



KEY HIGHLIGHTS

INDUSTRY: MANUFACTURING

**CHALLENGE**

Develop a reliable, nimble and economical infrastructure to run business-critical applications such as BlackBerry Enterprise Server, Exchange Server and SAP

SOLUTIONS

Improve the dependability and availability of vital applications by running them on VMware Infrastructure

VMWARE AT WORK

VMware Infrastructure 3 Enterprise, featuring:

- ESX 3.5
- VirtualCenter
- VMotion
- High Availability
- Distributed Resource Scheduler (DRS)

DEPLOYMENT ENVIRONMENT

- ESX 3.5 running on 44 HP BL685 and BL460 blade servers attached to a Compellent SAN
- Mission-critical applications running in production in virtual machines: a wide portfolio that includes BlackBerry Enterprise Server 4.1.5.31, Exchange Server 2007, SAP ERP 6.0, domain controllers, file and print servers, Quest monitoring tools, web servers
- Guest operating systems: Windows Server 2003 SP2, 64 bit and 32 bit

"I am extremely happy with the overall performance of BES, Exchange and SAP running on ESX. Some people question whether those applications can run in a virtualized environment. I'm here to say that they absolutely can, because we're doing it right now. Those and other mission-critical applications run extremely smoothly on ESX and we have no performance issues at all. When you factor in the time and money you save on hardware and systems management—and the peace of mind you get from better backup and disaster recovery—it's just smart to virtualize all your key applications."

Bill Moore

IT Infrastructure Manager

NuVasive, Inc.

NuVasive knows a thing or two about backbones—both the human and the computer kind. The San Diego-based medical device company develops products that make spine surgery as minimally disruptive as possible. Meanwhile, the IT team that supports those efforts is using VMware Infrastructure as the backbone of a virtualized data center that's robust and flexible enough to run business-critical applications like BlackBerry Enterprise Server (BES), Exchange Server and SAP ERP.

NuVasive's first experience with VMware technology was in 2006. "We were just testing ESX 2.5 on a very small scale, using VMs that were low powered," says IT Infrastructure Manager Bill Moore. "After I discovered that we could do a lot more with ESX, I started running more intensive servers on it, like our domain controllers and file and print servers. With each new version of ESX that came out, it got better and better, so I started running more and more of our environment on it. At this stage, I'd say we are about 90 percent virtualized."

Moore points to BlackBerry Enterprise Server (BES) as a watershed in NuVasive's virtualization efforts. "In the past, whenever I'd bring up the idea of running a mission-critical production server on ESX, everybody would shy away," he recalls. Deciding that bold action was the best way to convince the company's virtualization skeptics, he began running BES on VMs. "Almost everybody in our company carries a BlackBerry, so it's a very visible application," he says.

"We started off slowly, but I kept pushing the limits of BES running on a VM, just to see what it could handle," Moore explains. "I added more and more phones on it until we had about 210 lines on a single VM. I was really impressed with the fact that the mail came out immediately, just as it should, and I had no performance issues.

"Once BES was virtualized, it became my proving ground," he adds. "If somebody expressed reservations about virtualizing an application, I'd say, 'Your BlackBerry is running on VMware right now! That would surprise a lot of people—then make them feel more comfortable about trying out something else on VMware VMs. Once they know the reliability is there, their comfort level rises fast."

Thanks to that comfort level, NuVasive now has a VMware-first policy. "Whenever we get a server request, we always go with a VM, unless the application requires a physical connection like a specific video card," Moore says. "Otherwise, we virtualize everything. We only have a handful of standalone servers left, and as soon as they fall out of warranty, we're going to virtualize them as well."

In late 2007, NuVasive began virtualizing two more bet-the-business applications: Exchange Server and SAP ERP. For those and other projects, Moore and his team worked with an authorized VMware consultant, Ontario, CA-based SIGMANet. "We're a very fast-growing company with a lean IT department, so we lean on SIGMANet a lot to take care of various projects," Moore explains. Indeed, SIGMANet did most of the implementation for the upgrade from Exchange 2003 running on a conventional physical infrastructure to Exchange 2007 running on ESX, which involved about 500 mailboxes on four HP blade servers and was successfully completed in a month.

