

BACnet
International



JOURNAL

Issue 21

This Issue

BACnet Roadmap



Global Testing of the Global Standard



Add security management to your building automation system



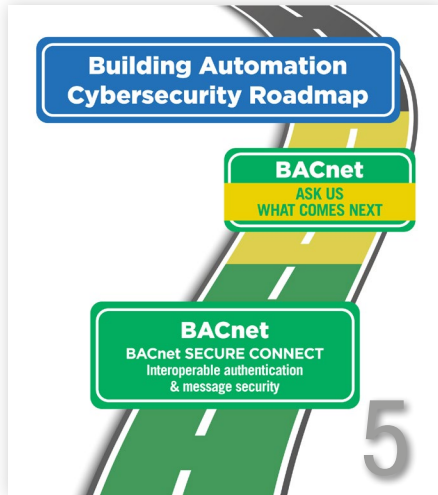
RCPassport™
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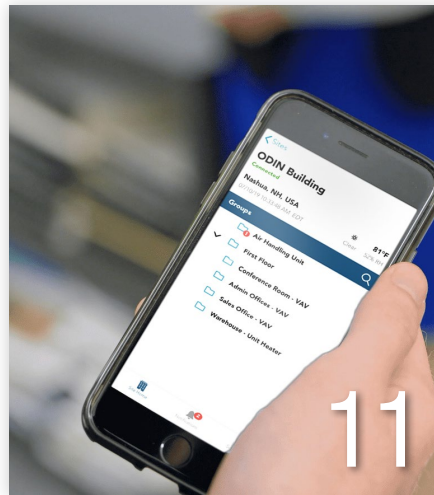
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BTL CERTIFICATION

Your Best Path to BACnet Interoperability



If you are involved with building controls and automation, rely on the BTL Certification program to make sure the products you buy have been rigorously tested for compliance to the BACnet standard. BACnet is the world's standard for building interoperable solutions but it only works when products are correctly implemented. When you buy products that are not correctly implemented it can cost you a lot in terms of system integration time and money.

The BTL Certification program is operated by the BACnet Testing Laboratories (BTL), which is overseen by BACnet International. BTL was established more than 15 years ago to lead compliance testing and host interoperability events. To achieve certification, BACnet products must successfully undergo rigorous industry-standard testing conducted by recognized, independent testing organizations.

Users can identify tested products through the BTL Listing Service which is available to users globally at no cost. The service supports searching for specific products as well as browsing through products with different capabilities. In addition, the listing service provides detailed information on the specific tested capabilities of each product.

Accelerate your system integration and avoid unnecessary integration costs. Require all BACnet products in your system be fully tested. Ensure every product displays the BTL Mark or is verified through the BTL Listing Service.

There are over 1100 products in the BTL Listings of Tested Products Database with more being added every month. **Find tested products to fit your needs at www.bacnetlabs.org.**



BACnet Testing Laboratories
bacnetlabs.org
info@bacnetinternational.org
+1-770-971-6003

