Case Study

Tridium Technology Enables Complex Integration at Whirlpool Data Center Project

Whirlpool Corporate Headquarters, Benton Harbor, MI

When Whirlpool Corporation migrated its central data center in Benton Harbor, Mich., from a mainframe environment to a high density server environment, the company conducted a single point-of-failure study to address facilities needs for the site. A decision was made in 2003 to overhaul the redundant backup systems for power and chilled water to make sure the mission-critical facility never failed.

"The data center supports Whirlpool operations globally. It runs 24/7," explains Bill Brown, data center engineer for Jones Lang LaSalle, which runs the data center under contract. The $12 billion-a-year, home appliance company conducts manufacturing operations in four continents and markets products in 170 different countries. Allowing the data center to go down, no matter what the circumstances, simply was not an option.

Plans called for upgrading and modernizing the incoming power system—boxcar-sized generators, transfer switches, sub-stations, UPS and battery systems—as well as the chillers and CRAC units housed within 12,000 square feet of data center space. The project also incorporated traditional building systems like HVAC controls in an adjacent building. Brown wanted integrated controls to ensure better maintenance and enable a rapid emergency response. But it was an unprecedented challenge tying together 15 types of equipment from multiple manufacturers, each of which used proprietary software controls, and traditionally required the use of additional integrators to convert the proprietary software.

A decade ago, Brown would have been asking for the impossible. No one had ever integrated so many different building and power systems before. Although equipment manufacturers had begun migrating to open protocol systems by 2003, there were still three different open systems, and they were largely incompatible. Fortunately, Brown found a company that could handle the job: ControlNET.

The Kalamazoo, Mich.-based building automation firm has built its business model on the conviction that open protocols represent the future of the building controls industry. With a team of Niagara Certified engineers plus support staff on board, the firm specializes in developing "best in class" open-protocol, web-based solutions in the building automation sector. Says General Manager Chris Bonzheim: "From the beginning, our focus has been on web-based, open protocol solutions. We believe the future of building automation is moving steadily towards open protocol systems and away from proprietary control systems. We do not believe that property owners want to be held captive by proprietary technology."

The underlying technology that made ControlNET's specialty possible is the versatile Honeywell WEBs platform developed by Richmond, Va.,-based Tridium, Inc. Capable of communicating with any proprietary or open-protocol system, Honeywell WEBs integrates the schematics of complex arrays of equipment in a unified, Web-based graphical interface, and makes it easy to drill down into any component of the system to find critical data.

Instead of implementing software controls for individual pieces of equipment, each of which has to be administered by a dedicated PC, ControlNET can use Tridium's technology to create integrated, enterprise-wide systems that control all the sub-systems from a single location, Bonzheim explains. "This is what a building enterprise system is all about. In our industry, there's a lot of talk about convergence, but it's been slow to happen—until Tridium came along. Tridium has allowed us to move beyond simple temperature control systems and into complete building enterprise systems."

The Implementation

The Whirlpool project represented a very complex building integration project, says Chris Davis, the senior application engineer at ControlNET who led the Whirlpool integration. Upping the ante, Whirlpool was running on a fast-track schedule, so ControlNET had only four months to turn the project around.

"We had done integration before, though not to the extent of this system. But we knew the Tridium technology was capable of handling it," says General Manager Bonzheim. "Chris Davis did his homework. We were confident it could be done."

Pulling off the job required coordination of the property owners, mechanical contractors, electrical contractors, and multiple systems delivered by separate vendors. Says Ed Merwin, Tridium's director of field sales: "ControlNET had to orchestrate not only the technical aspects of the integration but also the organizational aspects. It was not an easy feat."

Bonzheim, Davis and the rest of the ControlNET team deserve kudos for a phenomenal job, says Merwin, who adds that he also sees the project as a validation of Tridium's technology. "Think about it: This is one of the most complex building automation projects ever undertaken. It didn't require any special software to make it happen. ControlNET used a single tool kit and product line to pull it all together."

Whirlpool Data Center demonstrates intelligent buildings on a grand scale integrating numerous diverse systems using Tridium's technology.

