



## University of Phoenix

The parent company for University of Phoenix and other education subsidiaries, Apollo Group offers educational programs at 95 campuses and 153 learning centers in 39 states; Puerto Rico; Alberta, British Columbia; Netherlands and Mexico.

### Background

Enrollment at University of Phoenix and other Apollo Group subsidiaries more than doubled between 2001 and 2005, driving the need for a new data center. The organization's unique educational model depends on continuous availability of information technology services. The Apollo Group called on Emerson Network Power for help in designing an adaptive power and cooling infrastructure for the new data center.

### Case Summary

**Location:** Phoenix, Arizona

**Products/Services:**

- Liebert MP Advanced Power Strips
- Liebert FDC Foundation Distribution Cabinets
- Liebert System Control Cabinets
- Liebert 610 UPS Systems
- Liebert Deluxe Precision Cooling Systems
- Liebert XDA Airflow Enhancers
- Liebert Foundation Enclosures with Expansion Channels
- Liebert SiteScan Web
- Liebert Global Services

**Critical Needs:** Provide adaptive cooling and power solutions in new mission-critical data center at university serving more than 300,000 students worldwide.

### Results

- Peace of mind and high availability of IT resources used by worldwide faculty and student body
- Multiple active power and cooling distribution paths, with redundant components that are concurrently maintainable
- Highly adaptive power and cooling architecture allows data center to scale to future needs



## The Situation

“Technology has transformed the way we conduct business,” said Data Center Operations Senior Engineer Rick Oliver. “A decade ago we were largely ground-based, but today a significant portion of our business is online. That requires continuous access to information technology. Our ability to provide online education and services to our students requires rigorous quality controls. We serve a worldwide student body, and our faculty and students need to access their classroom, their course materials and services around the clock.”

With its increasing dependence on technology, the Apollo Group needed a new, 10,000-square-foot production data center at its corporate headquarters in Phoenix, Ariz. The company's commitment to technology has been one of its hallmarks. “We are often among the first adopters of any innovation,” Oliver said. “From blade servers to multi-terabyte disk storage to WAN technology, we're on the leading edge.”

New technology carries a price in terms of the power and cooling infrastructure needed to support it. “Faster and smaller uses more power and puts out more heat,” Oliver said. “Power fluctuations and heat tend to destroy the very technology we depend on, so we need power and cooling solutions that can scale with tomorrow's unpredictable power and heat loads.”

Oliver decided early in the planning process that Emerson Network Power would provide the power and cooling infrastructure.



***“With Liebert's SiteScan Web, we have real-time information about the status of our data center down to the device level.”***

*Rick Oliver, Data Center Operations Senior Engineer  
University of Phoenix*

## The Solution

“We have a highly qualified team that keeps our data center up and running,” Oliver said. “We make sure that we invest in solutions that make it easier to carry out our mission.” In this case that included multiple active power and cooling distribution paths, with redundant components that are concurrently maintainable.

The five-person Data Center Operations team worked with consulting engineers FM Solutions, Integrated Support Systems, the local Emerson Network Power representative firm, and DP Air, a Liebert solutions partner. The team specified Liebert power and cooling equipment that met Tier 3 qualifications and could quickly adapt to increasing power and heat loads.

## Adaptive Power Infrastructure Designed for Growth

The power infrastructure employs a dual-bus design that allows for maintenance, testing and repair to be carried out during continuous operation. The design team specified four Liebert 610 750 kVA UPSs, each with an “A” bus and a “B” bus connected to a System Control Cabinet. Each bus is connected to an independent generator.

A Liebert FDC Distribution Cabinet sits at the end of each row of racks, integrating power distribution into the rack environment. The Liebert FDC provides in-row power distribution, with 168 poles (four complete panel boards) in a stand-alone cabinet. This provides the ability to add new equipment without having to drag power across rows or creating under-floor cable dams.

Servers are housed in Liebert Foundation enclosures, which provide the flexibility to accommodate any variety and size of equipment.

“We have servers from all the major manufacturers, so the adaptability of the design was a major selling point,” Oliver said. “We were impressed by the built-in channel pathway for the data cabling and the built-in wire management within the channel, as well as by the aesthetic design of the units, which coordinate well with the server racks.”

Liebert MP Advanced Power Strips provide load monitoring and control to the receptacle level. “It’s a great product. They reduce the cable clutter and give us rack-level power management,” Oliver said. “The logic of having something vertical supplying end-to-end power management in the cabinet was obvious.”

## Reliable, Adaptive Cooling

A 24-inch raised floor allows ample air circulation through the under-floor plenum. At commissioning, the room held several hundred servers in 90 racks in a hot-aisle/cold-aisle configuration. Heat loads average 7 kW per square foot throughout the data center, and 11 kW per square foot in a high-density zone. When fully populated, the facility will hold more than 1,000 servers.

Three Liebert Deluxe System precision cooling units are used in an N+1 configuration to provide 640 tons of base-level cooling.

The Liebert Foundation enclosures contribute to both power and cooling efficiency. “The expansion channel that attaches to the back of the cabinet allows more space for hot air leaving the cabinet,” Oliver said. The patent-pending system Liebert EX Expansion Channels, and a variety of cabling and organizational elements, work together to simplify equipment installation, enhance cable management and improve air flow.

The design team deployed Liebert XDA Air Flow Enhancers on the exhaust side of 50 racks in a high-density area. The Liebert XDA prevents heat from accumulating inside the enclosure by increasing the airflow.

“Rather than waiting for heat to dissipate in a natural manner, the Liebert XDAs expel the heat into the hot aisle, where it is drawn into the ceiling plenum, cooled, and returned to the room via the cold aisle,” Oliver said.

He said that the Liebert XDAs delivered superior performance compared to fans mounted to the top of the rack.

“Attempting to extract heat with fans mounted on the top of each rack just concentrated the heat at the top,” he said. “Everything in the top third of the cabinet fried.”

### Web-based Monitoring Enhances Availability

Oliver knows that a small problem in a data center can quickly escalate into a disaster. “When you have your most valuable eggs in one basket, do you want to find out there’s a problem with the basket when it’s solvable, or after the basket has burned up?” Oliver asked. “With Liebert’s SiteScan Web, we have real-time information about the status of our data center down to the smallest device level.”

Liebert SiteScan Web is a full-featured, open-standards, Web-based monitoring, control and alarm management system for computer support systems. The programmable alarm management allows Oliver to customize the alert depending on the type of event. “If the situation is bad enough, SiteScan will call a technician before it calls one of us. We want him en route when we get the call,” he said.

The monitoring package’s data analysis and trend reporting tools allow Oliver and his staff to analyze

data and use it to prevent specific problems from recurring.

### Global Service Support

The Apollo Group uses Emerson Network Power services for the Liebert equipment in the data center. “Many data center managers underestimate the importance of the service channel,” Oliver said. “When your business depends on the quality of service, as ours does, it’s not a commodity. Uptime is a collaborative effort. Your service people are part of your team.”

### The Results

The Apollo Group’s new data center has the capacity to power the company’s existing business as well as the flexibility to scale to the demands of the future. The Data Center Operations team is confident that they have the adaptive power and cooling infrastructure needed to provide continuous support to the company’s several hundred thousand students, faculty and staff.

For more information on Liebert technology, visit [www.Liebert.com](http://www.Liebert.com).

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