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— Tuan Ngo  
Director, Worldwide Network Operations Group, Hay Group

#### KEY HIGHLIGHTS

##### Challenge

Vastly improve IT services across a global network while cutting spending dramatically.

##### Solution

Use VMware® technology to improve the availability of vital applications while paring costs to the tune of roughly \$2.3 million—and moving towards a cloud infrastructure for even greater efficiencies.

## Hay Group

As a global management-consulting firm with 85 locations in 47 countries, Hay Group's lifeblood is its IT infrastructure. It's used to gather data, collaborate on projects, and disseminate reports to colleagues and clients around the globe – making change happen and helping people and organizations realize their potential. To ensure the availability and enhance the performance of its vital applications and databases, Hay Group is upgrading its infrastructure with VMware technology.

The results have been so impressive that the firm continues to expand its virtualized environment while shrinking its physical one. Today, its primary datacenter is 100 percent virtualized on VMware vSphere 4 and plans are underway to also virtualize Hay Group's e-hosting facility, remote offices, and disaster recovery site.

Hay Group started down the path to virtualization in December 2006, primarily to save money through server consolidation. “We'd added a lot of physical servers to meet user and business demand,” explains Tuan Ngo, director of the Worldwide Network Operations Group. “That dramatically increased the amount of power and floor space we were using. I decided that virtualizing our datacenter with VMware Infrastructure would help us get costs back under control.”

The migration to VMware software was also driven by a desire to centralize key applications—including the ones that made up Hay Group's communications infrastructure—to improve availability, manageability and performance. “We used to have various stand-alone mail servers in about 60 locations around the world, and we had to hire people to manage and maintain those servers,” Ngo says. “We wanted to move all that to one Microsoft Exchange platform, which would reach all those countries yet be centrally managed here at headquarters.” During the migration, Hay Group used VMware Infrastructure to virtualize about two-thirds of its 3,000 Exchange Server 2003 mailboxes, and Ngo estimates that the Exchange implementation will be completely virtualized by the end of the year.

The benefits from Hay Group's savvy deployment of VMware Infrastructure are dramatic. “By virtualizing our datacenter with VMware, we've probably saved about \$2 million so far because we're not buying more physical hardware,” Ngo reports. “And I'm not sure about how to put a dollar amount on some of the business processes that VMware technology has allowed us to re-engineer—and make far more efficient.”

He cites the example of a recently opened office in India. “Instead of buying and setting up a new data structure for our new Indian office, we just set up VMware virtual machines in our central datacenter so the whole team can connect back to headquarters for their IT service. Not having to set up new infrastructure also saved us from hiring additional support staff to manage it. When you factor in efficiencies like that, the figure we've saved with VMware would be very significant,” Ngo says.

“You have to also consider the operational expenses we're saving,” adds Ngo. “The IT staff can do so much more in a shorter amount of time because VMware simplifies virtual machine management. So they can spend less time on routine tasks and more time on strategic initiatives for the organization.”

## VMWARE AT WORK

- VMware vSphere 4™ Enterprise Plus, featuring:
- VMware® ESX™
- VMware ESXi and VMware ESX (deployment-time choice)
- VMware vStorage VMFS
- Eight-way virtual SMP
- VMware vCenter Server Agent
- VMware vStorage APIs / VCB
- VMware vCenter Update Manager
- VMware HA
- VMware vStorage Thin Provisioning
- VMware VMotion
- VMware Hot Add
- VMware Fault Tolerance
- VMware Data Recovery
- VMware vShield Zones
- VMware Storage VMotion
- VMware DRS
- VMware DPM
- VMware vNetwork Distributed Switch
- VMware Host Profiles
- VMware vCenter Server

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Just as important as cutting costs is improving client services, and VMware technology has had a dramatic impact in that area as well. “Client reports are a key part of Hay Group’s business,” he points out. “We used to take a day or two to send out a thousand reports, but thanks to VMware, we can send out twice as many overnight.”

To build on these successes, Hay Group has implemented a VMware-first policy. “My approach is simple: we don’t add physical hardware,” Ngo says. “If we add a server, it has to be a VMware virtual machine. We run everything on VMware. Our main data-center is 100 percent Virtualized on VMware vSphere 4. Our virtual infrastructure is a total success story for Hay Group, and we want to continue to build on that success by extending the benefits of VMware out to all our remote offices.”

## Souping up SharePoint

Microsoft SharePoint Server 2003, used to collaborate on client projects and keep track of data and documents, is a key piece of Hay Group’s information arsenal. Because of logistical and staffing constraints, SharePoint was initially only available to U.S. employees. When Ngo started running it on VMware Infrastructure in 2007, SharePoint became more reliable and easier to manage—and the virtualized infrastructure let him expand the implementation around the globe.

“We now operate 24/7,” Ngo reports. “Without VMware technology, there’s no way we could offer clients and customers that kind of service without spending lots of money—for instance, we’d have to run and staff three shifts to cover all the time zones. Now we have a centralized global SharePoint portal for company information and financial data that’s used by all our 3,000 or so employees in 85 locations.”

That centralized SharePoint implementation runs on 21 VMware virtual machines housed on a cluster of 14 HP 385 G2 servers. And thanks to VMware tools, the reliability of SharePoint has increased. “Hardware will break down at some stage, and if we are tied to just one physical server, we could have major problems that would disrupt SharePoint, especially if a server went down at night,” Ngo says. “But if a physical server goes down in a VMware cluster, VMware High Availability automatically moves the virtual machines to another physical server.”

