Joint Customer Story

The University of British Columbia Becomes a Cloud Service Provider

KEY HIGHLIGHTS

Industry
Education

The Challenge
Centralize IT storage across the university; consolidate data and services to improve operational efficiency and service quality.

The Solution
Build a private cloud and transition to a service provider model.

Benefits

- Reclaim more than 2PB of storage capacity with deduplication
- Reduce storage management time by 75%
- Meet performance requirements with 60% less hardware
- Maintain high availability for services with nondisruptive operations
- Focus IT resources on strategy and innovation
- Provide reliable, centralized data protection

Customer Profile

Founded in 1908, The University of British Columbia (UBC) is a public research university in British Columbia, Canada, with over 50,000 students and more than 13,000 faculty and staff. With campuses in the Okanagan Valley and the Vancouver metro area, UBC is one of the largest universities in Canada and among the top research universities in the world.

The Challenge

Delivering private cloud services

For many years, the university operated under a decentralized IT model, with individual departments and faculties hosting their own applications and infrastructure. However, as the university's enrollment and data grew these silos became a source of management inefficiency.

"With petabytes of data growing at 50% annually, a decentralized IT model was no longer cost effective or practical for the university," says Mario Angers, manager of Systems at UBC. "Lack of standardization between departments made the distributed infrastructure very difficult to support."

In addition, UBC's primary e-learning platform—Blackboard Connect—had become business critical. Periodic downtime of the system was no longer an option because it could bring many university operations to a halt until access was restored.

UBC decided to provide a centralized IT storage service across the university and deliver services through a private cloud, with the goal of bringing all departments and faculties into the new system by mid-2015. "In order to offer competitive service levels for availability, performance, deployment time frames, and data protection, we needed to become a cloud services provider to departments and faculties across all campuses," says Angers.

Breaking down the storage silos

The university began by consolidating islands of storage onto NetApp® storage systems and virtualizing application servers and Oracle® Database servers with VMware® vSphere®, vCloud® Director, vCenter™, vCops, and VMware View™ for virtualized desktops.

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Brent Dunington
Systems Architect, University of British Columbia

"NetApp was the only storage vendor that could satisfy all of our requirements, including multiprotocol support and the ability to use NFS with VMware, within the university's budget," says Chris Krusch, systems architect at UBC. "We also found that NetApp integrates very well with VMware on a number of levels."

This first step yielded major improvements in capacity and provisioning time, but UBC still faced storage management challenges due to the sheer size of its data. "We had 8PB of data spread across 12 separately managed islands of storage, so managing our storage was a full-time job for two people," says Angers. "We wanted to reclaim those resources and unify storage management in our private cloud."

The Solution

Taking IT to the next level

When NetApp released the clustered Data ONTAP® operating system, Angers and his team recognized it as an essential technology for UBC's private cloud. Instead of managing multiple high-availability pairs of controllers, the university could move to a unified cluster or a scale-out architecture. Clustered Data ONTAP gives UBC a next-generation storage solution that delivers nondisruptive operations while scaling with the university's data growth rate of 50% a year—currently 4PB annually. An ideal foundation for private cloud deployments, clustered Data ONTAP can accommodate mixed workloads and multiple SLAs on a shared infrastructure, with support for high-speed applications as well as large content repositories.

"NetApp clustered Data ONTAP was a big deal for us because it gives us a single management point as well as the ability to move workloads around and service our storage infrastructure nondisruptively," says Brent Dunington, systems architect at UBC "It's what we needed to take our private cloud to the next level."

To minimize risk and shorten deployment time, NetApp Services installed, configured, and tested the NetApp FAS6250 and FAS3270 storage systems in the university's primary data center and deployed two FAS3250 systems at a disaster recovery site. NetApp service experts optimized the storage environment and helped enable a smooth transition from 7-Mode to clustered Data ONTAP 8.2. After the hardware was deployed, NetApp technicians installed the clustered Data ONTAP operating system and firmware for the new cloud environment. Data migration was handled by the UBC IT team. The university chose NetApp SupportEdge Premium for maintaining nondisruptive operations.

"The transition from NetApp Data ONTAP 7-Mode to clustered Data ONTAP has been largely seamless," says Angers. "We've moved 3PB over already, and most workloads required only minutes of downtime to migrate from 7-Mode. NetApp has been instrumental during our transition—they make sure we get the support that we need."

A storage-efficiency toolkit

The university is taking full advantage of NetApp software tools to improve management and storage efficiency. NetApp deduplication helps conserve storage capacity while NetApp Snapshot™ and SnapRestore® technologies allow IT staff to recover files quickly from space-efficient, point-in-time copies. UBC uses CommVault Simpana software to manage backups, leveraging the software's IntelliSnap feature to integrate with NetApp SnapVault® software for off-site replication.

