The University of Kansas Health System needed a new storage solution to meet the performance requirements of its Epic EHR system. Installing all-flash arrays from Pure Storage has exceeded the Epic performance requirements, reduced downtime, given application-development teams more flexibility, and slashed the time it takes to generate key reports.

**PURE STORAGE DELIVERS EPIC PERFORMANCE GAINS AT THE UNIVERSITY OF KANSAS HEALTH SYSTEM**

The University of Kansas Health System, founded in 1906 and became a public authority in 1998, is an integrated medical system that operates two hospitals with over 800 beds and nearly 80 facilities in the Kansas City metropolitan area. With nearly 10,000 employees, it serves more than 160,000 patients a year.

Like many healthcare institutions, it is investing heavily in advanced information technology to improve patient outcomes and enhance efficiency. The health system has been a long-time user of Epic electronic health record (EHR) systems. Epic requires its customers to meet certain performance requirements for their IT infrastructures, and those requirements change over time as the EHR software evolves.

In late 2014, University of Kansas Health System was at a critical decision point. “We faced the need to meet performance requirements for our Epic infrastructure for a pending upgrade. We looked at what it would take to meet the IOPS (inputs/outputs per second) requirement of our legacy storage system, and it was incredibly expensive,” recalled Mike Schlenk, Assistant Director of Server Design, Development and Enterprise Storage. “We took a step back and rethought the whole thing.”

The re-evaluation involved a recognition that storage technology was rapidly changing, and an appreciation that the demands on the company's IT infrastructure were going to increase sharply in the years ahead.

The health system made a major commitment to the equipment of a large provider of spinning-disk systems a few years before, replacing storage hardware from eight different vendors in a migration process that took nearly 18 months.

The resulting system “was satisfactory, but we saw a ‘hockey stick’ demand curve coming from increasing patient volumes and the performance requirements of the Epic EHR,” said Bill Young, Manager of Server Design, Development and Enterprise Storage. “Although I was biased in favor of our incumbent vendor, I told my storage engineers that we should be willing to look at disruptive technologies.”

The existing storage system was “rock-solid,” Young noted, “but we wanted a quantum leap to what’s next in storage technology, and a means to break the rip-and-replace cycle every three years.”
In early 2015, the health system worked with its system-integration partner, Forsythe Technology, to arrange a proof-of-concept trial between two vendors — the incumbent supplier and Pure Storage.

NEVER AGAIN A BOTTLENECK FROM STORAGE

The head-to-head evaluation was thorough and rigorous. “We evaluated everything — ease of use, performance, resiliency, recovery time, user interface, the support infrastructure, and more,” Young reported. “We had a single-spaced matrix that filled two pages.”

In the end, Pure Storage was the clear winner, Young noted, based on factors that included performance, ease of use, confidence in the company, price, and critical features such as deduplication, compression and snapshots.

“With Pure Storage, we not only came in under the cost of a new system from our incumbent vendor, but we knocked the Epic performance requirements through the roof,” Schlenk said.

During the test period, Schlenk noted, “one of our DBAs set scripts for various IOPS levels to make sure our storage was capable of handling those performance demands. He set it for 10,000, then 20,000, then 50,000 and the Pure Storage array wouldn’t break a sweat. Finally, he set it for 90,000 and he got a CPU bottleneck. He couldn’t get a storage bottleneck.”

That satisfied a key goal of replacing the legacy system. “We never wanted storage to ever be a bottleneck again,” Young noted. “And with Pure Storage installed, that has absolutely been the case.”

EASIEST INSTALL EVER

Migration from the legacy storage system to the Pure Storage array was planned and executed over a two-week period. “I’ve been through numerous data migrations over my long career, and this was the easiest one I’ve done,” Young said. “Pure came in fully staffed, made sure everything was ready for the conversion, and then fully participated in the migration, making themselves available to us if we ever needed anything.”

Schenk added, “the snapshot capability built into Pure Storage saved a lot of time because it allowed us to quickly copy a database in case something went wrong during the conversion process. In the past, any glitch would set us back days and caused who knows how many tasks being bumped down the road.”

After the initial 400-series installations, upgrades and expansions have taken place. Two FlashArray//M50s and one //M20 were installed in the company’s primary data center (located in an underground co-location facility), and one //M50 and one //M20 were installed at a secondary data center that is being migrated to a disaster-recovery site. The Pure Storage arrays host the company’s Epic EHR system, running on the Caché and SQL databases. As a long-time user of Cisco UCS servers, the health system appreciates the close integration between UCS and Pure Storage arrays.

“The advantages of Pure Storage became evident immediately after the migration,” Young said. “There was at least one instance when we were doing an upgrade to the Caché database and it went sideways. In the past, that would have been a four-hour restore from tape or some other backup system. But with Pure installed, it took no more than 10 minutes to recover. And when it went sideways again, it was just another 10 minutes.”
The IT staff wasn’t the only part of the company to witness the impact of the new storage. “Shortly after we went live with the Pure Storage array, we got some calls from the Epic application analysts saying that something was wrong with the Clarity reports they were running. Normally, it takes about 5½ hours to run them, but now it was taking 20 minutes. They figured something must be wrong,” Schlenk recalled. Added Young: “One of the DBAs looked into it and said there wasn’t a problem; it was just how things worked now. And we could see the broadest smile on his face.”

**SIMPLIFIED MANAGEMENT AND GREATER FLEXIBILITY**

Installation of the Pure Storage arrays has greatly simplified management tasks for the IT team. “We have done software updates and added controllers and the process was seamless. No one noticed,” Young said. “Having Pure gives us higher confidence that we can get all our maintenance completed within the downtime windows we have.”

Added Schlenk, “There’s a lot of pain we don’t have to deal with anymore — spindle counts, LUN sizes, cutting things up. These are all things of the past. But our DBAs are the biggest beneficiaries, in their ability to work more quickly.”

Schlenk also pointed to several sources of cost savings from the transition to Pure Storage. “Our power and space consumption in the data center are much lower. It’s almost laughable to think that we can potentially replace five full racks of storage with equipment that takes up just 20 rack units.” And beyond the operational savings, Schlenk sees cost benefits from the Pure Evergreen™ Storage program, which provides long-term predictability in maintenance costs and the assurance of always having the latest technology without suffering through forklift upgrades.

“The Evergreen program was one of the biggest selling points for my director,” Schlenk recalled. “He was quite happy to find a storage vendor that wasn’t going to basically make us buy again in three years.”

Another big benefit has been the high data-reduction rates the company has seen on the Pure Storage arrays — “from 8:1 to 13:1 across the board, mainly due to the Caché database,” Young observed.

Schlenk also noted that the snapshot feature of the Pure Storage arrays has given the company’s application development team the ability to spin up database copies quickly and easily, giving them the flexibility to pursue new concepts or approaches without impacting production applications or consuming precious storage capacity.

“Pure Storage gives us everything we wanted — greater performance, greater cost containment, seamless migrations, and greater flexibility,” Schlenk said.