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BACnet[®] Goes to School

By Hans Symanczik

The creation of a modern, future-proof and transparent building automation system were the University of Twente's goals for a renovation project completed earlier this year. The University of Twente in Enschede is the only campus-based university in The Netherlands. It offers education and research in areas ranging from public policy studies and applied physics to biomedical technology.

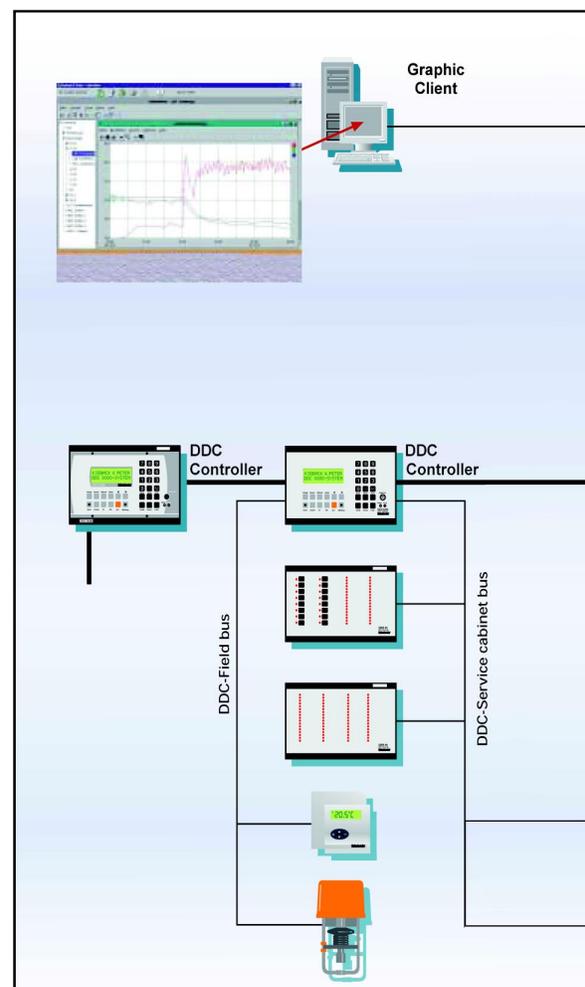
At the heart of the campus lies the Bastille building. This three-story building has chiefly served as a cafeteria. Desiring to use the building to its full potential, the Dutch university decided to host a shop, restaurant and dining halls on the first floor, student administrative services on the second floor and offices for 25 individual student organizations on the third floor. However, the provision of these new facilities did not go far enough. The building's technical functions needed a facelift, too.

The building owners wished to incorporate single-seat operational control of the building's functions, rendering the whole facility transparent and easy to maintain. They also needed the building to be future-proof, i.e., easily adaptable to future changes and upgrades. Being able to pick and choose devices and systems from multiple suppliers was essential to eliminate the risk and expense of being locked into a single vendor.

A leading supplier of device and system solutions in HVAC control and

building management recommended installing native BACnet direct digital control (DDC) HVAC controllers communicating with a higher-level building management system for complete HVAC control across the building. These HVAC controllers optimally combine DDC alarm and event management, simple parameter assignment and the flexibility of a field and switchgear bus with the communication possibilities offered by BACnet. For the BACnet hardware layer, it is possible to choose between Ethernet or BACnet/IP. As a complete BACnet central unit, these HVAC devices are able, by means of a separate controller with built-in processor, to communicate with several other multivendor BACnet devices both at the automation and management level, thus providing flexibility for the university's future expansions.

