



KEY HIGHLIGHTS

INDUSTRY: HEALTHCARE

**CHALLENGE**

Devise a strategic IT solution to sustain server growth and increase availability and performance of applications required by hospital staff, while adhering to power, space, and budget constraints.

SOLUTIONS

Run Windows-based, mission-critical applications on VMware Infrastructure, thereby ensuring manageability and high availability, reducing capital expenditures, and delivering efficient and effective world-class healthcare.

VMWARE AT WORK

VMware Infrastructure 3 Enterprise, featuring:

- VMware ESX 3.5
- VMware VMotion
- VMware Storage VMotion
- VMware vCenter
- VMware High Availability (HA)
- VMware Distributed Resource Scheduler (DRS)
- VMware Update Manager
- VMware Converter Enterprise

DEPLOYMENT ENVIRONMENT

- ESX 3.5 running on IBM 3650 quad core servers with 144 GB memory and IBM BladeCenter H521 servers with 126 GB memory
- Guest operating systems: Microsoft Windows Server 2003, Microsoft Windows Server 2000, and Linux Red Hat versions 4.6 and 5
- Virtualized applications in production: MEDITECH 5.6, Microsoft SharePoint Portal Server 2003 Enterprise, Microsoft SQL Server 2000 SP4, Microsoft SQL Server 2005 Enterprise, Microsoft Exchange Server 2003, Blackberry Enterprise Server 4.1.4.12, Kronos Workforce Central 6.0, ScriptLogic Desktop Authority 7.8, ScriptLogic Patch Authority Ultimate 5.9, Lawson S3 8.0.1.0, Sophos Enterprise Console 3.0.0, Pentax endoPRO 6.5.1, DB Technology RAS 3.28, RelayHealth ePremis 3.6, Sage Abra 7.70,
- Virtualized applications in pre-production: Microsoft SharePoint Server 2007, Wyse WSM 1.2

“As costs for providing high quality health care escalate, reimbursement for services provided continues to decline. Nevertheless, hospital leadership and staff, as well as our clinical professionals, clamor for new information technology to provide superior patient care, and higher quality information with which more meaningful operational decisions can be made. As a result, our mandate was to build an agile IT infrastructure that could respond well to growth opportunities and increasing demand for new software solutions without commensurately increasing hardware footprint as well as power and cooling costs which we just could not afford to sustain.”

Mark Lederman

Vice President and Chief Information Officer at Interfaith Medical Center

Interfaith Medical Center

Interfaith Medical Center is a multi-site community health care system, providing a wide range of medical, surgical, gynecological, dental, psychiatric, and pediatric services throughout Central Brooklyn, New York. The institution operates a 287-bed hospital and a network of ambulatory care clinics. Each year, Interfaith Medical Center serves over 200,000 patients in Central Brooklyn. The hospital features a nationally acclaimed Sickle Cell Program, innovative cardiac care, a state-of-the-art emergency department, and a comprehensive array of behavioral health services.

Interfaith began investigating virtualization when its server hardware requirements reached unsustainable levels and its ability to provide applications required by hospital staff was limited by budget constraints. “As costs for providing high quality health care escalate, reimbursement for services provided continues to decline”, states Mark Lederman, Vice President and Chief Information Officer at Interfaith Medical Center. “Nevertheless, hospital leadership and staff, as well as our clinical professionals, clamor for new information technology to provide superior patient care, and higher quality information with which more meaningful operational decisions can be made. As a result, our mandate was to build an agile IT infrastructure that could respond well to growth opportunities and increasing demand for new software solutions without commensurately increasing hardware footprint as well as power and cooling costs which we just could not afford to sustain.”

Then, about a year and a half ago, Meraz Nasir, Manager of Infrastructure at Interfaith Medical Center, saw a demo of VMware ESX and was impressed with its manageability, high availability, and rapid disaster recovery capabilities. Additionally, he learned that VMware Infrastructure 3 could maximize usage of CPU resources on Interfaith’s myriad servers, enabling the deployment of new applications without requiring additional power, space, or server resources. After considering offerings from VMware, Microsoft, and Virtual Iron, Interfaith selected VMware Infrastructure. “We looked at several virtualization options, and with features like VMware HA, VMware DRS, VMotion, Storage VMotion, and the ability to overcommit resources, it was clear that VMware was the best fit for our hospital,” said Nasir. “Ultimately, when we considered all aspects of virtualization, it wasn’t even close. VMware Infrastructure 3 seemed to be the perfect IT solution for Interfaith’s burgeoning growth.”

