote replication via SRDF/Metro with read/write access to both Site A and Site B ensures instant data access during a site failure.

Figure 2: Dell EMC PowerProtect DD Series Appliances integrates Cerner Application Clients with Oracle RMAN, enabling your healthcare organization to back up directly to disk.



Protect, simplify, and enhance Oracle Backup and Recovery for Cerner

Dell Technologies offers Cerner customers a choice of data protection offerings to help protect your critical patient information by maintaining smooth, continuous operations with the ability to restart quickly in the event of an unplanned outage.

BACKUPS MADE EASY

Simplify your Oracle backup and recovery for Cerner with Dell EMC PowerProtect DD Series Appliances. PowerProtect DD integrates with Oracle Recovery Manager (RMAN), which lets you to back up your Cerner Oracle environment directly to disk using RMAN and PowerProtect DD as a target. PowerProtect DD deduplication can be as high as 55% through inline deduplication,⁹ enabling your healthcare organization to store weeks or months of full backups.

You can further enhance Cerner backup efficiency with the PowerProtect DD Boost plug-in for RMAN, which improves backup performance by distributing parts of the deduplication processing from the PowerProtect DD system to the Oracle server. This integration can decrease CPU utilization on the Oracle server and help reduce LAN bandwidth required by 80 to 99 percent because only unique data is sent to the PowerProtect DD system. Integration

of Oracle RMAN and PowerProtect DD Boost gives DBAs needed visibility into and control over backup and disaster recovery processes without involving the backup administrator. Dell EMC PowerProtect DD Series Appliances can simplify complex Oracle backup processes while also controlling costs and meeting retention requirements.

Customer Example: Leveraged PowerProtect DD with their Cerner database and their backup times dropped from about 9 hours to less than 1 hour.⁹ This efficiency is a result of the Oracle RMAN integration, along with PowerProtect DD's effective storage algorithms.

ORACLE CUSTOMER BACKUP EXAMPLE¹⁰

- Up to 99% less bandwidth consumption for your backups and replication
- Simplify Oracle protection and reduce disk storage footprint by up to 30X with backup and recovery solutions integrated with Oracle Recovery Manager (RMAN)
- Avoid disasters – rather than recover from them

RESTORE YOUR CERNER ENVIRONMENT IN ONE STEP

Backups are important, but fast recovery from an outage is essential within a patient care environment. With Dell Technologies' Backup and Recovery Solutions for Cerner, full backups can be recovered in just one step, no need to deal with restoring a full backup and then dealing with subsequent incremental backups.



Learn more about our solutions for healthcare



Contact one of our healthcare experts



Connect with us.

1. dell.com/resources/en-us/asset/white-papers/products/storage/esg_economic_wp_dell EMC_powermax.pdf
2. dell.com/en-us/collaterals/unauth/white-papers/products/storage/h15090-dell-emc-unity-data-at-rest-encryption.pdf
3. www.dell.com/resources/en-us/asset/data-sheets/products/data-protection/h12927-dell EMC-powerprotect-dd-ss.pdf
4. www.dell.com/en-us/collaterals/unauth/briefs-handouts/products/data-protection/h17928-dell EMC-powerprotect-dd-so.pdf
5. Dell EMC PowerMax Family Data Sheet: dell.com/resources/en-us/asset/data-sheets/products/storage/h16891-powermax-family-ds.pdf
6. "Delivering Efficient Business Expansion with Dell EMC VMware-Based HCI," IDC whitepaper sponsored by Dell EMC, October 2018.
7. "The Cost of Using the Public Cloud," Evaluator Group, Jan 2019.
8. Based on block-based HA implementations via Cerner Consulting
9. Dell EMC PowerProtect DD Deduplication Storage Systems: https://i.dell.com/sites/csdocuments/Product_Docs/en/h11340-datadomain-ss.pdf
10. www.dell.com/resources/en-us/asset/white-papers/products/data-protection/h11755-business-value-dd-boost-wp.pdf