“We’re fully utilizing VMware tools like Distributed Resource Scheduler (DRS), VMotion and Storage VMotion at their maximum levels, and that’s working out great for us,” he adds. “When we first set it up, we used manual control of VMotion. Then, as we moved through the project and learned a few things, I decided to make it automatic. I know that I can trust VMware Infrastructure to manage workloads automatically and seamlessly. It works—or I wouldn’t be here. It works every time.”

## Virtualizing More Mission-Critical Applications

Another vital application that Hay Group entrusts to VMware is Microsoft SQL Server. The implementation, which is almost completely virtualized, runs on 30 physical servers. The size of the largest database varies from roughly 200GB to 500GB and I/O rates are high— Despite the application’s demands, Ngo has no problems to report: “SQL’s performance on ESX has been excellent,” he says. “I have absolutely no complaints.”

And Ngo’s colleagues throughout Hay Group aren’t complaining either. “There was some concern that performance would suffer if we virtualized SQL, but we were able to go back to the business units once it was running on ESX and they report that it actually runs faster than before,” he says. “I’ve been able to do that with just about everything we’ve virtualized. Once you can prove that VMware virtualization technology works—and makes applications run better—believe me, business units are happy to follow along with the program.”

## DEPLOYMENT ENVIRONMENT

- ESX running on 35 HP and Fujitsu servers connected to 3 Fujitsu SANs
- Operating systems: , Microsoft Windows Server 2000 and 2003, Windows Server 2008, Microsoft Windows XP, Microsoft Vista
- Mission-critical applications running in production in virtual machines: Microsoft Office SharePoint Server (2003, 2007), Microsoft SQL Server (2000, 2005, 2008), Microsoft Exchange Server, IBM Lotus Notes, IBM Lotus Domino, Microsoft Live Communications Server, Blackberry Enterprise Server (BES), ADP Server, HR & Finance and Accounting Servers, WebMethods/Software AG, Actuate, Global Remote Access authentication server.

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Another benefit that makes Hay Group’s business units happy is the faster server provisioning enabled by VMware Infrastructure. “The improvement is phenomenal,” Ngo reports. “Our server-procurement process used to take at least a month, often more like two months. Now we can configure a new virtual server guaranteed within three business days. That helps us keep up with demands of our business units and clients—and deliver the products that they need much faster. We could leverage VMware technology to configure a new virtual server in an hour or two, but based on our workload, the guaranteed SLA I can provide to my internal clients is within three business days.”

## VMware vSphere 4 and Plans for the Future

Most recently, Hay Group executed an ambitious project to upgrade their entire infrastructure to VMware vSphere 4. The industry’s first cloud operating system, vSphere turns virtualized IT infrastructures into a private cloud—a collection of internal clouds that connect to external clouds if and when the need arises. “Our primary datacenter is now 100 percent virtualized on vSphere 4. The upgrade went very smoothly and we are already beginning to take advantage of some of the exciting new features such as Fault Tolerance, vShield Zones, vStorage Thin Provisioning and Host Profiles. We are especially excited about Fault Tolerance because it will ensure zero downtime and zero data loss for applications most critical to the business.” Ngo says. “Cloud computing is something that everybody is talking about, but we’re doing more than talking. We are taking steps to achieve a self-provisioning datacenter, an internal cloud running on vSphere 4 where users can get access to the infrastructure and provision servers as needed and then extend our cloud by leveraging VMware vCloud providers, tapping into additional computing resources when we need them. For instance, if our business processes require additional resources, but only require them every 30 days, I can just lease those extra resources from a vCloud provider once a month for a day. Working with a VMware vCloud provider means we will have the same reliable VMware platform offsite and we will be able to run our business-critical applications far more dynamically and economically than ever before.”

VMware technology will also serve as the cornerstone of Hay Group’s disaster recovery plans. Early in 2009 Ngo and his team installed and tested SAN-to-SAN replication with VMware Site Recovery Manager and VMware Consolidated Backup at its main data center. When the DR facility that the firm is building at a nearby site is ready, they will move one of the SANs there and add a dozen or so ESX hosts. “That way, if disaster strikes one site, operations will resume seamlessly at the other,” he says. “Ultimately, we’ll have a bi-directional datacenter with two different locations that act as one.”

Plans are also afoot to virtualize one of Hay Group’s key revenue-producing systems, its e-hosting facility. “It currently runs on 66 physical servers, but I’m planning to virtualize it on vSphere 4 before the end of the year,” Ngo reports. Towards that end, he’s currently running VMware Capacity Planner to help design an optimal solution with maximum performance. The infrastructure will run on virtual machines with virtualized storage on a fully virtualized network (including routers, firewalls, load balancers and domain name systems) and have full failover capabilities.

Ngo says that plans to extend the benefits of VMware solutions to Hay Group’s world-wide offices will be fast-tracked if the economy picks up, but even if it doesn’t, lean times are smart times to virtualize. “Here at Hay Group, we’re transforming our business with VMware vSphere 4. This is a perfect time to virtualize, because although you want to be leaner, you also want to position yourself so that when the economy gets better, you can come out strong and be ahead of everybody else,” he observes. “And VMware is helping us do just that.”

## Results

- Drastically reduced hardware and maintenance costs—combined with the benefits of virtualization-enabled business reengineering—add up to roughly \$4 million in savings
- Datacenter is 100 percent virtualized on VMware vSphere 4
- Significantly reduced downtime means impressive savings: about \$500,000 dollars annually
- Power and cooling expenses cut considerably by shutting down six server racks
- Applications like SharePoint and Office Communicator are now available 24/7 at offices around the globe
- Server deployment time cut from about two months to three days
- Overall CPU utilization up from about 4 percent to 60 percent
- Implemented a disaster recovery and business continuity plan at a level impossible without VMware

