

The Changing Face of Infrastructure Monitoring

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Donald Trump is rumored to be heavily involved in it. Cisco Systems is all over it via its Cisco Connected Real Estate (CCRE) initiative. Numerous power, cooling and building-automation systems (BAS) vendors are jumping on the bandwagon.

What is it?

It's the convergence of IP networks and BAS. Convergence that is enabling IT managers to keep track of everything in one building via a single console.

"We are seeing an emerging market of security systems, HVAC and power systems managed via IP," said Andreas Antonopoulos, an analyst at New York City based Nemertes Research. "Long term, we will see other forms of convergence, such as IP managing a whole range of BAS."

BAS includes lighting, elevators, cooling and electrical elements. It can also encompass physical security systems, TV and fire safety — all united under IP as the overarching control and monitoring system. Antonopoulos lists the benefits as power savings, coordination of physical and logical assets, and improved security.

While such systems are starting to appear, it may be years before they are a standard part of provisioning a new data center. The early stages of convergence are here, however, and range from simple extensions of existing IT capabilities to full-fledged facility systems that tie IT tightly into a building's infrastructure.

Netuitive, for example, sells a business service management (BSM) solution that analyzes the data center in real time. It self-learns the system and transmits advanced warnings of heating and power issues. Netuitive Service Analyzer correlates environmental metrics, such as temperature and power consumption, alongside server performance metrics.

"Because server overheating creates IT nightmares, knowing ahead of time that the power consumption or temperature is going up allows the IT manager to contact the building manager to proactively prevent problems," said Jean-Francois Huard, CTO and vice president of research and development at Netuitive.

Netuitive's technology is based on statistical regression and correlation analysis. For example, a data center with multiple air conditioning (AC) units might have issues with one AC control board that failed to detect a rise in room temperature and therefore didn't send any alarms. This system would detect the anomaly early enough so an admin could have the AC control board repaired and address the overheating issue before any servers shut down. This technology also learns server patterns, so intensive periods of processor usage that send temperatures higher don't also sound the alarm for no reason.

According to Huard, Netuity requires sensors be connected to the network. These can be found in the smart UPS and APC-MGE's NetBotz sensor offerings or Liebert's cooling systems.

Eaton offers a different way of monitoring. In addition to power equipment, Eaton's Foreseer Enterprise Management System manages environmental and life/safety devices from any site carrying a Foreseer

server. It can interface with gear from most power and environmental equipment manufacturers, as well as fire, security, fuel, UPS, air handlers, HVAC, battery monitoring and temperature/humidity subsystems. Thus, IT managers can simultaneously track servers and building systems.

APC, meanwhile, has been steadily upgrading its InfraStruXure platform to encompass an even greater zone. InfraStruXure Central 4.0 covers data center design, monitoring and management, and it encompasses power, cooling, floor space and cabling. Its approach is to lower support costs and prevent downtime through early detection.

"With 1 to 2 percent of total U.S. power consumption now occurring in data centers, good data center design is vital — but alone it is not enough," said Soeren Jensen, general manager of enterprise management products at APC-MGE. "It takes the right combination of design, operational and management factors to run things properly."

InfraStruXure Central has three components to take care of each facet. Thus, it can be used to design a data center from the ground up (or reconfigure it), for day-to-day operations and in overall management. It keeps an eye on UPS, power switches, PDUs, batteries, cooling, environmental monitors, airflow and server racks. It can also be tied into some BAS systems and enterprise management platforms.

IP in Charge

Although many of the systems mentioned above can access data from building systems, most are limited in what they can do. Ultimately, however, that will change. The overall trend is for IP to be the backbone for all building systems. Instead of having dozens of different cabling systems, only a few will be needed, and IP will manage just about everything.

"Every major sub-system manufacture has something to say about IP," said Tom Shircliff, co-founder of Intelligent Buildings in Charlotte, N.C. Intelligent Buildings is a pioneer in real-estate technology, design and management. "Larger companies like Trane, Siemens, TAC and Johnson Controls promote building technology platforms that look like Ethernet diagrams with their BAS applications hanging off the edge."

While this is a good sign, Shircliff cautioned that many of these established players in the facilities market continue to protect their proprietary protocols. As a result, products often labor to be truly interoperable with "foreign" controllers, other building applications and other technologies. He advocates platforms that accommodate multiple protocols and applications. Shircliff's advice to anyone planning a new data center:

"Convergence comes at many different levels and you should take what you can get in today's environment, and look to the most progressive vendors to push your legacy systems and providers," said Shircliff. "Basic interoperability is already attainable with mechanical controls, access controls/security and lighting controls."

Case in point: Intelligent Buildings was a primary vendor in a site known as Ballantyne Village in Charlotte, N.C. It executed its Fourth Utility concept alongside other providers, including Liebert, Panduit and Cisco. Fourth Utility is all about harnessing IP as a readily available utility — just like electricity, water and gas.

"Most of the dozen applications that are converged and operating on the Fourth Utility infrastructure at Ballantyne Village were not planned from the beginning but were groomed onto the infrastructure along the way," said Shircliff. "Some are converged physically via conduit, cable tray and fiber optics, and others are electronically converged by being switched through the Cisco infrastructure."

This includes television, ambient music, digital signage on 35 plasma screens, energy sub-metering, WiFi, VoIP,

LED property lighting, point of sales and even lavatories that tell the maintenance staff to bring more toilet paper or paper towels.

Another example is the 4 million square-foot North Carolina Research Campus (NCRC), which is being built over the next few years at a cost of \$1.5 billion. Anyone looking to see the data center of the future would do well to investigate this property. It is being constructed from the ground up using Intelligent Buildings' Fourth Utility infrastructure.

"Building system convergence is being driven by the dominance of IP and the economics," said Jim Sinopoli, principal of Sinopoli and Associates, an engineering and consulting firm based in Spicewood, Texas. "As well as saving money on the construction of the building, the benefits are ease of management and streamlining of the skill sets required to manage the systems."

In the drawback side of the ledger, however, he notes that legacy methods of designing and constructing a building are hard to combat. Traditionally, each system is designed and installed separately. Therefore, it can be difficult to get architects, engineers and contractors to agree to look at doing things in a different way.

But like everything else, that will change with time. Shircliff thinks it might take another five to seven years for complete convergence to take place. Meanwhile, early adopters in the United States, like Ballantyne Village and NCRC, represent some of the relatively few North American examples, compared to a multitude of such state-of-the-art campuses using this technology in Asia, the Middle East and Europe.

"From the perspective of the data center, the Fourth Utility is all about reducing capital expenditures and operating expenditures," said Terry King, business development manager at Liebert. "For now, however, it is mostly hype and discussion in the U.S.A. and not a lot of action. But that is going to change in the near future."