Norton Healthcare

Norton Healthcare is the Louisville area's largest hospital and health care system by market share, and third largest private employer. The not-for-profit system includes four large hospitals in Louisville, with a fifth under construction and scheduled to open in August 2009; 11 Norton Immediate Care Centers; 9,800 employees; nearly 300 employed medical providers at some 60 locations; and nearly 2,000 total physicians on its medical staff. Norton Healthcare serves patients in the Louisville Metro area, including Southern Indiana, and throughout Kentucky.

Background

In the 1980s, Norton Healthcare inherited a basement data center to support mainframe computer systems. By 2006, the 35-year-old data center, which supported the organization's 13,000 users and 400 servers, had reached its power capacity. Norton Healthcare overhauled its data center to establish a power, cooling and monitoring infrastructure capable of supporting blade servers, virtualized servers, IP telephony systems, and electronic medical records.

Case Summary

Location: Louisville, Ky.

Emerson Network Power Products/Services:
- Liebert Series 610 UPS Systems
- Liebert Npower UPS System
- Liebert FPC Power Conditioning and Distribution Cabinet
- Liebert Foundation Distribution Cabinets
- Liebert STS2 Static Transfer Switch
- Liebert Challenger 3000 Precision Cooling System
- Liebert DS Precision Cooling System
- Liebert Deluxe System/3 Precision Cooling System
- Liebert SiteScan Monitoring Software

Critical Needs: Completely re-build a data center with a robust power, cooling and monitoring infrastructure capable of supporting a healthcare network.

Results

■ Doubled power capacity to establish a redundant power infrastructure to support more than 1,000 servers and future technologies.

■ Increased cooling efficiency by establishing a hot-aisle/cold-aisle configuration capable of cooling high heat-density blade servers.

■ Gained visibility of all environmental conditions and enabled proactive, preventative maintenance strategy through implementation of real-time monitoring.

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The Situation

Located in the basement of a 95-year-old hotel building, Norton Healthcare's data center was designed in the 1970s to support mainframe computers. When Norton inherited the data center in the 1980s, the facility sufficiently supported the healthcare network's two software applications, but 25 years and 400 applications later, technical planning director, Mike Moore, struggled to make the data center meet the organization's needs.

"Because of the mainframe technology and how data centers were configured during the time ours was originally built, the way things were organized – from a client server standpoint – was not ideal for our needs," says Moore. Equipment sat on a wood core floor covered by carpet. When additional cooling capacity was needed, Moore would install a new vent to increase air circulation. Once installed, the vents couldn't be moved, meaning Moore's only option for adding new equipment was to continuously reconfigure the data center layout around existing vents.

"We had rows going horizontally, others configured perpendicular to those, and still others configured parallel to them," he says. "There was no hot-aisle/ cold-aisle concept here. Air was being blown in all directions."

The health system's increasing need for power capacity compounded problems. The data center, which was now supporting the network's four hospitals, 10 urgent care centers and more than 60 physicians' offices, was running more than 400 servers, including 160 virtual servers and 140 blade servers. The data center supported 13,000 users and 7,000 nodes such as printers and faxes and IP telephony capabilities were rapidly being added. Demand for power was high, and the power distribution was inadequate.

Moore kept the data center running by adding new servers and computer room air conditioning (CRAC) units where he could. He began compiling a business case for building out the data center's power and cooling infrastructure to enhance cooling efficiencies and meet the health system's growing power needs. In 2006, the data center reached its maximum in power capacity.

"We could not add another server until we addressed our power issues," Moore says.

The Solution

Norton Healthcare consulted with Timothy Graham, a local Liebert Representative at Climate Conditioning Company, Inc.

"The biggest issue facing the healthcare industry today is the shift to digital technology," says Graham. "Before, if you went in for an X-ray, your doctor would store it in one of many file cabinets, but technology has made it possible for all of that information to be collected digitally and stored on backup storage devices. While this technology has enhanced the ability to treat patients, the result is a greater load being placed on infrastructure and an increased dependence on IT. Your network becomes mission-critical to treating your patients."

After consulting with Graham, Moore made the decision to completely remodel the data center from the slab up. Renovation of the 3,400-square-foot data center took place in two phases. In February 2006,

half of the room took on the task of supporting the network, while the other half was completely gutted and replaced. In October 2006, operations were transferred to the new space and the second half of the data center was replaced. During the course of the renovation, new electrical, data distribution, fire suppression, cabinets, cable management, security and monitoring capabilities were installed.

Two Liebert Series 610 UPS Systems were installed at 400 kVA to double capacity and provide the data center with completely redundant power. A static switch was installed to provide a simple, reliable response to brief overload conditions. "We installed the second Liebert Series 610 UPS to provide dual-bus power configuration and ensure a high-availability infrastructure," says Graham. "We installed the first unit during a weekend, and removed it without any interruption to their operations. A few weeks later, we installed the second UPS, and since then they've had true redundancy."

Eleven Liebert computer room air conditioning units were installed, including the Liebert Challenger 3000 Precision Cooling System, a Liebert DS Precision Cooling System and a Liebert Deluxe System/3 Precision Cooling System. The CRAC units were installed in a hot-aisle/cold-aisle configuration of three rows spaced six feet apart on a new raised floor to create cooling efficiencies not previously available in the data center.

The data center's Network Operations Center (NOC) was also completely remodeled, and its operations were enhanced through the implementation of

Before

After

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Timothy Graham,
Liebert Representative at Climate Conditioning Company, Inc.

Liebert SiteScan monitoring software. Liebert SiteScan provides the NOC with centralized monitoring and control of SNMP devices through existing network management systems. It also sends e-mail alerts and local notifications when environmental conditions or power capacities change.

The Results

By May 2007, the space was transformed into an efficient, visible space supporting more than 400 business-critical applications including financial management, scheduling, electronic health records and medical imaging.

"Our monitoring is leaps and bounds ahead of where it was before," says Moore. "Liebert SiteScan monitors all our environmentals and enables us to perform tests and preventive maintenance on our air handling equipment and power equipment, including generators, UPS units and power distribution units."

The implementation of a hot-aisle/cold-aisle rack arrangement increased cooling efficiency. Efficiency was gained in other ways as well, says Moore. "Just by building the NOC and the data center the way we did, we were able to increase our workload at least by 100 percent in the NOC without increasing staff, and the centralized monitoring system has reduced help desk calls by 20 percent," he says.

Norton Healthcare now has a scalable and redundant data center infrastructure that has already allowed for the addition of several hundred new servers. "We've configured ourselves so that we have the power that we need in every cabinet and in every device, so if a UPS unit experiences problems, it will be unnoticeable to the end user," Moore says. "We can still continue to operate with no performance loss whatsoever.

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Mike Moore,
Technical Planning Director, Norton Healthcare

"We shouldn't have any major considerations for a number of years now as a result of what we did," continues Moore. "We may have to add CRAC units to keep up with our server capacity, but with our current data center, we're good for another five years before we'll need to expand it."

"Norton Healthcare now has the capacity and redundancy to meet not only their current needs, but future needs as well," says Graham. "Everyone is sleeping better at night."

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