HOW TYLER ISD'S NEW VIRTUAL ENVIRONMENT SAVED IT $4M

Tyler ISD supports students and staff with HPE Synergy

Industry
Education

Objective
Upgrade organization's technological capacity to support students' evolving educational needs

Approach
Replace aging infrastructure and computers with virtual desktop infrastructure for a better learning experience

IT benefits
- Replaced aging hardware with HPE Synergy composable infrastructure and latest blade architecture
- Achieved superior IOPS capacity with HPE 3PAR StoreServ all-flash array
- Improved ability to support graphics-intensive programs with NVIDIA® GRID M10 GPUs

Business benefits
- Upgraded Tyler ISD's VDI so that it could be rolled out to 98% of staff and students and increased the potential number of concurrent users to 3000
- Allowed Tyler ISD's students to log on to their virtual desktops from anywhere and via any device, to expand learning beyond the classroom
- Saved Tyler ISD around $4 million in technology costs over 10 years

Tyler Independent School District (ISD) in Texas was hampered by aging hardware and struggling to meet the growing and increasingly sophisticated technology requirements of its staff and students. After assessing its options, Tyler ISD decided to upgrade existing virtual desktop infrastructure (VDI) with new HPE Synergy composable infrastructure and HPE 3PAR storage to serve its entire organization.

CHALLENGE

Update technology to support evolving educational needs

Tyler ISD is one of the largest public school districts in Texas. It has 27 campuses and caters to around 18,000 students in grades K–12. Tyler ISD also has around 2200 employees, including teachers and administrative staff.

Since implementing VDI as a pilot around 10 years ago, the school district had incrementally made it available to about a third of its campuses and administrative staff. However, aging enterprise technology and hardware meant the school district faced an urgent choice: either refresh that technology and replace thousands of old lab computers, desktops, and laptops, or upgrade its virtual environment so it could be rolled out to the rest of its district.

At the same time, an increasing focus on technology as a learning and communication tool was driving demand for better tools. For example, with school curriculums placing greater importance on science, technology, engineering, and mathematics (STEM) subjects, Tyler ISD needed high-end graphics capability to support teaching aids, such as design and drafting software AutoCAD, computer animation and modeling software Maya, and the Adobe Creative Cloud suite of applications. Even widely used programs and operating systems like Windows 10 use more sophisticated graphics to improve user experience.

> **"Students don't have to be sitting in class or in a computer lab. They can be across the world, log in to their virtual desktop and it's just like they're sitting at their desk. School and learning never has to stop anymore. In the past, we were very limited in what we could provide to our students because of the limitations on our hardware. Now we are free from those restrictions and we can do a whole lot more."**

– Joseph Jacks, Chief Technology Officer, Tyler ISD

Tyler ISD has strengthened educational connections in a virtual environment thanks to HPE Synergy and 3PAR.

With its old system providing limited graphics processing capacity, Tyler ISD's IT team needed to vet applications carefully before adding them to the system.

"A lot of the software teachers and students wanted to use requires a lot more graphics processing than we had, so we had to say 'no' a lot of times," says Joseph Jacks, Tyler ISD's Chief Technology Officer. "We didn't want to be the technology department that always says 'no'."

SOLUTION

Building blocks for a virtual environment
After weighing out a range of options, Tyler ISD turned to Hewlett Packard Enterprise for a solution that would allow it to upgrade its VDI and roll it out across the entire organization.

The solution comprised nine HPE Synergy Frames with 49 HPE Synergy 480 Gen10 servers with GPU expansion and HPE 3PAR StoreServ 8000 storage. An Intel® Xeon® Scalable processor family delivers workload-optimized performance to support flexible, cost-efficient delivery of services. These have been installed in Tyler ISD's main data center, which acts as the hub in the organization's hub and spoke architecture. Students and staff connect to the VDI via thin clients or zero clients, or to a virtual desktop from their own devices.

"Previously, we had always used Cisco blade systems with Dell EMC all-flash storage," says Daryl Kisosondi, Tyler ISD's Network Security Engineer. "When we started looking at it this time, we liked how the blade systems functioned, but we couldn't get the horsepower we needed out of the Cisco unified computing system. So, we looked at Dell. We looked at hyperconverged

technology. HPE's solution was the only one that would continue to allow us to use a blade system and allow us to use the full-size graphics processing units (GPUs) we needed to meet our growing needs."

"We also had a very small footprint available—we only had a couple of racks' worth of space and three racks of power. With HPE we were able to achieve the performance that we needed within that footprint."

"All the other vendors could achieve the performance we needed, but most of them couldn't fit the space and power requirements we had to meet. Most needed a fourth rack to do it, and they would have been several hundred pounds overweight."

DRAMATIC RESULTS EXCEED EXPECTATIONS

Since upgrading its VDI in December 2018, Tyler ISD can now host 3000 concurrent users. Also, 98 percent of the school district's students and staff are able to access the system virtually. According to Jacks, the new system has "more than exceeded our expectations in terms of speed, output, and the number of users we've put on the system."

"We're seeing lower central processing unit (CPU) utilization, lower memory utilizations, and better graphics," adds Kisosondi.

"We built this system, CPU-wise, to sit at about 80 percent, but what we're seeing is that we're rarely touching 65 percent. Previously, we were tapped out—we were seeing CPUs in the 90–100 percent range. That's a good indicator of the performance we're seeing."