After SIGMANet's Hassan Kassih showed him an SAP support note certifying that the company supports running its applications on ESX, Moore decided that the time was right to add SAP ERP to the company's application portfolio. "I made a presentation to our director of IT and brought that support note along with me," he recalls. "I said, 'VMware and virtualization are the way of the future. If we want a strong implementation of SAP that is going to carry us forward for several years, we should virtualize it with VMware ESX—which, by the way, SAP has qualified as a proven platform.' After that meeting we started assigning blade servers, and a few months later we had a full implementation of SAP ERP on the ESX 3.5 platform." That implementation runs on 14 HP blade servers: six for production, four for quality assurance, and four for development.

The implementation went live this summer, and Moore couldn't be more delighted—and relieved. "Our SAP implementation was a multimillion-dollar project, probably one of the most important ones we'll do for years to come, so we were all pretty nervous about it," he reports. "But SAP is running great on VMware. Everyone is very happy with the performance—including the SAP contractors we have here. They have given rave reviews. I think that speaks volumes for VMware."

Benefits of Virtualizing Vital Applications

Improved systems management is the first virtualization benefit Moore cites. "It's easier to control our environment through VMware," he says. "Being able to monitor and control applications and hosts from VirtualCenter's single console is extremely beneficial," he adds. "And being able to deploy VMs at the drop of a dime is incredible."

All those capabilities, especially the last, came in handy during NuVasive's SAP implementation. "We had an eight-month timetable, which is very difficult to do with an SAP implementation," Moore says. "I don't think we would have been able to keep the pace if we were doing a conventional implementation on hardware. We'd have to order the servers from SIGMANet, wait for them to be delivered, rack them, hook them into the SAN, provision the HBA, and install an operating system. All that could take days, or even weeks. But with VMware, we could right-click a template and deploy a server in about 20 minutes. So the time savings were tremendous."

VMware's flexible server-provisioning capabilities make it easy for Moore and his team to right-size the infrastructure supporting key applications. "As we got deeper into the SAP project, we found that we needed more servers than we had anticipated," he says. "We needed more quality-assurance and production servers because we were adding different modules to support the production of our

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medical devices. It was great being able to add capacity on the fly. Once we'd built out a few templates with different configurations of processors and RAM, we could literally just right-click and deploy a VM fitting the template we wanted in minutes."

ESX management tools save time, money and effort in other ways as well. "For instance, thanks to VMotion, we can perform maintenance on the hosts any time, without having to worry about downtime," says Assistant Administrator Darrell Marlow. "Our Exchange, BES, and SAP environments are always available even if we choose to do maintenance during critical business hours. It's a huge convenience."

The next frontier for NuVasive's extensive virtualized infrastructure is disaster recovery. The company currently uses VMware High Availability (HA) for immediate failover of key applications locally, and VMware Infrastructure is enabling ambitious plans that will let the main data center in San Diego failover to the company's Memphis site—and vice versa—in the case of a disaster or major disruption. "To be able to have standby virtual machines out there without having to waste space, money and power on physical boxes is terrific," Moore says. "We're working on plans that will leverage standby continuous replication (SCR) and VMware ESX to protect SAP, Exchange, BES—all the applications necessary for us to keep operating our business from a different site in the event of a disaster in either of our two main data centers. Our disaster recovery plan will allow us to significantly improve recovery of our systems, ensuring our critical applications are always available when we need them."

Results

- Business-critical applications like BES, Exchanger Server and SAP ERP run smoothly on VMware Infrastructure—and with better management and availability, thanks to VMware tools like High Availability and VMotion
- Uptime is 99.99 percent
- Saved about \$1.1 million dollars in hardware, cabling, rack space, power and administration costs
- By the end of 2009, close to 35 legacy servers will be retired, adding another million dollars in savings
- Data center is 90 percent virtualized, with a VMware-first policy for new servers
- 5:1 average server consolidation
- Reduced server-deployment time from days or weeks for physical hosts to about 20 minutes for VMs
- Current environment is about 50% utilized, with plenty of room for growth

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