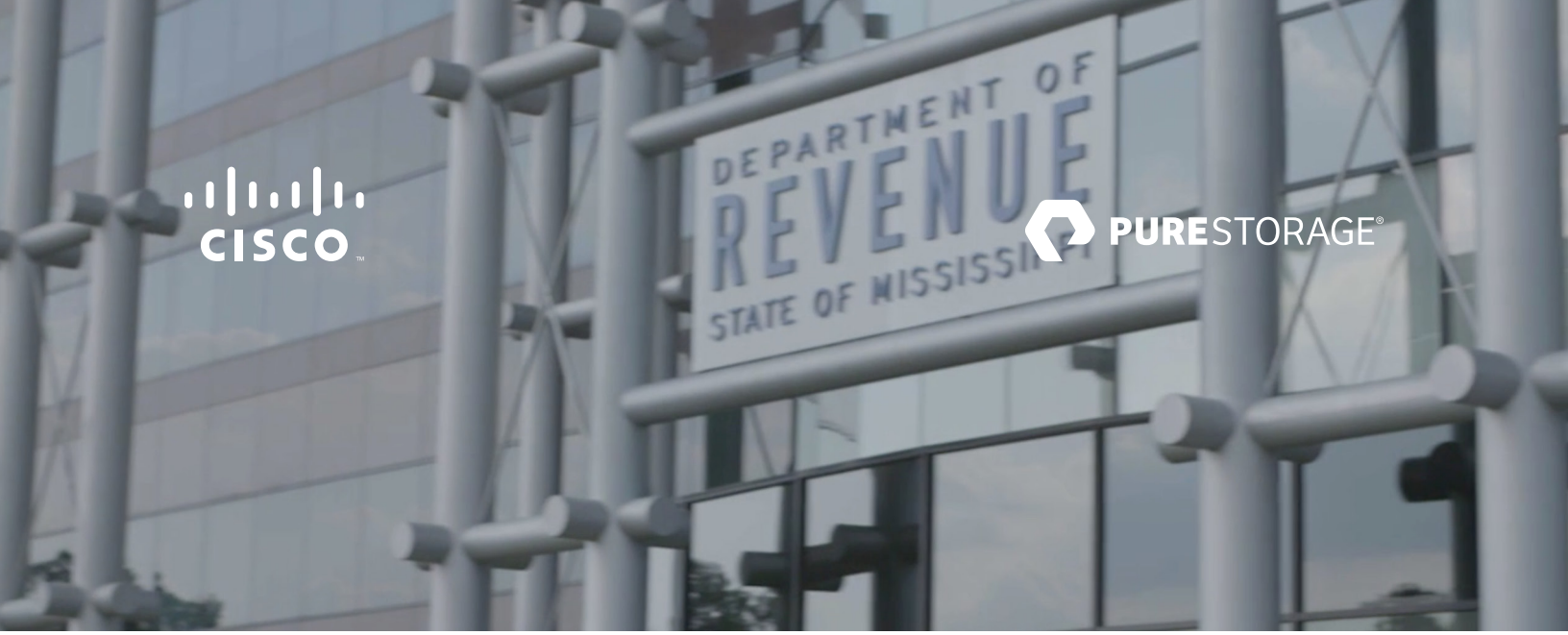


CISCO

PURESTORAGE®

CASESTUDY

MISSISSIPPI DEPARTMENT OF REVENUE

Location

North America

Industry

State Government

Company

Mississippi Department of Revenue

Use Case

- *Database – Microsoft® SQL Server®*

Business Transformation

The department is assured of a durable, thoroughly tested and certified converged infrastructure on which to run critical new applications, with exceptional ease of deployment and management, and a highly attractive long-term total cost of ownership.

Challenges

- Frequent downtime resulted in unpredictable availability of citizen-facing websites and employee productivity tools.
- Next-generation revenue systems required higher storage performance to produce the results desired for constituents and state employees.

IT Transformation

- Database transaction performance improved by as much as 20x.
- Data reduction rates of up to 9:1 sharply improve TCO and dramatically reduce data center footprint.

