



NTIA Reaps Huge Gains in TCO and Productivity With Shift to Virtualization and Network Storage

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The National Telecommunications and Information Administration (NTIA) is a federal agency immersed in some of the most leading-edge technology issues of our time. Yet, a year ago, its own data center was anything but leading edge. With a new CIO in place and committed partners such as StorageHawk and NetApp, however, NTIA was able to completely revamp its infrastructure in less than six months, saving millions of dollars and dramatically increasing productivity. Here's how.



The Challenge

Daniel “Griff” Drew Jr. clearly remembers the sight of NTIA’s data center when he took over as chief information officer at the agency in April 2012. “What I saw was a sea of red and amber lights,” Griff recalls.

There were more than 130 servers, over 70% of which were more than five years old and approximately 90% of which no longer had maintenance contracts. There were servers that were broken and just sitting idle, serving no purpose other than to take up valuable space and electricity. There was neither redundant power nor redundant network connections. Storage? All storage was local to each server. Virtualization? Not much, aside from a few pet projects here and there.

As the new CIO of a federal agency immersed in some of the most critical, leading-edge technology issues facing the country, Griff knew he had to take action — and quickly. NTIA is responsible for, among other things, allocating and managing the federal use of wireless spectrum across the U.S., and for developing federal policy related to the Internet economy. The agency is located within the Department of Commerce, and Griff’s IT department is responsible for approximately 300 internal users as well as more than 400 spectrum customers in agencies outside of the Commerce Department.

Adding even more pressure and urgency to the situation: The Commerce Department was conducting its own consolidation as part of the Federal Data Center Consolidation Initiative. There was no reason to move any of the old infrastructure into the gleaming new data center. Eleven racks had been set aside for NTIA. Griff decided that the new infrastructure would be stood up in the consolidated Commerce Department data center. While his team would still purchase and manage NTIA’s technology, it would now be a part of a much larger data center within the Commerce Department.

“We knew we had to go to the market, engage with vendors and do a technical analysis,” Griff says. “We had to look at compute, storage and virtualization technology. The goal was to do a fresh review of all the technology.” The process started in May 2012, less than six weeks after Griff began working at NTIA.

The Solution

Fast-forward a year and the sight Griff sees now is radically different. The sea of red and amber lights has been replaced by a deployment that is a model of efficiency and state-of-the-art technology. The old data center is gone, and NTIA’s operations are consolidated within the Commerce Department’s data center. Does NTIA use the 11 racks that were set aside for it? Not a chance. It only requires two racks. The 130-plus servers? Gone, replaced by 18 Fujitsu blade servers in the production facility, plus another 18 in a second data center for disaster recovery. Virtualization? The entire server environment is now more than 90% virtualized, using VMware vSphere technology.



Underlying the success of every component within NTIA's technology initiative is a completely new storage infrastructure built on network storage from NetApp, incorporating both storage area network (SAN) and network-attached storage (NAS) solutions. Choosing the right storage solution was a particularly critical aspect of the deployment for a number of reasons:

- **Replication:** As a federal CIO, Griff was concerned about availability and continuity. NTIA also has secure and unsecure missions, so the agency needed two networks: one for secure operations and the other for the continuity facility. Griff wanted to implement technology that would provide seamless integration between the two sites. The storage solution for the continuing operations network (COOP) had to replicate and mirror the one for the secure operations network, and it had to be fully capable of running all operations if the main production system went down.
- **Network Storage:** NTIA hadn't used networked storage in its previous deployment, but moving to a virtualized environment required a completely new approach. Griff didn't want local disk at all, not even for the boot process. In order to support the server consolidation as well as the shift to VMware, NTIA needed a solution that offered a truly unified operating environment that was simple to manage and simple to incorporate across both the production and COOP systems.
- **Disk Backup:** The backup situation had to be fixed. NTIA was using tape with a lot of manual processes. Backups were taking more than 21 hours and the agency was doing backups every day. Even worse, Griff and his team couldn't even identify how much data was being backed up. During the process of replacing the backup system, they discovered that they were backing up only about 48% of the servers. "It's a good thing there wasn't a disaster," Griff says now. "I didn't sleep for the first few months."

NTIA now deploys the NetApp FAS2000 Series on the secure missions network and the NetApp FAS3000 series on the standard network, both replicated to the COOP site. Combined, the systems support about 200 TB of storage, with a mix of SAS and SATA drives, plus some NetApp flash to boost performance. The backup system is now 100% disk-based, using SATA drives. Most backup activity is with NetApp utilities, SnapManager and SnapVault. CommVault is used to fill in the gaps.

