



BACKUP/RECOVERY/ARCHIVING	■
CLUSTERING	■
CONSOLIDATION	■
DATABASE	■
MANAGEMENT/UTILITIES	■
MESSAGING	■
VIRTUALIZATION	■

### CHALLENGE

Dell IT needed to quickly and cost-effectively provide server power to meet the growing needs of the company's internal development and testing groups—without exceeding space and resource constraints

### SOLUTION

Dell IT deployed a virtualized server farm based on Dell™ PowerEdge™ servers running VMware® ESX Server® 2.5, VMware VirtualCenter™ 1.2, VMware VMotion™, Altiris® Deployment Solution™, and Dell OpenManage™ for Servers. In addition, a Dell/EMC Fibre Channel RAID array running the EMC® Navisphere® Management Suite provides storage support for the shared development and test environment.

### BENEFIT

Because virtualization enables the deployment of multiple virtual machines on a single physical server, the Dell IT group has realized impressive hardware cost savings. In addition, the rapid deployment of virtual machines has enabled test and development teams to begin coding far earlier in the cycle—ultimately speeding products to market.

# Virtual Visionaries

Dell IT leverages advanced virtualization technology to provide shared computing services to the company's internal development teams—and makes unprecedented gains in cost savings and deployment time

It's hardly a secret that Dell staked its claim by delivering the products and services its customers need. While Dell's success in wringing inefficiencies from the supply chain is often credited with helping to make its success possible, another possible candidate for the company's accomplishments—innovative application development—is less talked about but no less important. From customer-facing sales applications to internal inventory and manufacturing software, Dell has been able to grow because of the developers who work tirelessly to provide customers with the experience they are looking for as well as the tools internal teams need to do their jobs more effectively.

Across the organization, Dell engineers and product development groups are dedicated to maintaining technology leadership. As they strive to continue this trend, the development teams at Dell place increasingly heavy requirements for servers, applications, and updates on the Dell IT group infrastructure. To help the teams bring products to market in a timely, competitive manner, Dell IT must be able to scale its shared service model and computing resources while containing the capital costs and staffing resources needed to efficiently manage these systems—not an easy feat.



As with many organizations, the effort to support the needs of internal development teams placed a heavy burden on Dell data center resources. “As Dell has grown, we began to run up against major constraints in terms of data center, lab, and rack space—as well as power and cooling resources,” notes Rick Merino, senior systems engineer in Core Engineering, Dell IT. “Being Dell, it was always easy to get our hands on more servers, but we didn’t necessarily have a place to put them. With critical development projects ramping up all the time, we needed to be able to quickly and easily deliver more computing power in less physical space.”

### **Virtualization on Dell PowerEdge server helps overcome physical constraints**

With developments in virtualization technology, it has become possible to create multiple virtual server instances on a single physical server—allowing for exceptional flexibility and scalability of IT resources. To meet the Dell IT group’s need to support development and test environments by deploying many servers in a small amount of space—and short amount of time—the team decided to implement a virtualized server farm of roughly 1,200 virtual machines based on approximately 100 Dell PowerEdge servers, each with four Intel® Xeon® processors and 16 GB of RAM. “Dell PowerEdge servers are perfectly suited for virtualization because they are based on open standards and they are optimized to run a variety of operating systems and applications well,” explains Merino.

In the near future, the Dell IT plans to augment its virtual server farm by adding next-generation Dell PowerEdge 2950 servers. “We believe that with the increased bandwidth PowerEdge 2950 servers can provide, we may be able to increase our virtual machine to server ratio—deploying more virtual servers in even less space,” notes Merino. Jon Mercado, senior systems engineer for Consolidated Platforms, Dell IT, adds, “In addition, the virtualization technology available with the PowerEdge 2950 servers opens the door for us to virtualize 64-bit operating systems—a standard we’re moving towards. This capability will be particularly valuable to many of our more leading-edge lines of business. For example, Dell.com—our online organization—is looking at moving more applications to 64-bit for the additional memory mapping capabilities it provides.”

To keep tabs on the health of physical servers in the farm, the Dell IT team utilizes Dell OpenManage for Servers. Built on the principle of open systems, Dell OpenManage for Servers provides robust, flexible systems management tools designed to help IT administrators proactively control server operations. “OpenManage allows us to easily monitor the status of our hardware through a centralized console, ultimately streamlining administrative operations,” explains Mercado.

### **VMware powers advanced virtualization and resource management**

To enable virtualization, all servers in the farm run VMware ESX Server 2.5, a software application that abstracts processor, memory, storage, and networking resources into multiple virtual machines, thereby providing greater hardware utilization and flexibility. VMware ESX Server allows

multiple unmodified operating systems and their applications to share physical resources. Each virtual machine represents a complete system, with processors, memory, networking, storage, and BIOS.

