U.S. Government Agency Prepares IT Storage for Cloud Service Delivery with VMware Virtual SAN Technology

A departmental headquarters of a U.S. government agency needed to evolve its partially virtualized IT environment into an efficient, low-cost infrastructure-as-a-service platform. Building on its success with VMware vSphere® server virtualization, the IT team virtualized its hardware-based storage tier with VMware Virtual SAN™ technology to reduce capital and administrative costs, simplify management, improve performance, and enhance scalability.

A large agency of the U.S. Federal Government operates a departmental headquarters where 2,000 workers manage life-cycle procurement programs that supply the agency's operations worldwide. The facility's IT group provides all systems, network, applications, and administrative support services. In scope and function the facility is almost indistinguishable from the main offices of a Fortune 50 corporation.

The Challenge

The agency was pursuing a long-term consolidation strategy to close offices, streamline operations, and reduce its geographic footprint, but it had a multitude of costly legacy software applications developed over decades and running in different locations in diverse hardware environments. The goal was to turn the departmental headquarters into an IT consolidation point that would provide centralized hosting, infrastructure as a service, and ongoing support services for applications and developers. To do so, its resident four-man IT team needed to quickly develop its infrastructure into a highly flexible, scalable, and cost-effective cloud service platform.

"We needed to change from a physical, client-server, manual-touch business model to a totally virtualized, cloud-delivered infrastructure-as-a-service model," says the facility's IT director. "That would give us a platform on which we could efficiently automate development operations."

The team's plan was to transform its existing environment in stages. Its starting point was a server environment 95 percent virtualized on the VMware vSphere platform and a small but fast-growing virtual desktop infrastructure based on VMware Horizon® technology. The most pressing issue was a mixed storage tier consisting of network-attached storage (NAS) devices and a hardware-based SAN that was nearing its capacity and performance limits.

"We were already using higher-performance drives to get the speeds we needed," says the IT director. "We saw that we were either going to have to expand our SAN environment significantly or move to a new technology. We were looking for something that would provide very high performance and be cost-effective.

INDUSTRY
U.S. Federal Government

LOCATION
United States

KEY CHALLENGES
- Reduce capital and administrative costs.
- Improve storage performance, manageability, and scalability.
- Evolve the local IT environment as a low-cost platform for cloud-based infrastructure service delivery.

SOLUTION
The IT team replaced the hardware-based storage systems supporting its private cloud and desktop virtualization platforms with the VMware Virtual SAN solution. This has reduced capital and administrative costs, improved performance, and enhanced scalability.

BUSINESS BENEFITS
- Lower capital and operating costs
- Simpler storage scaling and administration
- Better security and compliance

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VMWARE FOOTPRINT
• VMware Virtual SAN
• VMware vSphere
• VMware Horizon
• VMware NSX
• VMware vRealize Suite

APPLICATIONS VIRTUALIZED
• Custom legacy applications

PLATFORM
• Dell PowerEdge R620 servers
• Cisco UCS C240 M3 servers

The Solution

With much of the facility's server infrastructure already virtualized on VMware technologies, the team's search for a new storage solution quickly focused on the radically simple VMware Virtual SAN hyperconverged storage solution for virtual machines. Virtual SAN technology delivers enterprise-class, high-performance storage for virtualized applications, including business-critical applications. Its scale-out architecture uses x86 servers and server-side flash to lower overall storage costs. Its seamless integration with the vSphere platform and the entire VMware product stack makes it a simple storage platform for virtual environments.

The team designed an initial pilot deployment in the cloud to test both the Virtual SAN solution and VMware vRealize™ Automation™ for delivering private cloud resources. This was followed with an on-premises trial in the facility's VMware Horizon–based desktop virtualization environment. With successful outcomes in both pilots, the team began planning a full-scale implementation that would support a new on-premises private cloud and an expanded virtual desktop environment.

For its new production hardware platforms, the team selected two systems that optimize on-board storage. The private cloud environment runs on Dell PowerEdge R620 nodes, each of which can be equipped with up to 10TB of storage in various configurations of Serial Attached SCSI (SAS), Serial ATA (SATA), or solid-state drives (SSD). Cisco UCS C240 M3 servers power the desktop virtualization environment. Each can be configured with up to 12 3.5-inch or 24 2.5-inch drives.

The private cloud environment currently includes an eight-node production cluster hosting 100 virtual machines and 20TB of storage, and a four-node management cluster with 10 virtual machines and 10TB of storage. Production storage is scheduled for an upgrade to 50TB. The desktop virtualization environment, which currently serves 130 users, comprises two four-node clusters and uses the Virtual SAN solution for all storage. Both environments are expected to grow rapidly in coming months.

Business Benefits

The IT director expects the Virtual SAN solution to reduce the facility's storage capital cost by about 33 percent. Adding in the anticipated administrative savings, it may reduce total cost of ownership for the overall IT environment by as much as 50 percent, while improving storage response and application performance. "We can already see our servers performing as many IOPS as our SAN," he says, "and not having to traverse the network makes a huge speed difference."

The facility's IT team has found the Virtual SAN solution easy to deploy and manage. "As long as your hardware is compatible, it's really seamless," the IT director says. "It's also much easier to manage than separate compute and storage platforms, with all the connection issues that can entail. Having everything visible on one pane of glass is a huge improvement."

The migration to virtual storage is also helping the facility prepare for rapid growth as it begins offering infrastructure services to other agency departments. "With Virtual SAN being integrated into the hypervisor, I think it will scale easily," the IT director says. "You just pick up another server and add some drives. This is going to fit our environment perfectly, especially as we start providing private cloud services. When we need to add compute or storage capacity, it will be easy to do."

The new storage platform also helped the facility pass a recent security audit because the VMware vSphere Security Hardening Guide incorporates many virtual infrastructure best practices. "There was no extra preparation to get ready for inspection, as there always was with NAS or SAN storage," the IT director says. "The normal things we do every day in the VMware environment cover most of what we need security wise."

Looking Ahead

The facility is about to upgrade to the VMware Horizon 6 desktop virtualization platform while adding 300 users. Future plans include support for all 2,000 local users. In a concurrent upgrade, the private cloud platform will gain servers and add the VMware NSX® network virtualization platform for the Software-Defined Data Center. New management tools will include the complete VMware vRealize Suite, giving the IT team a platform for delivering cloud-based infrastructure services to other agency operations.

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