CASE STUDY

Creating a Sustainable Foundation for Epic* and Caché*

Intel® Xeon® Processor E7 Family
RISC Migration
Healthcare

University Health™

"Using Intel® and Dell™ hardware with Linux* and VMware*, you can provide a level of reliability that's better than or equal to anything out there. The benefits are so clear-cut, I would question how you could make the decision any differently."

– Greg Blanchard, Executive Director of IT, University Health System

Like many hospitals and health networks, University Health (UH) System is eager to create an affordable, sustainable environment for the InterSystems Caché* database that supports its Epic* electronic health record (EHR) system. As UH's database platforms neared their end-of-life, its IT group examined industry performance benchmarks, conducted detailed total cost of ownership (TCO) analysis, and migrated to an industry-standards-based environment powered by Intel® technologies. "The benefits are so clear-cut, I would question how you could make the decision any differently," says Greg Blanchard, University Health's executive director of IT.

Challenge

- **Cost-effective, mission-critical computing.** UH needs cost-effective infrastructure with outstanding performance and reliability. Its RISC-based platforms created interoperability headaches, drove up costs, and required special expertise to manage.

Solutions

- **Dell™ platforms with Intel® Xeon® processors.** UH migrated Caché to Dell™ PowerEdge™ R920 servers based on the Intel® Xeon® processor E7 v2 family and Intel® Ethernet Converged Network Adapters. UH chose the Dell Compellent™ SC8000 Storage Center Controller with the Intel Xeon processor E5 family for scalable, cost-effective storage.
- **Open standards-based software.** UH runs the Red Hat Enterprise Linux* (RHEL*) operating system and uses VMware vSphere* ESXi* for virtualization.

Technology Results

- **Exceptional database performance.** Industry data and Intel benchmarks show outstanding—and steadily increasing—database performance.
- **Flexible environment.** UH creates a consistent, flexible IT environment that helps improve interoperability, reduce risk, and free IT staff for more strategic assignments.

Business Value

- **More than 40 percent lower lifetime TCO.** UH stretches scarce budget resources through massive savings on hardware acquisition, associated software, high availability, and other factors. Five-year TCO is projected to be more than 40 percent less than continuing in the RISC environment, even with Caché license conversion costs included.

The Intel® Xeon® processor E7 family helps UH reduce costs, complexity, and risks

- **Platform for innovation.** UH is better equipped to deliver coordinated care, train medical professionals, expand services, and improve the health of Louisiana's citizens.

Vital Resource for Healthcare Professionals

Louisiana has some of the bleakest health outcomes in the United States. On lists of the healthiest states, it ranks 48th, with high rates of obesity, diabetes, and infant mortality.[1] Poor health takes a toll on residents' quality of life as well as the state's economic growth.

University Health is a leader in efforts to change that picture. As the clinical partner and teaching hospital for the Louisiana State University Shreveport School of Medicine, UH is a vital health resource for northwestern Louisiana. UH comprises major hospitals in Shreveport and Monroe, including a regional burn center, a Level 1 trauma center, the Feist-Weiller Cancer Center, and other facilities. Following Louisiana's initiative to transition former public hospitals into the private sector, UH is now a subsidiary of the Biomedical Research Foundation of Northwest Louisiana, a regional economic development organization.

As a teaching hospital, UH strives to deliver high-quality, coordinated care while conducting clinical research and developing the next generation of physicians, nurses, and allied health professionals. Epic and Caché are essential to these missions. The EHR and its databases help give clinical staff a secure, 360-degree view of each patient's health. They also enable researchers to gain valuable insights that can identify best practices and drive treatment breakthroughs. UH provides Epic and Caché infrastructure for its own facilities and several others throughout the state—a total of approximately 3,500 Louisiana health professionals.

Escaping RISC Restrictions

UH's IT group ran Caché on IBM P Series* servers with AIX*. For nearly all other applications and databases, including the Epic front-end and application layer, IT established a virtualized environment based on Intel Xeon processor-based servers and storage systems and running Linux. An estimated 90 percent of the Intel Xeon processor-based servers are virtualized with VMware vSphere.

Once RHEL became a target OS for Caché, UH was eager to escape the RISC environment. "The price point of the P Series platforms and the traditional nature of the AIX environment made the economics very challenging for us," says Blanchard. "Everything was more expensive—the platforms themselves, software licensing, peripherals, you name it. There were also big limits on your flexibility. It was very, very difficult for us to move outside the vendor's storage environment, management and virtualization technologies, and so forth."

