Kronos

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Senior IT Systems Manager,
Kronos Incorporated

VMWARE AT WORK

Challenge
Reverse server sprawl and hardware and energy costs in corporate datacenter and Hosting and Managed Services datacenter; streamline IT administration; and provide stable infrastructure for critical applications and databases.

Solution
Leverage VMware Infrastructure 3 in both corporate datacenters to increase consolidation and utilization rates while streamlining IT management, enhancing application performance, and enabling faster, simpler deployment of Windows desktop environments.

VMware at Work
• Corporate Datacenter—VMware Infrastructure 3 Enterprise, featuring:
  – VMware ESX® Server 3.0.2 with VMware vStorage VMFS
  – VMware VirtualCenter 2.02
  – VMware vMotion™
  – VMware Distributed Resource Scheduler (DRS)
  – VMware High Availability (HA)
• Hosting and Managed Services Datacenter
  – VMware ESXi™
  – VMware vCenter™ Converter

Kronos Incorporated

Kronos Incorporated (Kronos) is a workforce management software company based in Chelmsford, Massachusetts. Established in 1977, Kronos has approximately 3,000 worldwide employees and serves customers in more than sixty countries. In fact, 30 million people around the globe use Kronos solutions every day.

Keeping up with such phenomenal growth hasn't always been easy. For the Kronos IT team, the rapidly expanding business was beginning to take its toll on the corporate datacenter. Michael Moran, Senior IT Systems Manager, recalls, "We were experiencing physical server sprawl, low CPU utilization rates, power, cooling, and space challenges—the typical datacenter growing pains. We began looking for a tool to provide efficiency gains in systems provisioning, but we also wanted to be able to manage this new infrastructure with the same level of staffing." Kronos found its solution in VMware Infrastructure 3.

Since implementing VMware Infrastructure 3 in 2006, Kronos has virtualized 85 to 90 percent of its corporate production datacenter. "If you count the entire campus," says Moran, "we have roughly 1,500 virtual machines running on 75 ESX server hosts. The bulk of those are used for development activities in various business operations groups, including our Hosting and Managed Services group, which recently implemented virtualization in its development environment." As Kronos continues to expand its virtual environment, VMware provides the tools and technologies to solve critical business challenges and to make operations more efficient and profitable.

VMware in the Datacenter: Enhancing Performance of Large-scale Databases and Mission-critical Applications

Over the past two years, Kronos has implemented a large and varied virtual environment in its corporate datacenter, including many large-scale databases and mission-critical applications. Moran describes the company's virtual database implementation: "Approximately 70 to 80 percent of our SQL and Oracle databases are running on VMware. Some of the databases in our virtual environment are fairly large—60 to 100 GB, and performance has been great. They're all running perfectly on VMware and we get the support we need from Microsoft and Oracle to make this possible."

In addition to high-performance databases, functional teams throughout the company depend on VMware to provide robust, reliable applications, with high availability and minimal downtime. Many of the essential applications used by the sales and marketing teams, for example, are running on VMware. Moran elaborates, "We have also entirely virtualized our Aprimo and Trillium applications, which we use to manage critical marketing data, web content management systems, knowledge base systems, instant messaging systems, and commission systems. These are key applications that allow our sales and marketing teams to effectively perform their day-to-day business activities. And these applications are running at the same performance level as—or better than, on a physical box."

vmware®

"We have been very pleased with VMware, and we have experienced absolutely no compromise in performance of our virtualized applications. We are now looking for ways to extend our virtual infrastructure and to take advantage of high availability, resource pooling, and all of the other cool features that VMware brings to the table."

— Stan Dimitrov
   Technical Consultant for
   Hosting and Managed Services,
   Kronos Incorporated

DEPLOYMENT ENVIRONMENT

Datacenter:
- ESX Server running on Dell 6850's & 6950's with EMC CX3-80 SAN
- Guest operating systems: Microsoft Windows Server 2003 (Enterprise and Standard), Windows XP, Windows 2000, Linux
- Virtualized applications: Kronos Workforce Central 6.1, Microsoft Office SharePoint Server 2007, Microsoft SQL Server 2008, MySQL Enterprise Server 5.1, Oracle Database 11g, Oracle Siebel 8.1, Blackberry Enterprise Server v5.0, Citrix, Aprimo, Trillium, and more.

