CASE STUDY
Intel® Xeon® Processor E5 Family
Healthcare
Cloud Computing
Big Data

Gwinnett Medical Center Manages Data Explosion with Intel® Xeon® Processors

Healthcare leader handles big data workloads with private cloud powered by Intel® data center technologies

Gwinnett Medical Center

"Honestly, I don't know what other processors you'd use. It's that simple. You have to standardize your data center on something you can support. When you're running a mission-critical data center, you have to standardize on something you trust. We've standardized on Intel® processors for something like five generations now."

– Rick Allen, Assistant Vice President of Information Services, Gwinnett Medical Center

Ranked one of America's 100 Best Hospitals*,[1] Gwinnett Medical Center (GMC) operates in a dynamic environment with steep data growth, a fast-growing suite of applications, and a space- and cooling-constrained data center. To stay ahead, GMC has established a private cloud environment and standardized on Intel® data center technologies, including the Intel® Xeon® processor E5 family and 5600 series for servers and storage controllers, and Intel® Ethernet 10 Gigabit (10 GbE) Server Adapters. Rick Allen, assistant vice president of information services at GMC, says his technology strategy enabled his team to recapture 10 server racks while delivering high performance for new applications. His team manages 1 PB of storage from half a rack of IBM System Storage Area Network (SAN) Volume Controllers* (SVCs*) and is well positioned for what Allen predicts will be explosive data growth in healthcare.

CHALLENGES

- **Dynamic environment, rapid data growth.** GMC needs agility and performance to support new applications and handle rapid data growth cost-effectively.
- **Data center limits.** GMC's data center was constrained by limitations on cooling, space, and power.

SOLUTIONS

- **Intel® Xeon® processors.** GMC standardizes on the Intel Xeon processor E5-2600 product family and 5600 series for energy-efficient performance in its servers and its IBM System Storage Area Network (SAN) Volume Controllers (SVCs).
- **Private cloud.** GMC virtualizes much of its server and storage infrastructure in a private cloud with VMware vSphere*.
- **Intel® Ethernet 10 Gigabit (10 GbE) Server Adapters.** GMC is modernizing and virtualizing its networks with Intel 10 GbE Server Adapters.

TECHNOLOGY RESULTS

- **High-capacity data center.** GMC freed 10 racks in the data center and reduced its power draw, leaving room to handle growth both in the data center and in other parts of the medical center.
- **Efficient data management.** Allen's IT team manages 1 PB of storage from less than half a rack of IBM SVCs, providing high throughput and enabling GMC to run modern storage optimization techniques.

BUSINESS VALUE

- **Organizational agility.** GMC's data center has the space and performance for new applications, and the cloud enables IT to deploy new solutions in days or weeks.
- **More services, less cost.** With the savings from its cost-efficient environment, GMC can offer "big hospital" innovations such as a health information exchange (HIE) on its "medium-sized hospital" budget.

GMC manages 1 PB of storage from less than half a rack of IBM SVCs

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Growth in Volume, Variety, and Velocity

In today's dynamic healthcare environment, health system CIOs face rapid change on every front—from innovative payment models that require new ways of documenting care, to next-generation medical devices whose data feeds can provide fresh clinical insights. At GMC, those changes led to hockey-stick growth in server and storage requirements that accelerated when the organization began deploying electronic health records (EHRs). GMC is a leading not-for-profit healthcare network with two acute-care hospitals, 553 beds, and numerous outpatient facilities in the greater Atlanta area. GMC's 800 affiliated physicians and 4,200 employees serve more than 400,000 patients annually, and the center has won national awards for its high-quality care.

Now, data volumes and processing requirements are climbing again as GMC incorporates more and more real-time data feeds into its McKesson Horizon Clinicals* EHRs. "We're trying to take everything that happens within a hospital—automated patient-monitoring data, test results, and so forth—capture it, often in real time, tie it all back into the EHR, and present it to the doctors and nurses in a way that they can make decisions on it," explains Rick Allen, assistant vice president of information services at GMC. "It's tremendously valuable for productivity and clinical decision making, but the processing power and capacity to process and store and archive that data are just going through the roof."

In addition to higher volumes of data, GMC is feeding a greater variety of data into its EHRs. "We're capturing all kinds of structured and unstructured data about patients," Allen notes. "We're capturing every type of medical images, document images, dictation, sleep studies, and discrete data about patients, and it all needs to be stored and archived, some of it for decades. We're just starting to learn how to effectively use all that data and get the value from it." GMC is exploring or introducing new capabilities to help manage and optimize its data environment, including solutions for content management, document management, and e-mail archiving.

Intel Xeon Processors as the Private Cloud Base

GMC standardized on Intel Xeon processors five generations ago, moving away from RISC architectures, virtualizing on servers and storage controllers powered by Intel Xeon processors, and adopting each new processor generation. Why? "Honestly, I don't know what other processors you'd use," Allen says. "It's that simple. You have to standardize your data center on something you can support. When you're running a mission-critical data center, you have to standardize on something you trust."

