

# BACnet

International



## JOURNAL

13

Issue

### This Issue

Continued Growth of BACnet



**Global Testing of the Global Standard**



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San P. & Associates

## THE BACNET TESTING LABORATORIES

(BTL) was established to support BACnet® compliance testing and interoperability testing activities as well as oversee the BTL Mark and Listing program. The tests are designed to validate that the product correctly implements a specified set of BACnet features.

To date there are **over 700 BTL-Listed products**, providing users with assurance that these devices have passed the industry standard BACnet conformance tests conducted by a recognized, independent testing organization.

For suppliers, the rigorous testing associated with obtaining the right to use the BTL Mark is a powerful methodology for ensuring any implementation errors are found and eliminated before a product reaches the market. This improves product quality and reduces cost.

The BTL Mark is a mark of distinction that many building owners and control system designers have concluded **accelerates and lowers the cost of system integration**. As such, it is becoming commonplace for specifications to require the BTL Mark and/or BTL Listing in order to be eligible for a project.



BACnet Testing Laboratories

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## Content

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# Be the Mentor to Grow BACnet Younger



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## Dear Reader

We are constantly striving to grow our industry younger, yet we fall short of quantity and quality of, and connection to, the young folks who are attracted to our industry.

Could we be the problem? Do we all give of ourselves and seek opportunities to mentor those around us?

When I reflect on my five decades in the control industry, I sometimes think about how this happened. How did I get from being a kid on a small farm in Alberta to mentoring and penning this plea? What were some of the key things that put me in this industry?

An early introduction to the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) from some members of our local chapter on a voluntary outreach, who came to our school and invited me to be part of the student membership in 1966, plus those big ASHRAE manuals for free, were a fantastic start. Those outreach folks became my first industry mentors which led to my involvement in a mentoring organization. One of my mentors, who became a good friend, was Don Holte, who went on to become international president of ASHRAE. ASHRAE provided a path for my passion, the control of energy conservation, which led to me being part of starting a new ASHRAE chapter on Vancouver Island. This was done with the help of Ron Williams, who was a mentor of Don's as well as my mentor. I became chapter president of this new ASHRAE chapter. Ironically, one of the other original mentors, Stan Hayden, led me to become actively involved with the Association of Energy Engineers (AEE).

That introduction led to me becoming part of that organization as well, where I met ControlTrends 2016 Hall of Fame inductee Jack McGowan, who became my mentor and encouraged me to write. The 19 years of our magazine provided a reason to reach out, and provided a connection to these Hall of Famers; Mike Newman, George Thomas, Hans Kranz, and this year's winner Steve Bushby. Also, Werner Buck, former President of Belimo and another Hall of Famer, was one of our first advertisers and introduced me to a young lad he was mentoring, Lars van der Haegen, who is the current CEO of Belimo. You can see the power of mentoring in a 50-year cycle.

In 1969, I started at Johnson Controls, which trained me and connected me to a network of mentors and friends who are a big part of who I am now. One of my lead mentors, Cliff Badger, taught me how to think, by asking questions about my question; breaking the problem into bits. By the time I was able to answer all his questions, I was able to answer my own questions. A great lesson.

Mentors need not be experts at what they are mentoring. Sometimes our best mentors are our learning peers. In the early days of building computer simulations, we were all a community learning this new skill, and much like BACnet we constantly mentored each other. Working to develop one of the first Direct Digital Control (DDC) systems in 1975, I met my first system analyst, coders, and hardware developers, all while learning the politics of idea implementation. A mind-expanding project is full of life mentors and friends.

These mentors led me from Alberta and introduced me to an evolving DDC industry in British Columbia in early 1980, which allowed me to be part of a mentoring group with such BACnet pillars as Roland Laird, Raymond Rae, and later Carl Neilson.

Every skill I learned was tied to a mentor, and I can see all their faces as I write this for you. You may notice the word friend often gets attached to the word mentor.

Think about your path to BACnet. It was paved with people that inspired and mentored you and who are now your friends.

Somehow in this process of being mentored, we never feel worthy to become the mentor. But you are now worthy, and it is your turn to reach out to those around you in your work, and also, for the greater good, to those who surround you in your personal life and community and become their mentors as well. Millennials want to know, "Am I making a difference in the world, does my work matter?" Tell them yes, and let them know how important the work we do is and how they will have an impact. >>



Only you can grow BACnet younger. It is your turn to reach out and become the mentor. Yes, you are worthy.....smile. Did I mention how much I learned from those I have mentored? Learning how to think younger from those you mentor will be your greatest gift.

In this article, Steven Guzelimian, President at Optergy, makes some excellent points: <https://www.linkedin.com/pulse/do-you-mentor-enough-give-receive-steven-guzelimian>

Mentoring is not a subject you see discussed a lot in business circles. It is my feeling that it is a valuable part of making an organization whole. When you graduate from school, you leave with a base level of knowledge and little experience to apply that knowledge.

In my business (Building Automation), it can be tough for new people to get comfortable with the environment. There are few places to learn building automation, yet it is multi-disciplined (electronics, electrical, mechanical, software, IT ). People often come from mechanical engineering or industrial automation backgrounds and scratch their heads on day 1 trying to figure out the nuances of how this business works. Mentoring is key. Here is my suggestion to help your new recruits adjust.

“Mentoring is to support and encourage people to manage their own learning in order that they may maximize their potential, develop their skills, improve their performance and become the person they want to be.”  
Eric Parsloe, The Oxford School of Coaching & Mentoring

#### ABOUT THE AUTHOR

Ken Sinclair is the founder, publisher and owner of AutomatedBuildings.com, an online magazine and web resource providing the news as well as connection to the rapidly evolving industry that automates and implements truly intelligent, integrated buildings. He has authored numerous industry articles on internet integration and convergence for several international magazines and has provided free automation seminars at each AHR Expo for the last 18 years.

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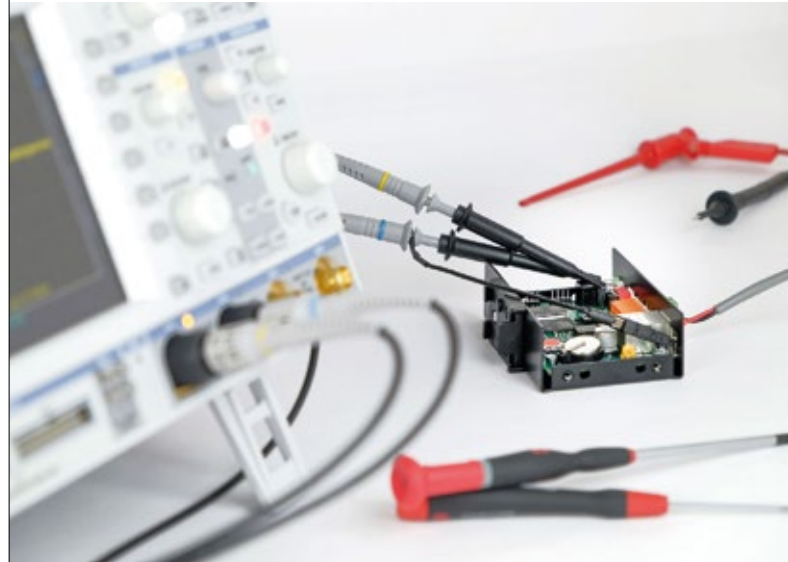
#### Resources for more information:

<https://www.linkedin.com/pulse/local-history-our-ddc-industry-ken-sinclair?trk=mp-reader-card>

<https://www.linkedin.com/pulse/h-michael-newman-hisstory-mine-ken-sinclair?trk=mp-reader-card>

#### Across my desk, this morning

[https://www.linkedin.com/pulse/how-making-difference-world-reduces-employee-turnover-chester-elton?trk=eml-email\\_feed\\_ecosystem\\_digest\\_01-hero-0-null&midToken=AQF5rhoSxWooJA&fromEmail=fromEmail&ut=053oZ\\_odsyzTE1](https://www.linkedin.com/pulse/how-making-difference-world-reduces-employee-turnover-chester-elton?trk=eml-email_feed_ecosystem_digest_01-hero-0-null&midToken=AQF5rhoSxWooJA&fromEmail=fromEmail&ut=053oZ_odsyzTE1)



## BACnet TESTING LAB

Since the beginning of 2012, MBS has been conducting independent BACnet conformance tests in its accredited test lab, approved by BACnet International and BACnet Interest Group Europe.

MBS covers the entire functional area of simple sensors and actuators on application specific controller (B-ASC, B-AAC), freely programmable DDC (B-BC) to control devices, GLT and Workstations (B-OD, B-OWS, B-AWS).

Reviews to provide the AMEV attestation are also available and can be done separately or as part of a BACnet conformance testing.

# BACnet in an IoT World

This year's buzzword is the Internet of Things (IoT). What this means is that data from a device, like a chiller or a boiler, that was only available on an LCD screen attached to the device is now available via the network. Ten years ago all we could get was a common alarm via an aux contact from the device if it was wired to a BAS panel, but that was about it.

Now with the reduction in the cost of chips, one can get a host of data from the device to aid in diagnosing faults. With a network connection we can get that data remotely on a client machine that could include a desktop PC, a tablet or a smartphone.

IT companies see the opportunity to provide Facilities Management clients with this data that is collected from the device and served up to a client. Unfortunately, these are proprietary solutions from vendors who are new to the building automation world.

So where is BACnet in all of this? Does BACnet have a role in this new IoT world? Of course it does.

## BACnet IoT data is used from the Device to the Domain

If you look at the chart below, Device data from a VFD or a chiller that may be a BACnet MS/TP device gets integrated into a System like a chiller plant. Let's focus on kW and kWh for now. Most VFDs and chillers have BACnet objects for kWh and kW.