"The best way to look at our system is input/output operations per second (IOPS). We average from 9000 to 180,000 IOPS a day. But we've also pushed the system up over 300,000 IOPS for a sustained period and it didn't break a sweat. Our old system would have fallen on its face if it hit that."

When comparing the HPE 3PAR to Tyler ISD's previous Dell EMC XtremIO storage, there is a "night and day difference," according to Kisosondi.

"We're seeing about 30 percent more inputs/outputs with this system," he says. "Previously, with the XtremIO, we were seeing our storage processors maxed out with less I/O than the 3PAR. They were running at 90–95 percent all the time. With the 3PAR we're seeing a higher load, of around 30 percent, but we're only seeing CPU utilization of around 10 percent at most. Most of the time it's around 5 percent. We haven't seen the top end of the 3PAR, which is quite amazing, considering how much I/O we generate."

Other improvements include faster user login times and a crisper user experience.

"Whereas user experience was sluggish with our old gear, it's now on par with an actual PC," says Jacks. "Overall, we have more than doubled the number of users we have on our VDI with this new solution and they're having a better experience using it."

As an added advantage, Tyler ISD's team can monitor how its hardware and storage are functioning from a single console, via HPE OneView.

CREATING A BETTER USER EXPERIENCE THROUGH GRAPHICS CAPABILITY

A key factor in the success of Tyler ISD's VDI upgrade has been the addition of NVIDIA GPUs as part of a software-defined solution.

NVIDIA's graphics cards provide the "graphics grunt" to support the increasingly sophisticated graphics requirements of applications used by students and staff in a virtual environment. As a result, Tyler ISD has been able to fix existing usability issues—such as not being able to play videos without stuttering—and provide users with a PC-like user experience on their virtual desktop.

NVIDIA's solution includes software that provides features large entities need to run an enterprise environment with tens of thousands of users. These include ease of installation, ability to monitor the system, and the ability to easily reconfigure aspects of the virtual environment.

"One of our limitations has always been not getting enough CPU compute power out of our systems to meet the needs of our staff and kids," says Kisosondi. "Using GPUs enables us to offload about 30 percent of the CPU capacity that we needed. This ability means we can add GPUs to every single server, which allows us to reduce the number of servers that we have."

The GPUs also mean that Tyler ISD can run graphics-heavy applications such as the Adobe Creative Cloud suite everywhere, rather than from just a handful of servers. This means that more of Tyler ISD's middle and high school students can now use them in their studies.

"A lot of web applications require some sort of GPU power," says Kisosondi. "Previously that GPU power would come at the cost of using extra CPU cycles, but as we didn't have enough CPU to begin with, we needed to find a way to offload that processing power to improve the CPU utilization. This solution allows us to do that."

BENEFIT

A cost-effective, connected hub to support learning

A significant benefit of the new system is that all the school district's 18,000 students can now access their files anytime, from anywhere and any device.

"Students don't have to be sitting in class or in a computer lab," Jacks says. "They can be across the world, log in to their virtual desktop and it's just like they're sitting at their desk. School and learning never has to stop anymore. In the past, we were very limited in what we could provide to our students because of the limitations on our hardware. Now we are free from those restrictions and we can do a whole lot more."

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– Daryl Kisosondi, Network Security Engineer, Tyler ISD

Customer at a glance

Hardware
- 8 HPE Synergy frames
- 49 HPE Synergy 480 Gen10 servers with GPU expansion
- 90 NVIDIA Tesla M10 Quad GPU Modules
- HPE 3PAR StoreServ 8000 Storage

Software
- HPE OneView

Deploying the new system means the answer to requests for new applications is more often yes than no.

"For example, we are now able to allow students to run the whole Adobe suite in our virtual environment," he says. "This means teachers can create graphics-intensive lessons, and students can do things like create and edit movies, which we'd have previously done on really robust PCs."

Another important benefit is the cost saving that Tyler ISD has enjoyed by choosing to upgrade to a virtual environment.

"We didn't have the funding we needed to replace every laptop and lab computer to be where we needed to be," says Jacks. "By going with this solution—which included upgrading our data center and upgrading our VMware® license from the standard to the enterprise version—the cost was around $4 million."

Purchasing thin clients and zero clients rather than standard laptops and lab computers means Tyler ISD will only need to refresh its hardware after eight to ten years, rather than after four to five years, reducing ongoing costs.

The school district is also able to service and support its technology with fewer technicians than it would have needed with standard hardware, lowering overall support costs.

"Over a 10-year period, we're going to save the district somewhere in the region of $4 million," Jacks says.

The move also provides a strong foundation for Tyler ISD to continue to upgrade its technology to meet the future needs of its community.

"Synergy was the most flexible, future-ready solution we looked at," Jacks says. "Because of the next-gen frames we ended up going with, it's going to be a case of simply swapping out some blade servers and keeping on rocking next time we upgrade, instead of needing to do a forklift upgrade."

"That was important to us too, because it helps us future-proof our installation. Rather than having to go back and ask for another $3 million when it's time to upgrade our installation, we'll be able to just start replacing servers, at a much lower cost."

With the right technology in place, Tyler ISD is now perfectly positioned to keep doing what it does best—helping to achieve successful student outcomes.

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hpe.com/us/en/integrated-systems/synergy.html

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