Hosting and Managed Services:
- ESXi running on Dell on Dell 2950's with Dell iSCSI SAN
- Guest operating systems: Microsoft Windows (2000, 2003, 2008)
- Virtualized applications: Kronos Workforce Central (6.0 and 6.1), Microsoft SQL Server (2000, 2005, 2008)

Microsoft SharePoint, one of the key applications for Kronos' order management and customer service teams, is 100 percent virtualized. Moran describes Kronos' virtual SharePoint environment: "We have a large deployment of SharePoint sites that we use for storing collaborative project and development information, as well as for tracking work tasks. We have also customized SharePoint for our order management and customer services folks, who use it as a tool for workflow. Their jobs rely heavily on SharePoint, and, fortunately, VMware ensures stability and reliability across the board."

Kronos' Citrix also reaps the benefits of virtualization on VMware. "Our entire Citrix environment is virtualized on VMware—20 virtual machines with 20 to 30 users per machine. Various applications run on Citrix, including Microsoft Dynamics GP, Wallchart, ClarifyCRM, OnTrack, and Centra," Moran comments. "Our education services group uses Centra for online training. We're very excited about the possibilities of VMware-supported online training, in general, because it's lower cost and provides a lot of flexibility."

In addition to the aforementioned virtualized applications and databases, Kronos has virtualized the latest release of its proprietary workforce management software. "Kronos Workforce Central 6.1, our latest release, is already supported for our customers in a virtual environment," explains Moran. "So, internally, we upgraded our 6.0 version to 6.1 and virtualized the environment."

VMware in Hosting and Managed Services: Facilitating Training, Testing, and Development

Kronos created its Hosting and Managed Services group in 2006, in response to customer requests for a single-point provider of applications, hosting, and IT management. Historically, Kronos sold licenses for its workforce management software to customers, who would then deploy the software on premise. Over the past several years, however, the trend has been to use hosting centers to build and maintain these applications. Kronos originally partnered with third-party hosting vendors who worked directly with Kronos customers. However, customers eventually became frustrated with the triangulation between hosting provider, application provider, and internal IT.

As a single-point provider, Hosting and Managed Services provides the IT function for the Kronos applications on behalf of its clients. Tom Champine, Director of Hosting and Managed Services, explains his team's role: "We know how much resource to assemble, and we're good at managing and supporting and patching and upgrading our applications, because that's all we do. Often the client doesn't have the project resources or the budget to provide the infrastructure. So by offering hosting services, we effectively neutralize these challenges."

To accommodate its growing hosting infrastructure, Kronos Hosting and Managed Services recently turned to VMware for server consolidation solutions. Stan Dimitrov, Technical Consultant for Hosting and Managed Services, recalls, "About seven months ago, we set up a few ESXi servers and packed them with full-blown systems installed with Kronos applications, such as Workforce Timekeeper, Scheduler, and HR. We have been very pleased with VMware, and we have experienced absolutely no compromise in performance of our virtualized applications. We are now looking for ways to extend our virtual infrastructure and to take advantage of high availability, resource pooling, and all of the other cool features that VMware brings to the table."

Since implementing virtualization, Kronos Hosting and Managed Services has deployed approximately 60 virtual machines for various purposes, including staging platforms for the Kronos Implementation team; demo servers for Kronos Sales and Marketing; production, development, and test systems for customers; and lab environments for testing and evaluating new products, third party software, and updates and service

packs. An additional 60 virtual machines will be deployed in short order for an upcoming project involving testing of new software. All this is made possible thanks to significant reduction in server provisioning time and ability to maximize utilization of servers.

