DRIVE LIMITLESS LEARNING

Six Best Practices for Modernizing Higher Education IT
Digital Transformation in Higher Education

IT modernization is dramatically changing learning experiences and teaching environments. Digital is also transforming the way institutions of higher education around the world operate. From large research institutions and teaching hospitals to community colleges, digital campus initiatives move academic institutions toward more secure, agile, and cost-effective infrastructure and services, empowering individuals at all levels—from faculty, staff, and administration to that most important stakeholder, the student.

The challenges posed by modernizing IT make it imperative to choose the right partner on the journey. Today, colleges and universities are accelerating digital transformation with VMware—taking a pragmatic, value-added path that taps the power of data centers, cloud, mobility, automation, and security to improve operations and contain costs.

This ebook examines the best practices embraced by academic leaders when they team with VMware as their IT modernization partner of choice.
Server Virtualization Was Just the Beginning

As a foundation for IT modernization, virtualization—pioneered by VMware—helped academic institutions efficiently deal with increasing demand for IT services while reducing hardware, energy, and operational costs. It also led to more dynamic and agile computing environments.

Today, a software-defined approach enabled by advanced technologies from VMware is at the core of data center modernization, transforming security, extending to any cloud, and supporting the delivery of apps, data, and information—anytime, on any device, wherever work needs to be done.

“What we really can’t do is buy storage from one firm, networking from another firm, compute systems from another firm, and expect them all to operate perfectly. A hyper-converged platform maximizes our uptime, minimizes our risk. VMware can actually do this.”

— Michael Feld
Interim CTO
Temple University Health System
IT Modernization
Best Practices

Academic institutions working with VMware take an evolutionary, not revolutionary, approach to IT modernization. These six best practices are among the ways top colleges and universities are accelerating digital transformation with VMware.

1. Boost Agility with a Software-Defined Foundation
2. Improve Operational Efficiency Through IT Automation
3. Provide Infrastructure as a Service
4. Create a Culture of Agility with Cloud
5. Transform Cybersecurity with a Software Layer
6. Increase Productivity Through Mobility
Boost Agility with a Software-Defined Foundation
1. Boost Agility with a Software-Defined Foundation

Traditional IT infrastructure silos pose significant challenges. They are difficult to maintain and costly to change. A modernized data center is virtualized, automated, standardized, and extensible across private, public, and hybrid clouds, making it ideal for innovation. Governed by software, a modern data center meets the increasing requirements of higher education institutions to deliver IT services faster and at scale, all while improving cybersecurity and the productivity of staff, faculty, and students. It enables existing IT staff to support on-premises legacy applications and future, cloud-based architectures, including cloud-ready development platforms and ecosystem partners, without ripping and replacing systems.

A software-defined data center (SDDC) is the optimal foundation for agility. It simplifies and streamlines entire IT infrastructures. The combination of virtualized compute, storage, and networking with a common management platform gives academic institutions the freedom to extend internal data centers to any public, private, or hybrid cloud for the increased flexibility needed to meet changing requirements—whether they are from students, staff, or in the context of regulatory shifts.

With an SDDC approach, Université Laval (U-Laval) has transformed into an IT service broker, offering its departments a cloud-based alternative to managing their own IT infrastructures, as well as serving the extended community with a public cloud. The addition of VMware NSX® network virtualization enables U-Laval to deliver isolated environments to different tenants on the same infrastructure, with fast provisioning and low costs. This allows U-Laval to offer regional municipalities, public sector entities, and school boards in Quebec an affordable and secure data center as a service.

Modernize your data centers for greater flexibility:

- Virtualize compute, storage, and networking.
- Move applications to the cloud at your own pace, when and where it makes sense.
- Automate and standardize management across the infrastructure.

TAKE A TOUR
The Modern Data Center
Improve Operational Efficiency Through IT Automation
2. Improve Operational Efficiency Through IT Automation

Cost management is key for every academic institution, be it public or private. Every campus recognizes it, but doing more with less continues to challenge teams stretched by the upkeep of legacy systems and proliferating endpoints. Furthermore, reliance on traditional legacy applications and high-touch, manual lifecycle management for the delivery of IT services negatively impacts availability, performance, and resource allocation. An enterprise-ready, complete cloud management platform manages, monitors, and automates data center and heterogeneous, hybrid cloud infrastructure. It improves consistency, quality, and speed to market with standardized blueprints for application environments, decreasing time spent deploying infrastructure and applications or responding to IT service requests.

