



KEY HIGHLIGHTS

INDUSTRY: ENERGY/UTILITIES



A UniSource Energy Company

CHALLENGE

Manage outdated data center with severely limited capacity while waiting for new data center to be built.

SOLUTIONS

Implement virtualization to consolidate servers, to reduce power and cooling demands, and to facilitate application management, upgrades, and availability.

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)

DEPLOYMENT ENVIRONMENT

- ESX 3.5 running on HP ProLiant DL360 and DL380 single and dual quad-core servers with 32 GB memory; Dell PowerEdge 1950 and 2950 dual quad-core servers with 32 GB memory; and Sun Fire X4150 dual quad-core servers with 64 GB memory attached to NetApp FAS3040, FAS3050, and FAS270 SANs
- Guest operating systems: Microsoft Windows 2000, Microsoft Windows 2003, Microsoft Windows 2008, OpenSolaris x86.
- Virtualized applications in production: Microsoft Office SharePoint Server 2007, Microsoft SQL Clustering 2005, Microsoft SQL Server 2000 and 2005, Oracle Hyperion Strategic Finance 9.3.1, Oracle PeopleSoft 8.9, GE Smallworld GIS 3.1 SP2 and 4.1, GE Smallworld PowerOn 2.5 and 4, IBM FileNet 5.5, IBM Maximo Directory Server 7.1, IBM Maximo Terminal Server 5, RIM Blackberry Enterprise Server 4.1.6 MR2, Symantec Enterprise Vault 2007 SP3, Autodesk AutoCAD 2009, and many other applications.
- Virtualized applications in pre-production: Microsoft Office SharePoint Server 2007, Microsoft SQL Clustering 2005, Microsoft SQL Server 2000 and 2005, Oracle Hyperion Strategic Finance 9.3.1, Oracle PeopleSoft 8.9, and many other applications.

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Stephen Kiser
Systems Administrator at TEP
Tucson Electric Power

UniSource Energy Corporation/Tucson Electric Power

UniSource Energy Corporation was founded in 1902 and is based in Tucson, Arizona. Through its subsidiaries, Tucson Electric Power (TEP) and UniSource Energy Services (UES), the corporation provides natural gas and electric service to customers throughout Arizona. TEP serves nearly 400,000 customers in the Tucson metropolitan area, and UES serves more than 236,000 customers in northern and southern Arizona. There are approximately 1,600 employees across the subsidiaries.

What Happens When the Power Company Runs Out of Power?

Two years ago, TEP was crippled by an outdated data center that had run out of capacity. Chris Rima, Supervisor of the Infrastructure Systems Team at TEP, explains their predicament: “We had essentially run out of things like UPS capacity and, ironically, power. Our old data center facility was not designed to meet the needs of today’s servers. It did not have proper cooling or hot-cold rows. So, we had some environmental issues with the old facility, the main one being power.”

Rima and his team initially started virtualizing servers to prolong the time that they could stay in the old data center until the new data center was built. As they implemented VMware Infrastructure 3, the financial benefits of virtualization became evident. “Capacity issues in the old data center were the primary drivers of virtualization, but the secondary drivers were financial. Lower capital costs for server builds, better resource utilization, less power per server instance—all of these factors positively impacted our bottom line. As a power company, we also recognize and value the environmental benefits of lower power consumption,” remarks Rima.

TEP’s Virtual Landscape

TEP’s current VMware infrastructure is comprised of 53 hosts and approximately 330 virtual machines. The company established a virtualization first policy nearly two years ago. Today, approximately 90 percent of its IT environment is virtualized. TEP’s virtualized applications include Microsoft Office SharePoint Server, Microsoft SQL Server, Oracle Hyperion Strategic Finance, Oracle PeopleSoft, GE Smallworld, IBM FileNet, IBM Maximo, RIM Blackberry Enterprise Server, and Symantec Enterprise Vault.

Among TEP's most mission-critical applications running on VMware Infrastructure are GE Smallworld GIS and GE Smallworld PowerOn. TEP's global information system - is built on Smallworld GIS, and the company's outage management system is run on Smallworld PowerOn. Stephen Kiser, Systems Administrator at TEP, explains the function and significance of these applications: "Our distribution personnel use the GE Smallworld outage management system to know how power is routed. This system ensures that everyone is working from the same blueprint. Our dispatchers rely on the outage management system and GIS to send the field techs to the right place to restore power safely. And we rely on VMware Infrastructure to keep these systems up and running at all times."

Also running on VMware are the mission-critical IBM Maximo Asset Management and IBM Maximo IT Service Management. Rima emphasizes the significance of these applications: "Maximo Asset Management is our enterprise asset management software for power production. We have used it for approximately eight years in all of our plant sites. If it were to go offline for an extended period of time, operations at all of the plants would be disrupted, and they wouldn't be able to manage their assets effectively. We also rely on Maximo IT Service Management to manage help desk tickets, IT requests, and new infrastructure builds. Without it, work management for the IT function would be severely disabled. These applications are essential to our organization, and VMware Infrastructure provides the reliability and availability that these applications require."

