



NC STATE UNIVERSITY

VMware Horizon View Securely Delivers 3D Graphics for Naval ROTC Training Simulator at North Carolina State University

INDUSTRY

Higher education

REGION:

Americas

SIZE

More than 33,000 students and nearly 8,000 faculty and staff

ABOUT THE UNIVERSITY

Founded in 1887, North Carolina State University (NCSU) is a comprehensive university known for its leadership in education and research, and globally recognized for its science, technology, engineering, and mathematics leadership.

PRODUCT

- VMware® Horizon View™
- VMware vSphere®
- VMware vSphere® Distributed Resource Scheduler™
- VMware vSphere® High Availability
- VMware vSphere® vMotion®

Snapshot

NC State University Libraries has deployed Horizon View to securely deliver a virtual environment with the 3D graphics required to train Naval ROTC midshipmen to drive any vessel in the U.S. Navy fleet. NCSU Libraries virtualized the Navy training simulator using a graphics processing unit (GPU)-enabled cluster powered by Dell and NVIDIA technologies. Authorized users can securely access the entire simulated training environment in software from a multipurpose creativity studio that is used for other training purposes such as simulating a trading room floor or crime scene. NC State University students, faculty, and staff in other disciplines also can use Horizon View to access critical 3D design software such as SolidWorks and AutoCAD.

Business Challenges

- Securely deliver high-performance computing and 3D graphics
- Support new infrastructure, systems, and services without additional IT staff

Triggers

- Application access and productivity issues
- Security concerns
- Need to reduce support costs at the current IT staff level

Solution

Horizon View virtual desktops securely and reliably deliver 3D-graphics simulations to Naval ROTC training. They also address other use cases in engineering and computer science at NC State University.

Benefits

- High-performance graphics rendering
- Robust and realistic naval vessel training experience
- Greater flexibility in training delivery and locations
- Improved security
- No additional IT support required

Use Cases

- Hosted, high-performance computing and 3D graphics
- Centralized, high-availability desktop

“Naval ROTC is using Hunt Library resources for a simulation program that gives us the flexibility to build different scenarios, different classes of ships, train the students, and then tear that training down in an instant and move the resources over to something else. That flexibility is exactly what universities need in the future.”

Dr. Marc Hoit
Vice Chancellor for IT and CIO
NC State University

Situation

There is no place like the James B. Hunt Jr. Library, which opened in April 2013 on the NC State University campus. Designed to be a technology sandbox for the university, the library is on the cutting edge of technological innovation.

NC State University is a model for how to successfully support the increasing use of personal computing devices on and off campus. It is also at the forefront of delivering high-performance computing and 3D graphics to meet the needs of an ROTC training program—and those of students, faculty, and staff in rigorous academic programs such as engineering and architecture.

NC State University Libraries is working with the Naval ROTC program on campus to deliver the software the Navy uses to train midshipmen to drive any vessel in the U.S. Navy fleet.

“The software features different ships and we were able to recreate the layout of the bridge for each one using our creativity studio,” explains Maurice York, head of information technology for NC State University Libraries. “We put the comm in the right place, the helm, and the munitions, then allow them to run a real-time simulation with the correct layout of the bridge to see what it’s like to work with a team in that environment.”

The challenge for the NC State University Libraries IT team was how to deliver 3D-graphics applications securely and reliably both to the ROTC training program and to the other 33,000 students and 8,000 faculty and staff working across NC State University’s 10 colleges—without any additional IT resources.

Solution

The IT team chose to virtualize the ROTC simulator and the library’s 250 staff and 100 student desktops with Horizon View because it would most effectively deliver a flexible, secure, reliable, graphics-rich computing environment.

Horizon View is a complete virtual desktop infrastructure (VDI) solution that simplifies desktop management and provides users with what they need, when they need it. It ensures end-user productivity and delivers a high-fidelity desktop experience with multimonitor configurations, rich audio and video content, and video acceleration with multimedia redirection (MMR) for H.264-encoded streams. With Horizon View, high-end 3D graphics can be delivered through shared (vSGA) or dedicated (vDGA) use of a server-based GPU, and basic 3D can be delivered entirely with software and no additional hardware investment.