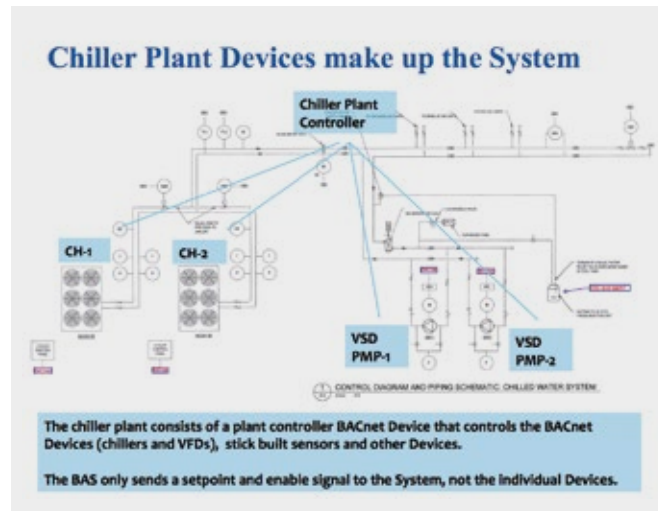
The IoT Device reports energy information and fault information to the operator using BACnet objects and services. This data can be provided without having to add additional meters as most BACnet Devices now have onboard real time meter data. Energy, power and shed rate data may be used for developing Device-specific Demand Response load shedding strategy. Operators now make "virtual rounds" on the Front End. The days of walking around with a clipboard to check out Devices are over. BACnet Devices have IoT data onboard. Specifying the BACnet Device data/networking requirements in projects is critical to your IoT strategy.

The kW and kWh data from each device can be added up to calculate the total System energy and power. If we know the gallons per minute of chilled water flow, we can calculate the kW per Ton of cooling in real time. kW/Ton is an important metric for assessing chiller plant efficiency. Picture 1 and 2

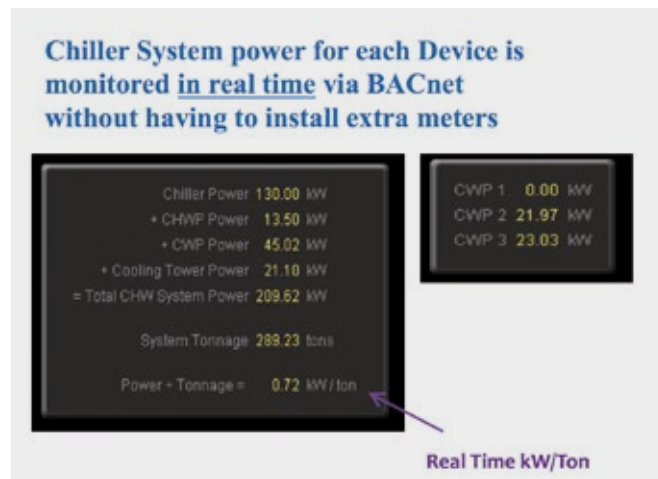
The data from all the various Systems can be added up and compared to the Building electrical meter data, which in turn can be a BACnet device. Building meter data

- Domain: BACnet Data is normalized for weather so it is comparable. Cost data is used for budgeting.**
- Campus: Bldg KPIs (energy/sf and kW/Ton) and costs are reported to Senior Management and the Board.**
- Building: FM reports Building performance to VP of Finance using an Energy Dashboard tool.**
- System: Operator/FM use BACnet data in a BAS Dashboard to monitor the Devices in the System.**
- Device: Bldg Operator Uses BACnet data to manage a single Device on the BACnet network.**

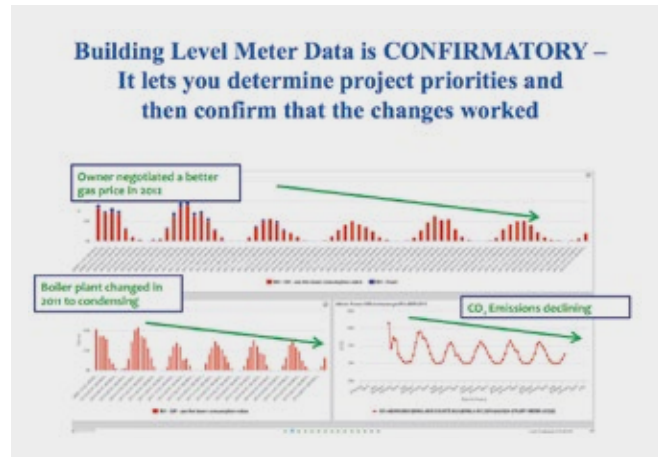
All pictures: © Appin Associates



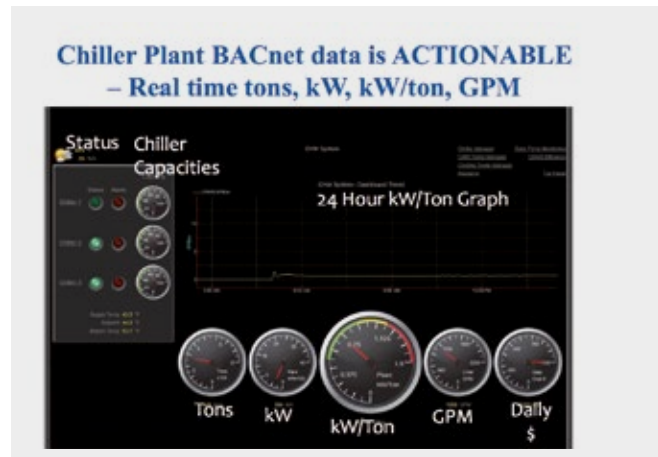
Picture 1



Picture 2



Picture 3



Picture 4

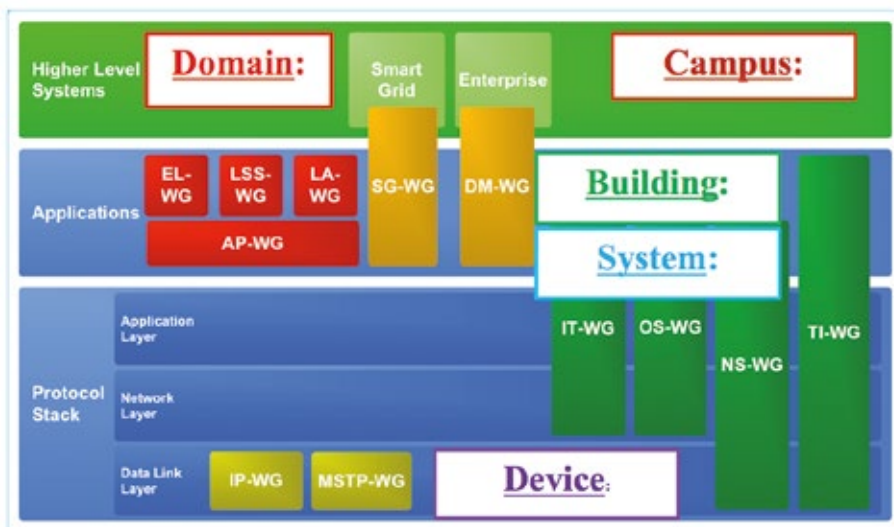
is what we call Confirmatory. We know how much we are consuming, but we don't know what Systems or Devices are using what energy and power. BACnet meter data from equipment (Devices and Systems) is Actionable. We can determine the day-to-day consumption and we can generate alarms when the 24-hour daily consumption changes by, say, more than 5% per day. Facilities Management staff can go and check to see if there is a setpoint problem or a Device was left in hand so it runs at 100% continuously. Picture 3 and 4

This BACnet data from Devices, Systems and Buildings can be aggregated to the Campus level. It is now common for this data to be consumed by an Energy Analytics Package (EAP) software tool – commonly called an Energy Dashboard. The Energy Dashboard may only track the total chiller System kWh because the users of these systems may only care about totals and Key Performance Indicators (KPIs) like kW/Ton or kWh/square foot.

The Energy Dashboard may provide the kWh/square foot and kW/ton for all chiller plants on campus so management can ask, "Why is the chiller plant in Building 123 consuming way more energy and power than in Building 456?" The Facility Manager's answer is, "We need to modernize the chiller plant in Building 123." BACnet IoT data can be used to justify the capital expenditures for a chiller plant replacement or upgrade.

Other users in the Enterprise will see the value of BACnet IoT data. The Campus Utility Department can use the data to implement and monitor a

## How BACnet helps you implement IoT from the Device to the Domain



Picture 6

Demand Response (DR) program. Under a DR program, loads in selected facilities are shed in a sensible manner and the commercial utility pays the Campus for the demand savings. The Utility Department may also use the data to negotiate bulk buys of electricity or natural gas to save money. The benefits of PV array and solar thermal projects can be tracked in real time. PV Devices can be part of the Campus-wide Demand Response plan. The Construction Department can use the data to commission a new project and then to evaluate the performance of A/E consultants' designs over time.

Picture 5

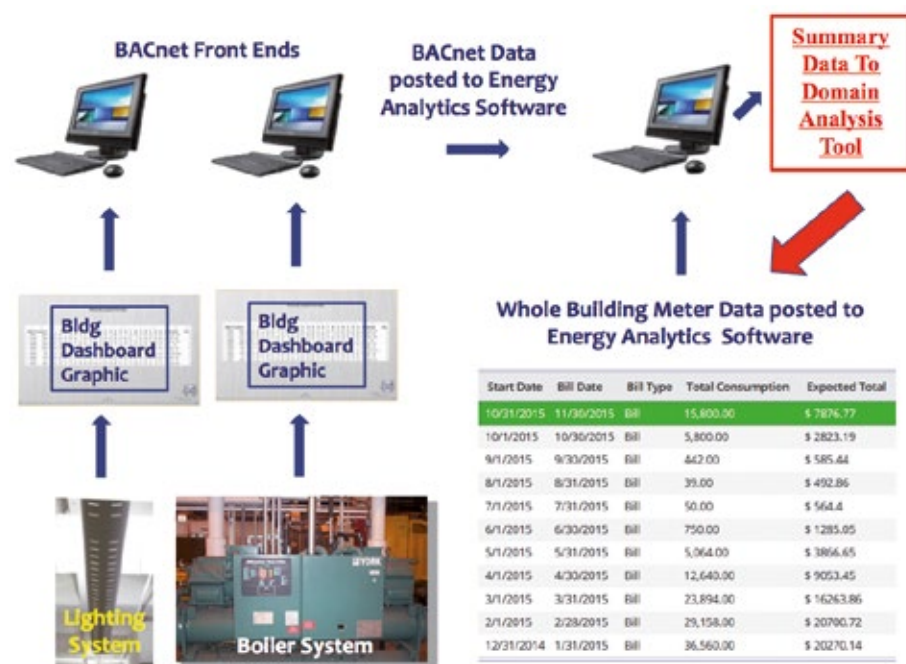
Large organizations with multiple campuses around the world may normalize this data for weather differences using a Degree-Day adjustment. Senior Management or the Board of Directors then have a summary report on utility consumption so they can set priorities for capital spending for the next fiscal year and beyond. In sum, as the data is aggregated from the Device to the Domain, there may be different tools used to analyse and summarize the data, but the data started its life as BACnet data in a Device.

