

# National Higher Learning Institution Builds Campuses of the Future

Cisco Borderless Network  
Apollo Group Case Study

## Executive Summary

- **Customer Name:** Apollo Group
- **Industry:** Higher Education
- **Location:** Phoenix, Arizona
- **Number of Employees:** 21,777

### Business Challenge:

- Provide state-of-the-art learning environment
- Reduce wireless network slowdowns and downtime
- Protect against security threats

### Network Solution:

- Deployed Cisco Borderless Network, built on end-to-end Cisco routing, switching, security, and wireless solutions

### Business Results:

- Improved wireless performance and reliability
- Reduced total cost of ownership of wireless network
- Helped ensure support for high-bandwidth media content in the classroom

Apollo Group builds Cisco Borderless Network to deliver high-performance wireless and media services for hundreds of U.S. classrooms.

## Business Challenge

Apollo Group, Inc., parent company of the University of Phoenix and other high-profile learning institutions, is rewriting the textbook for higher education. Founded in 1973, the organization today serves more than 400,000 students, employs 24,000 faculty members, and supports more than 200 campuses and learning centers nationwide.

“Our learning centers are a vital resource for our students,” says Dennis Crowe, director of network engineering, Apollo Group. “We want these centers to be the ideal educational environment. Everything should be available: Internet research, email, collaboration, video, class content, etc. We also need to ensure that these facilities are secure, so that everyone’s assets are safe.”

It is a lofty vision, and achieving it can be challenging, especially given the diversity of classroom environments that Apollo Group supports. Campuses offer associate-to doctorate-level degree programs, with larger campuses hosting up to 35 classrooms, often filled seven days a week.

“Modern students are much more technically savvy,” says Crowe. “They may bring two, three, sometimes four different wireless Internet-capable devices to the classroom. We need to be able to accommodate all of them. As more students use tablets, especially, we are seeing our bandwidth requirements multiply. We also need to support HD media to accommodate the video services that our faculty and students increasingly require.”

The sheer scale and diversity of Apollo Group’s nationwide IT infrastructure, however, presents unique challenges. As the company has grown, the network has evolved as a highly distributed environment, with equipment from many different vendors.

“In the past, we’ve had to invest a lot of time and manpower at the campuses to support the wireless network,” says Crowe. “We had more than 3000 wireless access points and 200 different distributed controller systems from multiple vendors out there. Each one can be different, and require independent interaction by an engineer to fix any problem.”

The IT team’s lack of visibility into the multivendor environment was also impeding its ability to quickly address problems.



“When students come to our campuses, they expect an outstanding learning environment. We owe it to them to provide reliable and steady network service, wherever they need it and however they choose to access it. The Cisco network has really helped us get there.”

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**Dennis Crowe**

Director of Network Engineering,  
Apollo Group, Inc.

“When we had problems with our wireless services at a given campus, we found we were very slow to react,” says Crowe. “We didn’t have the transparency we needed to identify and isolate issues, and we didn’t have tools to help us detect rogue access points or wireless interference that existed at a lot of these locations.”

Although University of Phoenix and other Apollo Group campuses have been an unprecedented success, these issues were beginning to affect students.

“A few years ago, the president of the company visited one of our sites and asked students if they could name one thing we could improve on our campuses,” says Crowe. “The answer was loud and unanimous: wireless access. I set out on a mission to redo the entire environment.”

## Network Solution

Apollo Group conducted an exhaustive competitive analysis for the network upgrade. After scoring vendors based on feature set, capabilities, and price, Apollo Group found that Cisco was the right partner. “With the flexibility of the Cisco routers and switches, and wireless features like Cisco CleanAir and multicast support, Cisco was clearly the best option,” says Crowe.

Apollo Group began to build a borderless network: a network that would allow students to connect smoothly, reliably, and securely from any campus location, using any wireless device. To lay the foundation for this environment, the company upgraded the national routing and switching infrastructure with Cisco Catalyst® Switches and Cisco® second-generation Integrated Services Routers (ISR G2).

The Cisco Catalyst Switches provide the latest power-over-Ethernet specifications to provide maximum flexibility for connecting phones, cameras, wireless access points, and other endpoints in the classrooms. And, with the ability to support firewall, application acceleration, and other service modules, the Cisco ISR G2 platforms allow Apollo Group to deliver multiple network services to the classroom with a single platform.

### Robust Wireless Connectivity

To provide a more reliable, higher-performance wireless service, Apollo Group deployed a Cisco Unified Wireless Network composed of Cisco Aironet® wireless access points, Cisco wireless controllers, and the Cisco Wireless Control System (WCS) management suite. The Cisco 802.11n wireless access points provide robust, highly reliable connections to support any wireless device that students may bring to the classroom. The access points also feature Cisco CleanAir technology, which automatically detects and resolves interference issues.

