

# Cisco Provides Bright Future for Hong Kong Education Sector

Hong Kong Institute of Education improves network and application delivery capabilities, and prepares itself for a new national academic structure in September 2009 with Cisco Catalyst 6500 Virtual Switching System (VSS) and Cisco Application Control Engine (ACE) modules.

EXECUTIVE SUMMARY
<p><b>The Hong Kong Institute of Education</b></p> <ul style="list-style-type: none"> <li>• Largest teacher training institution in Hong Kong</li> </ul> <p><b>Challenge</b></p> <ul style="list-style-type: none"> <li>• Optimize application delivery for 150 application servers</li> <li>• Increase network bandwidth to accommodate media-rich applications, mobile and remote access</li> <li>• Simplify and prepare institute's network to support Hong Kong's new academic structure with mobile learning and multimedia applications</li> </ul>
<p><b>Solution</b></p> <ul style="list-style-type: none"> <li>• Upgraded and virtualized existing Cisco Catalyst 6500 Series switches with Cisco Virtual Switching Supervisor and 10GE transceiver modules</li> <li>• Incorporated Cisco ACE modules into Cisco 6500 switches</li> </ul>
<p><b>Results</b></p> <ul style="list-style-type: none"> <li>• Higher bandwidth for institute's multimedia, mobile and remote access requirements</li> <li>• Faster and more flexible application deployments</li> <li>• Reduced operational costs</li> </ul>

## Introduction

The Hong Kong Institute of Education (HKIEd) is the largest teacher training provider in Hong Kong, and supplies the large majority of Hong Kong's teaching workforce. Established in 1994, HKIEd is a bastion of teacher education in Hong Kong. Formed from the merger of five teacher training institutions, HKIEd runs undergraduate to doctorate programmes with about 5,000 full-time equivalent students.

Today, more than 84% of Hong Kong primary school teachers and 30% of secondary school teachers are graduates of HKIEd or its predecessor colleges of education. The Institute has also trained 80% of kindergarten teachers. The HKIEd is also diversifying its mix of courses to allow students to acquire non-teacher training credentials such as an International Executive Master of Arts in Education Leadership and Change.

HKIEd now resides in its new campus in Tai Po, Hong Kong, where students and staff are given a 21st century education environment with the availability of multimedia applications, e-learning, mobile internet, remote access and other technologies.

## Business Challenge

With a user population of 5,970 pre-serving students and serving teachers, and 1,275 staff coupled with the increasing use of media-intensive applications, network traffic can hit gigantic peaks which heavily tax the capabilities of the current server configuration. "During these periods, our system suffers from slowdowns which hamper the learning and working pace of our students and staff, particularly when transferring large files and accessing e-learning

materials," said Francis Fong, Information Technology Manager, Office of Information Technology and Services, HKIEd.

"The demand for remote access is also on the rise - a source of additional network burden for our servers," added Francis. "E-learning modules and the growing popularity of off-campus access have increased the number of users accessing the intranet from outside the campus. As such, our servers must be able to handle these requests twenty four seven."

The constant expansion of HKIEd's IT infrastructure has also increased the level of complexity. Before the implementation, the institute was running on four separate datacenters supporting more than 150 application servers linked mainly by Cisco Catalyst 6500, 4500 and 3550 switches. Unfortunately, individual configurations make maintenance and management extremely inconvenient and since each datacenter may run many different hardware and software platforms, incompatibilities and system conflicts can also occur. "We are hoping to simplify our datacenters to have just one on-campus, and one off-campus," said Francis.

HKIEd is also actively preparing for Hong Kong's upcoming secondary education reform (known as the 334 system) - occurring in September 2009. The new academic structure places added emphasis on mobile field work and projects. As such, the institute plans to cater to this change with a robust, efficient network infrastructure that supports mobile learning.

With the increase in bandwidth demand, remote user population, network complexity and more advanced applications, HKIEd is looking for measures to expand its server capabilities while keeping complexity and operational costs to a minimum.



## Solution

Being an existing customer of Cisco, HKIEd was familiar with the provider's world acclaimed approach to network management and equipment. The institute quickly enlisted Cisco's help to rectify the incumbent issues. Together, Cisco and HKIEd staff determined that the appropriate solution was to augment the existing Cisco Catalyst 6500 Series Switches with the Cisco Virtual Switching Supervisor 1440 (VSS 1440), two Cisco Application Control Engine (ACE) modules and a set of 10 Gigabit Ethernet (GE) SFP line cards. "We selected Cisco because it has proven track record in the education sector that we believe will help us become a leading tertiary institute in the Asia Pacific region," said Francis.

