



Clover School District Rejuvenates Aging Computer Labs with VMware Horizon and VMware Virtual SAN

Clover School District had all but abandoned its computer labs in favor of personal iPads and MacBook Air laptops for every student. Then the state of South Carolina announced new, mandatory Windows-based standards for online testing. Instead of a massive capital investment in new desktop PCs, the district opted for a virtual desktop environment based on the VMware Horizon® 6 platform, and a new hosting platform powered by VMware Virtual SAN™ hyper-converged storage. The results: like-new desktop performance, a secure and compliant test environment, lower capital and operating costs, and a more resilient infrastructure.

Located in the north-central Piedmont area of South Carolina, the community of Clover is home to some of the state's most academically sound schools, from elementary to high school. The Clover School District serves a student population of over 7,500, with six elementary schools, two middle schools, one high school, and an alternative academy. With its proximity to the bustling metropolitan center of Charlotte, North Carolina, the district is growing at an annual rate of more than 4 percent.

The Challenge

As part of its mission to prepare each child for a successful, productive, and responsible future, the Clover School District has incorporated mobile computing devices into its instructional programs for several years. Its Connected Classroom 1:1 initiative now provides every student with a personal mobile device: Apple iPads for elementary and middle school pupils, and MacBook Air laptops for high school students. As it transitioned to personal devices, the district gradually stopped investing in its existing computer labs, in the belief they would soon become obsolete.

“We followed that 1:1 vision, and hadn't replaced a single desktop in the past six years except for some high-performance machines in our high school career tech programs,” explains Matt Hoffman, the district's Executive Director of Technology. “We've been siphoning off the better computers from those programs as they phase them out, just to keep our regular high school labs running. That's not sustainable.”

The labs' status changed overnight when the State of South Carolina announced new requirements for standardized online testing, complete with penalties for noncompliance. All tests would be administered in a secure testing environment on a locked web browser, preferably running on a Windows PC. This environment would not run reliably on OSX and not run at all on iOS devices. The district's neglected computer labs were suddenly a critical resource.

INDUSTRY

Education: K-12

LOCATION

Clover, South Carolina

KEY CHALLENGES

- Quickly upgrade previous computer lab infrastructure to meet new state online testing standards
- Future-proof lab infrastructure and ensure it can be flexibly grown or modified
- Limit the capital and operational costs of new infrastructure

SOLUTION

Clover School District successfully deployed a virtual desktop infrastructure platform, based on VMware Horizon 6.1 and VMware Virtual SAN that centralizes computer lab PC processing and storage and repurposes existing desktops as thin clients.

BUSINESS BENEFITS

- Reduced storage capital costs by 75 percent
- Increased system resilience and eliminated need to continuously monitor storage
- Boosted performance with applications and backups running in seconds instead of minutes
- Flexibility of starting with required amount of storage and growing as needed

“I am a huge fan of Virtual SAN. Traditional SANs require a lot of babysitting; we noticed we had TBs of over-provisioned storage. With Virtual SAN we were able to buy just what we need. We cut costs by 75% and don’t need to babysit storage anymore. System resiliency is great – Virtual SAN allows the show to continue without disruption in case of hardware downtime.”

- Matt Hoffman,
Executive Director of Technology,
Clover School District

VMWARE FOOTPRINT

- VMware Horizon
- VMware Virtual SAN
- VMware vSphere®

APPLICATIONS VIRTUALIZED

- Microsoft Office
- A state-certified secure browser for standardized test administration
- Various K-12 instructional services including graphic-intensive applications

The Solution

Hoffman and his team needed to quickly rehabilitate the existing computer labs to serve as both secure, compliant environments for online test administration and as flexible settings for ongoing instruction. They also hoped to lay the groundwork for an eventual return to testing in regular classrooms with personal devices. The team quickly settled on the idea of a virtual desktop platform that would centralize all processing and storage in the district’s data center and convert existing desktops to thin clients. Subsequent project phases would replace the aging PCs with zero clients and extend virtual desktop services to students’ iOS and OSX devices.

Because Clover Schools already used VMware vSphere® in its production environment, Hoffman chose VMware Horizon 6 as his desktop virtualization platform and designed a 100-seat pilot project. The district purchased a 4-node host cluster and configured the servers with 20TB of onboard storage using a mix of fast solid-state drives and traditional spinning disks. In a departure from its standard use of Fibre Channel SAN storage, the team installed VMware Virtual SAN, a software-defined, hyper-converged storage solution for virtual machines. Virtual SAN pools server-attached drives, creating a highly resilient shared datastore designed for virtual environments while reducing TCO by up to 50 percent.

“Finally, we zeroed out the actual desktop computers so they booted directly into our new Horizon cluster,” Hoffman says. “Suddenly we had brand-new computers.”

Business Results & Benefits

The pilot deployment proved conclusively that Clover Schools’ computer labs could be fully rehabilitated with a production-scale virtual desktop environment based on VMware Horizon and powered by Virtual SAN hyper-converged storage, but it also demonstrated a wider range of financial and operational benefits.

On the virtual desktop infrastructure side, the performance and efficiency of VMware Horizon allowed the district to avoid nearly \$1 million in capital expense needed to replace 800 desktop PCs. The repurposed thin clients will eventually be replaced with zero client machines at about one-fifth the cost of new PCs.

The Horizon environment also allows the district to easily impose strict security during online testing. “We can create an encapsulated network that has access to only one URL,” Hoffman says. “We can turn off the ability to take screenshots. We can turn off copy and paste. We can turn off USB access. We can disable all these features just for that testing day, then reboot the lab with fully functional desktops without any of the time, labor, and expense of re-imaging.”

On the storage side, Virtual SAN allowed the district to cut more than \$150,000 from its pilot hardware platform. “Working with Virtual SAN is basically just building the drives into your server nodes,” Hoffman says. “I think we spent about \$49,000 for our initial 20TB of storage, which included some solid-state drives. Our server vendor wanted more than \$200,000 for a Fibre Channel array with the same amount of storage.”

Hoffman and his team also discovered firsthand how Virtual SAN delivers tremendous system stability and resilience thanks to a hardware issue that caused server failures. “Nobody outside the server room knew it was happening,” he says. “Whenever we lost a node there was no impact on the user experience at all. That is completely amazing to me. If you’re concerned about data loss and recovery, I feel confident in saying that Virtual SAN is a secure product.” Virtual SAN also takes much less time than a Fibre Channel array to rebalance data after a hardware failure. “That means our network administrators don’t have to camp out half the night until everything is 100 percent stable.”

Looking Ahead

Hoffman and his team are preparing for a production scale deployment featuring Horizon licenses for 800 concurrent users and a new 8-node host cluster. The pilot platform will remain in service as a test bed for new Horizon applications that will extend the virtual desktop environment well beyond the computer labs.

The district is also evaluating VMware vCloud® Air™ as a disaster recovery solution. “I want a place that I can shift all of our servers to, to replicate all our existing infrastructure in the cloud,” Hoffman says. “That way, if a disaster occurs and takes our data center with it, it shouldn’t affect our classrooms.”

