A Forrester Consulting Thought Leadership Paper Commissioned By Stratus Technologies

Server Availability Trends In The Time Of Electronic Health Records

What The Move To Paperless Medical Records Means For Server Reliability

January 2010

FORRESTER®

Headquarters | Forrester Research, Inc.
400 Technology Square, Cambridge, MA 02139 USA
Tel: +1 617.613.6000 | Fax: +1 617.613.5000 | www.forrester.com

Table Of Contents

About Forrester Consulting
Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. Ranging in scope from a short strategy session to custom projects, Forrester's Consulting services connect you directly with research analysts who apply expert insight to your specific business challenges. For more information, visit www.forrester.com/consulting.

Executive Summary

The healthcare sector in the US is undergoing a major transformation, not only in government policy and clinical treatment but in the way patient information is managed. While other industries went digital years ago, hospitals and doctors are only now moving to widespread adoption of information technology. Electronic medical records (EMR) systems combined with regional and national health information exchange (HIE) networks promise to make patient information available to providers to improve quality of care, prevent medical errors, and reduce healthcare costs.

Three-quarters of healthcare IT professionals surveyed said that their organization experienced downtime in the past two years related to server failure.

This trend is making IT infrastructure a critical component of care delivery. Servers, networks, desktops, and portable devices need to deliver high service levels. In November 2009, Stratus Technologies commissioned Forrester Consulting to evaluate the impact of server availability on its clinical and business operations. While virtualization allows servers to handle more apps and workloads, it also makes them more critical failure points. And the sharing of clinical information makes any system outage a potentially regional problem.

In conducting in-depth surveys with 102 US healthcare IT professionals, Forrester found that these companies face significant challenges in maintaining server availability. And the impacts on the delivery of care and operations of the hospital or physician practice were significant, ranging from overtaxed and disgruntled medical staff to delays in patient care. Availability has become an imperative, yet healthcare IT professionals struggle to meet the challenge.

Key Findings

Forrester's study yielded three key findings:

- **Electronic health records are transforming the role of IT in healthcare.** After decades of slow adoption, new incentives and federal policies about healthcare and healthcare IT are driving providers to switch from paper to digital records. This shift is changing IT's mission, its user base, and the service levels required.
- **Server availability needs greater attention.** While respondents reported widespread impact of server failures on the providers' clinical activities, problems persist, and current strategies are not adequate to ensuring the appropriate levels of system reliability. Fewer than half of IT professionals think that their server infrastructure is ready to meet the current and future needs of their institution.
- **Cost is the big barrier.** Hardware and software costs topped the list of challenges as cash-strapped provider organizations are implementing a wide variety of clinical systems to meet the goals of electronic medical records, decision support tools, and diagnostic imaging systems. They are looking for a cost-effective solution that can still provide high levels of availability.

Setting The Stage: The Growth Of Electronic Health Records

While most industry sectors have hungrily consumed information technology to transform their businesses, healthcare providers have clung dearly to their paper charts. Not for want of vision, though. For the past 25 years, experts and

policymakers have talked up the power of doing away with the paper medical records in hospitals and doctors' offices in favor of electronic records that can be easily made available to physicians when and where they need them to provide the best patient care. Pulling together electronic records from multiple departments within a hospital or other providers would give doctors a much more complete picture of a patient's condition and treatment, improving diagnoses and reducing unnecessary tests.

But the fractured reality of the US healthcare system has made this hard to achieve. When providers get paid for individual services, the so-called "fee for service" model, being more efficient is harder to justify. The benefits go to the payer (health plan or Medicare, for example), but that's not who needs to make the investment. And real benefits come from process change — challenging in the world where forcing uncomfortable process change on physicians may mean that they just admit their patients to a different hospital. Hospitals run on very tight budgets, making capital scarce. And the vast majority of doctors practice in groups so small that it's hard to justify the investment in an electronic system when compared with the very low cost and risk of a wall of color-coded manila files.

The crisis in healthcare costs and quality has finally come to the front of the national debate. It was a key campaign issue in the past three presidential elections. Annual healthcare costs in the US exceed $2 trillion, according to the Center for Medicare and Medicaid Services, with continued growth that outstrips the overall economy. With healthcare costs consuming ever larger portions of companies' expenses and the national budget, more efficient and effective healthcare has become one of the most urgent issues on the agenda.