“Many of our campuses occupy floors in high-rise office buildings that share space with other enterprises, so our networks are often in range of other wireless networks and other sources of wireless interference,” says Crowe. “That causes a lot of performance and connectivity problems. The radio frequency intelligence that Cisco has embedded in the hardware gives us the visibility to address all of these issues. It gives us a self-healing network that can make adjustments on the fly without requiring intervention, which makes a huge difference.”

As Apollo Group continues to add access points to address the high density of wireless clients in the classroom, the organization will also benefit from the ClientLink capabilities of the Cisco Unified Wireless Network. The technology will



allow Apollo Group to improve throughput, by up to 65%, for all 802.11a/g wireless clients—currently representing approximately 46% of all wireless clients seen across campuses.

### **A Media-Ready Network**

Crowe's team also designed the campus network to lay the foundation for a medianet: a network that can meet the demanding requirements of high-definition video services. The Cisco wired and wireless infrastructure is designed to support the future deployment and operation of demanding video applications, and will reduce the time and cost of deploying video services. For example, the quality-of-service, multicast, and Auto Smartport features in the Cisco switches will make it easier to install and support the high quality experience requirements of digital media players, which are increasingly employed in e-learning applications. The embedded video monitoring intelligence of the Cisco infrastructure will also allow the Apollo Group IT team to better prepare for and provision new video applications that will place greater demands on the network.

"As we try to build a long-lasting network foundation, video content is my biggest concern, as it has the potential to bring a network to its knees," says Crowe. "With the Cisco infrastructure, we have a network that is ready for HD media services."

### **Safeguarding the Environment**

Although the Apollo Group wants to help ensure maximum openness and flexibility in the network, the organization also must protect against network security threats. To accomplish this, Crowe's team is deploying 802.1X port-based network access control across the entire wired and wireless network environment.

"The Cisco 802.1X capabilities help us mitigate any direct threats between faculty, students, and our network," says Crowe. "The system assures that all authorized students and faculty can easily access the data they need, through a path that is highly secure and closely monitored. At the same time, it blocks any outsiders from obtaining access to any critical information or student asset."

## **Business Results**

Apollo Group is now upgrading campuses across the United States with the new borderless network, and will continue the deployment through the coming year. With approximately one-third of all campuses completed, the company is already realizing impressive results.

"With the Cisco wired and wireless platforms, we have been able to substantially improve the delivery of content and services to our students," says Crowe. "We have been able to speed up our response times to any connectivity problems and minimize any potential downtime."

The new network is also having a profound effect on Apollo Group's operational efficiency. The ability to move from a distributed, difficult-to-manage wireless environment to a centralized, self-healing network translates directly to lower costs.

"Instead of managing 200 different distributed wireless controller systems, when our national rollout is complete, we will be managing just 20 Cisco wireless controllers,"

## Product List

### Routing and Switching:

- Cisco 2900 Series ISR G2
- Cisco 3900 Series ISR G2
- Cisco Catalyst 3750x Switches

### Wireless:

- Cisco Aironet 3500 Series Access Points
- Cisco 5500 Series Wireless Controller
- Cisco Wireless Control System Data Center

### Data Center:

- Cisco Catalyst 6500 Series Switches
- Cisco Nexus® 7000 Series Switches
- Cisco Nexus 5000 Series Switches

says Crowe. “As a result, we will be able to control the entire wireless infrastructure for a fraction of the cost of our existing environment.”

The Cisco wireless network and management tools also provide Crowe’s team with much greater visibility into the network and powerful new tools to correct any problems.

“The combination of the 802.1X security in the Cisco infrastructure and the Cisco Wireless Control System management tools give us the ability to see who is on our network and to monitor what they are doing 24 hours a day,” says Crowe. “We can identify and mitigate issues much more quickly. We can also now detect any rogue access points that are creating performance problems, isolate where they are located, and disable them very easily.”

Migrating to a single-vendor solution for the wireless access points, controllers, and management systems also simplifies IT team operations by eliminating the need to train engineers on multiple operating systems, and providing a single source of support.

Ultimately, all of these capabilities are allowing Apollo Group to provide a more flexible, reliable, and state-of-the-art classroom environment for students.

“When students come to our campuses, they expect an outstanding learning environment,” says Crowe. “We owe it to them to provide reliable and steady network service, wherever they need it and however they choose to access it. The Cisco network has really helped us get there.”

## Future Plans

Once the national deployment is complete, Apollo Group plans to continue building on the versatile Cisco infrastructure. The organization plans to expand video services and is also evaluating IP-based physical security solutions, including door access systems and video surveillance that would run on the Cisco network.

“Based on my experience working with Cisco, I am very confident that they will deliver on whatever we need to create the classroom of the future,” says Crowe. “Whether it’s supporting new features or resolving any issues we might encounter, I know Cisco will help us bring our vision to fruition.”

## For More Information

To find out more about Cisco Borderless Networks, visit: [www.cisco.com/go/borderless](http://www.cisco.com/go/borderless). For more details on Cisco solutions for higher education, visit [www.cisco.com/go/education](http://www.cisco.com/go/education).



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