The Benefits

After a year and a half in operation, Bill Brown with Jones Lang LaSalle is more certain than ever that the move to an integrated control system was the right decision. Integrated controls make it much easier to plan and conduct maintenance on the multi-million dollar power system, he says.

First, the control system can tell if there are problems with the equipment – pumps, air conditioners, whatever – that need tending to. Second, the system makes a gre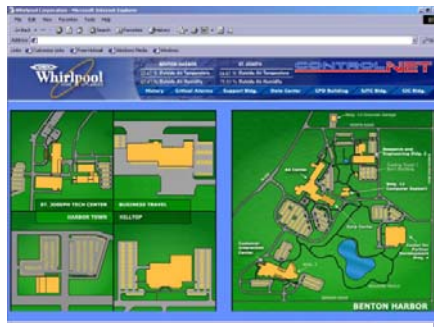at tool to help facilities managers undertake the maintenance. "If we're doing equipment maintenance on the UPS (uninterruptible power supply) system, we have to transfer the power supply loads," says Brown. "Before, we used to have to walk from building to

building to verify that the transfers had taken place. Now we can do it from a laptop at either location." Third, the entire system is monitored for alarms and dispatched 24/7/365 through a third-party security management company using Tridium's Vykon Alarm Server (VAS) component of the package. ControlNET certainly appreciates the confidence that

Whirlpool's Home Page for monitoring the corporate campus

Air conditioning/chiller monitoring screen for the data center

Whirlpool has placed in them. Since the original integration project, Whirlpool has selected ControlNET for 15 additional automation projects. Meanwhile, the firm's experience with open protocols has given it a big edge
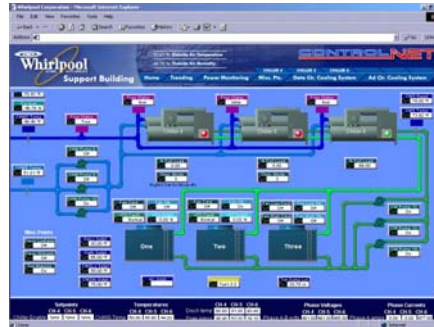
in competing with other firms, most of them still coming up the learning curve, for projects that require the integration of diverse systems.

But Bonzheim says the greatest satisfaction comes from meeting the challenge presented by a highly respected global manufacturer for control, automation, security, and reliability while delivering the energy efficiency that identifies Whirlpool as a good corporate citizen. "People have been talking about the benefits of intelligent buildings for years now," says Bonzheim. "Finally, they're here. With Whirlpool, we've demonstrated technology that provides a seamless integrated solution to the problems of managing multiple building systems. The ControlNET team is proud to lead the way toward making intelligent buildings a reality."

Major components included:

— **York chillers**, integrated through a Microgateway Panel (BACnet protocol)

— **Trane chillers**, integrated through a Trane BCU Panel (BACnet protocol)

— **Cooling tower systems**, with backup well water to protect against the loss of city water, utilizing LonMark controls

—**Johnson Controls JC80 system** converted for power and miscellaneous monitoring to ControlNET LonMark Controls

— **Liebert air conditioning units**, integrated with a Liebert Sitelink Panel (BACnet protocol)

— **Liebert leak detection system**, integrated through a Liebert Sitelink Panel (BACnet protocol)

— **Liebert uninterruptible power supply units**, integrated through Liebert Sitelink Panel (BACnet protocol)

— **Liebert static transfer switches**, integrated through Liebert Sitelink Panel (BACnet protocol)

— **Pre-action sprinkler systems** and fire detection systems, integrated through LonMark controls

— **Russelectric ATS complete with bypass switches**, integrated through Russelectric Microprocessor (Modbus protocol)

— **Onan generators**, each with its own fuel system, fuel tanks and parallel switchA, integrated through an Onan Microprocessor (ModBus protocol)

— **ATS for fuel system backup**, integrated through an Onan Microprocessor (LonWorks protocol)

— **Cuttler Hammer electrical substations**, integrated through Westinghouse Modbus NetLink (Modbus protocol)

— **Square D electrical substation**, integrated through Square D's ECC21 ethernet card (Modbus protocol)

— **Westinghourse electrical substation** integrated through Cutler Hammer Modbus Netlink (Modbus protocol)