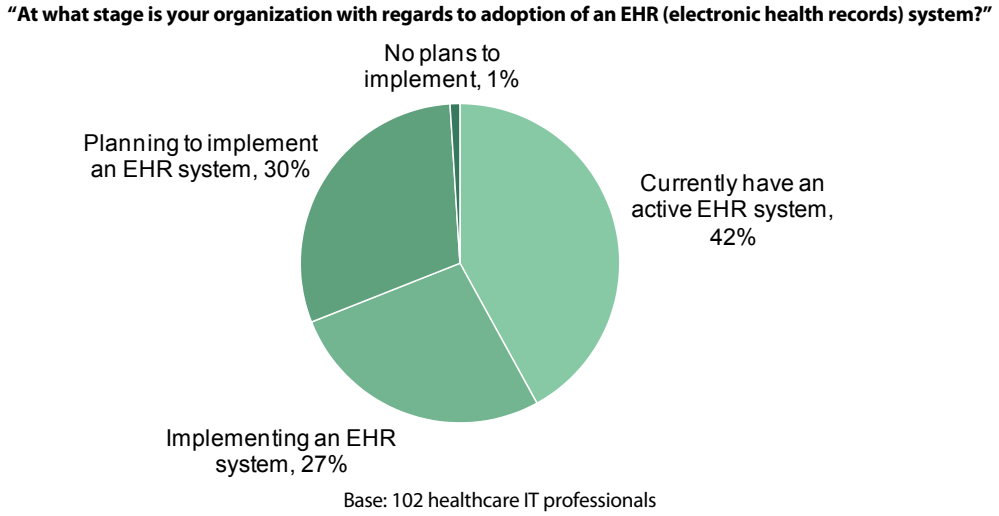
The Coming EHR Decade

In this climate, the electronic health record is finally blooming. Increasingly, studies are showing the tangible benefits of EHRs not only to the health system as a whole, but to individual providers. Large institutions get the most bang for the buck, leveraging their technology investments over a larger enterprise and enjoying the benefits of sharing clinical information across departments and facilities. And new technology offerings, like hosted applications, make these tools practical for small physician groups. Despite the cautious healthcare sector, EHR adoption is growing faster than it ever has. Forrester estimates that 28% to 30% of physicians use an EHR today, up from approximately 20% five years ago. The adoption rate among hospitals is higher still.

Our survey of 102 healthcare IT professionals at hospitals, physician groups, labs, and other provider organizations shows that gap closing. Only 1% (one respondent) had "No plans to implement" an EHR (see Figure 1).

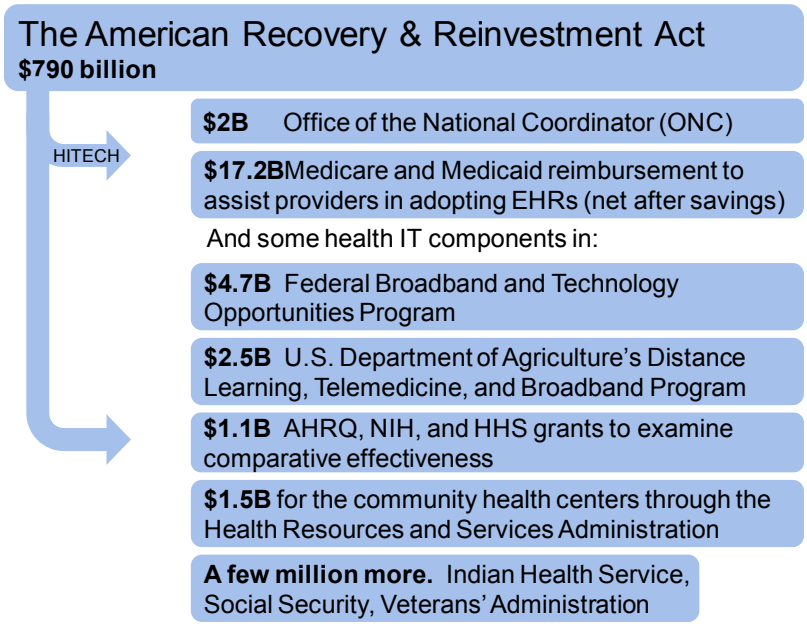
With so much at stake, the federal government — also the world's largest health insurer itself — is invested in seeing the healthcare sector enjoy the quality and efficiency benefits of digital records. The American Recovery and Reinvestment Act of 2009 includes a Healthcare Information Technology (HITECH) component that allocates billions of dollars to the promotion of electronic health records and the standards and infrastructure to share them securely. Thirty-six billion dollars alone has been budgeted for Medicare and Medicaid incentive programs that will directly reward doctors and hospitals that implement these clinical technologies. (The number appears smaller in the budget summary, because $19 billion of expected savings and penalties are factored in.) Payments to providers that have both deployed and demonstrated "meaningful use" of electronic health records will begin in 2011. Providers that qualify after 2012 will get reduced benefits. Latecomers after 2015 get nothing. Penalties start in 2016 (see Figure 2). Survey respondents acknowledge the power of the carrot being held out to them (see Figure 3).

