QUEEN'S UNIVERSITY FACULTY OF ENGINEERING AND APPLIED SCIENCE DEPLOYS VMWARE VIRTUAL SAN

INDUSTRY
EDUCATION

LOCATION
KINGSTON, ONTARIO, CANADA

KEY CHALLENGES
- Infrastructure bottlenecks prevented students and faculty from launching and using applications.
- IT team lost productivity dealing with complaints about system performance.
- Administration wanted to reduce CapEx and storage costs.

SOLUTION
To address escalating complaints about desktop performance, and to streamline IT management, Queen's University Faculty of Engineering and Applied Science implemented VMware Horizon desktop virtualization and the VMware Virtual SAN hyper-converged infrastructure solution.

BUSINESS BENEFITS
- Eliminated infrastructure usage spikes and lag in application launch times
- Increased performance for 3D modeling and Microsoft Office applications
- Simplified and reduced costs for IT and storage growth, streamlined desktop management

The Faculty of Engineering and Applied Science at Queen's University implemented VMware Horizon® desktop virtualization to enable access to critical applications. However, as the user base grew and applications became more resource-intensive, the existing storage solution couldn't handle the increasing demand. Because of slowness accessing applications, students often sacrificed lab time. By replacing the overburdened storage infrastructure with the VMware Virtual SAN™ hyper-converged infrastructure solution, the university solved performance and capacity issues, while scaling storage cost-effectively.

Queen's University is one of Canada's oldest educational institutes. Founded in 1841 through a royal charter, the public research university has around 23,000 students and more than 130,000 alumni worldwide. The Faculty of Engineering and Applied Science was created in 1893.

The Challenge
The educational landscape for engineering and applied science is becoming increasingly complex. More students have limited lab time for accessing high-performance engineering applications that demand high-capacity CPUs and graphics processing units (GPUs). If these applications are slow, students can't maximize their lab time, and frustration sets in, impacting their overall educational experience.

Last year, the Faculty of Engineering and Applied Science began experiencing an infrastructure bottleneck it needed to quickly address. Students and faculty members experienced delays launching and using applications. During peak times, students sometimes lost as much as 15 percent of their lab time waiting for applications to open. The resource-intensive engineering applications also adversely affected the staff's Microsoft Office applications. The IT team lost productive time dealing with complaints about performance and general poor application responsiveness.

It turned out that the university's EMC VNX SAN infrastructure was buckling under the demands of more than 100 engineering applications, like AutoCAD, MATLAB, SOLIDWORKS, Microsoft Visual Studio, and Eclipse. The hosts were routinely experiencing usage spikes five to six times above normal, which would bring down the entire storage system and ultimately prevent access to files and

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STEPHEN HUNT,
DIRECTOR OF INFORMATION TECHNOLOGY,
QUEEN'S UNIVERSITY FACULTY OF
ENGINEERING AND APPLIED SCIENCE

VMWARE FOOTPRINT
• VMware Virtual SAN
• VMware Horizon

APPLICATIONS VIRTUALIZED
• Microsoft Office
• MATLAB
• SOLIDWORKS
• AutoCAD
• Other engineering, computer science, and 3D modeling applications
• Visual studio development solutions

PLATFORM
• Dell PowerEdge R710 servers
• Cisco Nexus 5000 Series Switch
• NVIDIA GRID

PARTNER
• TeraMach Technologies Inc.

applications. Expanding storage resources with a new SAN was cost-prohibitive. Upon investigating hyper-converged infrastructure, the university found that this architecture approach would allow it to lower overall storage costs and scale storage quickly and granularly, while eliminating the I/O latencies associated with external storage.

The Solution

When a donor who wanted to enable technical innovation presented the school with funds, the Faculty of Engineering and Applied Science decided to replace its leased PCs with the VMware Horizon virtual desktop infrastructure (VDI) solution. This gave students, staff, and faculty remote and easier access to the applications they needed to do their work. The solution also reduced CapEx and streamlined the IT team's ability to manage desktop image complexity.

Starting with two departments, the solution has since been expanded to four departments and multiple staff offices comprising 3,500 students and 100 staff and faculty. Queen's also deployed NVIDIA GRID cards in all new equipment to support the GPU demands of students' intensive graphical modeling tools. The Faculty of Engineering and Applied Science now has 250 virtual machines and anywhere from 150 to 200 concurrent users.

The Faculty of Engineering and Applied Science chose the Virtual SAN hyper-converged infrastructure solution to replace its existing external SAN when its user base and usage of applications increased, causing storage performance issues. The VMware solution delivers flexible storage architecture, remarkable flash-optimized performance, and simplicity in day-to-day use.

Business Benefits

The VMware VDI solution improves productivity and satisfaction for students, faculty, and IT managers. With the VDI, users now have nearly instantaneous access to desktop applications. For IT management, the VDI has reduced CapEx and operational costs associated with managing desktops. System administration is simplified by central management of desktop images, and IT staff can respond rapidly and remotely to support requests.

The VDI lets faculty flexibly add new applications to support coursework. IT managers can update desktop profiles and rapidly deploy them to students. Faculty can drive more teaching innovation because it is easier to experiment with new tools. Graydon Smith, manager of IT systems and development, says, "The VDI gave us the ability to be more flexible to software changes throughout the year, and that flexibility has really helped."

The VDI deployment is even more successful with the Virtual SAN solution. Lags from system login and application launches have disappeared, allowing students to maximize lab time. "After deploying Virtual SAN, the improvement in performance was night and day. All of a sudden, everything was snappier," says Stephen Hunt, Director of Information Technology for the Faculty of Engineering and Applied Science.

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"We saw an immediate number improvement, and that was with our earlier VSAN version. We're moving up to our VSAN version 6.2," adds Smith. With the Virtual SAN solution, the team can add chunks of new storage as needed—and the environment is managed from a central dashboard. "The great thing about Virtual SAN is we just add more hosts and more disks if we need to expand. We still have lots of bays within the hosts to add more disks and expand out if we need to."

The system is also more reliable, reducing downtime and supporting demands. "I also found the management of it, from my perspective, to be so much easier," says Smith. "Our ability to respond to requests and general administrative responsiveness has been so much better. Before, it was like being on call all the time. Now with VSAN, I don't have to worry at all."

During the implementation, the Faculty of Engineering and Applied Science also migrated to Dell servers, which reduced CapEx by 25 percent.

"I was blown away with the implementation of VMware Virtual SAN for VDI. No single thing that we had done in the past had caused that extent of change from an end-user point of view," says Hunt.

Looking Ahead

After the tremendous success of the VMware Horizon and Virtual SAN implementations, the Faculty of Engineering and Applied Science is already installing a larger Virtual SAN environment and upgrading to Virtual SAN 6.2 to accommodate increasing storage needs of students and faculty. The university has also recently started an implementation of the VMware App Volumes™ solution to further speed application delivery, and streamline user management.

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