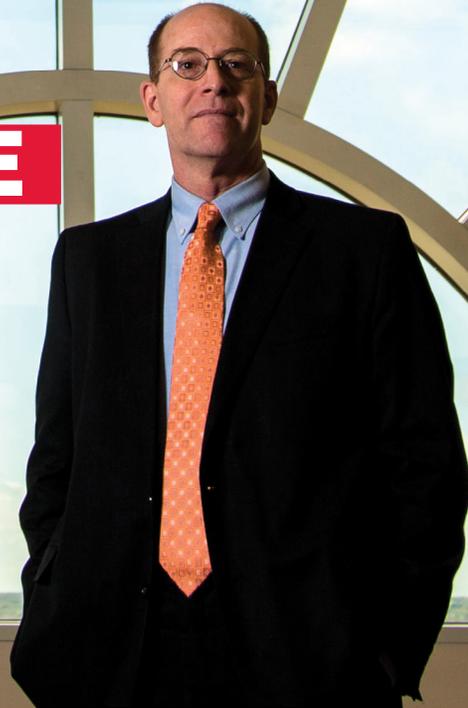# THE CASE FOR AN OPTIMIZED AND VIRTUALIZED I.T. INFRASTRUCTURE

"In a lot of ways, they are like an extension of our IT department. It's almost like having more staff," Reinhart IT Director Jerry Bishop says.

Learn how law firm Reinhart Boerner Van Deuren updated its back–office environment and enhanced desktop virtualization performance and data protection.

At a Glance

ORGANIZATION: Reinhart Boerner Van Deuren

HEADQUARTERS: Milwaukee

EMPLOYEES: 475

IT STAFF: 15

DESCRIPTION: Originally established in 1894, Reinhart is a business–oriented law firm with more than 200 attorneys in practice areas that include business law, litigation, healthcare, intellectual property, real estate, government relations, employee benefits, labor and employment, and bankruptcy. The law firm, which has both domestic and international clients, serves small and large businesses, individuals, nonprofits and other organizations. Reinhart is highly ranked in several practice areas nationally and statewide in *U.S. News & World Report*'s 2015 "Best Law Firms" rankings. Besides its headquarters in Milwaukee, the firm has offices in Madison and Waukesha, Wis.; Chicago and Rockford, Ill.; Denver; and Phoenix.

The vision of a lawyer rushing up the stairs of a courthouse to get to trial is a cinematic stereotype, but case-laden legal teams scurrying to make filing deadlines and put the finishing touches on opening statements is a reality that the firm Reinhart Boerner Van Deuren knows all too well. And it's a reality that today is highly dependent on technology.

The firm's lawyers and support staff rely on virtual desktops to communicate, conduct research, write contracts and briefs, and prepare for trials, says IT Director Jerry Bishop. And if legal teams notice even the slightest slowdown in performance, the IT department hears about it and must rush to find a fix.

Not too long ago, it wasn't that uncommon for users to be typing emails and "notice the letters were not appearing on their screens immediately. Or they would try to scroll with their mouse and click on the screen, and it would take a moment for it to catch up," Bishop says.

The suspected source of the performance hiccup was the Milwaukee law firm's existing server and desktop virtualization environment, which ran on data center equipment that was 3 years old and reaching end of life.

Bishop turned to CDW to help him diagnose the exact sources of his performance glitches and develop a long-term strategy to future-proof the environment. CDW's team of engineers performed health assessments on the data center infrastructure and determined that the main cause of the slowdowns was Reinhart's storage area networks and — to a smaller extent — some of its servers and network equipment.

Positive Growth's Negative Fallout

As the firm had expanded and opened new offices in Chicago and Phoenix in recent years, the influx of new employees, and the resulting growth in workload and storage requirements, spawned storage latency issues, Bishop says. Its SAN vendor's replication software for disaster recovery also slowed server and network performance.

0.5–0.6 milliseconds

The fast response time of virtual desktops since law firm Reinhart Boerner Van Deuren upgraded its storage hardware

"We were maxing out on the IOPs — input/output operations per second," he recalls. "A lot of data passes back and forth when you run virtual desktops, and when you're also replicating data to your disaster recovery site, that creates a great deal of load."

CDW's account managers and engineers held joint phone calls with Reinhart's IT staff and teams from VMware and NetApp to detail each specific infrastructure issue and define potential solutions, recalls Dirk McQuestion, a CDW advanced technology account executive.