GMC is currently deploying servers based on the Intel Xeon processor E5-2600 product family and 5600 series and has evolved its virtualized infrastructure to a private cloud. The medical center has also replaced all but a handful of its legacy platforms. "Out of 700 or so servers, we've got maybe 8 that still run on a RISC architecture, and those are only because the software requires it," observes Allen. "Otherwise, everything is on Intel technologies."

Allen says this technology strategy enables his lean IT organization to keep ahead of GMC's expanding requirements and cope with a data center that had been strained to capacity. "We were at a point where we couldn't grow anymore," he says. "Now we can." His Intel Xeon processor-based cloud lets Allen free 10 racks of server space in his previously crowded data center.

Along with increased performance and density, the new Intel Xeon processors provide crucial energy efficiency. "For a hospital, reducing power in the data center is huge," Allen comments. "There is a finite amount of power that we pull in from the city, so the less we use within the data center, the more the hospital can use for diagnostics equipment or whatever else they need it for. As I cut back, the business can grow more."

Storage Flexibility for a Dynamic Environment

GMC also benefits from the Intel Xeon processors' performance and energy efficiency in its virtualized storage environment. The data center team initially used IBM SVCs, which are based on the Intel Xeon processor, to virtualize 50 TB of storage in 2005. Today, after three generations of SVC nodes, each with a more powerful Intel Xeon processor, the team needs less than half a rack to manage GMC's total of 1 PB of data.

"Managing a petabyte of data with SVC nodes from 2005 would have taken a whole row of racks," says Allen. "The fact that we can do it on half a rack of SVCs is a great indicator of how much more capable the subsequent generations have become."

The SVCs' redundant, node-based design enables GMC to add and upgrade nodes while keeping its storage online. Taking advantage of that capability, GMC has had its SVCs in continuous operation since 2005.

With the performance and throughput of the Intel Xeon processor E5 family and 5600 series, GMC uses today's IBM SVCs to support advanced storage management techniques such as asynchronous replication, tiering, and online data migration of attached virtualized storage.

"The net impact is that we're really able to manage our storage growth and get much higher storage utilization than we would otherwise," Allen says. "Our storage environment is very flexible and available, and we can replicate data across our two data centers and keep our data in sync. We've done upgrades and moved storage between arrays without the applications or end users knowing anything about it. Last week we moved our medical imaging database off one storage enclosure onto another through the SVC without impacting the database at all."

Agility, Savings, and Room to Grow

GMC's Intel Xeon processor-based private cloud enables IT to respond quickly to requests for new services. "People come to us and just ask for capacity," Allen explains. "We spin up the capacity for them, and they don't have to worry about what infrastructure is in place. It's well designed and highly available. It's just there, and it's always there."

The private cloud proved its agility recently when Allen's team had to replace an end-to-end revenue management solution on short notice. "We were a development site for a solution that the vendor decided to sunset," Allen recalls. "They wanted to migrate everyone off quickly so they wouldn't have to deal with support. We had to spin up an entire environment for a whole new application suite that tracked the patient from admission through bill pay, and we needed to do it in less than a month—servers, storage, and everything else. For all the aspects that supported virtualization, we were ready for our users within two weeks."

LESSONS LEARNED

- **Virtualize and standardize.** Gwinnett Medical Center created the foundation for its private cloud by first standardizing and virtualizing its server and storage environments. Network virtualization with Intel Ethernet 10 GbE Server Adapters is underway.
- **Adopt advancing technologies.** By taking advantage of each new generation of servers and storage controllers based on Intel Xeon processors, GMC is able to keep pace with rising business requirements and data volumes within its data center constraints.

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Allen says his technology strategy also helps him stretch the IT budget to cover value-added services such as a community HIE that GMC is beginning to offer its affiliated physicians. "We save on power and we save by not having to buy as much high-end storage equipment—we can let the SVCs and the Intel Xeon processors move our data to the most cost-effective storage tier," he comments. "Our environment is also relatively easy and cost-effective to manage. We do more with fewer people than some of the other hospitals I'm aware of. We are able to manage and provide many of the services that larger hospitals provide, while keeping our IT spending at a comparable level to hospitals of our size."

Allen and his team work with Intel data center and healthcare IT experts as they develop and refine their technology strategy. "Intel knows the trends and technologies much better than we do," Allen says. "We have worked really closely with them to develop the road map we're on today. Being able to work with the company that's designing the technologies and is a leader in their own IT efforts, and aligning our road map with theirs—that's huge. It makes my life a lot easier, and ultimately the hospital runs more smoothly, everyone has the information they need, and the patients get better care."

Find a solution that is right for your organization. Contact your Intel representative, visit **Business Success Stories for IT Managers**, or explore the **Intel IT Center**.

[1] Ranking by HealthGrades. http://www.gwinnettmedicalcenter.org/news/GMCContentPage.aspx?nd=269&news=102.

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