“What we did was completely unique,” says York. “We virtualized the entire simulator. It’s made up of a dozen different machines that all need to talk to each other in a very close networking environment. Any one of those machines can become any different station on the bridge at any given time. The solution had been delivered in hardware before, but never recreated in a virtual environment.”

NC State University Libraries IT set up the Horizon View infrastructure in a GPU-enabled cluster using Dell servers and NVIDIA GRID graphics cards. vSphere Distributed Resource Scheduler and vSphere High Availability are enabled, and vSphere vMotion maintains balance across all of the hosts.

For the ROTC training program and other university disciplines such as design, engineering, humanities, and meteorology, Horizon View supports “a lot of graphical requirements with high performance so that students can get to work and the computing environment isn’t getting in their way,” explains York.

Prior to virtualization, the library had standard Windows desktops. All applications were pushed out directly to physical desktops by campus IT staff. Now, provisioning a new desktop takes very little time, and typically 10 or so standby virtual machines are available—so when someone logs out, a new one is created with several remaining available at any given time.

“We currently have all of our production desktops in the Hunt Library running on the 3D accelerated graphics engine and they’re providing the performance we need for all 33,000 students across 10 different colleges in multidozens of different units.”

Maurice York
Head, Information Technology
NC State University Libraries

At NC State University’s engineering school—fourth-largest in the United States, with one of the top 20 game-design programs in the country—desktop virtualization supports a wide range of 3D applications such as SolidWorks, AutoCAD, and other products in the Autodesk portfolio for faculty and student projects including simulations and fluid dynamics.

According to Chris Mann, an NC State University undergraduate student majoring in mechanical engineering, “Before virtualized desktops, I would have to go to a specialized computing lab with the powerful workstations that have the appropriate software installed. Now I can stay at home and use my weak laptop to run the virtual machine with SolidWorks on it, or in an emergency situation, I can even use it on my phone.”

Benefits

The Naval ROTC training program is highly secure with NC State University Libraries IT. “We were able to give absolute security to the Navy,” says York. “As soon as that simulator is not in use by them, we take that whole pool down. It’s secure in the server room; nobody can touch it.”

Because of virtualization, the Navy has the flexibility to use the training simulator in the library or in any classroom. “They can just dial into the pool, bring up the entire training environment, have all of their data and applications in the same secure environment, delivered anywhere on campus,” explains York.

For faculty, staff, and students who require always-available 3D applications, VMware desktop virtualization delivers high performance and “saves a ton of time,” says Mann. “I don’t have to travel between campuses. I can stay at home and do my work.”

From creating simulations to driving big data to working with visualization to enabling cutting-edge research, NC State University is continually thinking about how technologies can help it deliver never-before-possible capabilities to further the NC State University Libraries’ vision as a global hub for collaboration and research. Looking ahead, NC State University plans to leverage the suite of VMware vCloud® products—from the server environment to desktops to the cloud with automation and security—to provide the most innovative environment possible for students, faculty, and staff.

“We want to really push this innovation environment forward and create something entirely unique as a resource for this university,” concludes York.

“When I use SolidWorks on virtual desktops, it’s seamless. I don’t have any trouble with speed or anything. I can access the virtual desktops from my phone, my iPad, and my computer—it’s very convenient.”

Chris Mann
Mechanical Engineering Student
NC State University

About VMware Horizon Suite

VMware® Horizon™ Suite, the platform for workforce mobility, connects end users to their data and applications on any device without compromising IT security and control. The suite includes the following products:

VMware Horizon View

Simplify desktop management, security, and control while delivering an optimum end-user computing experience across all devices and networks.

VMware® Horizon Mirage™

Gain centralized, zero-touch physical and virtual desktop image management with native performance and flexibility for end users.

VMware® Horizon Workspace™

Streamline the end-user experience and reduce costs with a single workspace for applications and data, delivered securely on any device.

VMware® vCenter™ Operations Manager for Horizon View™

Monitor and optimize the health, performance, and efficiency of your entire VDI.

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