Figure 1
Electronic Health Records Are On The Way To Widespread Adoption



Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

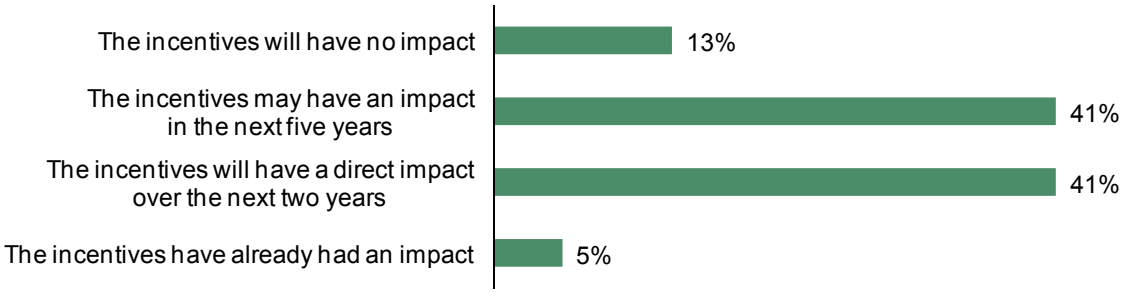
Figure 2
The Healthcare Information Technology (HITECH) Components Of The ARRA Stimulus Act



Source: Forrester Research, Dept. of Health and Human Services

Figure 3
Providers Expect That Federal Stimulus Payment s Will Further Accelerate EHR Adoption

"What impact do you believe the federal stimulus spending allocated for healthcare IT (HITECH), part of the American Recovery and Reinvestment Act (ARRA), will have on your IT budget and planning?"



Base: 102 healthcare IT professionals

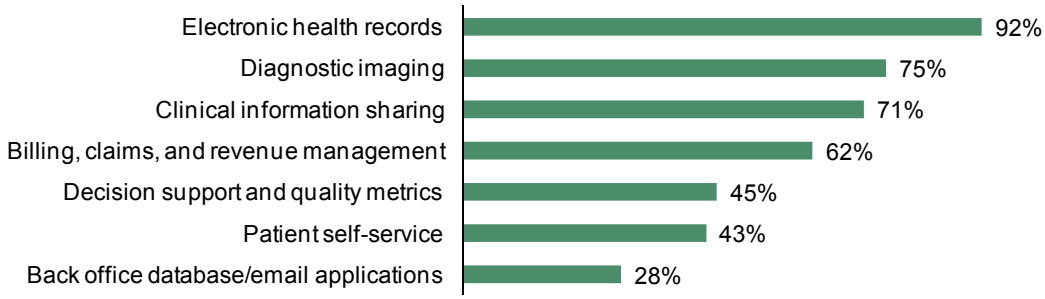
Source: Forrester Research, Dept. of Health and Human Services

Electronic Records Drive Demand For Servers — And Availability

Behind the flash of handheld prescribing tools, wireless tablets in the operating room, and remote radiology viewing, these systems demand a backend infrastructure of application servers, database servers, physician portals, patient Web sites, real-time claims gateways, secure access points for clinical information exchange, and hundreds of other potential services. The move to electronic records is the leading driver of demand for more server capacity (see Figure 4).

Figure 4
New Clinical Information Systems Are Driving Demand For Server Capacity

"Which, if any, of the following do you see as driving your future demand for servers?"

