



Lab Setting

Has Special Power Needs

Power management delivers cost savings for customer service lab

By **TOM COBURN**

Building out a modern computer facility means dealing with a host of power and heat concerns. Increased demands for storage and new densely-packed, blade-computing form factors have driven the power usage of data centers to 61 billion kilowatt hours of electricity in 2006 at a cost of \$4.5 billion, according to the U.S. Environmental Protection Agency. Add to that the HVAC needed to cool this computing infrastructure, and the power per square foot needed for many computer facilities has grown to more than 100 times the power per square foot of a regular office building.

This has forced many companies to explore new ways to manage this power to either keep costs down or in some cases to meet power constraints imposed by their utilities. When it built its massive new customer service lab in North Carolina, one such company, a leading network equipment manufacturer, faced the dilemma of inefficient use of a finite supply of power. The facility is equipped with more than 1300 racks of routing, switching, optical networking, wireless, and cable modem equipment. Staff comprises approximately 220 employees. The facility is used to simulate customer service issues, allowing service technicians to recreate a customer

problem so as to properly diagnose and correct complex customer issues in order to respond to customer needs quickly.

With the need to power thousands of systems, the lab required a huge amount of power — more than its local utilities could provide. Unable to keep up with its anticipated growth rate for more than a few years, the lab would have needed to move to a different location if a solution couldn't be found. Instead, though, the facility's staff was able to find an efficient way to manage its power utilization that could be implemented quickly into its existing systems. The power management solution enabled the company to extend the life of this facility while projecting savings of roughly \$1 million annually in utility costs.

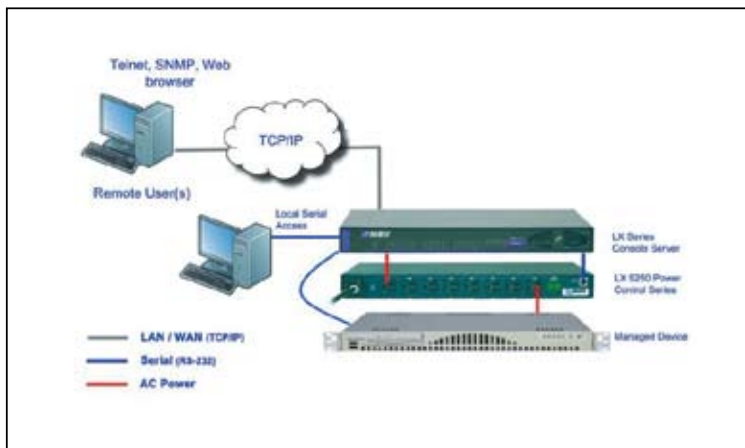
Restrictions to Expansion

From the outset of the facility's expansion, the lab was given a maximum power budget that would be sufficient for only three years of its planned growth. The plant's IT staff knew that equipment that was powered on but not in use wasted as much as 40 percent of the facility's power. Solving these power problems would reduce how much money it would cost the company to equip the facility, change the facility's future expansion plans, and lower operating expenses.

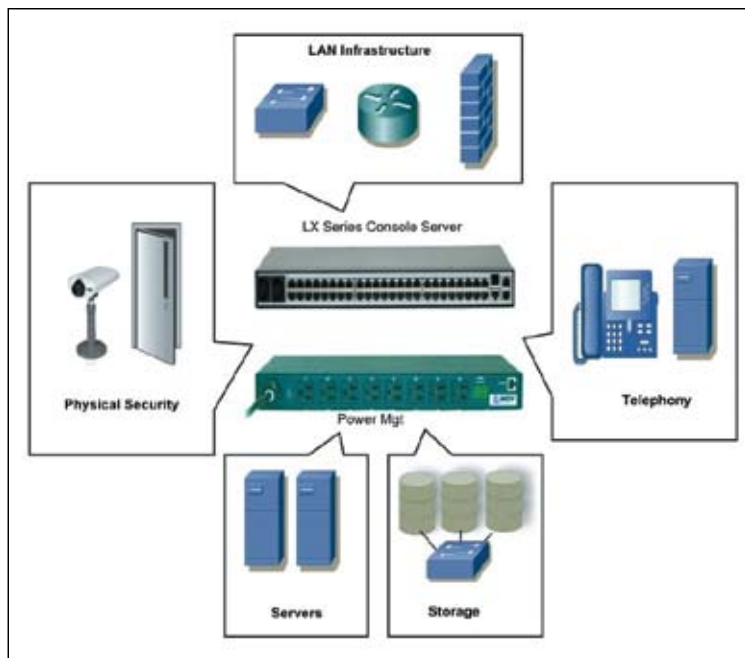
With reduced power requirements, the lab would also be able to invest in lower-capacity power infrastructure, including transformers, uninterruptible power supplies, and bus bars, that would lower its upfront capital expense. The reduced power requirements meant that capital expenditures could be reduced because the company could specify 300-amp



Tom Coburn is product line manager, MRV Communications



With intelligent power management, power to network devices can be managed by a network administrator or reservation software system to control total consumption.