### The BACnet Standard 135 helps you implement an IoT strategy from the Device to the Domain

If you look at the graphic above, the various BACnet committee Working Groups (WGs) are working on upgrades and enhancements to the BACnet standard. MS/TP Working Group's work focuses on the Device level. The SmartGrid (SG) Working Group's activities are aimed at the Campus and Domain levels. Picture 6

### Let's focus on the work of a couple of Working Groups:

BACnet's Applications Profile Working Group is preparing a dictionary of tags to give BACnet objects semantic meaning. Determining what an object means is now a time-consuming manual process that needs human intervention. You have to read the object list to find the heating setpoint and then tell the Front End how to use that setpoint.



Picture 5

Front Ends can discover BACnet devices and objects now. With tags, the Front End can get the meaning of the Device and its objects from the discovery. The Front End can build graphics automatically as we know that the Device is a VAV box with a damper and a fan. O&M, BIM and other data can be embedded in the Device and then discovered. Here are some sample tags: [Picture 7](#)

BBMD. BASs can then be managed by the IT department like any other computer. BASs can be secured using standard IP security techniques under IT jurisdiction and control. BACnet/IT supports DHCP, Active Directory and TCP/IP (not just UDP). The new Network Port object allows for simple network visible IP address configurations. The standard also supports IPv6 as well as the IPv4 addresses. [Picture 9](#)

5. BACnet is the only open standard that permits IoT implementation. Many vendors will want access to your BACnet data so they can serve it back to you in a proprietary manner so you are locked into their way of doing things. There is no need to do this.
6. Finally, you must check the utility and other data before you release it to others in your organization or to the public at large via an Energy Dashboard.
  - a. A smart BACnet-based IoT strategy lets the Facilities Management Department shine. Incorrect data will hurt you.
  - b. Showing buildings that are not performing or where there were problems (devices running in hand), is reality. Own up to mistakes and move on.
  - c. You can use the data to justify upgrades to fix the problem.

	Building Systems+	Control	Control Modifier+	Item Modifier+	Item Type
<b>Temperature Sensor</b>					
DEVICE	hvac;			group;	controller;
AI1 - RoomTemp	hvac;	processValue;	continuous; selfControlled;		sensor;
AV1 - HtgRoomSetpointOcc	hvac;	setPoint;	continuous;	whenOccupied;	

Picture 7

Once the dictionary and tagging model are approved through the standard public review process, the Working Group will create Application Profiles that will define minimum object and tag requirements for a chiller, VAV box or a VFD.

**Summary: BACnet is an integral part of the new IoT World**

BACnet has solutions for an IoT World from the Device to the Domain levels.

BACnet's Web Services Working Group has introduced Representational State Transfer (RESTful) Web Services. You used Web Services when you booked your last trip on Expedia® or Trivago. The address of the point is an http:// URI that allows a client to talk to that point using standard IP technology. But it is still BACnet data. Software packages at the Domain level will use Web Services to bring BACnet point data into a database at the Domain level.

But what does this mean in practical terms for users like the Facility Management department in the organization?

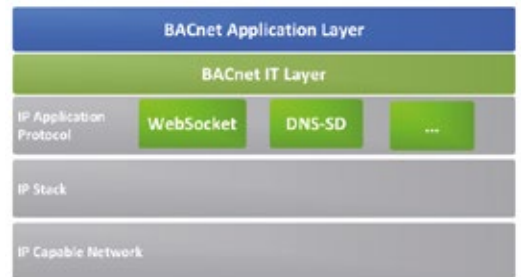
1. To have the Internet of Things, Things must be on the Internet! IT support is critical to a successful IoT strategy...IT is your new BFF! BACnet/IT is IT-friendly and will get support from IT departments because they can manage BACnet devices like any other device on their networks.
2. Once this data is public (outside the Facilities Management Department), users will want this data. You need to have the staff or outside resources to meet this demand.
3. Build Device, System and Building Dashboard virtual rounds into your Operator's schedule. Encourage discussion of problems at shift changeover.
4. Equipment must function or the data is useless. Running fans in hand rather than through the VFD increases energy consumption.

Picture 8



Picture 8

BACnet's Information Technology Working Group is working on BACnet/IT. This will eventually replace BACnet/IP. It is backwards compatible to BACnet/IP but there is no longer a need for a



Picture 9

**ABOUT THE AUTHOR**

Grant Wichenko is President of Appin Associates and a Professional Engineer.

He is a member of:

- ASHRAE SSPC-135 (BACnet committee – voting member),
- SGPC-13 (BAS Guideline Specification committee – voting member)
- ASHRAE 201P (SmartGrid committee – member.)

Appin Associates was the first Engineering firm in the world to join BACnet International in 1999.



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# Announcing New BTL Certification Program

On January 2, 2017, a new, unified worldwide BTL Certification Program was launched. This new program was formed by the merger of the BTL Listing and WSPCert Certificate programs. In this new program, a single application to the BACnet Testing Laboratories (BTL) provides companies with a Certificate of Conformance, a BTL Listing and the right to use the BTL Mark. The certification, which is based on the test plans of the BACnet Testing Laboratories (BTL), meets the international requirements of certification procedures according to the ISO 17000 standard series and product standards as well.

## BTL Testing

The BACnet specification is large and complex. Even the best development teams can misinterpret some detail of the protocol or introduce a subtle implementation error. The rigorous testing associated with obtaining a BTL Certificate and the right to use the BTL Mark is a powerful methodology for ensuring such errors are found and eliminated before a product reaches the market. Some projects even require products to be tested as many believe BTL-tested products accelerate and lower the cost of system integration.

The BTL tests are designed to validate that the product correctly implements a specified set of BACnet features. The specific BACnet features tested in a product are detailed in the BTL listing associated with that product. Only products that have earned the BTL Mark are eligible to be included in the BTL listings.

## BTL Certification Program

Once a product has been successfully tested by one of the four recognized BACnet Testing Organizations, it can be submitted for BTL Certification. Successful completion of the BTL Certification Process results in the following:

1. The supplier is authorized to apply the BTL Mark to the product and associated promotional material in accordance with the BTL Mark Usage Policy document
2. The product is included in the BTL Listing website, along with its PICS and relevant test report information
3. A BTL Certificate of Conformance for the product is created

## BTL Mark

The BTL Mark is a mark of distinction and has come to represent a high level of quality with the assurance that a product has passed the rigorous industry standard BACnet conformance tests conducted by a recognized, independent testing organization. This increases buyer confidence in both the product and its manufacturer.

## BTL Certificate

The BTL Certificate provides suppliers with a way to highlight products that have followed a formal procedure according to ISO standards, assuring independency and neutrality. The Certificate of Conformance can be used in a tender process for projects to state conformance to the BACnet standard.

## Benefits of One, Unified Program

Combining the BTL Listing and WSPCert programs makes it easier for suppliers and users since there is now one integrated global process for BACnet Certification and Listing. Suppliers only have to submit one application and all new products will have a formal certificate. Users and integrators can now look in one place to find information on all tested products. For many this listing is a primary research tool for BACnet product information. For questions about the new BTL BACnet Certification Program, please visit [www.bacnetlabs.org/FAQ\\_BTLcertification](http://www.bacnetlabs.org/FAQ_BTLcertification) or contact David Nardone at [david@bacnetinternational.org](mailto:david@bacnetinternational.org).



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### ABOUT THE AUTHOR

#### Andy McMillan

Andy McMillan is President and Managing Director of BACnet International, where he works with users and suppliers to expand and enhance the BACnet community. Previously he served as President of a building automation and energy management business unit of Philips Lighting.

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#### Frank Bitter

Frank Bitter is Director of WSPCert, located in Stuttgart, Germany. He has been responsible for the certification of BACnet Products on behalf of the BIG-EU since April 2008 and currently conducts certification processes.



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# BACnet for IT Infrastructures

BACnet, since its very first addendum 1995a, is capable of running over IP networks, and with the recently released addendum 135–2012aj, Annex U in BACnet 2016, can now also run over IPv6 networks. However, deploying BACnet/IP devices, BBMDs and even BACnet/IP routers in an IT infrastructure may not always be possible, due to conflict with IT policies in place for that infrastructure.

While it is true that building automation today often runs on a somewhat separated IP network, there are always devices that need to connect, for example, from the office network, from some cloud host, or through the cloud. Even more, the friendly utilization of an existing and given IP infrastructure, being highly managed by some IT organization, or not managed at all, whatever complexity it may have, is becoming an obvious requirement for building automation protocols like BACnet.

Information security requirements today demand the use of secure, strong and proven security technologies, such as Transport Layer Security (TLS) and the use of Public Key Infrastructure (PKI) certificates. Only well-known application protocols, and in particular their secure option, normally based on TLS such as HTTPS, may be allowed.

In early meetings of the IT Working Group (IT-WG) of the BACnet committee, some friction points of BACnet/IP and BACnet/IPv6 devices in such IT infrastructures were enumerated.

- BACnet is unknown to IT departments, so it is not part of policies and therefore blocked in firewalls and not supported by proxies.
- Data security (Clause 24) is not based on widely used and proven standards, such as TLS.
- Fixed IP addresses will still be needed for a long time, in particular for BBMDs. This may relax a bit when Network Port objects are used, allowing configurations by DNS names.
- Broadcasts may propagate through the entire network magically, out of control of IT.
- BACnet routers are perceived as adding some extra routing to, or even between, IP networks which cannot be managed by the IT department.
- Complex setups for Network Address Translation environments are needed.

Considering possible solutions, some main guiding principles were followed:

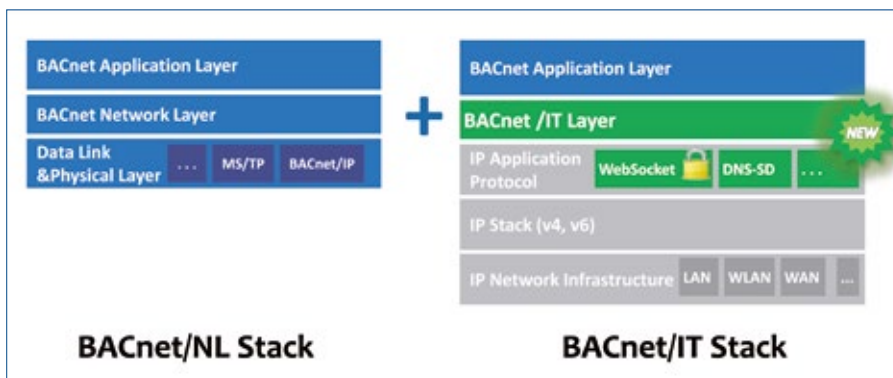
- BACnet should be able to run over well-known standard IP application protocols, including their secure variants.
- The IP or IPv6 layer is available, so there is no need for a routing network layer.
- IP application protocols and their lower layers are able to transport larger messages, having their own fragmentation and segmentation capabilities.
- For group communication over connection oriented protocols, a device group concept is required.
- BACnet devices and device groups are generally identified by a logical ID.
- BACnet devices and device groups are logical entities represented as some resource on an IP host.
- The network level address of these entities is therefore a complete URL, not just an IP address or host name.