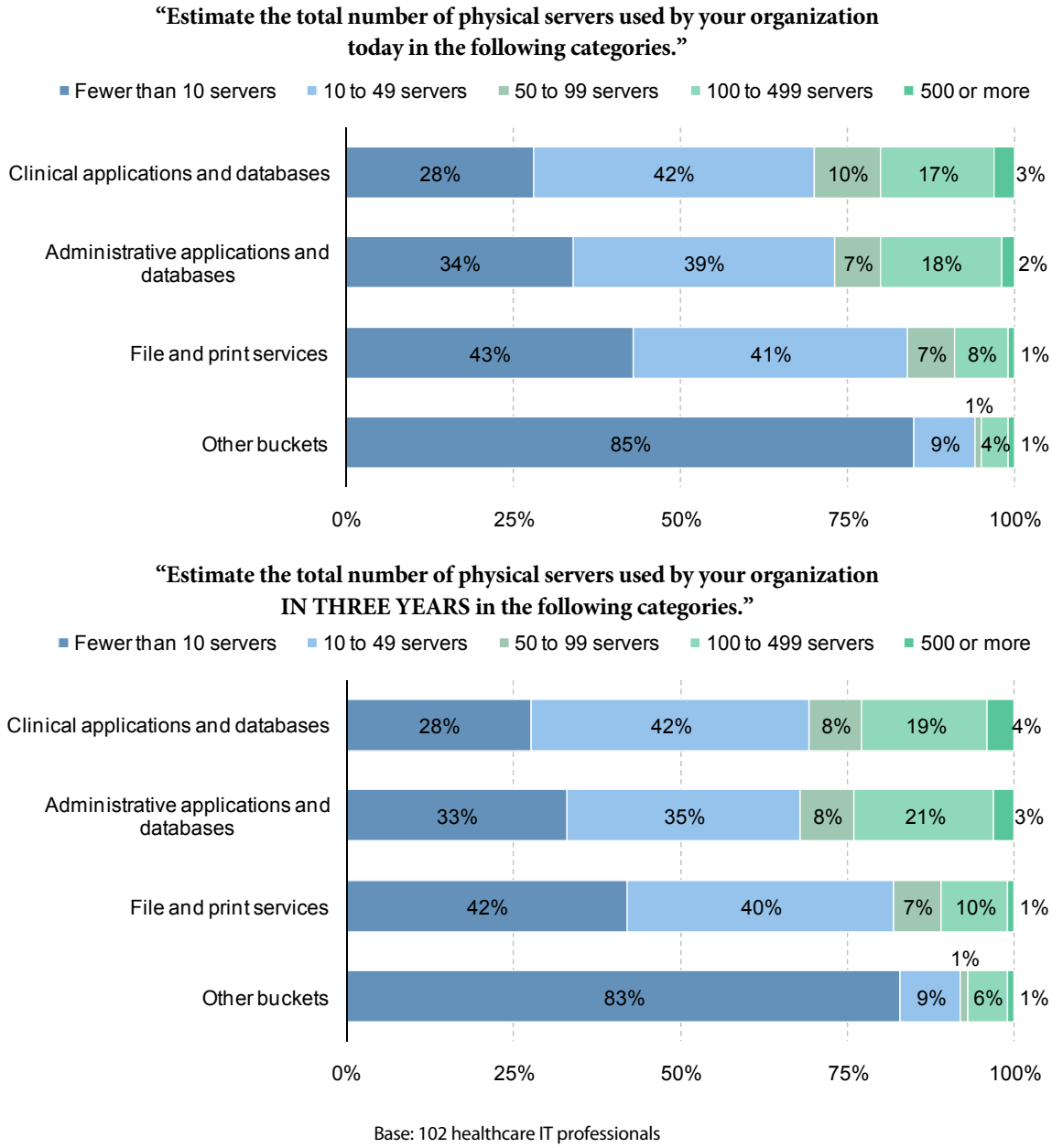


Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

We also asked respondents to estimate the number of physical servers they have today and to estimate the number in three years. Interestingly, the numbers remained flat, suggesting that server virtualization would make better use of existing infrastructure (see Figure 5).

Figure 5
Healthcare IT Professionals Expect Little Growth In The Number Of Servers Despite Supporting More Applications



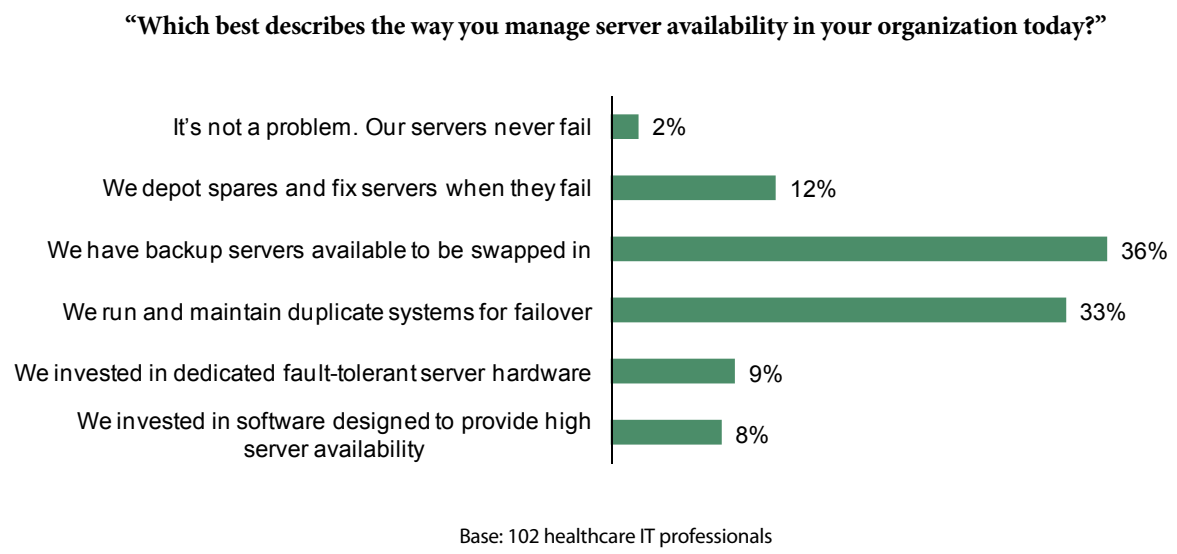
Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

Not only do providers need more power in the engine room, 68% of respondents strongly agreed with the statement that "Our organization is becoming more dependent on information technology." The vast majority have had to improve support response times to accommodate clinical users. They're mixed about their confidence that the systems in place can meet clinicians' needs and the standards for HITECH incentives. Half see system availability as a big issue for management. Overall, healthcare IT professionals are aware that the old service levels that supported administrative and billing systems were not going to be sufficient to meet the needs of the digital health era.

But keeping systems running to high levels of availability can be expensive. Respondents cited high hardware and software costs as the two top challenges in ensuring uptime. Clustering and fault-tolerant hardware dramatically raise the acquisition costs and can be budget busters for cash-strapped healthcare providers. Most settle for backup servers ready to be swapped in or maintain duplicate systems to failover to, both of which provide a lapse in service during a failure (see Figure 6).