For all of its Human Resources functions, such as payroll and employee management, TEP relies on PeopleSoft. Rima comments, "With approximately 1,600 employees, our HR team requires continuous access to PeopleSoft. We upgraded PeopleSoft last year, and as part of the upgrade, we put the application into a virtualized environment. Since then, we have had great performance and have been able to take advantage of VMotion and other features to minimize downtime."

Rounding out the lineup of applications that are virtualized in production are several more mission-critical applications. "IBM FileNet, Symantec Enterprise Vault, Hyperion Strategic Finance—these are all applications that we rely on heavily for our daily business operations. If any one of them were to go down or be unavailable for some time, our operations would definitely be impacted. Thanks to features such as HA, DRS, and VMotion, we rarely have to worry about that happening," comments Rima.

Harnessing the Power of Virtualization

Since implementing VMware Infrastructure 3, TEP has leveraged the software's features to address specific challenges facing the company. "In 2005, we had 80 to 100 physical servers that were grossly underutilized. After virtualizing our data center, hardware resource utilization increased greatly. We're getting much better efficiency now. We have also improved our availability and reduced planned outages," says Rima. He credits VMotion for many of these benefits: "VMotion is one of the primary business enablers, because it allows us to move things around without outages. We can use it to avoid planned downtime, which increases the availability of our critical applications and ensures business continuity."

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For TEP, the ease of upgrading software is another major advantage of virtualization. Kiser recalls a recent FileNet upgrade: "The application administrators performing the FileNet upgrade saw a huge benefit in VMware. We were a couple of revisions behind, and the ability to spawn off new instances and take snapshots before taking any permanent steps made the upgrade much easier. The FileNet application administrators could make sure that the process was correct before moving forward to the production upgrade." Rima adds, "In the case of FileNet, the upgrade was seamless, but if there had been a problem, we could roll back to the previous version very quickly without having to do an OS-level recovery thanks to snapshots. That wasn't an option before virtualization."

"VMware made upgrading our Hyperion environment easy as well. We actually needed to keep the existing environment running on physical servers while we deployed a newer version of Hyperion on ESX. We were able to deploy in a half-hour without having to rack anything. Plus, now that Hyperion is virtual, we can move the servers around with VMotion and clone them for QA testing, which would not have been possible in a physical environment," adds Tony Edelbrock, Senior Systems Administrator at TEP.

Virtualization has also provided TEP with invaluable backup and recovery benefits. According to Rima, "Being able to treat our Windows virtual machines as files has significant and very large business benefits. In some cases, we even see the benefit of putting just a single virtual machine on an ESX host server because of what we are able to do in terms of backup and recovery. Instead of backing up at the OS level, which is slow, resource-intensive, and costly, virtualization allows us to perform file system level backups on enterprise storage. We no longer need to put a backup license on every Windows instance and backup through Windows."

To further illustrate the benefits of virtualization, Edelbrock compares the pre- and post-virtual backup and recovery of TEP's outage management system: "Before virtualization, the backup and recovery process for the GE Smallworld outage management system and GIS was very manual. It could potentially take all night to back up data and move it out to the DR facility. In the event of a disaster, it could take three or four hours to do a full failover. In the meantime, the dispatchers would have to refer to physical maps instead of electronic data to get things up and running. It was a nightmare."

Today, thanks to virtualization, the backup process is much simpler. "Virtualization has been a lifesaver. It has really revolutionized the way we do things. For example, several of the backup processes were eliminated with the new architecture. And some processes that used to take several hours are now done every 15 minutes on the backend without any intervention on our part. The resources that had been used to do backups for several hours every night can now be applied to more strategic tasks," adds Edelbrock.

Future Virtualization Plans

TEP is testing VMware View 3 and expects to grow the number of virtualized desktops steadily in the years to come. According to Rima, "TEP currently has about 30 virtual PCs, which we use for remote access for clients who may not be onsite. We also use them as test-type PCs, if we need to do things like software installs for testing. We plan to build out more and more virtual desktops in the future, and VMware View 3 seems to be a great tool for this purpose."

Results

- Virtualized 90 percent of IT environment, including mission-critical applications such as IBM FileNet, IBM Maximo, Hyperion Strategic Finance, PeopleSoft, Symantec Enterprise Vault, and GE Smallworld
- Performed upgrades and physical-to-virtual migrations quickly and easily
- Dramatically reduced lead time to get new software into production
- Experienced zero downtime with applications by implementing features such as HA and DRS
- Streamlined backup processes, thereby eliminating several hours of backup time per night

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