

**Lakeland Health** needed much better performance and reliability from its storage infrastructure to meet the demanding requirements of its electronic health record (EHR) system. It turned to Pure Storage for a long-term solution. Now, key databases run faster, system maintenance takes far less time, and there is a highly cost-efficient growth path for future capacity.

**BUSINESS TRANSFORMATION**

Doctors, other caregivers and back-office employees have faster and more reliable access to critical patient information and EHR applications. The IT staff spends virtually no time managing storage, while the long-term expansion of storage systems will be easier and less costly.

**GEO**

North America

**INDUSTRY**

Healthcare

**LAKELAND HEALTH PRESCRIBES PURE STORAGE TO CURE LAGGING STORAGE PERFORMANCE**

The IT staff at Lakeland Health takes care to measure everything possible to understand how its systems are performing and how they affect the care of patients. So when its legacy spinning-disk storage system wasn't performing as expected, the team knew just how to evaluate potential alternatives.

Lakeland uses the Epic electronic health record (EHR) system to run its most mission-critical clinical applications. Epic has a "Good Maintenance" program which offers significant discounts to the cost of support for customers who meet certain performance criteria for their IT infrastructures.

"In early 2014, we had just bought an enterprise-scale storage device from a major manufacturer, which was going to host our Epic database at our disaster-recovery site," recalled Mike Lawler, senior systems engineer for Lakeland, based in St. Joseph, Michigan. "But the performance wasn't what we had hoped for, and it wasn't doing the job. Not only that, we were near the deadline for being certified for the Epic Good Maintenance program. The array had failed nearly 20 attempts to pass Epic certification criteria, and we knew it wasn't going to make it."

**PURE STORAGE ARRAY PASSES CRITICAL TEST WITH FLYING COLORS**

Lawler and his colleagues looked in the marketplace for a storage vendor with success in hosting Epic databases, and found Pure Storage. At Lakeland's request, Pure Storage quickly arranged a proof-of-concept trial that included its pioneering Love Your Storage program, in which a prospective customer can try a Pure Storage array for as long as 30 days, with no obligation, and return it at no cost if dissatisfied. Providing what Lawler said was "extreme white glove service," Pure Storage shipped a FlashArray 405 to Lakeland on a Tuesday and it was installed on Thursday. Over the weekend, the Pure Storage array was subjected to the Epic certification tests.

"Not only did the Pure Storage array pass the test, it passed on the first try and passed well beyond the required scale," Lawler noted. "To pass an Epic test on the first try is pretty unheard of. We were so surprised that we tested it again, because we didn't believe it."

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Mike Lawler, *senior systems engineer*

**COMPANY:**

Lakeland Health  
[www.lakelandhealth.org](http://www.lakelandhealth.org)

**USE CASE:**

- VSI – VMware® vSphere®
- Database – Epic® Caché®

**CHALLENGES:**

- Legacy storage system was unable to meet the demands of the EHR system.
- High latencies caused frequent delays in clinicians' access to critical data and applications.

**IT TRANSFORMATION:**

- Latencies have been reduced from as high as 14 ms to consistently less than 2 ms.
- A nightly database report that used to take 8-10 hours to produce now takes 15 minutes, and can be performed on-demand.
- The time needed to perform several key system maintenance tasks has been reduced by as much as 90%.
- Providers save more than 350 hours a year based on faster Epic database log-in times.

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“Working on any virtualized servers, it is significantly faster working with Pure Storage.”

Mike Lawler, *senior systems engineer*

The Lakeland team tested the Pure Storage array at data and transaction volumes that they don't expect to reach for several years, “and we couldn't break it. We went to seven times our current capacity and it didn't show any signs of giving up.”

**PURE STORAGE MEETS ALL THE CRITERIA**

While the POC results were impressive, the Lakeland team still had to satisfy itself on five key criteria for selecting a new storage platform:

- It had to fit within the allocated budget, which already had been tapped just six months before to buy the storage array that had failed to perform adequately.
- It should have as minimal a data center footprint and power costs as possible.
- Storage management should be as easy as possible, because no dedicated storage administrator was on staff.
- The performance had to be great enough to meet the Epic criteria today, as well as further growth in demand in the years ahead.

(Lakeland adds around 600GB to its main Caché database every year.

The impact of this growth on the storage infrastructure is magnified because Lakeland maintains five full copies and another dozen partial copies of the database for various purposes.)

- The solution had to be implemented within 60 days.

“Pure Storage met all those criteria,” Lawler said, “and it has continued to meet or exceed them ever since. We haven't missed a beat since we installed the first array more than two years ago.”

