International Banking and Financial Services Organization

This user of Emerson Network Power technology is one of the largest banking and financial services organizations in the world, with offices in Europe, the Americas, Asia-Pacific, the Middle East and Africa. Through an international network linked by advanced technology, the bank provides a comprehensive range of financial services, including personal financial services, commercial banking, corporate banking, investment banking and markets, private banking and other activities.

Background

Operations never cease for this global financial services giant. With offices in every time zone, the bank demands true 24x7x365 availability of its information technology resources. A highly flexible and dynamic power and cooling infrastructure is required to support these availability demands. Monitoring systems track availability by providing real-time data on support system operations as well as analyzing performance so that potential problems can be identified and eliminated before they occur.

Case Summary

Location: Manhattan, New York

Products/Services:
- Liebert XDV High Density Cooling Modules
- Liebert XDP Pumping Unit
- Liebert Challenger Precision Cooling
- Liebert Deluxe System/3 Precision Cooling
- Liebert Series 610 UPS
- Liebert PPC Dual-Input Precision Power Center
- Liebert SiteScan Monitoring System

Critical Needs: Create a dedicated, high-density computing environment to process critical financial transactions for one of the world's largest banking and financial services organizations.

Results

■ Eliminated hot spots and equipment malfunctions in existing data center.

■ Successfully converted storage room to high-density computing environment.

■ Created dynamic cooling and power infrastructure that can scale to support 1,000 blade servers as part of a planned expansion.

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The Situation

Blade servers were deployed at the bank's Manhattan facility to provide the computing capacity and speed required to support the bank's dynamic infrastructure. The deployment met this objective, but at the cost of adding a severe burden on existing power and cooling support systems. While speed and capacity increased, so did the risk of downtime, which is unacceptable to the bank's leaders.

"Similar to other organizations, we underestimated the impact of blades on our cooling system," says a senior manager in the bank's technology services office. "Once we started deploying blades, they seemed to multiply like rabbits, and we experienced heat-related problems much quicker than we expected."

Hot spots flared up as blades were deployed in environments designed for much lower equipment densities. The bank implemented several strategies to increase the performance of existing technologies, including arranging racks in the hot-aisle/cold-aisle configuration and converting perforated tiles to a high-volume grate style. These measures bought the company some time—until more blades were deployed.

"We even tried putting fans in the hot aisle to help move air to our base floor-mount cooling units," the manager says. "But we recognized this was a temporary solution at best, especially when we considered the cooling capacity required to meet our future requirements."

During the 2005 summer, the bank placed a moratorium on new servers at the Manhattan facility until it could address overheating within two areas.

"I was impressed by the flexibility of the different Liebert XD cooling modules. I didn't want anything touching the top of my racks that could interfere with future reconfiguration, so we suspended Liebert XDV cooling modules from the ceiling, which left clearance above the racks."

*Senior Manager,
Technology services office*

"The areas that failed didn't threaten business continuity, but we knew we had to find a solution before something mission-critical was affected," he says. "In today's computing environment, your cooling is just as critical as the network itself. If cooling fails, your servers are not far behind."

The Solution

Also in 2005, the bank began planning installation of a blade server farm to handle increased demand for computing capacity. Managers called on DP Facilities Inc., designer of its original data center, for advice on how the server farm could be integrated into the data center.

DP Facilities President Mark Gerard recommended creating a dedicated area exclusively for blade servers as opposed to spreading them throughout the data center.

Because its main data center had no more space, the bank decided to convert an adjacent storage room into a 1,200-square-foot, high-density computing environment to house 24 racks with as many as 1,000 blade servers. The servers were expected to generate up to 16 kW of heat per rack when fully populated.

Gerard and his staff calculated that traditional floor-mount cooling could provide a maximum of 5 kW of cooling per rack through the raised floor. Further, under-floor cooling alone for these high density loads would result in uneven air distribution through the rack. Cooling would be adequate at the bottom of the racks, but temperatures toward the top of the racks would exceed the manufacturer's recommended range for servers. The need for supplemental cooling was clear.

Bank managers considered several approaches, including one that would have sealed rows of racks into an enclosed space and used chilled water as a coolant. This solution lacked the desired cooling capacity and flexibility. He was also reluctant to introduce water into the data center.

Gerard recommended the Liebert XD high-density cooling system, which he learned about from Henry Porzio at the Liebert Manhattan office. "Knowing Liebert's commitment to high-density cooling, we were confident specifying and installing the system and felt assured of the success of the project," he says.

"We typically aren't early adopters, but blades were so different that we had to think outside the box to solve

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Mark Gerard, president
DP Facilities

the heat problem," the bank's technology services manager recalls. "The fact that Liebert equipment has such a strong track record minimized our concerns about implementing Liebert's XD technology."

A flexible, scalable and waterless system that delivers more than 500 Watts per square foot of sensible cooling, the Liebert XD family was designed specifically to meet the challenges of cooling high-density computing environments. For open data center environments, such as the bank's new facility, users can choose one or a combination of three different cooling modules:

• Liebert XDV modules that mount on the top of racks or are suspended above the rack.

• Liebert XDO modules that attach to the ceiling.

• Liebert XDH modules that fit between racks.