Figure 6
Redundant Hardware Is Key Strategy For Availability

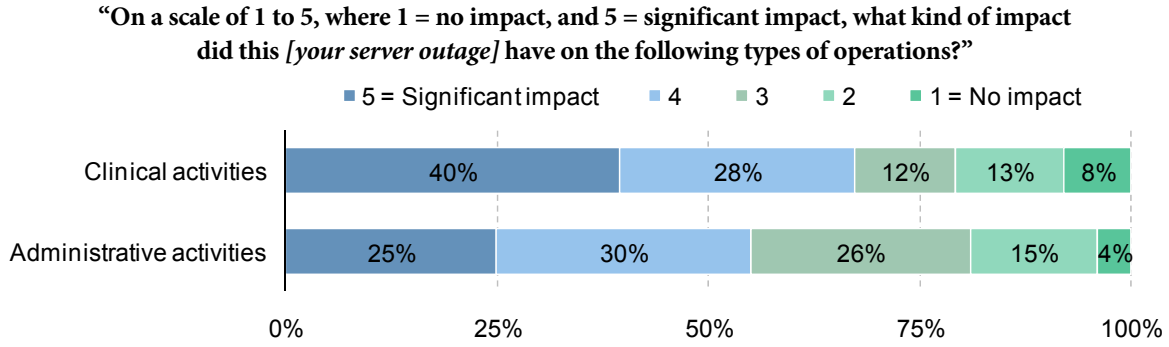


Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

Server Failures Persist And Have A Significant Impact

These strategies aren't working so well. A full three-quarters of respondents experienced downtime related to a server failure during that past two years. And these weren't blips. Sixty-eight percent had an impact on clinical activities, and greater than half affected administrative processes (see Figure 7). Rarely was there no impact, and recovery times were typically measured in hours. Only 1% of server outages were resolved within 5 minutes (see Figure 8). Providers' strategies for swapping servers and manual failovers are not medical grade.

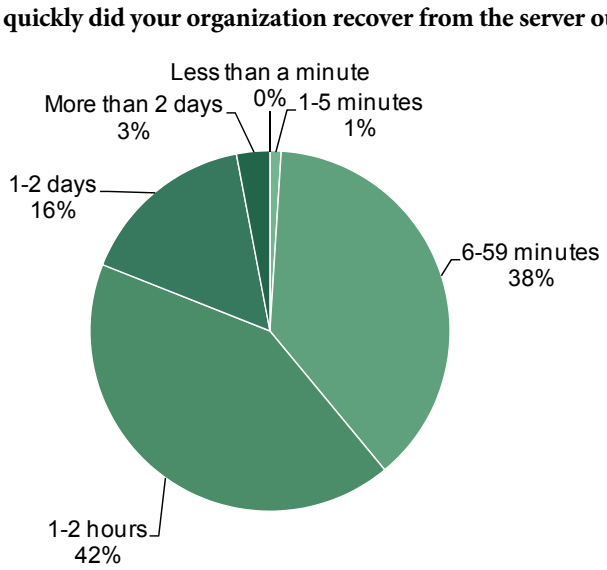
Figure 7
Clinical Activities Are Hard Hit By Server Outages



Base: 76 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

Figure 8
Recovery Times Often Last More Than An Hour



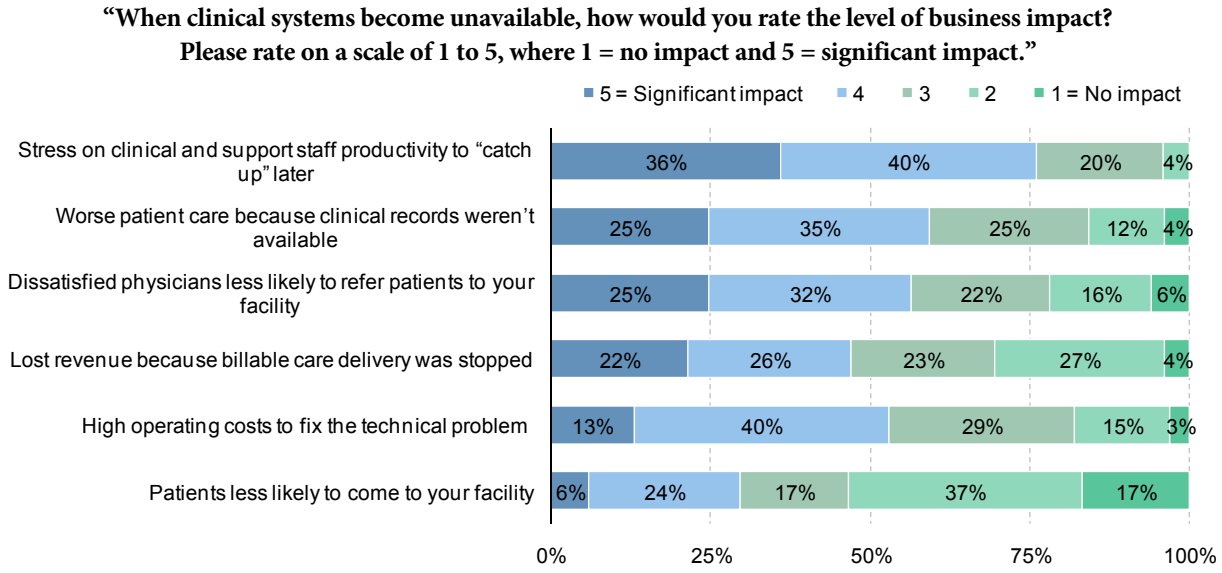
Base: 76 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

