



# Web-based Integration Hits a New Dimension



## Background

The University of North Carolina at Chapel Hill accepted its first student over 200 years ago, in 1795. The university offers over 100 fields of study to students who take advantage of the 14,800,000 square feet of academic, administrative, and housing facilities covering an impressive 729 acres in the beautiful and forest covered North Carolina landscape. What's more impressive is the 4,000,000 square feet of additional structures already planned and well under construction to be completed within the next five years.

## The Project

CyrusPowered Products™, the on-demand Web applications division of Cyrus Technologies Inc., a Florida based systems integrator, achieved the task of integrating over 100 buildings, utilizing nine separate building control systems into one, cohesive, easy to manage Enterprise Building Management System (EBMS). Set to be completed this November, the new EBMS at UNC at Chapel Hill is the largest Web Services integration scheme of its kind.

"The project specification was very broad," explained Matt Horton, Vice President and General Manager, CyrusPowered Products, "encompassing multiple BAS and IT disciplines with the primary goal to bring the entire Chapel Hill campus under one EBMS based solely on

XML/SOAP Web Services, utilizing the Web to create a consolidated, intuitive user interface." The entire system is essentially accessible and manageable from anywhere in the

world but is centrally housed in a state-of-the-art Building Operations Center, located directly on the university campus.

## The Challenges

With a project of this size, there is guaranteed a wide range of customer demands and project challenges that must be met. As with any college, the UNC campus is comprised of an array of diverse facilities: lecture halls, laboratories, offices, housing, libraries, dining halls, and more, with over 80 additional buildings planned. Due to the distinctive uses of each structure, over the years, different BMS were installed to meet the unique requirements of each facility's management.

In essence, the nine dissimilar building control systems caused the bulk of obstacles Cyrus Technologies had to overcome to integrate Chapel Hills's campus into one management network. Some of the control systems were open, utilizing the LON platform and some were proprietary solutions causing an overload of building automation system (BAS) protocols that were clogging the university network.

Further complicating the project was the university's inability to aggregate building control data and subsequently analyze the accumulated information. UNC facilities managers could not combine each control systems operation data, a result of the nine different protocols, creating "islands of data" whose constructive uses were severely truncated. Moreover, the university lacked a method to document data configuration across the network, posing the question of how to interpret collected building operation information.

Lastly, the nine BMS created an inconsistent management environment where human machine interfaces (HMI) were dissimilar. Each BAS had its own functionality and maintenance specification, irregular security levels, with complex and varied remote access to certain systems, and sparse Web accessibility.

**UNC at Chapel Hill took this integration opportunity to define four central goals for the project:**

- As a first priority, UNC wanted to eliminate the vast complexity of overseeing nine incongruent BAS.
- An improved and more consistent facility management interface for building managers was well over due. The new EBMS, under all circumstances, needed to offer managers a consistent building control interface for every

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structure, regardless of the building's installed automation system.

- Additionally, the EBMS also needed to allow for future upgrades and additions to include Chapel Hill's 80 plus buildings to be completed during the next five years.
- Last, the university needed a method to interpret and store aggregate building operations data.

### The Solution

"To achieve the goals of the project, we implemented into the EBMS a specially developed Campus Version of our online application HostedControls™ in conjunction with our database service Hosted Reports™, both of which are entirely Web-based," said Horton.

The complex solution included installing an Enterprise Class Server Farm, a collection of computer servers leveraged to accomplish the tasks far beyond the capabilities of just one server, a necessity in a project of this size. From here all BAS can be remotely controlled further simplifying full campus management.

Once the nine automation solutions at UNC were connected to the server farm in the Building Operation Center, Cyrus Technologies extended all building control networks with XML/SOAP Web Services Gateway protocol servers. In buildings controlled by LON based automation solutions, Echelon's LonMark certified iLON 100 e3 Internet Servers were utilized to connect the building's devices to the infinite information available on the World Wide Web. Utilization of the Web allows the on-demand employment of information such as weather data and energy prices to be applied to the operation of the control systems, allowing university facilities managers to handle the BAS most efficiently.

In the Building Operations Center at UNC at Chapel Hill facilities managers can now oversee all building operations in the entire campus. HostedControls™ provides a consistent management process for all 100 structures in the network. "Once HostedControls™ is deployed, UNC will experience dramatic levels of freedom regarding the systems they specify at the building controls level. Plus, they will migrate to self-sufficiently in terms of IT integration, which puts them back in the driver's seat at the Enterprise level," said Horton.

What makes this project unique is the level of integration that was achieved – a total of 33,000 nodes were integrated. It would not be an EBMS without every aspect of the campus being integrated into the network, including:

- Electric, water, and steam meters,
- Campus network security,
- Alarm management, and
- A cohesive scheduling platform for all network systems.

Cyrus Technologies also implemented SCADA functionality between the EBMS and each building, allowing UNC building operations staff, where necessary, to override each BAS remotely from the Building Operations Center.

With all control solutions integrated and manageable within the EBMS, automation and control data from all facilities can now be collected, 24 hours a day, and stored in an OLAP environment housed within the HostedControls™ interface. Using Web-based trending and reporting tools available through the HostedReports™ software, facilities management staff can now access BAS information collected by the network and analyze the operations of each building's system. The benefits are numerous including, recognizing system weaknesses, energy consumption, areas where two or more building systems can be leverage together, etc.

With the campus at their fingertips UNC at Chapel Hill operations and energy management staff are ready to take on the new, fully integrated EBMS, particularly after being specially trained by Cyrus Technologies on how to manage and take advantage of all the EBMS has to offer.

### Benefits to LON

With LON open systems, the ability to specify a system to meet the facility's exact usage requirements is unrestricted. This includes choosing a solution with the best HMI. A consistent HMI can mean the difference between hours of training and memorizing the intricacies of the interface, to having an intuitive overview of the entire building control network where you can draw up desired information to make important system operation decisions. Combine a LON based BMS with a Web Services HMI to extend the building functions to the Internet and the possible business and economic advantages are endless.

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