The solution provided several key features:

- Cisco VSS 1440 virtualizes the existing core network switches to provide flexible allocation of network resources
- Cisco ACE modules optimizes application delivery for Media Rich Applications
- Increase core network bandwidth to 10GE
- High availability protocols like Cisco Non Stop Forwarding (NSF) and In Service Software Upgrade (ISSU) reduce network downtime
- Room for future network services (eg. Wireless control, Firewall and VPN modules)
- Foundation for implementation of IPv6

The implementation was carried out over a span of seven months, beginning from July 2008 to January 2009.

## Results

With the newly implemented configuration, students and staff alike are experiencing high bandwidth, reduced system downtime, a simplified network structure and enhanced accessibility of HKIEd services and applications. "HKIEd strives to inculcate an appreciation and familiarity of multimedia technology in the area of education. We encourage the frequent constructive use of rich media and Web 2.0 applications in the context of education. With this solution, Cisco has effectively brought our institute to the forefront of education in Hong Kong," said Victor Cheng, Director of Information Technology Services, HKIEd.

Cisco ACE application module contain enhancements like virtualization and role-based administration that are unique in the industry to further improve application deployment times and resiliency while delivering significant power and cooling efficiencies and savings. "Using Cisco ACE, we have managed to reduce rack space by 20% and network cabling by 60%," said Francis.

VSS has also boosted available network throughput to 1.4Tbps, providing higher data transfer rates for applications. At the same time, the load balancing features of Cisco ACE have been applied to HKIEd's servers that provide network services (including LDAP, DNS, DHCP, directory, and web services). This has improved the user experience, with faster application response times.

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VSS has also enhanced the recovery abilities of the network, shortening the time needed for the system to recover from downtimes. "Our existing mechanisms used to take ten seconds to recover the network from system failure. VSS pushes this to a new level by helping the system do the same in a fraction of a second," said Francis.

The institute also managed to simplify its network structure by linking its datacenters. With VSS, HKIEd has linked the datacenters at each location together, allowing two linked chassis to be configured and operated as one unit. "This strategy effectively narrows four datacenters down to two. Our IT staff can now easily identify points of failure, perform maintenance with little disturbance to users and configure the system easily. It does away with the cumbersome L2 and L3 configurations," said Francis.

Installation of the VSS and ACE modules has resulted in the high availability and performance of HKIEd's network services and applications. The ACE modules have distributed end-user application requests across a server farm, and offloaded compute-intensive communications and security processing tasks - such as TCP and Secure Sockets Layer (SSL) encryption processing - from application servers. "We can even allocate network resources away from the main campus after school hours, to provide more bandwidth to student hostels. All without adding costs and complexity from acquiring additional services or peripherals," he added.

## Next Steps

HKIED's IT infrastructure is now ready for even better applications and services, including IPv6. "HKIED is on the verge of an exciting era. The coming of the 334 education reform will alter the landscape of Hong Kong education. With Cisco solutions, our institute is bracing itself for the coming changes by expanding the capabilities of our servers to support IPv6 and new applications that will change the way our students and faculty develop their knowledge," said Victor.

In the immediate future, HKIED will complement their virtualized switches with Cisco wireless service modules (WiSM) to support an 802.11n Wi-Fi network. This wireless network will enable even more exciting e-learning initiatives ahead. From there, HKIED plans to deploy Cisco Intrusion Detection modules and Firewall modules to further virtualize their network services on the Cisco VSS.

## For More Information

Cisco Catalyst 6500 Virtual Switching System (VSS) 1440: [www.cisco.com/go/vss](http://www.cisco.com/go/vss)

Cisco ACE Application Control Engine Module: [www.cisco.com/go/ace](http://www.cisco.com/go/ace)

Learn more about The Hong Kong University of Science and Technology: [www.ied.edu.hk/](http://www.ied.edu.hk/)

### PRODUCT LIST

- Cisco Catalyst 6500 Virtual Switching System (VSS) 1440
- Cisco ACE Application Control Engine Module
- Cisco GE SFP Line cards



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