Business challenge

To support ongoing expansion and transformation, the Froedtert & MCW health network needed to boost system performance and get ready to upgrade its electronic health record software.

Transformation

As it brings new services to a growing set of patients, Froedtert & the Medical College of Wisconsin health network must ensure high performance and availability for critical systems. Working with Meridian IT, the organization migrated to IBM® FlashSystem® and IBM Power® E870, achieving a near 50 percent cut in read-time for its Epic databases.

Business benefits

50%

cut in read-time for EHR databases, increasing system responsiveness

22x

increase in storage density, saving valuable rackspace in the data center

Gained

headroom to complete upgrade to latest version of Epic software

Froedtert & the Medical College of Wisconsin

Froedtert & the Medical College of Wisconsin boosts Epic performance with IBM

The Froedtert & the Medical College of Wisconsin (Froedtert & MCW) regional health network is a partnership between Froedtert Health and the Medical College of Wisconsin. The health network includes more than 2,000 physicians across 25 primary and specialty clinical locations. The network's three hospitals have 784 staffed beds, nearly 40,000 annual admissions and more than 930,000 annual outpatient visits. Froedtert & MCW network physicians have more than 750,000 annual patient visits at its health centers and clinics.

"During the proof of concept for FlashSystem, we saw a 40 percent performance improvement."

—Jeff Shober, Technical Infrastructure Manager, Froedtert & the Medical College of Wisconsin health network

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Growing requirements

In its recent Report to the Community publication, Froedtert & MCW health network leaders speak of a "transformational time" in healthcare, as hospitals, doctors and patients adjust to the reforms introduced by the Affordable Care Act. For Froedtert & MCW, this new transformation dovetails with ongoing efforts to provide superior value to its patients and the broader community, and will drive further growth and innovation in the scope and volume of services it provides.

New technologies regularly come into the picture—for example, the organization recently introduced a fully electronic medical image management system to streamline the transfer of imaging data from referring doctors to its own physicians. This contributes to constant growth in data volumes within the electronic health record (EHR) system, as does the addition of new software modules and system users. Equally, patient numbers are always growing, and the academic medical center campus is expanding to accommodate them: a new 610,000 square-foot Center of Advanced Care will handle both outpatient services as well as some inpatient care.

To help it manage operations efficiently while maintaining exceptionally high standards of medical care, Froedtert & MCW health network has relied on Epic EHR software for more than ten years. With further expansion and innovation on the horizon, the health system determined that it needed to upgrade its Epic environment and add new capabilities.

Hector Joseph, the health network's Chief Technology Officer, comments: "Epic is at the center of what we do, in terms of both administration and clinical management. We have a comprehensive suite of Epic modules, and we continually add new functionality. With more than 5,000 users across our health system, it's the most important single solution we have, and therefore we need to make sure that we stay on the path recommended by Epic Systems when it comes to the software version and the platform we run it on."

As part of its preparations to upgrade to the latest release of the Epic software, Froedtert & MCW teams worked through an extensive engagement with Epic Systems to determine the platform requirements in terms of performance and capacity. An additional requirement was to introduce a full replica of the production landscape for disaster recovery purposes—previously, the vendor had required only a scaled-down replica.

Jeff Shober, Technical Infrastructure Manager for the Froedtert & MCW health network, comments: "Even though our database for the Epic system is growing at around 25 percent year on year, our existing IBM DS8870 would probably have given us sufficient performance and capacity to run the new release of Epic. However, as the vendor also required us to deploy a full replica of our Epic environment for DR purposes, it made sense to build the new DR environment around the DS8870 and deploy a brand-new production storage solution. Beyond the requirements for high performance and availability, we wanted a solution that would be easy to deploy and maintain, and that would take up minimal rackspace in our production data center."

Moving to flash storage

Working with Meridian IT Inc., an IBM Premier Business Partner, Froedtert & MCW IT teams set up a test environment with an IBM FlashSystem array deployed behind an IBM SAN Volume Controller virtualization layer. Using solid-state IBM FlashCore™ technology rather than spinning disks, FlashSystem offers extremely high performance, intelligent RAID protection with IBM Variable Stripe RAID technology, and microsecond response times with IBM MicroLatency™. It also offers built-in AES-XTS 256 encryption with zero performance impact.

After running a number of performance tests using scripts developed with help from Epic Systems, the health network determined that FlashSystem would give it the performance, capacity and ease of management it was looking for, within a compact and efficient form-factor.

