



case study

Integration of Power, Electric and HVAC Systems for a Global-Brand Data Center

INTRODUCTION

Most data centers operate with a 24X7 high availability mandate. Every effort must be taken to ensure against any system failing — from the servers' internal processors to the power and chilled water systems that keep servers running and cooled. There needs to be redundant backup systems for every contingency. The Whirlpool Corporate data center in Benton Harbor, Michigan, has been operating with near 100% uptime, in part thanks to an integrated controls system with Niagara Framework® at its core.

CHALLENGE

Whirlpool's Benton Harbor data center needs to deliver near 100% uptime to keep the home appliance company's manufacturing and marketing operations humming on four continents. Multiple boxcar-sized generators, transfer switches, sub-stations, UPS and battery systems power the 12,000 square-foot facility. And to cool the space, there are multiple chillers and CRAC units. An adjacent building houses the data center's HVAC controls. Over fifteen years ago, when Whirlpool first migrated from mainframe computers to this high-density server environment, the company conducted a single point-of-failure study. One finding was that conventional approaches to managing primary power and cooling systems were insufficient for a data center. They would need to be more innovative to ensure on-time maintenance and to enable rapid emergency response. They would need to integrate all the primary power systems. Whirlpool looked to ControlNET, L.L.C., an early Tridium partner and adopter of open-protocol integration for this project.

"To do successful integration work for data centers and server rooms, with their mission-critical 24X7 availability requirements, your depth of knowledge must be wider and deeper than that of the average temperature controls contractor," comments Chris Bonzheim, General Manager, ControlNET. "Our Senior Application Engineer Chris Davis had deep knowledge of electrical systems. He understood how an electric power grid worked, and he could envision the integrated solution. When he created the graphic that tied together all these multiple systems — the majority not HVAC— it looked like one system. That vision was exactly what Whirlpool was looking for."

SOLUTION

The Whirlpool project represented a very complex building integration project on a fast-track schedule. ControlNET had only four months to turn the project around. Pulling off the job required coordination of the



