



An Agile Approach to Technology Education

At East Carolina University, Intel® Xeon® processors provide a robust foundation for desktop and server virtualization while helping improve storage performance



“You might not think about the controller’s processors when selecting a storage solution. But the Intel® Xeon® processors play a key role in creating a high-performance and intelligent storage environment. Now we have the performance to support a large number of simultaneous users.”

– John Jones,
Instructional Technology Consultant,
College of Technology & Computer Science,
East Carolina University

The College of Technology & Computer Science (TECS) at East Carolina University relies on a robust IT infrastructure to support students and faculty focusing on computer science, construction management, engineering, technology systems, and related fields. The TECS IT group virtualized its infrastructure and implemented desktop virtualization to increase agility and accommodate growing demand for resources. Both servers and storage systems capitalize on the raw compute power, memory capacity, and virtualization capabilities of Intel® Xeon® processors to maximize performance and hardware utilization, delivering more services to users while controlling costs.

Challenges

- **Improve performance.** Deliver a responsive, consistent experience for students and faculty, even when numerous users are booting up systems and running workloads at the same time.
- **Increase agility.** Quickly respond to requests for new IT services and accommodate growing demand.
- **Maximize resource utilization.** Make the most of IT resources to deliver the services students and faculty need while adhering to tight budget constraints.

Solutions

- **IBM and HP servers based on Intel Xeon processors.** The IT group uses IBM BladeCenter* HS21, HS22, and HS23 systems and HP BladeSystem* servers, all equipped with Intel Xeon processors and virtualized with VMware* virtualization software.
- **HP 3PAR* storage system equipped with Intel Xeon processors.** The IT group also implemented HP 3PAR virtualized storage, which uses Intel Xeon processors to power the controllers.

Technology Results

- **Increased consolidation.** The IT group dramatically increased the number of virtual machines (VMs) hosted in its infrastructure from fewer than 50 to approximately 2,500, while reducing the infrastructure footprint.
- **Improved performance.** Servers and storage deliver a responsive experience to users, even when numerous users boot up and run workloads simultaneously.

Business Value

- **Greater agility.** With a virtualized environment, the IT group can more quickly and cost-effectively respond to new requests for IT resources from students and faculty.
- **Enhanced distance learning.** By bolstering server virtualization and implementing desktop virtualization, the IT group is enabling more anytime, anywhere learning. Students enjoy the flexibility of working on projects off campus, and the IT group can avoid expanding on-campus labs.

“Our IT group has a very customer-centric philosophy,” says Joel Sweatte, director of the TECS. “We work hard to understand faculty and student requirements. We’re willing to try new technologies and strategies whenever it supports the curriculum.”

Being responsive to user needs requires a good deal of flexibility and agility. “From one semester to the next, we often have to reinvent ourselves and the services we provide,” says John Jones, instructional technology consultant at the TECS. “We need a very agile environment so we can provide the required resources quickly and without too much expense.”

Avoiding large expenditures is essential, given the IT budget. “We have an extensive infrastructure and support a large number of users, but we have a very limited budget,” says Sweatte. “As a result, we have to make sure we are always making the most of the resources that we have.”

Improving Flexibility and Agility Through Virtualization

Virtualization offered an effective way to address the needs to increase flexibility and maximize resource utilization. “We were an early adopter of virtualization technology,” says Sweatte. “Virtualizing servers and storage helps us to accommodate a rapidly changing curriculum.”



Intel® Xeon® processors help enhance the benefits of virtualization

We can give faculty and students the resources they need, whenever they need them.”

The IT group also implemented desktop virtualization to accelerate provisioning of student environments. “Students used to spend a lot of time downloading the right software, setting up their computing environments, and establishing connections to the network. Now we can quickly give them a virtual environment with everything pre-configured so they’re ready from the first day of class,” says Jones. “Virtualizing servers and desktops also lets us provide multiple environments to each student. Students studying IT security, for example, might need several operating environments to study malware and viruses. Through virtualization, we can provision multiple VMs instead of having to provide multiple, independent computers.”

Building a Virtualized Server Environment

The virtualized server environment uses primarily IBM BladeCenter systems. The most recent servers are equipped with the Intel Xeon processor E5 family. The IT group also has a limited number of HP BladeSystem servers, which use the same processor family. “In addition to delivering strong compute performance and multiple cores per processor, the Intel Xeon processor E5 family supports the large memory capacity that is critical for virtualization,” says Jones. “The more memory we have available, the more VMs we can run on each blade.”

Intel® Virtualization Technology (Intel® VT) also provides the built-in hardware assistance needed for creating the multiple isolated environments students need. “The Intel virtualization extensions enable I/O virtualization, which allows students to run a Microsoft Hyper-V* hypervisor in a virtualized Windows* 2012 environment,” says Jones. “Students can gain hands-on training with a full range of environments, and we can minimize the lab workstations we need to purchase and maintain.”



Increasing Storage Performance

With the growing use of VMs and the continued expansion of the distance-learning curriculum, the IT group gradually outgrew its existing storage system. But it was a single event that finally triggered a change. “The catalyst was a boot storm,” says Jones. “For the IT security class, each student runs multiple VMs. One night, more than 70 students taking the class tried to boot up all of those VMs at the same time to work on a class project. They experienced significant latency—our storage system just couldn’t keep up. It was time for a new solution.”

The IT group implemented an HP 3PAR storage system, which could offer better performance in a more flexible, virtualized storage environment. The 3PAR controllers capitalize on Intel Xeon processors to help accelerate data movement and provide a range of functions, such as the adaptive optimization capabilities that help deliver the needed service levels in the most cost-effective way. “You might not think about the controller’s processors when selecting a storage solution,” says Jones. “But the Intel Xeon processors play a key role in creating a high-performance and intelligent storage environment. Now we have the performance to support a large number of simultaneous users.”

Maximizing Resource Utilization

By building a virtualized server environment on blade servers equipped with Intel Xeon processors, the TECS IT group has been able to do more with less. “Virtualization gives us the flexibility and scalability to grow cost-effectively,” says Sweatte. “We can increase the number of VMs considerably without increasing the number of blades.”

The virtualized server environment has grown substantially over the last few years. “Five years ago, we supported approximately 50 VMs on a large collection of physical servers and workstations,” says Jones. “Today, we are hosting up to 2,500 VMs on just 40 physical blade servers. We simply could not have afforded to host that many VMs in the past. Creating a virtualized environment with the latest Intel Xeon processors has let us provide more services and support more users within a limited budget.”

Spotlight on the College of Technology & Computer Science at East Carolina University

The College of Technology & Computer Science helps students excel in careers relating to technology, construction, computer science, and engineering. Faculty work to inspire innovative thinking that can address real-world problems through teamwork and collaboration. Technology initiatives in this college and across the university have helped make East Carolina University a leader in distance learning among North Carolina state schools.

Enabling Anytime, Anywhere Learning

Desktop virtualization has helped ECU become a leading distance-learning center in North Carolina. “We can provide greater flexibility to students, and educate more students while using fewer on-campus resources,” says Sweatte. “Now that faculty have seen the benefits of distance learning, many are integrating elements of distance learning into more traditional courses, allowing students to collaborate and access class materials from the dorm room or anywhere else.”

Anytime, anywhere access to resources has become a central part of learning at ECU. “Today’s students expect 24/7 accessibility to computer resources, but we can keep all of our on-campus labs open around the clock,” says Sweatte. “By providing a virtual desktop environment and accessing a virtualized infrastructure, they can connect to the resources they need whenever and wherever they want to work.”

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