Support and maintenance posed particular problems. "In any organization, it all comes back to the people," Blanchard observes. "If I had to hire someone right now who could really support AIX, finding someone here in Shreveport would take a miracle."

Performance for a High-Stakes Database

UH's IT team had strong relationships with Dell and positive experiences using Dell PowerEdge servers for other mission-critical workloads. As the time approached to refresh their legacy infrastructure for Caché, UH IT leaders began talking with Dell's healthcare IT experts. "I told them I'd be interested in doing whatever it took to look at running Caché on a Dell platform with Intel processors and using Linux and VMware like we do everywhere else in our environment," Blanchard recalls.

Performance was an important requirement, and the team was impressed with the numbers coming from Epic and Intel. "It looks like Epic is taking the Intel platform very seriously," Blanchard says. "Last time I checked, the global references per second that Epic is citing are six, eight, ten times more than they were two or three years ago—and they keep rising."

Intel benchmarks show that the Intel Xeon processor E7 v2 family provides up to double the database performance of previous-generation Intel processors.[2] Tests performed in January 2015 by engineers from InterSystems and Epic showed that moving from the Intel® Xeon® processor E7-4890 v2 with Caché 2013.1 to the Intel® Xeon® processor E7-8890 v3 with Caché 2015.1 increased the scalability of a single operational database server by 60 percent.[3]

This performance helps health systems support rising volumes of users and application requests. Organizations can generate database reports more quickly, providing timelier information for planning and quality assurance. In addition, Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI) accelerates server database encryption. This can help maintain the confidentiality of protected health information (PHI) without the traditional slowdown in performance.[4] Intel AES-NI also helps reduce the costs of encrypting healthcare data.

UH quickly narrowed its focus to the Dell PowerEdge R920, the most powerful rack server in the PowerEdge family. The team matched the server with the Intel Xeon processor E7 v2 family. "The Intel Xeon processor E7 family was a good match for us in terms of the amount of memory, processing power, hyperthreading capabilities, and the virtualization technologies in the processor," says Huey Hammontree, UH systems and programming manager. "Those are the things you're looking at when you're going to be running Caché."

Storage performance was another, related concern. "Epic has a very specific I/O structure that can be difficult to deal with for most storage platforms," says Jason Hayes, systems and programming manager at UH. "Traditionally, you had to spend a lot—a lot—of money to get storage that could do that. Dell Compellent can handle that, and it's much more affordable. It's the icing on the cake for us."

Massive Cost Savings and More

In creating a consistent environment based on Intel technologies, UH's IT team delivers a huge payoff: massive cost savings, a more robust and agile IT environment, and strong business value.

To gain a clear picture of potential cost savings, UH worked with the Dell, Red Hat, Intel, and VMware for Epic (DRIVE) Center of Excellence. Located near Epic's Wisconsin headquarters, the DRIVE Center offers support and services to help healthcare organizations transition smoothly to an industry-standards-based environment.

Working with the DRIVE team, UH compared the costs of deploying Caché on a PowerEdge R920 with the Intel® Xeon® processor E7-4830 v2 product family, and advancing from its P Series platform to an IBM Power* 750. Looking at a five-year life span, the analysis showed that TCO for the Dell environment would be 42 percent lower than the Power environment.

Savings included a 60 percent reduction in initial hardware acquisition costs. Total acquisition costs, including Caché license conversion, were 34 percent lower with the Dell platform. Storage was not included in the calculations but would add further savings.

VMware virtualization technologies give UH the agility and availability of a virtualized environment while simplifying life for IT. "Being able to use vSphere for Epic and Caché is going to increase our productivity by leaps and bounds," Blanchard says. "Our guys are VMware experts—they work with it every day. Now we aren't having to do something different for Caché than for everything else. High availability and disaster recovery are 100 percent easier with the flexibility you have on VMware. We know the work Intel has done with VMware over the years to increase the performance and security, so that's a benefit as well."

Staffing and support are also easier in the new environment. "Linux is a popular operating system, and the base of applications is growing," says Blanchard. "There are a lot of people who understand it, and a lot who want to move in that direction. Many of our people run Linux on their home computers. Hiring qualified programmers and support staff is just a whole lot easier."

Reducing Risks

Complexity is a key driver of risk in an IT environment. By moving UH's healthcare database to technologies from Intel, Dell, VMware, and Red Hat, UH IT increases standardization, removes complexity, and reduces risks.

Blanchard says vendor support for the mission-critical environment has been excellent, which further reduces risks. "We're not the Cleveland Clinic or Kaiser, but the help we've gotten from Intel, Dell, and the other vendors has been outstanding," he comments. "It increased our confidence level in making the move."

