



## Communications Company Keeps Rural Kansas Connected with VMware Virtual Infrastructure

### VMware Software Enables Fast Server Deployment and Management, Effective Disaster Recovery, and Remote Desktop Environment

#### RESULTS

- Saved tens of thousands of dollars including hardware, power/cooling, labor, and rack costs
- Achieved 8:1 server consolidation ratio
- Increased CPU utilization rate from 5 percent to 20-25 percent
- Reduced development time for new servers and applications from weeks to minutes
- Downtime eliminated with VMware® VMotion technology

### High-Speed Internet and Digital TV in the boonies

Located in the Kansas River Valley next to the scenic Flint Hills, Wamego and the surrounding communities of St. George and Paxico have been served by Wamego Telecommunications Co., (WTC) since 1912. WTC provides the latest in telecommunications services to its 3,000 Internet customers, 2,500 cable TV customers, and 5-6,000 telephone customers.

WTC provides service and coverage for 99.9 percent of its service area. "Our mission is to provide high-quality, affordable services with the latest technology to all of our customers," says Jim Jones, network administrator for WTC. "Being in rural Kansas, when we say all, we mean all. You can drive into the boonies and still get DSL. Even if it's 20 miles from the middle of nowhere."

With the company's rapid growth and commitment to innovation, WTC began to look for a server consolidation strategy in January 2005. "We needed to get 16 or 17 new servers and would need the rack space, cooling, power, switches – all the things that make consolidation make sense," Jones says.

Putting separate applications on separate physical servers was not efficient. "We had a hard time justifying the need for one server per application," Jones explains. "We had one server as our mail server, one as our Web server. We were dedicating one server to be a DNS server, and we needed a bunch of DNS servers, a radius server, this server, that server. And they were all at 5 percent utilization."

So Jones went with Olin Hamilton, systems administrator for WTC, to a VMware seminar to learn about server consolidation on ESX Server. "We saw a presentation about how Sprint was using VMware software, but we realized that you don't need to be a large company to be able to benefit from this technology," says Jones. "The whole way home, we were excited. We kept saying, 'the possibilities are endless.' Even now, we keep saying that; it hasn't gotten old and we're still excited about the software's capabilities. Every time we turn around, there's a better use for it; it lets us do something we couldn't do before."

### Evaluation and Training at Once

Whereas most companies evaluate VMware software with a free downloaded evaluation copy, WTC decided to hit two birds with one stone by evaluating the software at a training class. "We didn't have the hardware for an evaluation phase, so we went to the Virtual Infrastructure with ESX Server and VirtualCenter class," says Jones. "We figured we could spend time and buy hardware, or take a week to evaluate it while learning everything we needed to know. It turned out to be an awesome idea. It helped us decide whether to do it, but also, we learned about sizing and other techniques that made everything so much easier. I highly recommend anyone who is getting into virtualization to take that class. The instructor was phenomenal. We got to try out VMotion, roll out whole networks, and everything was hands-on."

**"There were things we couldn't do before because of hardware costs. Now we can offer Web site hosting, server hosting and other services. We're able to buy licenses for software, provision it in our virtual infrastructure, provide services to customers at a low cost, and still see a profit."**

*Jim Jones*  
Network Administrator, WTC Communications



## VMWARE VIRTUAL INFRASTRUCTURE AT WORK

- ESX Server on 2-CPU Dell PowerEdge 2850 servers, with 8 GB RAM
- EMC Clariion X300 SAN
- Guest operating systems include: Microsoft® Windows XP, Windows 2003 Server, IPCop (Linux distribution)
- Applications running in both test and production in virtual machines include: ISP email, Web hosting, DNS, FTP, VPN, Active Directory, RADIUS, file and print, SQL, custom billing software, Microsoft Office, virtual firewalls for hosted virtual machines

Jones and his team used knowledge gained in the class to deploy their virtual infrastructure. "It was a matter of getting everything sized, bought and hooked up," says Jones. "We started with the simple things, such as domain controllers, DNS servers and file and print servers, and set up the infrastructure so that it fit into our existing network."