EXECUTIVE SUMMARY

Project Type: Data center power, electrical and HVAC integration

Client: Whirlpool Corporation

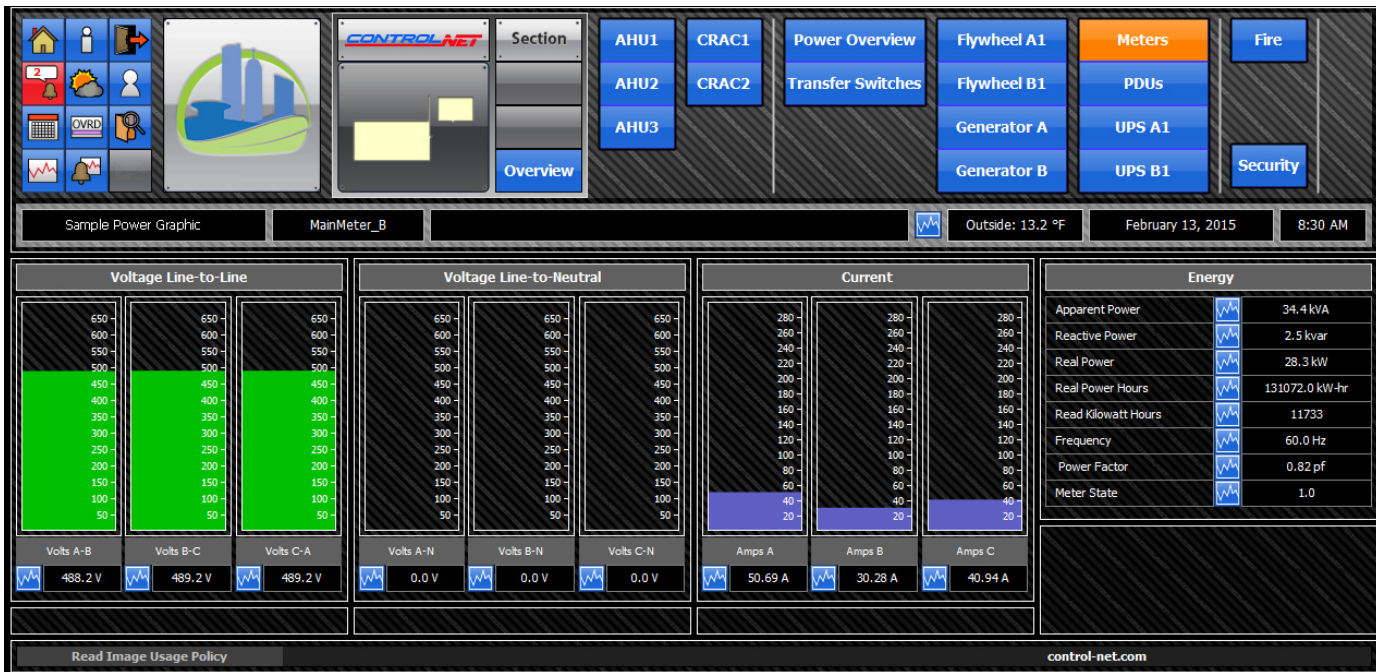
Systems Integrator: ControlNET LLC

Key Technology: Niagara Framework delivered under Honeywell WEBs brand

Benefits: Integrated controls enable proactive maintenance and rapid response to emergency and recovery in the face of disaster. The Niagara-based system delivers control, automation and security befitting a global manufacturer, along with the energy efficiency that supports its drive to be a good corporate citizen.

"Due to our early adoption of Tridium Niagara and its premise of protocol normalization into a single database as the gateway into integration, we won the project. At the time, there really were no other contractors in our market embracing integration and meeting the challenges head-on. Whirlpool searched nationally for a contractor that could do it. Little did they know, we were right in their backyard and we were the guys who could do it."

Chris Bonzheim
General Manager
ControlNET LLC



Sample ControlNET graphic for a power meter integration that shows the status of multiple power interfaces such as power supplies, generators, automatic transfer switches, static transfer switches and electrical substations.

Whirlpool facilities team, as well as mechanical contractors, electrical contractors, and the many equipment makers delivering their separate systems. The controls logic for 15 types of equipment from many manufacturers and diverse programming generations were orchestrated using the Niagara platform. ControlNET successfully implemented a centralized controls system and user interface, overcoming the challenges of different protocols and without calling in integration specialists skilled in one brand of proprietary controls software or another.

BENEFITS

The move to an integrated control system was the right decision for Whirlpool. Integrated controls make it much easier to plan and conduct maintenance on the data center power system. Among the benefits is that the control system can alert facilities managers to problems with the equipment – pumps, air conditioners, etc. Second, the system makes a great tool when doing the maintenance: for example, when working on a UPS system the building engineer formerly had to verify the transfer of power supply loads by walking from building to building. Now they can do that from a laptop at either location. Thirdly, 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). Whirlpool and ControlNET appreciate the confidence that affords.

ABOUT TRIDIUM

For over 20 years, Tridium has led the world in open-protocol application frameworks for operational data. Our products allow diverse monitoring, control and automation systems to communicate and collaborate in buildings, data centers, manufacturing systems, smart cities and more. We create smarter, safer and more efficient enterprises and communities – bringing intelligence and connectivity to the network edge and back.

INTEGRATION SCOPE:

BACnet-Protocol Integrations:

- Chillers (York and Trane)
- Air conditioning units (Liebert)
- Leak detection system (Liebert)
- Uninterruptible power supply (UPC) units (Liebert)
- Static transfer switches (Liebert)

LonMark-Protocol Integrations:

- Cooling tower systems, with backup well water
- Legacy BMS for miscellaneous monitoring
- Pre-action sprinkler systems and fire detection systems
- Automatic transfer switches (ATS) for fuel system backup (Onan)

Modbus-Protocol Integrations:

- ATS with bypass switches (Russelectric)
- Generators (Onan), each with its own fuel system, fuel tanks and parallel switch
- Electrical substations (Cuttler Hammer, Square D, Westinghouse)