There must be a generic path to communicate with BACnet network layer based devices. Payload mangling by intermediary entities is not possible.

## The BACnet/IT Stack

The new BACnet draft Addendum 135–2016bj, which recently was out for its first public review, proposes an additional BACnet stack architecture, referred to as the BACnet/IT stack. For the purpose of differentiation, the original BACnet stack with the BACnet network layer and application layer segmentation is referred to as the BACnet/NL stack.

In the new BACnet/IT stack, the BACnet Application Layer, now without requiring segmentation, uses the new BACnet/IT layer instead of the BACnet network layer. The BACnet/IT Layer implements, transports, and directory binds as so-called ports. A transport binding is a definition of how to use an IP application protocol for transporting BACnet service messages. A directory binding is a definition of how to use an IP application protocol for resolution and discovery of BACnet devices and objects. The architecture allows the addition of bindings to other IP appli-



© Siemens Building Technologies

BACnet/IT Stack

cation protocols in the future. Additional bindings to MQTT, CoAP, LDAP and others were discussed, but not yet formally proposed.

Initially considering a transport binding for using HTTPS, the relatively new, but well supported, WebSocket protocol upgrade to HTTPS (RFC 6455) was identified to better suit the needs. The first directory binding present in the new addendum defines the use of DNS-SD (RFC 6763) over DNS (RFC 1035) or mDNS (RFC 6762) for the purpose of resolving logical IDs to URLs and to discover devices, device groups and objects.

Aside from the BACnet/IT Layer, some supporting functionality for BACnet/IT is defined for the application layer.

Only the local directory functionality is mandatory, all other functions are optional and not required in every BACnet device.

### Directory

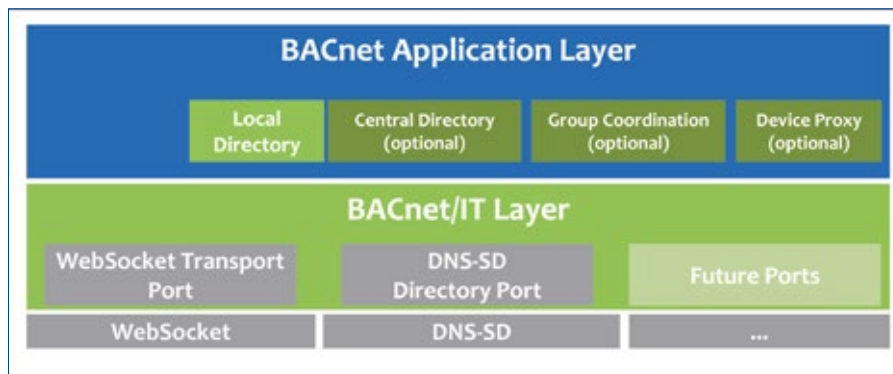
Every device contains a local directory which is not much more than a cache of learned directory information, and the devices and device groups present on the local host. Optionally, a device can also be a central directory, in which all directory information for the system is available and can be retrieved using unicast communication. The directory information is represented through a new Directory object.

### Device Group Coordination

The application layer may include device group coordination functionality. This implements device groups, exposing Device Group objects for member registration and providing a resource for sending to the device group. The logical device group identifier resolves to the URL for the resource to which messages can be sent and then gets distributed to the device group members.

### Device Proxy

The device proxying concept allows BACnet devices and device groups to be accessible in network areas or over protocols not directly sup-



© Siemens Building Technologies

BACnet/IT Directory

ported by the device or the device group. The connection with BACnet/NL based devices is a device proxy as well, referred to as the BACnet/NL Device Proxy. This proxy enables communication of BACnet/IT devices with BACnet/NL devices and device groups. BACnet networks are represented as BACnet device groups in BACnet/IT.

With the initial set of transport and directory bindings defined for BACnet/IT, BACnet devices and systems can be built to be compliant with IT policies. In particular, IT grade standard network security is supported – an ever-growing requirement these days.

The BACnet committee is now working on resolving comments received in the first public review. Interested persons can follow this more closely through registering in the “BACnet-IT-WG” Yahoo Group of the IT-WG. Addendum 135–2016bj will soon be seen again in a next public review.

### ABOUT THE AUTHOR

Bernhard Isler, chairman ASHRAE SSPC 135 BACnet committee, works for Siemens Building Technologies as a system architect, at its headquarters in Zug, Switzerland. He first got involved with BACnet back in 1992, when evaluating BACnet, available as its second public review draft at that time, for application in fire detection systems. In 2011, he was the recipient of the first Swan Award, set out in honor of Bill Swan.

Bernhard completed a professional education in Electro Mechanics with a Swiss National Certification, and holds a BA in Electrical Engineering from the University of Applied Sciences in Rapperswil, Switzerland.



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# Finally! A Central Location for BACnet Focused Learning and Knowledge Sharing



Education • Resources • Community

We are thrilled to announce the launch of The BACnet Institute, an online learning environment.

The BACnet Institute (TBI) is an education and information platform developed to serve as a central resource for BACnet-related education as well as deeper collaboration and knowledge exchange, and to assert BACnet's essential role in building automation as well as ensure its successful integration. The BACnet community, spanning development, integration, engineering and facility management pro-

fessionals, can now conveniently share innovative strategies, research, and best practices from anywhere around the world, at any time of the day.

## Development of The BACnet Institute

A few years ago, 10,000 BACnet International community members were surveyed regarding their thoughts on education. Out of that survey came a resounding clarity that there is not enough access to education for BACnet, especially initial education. BACnet International, in collaboration with other industry leaders and BACnet groups, spent time designing a tool with a collaboration of community, dialogue, an easily accessible resource library, forums, and online courses, that would answer many of the currently unanswered questions regarding where to send somebody if they truly want to learn more about BACnet.

The resulting BACnet Institute offers three distinct learning sections – Courses, Resources, and Community, each offering a unique opportunity for learning.

## COURSES

The Courses section houses on-demand, self-paced courses. The goal of this section is to provide interactive learning experiences to individuals at all levels. Currently, this section offers a BACnet Basics course that contains six lessons which are geared towards individuals unfamiliar with BACnet, or those who need a refresher. At the end of the course, users can test their knowledge by taking the mastery test; those who pass will receive a certificate of completion. The My Learning tab on the website tracks the user's progress and maintains his/her certificates. >>

# More Secure BACnet

Although your BACnet MS/TP network is secure, your BACnet/IP network can contain security weaknesses. Use our high performance BASrouterLX for enhanced security:

- Whitelist allows only specific BACnet/IP devices to communicate
- Stand-alone routing between BACnet/IP, BACnet Ethernet and BACnet MS/TP networks
- MS/TP backbone allows MS/TP cabling to interconnect BACnet devices
- Backward Routing



**BASrouterLX**

**CONTEMPORARY CONTROLS®**

Plans are underway to add several new courses in 2017, so be sure to visit the site throughout the year for updates.

## RESOURCES

As a repository of articles, white papers, presentations and recorded webinars, the Resources section centralizes a wealth of expert knowledge, which is categorized by application, focus and user level for easy accessibility.

The BACnet Institute will curate existing information and resources, as well as commission the development of new resources such as video presentations, white papers and webinars.

## COMMUNITY

The Community section contains two forums: User Community and Developer Community. The main purpose of these forums is to encourage knowledge sharing across differing expertise and perspectives.

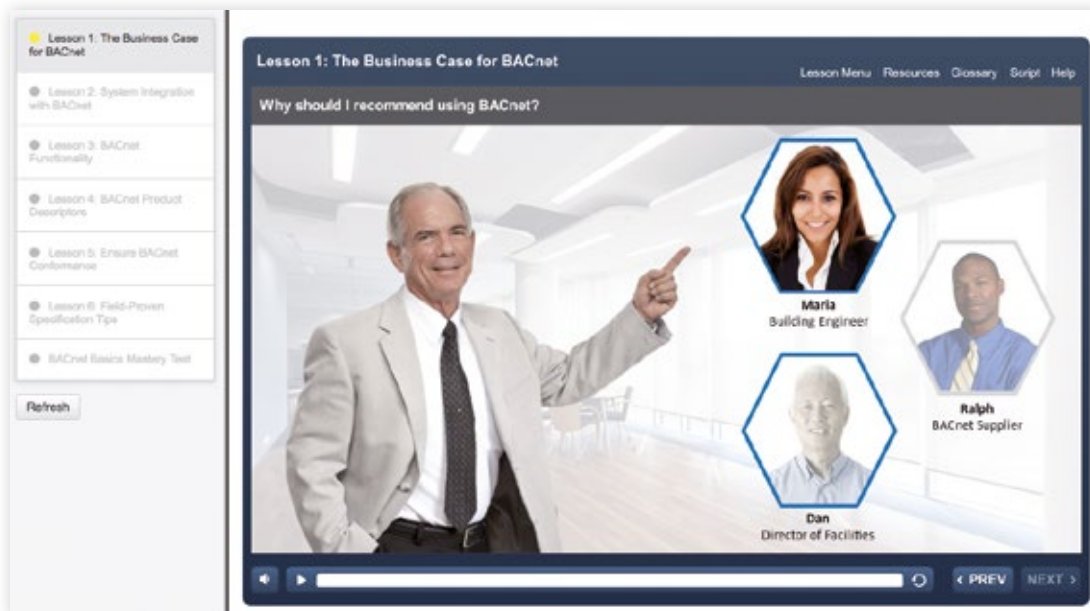
The User Community, or “Ask the Expert,” allows BACnet system users to submit BACnet-related questions to be answered by a panel of BACnet experts. Users can also search the archive or previously answered questions.