### Building a Virtual Desktop Infrastructure

At the same time WTC began looking for a server consolidation solution, it was also looking for a solution to streamline desktop computer deployment. "We were at a technology show in Kansas City, and were looking at solutions," Jones says. "We were going to need 10 to 15 desktop computers. We looked at one solution where you could put all the PCs in the datacenter, then put a thin client on each person's desk and manage centrally located PCs. For the management software, you had to install three versions of Java, two versions of Active Perl, and two versions of Apache server to manage this behemoth. It was supposed to make things easier, but it made things impossible."

When Jones decided to buy VMware ESX Server, it hadn't occurred to him to use it to host desktop environments. But when the other solution did not pan out, and two employees were starting work with short notice, WTC needed computers for the new personnel to use temporarily. Jones and his team set up some older computers as thin clients so the new employees could use remote desktop protocol (RDP) to access Windows XP virtual machines running on virtualized servers. "It was pretty cool," says Jones. "A new user, even with an old laptop, can RDP to a virtual XP box, and it works beautifully."

Now, anytime someone needs a new computer, it is easy and inexpensive to create a thin client. From the thin client, the user can login and access the appropriate virtual machine running on ESX Server. "We don't have anyone who is a heavy user," says Jones. "Our staff uses Microsoft® Office and our customer billing software. The users are set up so they can move around; they can RDP from home. They don't realize they are using RDP; it's all on their computers."

Jones uses 2X ThinClient Server for Windows installed on a host with VMware ESX Server. The software integrates with Active Directory for the login and access, and user connections and hardware settings can be adjusted so software on the server is directed to the thin client. "Depending on how an account on the thin client server is set up, users are directed to the appropriate terminal server," says Jones. "From our end, it's a virtual Windows XP box on ESX Server."

The solution is also cost effective. Using the 2X ThinClient software, WTC does not need high-end thin clients. "You can use almost any hardware with it," Jones says. "You can spend \$125 for the thin client and it will work fine." For up to 10 users, 2X ThinClient software is free, and for up to 25 users, it's just under \$600.

### The Results: Increased Capabilities at Lower Cost

Because of the benefits of virtualization, WTC continues to build on its virtual infrastructure, including its hosted desktop environment. The benefits include:

- **Reduced costs.** With virtual infrastructure, costs are avoided because WTC no longer needs as much hardware, space, switches, or power.
- **Server consolidation.** WTC runs 17 virtual machines on two physical servers, and plans to expand without a heavy investment in new hardware.
- **Improved CPU utilization.** Before using VMware software, CPU cycles were only 5 percent utilized. Now, utilization is 20 to 25 percent.
- **Faster, easier server deployment.** Jones explains: "Before, deploying a new server was a pain in the neck. You'd have to size the machine, plan on it being bigger, buy it, get it in, and it's not like the last machine you got, so you can't deploy your standard image on it. You have to install your operating systems from scratch, get your drivers rounded up, mount the servers in the racks and



possibly disrupt service if you start knocking cables around. Then you have to make sure you have enough power. Now, with VMware virtual infrastructure, you click and deploy. It's just that easy."

- **Improved application availability.** During hardware upgrades, WTC uses VMotion to move virtual machines to a different physical server and eliminate downtime.
- **Improved disaster recovery.** Before using VMware software, disaster recovery was difficult. Now, WTC can take snapshot images of its virtual environment, making recovery easier. "It's not easy with physical servers," says Jones. "If you have a replacement that has different hardware – and the hardware is always different – it's a pain. Now, with virtual machines, everything is standardized so recovery is so much easier, and we can get everything back up in minutes."

### Growing the Business

WTC plans to use its virtual infrastructure to offer even more services to its customers. "There were things we couldn't do before because of hardware costs," says Jones. "Now we can offer Web site hosting, server hosting and other services. We're able to buy licenses for software, provision it in a virtual infrastructure, provide services to customers at a low cost, and still see a profit."

For example, WTC can provide server hosting, including firewall protection. "One customer wanted a PC hosted on our server, so he could RDP into it from anywhere," Jones says. "We found IPCop, a CD-ROM-based Linux firewall, and created a virtual machine plus extra VLANs. We can use VMotion with IPCop and it works as a firewall. Now he has an XP box behind its own firewall that he can VPN (virtual private network) into from anywhere. So we host his entire network."

Jones adds that it is now economical to try out new project ideas because WTC can do it on virtual machines instead of investing in more hardware. "We can try new services, offer them to customers, and if it sells, continue them," he says. "It lets us think of new ideas instead of trying to figure out how to buy the hardware."

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