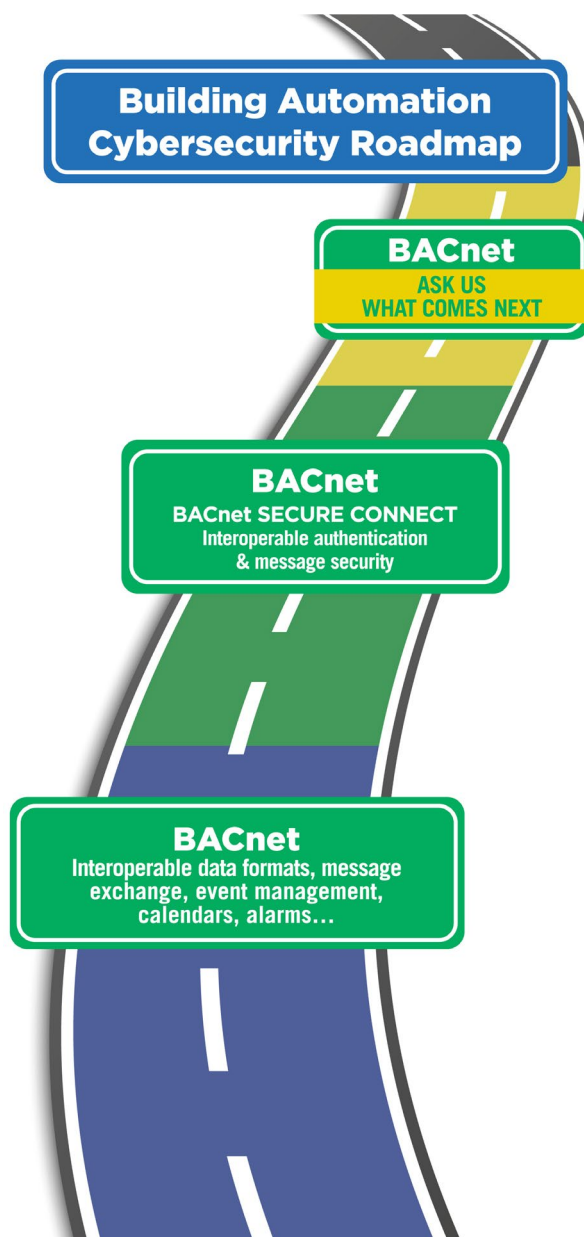
Cybersecurity Roadmap

The BACnet community is developing a Building Automation cybersecurity roadmap to guide users and equipment suppliers through the complex and rapidly evolving cybersecurity landscape. The goal is secure, interoperable solutions that meet the business needs of users. When BACnet began the concept of interoperability, the focus was on the interactions among controllers and equipment in the building automation system. However, IT infrastructure and building systems continue to converge, so our concept of interoperability must expand to include IT systems and best practices. Nowhere is this more urgent than in cybersecurity.

Our journey toward interoperable and secure BAS systems began a long time ago with the initial release of BACnet and has continued with its subsequent enhancements and extensions. Through the end of 2019 our journey brought us to broad interoperability covering a wide range of building controls subsystems and requirements. Security, however, was accomplished outside of BACnet and thus did not benefit from the interoperability BACnet provides. As you probably know, in 2020 BACnet Secure Connect, or BACnet/SC, was added to the standard, and it pushed us further along the road by providing interoperable device authentication and message encryption. These are major advances, but they are not the end of the road.

There are other things we need to address, including interoperable message authorization, security certificate management and other system management functions. The BACnet Committee (SSPC 135) is working on these further enhancements to the standard. In addition, an industry group organized by Cimetrix has been working to move the industry further along the road. In particular, this group has looked at interoperability in the context of IT infrastructure and best practices. Over the next few months that industry group will complete its initial work and make it publicly available. Additional efforts beyond that will probably be organized under the auspices of ASHRAE and BACnet International.

It is an exciting time and a challenging time in Building Automation. The possibilities that new technology brings are endless. It is up to us to ensure those new technologies are implemented in ways that enhance interoperability, not impede it. For more on these topics, look for upcoming webinars from BACnet International.



© McMillan

Andy McMillan
 President and Managing Director BACnet International
 andym@bacnetinternational.org | www.bacnetinternational.org



ABOUT THE AUTHOR

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.

BACnet Provides an Ideal Smart Building Backbone

Instead of limited open interfaces or APIs, building owners and controls specifiers should adopt robust BACnet interfaces for lighting controls systems to enable full integration with building systems and support automation, write Beatrice Witzgall and Andy McMillan.