The Developer Community allows BACnet product developers to openly discuss current BACnet-related topics. Developers can search prior posts, including the most recent five year history of BACnet-L postings.

### The BACnet Institute is a one-stop, 360-degree BACnet online learning environment.

While registration to TBI is required, it is free. New users can register by selecting ‘Sign Up Now’ on the login page: <http://www.thebacnetinstitute.org>

Most importantly – we encourage your input to ensure The BACnet Institute e-learning platform continues to provide current and beneficial learning opportunities. Please email your ideas and comments to: [education@bacnetinternational.org](mailto:education@bacnetinternational.org)



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**Michelle Eriquez**

Education & Information Initiatives | The BACnet Institute  
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# BACnet Routers Offload Building Controller Communications

The eye-catching Henderson 688 is a “BEAM Plus” platinum award winning building located in Shanghai, People’s Republic of China. The high-end office building caters to international tenants and has 24 floors above ground and 3 floors below.

## The Challenge

A new Building Management System (BMS) installed at Henderson was based on BACnet/IP with the intent of accommodating future expansion plans. It needed to be cost-effective and dependable. The building controllers communicate up to the supervisor using BACnet/IP over Ethernet, while typically communicating down to unitary controllers over BACnet MS/TP. Supervising the numerous unitary controllers to be used on the job represented a significant communications burden on the building controllers which would be taxed with participating in the low-level handling of MS/TP token-passing traffic with the unitary controllers along with its other duties. The System Integrator (SI) wanted to reduce the communications burden upon the building controllers and Contemporary Controls had the solution.

## The Solution

The installed BMS utilized one supervisor, 4 building controllers, 1,800 VAV controllers, and 100 other unitary controllers. Typically, there were 75 VAV controllers per floor that would require supervision from building controllers. The existing building controller has only one serial port that can be used for MS/TP communication although two more serial ports can be obtained by installing a dual-serial port card. There was also one other issue. The VAV controller data sheet recommends at most 40 devices per MS/TP segment that would require two MS/TP segments per floor. This would mean that two building controllers per floor for a total of 48 building controllers or 24 equipped with expansion cards.

There is another way of communicating to the MS/TP VAVs from the building controller. The controller has two communication ports – one Ethernet port for BACnet/IP and one serial port for BACnet MS/TP. Instead of connecting the VAV MS/TP segments directly to the building controller, the segments were connected to Contem-

porary Controls’ BASrouter which routes BACnet MS/TP traffic to BACnet/IP. The BASrouter also has two ports – one Ethernet port for BACnet/IP and one serial port for BACnet MS/TP. Once all the VAVs appear on the BACnet/IP network they are “discovered” by the building controllers resulting in communication between building controllers and VAVs over BACnet/IP instead of BACnet MS/TP. The building controllers “think” the VAVs are on the BACnet/IP network.

While the building controller has the ability to route MS/TP traffic over one of its serial ports, handling the overhead of the BACnet MS/TP token passing protocol burdens the building controller’s CPU. This results in increased CPU usage that could be used for other functions possibly requiring a change to a higher-powered controller. Contemporary Controls has conducted tests in its laboratory to prove this point. Two BASrouters became responsible for two MS/TP segments per floor. So instead of installing 24 or 48 building controllers just to handle MS/TP traffic, the SI used 51 of Contemporary Controls’ BASrouters. Each BASrouter ended up servicing 28–48 VAV controllers per segment.

By using Ethernet as the BACnet/IP network, the BASrouters can tap into any available Ethernet switch port. The SI decided to use Contemporary Controls’ CTRLink line of Skorpion 8 and 16-port 10/100 Mbps Ethernet switches which are DIN-rail mountable and can be powered from 24 VAC control panel power. The supervisor, building controllers, and the BASrouters all share the same Ethernet network.

Installing and operating the BASrouter with several unitary controllers is simple and straightforward. Once the BASrouter is properly installed and configured using a web browser, all the connected unitary controllers can be accessible from BACnet/IP. Unitary controllers auto-baud. They wait until a head-end device – usually a building controller – sends out frames so connected controllers can “wake-up” and set their speed to that of the building controller. The BASrouter takes the place of the building con-




© Contemporary Controls



© Contemporary Controls

troller so its data rate must be set during configuration thereby allowing the unitary controllers to automatically match their data rate with that of the BASrouter.

## Conclusion

The building controller usage can be decreased by offloading the MS/TP token passing to external BACnet MS/TP to BACnet/IP routers. This is especially important when the building controller is required to handle multiple MS/TP networks as with the Henderson building. By using Contemporary Controls’ BASrouters the performance of the remaining building controllers improves. 



**Contemporary Controls**  
[info@ccontrols.com](mailto:info@ccontrols.com) | [www.ccontrols.com](http://www.ccontrols.com)



Stadiums around the world enjoy high-reliability, low-cost BMS thanks to unique BACnet/IP, such as the Lusail Multipurpose Hall, in Qatar, pictured here.

© Lusail stadium homepage

## Goal for BACnet Stadiums

Stadium operators from Slovakia to Qatar are achieving 50% lower network load for their HVAC facilities, compared to conventional systems. VLT HVAC Drives serve both stadiums with a unique BACnet/IP, ideal for building automation and control networks.

In Trnava, Slovakia, the 19,000-seat City Arena forms part of a demanding multi-purpose building that also incorporates restaurants, offices, cinemas and a shopping mall enjoyed by 16,000 visitors daily. City Arena is the most modern football stadium in Slovakia, recognized as “Building of the Year” by the Slovak Chamber of Civil Engineers; and meeting the high standards of UEFA and FIFA.

All HVAC operations for the complex are integrated into a single state-of-the-art Building Management System (BMS). It controls all aspects of operations from ventilation to under-pitch heating, via a BACnet/IP network with about 10,000 data points. Heating, ventilation and cooling interact as effectively as possible and only operate when needed, to maintain optimum energy efficiency.

The BMS manages the energy sourced from heat pumps and district heating to supply demanded heating and cooling throughout the complex, to suit the time of year.

The Lusail Stadium is another exceptional sports arena operating Danfoss VLT HVAC Drive units with BACnet/IP, selected and installed by Dorman Smith. This landmark multi-pur-

pose indoor sports hall is one of the first of the upcoming stadiums in Doha, Qatar, built for the world handball championships and supporting the sporting event infrastructure of Qatar. It has a budget of over \$325 million, and has been developed by the Qatar Olympic Committee.

The main hall seats 15,300 spectators spaciouly. Overall, the facility, with one main hall and two training halls following the standards and recommendations of the International Handball Federation (IHF), has a footprint of 45,000 square meters (over 484,000 square feet).

The BMS runs on BACnet/IP, controlling all aspects of the facility to ensure optimal energy efficiency and a low total cost of operations (TCO).

### Reduced cost of ownership

For both facilities, the VLT BACnet/IP MCA 125 option brings enhanced functionality to reduce overall cost of ownership.


The VLT BACnet/IP MCA 125 option allows quick and easy integration of the VLT HVAC Drive into each BMS using the BACnet/IP protocol or by running BACnet on Ethernet. It can

read and share data points and transfer actual and requested values to and from the systems. The VLT HVAC Drive facilitates daisy-chain configuration with no need for external switches. It achieves this via the embedded managed switch, with two external ports. This switch allows the use of a line structure for the Ethernet cabling, and ring structure such as RTSP (Rapid Tree Spanning Protocol). These structures remove networking components from the installation, which decreases costs and limits faults.

The VLT BACnet/IP MCA 125 also enables control of multiple high-efficiency permanent magnet motors in parallel.

### Fast data access, better network utilization

Besides standard functionality, the VLT HVAC Drive with BACnet/IP offers faster access to data, and low loading of the BMS, enabling the use of a smaller overall BMS.

Compared to many native BACnet products, the benefits for these projects of using the new solution are reduced installation time, faster commissioning time, and optimal stability in BMS performance. 

#### Danfoss Drives

Jesper.Therbo@danfoss.com | [www.drives.danfoss.com](http://www.drives.danfoss.com)



# A Smart Building for Google

Google relies on Smart Technology by Kieback&Peter in its new development center in Munich. The building will soon be certified as a gold standard green building by the German Sustainable Building Council. Kieback&Peter played an important role in achieving this high standard.

In the south of Munich's Arnulfpark, not far from the Central Station, there is a remarkable office building complex – the “Kontorhaus”.

The main tenant is also noteworthy. Internet giant Google has rented over 55 percent of the office space in the building.

The new building, completed in 2015, has a sophisticated design, with its exterior brickwork and archways being more reminiscent of classical industrial buildings. Twenty-five thousand square meters of office space are divided throughout a 12 floor high-rise building with three 7-story pinnacles.

The interior of the Kontorhaus by contrast is ahead of its time. Here, Google's innovative trend-setting office concepts are implemented. Along with highly functional offices and relaxed meeting points, the company center also provides its employees with a fitness centre, a canteen and garden roof terraces. The Kontorhaus is a forerunner in terms of ecology.







Kieback&Peter was also responsible for the entire building management system of the Kontorhaus.

© Christian Rudnik/Google Inc.

Google provides highly functional offices and relaxed meeting points, a fitness center, a canteen and garden roof terraces.

### Demonstrably sustainable practices

Groundwater is used to control the indoor temperature. A mechanical ventilation system with a heat recovery function ensures pleasant indoor climate conditions, along with cooling ceilings, cooling panels and an externally located electrical shading system.

It is, therefore, not without good reason that the building is soon to be certified as a gold standard green building by the DGNB German Sustainable Building Council.



© Christian Rudnik/Google Inc.

Kieback&Peter also plays an important role in this, since the Berlin-based company provides smart technology both in the office space rented by Google as well as in the Kontorhaus as a whole. Google alone has installed 222 individual room control systems, and 300 motor-controlled fire dampers are connected via a bus system.

700 data points for air conditioning and ventilation technology. Communication is carried out via BACnet and Modbus, and because all of this is working so well and the customer is so happy with the results, Kieback&Peter will provide even more technology to the Kontorhaus in the future, since other building tenants have now also ordered individual systems. 🏡

### Success ensures further business

Kieback&Peter is also responsible for the entire building management system of the Kontorhaus. The specialist in building automation systems has installed 16 control stations with over 3,000 physical data points and more than



**kieback & peter**  
Technology for Building Automation

**Kieback & Peter**  
info@kieback-peter.de | www.kieback-peter.de

# BACnet Integration Supports Municipal Performance Contract in Norway

About 25 kilometers from Norway's 3rd largest city, Trondheim, lies a small municipality known as Skaun. It boasts a population of 7668 and is within the county of Sør-Trøndelag.