Lessons Learned

What advice do UH leaders offer their healthcare IT peers? "Follow the Epic recommendations and options," says Blanchard. "Now that Linux* is a target platform for Caché*, this is a very easy decision. Using Intel® and Dell™ hardware with Linux and VMware*, you can provide a level of reliability that's better than or equal to anything out there. You can do it more easily and at much lower cost. It's going to make your life a lot easier."

"The DRIVE solution fits our needs perfectly. The Dell, Red Hat, and Intel teams were committed collaborators with us during implementation. With their help, our technical team was able to successfully migrate to our new platform on time and on budget, with minimal business impact. I couldn't be more pleased with the outcomes."

– Marcus D. Hobgood, CIO, University Health System

UH's chief information officer, Marcus D. Hobgood, says the project has been a huge success. "UH IT strives to deploy and maintain the most advanced systems and technology available to improve the outcomes of our patients, increase operational efficiency, and provide state-of-the-art systems for medical education," Hobgood states. "The challenge that UH shares with most hospitals is to make these technology investments affordable. The DRIVE solution fits our needs perfectly. The Dell, Red Hat, and Intel teams were committed collaborators with us during implementation. With their help, our technical team was able to successfully migrate to our new platform on time and on budget, with minimal business impact. I couldn't be more pleased with the outcomes: UH has the most advanced technology and systems for our patients, we had a successful migration, and we have a lower total cost of ownership."

That same vendor responsiveness also helps UH maintain the security of its health IT environment. "Linux on Intel® platforms allows for much faster deployment of security patches when vulnerabilities are identified," says Blanchard. "Something like the Heartbleed bug—we heard of RISC vendors taking six months to patch it. We had a patch within hours."

A Platform to Grow On

Demands on the Caché database and other healthcare IT solutions continue to climb. "They're rising exponentially and show no signs of stopping," Blanchard says. "We have new requests every day, plus Epic itself is always adding capabilities that raise the performance requirements."

Blanchard is counting on Intel technologies to help UH keep pace. "The great thing about being on Intel platforms is that Intel keeps getting better and better," he observes. "The performance of the processors has always outpaced the price point, so we keep getting a lot more compute for even less money. Moving Caché onto Dell and Intel buys us time to get ahead of the curve with Epic. It allows us to do more of the things we need to do so we can keep up with rising demands. It is going to be very beneficial for our organization, both economically and in terms of fulfilling our mission."

As UH builds on its investments in Epic and Caché, the ultimate beneficiaries are the people of Louisiana. "Epic has been great for doctors and patients," Blanchard says. "Going forward, it gives us a lot of ways to add value throughout the area."

UH is exploring options to help local and regional clinics and rural hospitals in northwest Louisiana adopt Epic and Caché. "Since we're the regional specialists, we might have patients come from 60 or 80 miles away for their care," explains Blanchard. "If we're able to securely access and share those patient records, we make it much easier for the patients and their care teams. We can provide better care while they're with us and provide greater continuity of care when they go back into the community. That type of close collaboration can help reduce readmissions, cut costs, and provide a better experience for the patient."

In addition to helping UH clinicians deliver more coordinated care, Blanchard says the EHR is a tool to inspire and engage patients. "We're giving patients access to their medical information through our patient portals, and that can motivate them to get more involved in managing their own care," he says. "For people with these complex, chronic health conditions, anything you can do to increase their engagement in their healthcare can be a big factor in improving their health and their quality of life. In the long run, that can have direct and indirect benefits for the state's economy."

Find the solution that's right for your organization. Contact your Intel representative, visit Intel's **Business Success Stories for IT Managers**, and check out **IT Center**, Intel's resource for the IT industry.

[1] America's Health Rankings: State Data, Louisiana, 2013. http://www.americashealthrankings.org/la
[2] The Foundation for Better Business Intelligence, Intel Corporation, 2014. http://www.intel.com/content/dam/www/public/us/en/documents/product-briefs/xeon-e7-v2-family-brief.pdf
[3] InterSystems and VMware Increase Database Scalability for Epic EMR Workload by 60 Percent with Intel® Xeon® Processor E7 v3 Family, Intel Corporation, 2015. https://www-ssl.intel.com/content/www/us/en/healthcare-it/epic-intersystems-vmware-paper.html
[4] High Performance Encryption for Electronic Health Record Databases, Intel Corporation, 2012. http://www.intel.com/content/dam/www/public/us/en/documents/solution-briefs/high-performance-encryption-for-electronic-health-record-databases-brief.pdf

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