The Road to Virtualization

Last year, following the intensive end-to-end analysis, Bishop's staff modernized the IT infrastructure with HP BladeSystem blade servers and flash-based Tintri storage appliances.

The result? Speedier access to applications, a boost in worker productivity and — for the IT department — a more reliable, cost-effective infrastructure that both improves data security and simplifies management.

"We found and fixed the bottleneck," Bishop says.

Virtualization is one of the most popular IT projects among businesses, but it's particularly appealing in a document-intensive legal environment. By consolidating servers and increasing hardware utilization, law firms can lower their energy costs, cut IT spending, reduce total facilities costs and bolster security.

Many firms virtualize their servers in phases and continually fine-tune and optimize their implementation to take full advantage of virtualization's benefits. Reinhart Boerner Van Deuren, for example, taps virtualized environments for desktops, storage and disaster recovery.

Besides upgrading hardware, the business-oriented law firm also regularly updates software and tweaks systems configurations to make its virtual environment as effective and efficient as possible. Ultimately, Bishop says, the goal is a constantly improving user experience for the firm's 205 lawyers and 220 support staffers, as well as dozens of contractors.

Reinhart, which has been ranked among the best law firms in the nation, began virtualizing its servers in 2010. Shortly after that, the IT team replaced traditional desktop computers with a virtual desktop infrastructure (VDI), which sends images of the Microsoft Windows operating system and applications from servers to users' desktops.

When Bishop joined Reinhart in late 2013, he inherited a VMware environment that housed about 470 virtual desktops for employees and about 300 applications that were more than 90 percent virtualized.

Bishop says virtualization has lived up to its promise at

Reinhart. The firm has benefited from increased hardware utilization and flexibility, such as the ability to spin up servers quickly when needed. "It does help us provision new servers much more quickly and gives us better consistency on the builds," he says.

Plus, with VDI, the firm reduces support costs because the tech staff can manage virtual desktops centrally on the server. Although cost savings are important, the primary benefit of desktop virtualization is the ability for the IT department to provide users with a consistent user experience, Bishop says.

To the user, the sense is that the desktop environment continuously achieves better performance — almost transparently, he says. There's no more need for IT to make deskside visits for every upgrade, patch or other end-user support query.

Furthermore, corporate information is more secure because all data resides in the data center, Bishop notes. Not only does that better protect the company from viruses and spyware, but also employees don't have to worry about losing important or sensitive information from a hard drive crash or stolen notebook computer.

Putting the VDI Pedal to the Floor

But optimum VDI performance wasn't always a sure thing at the law offices spread across the Midwest and Southwest. Not long after joining Reinhart, Bishop discovered that performance, particularly for virtual desktops, was a problem.

The virtual desktops sustained latency of 2 to 2.5 seconds in the mornings and afternoons. What's more, at its peak, latency sometimes stretched beyond 4 seconds to as much as 10. It was simply unacceptable, Bishop says, recalling that users complained and some even asked for a return to physical devices on their desks.

While some Reinhart lawyers have notebooks they use when in court or traveling, everyone on staff relies on VDI to access all the necessary applications, including Microsoft Office, a document management system, e-discovery and general business applications, such as accounting software and a time-entry system.

Since the existing storage maintenance contract was ending, the CDW team recommended that Reinhart upgrade to new storage hardware. But as an interim fix, it suggested that Reinhart upgrade its existing storage system to the latest operating system to address bug fixes and derive moderate improvements while a full revamp took place.

"We all worked together to get them to a steady state," McQuestion says.

Last spring, Bishop considered purchasing new SANs

Next on the IT Docket

Reinhart Boerner Van Deuren isn't finished with its IT infrastructure virtualization and data center improvements.

This fall, IT Director Jerry Bishop plans to upgrade network switches to increase bandwidth on its LANs. And within the next year, he plans to upgrade the firm's secondary data center with new blade servers.

Bishop is currently preparing to leverage the latest version of VMware Horizon VDI software and VMware's AirWatch mobile device management software to deliver a new mobility solution to the firm.

By pairing the two, Bishop and his team will support what they like to call "virtual attorneys" — providing lawyers with full desktops to any mobile device as well as single applications published to those devices.

from its existing storage vendor. But he also researched the latest advances in storage hardware and ultimately standardized on new flash-based, virtual machine–aware storage appliances from Tintri, whose flash storage provides faster data access.

