

Cutting I.T. Down to Size

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A group practice uses "blade" computers and proximity badges to keep things simple in its exam rooms.

By Greg Gillespie, Managing Editor

Northwestern Memorial Physicians Group believed that many of its physicians would grow to love having computers in exam rooms. It also knew, however, that hate was lurking just under the surface.

Physicians at the Chicago-based practice had used computers in their offices for e-mail and Web surfing. But if computers were going to be used at the point of care, the practice had to clear some "usability" hurdles, says Lyle Berkowitz, M.D., medical director of clinical information systems.

Exam room computers had to be more reliable than the practice's "back office" PCs, which broke down-and stayed down-until information technology staff could fix them. Computers in exam rooms also had to be much smaller than "regular" PCs because space was so tight. In addition, the computers couldn't be so loud that they distracted physicians and patients during encounters.

"Our exam rooms are small, and even normal computer noises are a big distraction," Berkowitz says. "We offer alternative treatments such as massage therapy and acupuncture, and we can't have computers grinding away when we're trying to treat patients."

After testing a number of hardware options, Northwestern Memorial decided two years ago to install "blade" computers in its exam rooms. The computers have proven almost 100% reliable, do not cramp exam rooms and are completely silent, Berkowitz says.

At the same time it implemented the blades, the practice took on another usability issue by implementing a proximity badge network that simplifies the computer log-in/log-off process.

"So far, everything is working exactly as advertised," Berkowitz says. "If a blade computer goes down, it's back up in a matter of minutes. And the proximity badges make it much easier for us to get on and, just as important, off the computers when we're moving throughout the practice. We eliminated a lot of problems that make physicians hate computers."

The blades

Blade computers are not what people usually think of as "computers." About the size of a videotape, they contain standard PC components such as microprocessors, hard drives and operating system software.

Northwestern's blades-from ClearCube Inc., Austin, Texas-do not reside in the group practice's exam rooms. They're stored in utility closets at the practice's various facilities. User ports, also about the size of a videotape, are mounted under exam room counters. The keyboard, mouse and flat-panel monitor in each exam room link to a blade computer via the user port.

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On the back end, the blades are connected to servers from Fort Lauderdale, Fla.-based Citrix Systems Inc. The servers house the practice's electronic medical records software-from Kansas City, Mo.-based Cerner Corp.-and distribute the software to each blade via cable connections.

Clinical data entered and accessed at the point of care is stored in a clinical database shared with Northwestern Memorial Hospital, with which the practice is affiliated.

Hands-off maintenance

Northwestern Memorial Physicians Group has 12 offices scattered across Chicago. When it decided to move computers into exam rooms, one of the first decisions it had to make was how to maintain computers throughout its facilities, explains Alan Jordan, a clinical computing analyst at the practice.

"We have six people in our I.T. department, so we're pretty lean," Jordan says. "We didn't think that we could run from facility to facility fixing computers that went down and installing software upgrades on all the machines. Our analysis estimated that for every 15 minutes a computer was down in an exam room, it would cost the practice \$150 in lost revenue-plus be a major inconvenience for our patients."

A major selling point for the blade computers was that they could be remotely managed, Jordan says. A monitoring application from ClearCube enables Jordan to log onto a PC and check the performance of each blade.

One thing Jordan must monitor closely is the heat of the blades. Because they are slim, stripped-down versions of PCs, without the casings and fans, they tend to get hot when in constant use. The monitoring software takes temperature readings of the blades' processors and alerts Jordan if they are nearing the danger zone of 92 degrees Fahrenheit. To ensure that the blades don't overheat, the group practice keeps its utility rooms at 72 degrees Fahrenheit and also monitors the humidity.

"We found that the blades heat up the utility rooms by about seven degrees, so we keep the rooms cool and dry to make sure they stay well within the optimum temperature range," Jordan says.

In case a blade does go down, the practice has other computers standing by. For every seven blades, Northwestern has one back-up blade stored in each utility room. If a blade goes down,

Jordan can automatically turn it off and switch over to the back-up, which can be ported into any of the exam rooms. "It's like having an I.T. person standing outside the door carrying a new PC," Jordan adds.

While Northwestern Memorial Physicians Group can remotely manage its computers, most of its peers aren't as lucky, which always has been a major headache for I.T. departments, says John Osberg, president of Informed Partners LLC, a Marietta, Ga.-based health care consulting firm.

Inexplicable, as always

Computer hardware has become more standardized and stable, but PCs still have inexplicable breakdowns that can severely hamper their effectiveness, especially when they're being used at the point of care, Osberg says.

"I.T. departments have to contend with increasingly complex software applications, especially clinical applications, and having to focus their energies on the mechanical aspect of computing-the

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machines-takes them away from their primary responsibilities," he says. "Eliminating the problems associated with keeping the computers up and running gets rid of a major headache."

In addition to simplifying and centralizing hardware maintenance, Northwestern Memorial Physicians Group also has confronted another major headache for I.T. departments-the problems associated with getting physicians logged in and out of computers. Having to remember-and enter-multiple passwords can be difficult. At the point of care, the time it takes to log onto a computer is time subtracted from treating a patient.