The servers are divided into groups of 20 for manageability, but they share the same storage area network (SAN) and are managed by a single PowerEdge server running VMware VirtualCenter 1.2. VirtualCenter enables the rapid provisioning of virtual machines and the monitoring of both physical server and virtual machine performance. “We utilize VirtualCenter as the main management console for capacity monitoring of our virtual infrastructure,” explains Merino. “Thanks to virtualization and tools like VirtualCenter, our operations team needs only to worry about a few touchpoints rather than maintaining hundreds of different servers that have various hard drives, rate cards, and chassis configurations. For this reason, managing the virtual environment presents far less of a burden.”

VirtualCenter intelligently optimizes resources, ensures high availability to applications in virtual machines, and makes IT environments more responsive and flexible through virtualization-based distributed services such as VMware VMotion. Using VMotion software, Dell IT can move running virtual machines from one physical server to another with no impact to end users. “We utilize VMotion to help level out the load across our virtualized environment,” Merino states “Once a hot spot or high resource consumption area has been identified through the VirtualCenter console, VMotion is triggered to load-balance the environment by moving virtual machines that are resource-intensive to other posts that may have more availability. In this manner, we can keep our environment up and running, ensure application availability to end users, and guarantee optimal resource utilization.”

In addition, VMotion enables the Dell IT team to perform maintenance and upgrades on the fly—without causing downtime on the shared development environment. “Using VMotion, we can upgrade our hosts with zero interruption to the business,” explains Mercado. Completely transparently to the end user, we can move a running virtual machine off of one physical host and move it to another while we bring the first down for maintenance.”

### **Altiris software enables rapid virtual server deployment**

To quickly and easily deploy virtual servers within the environment and provision the ESX Server operating system, Dell IT uses a scripted installation process that utilizes the Altiris Deployment Solution. “When we build a server farm, we build the first virtual machine, which we call a ‘gold’ virtual machine, as a template using the Altiris deployment server,” explains Mercado. “This master virtual machine leverages Microsoft® Systems Management Server (SMS) to constantly receive security updates, group policies, and domain policies. It is a complete, compliant build of what a server should be in our environment. Then, whenever we need to provision additional virtual machines, we simply clone the gold virtual machine using either the VirtualCenter wizard for single copies or VMClone to automatically create large numbers of copies.”

According to Mercado, this process greatly speeds the deployment of new servers in the farm—to the benefit of Dell development and test

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— **Rick Merino**, Senior Systems Engineer in Core Engineering, Dell IT



groups. “To build a physical box would take a dedicated IT resource a great deal longer because you have to allow time for ordering the hardware, racking the hardware and loading the operating system,” he continues. “But now we can clone a virtual machine in approximately 20 minutes. The faster we can build a new virtual server, the faster we can equip our development and test teams to do their jobs.”

#### **Manageable storage means fewer administrative headaches**

Providing storage support for the virtualized environment is a SAN based on a Dell/EMC CX700 Fibre Channel RAID array, with most of the virtual machine disk files residing on RAID-5 logical units. In addition, the Dell IT group utilizes the EMC Navisphere Management Suite to provide complete storage management, monitoring, and configuration—all from a simple Web browser interface. “We have found that the Navisphere solution really eases configuration operations on the back end and facilitates the overall SAN provisioning process,” notes Mercado.

#### **Virtual machines cut hardware costs, speed development cycles**

Since deploying the virtualized server environment, the most notable benefit for Dell IT has been the impressive cost savings the solution delivers. “To equal the number of virtual servers in our VMware farm, we would have to deploy approximately 320 physical servers—which equates to several million dollars in hardware costs,” explains Merino. “Since we can build a VMware farm for substantially less, we save several million dollars per farm—and we have four of them. So when you factor in the entire deployment, we are looking at millions of dollars in hardware cost savings alone.”

#### **HOW IT WORKS**

##### **HARDWARE**

- Dell™ PowerEdge™ 6650 and Dell PowerEdge 6850 servers with Intel® Xeon® processors
- Dell/EMC CX700 Fibre Channel RAID array

##### **SOFTWARE**

- VMware® ESX Server® 2.5
- VMware VirtualCenter™ 1.2
- VMware VMotion™
- Altiris® Deployment Solution™
- EMC® Navisphere® Management Suite
- Dell OpenManage™ for Servers

In addition to saving Dell a great deal of money, the virtualized server farm also saves the company time—a critical gain in the race from development project to fruition. “Server deployment time has been cut to a fraction of what it was. While the typical physical server deployment can take anywhere from three to six weeks, we have been able to bring it down to two days using virtualization technology,” concludes Mercado. “When we can deploy servers to our development teams faster, they can start coding far earlier in the project cycle than ever before. Ultimately, that means that we can get our products to market more quickly. And not only is that good for Dell, but it’s good for our customers as well.”



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