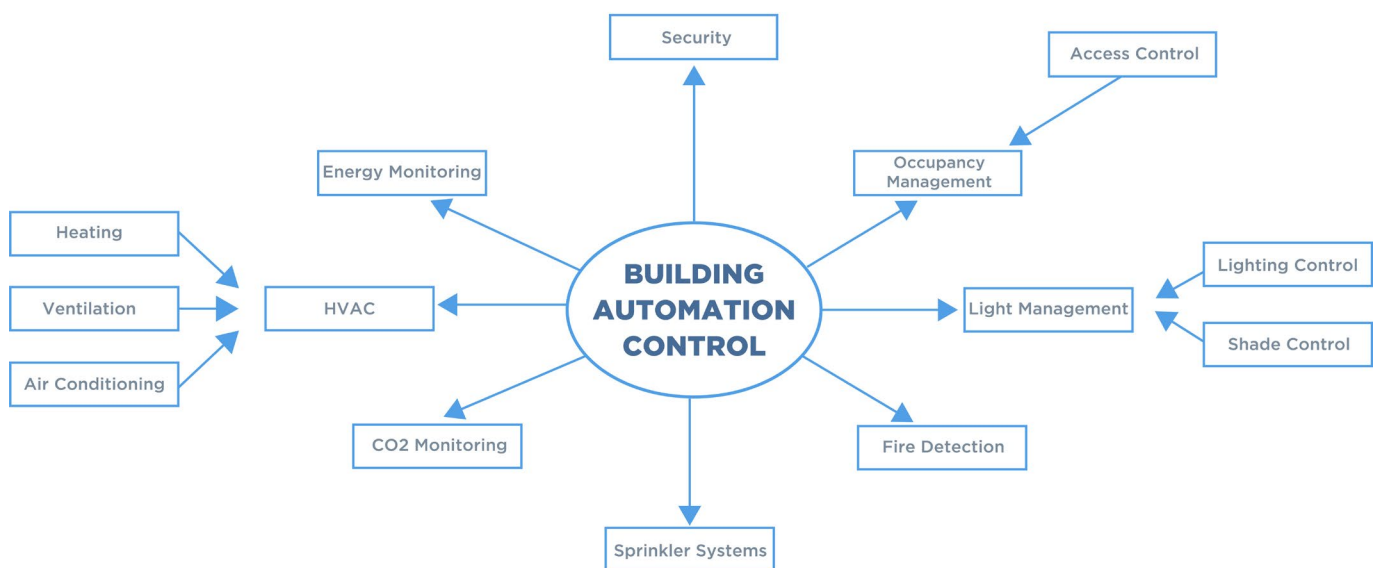
BACnet has been a core element of the building automation business for years, yet many lighting professionals are unaware of exactly what it is. BACnet is a universal communication protocol for **B**uilding **A**utomation and **C**ontrols that unifies various systems and vendors into one network and control interface. The globally accepted standard allows intelligent devices in buildings to interconnect and interoperate by defining communications rules and networked equipment mechanisms to exchange data, commands, and status information (<https://bit.ly/3BR7UC7>).

The key to making a building successfully “smart” is the interoperability of discrete systems and equipment supplied by numerous vendors. Integration across multiple systems and vendor solutions through an open standard achieves cost savings and streamlined operations for building owners. It also provides flexibility for future use cases. BACnet is the link that connects multiple systems, enabling sophisticated energy management, occupant comfort, and building security applications.

BACnet also enables information and controls from all building systems to be combined into one single graphical control interface, which can also be accessed remotely. It simplifies operations, reduces user training, streamlines maintenance, provides alerts, and allows room for expansion and cross-functional add-ons. That is why BACnet has grown to become the predominant worldwide building integration protocol. According to a 2018 market study, BACnet is being specified in nearly 65% of projects globally and in over 80% of US projects.

The smart building is a large, interconnected puzzle where each component is a piece of a much bigger picture. A smart building shares data across multiple systems to respond to real-time needs and conditions or to learn and optimize building operations. When the building automatically knows how to react to the data and changes in its external environment, all within the parameters of its design intent and equipment requirements, it then becomes smart.

Building automation and its associated technologies are gaining more relevance and momentum, especially during the current coronavirus pandemic. It is an evolving landscape with new requirements and applications under constant development. Although individual equipment technology is often in place, if the correct infrastructure has not been set up, enabling various systems to communicate with each other becomes complicated and expensive. BACnet addresses integration of all aspects of building systems including HVAC (heating, ventilation, and air conditioning), security, shade controls, fire detection, sprinkler systems, energy and air quality monitoring, access controls, power distribution, and lighting. All these systems can operate and work independently, but they become unified and provide new value propositions with BACnet as the network’s protocol backbone.



A building automation system comprises multiple subsystems that offer discrete capabilities and should be integrated in a way that allows each device, node, or system to exchange data, commands, and status details for a truly smart connected building. © BACnet International

