



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. Because the organization's educational model depends on continuous availability of information technology services, an adaptive power and cooling infrastructure was critical. It was also important to gain a better understanding of data center operations to enhance growth planning and increase data center efficiency.

Case Summary

Location: Phoenix, Arizona

Emerson Network Power Products/Services:

- Liebert MP Advanced In-Rack Power Distribution
- Liebert FDC Foundation Distribution Cabinets
- Liebert System Control Cabinets
- Liebert Series 610 UPS Systems
- Liebert SiteScan Web
- Liebert Deluxe Precision Cooling Systems
- Liebert Foundation Enclosures with Expansion Channels
- Liebert Services
- Aperture VISTA

Critical Needs: Create and maintain an adaptive cooling and power infrastructure for mission-critical data center at university serving more than 300,000 students worldwide.

Results

- Deployed a flexible and scalable power and cooling architecture that ensures the data center can support future business and technology requirements.
- Enhanced data center availability through multiple active power and cooling distribution paths with redundant components that are concurrently maintainable.
- Increased understanding of the current state of critical IT infrastructure through proactive monitoring and management.
- Gained real-time visibility into available power and cooling capacity.
- Reduced risk of technology deployment by enabling ability to model impact of technology changes on data center infrastructure.

The Situation

“Technology has transformed the way we conduct business,” says Rick Oliver, Apollo Group data center manager. “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 online classrooms, 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. When fully populated, the facility would need to hold more than 1,000 servers. The company’s commitment to technology, one of its hallmarks, would drive the development of this new data center.

“We are often among the first adopters of any innovation,” says Oliver. “From blade servers to multi-terabyte disk storage to WAN technology, we’re on the leading edge and that has helped fuel the success of our business.”

New technology, however, 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,” says Oliver. “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 knew that once the data center was operational they would need to proactively manage the data center environment to achieve “world-class” performance. He also understood that to increase data center efficiencies they would need to integrate the monitoring and management of the critical infrastructure.

The Solution

Oliver decided early in the planning process that Emerson Network Power would provide the power and cooling infrastructure. And after doing a deep evaluation of available tools, he decided to use Aperture VISTA.

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

The five-person Data Center Operations team worked with FM Solutions, consulting engineers; Integrated Support Systems, a local Liebert Representative; and, DP Air, an IT reseller and Liebert Network Solutions Partner. The team specified Liebert power and cooling equipment that met the high-availability needs and could quickly adapt to increasing power and heat loads.

Adaptive Power and Cooling Infrastructure

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, 750 kVA Liebert Series 610 UPS systems, each with an “A” bus and a “B” bus connected to a System Control Cabinet and 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 allows the addition of new equipment without dragging 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 power distribution units, which are mounted in the racks themselves, provide load monitoring and control to the receptacle level.

The data center features a hot-aisle/cold-aisle configuration and a 24-inch raised floor that allows ample air circulation through the under-floor plenum. Twenty-six Liebert Deluxe System precision cooling

units are used in a N+1 configuration to provide 572 tons of base-level cooling.

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 XDA units 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,” says Oliver.

Data Center Monitoring and Management

Emerson Network Power’s Liebert SiteScan Web, a full-featured, Web-based monitoring, control and alarm management system, was implemented to monitor the critical infrastructure and provide real-time information about the status of the data center down to the smallest device level.

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. The programmable alarm management enables Oliver to customize the alert depending on the type and seriousness of the event.

Aperture VISTA, which is a data center infrastructure resource management system, was implemented to proactively monitor and manage all aspects of the data center environment.

Together, Liebert SiteScan and Aperture VISTA provide Apollo Group a comprehensive data center infrastructure management solution.

Specifically, monitoring and management across domains can be merged to create new capabilities such as holistic services at a targeted service level and actionable reporting on availability and performance.

Two areas where Oliver sees Liebert SiteScan and Aperture VISTA working together to enhance operation of his data center are maintenance and capacity planning.

For example, Oliver can reconfigure the data center to accommodate maintenance activities; thereby maintaining the critical infrastructure without disrupting service. Aperture VISTA can map maintenance activity onto affected racks while Liebert SiteScan can suppress alarms for the equipment under maintenance.

Liebert SiteScan and Aperture VISTA can also work together to ensure Apollo Group deploys hardware without exceeding power, space or cooling capacity. Liebert SiteScan provides real-time data on power and cooling capacity, and Aperture VISTA shows available capacity for a proposed change.

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 it has the adaptive power and cooling infrastructure needed to provide continuous support to the company's several hundred thousand students, faculty and staff.

"The adaptive power and cooling infrastructure gave us the availability and flexibility we needed to continue to grow our business," says Oliver. "Aperture VISTA elevated us to another level in terms of fully understanding our data center environment."

Specifically, the data center infrastructure resource management system is providing a top-down visualization of the data center with a more detailed and sophisticated tracking of assets. The team can easily obtain accurate, current views of data configuration and capacities, and a controlled procedure for equipment moves, additions and changes.

"This new in-depth view of our data center is going to provide numerous benefits across the board. For instance, we now have the confidence and understanding we need to begin planning a major virtualization project."

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