One of the big advantages of working with NetApp has been the truly unified storage platform. NTIA is able to manage the entire storage environment with a single set of tools for SAN, NAS, backup, recovery and replication, whereas competitive solutions would have required multiple systems/operating environments and storage management utilities.

The Process

So how was NTIA able to move from the sea of red and amber lights to today's modern environment so quickly and successfully? One of the smartest things Griff did was to engage StorageHawk as a technology partner early in the process. StorageHawk is a systems integrator that specializes in technology deployments for all verticals within the federal government.



Griff initially brought in a number of potential partners to help with the evaluation and research, but he quickly chose StorageHawk because it was clearly intrigued by the challenge, had the experience and expertise Griff was looking for and had the vendor-agnostic approach that he desired.

“We were involved in the entire deployment,” says Daniel Furth, vice president at StorageHawk. “Because we work with a large number of vendors, we were able to focus on best practices and best-of-breed technology. We knew that ease of management was critical, as well as integration across the networks. We were able to hit on all of the hot buttons that were important.”

One of the big differences in StorageHawk’s approach was its willingness to look at solutions from multiple suppliers. StorageHawk coordinated and led several multivendor roundtables, with each vendor participating in the discussion and having input on the overall design and architecture, without any assurance of a procurement. This well-managed multivendor approach moved things forward very quickly, but in a way that gave confidence to the whole team at NTIA. “Other integrators we brought in were not interested in this approach because they wanted us to pre-decide on specific vendors as well as technology,” Griff recalls.

This was apparent in how NTIA and StorageHawk chose NetApp for storage. At first, Griff was predisposed to not use NetApp. Six years earlier, he had deployed NetApp solutions at another agency and he thought that the technology might be dated. This was clearly not the case, of course, and after reviewing a wide range of competitive solutions, it was obvious to the teams at NTIA and StorageHawk that NetApp was by far the best solution for NTIA’s deployment.

“To get the advanced capability we have gotten with NetApp, with any other vendor we would have had to install multiple pieces of equipment and manage it in multiple different ways,” Griff says. “This was the best option for performance, size and scope, and for handling everything right out of the box.”

The Results

The impact of the new compute and storage environment has been dramatic. “When I got here, we had things going down every week,” Griff recalls. “All of our consolidated file share locations were on a single nonredundant Windows file server that crashed routinely. Then we did the migration, and all of a sudden our users were commenting about how everything was much faster and there were no more outages.”

Griff says a cost analysis showed that NTIA would save \$2.8 million over a five-year period by installing the new system and not going through the process of maintaining, upgrading and expanding the old system. “That’s about the break-even point for the cost of the project,” he says, noting that his cost analysis even includes funding for a technology refresh for the new systems.

And those are just the hard costs of the hardware and software. Griff estimates there will be an additional \$1.6 million in operational cost savings over the five-year period, with much less time spent on tasks such as provisioning new devices, managing existing devices and doing repairs. And that’s not even counting user productivity gains enabled by the new system.



“It used to be that if you needed a server around here, it would take two weeks or two months,” Griff says. “Now we tell people, you’ll have it in two days. At first they didn’t believe us. Now they smile when we tell them.”

Backup is another area of dramatic progress. Backups are taking less than an hour, and a full replication to the backup site is taking less than six hours. When the project started, Griff says one of his goals was to be able to back up 100% of the data to the COOP facility multiple times a day. His bosses were skeptical and gave him well more than a year to put that capability in place. It was completed in a three-month period, before the end of 2012.

“We now have a true highly available environment where we can pull out multiple cables and it doesn’t impact the availability of any of the systems at our local data center,” Griff says. “We got rid of managing tapes — we are now 100% backed up and replicated in an operable state and archived for longtime storage at a remote facility. We now have a modern platform with full visibility into all servers at any time. We can remotely restart every server in 30 seconds, and we can replicate items from the production server to a sandbox or to a true clone in the test environment. And we’ve more than covered our costs over a five-year period.”

One of Griff’s favorite moments was seeing hundreds of pieces of old computer equipment stacked outside the data center on its way to being sent out for use as surplus and old parts, the faded remnants of a once brilliant sea of red and amber lights. As Griff and his operations manager saw the scene, they couldn’t help but remark how far they had come in such a short period of time, thanks to their own vision and persistence along with the efforts of key partners such as StorageHawk and NetApp.