FlashStack

FlashStack™ Converged Infrastructure Provides Relief to the Mississippi Department of Revenue

The Mississippi Department of Revenue knows how to collect and distribute money very efficiently. But occasionally it must spend precious capital on its own needs. And when that happens, it wants the best return on its investment.

"Our approach — which is supported by management — is that you invest in making sure the end-user experience is as smooth and easy as possible," observed Patrick Welch, Network Services Manager for the Department of Revenue (DOR). The end-users Welch alludes to include department employees as well as Mississippi citizens. The DOR collects and distributes revenues from all the state's tax sources, including levies on income, sales, alcohol, tobacco, oil and gas, and motor vehicles — totaling more than $7.8 billion a year.

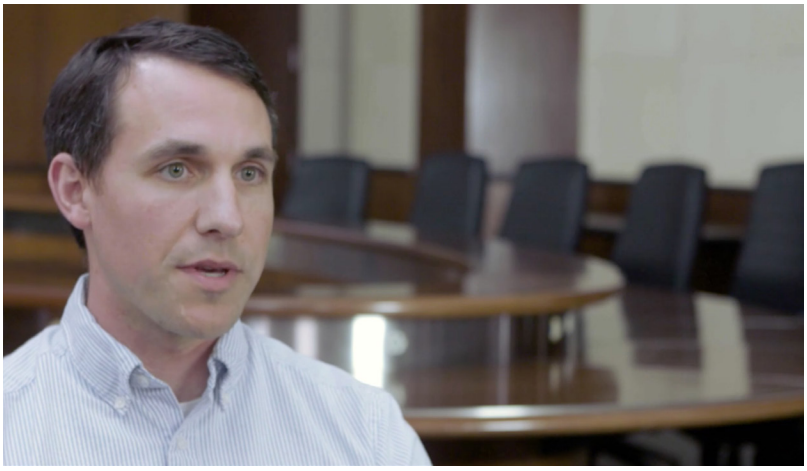
"From an internal perspective, you want employees to be as efficient as possible. And from the taxpayer perspective, you want them to be able to access tax records and information through our website as easily as possible," Welch noted.

That hasn't always been the case. "We have seen what happens when you spend the least amount of funds available," Welch observed. "Our internal user experience for several years was poor, due to hardware that was inadequate in its capabilities and imposed unnecessarily heavy management demands on the IT staff."

To remedy the performance problems, the department's IT staff has chosen to deploy FlashStack converged-infrastructure solutions. FlashStack configurations include all-flash storage arrays from Pure Storage, UCS servers and Nexus switches from Cisco Systems, and server-virtualization software from VMware — all in

"When the whole IT team met to decide on storage vendor, everybody said Pure Storage."

PATRICK WELCH
Network Services Manager



a single platform that is simple to design, deploy, expand and manage. Using reference designs approved and pre-tested by Pure and Cisco, the DOR's configurations were architected by Venture Technologies, the department's system-integration partner.

Accelerating the Development of Critical New Applications

The decision to install FlashStack configurations — both at the main data center in Jackson and at a remote disaster recovery site — were made to support two strategic additions to the DOR's technology platform.

"The fact that Pure Storage has partnered with Cisco and built a reference architecture around UCS made us very comfortable."

PATRICK WELCH
Network Services Manager

One is MARS (Mississippi Automated Revenue System), which replaced multiple computer systems with a single integrated system, and MARVIN (Mississippi Automated Registration Vehicle Information Network), which will give vehicle owners a vastly improved way to access information and perform transactions when it is implemented in the Fall of 2017. "When the MARS and MARVIN projects came along and I found out my department would be responsible for these applications, I wanted to make sure we had the right product," said Welch.

The DOR had prior experience with a converged infrastructure, but the storage component delivered inadequate performance, was very complex to manage, and was very costly to expand. Venture Technologies recommended the FlashStack solution because it seamlessly integrated the superior performance of Pure Storage arrays with the Cisco UCS servers and VMware vSphere virtualization software, which the DOR was already using. "We've been a UCS customer for seven years, and we've been super-impressed with it as a server platform," Welch said. "We had known about Pure for a while and really liked the technology. So the fact that Pure has partnered with Cisco and built a reference architecture around UCS made us very comfortable."