The new appliances sped up response time and immediately resolved performance problems. In fact, a year ago, 40 percent of help desk calls were complaints about slow virtual desktops; now those calls are gone.

"Tintri is fast and performs well," Bishop says. "We put all the virtual desktops onto the Tintri storage system, and it produced immediate performance benefits for the users."

In all, the Reinhart law firm purchased seven Tintri VMstore appliances for the main and secondary data centers, including two high-end Tintri VMstore T850 models, each of which can support up to 2,000 VMs and features 52 terabytes of raw storage. Of that, 5.3TB is flash and the remaining is traditional hard disk storage.

About 95 percent of workloads today are served up as flash storage unless the firm is doing a big processing job, Bishop says.

New Appliances to the Rescue

Besides the boost in speed, the new storage appliances also simplify storage provisioning, as well as eliminate the cumbersome and time-consuming task of configuring volumes and logical unit numbers.

"Because the new storage system is VM-aware, storage is now part of the virtual environment and much easier to administer," he says. "We no longer have to do the behind-the-scenes stuff."

> ## "We put all the virtual desktops onto the Tintri storage system, and it produced immediate performance benefits for the users."
>
> — Jerry Bishop, IT Director, Reinhart Boerner Van Deuren

The IT department can now set up storage for a new virtual server in minutes — much faster than the hour it used to take with the previous SANs, Bishop says.

And because Tintri is essentially plug-and-play, it was easy for the IT department to install. In fact, the IT staff got the new storage devices up and running in 15 minutes. They then spent three days migrating VMs and data to the new hardware.

"At first, we took it slow with the migration," Bishop says. "We used vMotion to move some workloads over, but once we got confident, we quickly moved all of them."

Upgrading the Rest

As the final phase of its overhaul, the firm last summer bought new BladeSystem servers for its main data center and pushed to virtualize remaining stand-alone applications. Today, everything is virtualized except for three index servers for a document management system.

Bishop's team also doubled Internet and MPLS bandwidth speeds into each office. And with CDW's advice, he's updated network configurations to improve quality-of-service routing. Essentially, the firm has upgraded the entire data center infrastructure through this series of projects.

"Like any complex system, you start with the major issue first, which for us was storage. We got that out of the way, and it allows you to sort out what's left that caused the performance problem," Bishop says. "It was a little bit of the server and the network, and all the different configurations and versions of operating systems, and we've taken care of it."

Bishop says he couldn't have done it without CDW's help. Not only did CDW engineers diagnose and provide advice on how to fix VDI performance issues, CDW solution architects also helped design and configure the right server solution for the firm's needs.

In the past, the Reinhart law firm purchased technology from multiple companies, but now CDW is its go-to technology solutions provider.

"Our CDW account team understands our business.

When we pick up the phone, they not only help us with purchases, but also assessment, planning and implementation," Bishop says. "In a lot of ways, they are like an extension of our IT department. It's almost like having more staff."

CDW Executive Account Manager Luke Larson, who has assisted Bishop throughout the IT infrastructure refresh, is impressed with the IT team's efforts.

They've "taken their virtual environment to the next level," Larson says.

Overall, the Reinhart law firm has seen good return on investment in virtualization and related infrastructure. The new storage hardware, combined with new Veeam replication software for virtual environments, has made it much faster and easier for Reinhart's IT team to back up and protect VMs and data.

The firm's previous replication software was clumsy and hard to manage, and the replication process would often slip into the next morning, which affected virtual desktop performance, Bishop says.

A Case for IT Investment

The IT staff can now enable replication on Tintri and Veeam with a few mouse clicks. "It allows us better recovery times for our Tier 1 and Tier 2 applications," he says. "It's simpler to do restores at our DR site, and we can replicate to the DR site in a normal overnight production schedule."

Plus, the retooled infrastructure let the IT staff consolidate the main data center from seven racks to three at the firm's colocation facility, which is a source of recurring savings. Furthermore, the easier storage management has freed up IT staff to focus on other IT or business challenges and bring new services to users.

That's a big win, Bishop says. "Instead of managing storage, they can help attorneys with e-discovery in a litigation case or with IT compliance goals for privacy and security."

→ Want to know more? Call 800.800.4239 to speak to an account manager about virtualization and other infrastructure optimization solutions, or learn more at **cdw.com/virtualization**.

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