Initially, Interfaith created a three-host infrastructure cluster, comprised of IBM System x3650 quad core servers running ESX 3.5 and hosting 47 virtual machines. The majority of Interfaith's Microsoft Windows-based applications were running on this cluster, including its most mission-critical applications. "For the first few months, I monitored the virtual infrastructure cluster's resource utilization closely, because so many of our mission-critical applications were running on it. I found that not only were the applications performing flawlessly, but the entire server cluster was much more stable, with nearly zero downtime. Then I realized how much money we were saving by not buying new servers and by maximizing the number of virtual machines we deploy on each piece of hardware," recalls Nasir.

Nasir ran a VMware total cost of ownership (TCO) analysis and concluded that if Interfaith virtualized its entire environment, the institution could save \$600,000-800,000 over three years, including over \$16,000 in server provisioning time and \$230,000 in unplanned downtime. Based on the success of the first virtual cluster, as well as the projected savings from the TCO analysis, Nasir convinced management to roll out a second virtual cluster for Interfaith's MEDITECH environment, with 14 ESX hosts on IBM BladeCenter HS21 servers. "With the majority of our environment now running on VMware, we have more resources to allocate to the tools that our doctors and nurses need to deliver efficient and effective healthcare. Additionally, thanks to the increased uptime, performance, and availability afforded by virtualization, our hospital staff can focus on patient care instead of dealing with technical issues," says Nasir.

Mission-critical Applications on VMware

Today, 95% of Interfaith's Windows-based applications are virtual, and all of its virtual applications are certified on VMware. In fact, Interfaith has virtualized nearly all of its mission-critical applications. "In one of our clusters, we are running MEDITECH, which is a healthcare information system that will soon be the foundation of patient care and billing at Interfaith. In our other cluster, we are running Microsoft SharePoint Portal Server 2003 Enterprise, to which hundreds of users connect daily; Microsoft SQL Server 2005 Enterprise; Microsoft Exchange Server 2003; Blackberry Enterprise Server 4.1.4.12; and our Windows DHCP server. Then we have ScriptLogic Desktop Authority 7.8, which is absolutely critical because every single machine in our domain is managed by login script; ScriptLogic Patch Authority Ultimate 5.9, which we use to deploy patches to nearly 800 desktops; Lawson S3 8.0.1.0, for finance and accounting; Sophos Enterprise Console 3.0.0, including Sophos Anti-virus 7.6.1; Sage Abra 7.70, which is our Human Resources system; and the list goes on and on—we're confident that VMware really is the best infrastructure on which to run our most crucial applications, and application performance has never been better," remarks Nasir.

Another mission-critical application is Kronos Workforce Central 6.0, which schedules staff hours, calculates time and overtime, and then transfers the data to payroll. "Kronos Workforce Central is business critical for us. If Kronos were to go off-line for any reason, the DCM service would stop, staff hours would not be reported, and payroll would be inaccurate. With ESX, the Kronos Server will automatically restart in a matter of seconds, averting a disaster. Plus, with vCenter

"In one of our clusters, we are running MEDITECH, which is a health care information system that will soon be the foundation of patient care and billing at Interfaith. In our other cluster, we are running Microsoft SharePoint Portal Server 2003 Enterprise, to which hundreds of users connect daily; Microsoft SQL Server 2005 Enterprise; Microsoft Exchange Server 2003; Blackberry Enterprise Server 4.1.4.12; and our Windows DHCP server. Then we have ScriptLogic Desktop Authority 7.8, which is absolutely critical because every single machine in our domain is managed by login script; ScriptLogic Patch Authority Ultimate 5.9, which we use to deploy patches to nearly 800 desktops; Lawson S3 8.0.1.0, for finance and accounting; Sophos Enterprise Console 3.0.0, including Sophos Anti-virus 7.6.1; Sage Abra 7.70, which is our Human Resources system; and the list goes on and on—we're confident that VMware really is the best infrastructure on which to run our most crucial applications, and application performance has never been better."

Meraz Nasir

Manager of Infrastructure at Interfaith Medical Center

“VMware will serve as the foundation of our plan. There is no way we could have afforded disaster recovery without virtualization, because the hardware costs alone are so high. Now that everything is virtual, we are planning to implement a disaster recovery site in 2009 using Site Recovery Manager.”

Mark Lederman
Vice President and Chief Information Officer at
Interfaith Medical Center

scheduling, we are able to automate our systems management for routine tasks. It has been very stable and running smoothly, and the performance is outstanding,” says Nasir.