One of the municipality's goals was to improve operational efficiency through uniform training and procedures. To do so, a uniform building management system was needed for all of the public buildings, schools, and nursing homes in the district. A BACnet-powered system was appealing to community officials because of the open sourcing of products and service providers they might need over the long term.

Saving energy, however, was the primary objective for the project. It was felt that consistency and ease of operation would help generate such savings. In turn, automation and energy management and monitoring technology, along with the requisite training and support services, would be required to achieve this objective.



© The S4 Group

Two of the municipality's buildings, Borsa Kindergarten and Rossvollheimen Nursing Home, were previously instrumented with Johnson Controls Metasys building automation systems using the N2 field bus technology. The project required that these two buildings be brought into the uniform user interface implemented for the entire municipality.

Schneider Electric was awarded the energy performance contract for the municipality. The company would provide enterprise-level automation through their StruxureWare Enterprise Server, and building level automation through their StruxureWare Automation Servers at each location. Schneider Electric's Energy Operation system would measure the project's energy savings.

Initial inspection of the Metasys system found that the N2 bus was within manufacturer specifications and all N2 devices were fully functional. Therefore, it was determined that integration to the existing system could proceed. To accommodate the integration, a BACnet-N2 Router from the S4 Group was chosen for each building.

For these two buildings, the operators also wanted to move to the common interface used for other municipality facilities. This meant that the existing operator workstation would be decommissioned. Therefore, one of the integration project tasks was to move all scheduling, global variable support, and other services and functions of the NCM supervisory controller to the Automation Server in each building.

The Configure Wizard built into the S4 Open Management Console (the user interface for the BACnet-N2 Router) accurately discovered the N2 devices and assigned the appropriate S4 device templates that provided the BACnet point mapping. When the Configure Wizard completed its task, the discovered N2 devices were automatically published as emulated BACnet devices to BACnet under a virtual network.

Point lists were automatically assigned by the Configure Wizard for N2 devices that were application specific controllers. Since the JCI DX-9100 controllers are each custom programmed, the Schneider Electric team used the S4 Open Metasys Configuration File Conversion Utility to generate custom Device Templates exactly matching the point assignments for each DX-9100. The integration team then assigned the custom Device Template to the device object in the BACnet-N2 Router for each DX-9100.

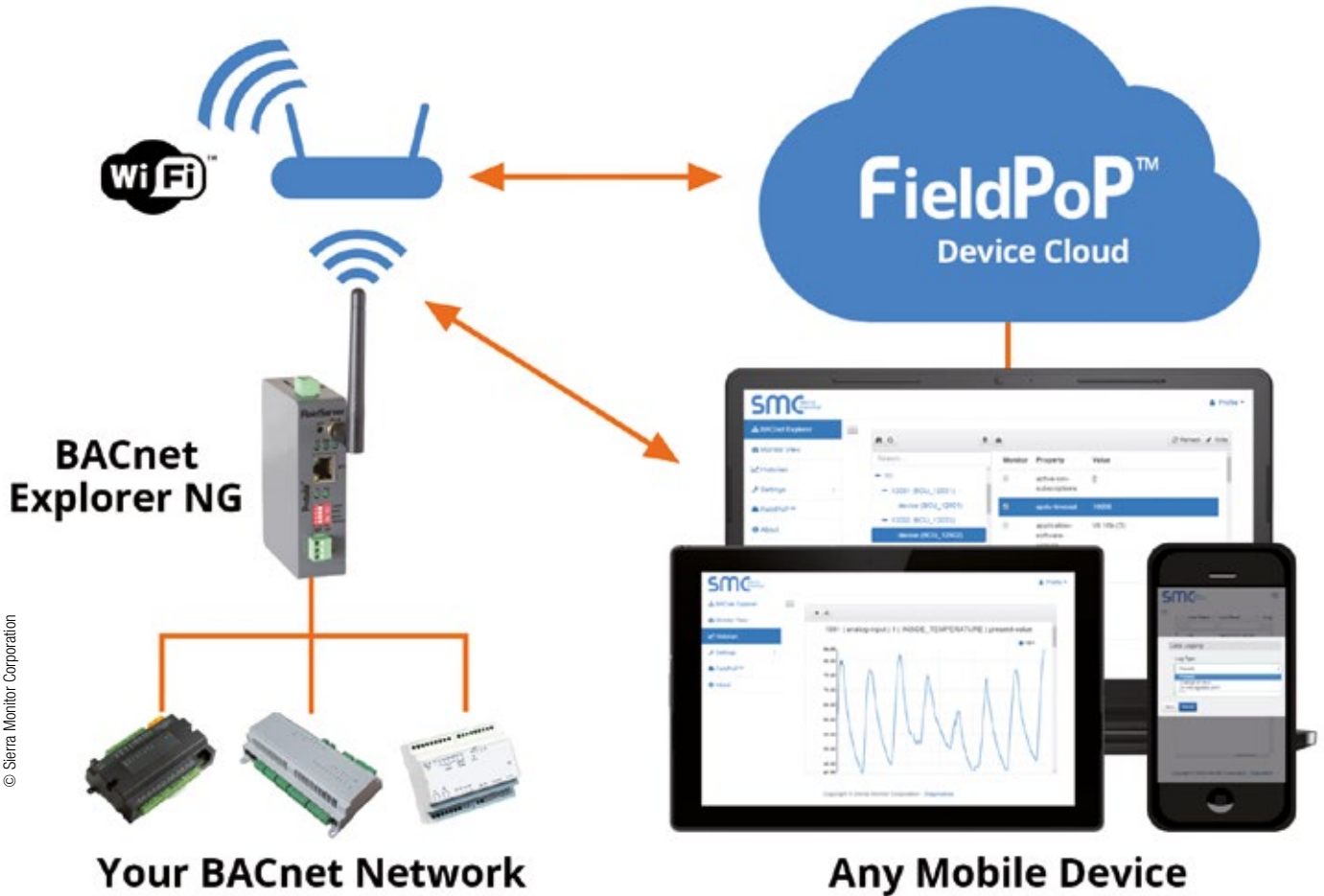
Here, the BACnet-N2 Routers are BACnet servers and the StruxureWare Automation Servers are BACnet clients. The standard BACnet discovery process in the SmartStruxure systems was used to bring the information into the new building operating environment.

Following the integration, client interviews were conducted to gauge success. The building operators observed that they can operate their installations in a consistent and efficient manner. As a result, they use less time for such duties as system inspection.

According to one Skaun municipality official: "So far, we are satisfied with the deliveries and the collaboration with Schneider Electric and look forward to get confirmation on the agreed energy savings in coming years. Another factor is that the project has led to significant renewals of technical facilities and building parts, including BACnet communications. This is also considered as very important for the municipality." 🌱

**The S4 Group**  
 sejones@thes4group.com | www.thes4group.com





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# Redefining the BACnet Explorer

Sierra Monitor's BACnet Explorer NG is a portable device that is WiFi-enabled, cloud-connected, and remotely accessible

## The Traditional BACnet Explorer

Software that discovers devices and data points for troubleshooting purposes, running on a PC connected to a BACnet network.

## Sierra Monitor's BACnet Explorer NG

Like traditional BACnet Explorers, our Explorer NG discovers, explores, tests, and monitors devices and data points; and logs and graphs selected points. But that's where the comparison ends!

A portable device, not software on a PC: The Explorer NG is a self-contained device that an integrator carries in their toolkit, connecting the

device to a BACnet network over RS-485/Ethernet. Leave it behind overnight to monitor the network or take it back with you when the job's done.

WiFi-based interaction with device, not tethered to a PC: Configure and interact with the Explorer NG from your mobile device. Walk around and stay connected over WiFi to the Explorer NG.

Diagnose and troubleshoot remotely, not just from within the facility: Every Explorer NG can be paired with the FieldPoP™ cloud portal over the facility WAN or a cellular link. Authorized remote users can securely connect to and use the Explorer NG's features through the cloud.

Remote notifications and data upload: Set up the Explorer NG to notify personnel through

the cloud based on defined triggers. Push the Explorer NG's locally stored data to the cloud and expose through REST APIs for long-term analysis.

New business opportunities: Use the Explorer NG with FieldPoP to provide continuous monitoring, maintenance as a service, or to integrate a BACnet network to a cloud application.

What will you do with our BACnet Explorer NG?



**Sierra Monitor Corporation**  
 sales@sierramonitor.com  
 www.sierramonitor.com

# Omni, the BACnet BEMS Controller

Innotech released their new BTL-listed, native BACnet Building & Energy Management System (BEMS) Controller called Omni.

Described as compact, flexible and feature-rich, Omni is designed to reduce hardware and software, making Omni suitable as an all-in-one BEMS for smaller applications (like OEM), right through to a larger, multi-site native BACnet solution.

Omni features include: advanced Native BACnet capabilities, Programmable Points (Universal Input/Outputs), cross-platform Web-Server, email & SMS notifications, battery-backed Time-Clock (with iCal calendars), 180million records of Data-Logging, multiple channels of Ethernet & RS4 85 comms, HMI options, backward compatibility with existing Innotech controllers and more. Omni contains industry-first innovation providing benefits and savings from installation right through to facility management.



Omni, the all-in-one Building & Energy Management System Controller for smaller as well as large, multi-site applications. © Innotech Control Systems

Omni's BACnet capabilities include multiple BACnet MS/TP channels, BACnet/IP, Routing on all comms channels, and a BACnet Broadcast Management Device in all Omni primary controllers.

Omni's Programmable Points provide cost savings by allowing the use of every point on the controller as any type of input or output. Omni Points also include diagnostic feedback, making Omni suitable for any critical application.

Omni's Focus programming software provides simple, but powerful, programming of the Omni network, integration, and even simulation, saving valuable time and money by greatly reducing site commissioning time. To enquire about Omni, or to become an Innotech partner please visit our website.

Innotech Control Systems  
sales@innotech.com.au  
www.innotechcontrols.eu

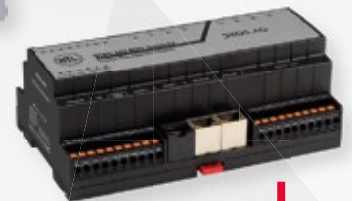
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Control Technology

DEOS AG develops and produces intelligent Digital Energy Optimization Systems for building automation since 1967. Our strengths lies in end-to-end BACnet solutions. More than 250 certified system integrators use our technologies around the world.