End-to-end virtualization, centralized management, and IT automation help campuses
- Eliminate wait times for provisioned infrastructure and applications
- Standardize configurations
- Reduce unnecessary rework
- Respond faster to requests for new IT services
- Lower both capital expenditures and operating costs

Technology plays a key role in powering online learning and delivering services to both students and administration at the University of New Mexico (UNM). When UNM needed to upgrade its IT infrastructure to automate services, increase agility, and eliminate outages, it began establishing an SDDC. Today, UNM’s investment in VMware solutions has resulted in decreased costs and increased efficiency and reliability.
Automate IT across your data centers and hybrid cloud:

• Gain policy-driven, automated delivery of production-ready infrastructure, apps, and custom IT services.
• Unify monitoring and automate performance management across apps and infrastructure.
• View real-time log management and analytics across physical, virtual, and cloud environments.
• Automate costing, usage metering, and service pricing of virtualized infrastructure.

“"The combination of VMware vRealize® Automation"™ and VMware NSX is a game-changer for us. The security, speed, efficiency, and portability benefits are very tangible.”

— Brian Pietrewicz
Deputy CIO
UNM
Provide Infrastructure as a Service
3. Provide Infrastructure as a Service

Fragmentation of IT across a campus can cause inefficiencies, raise costs, and complicate security efforts. As IT organizations become more agile with a completely software-defined infrastructure, services can be delivered faster, with compliance and security built in, and for lower cost. With a simple self-service portal, anything from storage to networking to high-performance computing can be provisioned in minutes instead of weeks.

The University of New Hampshire deployed a software-defined network that could create secure network segments without adding more hardware. It consolidated 500 physical servers into 80 that run thousands of virtual machine (VM) workloads. Consolidated hardware clusters, while staying in compliance with PCI and HIPAA thanks to VM-level firewalls and logging in NSX, allow workloads to run securely on the same host yet remain fully separated for compliance needs.

“When schools understand that they can get resources and applications cheaper and quicker, they are inclined to use the UNH central IT secure data center.”

— David Bird
Lead System Administrator
University of New Hampshire
Unify curriculum, research, and IT efforts across campus:

• **Speed innovation** – Deliver infrastructure as a service, including High-Performance Computing, via a self-service portal to drastically improve time to market.

• **Ensure consistent environments** – Use templates to help ensure consistency and compliance with security policies and regulatory guidelines.

• **Reduce costs** – Eliminate cost duplication and overprovisioning, and reduce overall capacity by reclaiming inactive resources.

• **Safeguard funding sources** – Align with security regulations and compliance mandates (e.g., NIST 800-171 and GDPR) using VMware Validated Designs™.

**READ THE GUIDE**
IT Management and the GDPR

**VIEW THE VIDEO**
Sharing High-Performance Devices Across Multiple Virtual Machines
Create A Culture Of Agility With Cloud
4. Create a Culture of Agility With Cloud

Cloud is a strategy, not a destination. Yet without a common operating environment, managing workloads across on-premises, public, and hybrid clouds can be difficult and time consuming. Successful cloud deployments enable campuses to manage a workload where it makes sense—on premises, or in a particular public cloud—depending on application type, program, or educational goal.

Extend to Public Cloud

VMware leads in ensuring interoperability, enabling academic institutions to run workloads anywhere without having to commit to one vendor or rewrite application code. The largest public cloud providers, Amazon Web Services (AWS), Microsoft Azure, and IBM Cloud, in addition to the robust VMware Cloud Verified partner network, team with VMware on hybrid cloud solutions that are compatible with VMware infrastructure. This compatibility enables campuses to extend on-premises VMware vSphere® infrastructure to commercial clouds based on vSphere, and move workloads back and forth using a common toolset for management and monitoring.

