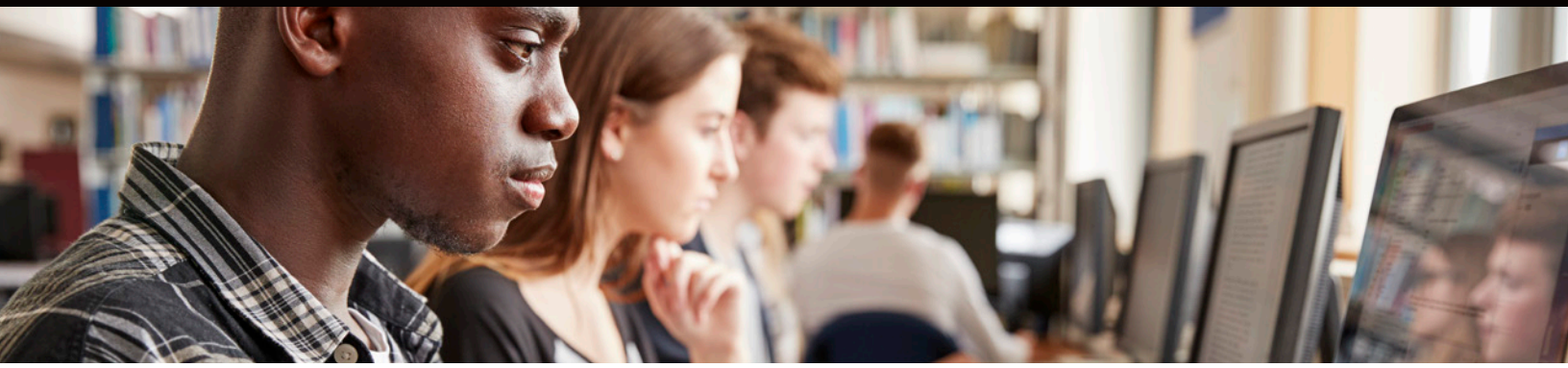
VIOLIN SYSTEMS

CASE STUDY: COLLIER COUNTY SCHOOL DISTRICT

COLLIER COUNTY RUNS THEIR SCHOOL DISTRICT AT THE SPEED OF MEMORY WITH VIOLIN

"We were looking for a SAN storage replacement that could handle our peak data base loads and found the best-of-breed technology in Violin Systems."

— Tom Petry, Director of Technology, Collier County Public Schools



CCPS Collier County Public Schools

IT ENVIRONMENT

- More than 600 physical servers with a high focus on virtualization for the majority of the applications with a "Boot from SAN" configuration
- Server hardware: 12 DL380 G8s with Dual 10 Core Intel processors with 64GB RAM

CURRENT STORAGE

- Multi-tier SAN environment with heterogeneous storage systems
- About 1PB of storage with stringent data retention requirements

Collier County Public Schools, located in south Florida, is a large school district and one of the most technologically advanced K-12 districts in the U.S. To meet the challenge of supporting online testing for 45,000 students, the district implemented Violin all flash arrays to solve challenges that their Tier-1 SAN could not. The result: dramatic performance improvements, lower IT costs, and a better end-user experience.

Collier County Public School District is one of the largest, diverse K-12 educational institutions in Southern Florida, with national recognition as a technology leader in education. The district has 7,000 employees and educates over 45,000 students annually, placing it in the top 1 percent of districts nationally, in student population.

The district runs a cutting-edge IT infrastructure that includes over 600 physical servers, along with 28,000 desktop and laptop PCs. Approximately 22,000 student accessible networked computers are available, representing a 2 to 1 student-to-com- puter ratio. All applications are delivered centrally with 20GB/s of network connectivity through a fiber optic network that is 100% owned and operated by the district. Collier also has a dark fiber connection to a disaster recovery site 150 miles away in Miami with synchronous data replication.

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SOFTWARE

- Microsoft SQL Server 2012 Enterprise Edition with AlwaysOn for replication of online testing environments
- Citrix XenDesktop for streaming virtual desktops to thin client terminal devices

VIOLIN EQUIPMENT

- 2 Violin arrays utilized for SQL Server 2012 Enterprise Database
- 1 Violin array utilized as write cache for Citrix XenDesktop Streaming
- 1 Violin array utilized in conjunction with the above devices for replication of critical data

The Challenge

Collier County district's storage infrastructure is a multi-tier, heterogeneous SAN environment that holds approximately 1 petabyte of data, including a massive Microsoft SQL Server data warehouse. This system serves as a data retention and reporting tool, but as standardized assessments become more important and more frequent, the district has made increasing use of the system for online student testing.

As Tom Petry, Director of Technology at Collier County Public Schools, explains, "We've used our data warehouse application for a long time, to collect statistical information and store grades. But over the last couple of years, the district has implemented quarterly assessment tests, and every student has to be tested in multiple subjects. As a result, we quickly went from supporting a few hundred students to several thousand testing simultaneously."

Although the district already had other high-end Tier-1 storage devices in place, they were still experiencing latency under peak loads. "The issue we were experiencing," according to Nick Burdick, Network Analyst, "was that there were so many views and table structures built into the database over the years that it was getting a lot of latency even on our high-end Tier-1 platforms. Even with an optimized database," says Burdick, "we still couldn't solve the issue of having an excess of 5,000 users hitting the system at the same time at peak times of the semester when students were taking online tests and teachers were running reports."

