

# HyTrust Enables University of California, Berkeley, to Cost-Effectively Enhance and Secure Its Virtualization Capabilities

The HyTrust Appliance Allows Campus Data Center to Provide Infrastructure as a Service (IaaS) Functions to Over 30 Internal and External Divisions, While Reinforcing Security and Availability



## HyTrust® Appliance

**INDUSTRY**  
Education

### OBJECTIVE

To deliver the power and flexibility of virtualized services to multiple tenants while monitoring and maintaining the highest levels of security and controlling access to the centralized architecture.

### APPROACH

- Use HyTrust Appliance to segment the infrastructure
- Enable separation of duties, with total visibility into changes
- Establish two-factor authentication to support security
- Secure access to VMware vCenter and directly hosted applications
- Map hypervisor configuration to regulatory templates
- Leverage investment in RSA SecurID infrastructure

## A Major University Tackles the Complex Challenges of a Growing Virtualized Data Center and Diverse, Multiple Clients

As a leading university at the forefront of education and research in the U.S. and abroad, The University of California, Berkeley (“UC Berkeley”), now serves in the role of a centralized IT department, hosting virtual servers for clients within and external to the campus itself.

Founded in 1868, this legendary educational institution has distinguished itself across nearly all fields of research and study. Today, UC Berkeley is reaching new horizons of scientific and engineering progress as well as providing thought leadership in the humanities, arts and social sciences. As part of its commitment to extend the benefits of first-class education to a growing cohort of students, professors, and research programs, Berkeley provides important IT capabilities and services to other campuses as well as to its own internal clients. Implementing the leading edge of IT progress is part of that vision as demands soar for secure resources. To answer those demands, UC Berkeley employs groundbreaking technologies offered by the most capable and respected vendors.

“The HyTrust Appliance is the **robust solution we need to offer essential new capabilities to our growing customer base**—while enforcing policies and maintaining the utmost security.”

Curtis Salinas,  
Systems Administrator



### TECHNOLOGY IMPROVEMENTS

- Deliver direct, controlled administrative access to clients  
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- Enforce policy across the virtual infrastructure  
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- Allow monitoring, alerting, troubleshooting, and forensic analysis  
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- Support protocols, including vSphere Client, Web client, and SSH  
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- Enable Infrastructure as a Service (IaaS) with security and availability

### PROJECT OUTCOMES

- Enforced compliance with internal policies  
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- Lowered operations costs significantly  
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- Instilled tenant confidence and encouraged productive participation  
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- Solved access control, policy enforcement, and compliance  
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- Improved return on virtualization investment

Today, the University is challenged to control access and protect security, leverage its substantial current IT investment, and scale to meet future needs. To accomplish this, the campus has virtualized extensively, hosting servers in a centralized architecture for approximately 30 different divisions, or tenants, throughout its own system, as well as for those of other schools, such as UC Merced and UCLA.

#### A Tradition of Progress and Responsibility

As the pioneer University of California campus, Berkeley has always taken on major challenges integral to its leadership mission. Founded in the momentum following the Gold Rush by leaders of this 31st state, UC Berkeley is now one of the world's preeminent educational institutions. Its distinguished faculty boasts 20 Nobel Laureates, an unrivaled research library, and more than 350 stellar academic programs.

The list of Berkeley's achievements and their impact on human progress is nearly impossible to quantify. Added to the phenomenal economic growth the campus has fostered are scientific breakthroughs that include the discovery of vitamin E, identification of the influenza virus, paradigm leaps in computing, and the imaging of the early universe. Landmarks in the arts and social sciences include discovery of a lost Scarlatti opera, the drafting of the nation's first no-fault divorce law, key research on urban street gangs and human nutritional requirements, and much more. UC Berkeley is noted for attracting and nurturing the finest students from within its own geography and around the world.

Respected sources rank UC Berkeley at or near the top of all educational institutions; a National Research Council analysis concluded that UC Berkeley has the largest number of highly ranked graduate programs in the U.S. In doctoral programs, 48 of 52 Berkeley programs are within the top 10 nationally.

