



# Northwestern Memorial Hospital: Rich PCs Are Just What the Doctor Ordered

## SOLUTION SUMMARY

<b>Challenge</b>	Committed to delivering the best patient experience, Chicago's highly-ranked Northwestern Memorial Hospital was ready to roll out a new clinical information system that promised to save time, cut costs, and reduce medical errors. But an aging base of thin clients and 166 MHz PCs lacked the performance, flexibility, and reliability to support the new system.
<b>Solution</b>	Northwestern Memorial made powerful new Intel® Pentium® 4 processor-based PCs a cornerstone of its new technology strategy. It has put new PCs in patient rooms to enable bedside documentation, and is replacing existing PCs in both clinical and administrative settings. The hospital is also simplifying its client environment, moving toward a three-year PC lifecycle to hold the line on management costs, and expanding its use of Intel architecture-based servers.
<b>Business value</b>	With fast PCs and notebooks and a new clinical documentation system in place, nurses and physicians enter critical information at the point of care, avoiding duplicated effort, saving time, improving accuracy, and enhancing the patient experience. The new systems' speed, reliability, and ease of use enhance productivity and promote the adoption of new technology. The systems give Northwestern Memorial flexibility as it considers future IT initiatives, and the more manageable client environment helps generate total cost of ownership (TCO) savings.
<b>PCs</b>	Standardizing on Dell Optiplex* SX260 PCs based on the Intel Pentium 4 processor and Dell Latitude* C840 notebooks based on the Intel Pentium 4 Processor M running Microsoft Windows* XP Professional
<b>Servers</b>	2-way Hewlett-Packard ProLiant* servers based on the Intel Pentium 4 and Intel® Xeon™ processors
<b>Application</b>	Cerner Millennium PowerChart* electronic medical record

## Business Challenge

### INVESTING IN INFORMATION TECHNOLOGY

After years of languishing at the bottom of IT investment charts, healthcare now outpaces other industry sectors in IT spending. Instead of putting just 2-3 percent of their annual budgets into IT programs, hospitals are investing aggressively in innovative projects to create electronic patient records, allow physicians to order medications and tests online, barcode-enable medications, and more.

Healthcare's IT investments are critical to hospitals, patients, and society as a whole. Healthcare systems the world over face staffing shortages, skyrocketing costs, and a rising demand for services. The US alone spent \$1.4 trillion on healthcare in 2001, and the figure is predicted to reach \$3.1 trillion by 2012.<sup>1</sup> Factor in the aging baby boom population, and it's no surprise that healthcare systems worldwide are recognizing information technology investments— including powerful PCs and notebook computers— as just what the doctor ordered.

<sup>1</sup> See <http://cms.hhs.gov/statistics/nhe/projections-2002/t2.asp>.

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**Michael Carper**

Director of Technology Management,  
Northwestern Memorial Hospital

## A LEADER IN MEDICINE AND TECHNOLOGY

Leading the way are institutions like Northwestern Memorial Hospital. For the past seven years, the hospital has earned National Research Corporation's prestigious Consumer Choice Award as the city's top hospital. US News & World Report's America's Best Hospitals survey ranked Northwestern Memorial as one of the nation's top 50 hospitals in 11 of its 17 categories, including such heavy hitters as oncology, neurology/neurosurgery, and gastroenterology.

Founded in 1972 from the merger of two of Chicago's oldest and most respected medical institutions, Northwestern Memorial is one of the nation's premier academic medical centers and the primary teaching hospital for Northwestern University's Feinberg School of Medicine. The hospital has more than 5,000 employees and 1,200 affiliated physicians, and in 1999 opened a new 2 million sq ft facility that houses 720 beds and a 22-story outpatient pavilion. It's a model facility for healthcare providers, hosting hundreds of tour groups from the US and abroad each year.

Northwestern Memorial is proud of roots that stretch back 137 years—and of being forward-facing. It's no coincidence that along with its other kudos and plaudits, Northwestern Memorial has also earned a spot on Hospital & Health Networks' list of the nation's most wired hospitals for three years running.