Interfaith also runs many healthcare-specific applications on VMware Infrastructure, such as its glucometer system, which manages blood glucose testing for diabetes patients, and Pentax endoPRO 6.5.1 for gastrointestinal screenings. Additionally, Interfaith uses DB Technology RAS 3.28 to scan and manage patient information in a searchable database. Nasir explains, “When the doctors in our clinics see their patients, they first need to look at the patient’s chart. They cannot do this if RAS is not up and running. Our RAS database has a half-terabyte of data with hundreds of thousands of patient files, and it runs flawlessly on VMware.” Also essential is RelayHealth ePremis 3.6, which helps manage Medicare and Medicaid claims. “If ePremis went down for a day, thousands of claim reimbursements would be delayed, so it is definitely mission-critical,” remarks Nasir. “With VMware HA failover protection, we can ensure that all of our applications are available 100% of the time. And with VMotion, we never need to worry about planned downtime. In fact, we have experienced nearly zero downtime since going virtual.”

Perhaps most critical to Interfaith’s day to day operations is its MEDITECH system. “MEDITECH is a leading healthcare information system; it’s like SAP or Oracle for hospitals. We are currently running MEDITECH on 40 virtual machines—representing nearly half of our virtual environment, and have 20 to 30 terabytes of data. Within two years, we expect to be running our entire hospital administration, from patient care to billing, on MEDITECH. The fact that we’re running such an indispensable application on virtual machines speaks volumes about our faith in VMware. The benefits of running MEDITECH on VMware, such as high availability, improved performance, and proven stability, not to mention the cost savings resulting from server consolidation and increased uptime, are irrefutable,” remarks Nasir.

What Lies Ahead

By the end of 2009, Interfaith is targeting 98% virtualization. “We are going to be implementing Microsoft Exchange Server 2007 and Office Communications Server 2007. VMware did an excellent job getting these products certified with Microsoft. We’re glad Microsoft decided to virtualize these applications, since Interfaith has a virtualization-first policy—if a vendor does not support its products on VMware, we either work with them to get their products VMware-certified, or we look for another vendor,” says Joseph Sorrenti, Assistant Vice President of Infrastructure at Interfaith Medical Center. “In addition, within two years we are hoping to run our entire hospital building, patient billing, and core clinical systems on MEDITECH,” he adds.

Interfaith is also planning to implement its business continuity and disaster recovery strategy over the next 12 to 18 months. According to Lederman, “VMware will serve as the foundation of our plan. There is no way we could have afforded disaster recovery without virtualization, because the hardware costs alone are so high. Now that everything is virtual, we are planning to implement a disaster recovery site in 2009 using Site Recovery Manager.”

“Information technology in our hospital is important, but most important are the patients and the people who serve them. Our goal is to make available the technology that allows our doctors and nurses to focus on delivering world-class healthcare. VMware is our partner in accomplishing this goal.”

Joseph Sorrenti
Assistant Vice President of Infrastructure at Interfaith
Medical Center

Lastly, Interfaith is planning to deploy to its nursing stations 50 thin clients using VMware View 3. “Full-blown PCs are too buggy and prone to crash. A VMware View deployment will lower IT costs, reduce energy consumption, and improve reliability and information security. And since VMware is now supporting different interoperable remote access protocols, we can roll out many more, possibly hundreds of virtual desktops in the future,” says Sorrenti.

Sorrenti credits VMware for helping to improve the quality of healthcare at Interfaith and cites the example of a recent storage area network (SAN) upgrade: “We used VMware Storage VMotion to migrate two terabytes of data to a new SAN environment. We did the migration in real time, and there was absolutely no interruption in data availability. Without VMware Storage VMotion, the upgrade would have likely taken two days and required expensive outside consultants. The time and money that we saved by using VMware can go directly to improving patient care.” Sorrenti continues, “Information technology in our hospital is important, but most important are the patients and the people who serve them. Our goal is to make available the technology that allows our doctors and nurses to focus on delivering world-class healthcare. VMware is our partner in accomplishing this goal.”

Results

- Virtualized 95% of Windows-based applications, including Microsoft Sharepoint Portal Server 2003, Microsoft SQL Server 2005, Blackberry Enterprise Server 4.1.4.12, ScriptLogic Desktop Authority 7.8, and Lawson S3 8.0.1.0
- Increased uptime for applications such as MEDITECH 5.6, Pentax endoPRO 6.5.1, and DB Technology RAS 3.28, which are crucial to everyday patient care.
- Virtualized 102 of 120 servers, achieving a 17:1 consolidation ratio.
- Reduced server deployment time from three weeks to 30 minutes
- Increased server utilization from 6-8% to 70%
- Target savings of \$600-800,000 over three years

**VMware, Inc. 3401 Hillview Ave., Palo Alto CA,
94304 USA Tel 877-486-9273 Fax 650-427-5001**

Copyright © 2008 VMware, Inc. All rights reserved. This product is protected by U.S. and international copyright and intellectual property laws. VMware products are covered by one or more patents listed at <http://www.vmware.com/go/patents>.

VMware is a registered trademark or trademark of VMware, Inc. in the United States and/or other jurisdictions. All other marks and names mentioned herein may be trademarks of their respective companies.