Welch said that when he brought the IT team's recommendation to senior management, he presented the choice of FlashStack in the context of long-term return on investment. "I know these are applications that we will have to support for a long, long time," he noted. "The solution we picked was a little more expensive than some alternatives in the short term. But the way Pure Storage has redefined customer support and introduced a revolutionary new business model for mass storage, the long-term total cost of ownership makes it a clear choice."

Contributing heavily to FlashStack's attractive TCO are the

deduplication and compression features of the Pure Storage array. Welch said the DOR is achieving data-reduction rates of 3:1 on its encrypted SQL Server databases and 9:1 on normal workloads. This greatly reduces data-center space requirements and operating costs, as well as offering more-than-adequate room to accommodate additional workloads in the future.

Performance More Than Doubles on Critical Applications

The DOR is in the process of migrating the existing MARS application onto a FlashStack configuration, and is testing the new MARVIN application on the converged infrastructure as well.

> *"We have thrown everything we could at the Pure Storage array and it has never broken a sweat."*
>
> **PATRICK WELCH**
> Network Services Manager

Early testing has shown dramatic increases in performance.

"Pure Storage is absolutely smoking our SQL transactions compared to what we had deployed before," Welch reported. "MARS and MARVIN are highly transactional, and we are seeing improvements of 150% or more in these transactions. Previously, we were seeing IOPS in the low thousands. On Pure, we're seeing as high as 260,000 IOPS."

He added, "Night-and-day isn't even an apt comparison."

Welch said that during benchmark testing, "we have thrown everything we could at the Pure Storage array and it has never broken a sweat. I have no concerns about putting any workload on it. I sleep well knowing we have best-in-class equipment in the data center with Pure and Cisco. The performance just blows everything else out of the water."

While Mississippi citizens will see the benefit of the FlashStack implementation through better-performing websites, Welch said the biggest benefit so far has been in the sharply reduced number of hours the IT staff spends managing storage. "The staff always was working on something. You could count on a cluster breaking two or three times a week, and those had to be fixed no matter the time or the day. But Pure Storage makes it so easy. I used to spend my time micro-managing storage, and now I don't have to do anything like that. I have so much extra time during my day."

Zerto Delivers Complete Business Continuity Solution

Business continuity is essential for the DOR, and the department has adopted Virtual Replication from Zerto as its solution. Virtual Replication for SQL Server enables robust, enterprise-class business continuity and disaster recovery that delivers Recovery Point Objectives (RPOs) of seconds and Recovery Time Objectives (RTOs) of minutes, plus advanced features for protecting highly transactional databases.

No complex application integration is required for Zerto Virtual Replication, because all the replication is accomplished through the hypervisor.

"We use Zerto to replicate all our VMs from our main data center to our co-location data center," Welch noted. "Using Zerto with Pure Storage is as effortless as using Pure itself. It's just been seamless."

Simplified Management Eases Workload

Welch praises the effortless management of the Pure Storage array in the FlashStack configuration. "Things I used to spend days on before are now reduced to minutes," Welch observed. "There were months with our old system that we couldn't add even 10GB to a drive on our servers because the SAN just couldn't take it. But now, in just 10 minutes we can add a data pack that adds 10TB of availability, and that's before de-dupe and compression."

Part of the attraction of a converged infrastructure is the seamless integration between the various components, something Welch has witnessed firsthand. "The integration between Pure Storage and vSphere has been very smooth. It's very easy to create and assign data stores in vCenter. Pure has very deep integration with VMware, and we are taking full advantage of that."

The Pure1™ management application also has won Welch's favor. "It has just been invaluable," he noted. "The ability to see all our storage resources and key metrics right on your smartphone is amazing. I have never seen anything like it."

Looking back at the DOR's previous storage infrastructure, Welch recalled, "There were times I've been in the data center at 3 a.m. with the SAN taken apart and storage processors in my hand, and I don't ever want to go back to those days. If you want to keep your job, FlashStack is the kind of thing you buy."

Products and Services

Unified Computing FlashStack Converged Infrastructure:

- *Cisco® UCS® servers*
- *Pure Storage FlashArray*
- *VMware vSphere*

Cisco Networking and Security Solutions:

- *Cisco Nexus switches*

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