"Hospitals have to get into the electronic age," says Michael Carper, director of technology management at Northwestern Memorial. "There's a paradigm shift that has to occur in healthcare. You can't get to the new electronic world on a paper budget. You've got to invest in information technology, and for us, that has included an aggressive update of our PC base and new PCs based on the Intel Pentium 4 processor."

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### Business Solution

The client refresh became a priority when Northwestern Memorial decided to roll out a clinical documentation system that would enable doctors, nurses, and other care providers to enter information into an electronic medical record (EMR) at the patient's bedside. "This is the first step in a move to bring all our information online and make it accessible to clinicians from anywhere in the organization or even from their homes," Carper

explains. "EMR is a proven way to reduce errors and create efficiencies. You can make the same information available in different departments without duplication, track more data in real time, and mine more data to do results-based medicine, all of which helps improve the patient experience. You also create a better audit trail, which for us as a self-insuring institution can create yet another source of savings."

### POWERFUL APPLICATIONS NEED POWERFUL PLATFORMS

The new clinical application became the forcing function for a widespread client refresh. "If you don't keep your PCs up to date, you have to look at what applications won't work and what pieces of the business you won't be able to enable," says Carper. "If you want state-of-the-art information systems that improve flexibility and reduce errors and improve patient care—all of which Northwestern Memorial is committed to—you have to have the platforms to support them. You can't run those apps on a 166 MHz PC that you drive until it breaks."

The IT team had little trouble getting management buy-in. "It was a strategic decision, rather than cost driven," Carper says. "They understood the risk of not investing—that if we didn't, these applications that we were investing millions of dollars in literally would not run. Once they saw the features we could get and the price points, the systems sold themselves."

Within six weeks, the IT team installed 1,000 Dell Optiplex SX260 PCs based on the Intel Pentium 4 processor and Microsoft Windows XP. Each patient room has a rich PC that resides on a stainless steel stand, and administrative PCs are being replaced. New PCs on Ergotron carts are also available at nurses' stations and at hallway areas, so caregivers can review a chart before visiting the patient. Northwestern Memorial is bringing in another 1,300 PCs in 2003, and by the end of 2004, will have replaced all client workstations. The team also added 300 new notebook computers based on the Intel Pentium Processor M to enhance the productivity of mobile caregivers, and is eliminating its thin terminals.

"Hands down, a rich client is a better investment," says Jack King, desktop architecture and application delivery manager at Northwestern Memorial. "For a few more dollars than the cost of the thin terminal, we gain a lot more flexibility. We don't have to have the back-

end systems do all the processing, so we can support multiple programming models. If we decide to go mobile at the point of care, we can redeploy the PCs to our back office. Even if we bought new thin clients, the PC performance would still be better. There's no way a thin client can outrun a locally installed app on a powerful PC."

Along with the immediate benefits Northwestern Memorial is seeing from its electronic charting application, the new PCs position the hospital to take advantage of an emerging world of new healthcare solutions—from using Webcams to broadcast surgeries that medical students can view at their PCs, to using PCs to rapidly display and manipulate high resolution X-rays and other images. "These PCs are a form of future-proofing," says King. "We may not know what new applications will be there a year from now, but we know we'll have the performance to run them. We see PCs the way people see networks—they're basic infrastructure that is helping us build for the future."

#### **PERFORMANCE + RELIABILITY = PRODUCTIVITY + ENTHUSIASM**

The new PCs are proving to be a sound investment for Northwestern Memorial. "With the thin clients, it took 12-15 seconds of the caregiver's time to open an application," King says. "Running locally on the PC, you can do that in about half a second. If you think about having 4,000-5,000 caregivers and how many patients they interact with over the course of a day, those 12-15 second increments can add up to a lot of wasted productivity. If you're a patient with a 15-minute appointment, the less time the provider has to spend waiting on the computer, the happier you're going to be."

Users are enthusiastic. "The new PCs are 15-20 times faster," says Carper. "They're more attractive, more reliable, and easier to use, so it's easier to get doctors and nurses to adopt the new information systems we're putting in place. That's a significant advantage right there."