What's the real impact of these lengthy outages? Respondents cited added stress on clinical staff as the biggest impact, a bad outcome for a practice or hospital already under pressure to attract the best physicians and retain a full nursing staff

(see Figure 9). The impacts cited most often were also ones that had very high visibility in the organization. Worse patient care, dissatisfied physicians, and lost revenue are key performance metrics that senior management watches closely.

Figure 9
Server Outages Have A Significant Impact On Clinical Staff



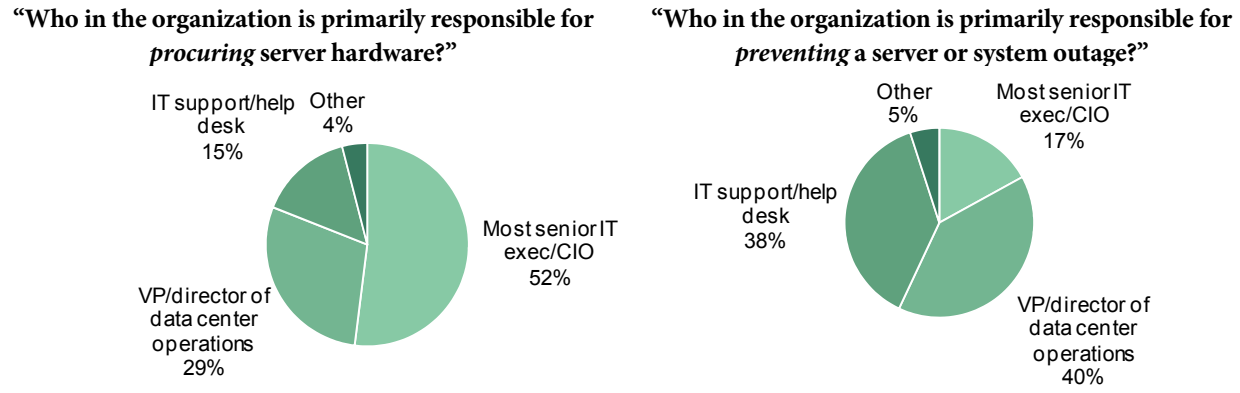
Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

Healthcare Institutions Are Looking To Close The Availability Gap

So who makes the decisions about server reliability and availability? In conversations with hospital IT buyers, Forrester has learned that most of the time the hardware is part of a recommended "solution" that rides in with the purchased clinical application or electronic health record package. Senior IT execs and operations VPs are typically driving the procurement decisions, and rarely are IT support staff involved (see Figure 10). Until something goes wrong. Then it's the support staff and IT management that have to pick up the pieces. Not putting more importance behind an availability solution upfront gets healthcare providers in trouble.

Figure 10
Executives Spec The Hardware While Support Manages The Fallout

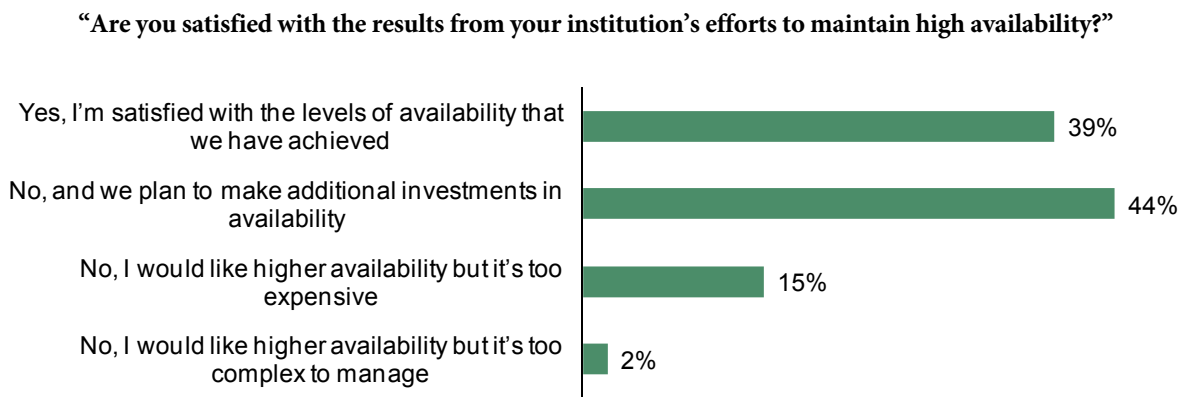


Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

Most are trying to close that gap. More than half of respondents would like to see more reliable performance from their servers, and 44% plan to make investments in technology to get there (see Figure 11,). Some see cost as a big barrier. Fault-tolerant hardware can be hyper-reliable, but that premium availability comes at a premium price. Buyers would like alternative solutions that help make that tradeoff more acceptable — taking into account the realities of their IT budgets and the real cost of server and system downtime.