Champine describes this new project, for which his team is building a staging environment for client testing and evaluation of release candidates for Kronos version 6.2. "Our applications development team needs clients to test drive and comment on various release candidates. So Hosting and Managed Services is leveraging VMware to provide a virtual staging platform that allows customers to access the software over the internet to a virtual machine image, without having to provide the actual system. We've found an effective way to bring our developers and our customers together, which is not an easy feat, and it has resulted in better customer satisfaction."

VMware plays an important role in pre-sales activities, as well, by enabling Hosting and Managed Services to provide virtual demo databases to prospective customers. "The virtualized demo software replicates the user experience, so our clients can see and experience exactly what they're going to get," explains Champine. "It's much easier to see the benefits of our Workforce Management solution when the customer has access to this sort of tool, and VMware allows us to provide it to them for effectively no cost."

Kronos also provides its Hosting and Managed Services clients with bridging solutions, or virtual machine images that clients can use while their systems are being built. According to Champine, using virtual machines to bridge the gap between sales and implementation solved a big problem. "There used to be a long delay between selling the solution and building it out. Meanwhile, our technical consultants, whose job is to provide training to our customers, would be idle until a system was ready to be implemented at the customer site. Thanks to VMware, we can now provide customers with a virtual machine instance, which they can use for training while their system is being built. This allows the project to proceed and keeps our customers happy." Even in situations where customers are not ready to deploy Kronos at their own datacenters, VMware Infrastructure is leveraged to bridge the gap. "We had a customer who purchased Kronos software but their datacenter was still being built. We decided to provide them with a temporary hosted system where they could deploy and go live with the application. Once the datacenter was built, we simply moved the application over as a virtual appliance with a few simple clicks. It was easy and the customer was happy to get the project off the ground without waiting for their datacenter.

Not only has virtualization enabled Hosting and Managed Services to consolidate servers and to provision virtual machines for development and pre- and post-sales services, it has also given Kronos a competitive edge. "When we talk to prospective clients and let them know that their application will be in a virtual environment, most of them are very comfortable and very happy, because they know that we can create high availability," comments Champine. "In addition, we've been able to drop the total cost of ownership for our services with VMware and this has really allowed us to be more competitive."

Increasing Market Penetration by Reducing Hardware, Manpower, and Energy Costs

Virtualization has benefited both the datacenter and Hosting and Managed Services in innumerable ways, some shared and some unique. Through features such as Memory Overcommit and High Availability, as well as tools like cloning and snapshots, VMware has facilitated IT administration, improved application and database performance, minimized downtime, and dramatically lowered energy and server hardware costs.

One of the most widespread and significant virtualization benefits is VMware's rapid server provisioning. Moran comments, "With the ease of provisioning virtual servers,

"Our application administrators absolutely love the ability to clone an entire system, because it makes them feel more at ease. Many of our business groups also use clones and snapshots for deploying patches. It's so easy—they just create a snapshot, deploy the patch, and, if it works, they apply it. If it doesn't, they simply roll back to the snapshot. Cloning and snapshots have significantly improved the way that we perform upgrades, deploy patches, and roll out test environments."

— Michael Moran
    Senior IT Systems Manager,
    Kronos Incorporated

there are all kinds of things that we can do in the virtual space, and we can do them in minutes as opposed to hours. For example, we can build a machine that used to take 4 to 6 weeks in 4 to 6 hours. In a critical situation, we can even do it in 15 minutes."

Likewise, for Hosting and Managed Services, the simplicity of deploying new virtual machine images is key. "With a physical server, you have to rack it, install the new OS, set up the server for remote access, go back to the office, get on the remote desktop, and install the rest of the applications," says Dimitrov. "With VMware, you create a new image, connect to the VMware host, and you're done."

Dimitrov also appreciates the ease with which VMware handles allocating resources and setting up failover redundancy. He explains, "VMware makes allocating resources such as memory and disk space much easier. For example, increasing memory on a physical server requires a physical change, whereas on a virtual server we can simply change a setting. Similarly, we can provide redundancy at the OS level by copying the virtual machine image to multiple hosts or auto-provisioning hosts to fail over between machines. So, instead of taking hours or even days to restore a server, we can restore a virtual server within minutes and with practically no downtime to users."