Putting powerful PCs at the point of care also minimizes the productivity impact of network failures. "With thin clients, you're completely dependent on the network," Carper says. "As we move the applications closer to the users, they can remain productive even if there's a network outage. That's a key point for us."

Finally, by modernizing and standardizing its client infrastructure, the hospital expects to increase uptime

and productivity and reduce its client operating expenses. "Intuitively, I believe our support costs are going down," says Carper. "We can deliver a higher service level. We have a single environment that spans the point of care and the back office functions, so we don't need two different skill sets to support our systems. With this degree of standardization, we can automate our software distribution and streamline our management practices. Our IT people can spend their time implementing new solutions instead of putting out brushfires. All that adds up to lower TCO. But the cost savings are secondary to the strategic value of these machines. They're helping Northwestern Memorial fulfill our mission of providing the best patient experience and attracting and keeping the best people. They're truly mission critical."

#### **INTEL PROCESSOR-BASED SERVERS HELP RECHARGE THE INFRASTRUCTURE**

Client infrastructure isn't the only IT area where Northwestern Memorial is investing. The hospital has replaced and upgraded its network, and is looking to consolidate many of its servers onto new Intel processor-based servers. Both in its server consolidation and its deployment of new applications, the hospital's IT team looks

to Intel platforms for their performance, scalability, high availability and flexibility. For example, dual Intel processor-based servers handle the front end for a new online supply ordering system that is cutting the costs of supplies and freeing purchasing staff for higher value activities. Intel processor-based servers running Microsoft Exchange\* are coming online to provide integrated messaging as the hospital migrates from a legacy phone system to Internet Protocol (IP)-based telephony.

The hospital is planning for a new data center that will open in 2004 and contain all new servers, many of them based

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**Jack King**  
Desktop Architecture and Application Delivery Manager,  
Northwestern Memorial Hospital

on the Intel architecture. “We can’t afford to retire all our legacy systems, because some of those applications only run on legacy platforms,” says Jeff Brooks, Northwestern Memorial’s manager of server architecture and operations support. “But as more applications come onto the Intel platform, and as Linux\* increasingly becomes available in a supported environment, that’s the direction we’re going. We’ll be looking at the Intel Itanium® 2 processor and the Intel Xeon processor MP for some of the server consolidation and for the Cerner Millennium Suite, which is our main clinical information system.”

#### ATTITUDES CHANGING

Meanwhile, as Northwestern Memorial begins to reap the rewards of its recent IT investments, its IT management team sees a change in attitudes toward IT spending.

“Traditionally, hospitals haven’t acclimated well to spending on technology,” Carper says. “An MRI machine is an attractive investment because it will generate revenue. The benefits of IT investments have been seen as ‘nice’ rather than ‘essential.’ But as hospitals start to make these IT investments and see first-hand how new information systems and platforms can get them to the next level of performance and efficiency and enhance the patient experience, we’re seeing a shift. The tide is definitely coming in.”

#### MORE INFORMATION

[www.intel.com/ebusiness](http://www.intel.com/ebusiness)  
[www.nmh.org](http://www.nmh.org)

#### LESSONS LEARNED

- Let the mission drive the technology. No one needs technology for its own sake. Northwestern Memorial Hospital’s IT team advises letting your business goals or your institution’s mission drive your technology strategy. For Northwestern Memorial, that means using powerful, Intel Pentium 4 processor-based PCs to enhance user productivity and organizational flexibility, mobile Intel Pentium Processor M notebooks to add the convenience of mobility, and Intel architecture-based servers to support innovative services that deliver deep business value.
- Know what you need. “Healthcare doesn’t need the fanciest PCs, and we can’t afford them,” says Northwestern Memorial’s Michael Carper. “But we do need modern systems to get the security, performance and flexibility. Buy PCs that will last you two to three years.”
- Retire old PCs. “Healthcare institutions tend to neglect the desktop,” says Jack King. “Then, they end up spending a lot of time and energy trying to support those old systems.” Replacing trouble-prone older PCs helps reduce support costs and paves the way for new applications and usage models.

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