Figure 11
Most Healthcare Institutions Are Looking To Improve Availability



Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

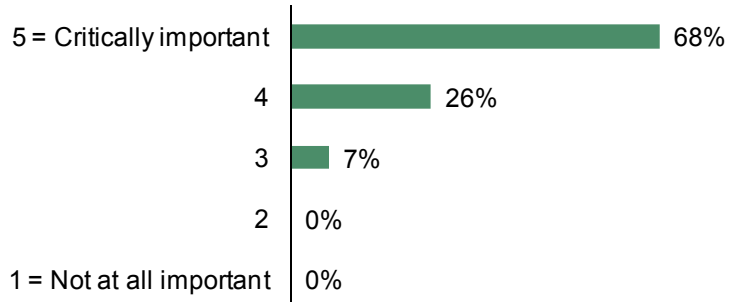
KEY RECOMMENDATIONS

Information technology is rapidly becoming a critical component in the delivery of healthcare. Despite debate on the rate of growth or barriers to adoption, EHRs are growing and here to stay. This is transforming the role of IT — and the IT organization — from supporting administrative processes to supporting patient care. Get ahead of the threat and:

- **Assess your entire server portfolio and identify critical and key points of failure that impact care.** Across the wide array of servers, some are more critical to operations and care delivery than others. But don't assume that a lowly print server isn't critical. Printing lab results and patient discharge notes are critical steps in care delivery and clinical workflows. Identify both the function and the process role of each server. Then assign a relative rating of importance and impact in the event of a server failure.
- **Develop a strategy for server availability.** Healthcare providers were clear: When systems go down, it significantly impacts their business and the quality of care delivery. It's critical to factor this reality into the real cost of server infrastructure and recognize that the cheapest availability solution may not be the most cost-effective, even in the short term. Figure out where to spend precious resources, and spend those resources wisely. There are new offerings, some based on off-the-shelf redundant hardware, plus software that provides high availability. By investing in a solid set of tools, you can minimize the cost impact.
- **Align with a vendor that understands healthcare's requirements for availability.** Protection is something you don't think you need until you need it. Vendors with experience in managing availability solutions, especially in the healthcare environment, can provide insight and advice to ensure that implementations are robust and will keep clinical processes flowing. Sixty-eight percent of survey respondents felt that having a server vendor that understood the healthcare sector's unique needs was a critically important factor to them (see Figure 12).

Figure 12
IT Professionals Want Suppliers That Understand The Healthcare Sector

"How important is it that your server vendor understands the healthcare sector's unique requirements and challenges? Please rate on a scale of 1 to 5 where 1 = not at all important and 5 = critically important."



Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

Appendix A: Methodology

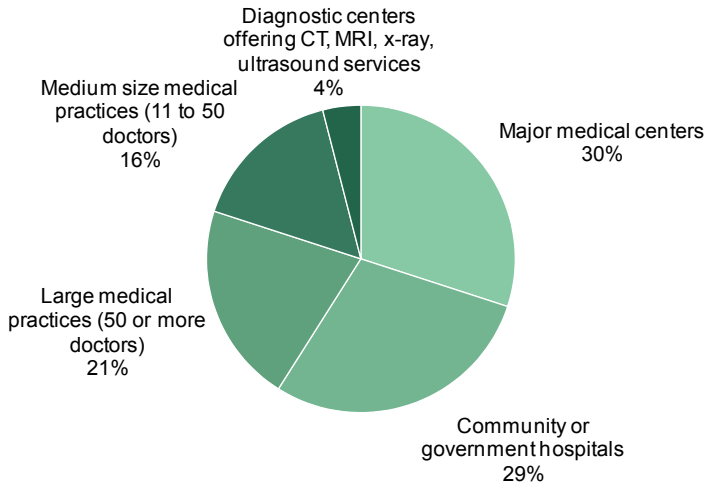
In this study, Forrester conducted an online survey of 102 healthcare IT professionals in the US to evaluate the increased prevalence of IT, challenges in maintaining server availability, and the impact of cost and cost-sensitive solutions. Survey participants included decision-makers in IT infrastructure in medium and large medical practices, diagnostics centers, major medical centers, and community or government hospitals. Questions provided to the participants asked their current and future plan for their healthcare IT infrastructures, challenges around maintaining system availability, their experience with downtime related to server failure, and their impressions on the effectiveness and cost in achieving availability SLAs. The study began and was completed in November 2009.

