# Datacenter Consolidation for Academic Institutions

- More datacenter infrastructure is consolidated on VMware than on any other platform.

- VMware solutions for server and datacenter consolidation fully support key academic requirements.

- Practical to implement, VMware solutions scale to support department use and cross-department implementations.

- VMware solutions deliver functionality and value beyond the hypervisor, including comprehensive enterprise IT management and security solutions.

- VMware provides a prescriptive path to your cloud and shared services adoption.

**VMWARE DATACENTER CONSOLIDATION BENEFITS**

- Cost reduction
- Standardization
- Improved security
- Sustainable operations
- Support from leading education software providers

## The Case for Change

IT can be a strategic asset, transforming the way academic institutions achieve education goals. Efficient datacenter operations improve learning environments, foster greater staff and research collaboration, and support business-critical administrative services. Inefficient datacenter operations beget duplication and waste.

Although nearly every academic institution operates a datacenter, most function significantly below capacity—using less than optimal computing power, despite the additional infrastructure, real estate and energy investments. Today, requirements for greater efficiency and reduced costs have higher education IT leaders assessing how best to reduce, reuse and rethink their IT infrastructure investments.

Budget pressures require every institution to make smart investments and cooperate whenever possible. By doing so, institutions can prevent funds from being directed to other projects. Datacenter consolidation provides an opportunity for IT leaders in education to make modest investments in people, process and technology for tremendous gains in cost, agility and security. With the potential to speed time to value compared with other IT initiatives, datacenter consolidation is most effectively achieved with virtualization, the foundation for cloud computing.

As the pioneer of virtualization and the global leader in virtualization and cloud infrastructure, VMware is uniquely qualified to support academic datacenter consolidation initiatives as the first phase on a prescriptive path to cloud computing. A virtualized datacenter also creates a technology standard for building and delivering shared services within and among departments, colleges, universities, research centers and other academic environments. Because VMware virtualization reduces costs, increases agility and enhances security, more datacenter infrastructure is consolidated on VMware than on any other platform.

### Best Practices for Datacenter Consolidation

The decision to consolidate is often easier than knowing how or what to consolidate. VMware makes datacenter consolidation successful by coupling proven technology with the right approaches to aligning people and transforming processes. VMware Professional Services experts use a VMware best-practices methodology (see Figure 1) to provide proactive insight into inventorying, prioritizing and properly timing the consolidation or retirement of servers. This can prevent expensive, time-consuming fixes later that might compromise education goals.
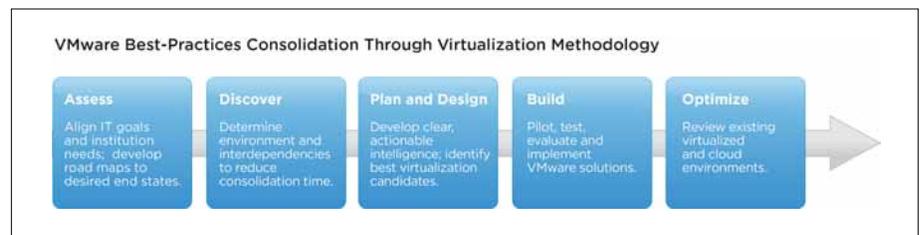


**Figure 1.** VMware offers a comprehensive approach to datacenter consolidation.

As consolidation targets are identified and planned, the best practices–based model from VMware translates infrastructure dependencies into actionable information. VMware has designed its comprehensive approach as a phased process to maximize the benefits of virtualization and prepare a path to the adoption of private and hybrid clouds. With VMware, IT leaders can overcome common consolidation obstacles by leveraging best practices based on customer experiences. Technology implementers benefit from VMware account management, education and certification services, which help to address all stakeholder requirements. Moreover, academic institutions gain the cost justification they

**vm**ware®

- Reduced new service deployment times from three to four weeks to only a few hours

- Significantly reduced power, cooling and datacenter space to support green IT initiative

- Reduced operational expenditures by $70,000 per year

- Obtained ROI payback in just 3.25 years

- Reduced recovery time for site failures from days or weeks to just minutes

- Achieved a 7:1 server consolidation ratio

- Enabled remote management of the centralized, virtual server environment

- Eliminated future capital expenditures of more than $600,000 in hardware replacements [4]

*"By virtualizing our infrastructure on a VMware platform, we've enabled an architecture that is as cost-efficient as it is flexible and reliable. Every time we've quantified the cost savings of virtualizing servers, we've documented a savings of roughly 10:1."*

- Rob Lowden, Director of IT, Indiana University [5]

need to extend virtualization beyond consolidation to automating IT management and enabling cloud computing.

## Phase 1: Teaming with VMware for Datacenter Consolidation

Virtualization is the foundational technology for datacenter consolidation. VMware virtualization is already in use at many higher education institutions around the world, among them Carnegie Mellon University, Massachusetts Institute of Technology, Oxford University, Santa Clara University, Georgia Tech and the University of British Columbia. Using VMware vSphere®, the leading virtualization platform for server and datacenter consolidation, academic institutions are reducing IT capital and maintenance costs while enhancing IT security.

