



ASHRAE and manufacturers of IT equipment have recommended operating temperature ranges for inlet air to data center IT equipment in the range of 64.4-80.6°F. The cooling units are normally controlled in a standalone, decentralized mode based on return air temperature to the cooling unit, rather than inlet air temperature to the servers. This often results in over-cooling, and wasting energy.

At the California Franchise Tax Board Data Center, steps were taken to improve the efficiency via several steps that included:

- ✓ Installation of wireless temperature sensors and power-monitoring data loggers
- ✓ Repositioning floor tiles to improve air distribution
- ✓ Retrofitting computer room air handling (CRAH) units with Variable Frequency Drives (VFDs) to modulate fan operation
- ✓ Installing automated software to provide temperature control
- ✓ Installing hot-aisle containment curtains to isolate server hot-aisle airflow
- ✓ Blanking of openings in the racks to prevent airflow "short circuits" through the racks

The new software system needed to communicate to the Computer Room Air Handlers (CRAH). The software utilized Modbus, while the CRAH used BACnet/IP. Since the key component in making this new design function fully was data integration, it was necessary to devise a way for the new software network to interface to the CRAH and the integrator came to FieldServer Technologies for a solution.

The FieldServer Model FS-B2010 was selected to provide this important data integration solution. FieldServer has long been known as a leader in gateway technology and drivers for the Building Automation industry.



With interoperability capability between the CRAH and the new software system, plus the VFDs, the system was able to eliminate data center load by reducing fan speeds and turning CRAHs off when not needed. It is estimated that the project eliminates 475,239 kWh per year which is 21.3% of the baseline energy consumption of the data center prior to the installation.



The most common method used for controlling data center cooling devices employs the return air temperature from the data center. This method provides a blended air temperature regime from the data center to the cooling devices that masks the actual needs of the servers. Consequently, the cooling devices will operate inefficiently because they do not accurately anticipate cooling requirements.

However, by retrieving server inlet air temperature from the server's manageability network and linking this information to the building management system to control the cooling system in the data center, energy reductions can be achieved by more precisely controlling the amount of cooling required.

To achieve this goal it requires communication between the server information and the cooling controls. The Information and Communications Technology (ICT) management network can feed the server temperature information to the Intel Facility Management System (FMS). Data is then presented to the Cimplicity HMI software where it is available to the data center cooling system devices.

A GE Fanuc Series 90-70 PLC system provides the process control through the GE Fanuc Cimplicity HMI. In order to interface to the Liebert Computer Room Air Handlers (CRAH) the user needed to convert between the Ethernet Global Data (EGD) on the GE PLC and the Liebert CRAH which utilized Modbus RTU protocol. The FieldServer Technologies FS-B2010 was the gateway of choice to accomplish this interface.



The user stated that, "The FieldServer gateway was chosen due to the flexibility to adapt to alternate protocols on both the controller and the CRAH, providing a flexible solution for future units/sites."

This interoperability capability enabled the center to reduce both chiller-plant and pumping energy by 30 to 40 percent.