

Case Study

U.S. General Services Administration Chooses Tridium's Vykon™ to Automate Intelligent Building Project for Chicago Federal Facilities



*John C. Kluczynski
Building in Chicago, IL*

Construction of the Federal Plaza complex in Chicago started in 1960 and was completed in 1973 with three separate buildings: the Everett M. Dirksen Federal Building and U.S. Courthouse (EMD), the John C. Kluczynski Federal Building (JCK), and the U.S. Loop Post Office (USPO).

EMD is a 30-story building comprising a gross area of about 1.2 million square feet, used mainly for operations of the U.S. Courts. JCK is a 42-story office building of about 1.4 million square feet housing a variety of Federal agencies. 3,900 Federal employees work in the two buildings, which attract about 1,400 visitors daily. GSA is the largest commercial-style real estate organization in the U.S., managing more than 339 million square feet of workspace for more than one million Federal employees across the nation.

Several attempts to upgrade controls to DDC at the Federal Plaza over the years resulted in a myriad of control systems providing different "islands of control". Since these systems could not share information, having building HVAC mechanics service and run the equipment was difficult at best.

In 1994 a competitive bid contract to upgrade the DDC controls was won by a LonWorks system integrator. Teng & Associates, Inc. designed a multi-phased integration of LonWorks at EMD to provide a total building retrofit of all HVAC, power monitoring, and lighting systems. The installation allowed precise temperature control, energy savings, and future compatibility for other installations. Due to the success of the installations at EMD, the GSA decided to continue the use of the LonMark-based controls for a similar conversion at JCK. When the DDC conversion in JCK was nearing completion, the GSA had a desire to combine the buildings into one common user interface. Because of the massive size of the system, the centralized graphical user interface being used created a bottleneck and as a result, the performance was poor. At this point, a decision was made to use Tridium's Vykon™ software package, which is based on the Niagara Framework™.

The GSA's Everett McKinley Dirksen and John C. Kluczynski Buildings – Chicago, IL

- Total of 78 floors and more than 2.3 million square feet.
- House Federal courts and offices of the FBI, DEA, U.S. Attorneys, U.S. Marshals Service, Department of Labor, IRS, Passport Office and other agencies.
- Dirksen building – age 38 years; Kluczynski building – age 29 years.

The GSA Needed

- An open software solution that could handle and consolidate nine different manufacturers' products, three LON network management tools, and two building automation software packages monitoring over 2000 nodes.

Vykon Provided

- A single-sourced, graphically-consistent, real-time building automation infrastructure for all control devices in both buildings.
- 24-hour, Internet-based monitoring of building controls, with alarming capabilities to alert maintenance supervisors of any problems with system.

Benefits

- Managers can read real-time energy and operational data and send commands to and from different devices. Using any web browser, they can take immediate action to help manage energy consumption and costs, correct comfort problems, or do whatever else is necessary for smooth and concise building operations – from anywhere.
- Vykon provides the GSA with the inherent capability to open all future building management projects for competitive vendor bidding due to Vykon's ability to access any and all information.

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Teng & Associates, Inc. designed a network architecture that would integrate the various LonWorks control systems into the GSA's private wide area network (WAN). In EMD, at each floor, Tridium's JACE controller is used for network management, supervisory control logic, and provides the interface between the LON network on the floor and the Ethernet backbone. In JCK, a JACE is used on every other floor.

The LonWorks network re-design allowed the use of a higher speed Ethernet backbone for both buildings. This included Ethernet risers in each building, with a fiber-optic-to-copper link for building-to-building connectivity.

"We needed a high speed, high performance, distributed solution," states John Huston, PE, Director of Technology Integration for Teng & Associates, Inc. "Tridium's Vykon Suite provided the infrastructure to meet the GSA's current and future requirements."

After several months of building the applications, the graphical user interface was available to the GSA staff. Today, the GSA has over 1,500 web pages displaying all facets of the buildings' operation. From discharge air temperature on a 100 HP air handling units to instantaneous kWh readings, the GSA has this information available at its fingertips, regardless of where the operator or manager is located within the GSA's WAN.

Since the JACE is a BACnet device and supports a wide variety of protocols and data exchange mechanisms, the GSA can integrate devices and systems regardless of manufacturer or product type without any expensive retrofits, and bring them together into one cohesive system. This allows the GSA to have their contractors truly choose the "best-of-breed" control products and devices for the specified application.

The Niagara Framework also provides the ability to run other applications such as maintenance and asset management, energy services applications, and provides the ability to manage this information in an integrated environment.

This system offered all that the GSA wanted: a web browser-based user interface, a fully scaleable, multiple server/thin-client architecture providing plenty of room for planned expansions, and a wide array of connectivity options. Based on the success of this project and the accessibility of information via the GSA's WAN, the GSA has expanded the implementation of the Vykon products to several other Federal facilities throughout the country.

Integration Challenge

Through Tridium's Vykon Building Automation Suite, the GSA now successfully and efficiently monitors and controls:

- Control system including over 2,200 nodes and over 18,000 points
- One of the largest LON networks in the world with Vykon's WorkPlace Pro LON Management feature. This replaced 4 existing separate LON management tools.
- Products manufactured by 14 different manufacturers and installed by 5 different contractors
- 13 Mechanical Floors
- 40 Pumps
- 65 Fan Coil Units
- 433 Smart Thermostats
- 1,300 VAV Boxes
- 160 Lighting Panels
- 237 Occupancy Sensors

The system utilizes:

- Vykon's Web Supervisor with integral WorkPlace Pro engineering tool
- 1,500 web pages for the Graphic User Interface
- 57 JACE-501 embedded servers
- 8 web browser-based workstations

"GSA was in a real spot when the sheer magnitude of our project started to overwhelm the original control system. Teng redesigned the network architecture and Tridium provided their JACE controllers, Vykon software and programming expertise."

- Tom Jablonski
GSA Contracting Officer's
Representative



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