To provide optimal performance for virtual machines, the university uses NetApp flash storage technologies. NetApp Flash Cache™ intelligent caching provides PCIe-based intelligent caching of recently read user data and NetApp metadata at the array level. NetApp Flash Pool™ intelligent caching promotes "hot" data to solid-state drives at the aggregate level.

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>
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> Manager, Systems, University of British Columbia

NetApp OnCommand® Unified Manager provides an easy-to-use interface that unifies operations, provisioning, data protection, and performance management. "It's much easier to manage NetApp storage running clustered Data ONTAP," says Dunington. "Specialized storage management skills are not required, and we can do it all from a single pane of glass."

To view real-time status of storage health and usage from within VMware vCenter, UBC uses NetApp Virtual Storage Console for VMware vSphere. NetApp OnCommand Balance helps UBC optimize virtual machine density and understand how application workloads, utilization levels, and resources interact—providing infrastructure-wide intelligence for the university's private cloud.

Business Benefits

Maintaining high availability for services

More than 1,000 virtual machines have been migrated to clustered Data ONTAP so far, including the supporting infrastructure for Blackboard Connect. Approximately 70% of workloads and 40% of the university's data now reside in the private cloud environment.

High availability is one reason departments are enthusiastic about moving their applications. Services hosted on clustered Data ONTAP are now continuously available, even when the systems team needs to load-balance storage for capacity or I/O performance. "We can move workloads and perform updates nondisruptively," says Dunington. "We've done firmware updates on the NetApp controllers during business hours because we trust clustered Data ONTAP."

Robust performance with QoS policies

Application performance in the private cloud is equal to or better than what departments had experienced previously, thanks to NetApp flash technologies and the storage quality of service (QoS) feature in clustered Data ONTAP 8.2. By setting QoS policies on cluster objects, UBC can throttle rogue workloads and prevent them from affecting other tenants. This helps set consistent user expectations for performance and meet service-level agreements under varying loads.

"Our long-term strategy is to use QoS policies in NetApp clustered Data ONTAP to make sure tenants are always getting the IOPS that they need," says Dunington. "We're meeting our performance requirements with NetApp clustered Data ONTAP, and we're doing so with 60% less storage hardware. That's a better consolidation ratio than we even expected."

The team plans to move the university's business-critical Oracle databases and Oracle PeopleSoft applications into the clustered Data ONTAP environment in the near future. "We already achieved great success virtualizing our Oracle environment with VMware, and look forward to realizing all the benefits of clustered Data ONTAP for those workloads as well," says Angers. "Business users will appreciate the increases in performance and availability."

Maximizing operational efficiency

Managing UBC's clustered Data ONTAP environment requires very little hands-on storage administration. Storage management requirements have already decreased by 75%, and they will decrease further as more virtual machines are moved over. With data and virtual machines consolidated in a unified cluster architecture, it's easy for the team to provide reliable, centralized data protection for all departments. With NetApp deduplication, UBC is also reclaiming more than 2PB of storage capacity across the organization.

"In addition to high availability and solid performance, we're giving departments and faculties a much more cost-effective option with our NetApp and VMware-based private cloud," says Angers. "It has been an overwhelming success."

Leading the way

With its transition from decentralized IT to service provider, UBC is setting an example for other educational institutions to follow. By driving costs and inefficiencies out of its IT architecture and processes,

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it can redirect funds and person-hours toward more strategic initiatives. In the fall of 2014, the university will begin delivering services to other educational institutions on a cost-neutral basis to help them realize the same efficiencies.

“There are no barriers to expansion with NetApp clustered Data ONTAP and VMware,” says Angers. “We can scale for capacity, and we can scale for performance—and do both cost effectively. We can provide a strong foundation for learning without requiring university departments to make infrastructure investments. It’s a win-win.”

SOLUTION COMPONENTS

NetApp Products

NetApp FAS6250, FAS3270, and FAS3250 storage systems with clustered Data ONTAP 8.2

NetApp FAS3170, FAS3270, and FAS6210 storage systems with Data ONTAP 7.3 and 8.1

NetApp OnCommand Unified Manager

NetApp OnCommand Balance

NetApp Virtual Storage Console for VMware vSphere

NetApp Flash Cache

NetApp Flash Pool

NetApp Snapshot and SnapRestore technologies

NetApp SnapVault

NetApp deduplication

Environment

Applications: Blackboard Connect, Microsoft® Exchange Server, Oracle PeopleSoft, CommVault Simpana with IntelliSnap

Databases: Microsoft SQL Server®, Oracle

Operating systems: Windows® 2008 R2, Red Hat Linux®

Virtualization: VMware vSphere 5.5, vCloud Director, vCenter, vCops, and VMware View

NetApp Services

Storage system installation and SupportEdge Premium

Protocols

NFS, CIFS, iSCSI

Partner

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