

The New Face of Building Automation

Increasing connectivity options and greater concerns about energy efficiency are just some of the reasons why it's time to change the traditional view of building automation existing only in communication closets, boiler and fan rooms, says Ken Sinclair.

The building automation industry has developed a new face, not just that which can be projected by digital signage software, but a new face that includes new functionality and form. Buildings are now expected to be an interactive part of their virtual community and of course the electrical grid. This new face is creating untold opportunities that we all must investigate, understand and support.

According to Anto Budiardjo, President & CEO, Clasma Events, organizers of the BuilConn industry events for the emerging community responsible for the convergence of buildings and IT, this new face is strangely a combination of the past, the changing, the new, and a heavy dose of socially-driven subjects that together are turning the world of energy and buildings upside down.

He cites the example of ASHRAE, the association responsible for HVAC in the US and arguably around the world, which for decades has been the standard bearer of building automation and focused on what many would consider traditional views of controls and automation.

“But there is a new guard at ASHRAE and a realization that not only are controls and automation critical, but the convergence with IT and the proliferation of smart sensors and integration with energy suppliers will play a huge role in achieving the Net Zero Building goals, which would contribute significantly to addressing the climate change and energy supply solutions around the globe,” he says.

In addition, BuilConn 2008 will host the first ever keynote by a senior-ranking ASHRAE executive, indicating that convergence, IT, and specifically, connectivity is something appearing on the radar screen of the association. “We welcome ASHRAE to the BuilConn family,” remarks Anto Budiardjo.

Buildings 2.0

A great deal is being said about the future of buildings. How information technology is shaping the way buildings are designed, built, operated, and how buildings are generally viewed in the Internet-centric world we live in today. Many words and descriptions have been used to describe this vision, but none have come closer than the outcome of the Cisco Connected Roundtable at BuilConn in Dubai in 2007.

The concept is to frame the future of buildings under the term “Buildings 2.0”. It is a vision that the future of buildings is one which is controlled, managed and connected to the Internet in a way that goes far beyond simply placing a Web server to the control system or in the use of IP (Internet Protocol). Rather, Buildings 2.0 is:

- A vision of how technologies such as IP and Web Services will transform how building systems connect to each other and how the limitations of traditional integration will be blown away.

- A desire to look at buildings in a new way, how the occupant's experience through new-found services – in concert with the purpose of the building – and maximizing a building's performance can work in harmony.

- Sensitive to the immense investment owners have in their buildings, and must allow facility managers





Anto Budiardjo, President & CEO, Clasma Events, organizers of this May's BuilConn 2008 in Santa Clara, points to increasing acceptance of IT and building automation technology convergence.

to leverage existing systems and assets to work in the context of the vision outlined by Buildings 2.0.

- An initiative that cares for the scarce resources on planet Earth, recognizing that enormous opportunities exist today to adopt technologies that will enable buildings to use less or even no fossil-based energy, and thus produce less harmful carbon emission.

Wising up

GridWise Thinking is the big picture which is changing building automation's face, form and function. GridWise (www.gridwise.com) is an entirely new way to think about how we generate, distribute and use energy. Using advanced communications and up-to-date information technology, GridWise improves coordination between supply and demand, and enables a smarter, more efficient, secure and reliable electric power system.

Since the building automation industry controls the energy-intensive part of the buildings it is mandatory that this partnership be well understood to allow correct integration and interoperability with the grid.

The wisdom and economics of buying back peak electrical demand is now being driven by the exposed real costs of new electrical generation and distribution. This provides new money to the building automation industry to reduce overall electrical peaks in an orchestrated interaction with the grid.

Buying back peak electrical demand is big business. A US\$900 billion market opportunity was identified for the industry to make the US national grid smart and wise with interactive connectivity. GridWise Demand Response (DR) and GridWise devices provide a quicker response time than existing generation control.

These quick interactions when coupled with the sheer economics of not providing new generation and distribution is the reason that the grid folks are willing to invest in the industry's interaction with the grid. Conservation and DR coupled with smart grid approaches are being billed as the new green fuel for the electrical grid.

In April 2007, GridWeek demonstrated the winds of change are blowing in several directions and at several levels. The event allowed politicians, electrical regulators, generation, distribution folks, technology providers and electrical energy users a common venue

to talk about the smart grid of the future and its required changes. It showed how connectivity and innovation will help change the grid users' behavior by communicating price breaks for time-of-day billing using new connectivity paths.