Looking down the road, The Collier IT team realized they needed to find an alternative solution. "The writing was on the wall. It was pretty obvious our current environment wouldn't be able to handle the growing requirements of these applications."

The Solution

To solve their growing need for sustainable storage performance, The Collier IT team upgraded their data warehousing application to Microsoft SQL Server 2012 and replaced their traditional storage with flash arrays from Violin Systems.

"When Collier County Schools evaluated all the storage vendors out there, they were very impressed with the large capacity and small footprint of the Violin flash arrays. They were blown away by the performance and ease of management. What they needed was a storage solution that could handle their peak loads and give them the room to grow, and they found the best-of-breed technology in Violin Systems."

The Collier IT team went through several architecture discussions with Microsoft, Violin, Intel, HP and others about the best way to architect their new SQL 2012 environment, and found that the Violin solution would enable them to build a more compact, cost-effective solution. "In the past, we probably would have purchased quad-socket servers with 1TB of RAM because you have to overprovision CPU and RAM resources to get the big numbers and the low cost per transaction with disk-based storage," said Rob Soberon, Senior Network Analyst. "But with the Violin solution, we realized we could run our primary storage itself at the speed of memory, so we were able to get maximum performance with a less expensive 2-socket, 10-core server and only 64GB of RAM."

"With our traditional Tier 1 disk-based system, we had to use pools of 50-60 disks to get just marginally adequate performance. The Violin solution has allowed us to condense our storage considerably from the old monolithic array, which was a monster on power and cooling. In addition to that, we were able to reduce the server requirements for the SQL environment down to a smaller number of servers and smaller size servers, resulting in a much smaller overall datacenter footprint."

— Nick Burdick, Network Analyst, Collier County Public Schools

Results and Benefits

The Collier IT team tested the Violin solution by running a 30-day proof-of-concept in production, and they were blown away by the performance. "Right after we did the benchmark testing, and we saw the traffic number hitting the servers, when an excess of 5,000 students were testing simultaneously," recalls Brett Reynolds, Programmer/Analyst, "it was pretty obvious that the Violin solution could effectively shape peak loads that our traditional Tier 1 storage wouldn't have been able to handle at all."

"Our traditional systems couldn't sustain our bursting capabilities that some of the queries would cause," explains Reynolds. "That's where the Violin solution came into play for us; it was able to keep up with sustained transactions, both reads and writes, during random IOPs."

The Collier IT team says the response from end users has been overwhelmingly positive. "We migrated one application to the Violin array on a Saturday, and on Monday some of our users were already asking, 'Hey what did you do to the application?' It wasn't slow before–the old devices were Tier-1 storage–but they noticed a significant performance improvement."

Efficiency and Manageability

In addition, The Collier IT team has seen increases in IT efficiency across the board with Violin. "With our traditional Tier 1 disk-based system," states Burdick,"we had to use pools of 50-60 disks to get just marginally adequate performance. The Violin solution has allowed us to condense our storage considerably from the old monolithic array, which was a monster on power and cooling. In addition to that, we were able to reduce the server requirements for the SQL environment down to a smaller number of servers and smaller size servers, resulting in a much smaller overall datacenter footprint."

Cost Reduction

The ability to use smaller, less expensive server equipment enabled the Collier IT team to achieve more than $200,000 in hardware savings alone. "That's where the big savings came in," says Petry, "because we were going to spend upwards of $300,000 on those highly configured servers. And we've still kept CPU utilization fairly low because the Violin solution is able to keep up with the all the reads and writes being requested from the processors, so it's essentially happening in real time."

Expanding to Virtual Desktops

Beyond server applications, The Collier IT team has also purchased a Violin array to replace the existing card-based flash storage that supports Citrix XenDesktop for about 12,000 devices. Cedar Kraus, Assistant Director of Technology, says, "The disadvantage of our existing card-based storage was that they're sitting in a single server, therefore a single point of failure vs. a shared flash-based storage solution as the Violin Systems Array." The Collier County School District's IT Department is confident that the Violin solution will allow them to save even more money by reducing their server requirements. "We were using flash-based cards in eight dual socket servers, but with the Violin solution, we will be able to go down to two dual socket servers with a 3210 provisioning all the LUNs." Overall, The Collier IT team is extremely satisfied with their decision. "This is the best storage technology we've ever purchased for our datacenter."

Looking Ahead

The Collier County School District's IT Department foresees many growth opportunities with the Violin solution, especially considering the size of the district and the data retention requirements they must adhere to, and also recognizes the added value of redeploying their old storage devices. Whenever asked about the Violin's architecture, Collier County's IT Department states that "The ROI on the Violin investment is that you can repurpose your existing traditional Tier 1 disk arrays for compactly needs of the application while utilizing the Violin arrays to solve application performance challenges."

More importantly, the Violin array has fundamentally changed Collier County School District's IT Department's approach to application planning. "In the past, when we had to do careful planning around storage performance requirements. Now, with the Violin all flash arrays, storage performance isn't even a consideration. The IOPs we get from the array exceed the requirements of our applications, giving us a lot of room to grow without making additional investments in storage hardware."