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www.deos-ag.com



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# 50 Years of Experience

**50** years of innovations from Rheine: 50 years of intelligent building automation, 50 years of customer proximity and partnership. DEOS AG is not only putting its new range of BACnet solutions for building automation on display at the ISH in Frankfurt, the company is also celebrating its 50th anniversary at its trade show booth.

DEOS AG offers BACnet products and solutions for the management, automation and field level to provide building users with greater energy efficiency and more comfort.

DEOS AG (Digital Energy Optimization Systems) has been developing, producing and distributing intelligent solutions, products and services for 50 years. The range of DEOS solutions is used primarily by operators of hotels, office buildings, hospitals, airports etc.

In addition to the world of BACnet products, DEOS AG has a comprehensive collection of crucial certificates and tests, such as WSPCert, BTL, AMEV-B, CSA, CE, etc. As one of the German BACnet pioneers, the company will be displaying its ISH trade show highlights at its booth in hall 10.3/A19.

## The DEOS highlights at the ISH

With the new BACnet IP compact controller OPEN 600 EMS basic24, DEOS AG has been offering a new cost-effective controller since the beginning of the year. Thanks to the communication via BACnet IP, this controller is the perfect choice for use in both existing buildings as well as in new projects. The integrated web server and the graphic visualization present the system graphics based on HTML5 and render them in full HD resolution as usual.

A MODBUS model will be added to the product line of the DEOS single room unit OPEN SRU for the ISH. This interface makes it possible to connect devices from other manufacturers.

The SRU supports room automation according to VDI DIN EN 15232 and complies with B-ASC specifications.

The new DEOS Cloud Solutions allow the end users to set up a secure IT network of branches and properties in building automation and protect themselves against cyber attacks. This site networking can be combined with the centralized and multi-client-capable BMS installation. 🌐



© Deos AG



### DEOS AG

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# New to the BACnet International Family



BACnet International is the global organization that encourages the successful application of BACnet through interoperability testing, educational programs and promotional activities. BACnet International complements the work of other BACnet-related groups whose charters limit their commercial activities.

BACnet International community membership includes a who's who list of top tier companies and industry professionals involved in the design, manufacturing, installation, commissioning and maintenance of control and other equipment that use BACnet for communication.

We are proud to welcome the following new members to BACnet International.

## Gold Member



Fresh Air. Fresh People.

### WindowMaster

WindowMaster A/S was founded in 1990. Its founding vision is to create better buildings that have plenty of fresh air and excellent and safe indoor climates. They supply sustainable indoor climate solutions for all types of buildings and their solutions are based on natural forces – natural ventilation. In addition, they have many years of experience in providing smoke ventilation solutions that comply with European EN standards and Danish regulatory standards.

Skelstedet 13  
2950 Vedbæk  
Denmark



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## Silver Members



### Enlighted

Enlighted is a leading IoT solutions company that delivers the leading technology platform for enabling smart buildings. From their patented breakthrough sensor technology and scalable network to real-time data collection, analytics system and high-value applications, Enlighted is redefining what a smart building can be. Enlighted solutions are already installed in over a 100 million square feet of enterprise space using applications ranging from energy savings and space optimization to safety and security, making smart buildings brilliant.

930 Benecia Avenue  
Sunnyvale, CA 94085  
United States



### Fidelix

Fidelix Ltd was founded in 2002 to develop and perform contract work on intelligent and reliable building automation and safety systems. Over the years, their advanced innovations have helped them to grow into one of the largest companies in the sector in Finland.

Martinkyläntie 41  
VANTAA 01720  
Finland



### IMI Hydronic Engineering

IMI Hydronic Engineering is an industry leader in green solutions for indoor climate control, providing high performing and quality products and services to more efficiently protect and control HVAC systems.

Route de Crassier 19  
1262 Eysins  
Switzerland

# Number of BTL-Listed Products Continues to Grow, and Merger of Two Programs Provides Simpler, Integrated Global Process

In January of 2017, the BTL Certification Program was launched, combining the BTL Listing Program and the WSPCert Certificate Program. Going forward this will be the indicator that a product has successfully passed rigorous verification by testing and demonstrates that it correctly implements rules and interoperability of the BACnet protocol. The BTL Certification includes all the privileges previously granted by the BTL Listing and WSPCert, including a Certificate of Conformance, a BTL Listing and the right to use the BTL Mark.

For any products completing testing after January 2, 2017, BTL Certification will be the norm. For all products currently Listed or currently WSP-Certified, manufacturers will have the opportunity to apply for their product to be transitioned to the new BTL Certification Program during the 2017 calendar year.


More and more product specifiers are requiring BACnet as a “must-have” for system requirements. There are now 131 distinct manufacturers with BTL-Listed Products. Specification of BACnet as the protocol, and requiring BTL Certification is becoming THE benchmark for project specifications to ensure interoperable installations.

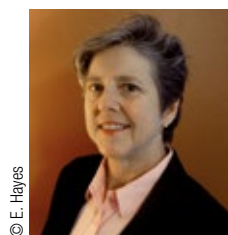
The BTL Mark may be displayed only on products that have successfully passed BTL Testing. Testing ensures that the device correctly implements all of the BACnet functionality it contains as governed by ASHRAE standard 135.1. The BTL Working Group defines the BTL Test Plan and governs the testing.

For suppliers who want to apply for BTL Testing at the BTL Lab, please submit three forms to [btl-coordinator@BACnetinternational.org](mailto:btl-coordinator@BACnetinternational.org): BTL Checklist, BTL Testing Application, and BTL Testing Agreement. These forms and instructions for the entire testing process may be found at: [http://www.bacnetlabs.org/page/test\\_documentation](http://www.bacnetlabs.org/page/test_documentation) under the heading Current Test Package and Application Forms.

The signed BTL Testing Agreement and the \$750 Application Fee are required to secure a place in the testing queue. The testing queue is currently around two months but may vary depending on the number of applicants at any given time. The BTL Checklist and BTL Testing Application determine the testing which will be performed. An Application Acceptance letter will be supplied that includes a formal estimate for the amount and time of testing and a test entry date. Fees are billed at the conclusion of testing.

BACnet International member companies with Silver level or higher memberships receive a discount on testing fees. (The Testing Application fee is the same for all applicants.) Participants may apply for Testing and BTL Certification for a family of devices that share underlying BACnet software in order to minimize testing costs.

If you have any questions, please contact [btl-coordinator@bacnetinternational.org](mailto:btl-coordinator@bacnetinternational.org). 



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# BACnet International Annual Awards Presented in Las Vegas

## Association Recognizes Leaders and Contributors in the BACnet International Community

The BACnet International community is proud to honor a distinguished set of members whose contributions over the past year have led to increased awareness and improvement of the BACnet International association and the BACnet standard.



BACnet Hall of Fame Inductee: Steve Bushby © BACnet International

The award ceremony took place during the 2017 ControlTrends Awards in Las Vegas, NV, on January 29, 2017. BACnet International Managing Director and President Andy McMillan, Marketing Committee Chair Rocky Moore and Education Committee Co-Chairs Steve Karg and Scott Ziegenfus were on hand to present the awards. The Annual Awards are bestowed upon deserving individuals, companies and projects in recognition of outstanding achievements in several categories, including Volunteer, Member, and Project of the Year.

There were two new awards presented this year – the Rising Star Award and the BACnet Hall of Fame. The Rising Star award is presented to an individual fairly new to the industry who has already contributed to the betterment of the BACnet International association and showed a commitment to the BACnet community. Inductees into the BACnet Hall of Fame are individuals with at least a decade of meaningful contributions to the BACnet community, who have played a unique and valuable role in the ongoing development of the BACnet standard or the community, championed open dialog and a collaborative approach to resolving issues, and demonstrated a global perspective with respect for regional and cultural differences. “The BACnet International Annual Awards provide an opportunity to recognize individuals who through their hard work and dedication continually enrich the

BACnet community,” McMillan said. “There are members who consistently go above and beyond to make BACnet an effective and successful building automation standard and we are proud to acknowledge them.”

### The award winners are:

#### BACnet Hall of Fame Inductee

##### Steve Bushby, National Institute of Standards and Technology (NIST)

Steve has had leadership roles spanning decades in developing the BACnet standard, as well as ensuring its adoption as an American national standard, an ISO standard, a European Community standard, and a national standard in over 30 countries. He is a member of a rather small community known as former chairmen of ASHRAE SSPC 135, where he served with distinction.

He also created and managed the BACnet Interoperability Testing Consortium, a cooperative research and development agreement between NIST and 22 private sector partners. That consortium was the seed that grew into today’s global BACnet Product Testing and Certification program administered by BACnet International.

Through his work with BACnet, and the extensive network of trusted relationships he forged in the controls industry, Steve helped to change user and supplier expectations of control systems from unique and proprietary to Open and Interoperable.



Volunteer of The Year: Steve Jones © BACnet International

#### Volunteer of the Year

##### Steve Jones, The S4 Group

Steve is an active and dedicated participant of the BACnet International community. His contributions have become a prominent voice within

the BACnet community. He writes about BACnet for various publications, participates vigorously in the BACnet Marketing Committee, and contributes Success Stories to the BACnet International website regularly. Steve also actively participates in the annual PlugFest Interoperability Event and provides relevant input for improvement, strengthening the event for all who attend. He has even dedicated his time to setting up an in-house interoperability testing lab to test several vendors’ equipment.



Member of the Year: Tim Skell © BACnet International

#### Member of the Year

##### Tim Skell, ABB

Tim is an active member of the BACnet International Marketing Committee, attending all meetings, providing multiple articles to both the Journal and Foundations publications, providing Success Stories, and helping out in BACnet International’s AHR Expo booth. He is always willing to volunteer to speak during BACnet educational sessions, including a 100+ audience with standing room only at NFMT Vegas last fall. Tim also participates in the PlugFest Interoperability Event and in the BTL Working Group. He is a strong supporter of BACnet as the go-to guy for anything involving applying and troubleshooting BACnet in an installation, testing new implementations of BACnet on various products, and educating customers, consulting engineers, and owners on the advantages of the BACnet protocol.