"I was impressed by the flexibility of the different Liebert XD cooling modules," the manager says. "I didn't want anything touching the top of my racks that could interfere with future reconfiguration, so we suspended Liebert XDV cooling modules from the ceiling, which left clearance above the racks."

Refrigerant circulates to and from the 48 Liebert XDV cooling units via three Liebert XDP pumping units, which in turn connect to a redundant chilled-water system and an existing rooftop glycol dry cooler farm. This includes glycol supply, return and a spare riser, so that in the unlikely event of a leak the system can switch to the spare riser.

Liebert recognized early that some data center professionals are reluctant to bring water into the facility. The Liebert XD system uses an environmentally friendly, phase-changing refrigerant that operates at low pressure and becomes a gas at room temperatures, making it ideal for use around electronic equipment. In addition, the pumped refrigerant technology is more efficient than chilled water, which can yield significant cost savings throughout the equipment's lifespan.

Interlaced piping from the Liebert XDP pumping units to the Liebert XDV cooling modules creates redundancy so that the failure of a single pumping unit or cooling unit would only reduce cooling capacity while the problem was being rectified and not trigger a shut-down.

"The Liebert XD system delivers a fault-tolerant cooling solution for blade server environments," Gerard says. "This helps us meet the bank's need for a completely uninterruptible data center."

A five-ton Liebert Challenger precision cooling system provides relative humidity control and air filtration for

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the new environment. Liebert Deluxe precision cooling systems in an adjacent room provide base-level cooling via the 10-inch raised floor.

The bank's existing data center has dual-bus power distribution running from two separate utility power vaults all the way to the computing hardware. Each power path is configured with Liebert PPC dual-input Precision Power Centers, which supply grounding, custom distribution, monitoring and expansion capabilities, and Liebert Series 610 UPS units, which provide immediate response to utility outages with high overload capacity. Side "A" switchgear and UPS systems are housed in a separate room from Side "B" equipment. In the event that a fire or other disaster disables the equipment in one room, the other side can support the entire load.

To provide an equivalent level of redundancy for the new high-density facility, DP Facilities rebalanced the loads in the building and created two stand-alone UPS rooms, each of which houses a 500 kVA Liebert Series 610 UPS.

Liebert SiteScan Web delivers flexible monitoring and control of the critical cooling and power systems throughout the bank's data centers. This enterprise-wide monitoring solution displays the status of all critical systems from any internal computer, allowing staff to quickly ascertain the status of all critical systems. Rich data analysis and trend reporting capabilities allow managers to identify and correct problems before they become critical.

Liebert SiteScan Web can export real-time and historical data directly to an operator's spreadsheets via an XML/SOAP interface to Microsoft Excel. In addition, programmable alarm and event management functions notify key personnel when operating conditions fall outside of set parameters, allowing time to correct issues before they trigger cooling and power system failure.

"The Liebert XD system integrated easily into our existing Liebert SiteScan Web system," says Michael Ludwikowski, chief engineer for building maintenance company Jones, Lange, LaSalle. "If an issue or alarm is raised, notifications are immediately sent to key personnel, and these notifications are detailed and descriptive enough so that the problem can be quickly and effectively addressed.

"These capabilities, along with the system's ease of use, allow us to focus on our business, rather than on the systems behind it," he adds.

"It's a great comfort to know that we have a flexible and reliable cooling solution that will easily scale to our future expansion needs."

Senior Manager,
Technology services office

The seamless installation process impressed the bank manager. "Only one wall separated the construction space from our main production data center," he says. "The technicians understood our need to maintain continuous operation and were careful that the dirt, dust and debris didn't impede on our production space."

Ludwikowski says that Liebert acted as a partner throughout the project lifecycle, from the early design stages through the provision of onsite training for the entire bank staff. "Henry Porzio was on site just about every day from the initial planning through commissioning," he says. "The Liebert personnel provided continuity of service that equals the performance of their equipment."

The Results

The bank now has a high-density computing environment with a dynamic critical infrastructure to accommodate current and future computing capacity.

Since installation was complete in January 2006, the systems have maintained optimum temperature and humidity levels. After all blade servers were moved to the new room, the existing production data centers returned to normal operating temperatures. Hot spots are a thing of the past.

"The Liebert XD system has proven to be high on reliability and low on maintenance," says Ludwikowski.

"The Liebert XD system has delivered on all of its promises," says David Fitzgerald, installation foreman for DP Facilities. "We have loads of extra floor space for computers and a small electric bill to keep the building manager happy. More than a year later, we have still not received an alarm."

The bank's technology services manager is pleased with the performance of the new systems. "The return on our investment is that availability is back to 100 percent," he says.

At commissioning, the room held about 10 percent of its capacity of 1,000 blade servers and is expected to be at full capacity within 24 months.

The plug and play nature of the Liebert XD systems makes it easy to for the bank to add or reconfigure servers within the room as needed. "It's a great comfort to know that we have a flexible and reliable cooling solution that will easily scale to our future expansion needs," he says.

In fact, the bank frequently hosts tours of its high-density room to showcase the operating environment.

"We're proud of what we've done here. It works," the manager says.

For more information on Liebert technology, visit **www.Liebert.com.**

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