For the recalculation of protein structures, the Centre for Molecular and Biomolecular Informatics (CMBI) at the UMC Academic Medical Centre St. Radboud in Nijmegen needs vast computing power that can be deployed simply and flexibly. Additional computing power must be immediately available as demand arises. The CMBI addresses this need with a VMware-based High-Performance Computing Cloud, delivered by a VMware Cloud Provider.

“Five years ago, we would have needed servers across Europe for our calculations, but now this cloud platform suits our needs very well.”

— Gert Vriend
Professor
Centre for Molecular and Biomolecular Informatics
VMware Cloud™ on AWS brings the VMware SDDC to the AWS Cloud as an on-demand service. Powered by VMware Cloud Foundation™, the service integrates vSphere, vSAN, and NSX along with VMware vCenter® management, and is optimized to run on dedicated, elastic, bare-metal AWS infrastructure using familiar VMware tools and a broad range of AWS services.

**READ THE CASE STUDY**
Université Laval (U-Laval) Transforms into an IT Service Broker
Transform Cybersecurity with a Software Layer
5. Transform Cybersecurity with a Software Layer

Security remains the top IT priority for every academic institution. A software-defined approach to infrastructure extends to security, better safeguarding data and applications through a defense-in-depth approach to mitigating risk.

More operationally efficient than hardware, software can be used by campuses for ubiquitous abstraction of physical resources across their entire IT environment: infrastructure, apps, networks, and endpoint devices. This abstraction, pioneered by VMware, enables full visibility, context, and control of interactions between users, apps, and devices while also allowing for the insertion of third-party security and compliance services. This same open and ubiquitous architecture provides comprehensive policy-based governance, automation, monitoring, and identity-based conditional access to provisioned resources.
Control Lateral Movement Inside Your Data Center

Because traditional perimeter-centric network security doesn’t solve the growing problem of attacks targeting universities, there’s micro-segmentation with software-defined networking. VMware NSX enables granular firewalls and security policy enforcement for every workload in the data center:

• Eliminate server-to-server threats within the data center.

• Reduce errors and inefficiencies inherent in a physical networking environment.

• Ensure security policies move with the application.

• Reduce scope of compliance by isolating the systems that store, process, or transmit sensitive data.

Edinburgh Napier University deployed NSX to create a seamless IT experience for students and staff alike. With a granular level of security at the network layer, the IT team can both migrate and provision new servers in half the time it used to take, helping them to get new services to students and staff quicker.

“VMware NSX helps to protect our students and staff, which ultimately helps protect the University.”

— Iain Russell
Head of Infrastructure
Edinburgh Napier University
As the first software-defined networking solution with a published Security Technical Implementation Guide (STIG), NSX meets the security requirements for installment on Department of Defense (DoD) networks, thereby supporting research collaborations that may involve the Federal Government. The Defense Information Systems Agency (DISA) has also released a STIG for vSAN, vSphere, and VMware AirWatch®.

Read the White Paper
Core Principles of Cyber Hygiene in a World of Cloud and Mobility
6

Increase Productivity Through Mobility
6. Increase Productivity Through Mobility

Modern infrastructure enhances institutional agility and flexibility while providing an architecture that securely mobilizes campus stakeholders, including students who bring personally owned devices into the campus IT mix. A digital workspace platform, such as VMware Workspace ONE™, integrates access control by identity, application management, and multiplatform endpoint management to deliver secure access to data, apps, and IT services from any device or location while maintaining a consumer-like user experience.

The Digital Workspace

Beyond mobile devices, the digital workspace encompasses virtual desktop infrastructure (VDI) that modernizes PC experiences for example, in campus labs. VDI enables IT to centrally manage and deliver desktops and applications for more cost-efficient, agile, secure delivery. VDI simplifies Windows 10 migrations and the management of legacy apps side by side with modern SaaS and web-based apps.
When colleges and universities deploy the digital workspace, they

- Provide a modern interface and self-service app catalog for an unmatched user experience
- Deliver single sign-on access to any app or data from any device or operating system
- Enable the centralized management of users, apps, and devices from a single console
- Offload cumbersome IT management tasks, including full application and PC lifecycle management
- Provide real-time visibility into user, device, and application behavior across locations, and over-the-air delivery of apps, policies, and updates
- Strengthen data protection by keeping data off devices, secure in the data center

Transforming Learning
Western Carolina University is using digital workspace solutions to provide flexible, convenient access to apps and data from cafés to labs to offices. Through a single portal with a single log in, the university community can study and work on any device at any time.