Peter Kelly-Detwiler, Vice President of Energy Technology Services, Constellation NewEnergy, has spoken extensively about the need to create virtual peaking plants that can deliver capacity to the electric grid during times of peak demand. Elaborating on where participating companies can look to harvest the load in their facilities, he mentions that there are a variety of automated building systems that represent prime load-response assets. Most familiar, of course, are heating, air conditioning and lighting systems.

"The definition of a load-response asset can be expanded well beyond these opportunities to include any electricity load capable of being dropped, moved, or reduced during a specified time period to a level below what it would typically consume. Load-response assets are further characterized by a series of simple questions: How many kilowatts (kW) can be dropped? How long and how much advance notice is required? How many times per day, week, month, or year can the load be reduced?," he explains.

"As you can imagine", says Kelly-Detwiler, "the value of a load-response asset increases with reaction time, length of drop, and the number of times the process can be successfully repeated.

Meanwhile, Steve Smith, Director of Sales and Marketing, Honeywell Utility Solutions, talks of how part of the new face is appearing on a thermostat near you.



Demand response programs help limit energy use at specific peak times, when demand strains the electric grid and increases costs for both utilities and customers.

“Utilities implement demand response programs to help limit energy use at specific peak times, when demand strains the electric grid and results in higher prices for both utilities and their customers. One way to reduce demand is by installing smart thermostats or other load control devices in homes and small businesses. These devices allow the utilities to cycle equipment like air conditioners on and off for short periods of time,” says Smith.

“By having control over peak energy use, utilities are able to stabilize costs, reduce the need for additional power plants, and avoid disruptions like brownouts and blackouts. In return for their participation, customers usually receive a break on their monthly bill or a free programmable thermostat, which can help drive their energy costs down.”

Steve Smith also notes that generating new power used to be the default option when the demand for electricity started to creep toward or eclipse the available supply. “Need more power? Build another plant.” However, times have changed. For example, peaking plants now cost up to US\$1 million per megawatt of generation capacity.

Environmental concerns make nuclear power – which has the greatest return on investment – less popular, attractive and possible. Plus, power transport is increasingly difficult due to constrained distribution systems and infrastructure. That’s why demand response and conservation programs are on the rise and more and more necessary.

From BIMs to VBOCs

Building Information Models (BIMs) are data models to track all information about the design, construction, acquisition, and operation of a building. Methodology. This approach – using IT to create and model a view of buildings where information must be shared between all building systems and stakeholders through modern IT-based network infrastructures – has won support from the Construction Specifications Institute (CSI). Its MasterFormat framework has been the boilerplate upon which thousands of building specifications have been created in the world of spec-build for decades.

According to Toby Considine, Systems Specialist, Facility Services, University of North Carolina, “I have long wondered how we are going to bring building control systems into the wider world. Building inhabitants see building systems as invisible and



The usefulness of data typically ‘trapped’ within a conventional building control system can be greatly enhanced with a Virtual Building Operations Center (VBOC).

uncontrollable, and so they pay them no mind. Money spent on building systems is an instant expense, to be minimized, rather than an investment to be optimized.

“Capital assets are receiving new attention, driven by the fashion of Green and the imperative of sustainability. Owners are demanding Building Information Models rather than lines on paper (CAD blueprints) to get better built buildings at lower cost.”

Meanwhile, VBOC is an acronym for Virtual Building Operations Center, whereby all of the enterprise hardware, software, operating systems and associated IT support in a centrally located data center. Here, professional IT staff maintains the integrity of the servers and operating systems as well as the integrity of all collected building controls data.

Located within each property that subscribes to a VBOC are simple Web Services Gateways (WSGs) which collect and serve up data to the central servers across the Internet using standard IT protocols. Data collected from the WSGs are stored in a common format database and accessed by authorized users from a web browser, simple and secure. Standard and customized reports are generated within the user’s browser, or scheduled to be issued via multiple standard delivery methods.

According to George Huettel, President, Cyrus Technologies, the VBOC is not intended to replace the functions of a well designed and implemented control system at the building level. Rather, it is designed specifically to normalize data using IT standards of XML/SOAP Web Services from various building control technologies. Once normalized, a standard set of tools for scheduling, alarm management, data trending and reporting are used to permit aggregation of digital assets, not just physical assets.

“The effectiveness and usefulness of data typically ‘trapped’ within a conventional building control system is enhanced tremendously, and we have only scratched the surface of what can be accomplished with the technology platform,” says Huettel.

All this goes to show that lots of new identities are being projected onto the face of building automation. For years, traditional building automation existed only in the communication closets, boiler and fan rooms of our buildings, but it now has a public profile, purpose, and has put a smile on our new face.

CEA

Ken Sinclair is Editor/Owner of specialist building automation website www.AutomatedBuildings.com