In addition, if physicians forget to log out of computers located in treatment areas, they potentially are leaving protected health information on-screen where unauthorized staff can see it, a serious violation of the Health Insurance Portability and Accountability Act.

The log-off problem in particular was a chief reason why the group practice decided to install proximity badges, Berkowitz says. "Logging in is a hassle, but what made us nervous was the logging out part," he says. "Physicians are moving in and out of exam rooms all day, and when they're with patients it would be very easy to forget to log off a computer, and that's an unacceptable risk."

The proximity badges-from Ann Arbor, Mich.-based Ensure Technologies-are the size of a thick credit card. When a physician is near an exam room door, a radio frequency device attached to the computer monitor "reads" the physician's badge and calls up their user profile. When the physician enters the room, they enter their password on-screen and have access to the electronic record and other applications.

When a physician leaves the room, the proximity badge system locks down the computer. If the physician doesn't re-enter the room in a few minutes, their session is ended. In addition, if another physician or staff member enters an exam room when a physician is logged onto the computer, a screen saver hides the information on screen. The physician who is logged in must re-enter their password to lift the screen saver.

"Our decision to use proximity badges really can be explained with one word-HIPAA," Jordan says. "We decided the human factor-relying on everyone to log out-created too much of a risk in our exam rooms."

The proximity badges, like the blade computers, also can be remotely managed. Extra badges are stored at each facility. If a user forgets or loses their badge, I.T. staff can "lock" that badge out of the system. An extra badge is then activated for the user by having an I.T. staff member type the badge's unique identification number into the application that monitors the system, Jordan explains. "We have set up the security system so that no one can perform their jobs without having a proximity badge on their person," he adds.

Price to pay

The proximity badges and blade computers have created a new computing environment for Northwestern Memorial Physicians Group. Blade computers, for instance, have enabled the practice to centrally manage its I.T. operations and simplify the user experience for physicians.

These and other benefits, however, came with a price tag. The blade computers cost about \$1,200 each, a premium compared with the cost of most desktop computers. And the practice spent almost \$300,000 to implement the blades, a figure that includes the costs of replacing some worn-out cables and installing ceiling fans to cool down some of the blades' utility rooms.

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The practice, however, was willing to pay for increased reliability, Berkowitz says. In addition, he expects the blade installation will prove to be a better choice than a PC installation because of decreased maintenance costs.

"We haven't done a `hard' return on investment analysis, but our physicians know our computers don't go down, and they are very happy because the computers don't get between them and their patients," he says. "We've avoided what we felt were the major disadvantages to having computers in exam rooms-maintenance, space and noise. And we expect this will save us money in the long run."

One more step down the road

Blade computers potentially are the next step in the evolution of computing systems. But some experts question whether health care information technology vendors are prepared to keep pace.

In a sense, blades are a new twist on the old mainframe computing idea, contends John Osberg, president of Informed Partners LLC, a Marietta, Ga.-based health care consulting firm.

Mainframe computing was based on massive, "smart" databases connected to "dumb" terminals. Blade computing is similar in many ways, but provides more functionality and reliability than mainframe systems, he says.

"Blades take us back to the concept of `green screen' terminals, which I don't think is a bad idea at all," he adds. "Blade computing, however, has improved functionality and reliability compared with mainframe computing. With blades, the system doesn't rely on the mainframe doing all the processing, because the blades have processing capabilities. That provides better performance and gives end users more functionality than green screens."

However, in a case of history repeating itself, computing hardware has jumped ahead of software, Osberg says. While blade computing can create a stable hardware platform, operating systems and applications can't match its performance, Osberg says.

"Operating systems and other applications are single-user applications that are starting to be used in a multi-user environment, and they still don't have the reliability needed to handle true distributed computing," he contends. "That could limit the potential of blade computing, because I.T. departments will hesitate to install blades if they aren't satisfied that software can handle such an environment."

Software limitations are one reason the market for blade computing hasn't expanded as quickly as predicted, says Donald Gravlin, vice president and CTO of the health care practice at Cap Gemini Ernst & Young, a New York-based consulting firm.

"Many analysts predicted that blade computing would be a huge market in the next few years, but we haven't seen it make many inroads in health care, except at pharmaceutical firms," Gravlin says.

"Part of the problem is that a lot of health care applications don't scale up very well. They still are built on a client-server architecture, and it's difficult to program them to work in the distributed environments used by blade and thin-client computing.

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"However, there are some companies that are putting their best feet forward and changing the fundamental architecture of their applications. The idea is catching on, but it hasn't caught on as quickly as expected."

When it does, though, it likely will fuel the trend toward outsourcing, Osberg says. If organizations have stable hardware and software platforms, monitoring and troubleshooting can be done from virtually anywhere, including outside the United States.

"This evolution eventually will make I.T. departments obsolete," Osberg predicts. "I.T. departments will be outsourced because organizations won't need staff members to replace a blade or fix an application; it can be done from India for one-third the cost. That's an issue that I.T. departments will have to face."