### Smarter Capital Expenditures

Energy and cost savings are natural by-products of virtualization. By preserving existing investments and decreasing hardware, software, network and storage requirements, IT leaders report lower capital expenses. VMware customers are realizing physical-to-virtual consolidation ratios ranging from 2:1 to greater than 10:1, depending on application loads. Fewer devices consume less electricity, so IT infrastructure requires less cooling and ventilation. The IT environment footprint is also reduced. Each server virtualized is equivalent to eliminating 4 tons of $CO_2$ emissions or taking 1.5 cars off the road.[1]

Experts at Pacific Gas and Electric Company estimate that an industry-standard server requires an average of 4,071 kilowatt-hours (kWh) annually to power and cool.[2] Those kilowatt-hours multiplied by the number of x86 servers running in a datacenter result in an estimate of electricity consumption, carbon footprint and related costs. Such calculations reveal that the potential for additional savings is dramatic: if all academic institutions virtualized their x86 servers by the lowest average consolidation ratio of 2:1, the education-wide result could be a 50 percent reduction of server-based energy consumption, $CO_2$ emissions and space.

Academic institutions have already seen impressive capital savings. "VMware's track record both within our organization and across the industry speaks for itself in terms of the huge cost savings and gains in operational efficiencies we were able to achieve," says Link Alander, associate vice chancellor for technology services at Lone Star College System.[3]

### Reduced Operational Expenses

The majority of IT costs are allocated to maintenance. VMware virtualization enables academic institutions to lower operational costs because VMware reduces IT complexity and increases automation, freeing IT staff to work on more strategic projects that drive more education value. IT leaders in education rely on vSphere to virtualize business-critical applications and accelerate application delivery. Because vSphere improves quality of service through dynamic scaling and high availability, academic institutions can run applications with higher reliability at lower costs.

### Enhanced IT Security

Consolidation using virtualization protects IT environments. Virtual infrastructure can be more stable and secure than traditional physical infrastructure: it reduces the attack profile of the enterprise, enables easy isolation of breaches or contaminated infrastructure, and provides protection so that if one machine fails, others are unaffected.

VMware vShield™ provides agencies with a single comprehensive framework for securing virtual datacenters and cloud environments at all levels—host, network, application, data and endpoint. Academic institutions centralize security across the virtual datacenter, secure the edge of the virtual datacenter, protect applications from network-based threats, and offload antivirus and anti-malware processing for endpoints. When an institution uses VMware certified and validated solutions for consolidation initiatives, its datacenter security and compliance capabilities can far exceed the capabilities of physical environments.

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[1] Derived from The World Factbook. Country Comparison: Electricity Consumption. CIA, 2008.
[2] Ibid.
[3] VMware. "Lone Star College System Virtualizes 14 Campus Datacenters, Slashes IT Costs and Improves Disaster Recovery." Case study, 2010.
[4] Ibid.
[5] VMware. "Indiana University Virtualizes Mission-Critical Oracle Databases." Case study, 2011.

## Phase 2: Automating IT Infrastructure Management

VMware IT management solutions seamlessly integrate into the vSphere virtualization platform to multiply the cost-savings benefits of consolidation. VMware intelligent policy management enables academic institutions to improve system maintenance, compliance, governance, disaster recovery, business continuity, identity management and other IT infrastructure management tasks that are repetitive, yet critically important. With VMware, academic institutions can provision new servers more quickly. "It used to take three months or more to provision a server, mostly because we were so short on space. We'd have to wait for a server to die before we could add a new one. With the VMware environment, IT can provision a new server in about 15 minutes," explains Michael Thorson, director of infrastructure at the University of British Columbia.[6]

### Performance, Capacity and Configuration Management

When IT has fewer manual processes, it can increase its focus on strategic education objectives. VMware vCenter™ Operations Management Suite™ integrates performance, capacity and configuration management to automate and simplify operations management in dynamic virtual and cloud environments. The suite provides real-time, cross-team views that help academic IT teams be more proactive. It also includes dashboards for performance, capacity and configuration change events, so IT teams can set policy controls and maintain continuous compliance with operational best practices. Using capabilities such as provisioning and configuration analysis, the solution detects unwanted changes that lead to downtime in IT production environments. By analyzing and forecasting capacity needs, IT staff can deliver the right amount of capacity at the right time. Academic institutions can right-size virtual machines to increase consolidation ratios, reduce costs, and make better use of compute power and VMware investments.

### Compliance and Security Management

Change is constant, and effective compliance monitoring reduces risks associated with change. VMware vCenter Configuration Manager™ automatically assesses and reports on the compliance status of virtual infrastructure and applications, as well as the impact of planned or unplanned changes. It includes out-of-the-box compliance policies for most of today's common standards. Traditional tools provide only out-of-compliance reports; vCenter Configuration Manager offers a simple one-click method for quickly remediating issues and bringing a system back into compliance.