Power management is one component of out-of-band management, which also includes networking, telephony, storage, servers, and physical security—all managed through the console server and intelligent power strip.

(A) bus bars instead of 500-A bus bars. The company also reduced on-site battery back up because it could remotely turn off equipment in the event of a power failure.

In addition to lowering power plant costs, the lab reduced its recurring bill for powering equipment racks. With more than 1000 racks of equipment, the savings led to a very fast breakeven point in the company's investment in power management equipment. With less heat from the power plant and the equipment, HVAC costs could also be reduced, adding another 20 percent savings to the recurring power costs.

Add Intelligence to Power Management

In its previous location, the lab had used a much more

limited power management solution that did not meet the power capacity and management requirements for the new facility. In this application, a 24-port, vertically mounted power device was attached to each equipment rack or bay and supplied power for all equipment in the rack. These models support the cabinet requirements of 30-A, three-phase, 208-V power.

In addition to the dense devices, the lab added intelligence to its power management system by connecting the power devices to a console server, which gave network managers a host of remote management and monitoring capabilities. For instance, in the old lab network managers had to administer more than 1000 IP addresses from the power devices. With the console server solution in place, that number shrank to 130 IP addresses as multiple devices shared a console server. This lab chose a solution from MRV Communications including the LX 4000T Series console servers along with the LX 5250 power management devices. Up to 12 of the devices are serially connected to one 16-port LX-4000T Series console server. The LX 4000T provides secure out-of-band device configuration and management capabilities for mission critical networks and power management systems.

The lab monitors the power consumption of each device to compute aggregate power usage.

The LX servers provided administrators with automated notification and customized response based on power use per rack. The lab monitors the power consumption of each device to compute aggregate power usage. Through automated programming they can power down unused test equipment that may overload the power system. The console servers' unique "trigger/action" feature allows automated responses including email, SNMP trap, and text notification along with the option to disable power to pre-defined lower priority devices based on an external input.

Because of the magnitude of the facility, the IT team made use of the clustering capabilities of the LX4000T, which allows any number and combination of console servers to be used as a single management entity, greatly simplifying network planning and troubleshooting. Clustering, combined with the ability to group outlets, broadens the reach and scope of power management across multiple racks. Lab operations benefit from this feature because devices under test and test/analyzer equipment can be distributed to any available space in the lab. Management enhancements for MRV power solutions include user-configurable utilization thresholds and automated power control.

Comprehensive Power Management

The lab chose this particular power management solution because it provided higher capacity, higher density, and additional management features that allowed them to control power use. The solution also supports input current monitoring, power sequencing, and the ability to control and group outlets by name. It can aggregate all power control device utilization managed by a single console server providing a total power utilization value.

One critical element of the solution that was highly valued was efficiency of implementation

A key element of the solution is integration of the solution with the lab's equipment reservation system. This web-based system allows lab employees to reserve equipment when they need it for testing. Based on a pre-determined testing schedule set forth by the lab manager, the system sends action messages to the console server to power individual pieces of equipment on or off based on need. The system also tracks

power consumption, and uses trigger/action thresholds to ensure that individual power distribution bus bars are not overloaded.

When a lab employee reserves the equipment, the reservation system communicates with the console server, which triggers the power device to power up the required equipment. Similarly, after 30 minutes of non-use, the LX triggers the device to power down the equipment. Additionally, the system is configured with environmental monitoring through attached temperature and humidity sensors.

Power Goals Met

One critical element of the solution that was highly valued was efficiency of implementation — so much so that the evaluation process took only three months, and the results were so impressive that the lab began ordering equipment within two weeks of the completion of the evaluation.

With projected annual savings of \$1 million from this implementation, the equipment manufacturer has already begun looking at expanding its MRV-based lab solution, including adding the Media Cross Connect, a programmable digital patch panel, which the company can integrate with its Web-based reservation tool to build an automated physical layer infrastructure for instantaneous connectivity between devices in the lab. ■



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