Appendix B: Demographics/Data

- Ninety-eight percent of respondents came from the healthcare and life sciences industries; 2% were in public services.
- Respondents represented a variety of healthcare organizations (see Figure A1), with a wide variety of revenue (see Figure A2).
- Respondents all held titles of director or manager of IT or above (see Figure A3), and were decision-makers or influencers for the IT infrastructure of their organization (see figure A4).

Figure A1
Respondents Represent A Variety of Healthcare Organizations

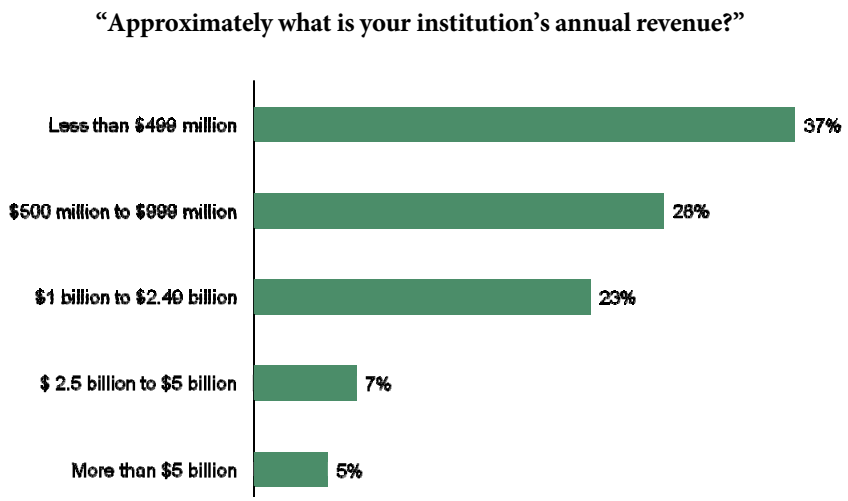
"Which of the following best describes the organization you work for?"



Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

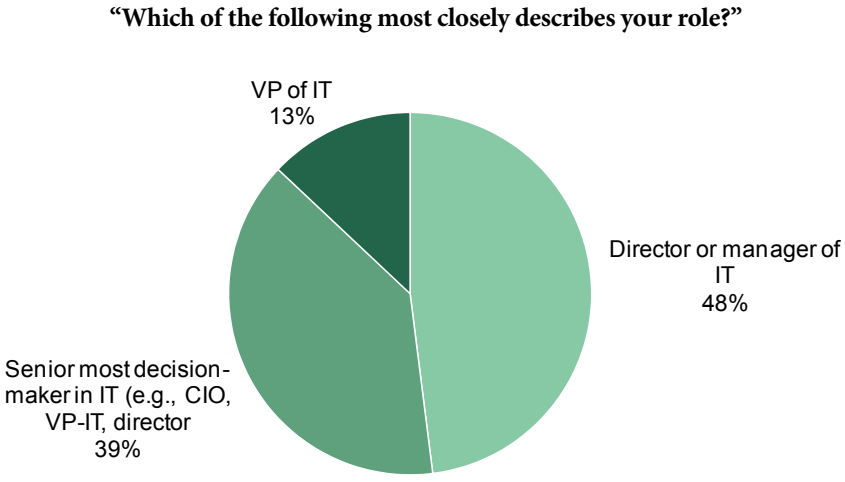
Figure A2
Respondent Revenue Breakdown



Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

Figure A3
Respondent Role Overview

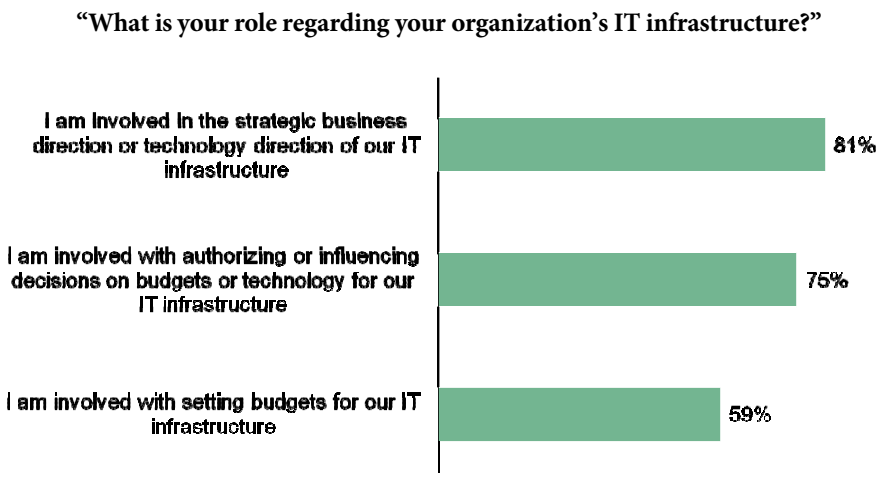


Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009

Figure A4

All Respondents Were Decision-Makers and Influencers For Their IT Infrastructure



Base: 102 healthcare IT professionals

Source: A commissioned study conducted by Forrester Consulting on behalf of Stratus Technologies, November 2009