#### Developing Information Technology That Sustains Excellence and Progress

Early on, UC Berkeley recognized the value of virtualization and implemented it in their data centers. Now, as the centralized IT department for a large educational system, Berkeley leverages virtualization to cost-effectively host the virtual servers of approximately 30 different divisions, or tenants throughout its own system as well as those of other entities, such as UC Merced and UCLA.

The needs of Berkeley's data center tenants exceed simple compute power, however. Each demands the specific advantages of virtualization, such as flexibility and power. These require direct administrative access and represent a significant challenge to UC Berkeley: How does the University extend this versatility and flexibility, offering Infrastructure



as a Service (IaaS) to numerous tenants without compromising security and availability?

### Two-Factor Authentication—a Vital Element of the Solution

The first technical hurdle for Berkeley was to implement two-factor authentication so that its datacenter tenants could securely access VMware vCenter as well direct-to-host. This was in accordance with a mandate established throughout the system. The University had already invested in RSA SecurID infrastructure so they wanted to leverage that investment. Establishing two-factor access was not only compliant with internal policy but was also seen as a measure to instill confidence across the various tenants and encourage greater participation.

Curtis Salinas, the systems administrator for Information Services and Technology, states the challenge thus: "It happened for our Windows infrastructure several years ago, and now it's happening at the hardware virtualization layer. We're 'too big for our britches' and lack a solid methodology for monitoring, securing, and maintaining our vSphere systems as we continue to expand."

To gain these capabilities, UC Berkeley chose HyTrust and its innovative HyTrust Appliance. Initially, the university had sought HyTrust for its ability to deliver two-factor authentication for the virtual infrastructure via RSA SecurID. "However," says Salinas, "I quickly realized that HyTrust had much more to offer us than just two-factor authentication. Their implementation of host configuration templates alone has made it worth the purchase, not to mention the granular access policies and auditing, and root password vaulting (my favorite)."

### The HyTrust Appliance Delivers a Comprehensive, Accessible Security Solution

UC Berkeley immediately recognized the ability of the HyTrust Appliance to serve as a foundation for solving issues of access control, policy enforcement, and compliance. The HyTrust Appliance provides a secure gateway for access to the virtual infrastructure and supports all available access methods and protocols, including vSphere Client, Web client, and SSH. The HyTrust solution also delivers a straightforward way to enforce policy across the virtual infrastructure. These policies determine, among other parameters:

- Permissions to access specific resources based on two-factor authentication
- Conditions under which access is granted
- Which operations can be utilized
- How infrastructure components interact with one another



A major differentiator of the HyTrust Appliance is its ability to provide records of all access to the virtual infrastructure in a log-form that is:

- Granular
- User-specific
- Human-readable
- Audit-quality

Along with maintaining records, the HyTrust Appliance performs comprehensive monitoring, alerting, troubleshooting, and forensic analysis. It also analyzes the hypervisor configuration and ensures that it maps to the stringent templates of such regulations as the Payment Card Industry Data Security Standard (PCI-DSS). The solution can assess and remediate the configuration as needed.

### The Solution: Segmenting the Infrastructure Supports Security

HyTrust Appliance enables proper segmentation of the infrastructure so that centralized IT organizations like UC Berkeley can enforce separation of duties, gain complete visibility into changes, and provide evidence of compliance. The solution dramatically improves customers' return on their virtualization investments by promoting secure, accountable self-service across the entire IT ecosystem, which can lower operations costs significantly. Raising user confidence promotes more cost-effective virtualizing—including in systems that are mission-critical, contain sensitive data, or are subject to compliance.

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### A Flexible Solution Offers Cost-Effectiveness, Increased Productivity, and Scalability to Grow On

HyTrust Appliance allows UC Berkeley to exceed expectations in fulfilling its commitment to its tenants. It actually allows UC Berkeley to provide Infrastructure as a Service to approximately 30 tenants, which encompasses approximately ten clusters and nearly 1,000 virtual machines. As these UC Berkeley tenants have gained confidence in the solution's security, they have added up to 30 new virtual machines per month, reinforcing the functionality of the overall environment and expanding its ability to serve their clients.

Even critical applications like Oracle database clusters, once considered off-limits in the shared virtual environment, are now slated for deployment in the new environment. The solution has proven so successful that UC Berkeley is seeking to expand beyond its existing tenants and has approached other higher learning institutions with an offer to host environments for them.