VMware's snapshot and cloning capabilities provide Kronos with incomparable flexibility and recoverability. "Our application administrators absolutely love the ability to clone an entire system, because it makes them feel more at ease," says Moran. "Many of our business groups also use clones and snapshots for deploying patches. It's so easy—they just create a snapshot, deploy the patch, and, if it works, they apply it. If it doesn't, they simply roll back to the snapshot. Cloning and snapshots have significantly improved the way that we perform upgrades, deploy patches, and roll out test environments."

Another valuable VMware feature is "memory overcommit," which has allowed Kronos to achieve high virtual machine density. Moran explains, "Using memory overcommit, we can share resources across multiple virtual machines. For instance, we have some requests from folks who say they need 4GB of RAM per machine, but we know they use less than 1GB. So we build them four or five machines that are overcommitted from the host perspective, knowing that VMware will share those common piles of memory with other virtual machines that need access to it. This allows us to consolidate high numbers of machines onto one host. We've packed as many as 42 to 49 virtual machines on one ESX server host." Moran also draws the connection between higher virtual machine density and lower total cost of ownership. "With features like memory overcommit, we are able to achieve greater savings and to have a lower cost per application, because we can put more virtual machines onto each ESX host."

By consolidating physical hardware in the datacenter, Kronos has significantly reduced energy costs. According to Moran, "Power consumption in the datacenter decreased by 20 percent as a result of implementing VMware. The reduction in energy costs has allowed Kronos to bring new technologies online to support business activities. Even with all of the new datacenter growth, we're still seeing a 12 to 15 percent drop in energy costs, which is outstanding."

Kronos Hosting and Managed Services has also dramatically reduced power consumption since implementing VMware. Dimitrov comments, "We haven't performed any official calculations of energy costs, but we are definitely seeing savings." In addition to energy savings, Hosting and Managed Services significantly decreased hardware costs, such as server racks, cables, and network equipment, and eliminated the manpower required to provision, set up, and maintain this hardware.

As a result of the myriad virtualization benefits, VMware has enabled Kronos to regain control over its unsustainable datacenter growth, which, in turn, has allowed the company

to focus resources on more strategic goals. Virtualization has also contributed to increased market penetration. Champine recalls, "Before virtualization, our market prices were higher, because we weren't getting as much utilization out of any given server. Higher pricing leads to lower transaction closing rates and decreased market penetration. Since implementing VMware, we have lowered our prices and increased our market penetration by increasing utilization of existing hardware to 80 percent, up from 5 to 15 percent. That's an enormous improvement."

Expanding the Virtual Landscape

Future plans for VMware at Kronos are wide-ranging, with many plans already in action. For example, Kronos is currently testing VMware View and intends to go live with virtualized desktops in the near future. Kronos is also actively investigating VMware vCenter Site Recovery Manager for failover and automation of the virtual environments in its corporate datacenter.

For Kronos Hosting and Managed Services, the next step is to virtualize 80 to 90 percent of all hosting infrastructure. Additionally, Hosting and Managed Services' future plans include implementing VMware vSphere™ 4 and providing disaster recovery services to its clients by replicating data in real time.

Results

• Virtualized 85 to 90 percent of corporate production environment, including applications such as Kronos Workforce Central, Microsoft SharePoint Server, Microsoft SQL Server, Oracle Database, Siebel, Blackberry Enterprise Server, Citrix XenApp, Aprimo, and Trillium

• Achieved average consolidation ratio of 16:1 in corporate datacenter

• Decreased power consumption by 20 percent in corporate datacenter

• Increased utilization of existing hardware by approximately 75 percent in Hosting and Managed Services datacenter

• Reduced server provisioning time from 4 to 6 weeks to 4 to 6 hours

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