Protecting IT environments that house private information remains a top priority for academic institutions. With vShield and vCenter Configuration Manager integration, IT teams can establish a regular interval for automatically determining which virtual machines contain confidential or sensitive information. The solution then determines the set of virtual machines that are communicating with the virtual machines that contain the sensitive information, and places all of them in one security group, enforcing the network isolation often needed to meet compliance requirements.

### Disaster Recovery and Continuity of Operations

Downtime prevents academic institutions from achieving objectives. VMware vCenter Site Recovery Manager™ automates disaster recovery and improves business continuity. This solution includes the industry's first hypervisor-based replication to enable cost-efficient replication for vSphere environments and supports the use of heterogeneous storage across sites. vSphere Replication simplifies the process by managing it directly through VMware vCenter Server™ at a granular, flexible virtual-machine level. Using Site Recovery Manager, academic IT organizations can perform planned, routine migrations with application-consistent recovery and protection against data loss. The solution's automatic failback feature manages replication reversal and failover to the original production site to streamline routine migrations.

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[6] VMware. "Virtualizing Oracle Database Servers Readies University of British Columbia to Achieve Infrastructure Goals." Case study, 2011.
[7] VMware. "University Virtualizes to Simplify Server Management, Increase Agility in Offering New Services." Case study, 2010.

- Proven results in academic institutions
- More than 350,000 customers
- Open, standards-based solutions
- Expansive partner network of more than 50,000 partners, including leading education ISVs

## IT Management

IT leaders at academic institutions need visibility and control to run IT effectively. Through a five-stage, value-driven approach, VMware simplifies IT management by applying a management lens to IT activities—from costs and service levels to vendor management to providing a common language for IT and stakeholders. The result is transparency and trust in all IT activities, effective execution of IT strategy and the ability to accelerate the benefits of cloud computing.

## Phase 3: Moving to Your Cloud

A virtualized datacenter paves the way to your cloud—the right private, public or hybrid cloud to meet unique education needs. Additionally, virtualization establishes a technology standard for academic institutions to build and deliver shared services. Both your cloud and shared services, enabled by the comprehensive VMware cloud infrastructure suite (see Figure 2), can reduce costs and increase efficiency.

With vSphere, academic institutions gain application portability and interoperability for collaboration between onsite and offsite cloud environments. For more efficient sharing of services, IT leaders deploy VMware vCloud Director®. Using it to create a catalog of approved IT services with the right configurations and security settings, academic institutions can simplify and accelerate provisioning.

### Datacenter Consolidation and IT Transformation Begin with VMware

VMware solutions deliver cost savings, efficiency, security and compliance benefits while keeping data and applications highly available, which enables academic institutions to respond quickly to change. By leveraging best practices–based professional services, program management and proven industry-leading software, VMware helps academic institutions design and execute server and datacenter consolidation strategies for maximum ROI and scalability.

From datacenter consolidation to IT management to your cloud, VMware virtualization and cloud infrastructure solutions support academic institutions evolving at their own pace. To learn more about making the case for your datacenter consolidation initiative, visit http://www.vmware.com/solutions/education or call VMware at (877) 4-VMWARE or (650) 427-5000.
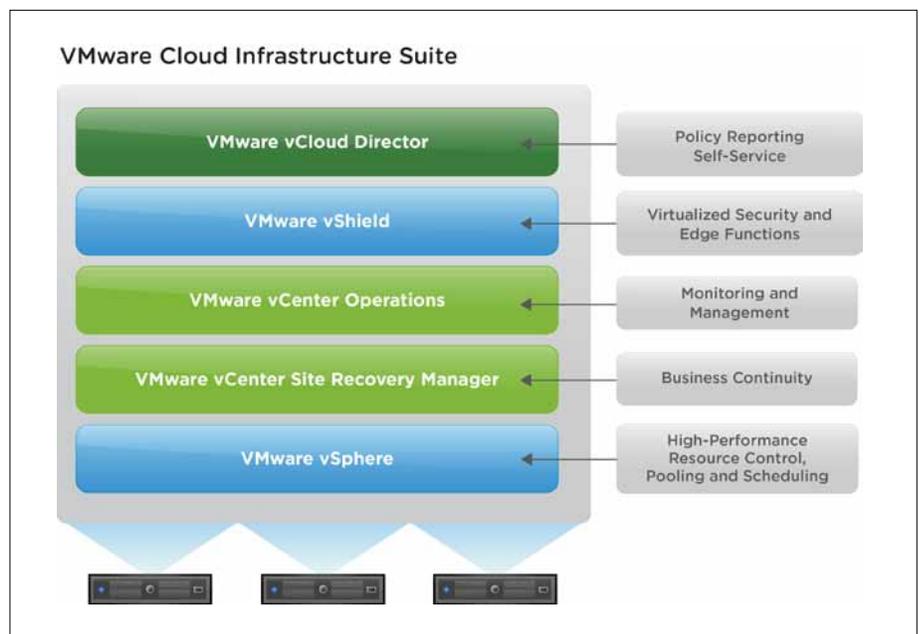


**Figure 2.** VMware solutions support higher education datacenter consolidation initiatives.