Given its high degree of confidence in the performance and reliability of the Pure Storage array, the Lakeland team moved the Caché database for the Epic application onto the all-flash array in the disaster recovery (DR) center.

About a year later, the storage-area network supporting the production database was nearing the end of its support contract. While it was performing as expected, Lawler noted, “The system management requirements weren't within our realm of expertise. Plus, it occupied three linear rack spaces, which meant high operating costs. And when we received the bid for capacity upgrades and continued support, it was prohibitively expensive so we determined that a platform change would be necessary.”

The Pure Storage array in the DR site “was doing everything we needed and more, so we decided to add Pure Storage arrays in our primary data center as well.”

Today, Lakeland has three Pure Storage arrays — two in its primary data center and one at its DR site — supporting its Epic database and applications, as well as 600 servers spun up in a virtualized server infrastructure (VSI) powered by VMware vSphere.

**IMPROVED PERFORMANCE BENEFITS ALL USERS**

The impact of switching to Pure Storage arrays has been seen throughout the Lakeland organization, which includes three hospitals, more than 30 ambulatory offices, over 30 affiliate physician practice locations, an outpatient surgery center, and around 5,000 end-users supported by the IT infrastructure.

Read latencies for the Caché database on the legacy storage system were running around 14 ms; they now are consistently below 2 ms, Lawler reported. “When you multiply that 7x performance improvement by the tens of thousands of transactions the system supports every day, you get a sense of the impact it has on the people we support. By one calculation I've seen, end-users in our organization may be saving more than

350 hours a year based on faster log-in times. Our goal is to give doctors and other clinicians the fastest, most reliable access to the data they need to improve patient outcomes. Anything we can do to reduce those access times contributes to that goal.” Write-cycle times are about one-sixth on the Pure Storage arrays compared to the spinning-disk system.

Lakeland also measures “exceptions,” which are instances in which end-users encounter an unacceptably long wait for a response from the application or database. After installing the Pure Storage array, Lakeland’s exception rate decreased an average of 35% across all workflows.

A heavily used reimbursement application running on the VSI had been experiencing slow response time and frequent errors, prompting users to complain. “Once we moved that application onto the Pure Storage array, the complaining stopped,” Lawler said.

### **SIMPLIFIED MANAGEMENT CUTS BURDEN ON STAFF**

Performance improvements also have been noted within the IT department.

One of the system-management tasks performed every night is a SUP refresh on the Epic database. IT analysts are tasked with these nightly updates to support end-users such as doctors, nurses and back-office support staff. Consequently, its availability every morning is crucial to effective and efficient IT operations. The refresh used to take as long as 10 hours, but since the Caché database has been moved onto Pure Storage, it is completed in around 15 minutes. This means the update can be performed on-demand anytime during the day, not just overnight. Other critical overnight jobs, such as patient billing, now run in half the time.

Improvements also affect system maintenance for the virtualized servers, Lawler noted. “If you’re working on any of the virtualized servers, it’s significantly faster working with Pure Storage, so our administration efficiency is quite a bit better.” Rebooting a server takes about a minute, he said, compared to the previous 15-20 minute wait time.

### **PURE STORAGE DELIVERS TOP-NOTCH SUPPORT**

The Lakeland IT team has high praise for the support from Pure Storage. “From the very first contact, we have been extremely impressed with the level of support from Pure Storage,” Lawler said. “With our incumbent vendor, I couldn’t tell you the name of our support rep. But with Pure Storage, we know our rep very well. He’s checking our array every day, and if he sees any anomaly, he’s calling support proactively, usually before we even know there’s an issue.”

Another aspect of Pure Storage that has impressed Lakeland is the Pure Evergreen™ Storage program, under which a customer is guaranteed non-disruptive upgrades to the latest technology for any Pure Storage array under a support contract. “Evergreen was one of the huge attractions to us,” Lawler noted. “But the bigger attraction has been the 100% trade-in. If we want to upgrade, it’s just the difference in price between the two models. We get full credit for what’s already been purchased. That is a huge benefit for us, because every other vendor’s model requires a forklift upgrade and a lot of disruption. We have already taken advantage of Evergreen Storage twice.”

One of the Evergreen changes involved upgrading FlashArray 405s to FlashArray//M20s. The upgrades were performed on a weekday morning, during full production runs, with no disruption whatsoever.

“We have already taken advantage of Pure Evergreen™ Storage twice.”

Mike Lawler, *senior systems engineer*



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