The DDC HVAC controllers at the uni-



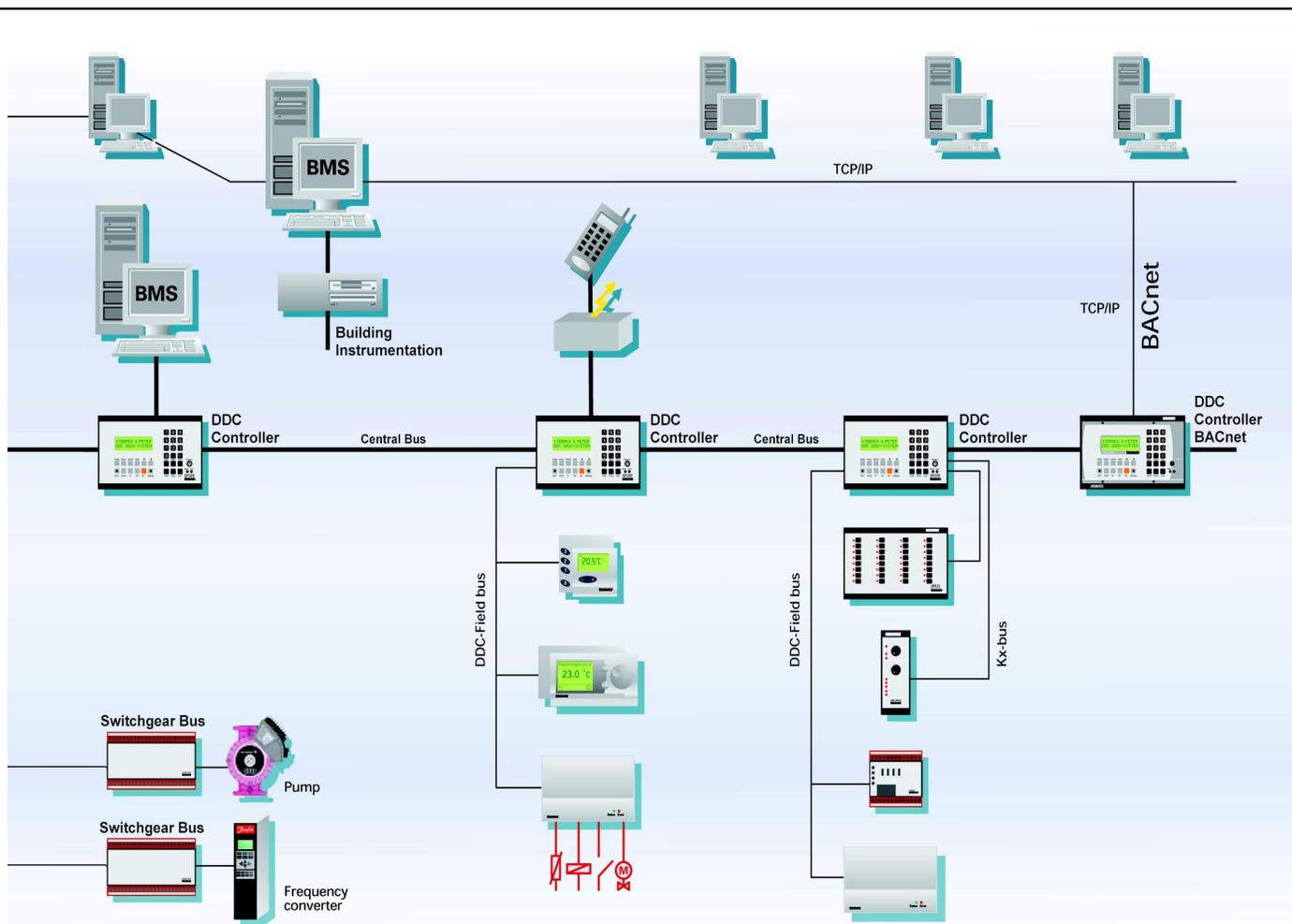


Figure 1: Direct digital control system layout for the University of Twente in the Netherlands.

iversity are connected via a fiberglass backbone to the building management system (BMS) and to other buildings on the campus. The BMS offers real-time, multi-user, multitasking capabilities and a user interface and has been installed to configure, modify and monitor the network. This means that entire facility is transparent and easy to maintain from a single operational seat. The BMS works with DDC systems on the principle of distributed control. This means if communication to the BMS is interrupted, DDC functions will continue to work seamlessly.

The BMS is based on a QNX operating system, although it is also possible to connect it to other operating systems such as Microsoft Windows 95 or Windows NT/Unix. This option made it easy to integrate the BMS into the existing PC system and network at the university. The BMS software is split into an operator control level and a program level. At the operating level, user-friendly features, such as the transparency offered by the graphic-based interface, mean that tasks can be carried out easily using plain text in tabular form. Upon selecting the university's Bastille building from the overview, for example, the operator can immediately see the actual values, setpoints and times based on data provided by the BACnet HVAC controllers. It is also possible for the operator to activate all HVAC components remotely. Furthermore, the program level offers

the possibility of carrying out project planning as well as data backups. Flexibility is achieved by the fact that additional software modules can be incorporated into the BMS at any time.

The installation of native BACnet HVAC controllers means any future changes in use or expansions made across the site can be achieved quickly and cost-effectively simply by adding more open, BACnet devices to the network — naturally selecting those most suited to the purpose from a wide range of manufacturers. The transparency of the system also makes it possible to collect and store trends to run the building even more efficiently based on this historical data. By studying building demands, various system setpoints may be reset to suit building usage and tenant requirements. In a building such as that at the University of Twente, where students come and go at different times, such historical data is essential for gaining an accurate overview of when peak usage times occur and when the building has lower levels of occupancy.

And what do the students think? From their point of view, the new, modern facilities at the Bastille building can now be enjoyed at an optimal temperature, making the University of Twente a really “a cool campus” in both the figurative and literal sense.

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