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BACnet® Simplifies Complex



By Carl Bate

S Components' U.K. division headquarters is a purpose-built 800,000 ft² (74 000 m²) complex (equivalent in size to five football fields) in central England. The site consists of administrative offices, calibration laboratories, call centers, and warehouses, the tallest of which boasts the most level floor in Europe to prevent stacking vehicles from toppling at their full height extension. The main areas of the site are operational 24 hours a day, 365 days a year.

The company installed various control systems to help its plant and services department engineers to run the site efficiently. However, using different manufacturers' controllers meant the department had to operate a different PC operator workstation (OWS) for each vendor. With the site expanding and more controls being fitted, a decision needed to be made regarding which controls manufacturer to standardize on in future projects. Various manufacturers were considered, and the facility engineers attended trade shows to research the latest technologies. After discussions with several suppliers, the plant and services management agreed that all new plant equipment and controls installed on the site must be native BACnet. The primary reason for this decision was that the BACnet open protocol would enable various equipment and controls to "speak" a common language, and thus be connected onto a single facility-wide communication network.

A major benefit of this would be the reduction of electrical wiring necessary when monitoring and controlling equipment, such as boilers, chillers, generators and equipment associated with other building services. Without using BACnet, the site would have required many "hard-wired" connections with the BAS controls to monitor faults and to provide system interoperability. Instead, sensor readings, alarm conditions and override facilities could be broadcast throughout the entire network, allowing them to be accessed by users within a single graphical BACnet supervisory platform. This would enable the company to mix and match equipment and controls from various manufacturers on site, giving them complete freedom of choice for future retrofit and expansion projects.



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BACnet helps facility staff to prioritize their workload for the day.

In addition, the company required all new equipment installed on the site to provide more functionality than the limited control and status monitoring capabilities of existing units, which had been "hard-wired" to the BAS controls. By using a BACnet system, operators were given greater control flexibility, while

receiving more detailed information of internal faults and measurements from BACnet equipment. This has proved to be invaluable to engineers for recognizing and reacting to problems more quickly, as well as for planned maintenance.

Figure 1 shows a simplified representation of how the network is laid out. Engineers monitor and control the site from a central head-end graphics PC workstation. They are able to check for faults in the

morning to prioritize their workload for the day. They also can look for operating anomalies that may indicate a fault in the making and, at the end of the day, ensure everything has been cleared and all services can run according to their programmed operation.

Due to the immense size of the facility, three other operator workstations are located around the site that are set up to supervise various alarms. This enables event and alarm notifications to be routed to different stations depending on source and time of occurrence.

The BACnet system is set up to be simple to use, despite its higher level of functionality. Operators can view equipment

status without the need for previous computer experience. This is achieved by displaying faults from various equipment manufacturers on a single screen, with the ability to navigate to a visual representation, or mimic, of the associated building system. This makes it simple for operators to readily access status information across the entire site.

The various equipment and systems controlled and monitored are associ-

ated with the HVAC, life-safety, lighting and other electrical services. The most recent additions include new chillers, many fan coil units and variable-air-volume (VAV) boxes, as well as three generators capable of powering the entire site in the event of any power disruptions. All units are fitted with BACnet controllers. The communication of all main plant controllers uses a high-speed fiber-optic Ethernet LAN.

Warehouse complex in Corby, U.K.



Figure 1: Simplified diagram of BACnet network.

Various native BACnet building controllers installed at key locations within the facility are connected to the Ethernet fiber backbone. Each controller supports a BACnet MS/TP subnetwork that connects to native BACnet field controllers for all other HVAC equipment, such as the air-handling units, fan coil units and VAV boxes. For example, VAV boxes fitted with BACnet controllers serve the main office complex. These controllers communicate on a BACnet MS/TP subnetwork. The main plant and services PC workstation is used to monitor and control this area, allowing changes such as setpoint and time schedule adjustments, to be performed as and when required by operators.

BACnet operator workstations also include fully animated graphics, allowing operators to view and adjust system functions such as time schedules, alarms and trend logs, as well as providing a complete view of each area within the site. About 150 control units are installed at RS, with new units continuously added as various areas undergo retrofit or expansion.

The BACnet control system has resulted in greater choice and flexibility for the plant and services department to select equipment and systems.

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