"During the proof of concept for FlashSystem, we saw a 40 percent performance improvement on our previous storage solution, which we knew would give us ample headroom for the new version of Epic," says Shober. "The solution also offered an extremely small footprint, enabling us to pack about 39TB of usable capacity into just 2U of rackspace, which is more than 22 times the density of our previous solution. Space is always tight in the data center, so it's great to be able to reduce the pressure in this way."

Naturally, the Froedtert & MCW network also needed to upgrade the servers supporting its Epic software. Ron Kasica, Senior Unix Administrator, comments: "We had maxed out the number of CPUs on our existing IBM Power 595 servers, so those would not meet the vendor's requirements for the new version of Epic. We therefore deployed two IBM Power E870 servers in the production environment, and one E870 for the DR environment, re-deploying the 595 servers to run ancillary systems and test/development for Epic."

IBM Systems Lab Services supported the migration to the new IBM Power Systems™ servers, helping in particular with the configuration of the IBM PowerHA® high-availability clustering. The E870 servers are linked via a four-node SAN Volume Controller cluster to a FlashSystem for the main Epic production environment and to a DS8870 for ancillary Epic modules. The DR environment has the same architecture but with a single E870 server. Separate from the SAN Volume Controller environment, the Froedtert & MCW network also runs an IBM Storwize® V7000 for non-Epic applications and an IBM XIV® used largely to host its VMware virtual server landscape.

The replication of data from the production to the DR environment is handled by InterSystems Caché database mirroring. Separately, Froedtert & MCW IT uses IBM FlashCopy® on the primary FlashSystem array to take an instant snapshot every evening of the LUN containing the Caché database and move it to the secondary FlashSystem. The organization then uses IBM Spectrum Protect™ software to perform a backup of the replicated database. This arrangement avoids overloading the network during data backup.

With its new platform now fully operational, Froedtert & MCW IT is working with Epic Systems to complete the upgrade of its large and complex EHR environment.

Speeding through complex work

Upgrading to Power E870 servers and moving to FlashSystem storage produced immediate and clear performance gains within the Froedtert & MCW Epic environment.

"We use the System Pulse tool from Epic Systems to monitor our performance," says Kasica. "Looking at the charts before and after the migration we can see the cut-over point very clearly. The read-time for the Caché database is the critical measure, and that has dropped by close to 50 percent. As the volume of data rises, we anticipate that we'll maintain this level of performance—which wouldn't be the case in a solution using spinning disks, where typically the performance would drop off."

Shober comments, "Epic users with complex workflows will certainly notice the performance improvement stemming from the reduction in database read-time. As we ramp up our migration to the latest version of Epic, we are confident that FlashSystem and our POWER8 processor-based servers will provide the performance, availability and capacity we need."

In parallel with the version update for its Epic EHR system, the Froedtert & MCW network is adding new functionality, as Hector Joseph explains: "New patient engagement tools are high on our list of new capabilities within the Epic environment. We're also looking to introduce telemedicine options that will be more convenient and cost-effective for patients. Beyond that, we're actively implementing new Epic modules for Physician Billing, Orthopedics and Research. Finally, we're significantly ramping up our big data reporting and analytics from the Epic system, to meet the insatiable appetite for deeper analysis from both business and clinical users. The upgrade to our storage and server landscape has given us the headroom to make all of this feasible."

In addition to providing more responsive systems to administrative and clinical staff alike, the move to FlashSystem has simplified management for the Froedtert & MCW IT department. Kasica comments: "Life is much easier with FlashSystem because we no longer need to worry about how many disks we have allocated to Epic or how our pools of disks are arranged. Everything is much faster and simpler, so we can reinvest the time we save in helping the business in other areas."

Says Shober, "In addition to reducing our use of floorspace in the data center, FlashSystem is far more energy efficient than the equivalent enterprise disk system. Energy usage was not a primary consideration in this upgrade project, but it's certainly a benefit to have lower electricity and cooling requirements."

As the Froedtert & MCW health network continues to expand and transform, the organization's IT leaders value the close working relationship it has with IBM, Meridian IT and Epic Systems—as well as the relationships between these organizations. The IT department is often tasked with solving problems within very short timescales, and benefits from the flexibility of its external partners to help it overcome these challenges.

Shober concludes: "We always need to be ready for new requirements from the business, and the lead times are sometimes shorter than we'd like. But we rise to the challenge and we draw on the strength of our relationship with IBM and Meridian to work together and come up with a viable plan. IBM works closely with Epic Systems to make sure its products meet the present and future requirements, and consistently brings innovations to market that help us better serve our organization and the community around it."

Solution components

- IBM® FlashSystem® 840
- IBM Power® E870 with POWER8® processors
- IBM SAN Volume Controller
- IBM Spectrum Protect™
- IBM Systems Lab Services

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