

# The Convergence of WACS and IT

Five questions on, four perspectives of, an emerging trend

**1** In this age of universal graphical user interfaces (GUI), is there any reason to continue using a building-automation-system (BAS) manufacturer's graphics instead of Web-browser-type operator interfaces?

"In general, no," the survey's designer participant, Valentine A. Lehr, PE, FASHRAE, a senior partner of New York-based Lehr Consultants International and a member of *HPAC Engineering's* Editorial Advisory Board, said. "There is no reason for the manufacturer's graphics."

The survey's advanced-user participant, H. Michael Newman, manager of the Utilities Computer Section at Cornell University in Ithaca, N.Y., agreed: "If by 'manufacturer's graphics' you mean a client GUI application used for the run-time operation of a BAS that must be installed and maintained on every potential workstation, as opposed to an application used for BAS setup, configuration, or commissioning, then the answer clearly is no. The software tools available to GUI designers for BAS, such as JavaScript and other scripting languages, supplement HTML (HyperText Markup Language) display technology to permit controls, such as buttons, scroll bars, sliders, and other user-input devices, to be displayed and actuated, thus, allowing operators to interact with the BAS through a Web browser with nearly the same look and feel of traditional client GUI."

One should not be so quick to dismiss the value of manufacturers' graphics, the survey's manufacturer participant, Tom Zaban, P.Eng., vice president of sales and marketing for Reliable Controls Corp.,

said.

"Just because browser-based technology is ubiquitous does not mean that content (i.e., graphics) no longer is needed ..., Zaban said. "The more people go online, the higher their expectation for quality information becomes."

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As the survey's controls-integrator participant, Brian Dutt, vice president of sales and marketing for Delta Controls Inc., explained: "Manufacturers often create higher-quality interfaces for use with their products. It is quite simple for a manu-

facturer to create additional properties and functionality within their controllers that go beyond those defined by open standards. This added functionality ... is available to the end user only when utilizing the manufacturer's software interface."

One could argue, Zaban said, that: "Theoretically, there are enough image assets on the Web to make any manufacturer's library redundant ..., and maybe in time that *could* become true, but good luck. Try putting that into practice today. You would have to cope with the lack of images and the inconsistency in color, texture, camera angle, and resolution—all necessary to deliver a professional-looking end product. I would expect for the time you would spend piecing together a functional public-domain library you could hire a team of pimply faced kids to make a new library from scratch and do it cheaper with a better result. Then, you will need the animations. Forget it—game over.

"There is an intimate tie-in to each manufacturer's product and the behavior of any animation of modest complexity," Zaban continued. "The frames of the animation are 'coded' to behave according to the bits

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set within the object, which, in turn, are based on values/states measured and/or calculated by the controller or derived by direct operator input. There is no consistent standard in the industry describing that relationship that I am aware of. ... The nature of animations is just too creative to nail down to a standard that would cover a wide variety of cases.”

## 2 Is there a good reason *not* to consider using multiple vendors' products in a single system?

“There are several reasons to avoid mixing and matching, although the technical barriers essentially have been eliminated in recent years through the development and widespread adoption of standard networking protocols ...,” advanced user Newman, who chaired the American Society of Heating, Refrigerating and Air-Conditioning Engineers’ BACnet committee from 1987 to 2000, said. “The most significant impediment would be the need to become proficient with the configuration, programming, commissioning, operation, and maintenance of equip-

ment from different manufacturers. This involves training, documentation, the need to have spare parts for each system, and so on.”

That does more than increase cost, controls integrator Dutt said.

“Developing intimate knowledge of a single manufacturer’s product is spread across multiple individuals within a value-added reseller’s (VAR’s) technical team,” Dutt said. “If the VAR chooses to support multiple manufacturers, it typically will develop knowledge specialists for each product family. This increases the risk to the organization should the specialist choose to leave the organization. It also causes risk to the service and support of the project longer term.”

In the absence of operation-and-maintenance personnel with the requisite level of knowledge and skill, “You would need to be sure that you have the necessary support from the different suppliers to avoid finger-pointing in the event the systems don’t cooperate as expected and required,” Newman said.

## 3 Is it practical to remove GUI development from a controls contract and employ someone who specializes in developing GUI using standard server-based tools?

“Yes, that is the preferred approach ...,” designer Lehr said. “We are using it on larger projects.”

Controls integrator Dutt sees it as practical only in situations in which an owner is seeking competitive bids.

“If the owner is happy with the current solution they have, then it is better to leave the interface and controls to be supplied from a single vendor,” Dutt said. “In my experience, most building managers are looking to work with controls contractors they can trust to do a good job.”

Manufacturer Zaban said he can think of only one case in which it would be practical: “A university has multiple vendors supplying various automation systems to its campus. The contracts call for basic graphics to be created and commissioned. Then, after the job is done, the university retains a different company that re-uses the graphic annotations of the base contract, but slides

# The Survey Participants

### THE DESIGNER

A senior partner of New York-based Lehr Consultants International and a member of *HPAC Engineering's* Editorial Advisory Board, **Valentine A. Lehr, PE, FASHRAE,**



is noted for innovation in high-rise construction, hotel design, and master planning of complex projects. He has led design efforts for numerous award-winning environmental projects.