Project of the Year: Air Mobility Training Centre, Reliable Controls © BACnet International



**Project of the Year**

**Air Mobility Training Centre in Trenton, Ontario, Canada, by Reliable Controls**

The Air Mobility Training Centre is one of the most complex facilities of its kind. It was built to house the equipment and personnel required to train pilots and maintenance crews for the new CC-320J Hercules aircraft purchased by the Canadian Forces. It also provides support to Canadian troops serving in combat, as well as for peacekeeping and humanitarian missions around the world.

Equivalent to two football fields, it provides crews with a state-of-the-art environment in which to train. The LEED® silver certified facility consists of a combination of 2- and 3-story educational and office spaces, designed and built to accommodate the latest in aircrew and technician simulation, making it one of the most advanced flight training facilities in the world.

The facility now benefits from remote access, integration to a large WAN for multiple buildings, and creative programming encompassing energy saving modes within the building. The expertise and diligence of the DDC professionals involved with this complex project brought in the project almost \$20 million under budget.



Rising Star: Natsuko Takahashi © BACnet International

**Rising Star Award**

**Natsuko Takahashi, Delta Controls**

Natsuko is an energetic member of the BACnet Testing Laboratories (BTL) Working Group and, according to other members, has an infectious, can-do attitude and is a significant asset in the development and updating of BTL tests. She is always striving to do more with the BTL Working Group and over the past year has regularly participated in meetings and helped update BTL documentation. She also presented an educational session at the BACnet PlugFest Interoperability Event.

# Announcing New BACnet International Board Members

BACnet International is pleased to welcome the following new members to the Board of Directors:



© E. Johnson

**Erica Johnson**

Erica Johnson was named Director of the University of New Hampshire's Interoperability Laboratory (UNH-IOL) in Durham, NH, in 2007. In this position she utilizes her industry experience in networking, developing certification test programs and creating relationships with forums leading the UNH-IOL's continued success. In recognition of her ability to drive technical innovation, she has been recognized by NH Business Review as a recipient of the 2016 Outstanding Women in Business award, Fierce Telecom's list of "Women in Wireline", and was awarded, by the University of New Hampshire, with the UNH Women's Commission's Stephanie Thomas Staff Award in honor of her achievements in promoting and embodying the advancement of women in the sciences. She received her Bachelor of Computer Science and MBA from the University of New Hampshire in 2001 and 2011, respectively.



© R. Jayaraman

**Raj Jayaraman**

Raj Jayaraman currently serves as Vice President of Philips Lighting. Since joining Philips in 1988, where he worked for Philips Research in the area of integrated circuit design, he has amassed over 30 years of experience in the lighting and electrical products industries. He has held a variety of executive positions in R&D, Lean Operations, Supply Chain, Marketing and General Management. He was deeply involved in the controls strategy and business at Philips Lighting, and also has extensive experience with M&A activities there. He currently leads for Philips Burton, a business focused on medical lighting applications. Raj received his PhD from MIT in Microelectronics and holds nine patents.

**Erica and Raj join the following on the BACnet International Board of Directors:**

- Andy McMillan      BACnet International
- Brad Hill            Honeywell
- Roland Laird        Reliable Controls – CHAIR
- Raymond Rae        Delta Controls
- Nancy Stein         Siemens Building Technologies
- Dennis Swoboda    Blue Ridge Technologies
- Michael R. Wilson   Automated Logic

## NEW BTL-LISTED PRODUCTS

(Products Listed from October 2016 – February 2017)

Manufacturer	Product Name	Model
Accuenergy (Canada) Inc.	Acuvim II Series Multifunction Power and Energy Meter	Acuvim II, Acuvim IIR, Acuvim IIE, Acuvim IIW, Acuvim IIBN, AXM-BIP
Duksan Mecasys Co., Ltd.	IDC Series BACnet Controller	IDC-3032M
Ges Teknik A.S.	AW-WSHP-Gateway	SMC-GT-BAC2K15
Gesellschaft für Regelungstechnik und Energieeinsparung m.b.H.	WEBVISION	WEBVISION 5
Intesis Software, SLU	IntesisBox Air Conditioning Gateways - BAC-1 series	DK-RC-BAC-1, DK-AC-BAC-1, ME-AC-BAC-1, PA-AC-BAC-1, PA-RC2-BAC-1, TO-RC-BAC-1
KMC Controls	Conquest BACnet Router	BAC-5051E
MechoSystems Inc.	WhisperShade BACnet Interface	
Opera Electronics Inc	Opera 6000	6000A, 6000B
	MACH-ProZone™	MPA-111-A-F, MPA-12-A-F, MPA-12-F, MPA-33-A, MPA-33-A-F, MPA-34-A, MPA-34-A-F, MPA-35-F, MPA-36-F
Trend Control Systems	IQ4	IQNC, IQ4NC32
	IQ4	iQ411, iQ422, iQ412, iQ4E

## Calendar of BACnet International Events

Dates 2017	Event	Location
May 9 – 11	LIGHTFAIR International	Philadelphia, PA
September 26 – 28	PlugFest Interoperability Event	Durham, NH
September 27 – 29	World Energy Engineering Congress (WEEC)	Atlanta, GA
November 14 – 15	NFMT Orlando	Orlando, FL

For more information about all events, contact David Nardone, BACnet International, [david@bacnetinternational.org](mailto:david@bacnetinternational.org) or visit [www.bacnetinternational.org](http://www.bacnetinternational.org)

## BACnet International Journal 13

The BACnet International Journal is a global magazine for building automation based on BACnet technology. Experts, practitioners and professionals show the way in applying and developing the BACnet standard – from building automation trends to devices and application projects; from qualification and training to testing and certification; from who's who in the BACnet community to useful information on events and publications. Special attention is given to members and activities of BACnet International.

### Distribution

This Journal can be ordered free of charge by BACnet users as well as partners, members, media representatives and friends of BACnet International. Order the BACnet International Journal by e-mail at [info@bacnetinternational.org](mailto:info@bacnetinternational.org).

### Online distribution

The BACnet International Journal is posted to [www.bacnetinternational.org](http://www.bacnetinternational.org).

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### Board of Directors

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Brad Hill, Honeywell International  
Raj Jayaraman, Phillips Lighting  
Erica Johnson, UNH – Interoperability Lab  
Roland Laird, Reliable Controls – Chair  
Raymond Rae, Delta Controls  
Nancy Stein, Siemens  
Dennis Swoboda, Blue Ridge Technologies  
Michael R. Wilson, Automated Logic

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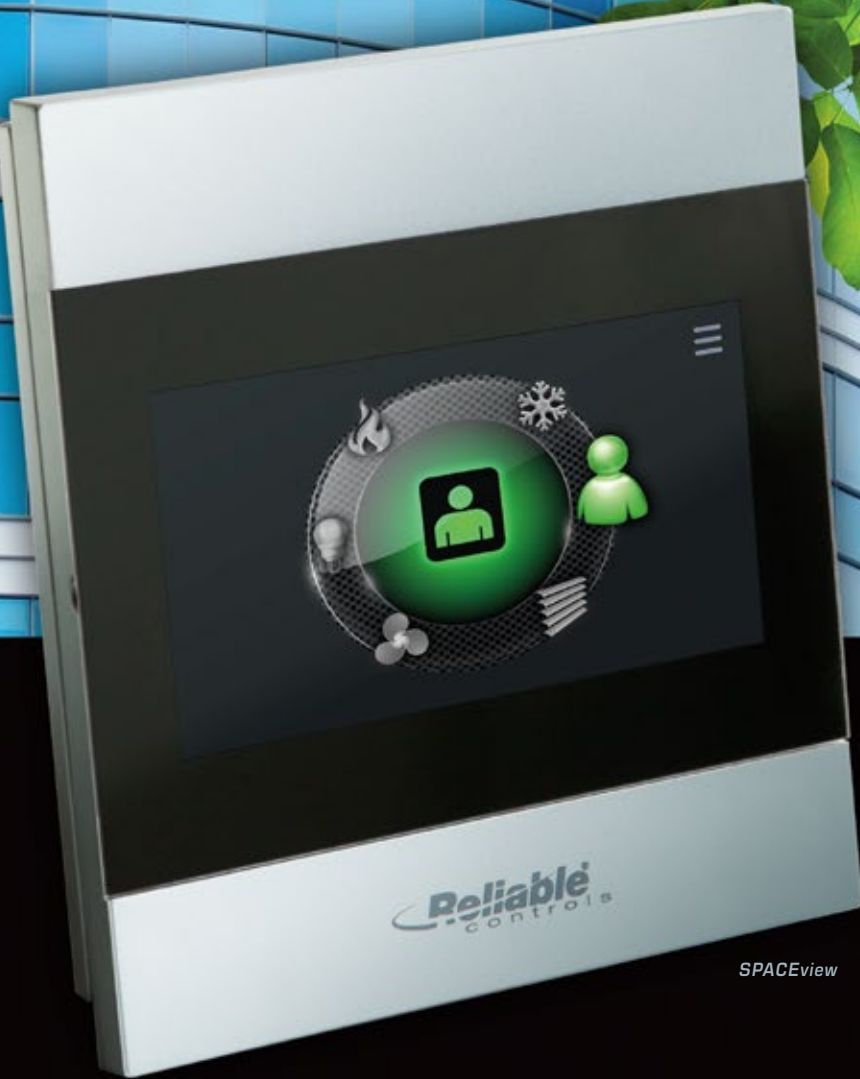
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# MACH-ProView™ LCD



SPACEview



LISTview



STATview

Reliable Controls unveils the new MACH-ProView™ LCD. This freely programmable, combination BACnet® Building Controller (B-BC) and BACnet Operator Display (B-OD) resides on Ethernet, Power over Ethernet, Wi-Fi or EIA-485 networks. Backed by an industry-recognized 5 year warranty and a nation-wide network of certified Authorized Dealers, the new MACH-ProView will empower you to stay in touch with your building's performance.

*people and technology you can rely on.™*



## Continually Raising Building Standards

BACnet International is an industry association that facilitates the successful use of the BACnet protocol in building automation and control systems through interoperability testing, educational programs and promotional activities.



**BACnet is leading the world in Building Protocol Standard:** It plays a significant role in building automation projects worldwide.



**Achieving the Mark of Distinction:** The BACnet Testing Laboratories (BTL) Mark provides users with assurance that a product has passed the industry standard BACnet conformance tests conducted by a recognized, independent testing organization. The BTL Mark is a mark of distinction, achieved by more than 700 products, that many building owners and control system designers look for as a must-have in order to be eligible for a project.

► Discover More Today: [www.bacnetinternational.org](http://www.bacnetinternational.org)