case study

Smart+Connected Communities installation designed to save energy costs and improved performance

Cisco, UK

Cisco is a global leader in IT, providing solutions for transporting data, voice and video within buildings, across campuses, and around the world. Its European Headquarters located in Bedfont Lakes, UK is part of the Cisco Smart+Connected Communities (S+CC), a global initiative using the network as the platform to enable economic, social and environmental sustainability and transform physical communities, cities and countries into connected communities. The Johnson Controls - Cisco Alliance is a global collaboration focused on providing converged and integrated network systems (building, business and specialty) and services to building owners, operators and tenants. These converged network systems and services increase energy efficiency, improve safety and operational performance, maximise real estate portfolio value and enable the seamless incorporation of future technologies.

Integration of Metasys™ and Cisco SDP into one solution

In December 2011, following a competitive tender selection, Cisco invited Johnson Controls UK to collaborate in the development of a solution, enabling the building operator to view, monitor and control both building services systems, and information technologies from a single user interface. The Building Management Systems (BMS) portion of the project, based on the Metasys™ platform, included the Network Control Engine (NCE) and Network Integration Engine (NIE), it also involved the installation of 132 electric and thermal meters and a complex lighting control system using the Wago/ DALI (Direct Addressable Lighting Interface) solution.

After 6 months of development, Johnson Controls began implementation of a new technology and succeeded in demonstrating the solution at Cisco's European Headquarters at Bedfont Lakes. Johnson Controls has successfully integrated its BMS Metasys™ with Cisco's Service Delivery Platform (SDP). This enables the data from all of the selected building service systems – including the Heating, Ventilation and Air Conditioning (HVAC), conference room controls, lighting controls and fire detection systems – to be available on their user interface.

Johnson Controls

Smart+Connected Communities Program for Cisco facilities

The S+CC project at Bedfont Lakes is part of a global program to install a set of S+CC offerings over a number of Cisco facilities including buildings in San Jose, Bangalore, Rolle and Dubai. The installation of these solutions within Cisco facilities provides the S+CC development team with opportunities to enhance the solution and test value propositions.

The program includes tying local BMS to Cisco's SDP for energy monitoring and scheduling integration, adding digital signage to the facilities to notify and inform building occupants, and providing IP phone control for conference rooms. For Bedfont Lakes, the project scope included the integration of these solutions into Building 9, an approximately 130,000 square foot facility housing office space, a large demonstration centre, and lab environments. The system would cover 29 conference rooms and include approximately 50 IP phones and 25 digital signs.

Integrating to Cisco Business Software

The challenge for Johnson Controls was to develop a solution that provided all of the building services data from a range of disparate building systems such as the HVAC plant, lighting controls, energy metering and remaining elements of the legacy BMS, to provide control through to Cisco's SDP. This is a dynamic solution that Cisco uses to interact with their business systems such as email, calendar, energy analytics, and carbon reporting.

The interface to the Cisco SDP application utilises the open protocol oBIX (open Building Information Exchange) so Johnson Controls provided, installed, and configured a gateway solution using the Soft Jace AX system (Software Java Application Control Engine, AX is reference to the current revision).

The S+CC system at Bedfont together with the Johnson Controls Metasys™ system form a common seamless operating platform for the BMS, lighting, fire monitoring, and energy metering; it also forms the link between the BMS system and Cisco's SDP via the oBIX interface. The S+CC at Bedfont along with the AX/Metasys™ System carries out high level energy monitoring and control of lighting and HVAC in the conference rooms.

Results

Supportable System

BMS is a critical system for Cisco's operations in Bedfont Lakes. Not only does it monitor and control traditional commercial facility systems providing for occupant safety and comfort, the BMS also manages the HVAC systems that supply cooling to Cisco's labs, the heart of Cisco's solution development and support. Prior to the installation of the Metasys™ system, the buildings in Bedfont Lakes were operating on an out-dated and no longer supportable BMS. The replacement with the Metasys™ system now provides Cisco with a highly supportable BMS platform with available parts, service and a long-term commitment to enhancements and migration.

Lighting Control and Daylight Harvesting

Integrated to the Metasys™ BMS is a lighting control system with sensors in each conference room which controls the lights based on a combination of inputs. The lighting control system uses DALI and was installed as part of the Johnson Controls scope of work. In addition to the typical control scheme based on occupancy and the momentary light switch in the room, the BMS also receives commands from the IP phone in the room via the SDP. Lights in each conference room can be set for use in combination with overhead projectors and can be set to 25%, 50%, 75% and 100% of full brightness.

The lighting control solution also allows for daylight harvesting in the open office areas. During illuminated times the lighting will be dimmed to meet the current room lighting set point as outside light becomes more intense, enabling daylight harvesting for that room

HVAC and Thermal Energy

Metasys™ was used to collate and manage the measurement of thermal energy used by the buildings. Metasys™ is able to calculate energy consumption associated with the use of hot and chilled water in the HVAC systems. The information is supplied dynamically to the Cisco SDP for early identification of problems and management of energy consumption.

In a similar manner to the lighting, the Metasys™ and SDP coordinate to manage the temperature of the conference rooms. When the building is unoccupied during nights and weekends, the BMS uses the unoccupied temperature setpoint for the entire building. However, during occupied hours, the setpoint for the conference room is established by the SDP which informs the BMS of upcoming meetings scheduled in the room. If a meeting is scheduled the BMS uses the occupied setpoint and when no meetings are scheduled, the BMS uses a standby setpoint which allows the BMS to rapidly heat or cool the room should the room become occupied.

Energy Conservation Scheme

An important element to the success of an S+CC facility is the ability to monitor overall and sub-metered energy consumption enabling higher productivity of the building and the potential for energy savings and carbon emission reduction. All electrical circuits are metered for consumption and all electrical circuits fall into one of the three measurable categories, lighting, HVAC and plug load. The facility energy usage is also segregated between office and lab areas.

To facilitate these measurements, new multi circuit meters were installed and connected directly to Metasys™. Integration of the Johnson Controls Metasys™ with CISCO's EnergyWise protocol, allows for the measurement and verification of **94%** of the building energy consumption. Thus enabling Cisco to receive and control data from both CISCO's IT infrastructure as well as from their building services.

With Return on Investment (ROI) savings' projected at £120k per year per building through ongoing collaborative works with Accenture, Johnson Controls has made valuable energy data visible to CISCO from the site level facility management team to the corporate level sustainability group through the CISCO SDP.