“We’re excited, as a university, and as an IT department, to give students a consistent experience and really level the playing field. We’re breaking down barriers and making resources more accessible. We’re excited that we can bring everything together in a very intuitive and easy-to-use package.”

— Mark Ellersick
Technology Support Analyst
Western Carolina University
The Digital Workspace in Action
North Carolina has made a bold and exciting promise to its residents: Beginning in fall 2018, the North Carolina Promise Tuition Plan will dramatically reduce tuition costs at three state universities. Western Carolina University is one of these schools, and it expects the promise of $500 tuition to boost enrollment by approximately 50 percent, bringing in 5,000 more students over the next five years. Along the way, Western Carolina University needs to maintain its focus on technology and high-value education as enrollment increases rapidly. The university is using a combination of VMware solutions and expertise to improve service quality while reducing costs.

Attract Top Talent: Improve Computing Experiences for Students and Faculty

Students
Students bring any device they own and with a single set of credentials, they can access any application they need through a web browser. As they add and drop classes, apps are automatically added or removed from their digital backpack.

Faculty
Professors or principal investigators can access any education or business application and any research or other data, whether they are in class, at their office or at home - helping them balance life and work.

Curriculum, HR, and IT
Teams work hand in hand to identify and make available needed apps (virtual, SaaS, Cloud-Native, Mobile, even full research environments). They are made ready for deployment to appropriate faculty, staff, and students.
Taming the Internet of Things

As more and more connected devices enter the higher education environment, campus IT teams will be confronted with interoperability and security questions. How will Internet of Things (IoT) devices be configured, secured, managed, and monitored, from the edge to the cloud? A single platform, such as VMware Pulse™ IoT Center™, supports academic institutions’ enterprise-grade IoT success. From smart classrooms and research facilities to optimized supply chain management for more efficient procurement in areas such as food service, the opportunities for innovation in the educational experience are endless. With VMware, campuses can leverage IoT to evolve and innovate, without reinventing the wheel.

READ THE BRIEF
The Secure Digital Backpack with the VMware Connector for Ellucian
Drive Limitless Learning with IT Modernization and VMware

Groundbreaking software-defined solutions modernize IT and improve security, accelerating digital transformation for academic institutions around the world. Position your campus for IT modernization success with VMware.

Tap into a World-Class Team Dedicated to Higher Education
VMware understands the unique requirements of academic IT, making VMware technology solutions built on a virtualized, software-defined approach to IT even more advantageous for institutions seeking to preserve investments in point solutions or legacy applications. With VMware, you’re partnering with a dedicated team of business and technical experts who really understand how higher education is changing today, and how IT can help drive innovation.

In the years since VMware introduced the concept of server virtualization to higher education, it has helped colleges and universities enable secure access to applications and infrastructure while lowering costs. Today, VMware provides remote access to collaborative research computing environments, ensuring that the IT infrastructure driving campus workflows in financial aid, healthcare, campus security, transportation, logistics and of course, the classroom—are efficient and secure. With VMware, your IT team can meet the needs of today’s modern mobile learners by securing and mobilizing digital learning and research environments.

Benefit from Long-Standing Partner Relationships
The VMware portfolio of data center and multi-cloud IT solutions supporting the end-to-end IT framework, from the data center to endpoint devices, serves the entire academic IT landscape. Deeply integrated partnerships across academic systems integrators and technology providers—including Dell, Microsoft, Apple, Amazon, and IBM—accelerate IT modernization initiatives securely and effectively.

Take an evolutionary, not revolutionary, approach to IT modernization in support of your campus goals. Modernize IT with best practices and technologies from VMware.

Learn more at http://www.vmware.com/go/education.