### THE MANUFACTURER

The vice president of sales and marketing for Reliable Controls Corp., the Victoria, British Columbia-based designer and manufacturer of Internet-connected building controls



and green building-automation controls, **Tom Zaban, P.Eng.,** has a degree in mechanical engineering from the University of Waterloo and a family-business background in electronics manufacturing.

### THE INTEGRATOR

As the vice president of sales and marketing for Delta Controls Inc., the Surrey, British Columbia-based developer and manufacturer of building-automation systems, **Brian**



**Dutt** is responsible for the company’s product-strategy, marketing-services, and global-sales teams. He has a diploma of technology in electronic engineering and a trade qualification as an electrician.

### THE ADVANCED USER

**H. Michael Newman** manages the energy-management-and-control system at Cornell University in Ithaca, N.Y. The system extends to some 150 major buildings,



includes equipment and communication protocols from more than 10 suppliers, and incorporates several thousand field devices and hundreds of thousands of sensors, actuators, and data points.

in a completely new graphic and gussies things up using the tools of that specific vendor so that the final graphics are very consistent with all of the previously completed buildings on campus. The university gets the value it wanted in the graphic (a relatively intuitive col-

lection of dynamic data on one screen), but tosses out the base image because it is not worth the money and time fighting the original contractor because they used the wrong shade of gray.”

The tools used to create the content of interactive Web-accessible displays

are almost entirely manufacturer-specific, advanced user Newman said.

“Some suppliers use commonly available software, such as Microsoft Visio, to develop their system graphics, while others use entirely proprietary applications,” Newman said. “Even if the format of the graphic is ‘standard,’ the display of real-time data, archival trend data, or other database information requires manufacturer-specific ‘callback’ routines to collect the data and present it to the server. If, as is common, the graphic is stored in a proprietary format, it is the job of the manufacturer’s server to interpret the graphic file, render it into Web-displayable form, and ship it to the browser. All of this is not to say that there are not contractors who are competent with vendor XYZ’s GUI-development tools. If your server is from XYZ, you certainly do have the option of hiring a third-party contractor to develop or extend the GUI.”

#### **4** How far down into control-system architecture should designers push to replace specialized HVAC control components with more-standard general-purpose information-technology (IT) products?

“There is some argument to say the marketplace should determine this issue,” designer Lehr said. “However, in response to the question, if pushed, it should be down to the router (Ethernet) level.”

Because of current building practices, replacing specialized HVAC components with more-standard general-purpose IT products is practical only to the building-controller level, controls integrator Dutt said.

“Most application controllers are required to be commissioned before the end of a project,” Dutt explained. “This makes it difficult to cost-effectively deploy IT-based controls at the application level. If the owner of the project is a stakeholder in the IT-based solution, then it is possible, but it will take a significant amount of effort to ensure the

design survives the construction phase. Currently, it is cost-effective to deploy IT networks to the building-controller level, as this network typically can be installed during construction and can be used during system commissioning.”

Manufacturer Zaban believes: “We’re already ‘all the way down’ from an architecture perspective. ... Most designers just don’t know it yet.

“Now that we have a decent standard open protocol—‘decent’ meaning well-defined, popular, and, most importantly, extensible—we can go ahead and write BIM (building information modeling) algorithms that would fully specify all aspects of building controls,” Zaban explained. “That means controller profile, network, sequence, interoperability, database, alarm, commissioning, wiring, documentation, service information, and even part numbers.”

A BIM BAS model is a “pet project” Zaban said he has been “threatening to do ... just to shake up the industry a bit. ...

“It would represent the Holy Grail of DDC (direct digital control) implementation ...,” Zaban said. “It also would put a lot of frustrated consultants out of their misery because it would minimize their exposure to the technology. ... The means already is there; you don’t need to ‘push’ any further. ... We have general programmable controllers that can be applied to highly specialized applications, and the protocol provides deep integration into IT models.”

## **5** Should designers promote Web-enabled access for multiple buildings?

“Yes, this is an excellent approach ...,” designer Lehr said. “The only limitation is reluctance to add cost.”

In the building-management industry, an increasing number of people are being asked to do more with less, manufacturer Zaban said. “And now they’re getting pressure from environmental ethics, rising fuel costs, exectatious ten-

ants, and shareholder anxiety because commercial real estate is one of the few investments that hasn’t totally tanked yet in the recession. Yes, we need to help these poor souls any way we can.”

That may not necessarily be through a Web-accessible control system

(WACS), controls integrator Dutt said.

“The designer should first understand the true needs of the building owner and then, based on his past experience, make a recommendation that will suit that particular situation,” Dutt

said. “While most facilities can easily justify a WACS, there may be situations in which individual platforms and operators make business sense.”

Advanced user Newman sounded a word of caution regarding Web-enabled access for multiple buildings: “If the GUI servers are from different manufacturers, the operator will end up being in different operational environments for each system. That means the operator will have to learn different ways of performing the same function on each of the systems. The steps to access and change a temperature set point, for example, may be very different from one system to the next. Still, having to maintain only one operating system and browser at each operator site is a big advantage over the old days.”

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