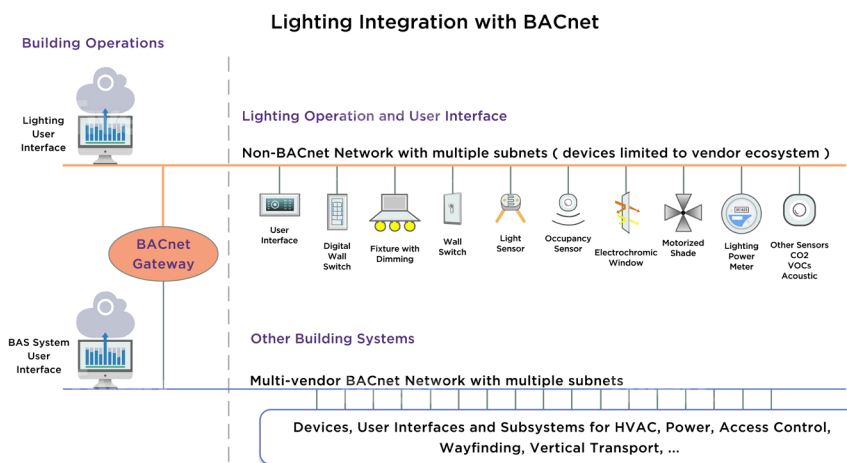
Use cases

The use cases are extensive, and it is up to the building owner and the designers to define them. One office use case could be automatic dimming of conference room lights when a meeting is scheduled to end as a means to signal occupants to wrap up. Another scenario could entail the HVAC system adjusting to occupants' actual locations within the space rather than having the entire space heated or cooled to a certain temperature despite vacancy.

Initial use cases of building system connectivity revolved around energy savings to cut building operational costs, such as connecting access systems with occupancy to turn lights off when no one is in the space. Another functional use case is load shedding to take advantage of utility rebate programs through power-utility credits. Getting employees safely back to work during the pandemic opens up the possibility of new use cases (<https://bit.ly/3ttqCgm>). For example, how can you manage density reduction if you cannot measure real-time occupancy? Or how can you ensure a clean workstation when you do not know where someone has been sitting?

Some of these scenarios can be managed internally with a standalone lighting system via sensors, but others require integration across systems or vendors. For example, a more advanced use case is wayfinding, where an employee enters the office by swiping their access keycard and the hallway lights turn on all the way to the employee's assigned office. Automated notifications to maintenance workers when lights fail or are about to reach end-of-life are other common use cases.

Unfortunately, many lighting controls manufacturers focus on their ecosystem and an isolated silo of hardware and software with little consideration of its integration into the larger ecosystem. As a result, they do not offer or embrace integration with BACnet. It frequently requires a special request by the building owner/operator early in the specification process. Typically, lighting controls are self-sufficient proprietary systems with limited open interfaces or application programming interfaces (APIs). While HVAC and other applications have adopted and integrated BACnet natively, the lighting industry has not. This limits potential applications for building owners and increases costs when the network control technology is not addressed and specified early enough. Building owners/operators need to understand that identifying the overall integration needs and protocol early in the process is crucial.



In a traditional approach, lighting controls sit on their own communication layer and connect to the building network via a gateway. © BACnet International

They also need to define relevant use cases so the technical requirements can be outlined and established to specify which systems need to communicate and in what ways.

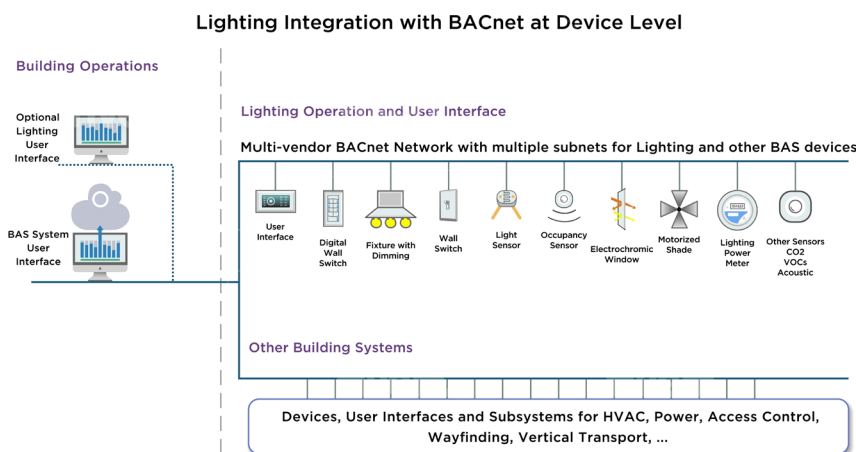
Lighting integration

Some control systems manufacturers claim they offer BACnet support or compatibility, but they often support only a small subset of functionalities and address specific use cases. In BACnet, device communications capabilities are specified in functional building blocks called BIBBs (BACnet Interoperability Building Blocks). The extent to which a particular manufacturer's lighting controls support robust integration with other building systems is dependent on which BIBBs the company supports. This means an owner/operator or system specifier must look more deeply than just BACnet when evaluating their options and choosing the right manufacturer

to work with. They need to evaluate suppliers on the fit between a supplier's BACnet integration functionality and the requirements of the defined and future use cases.

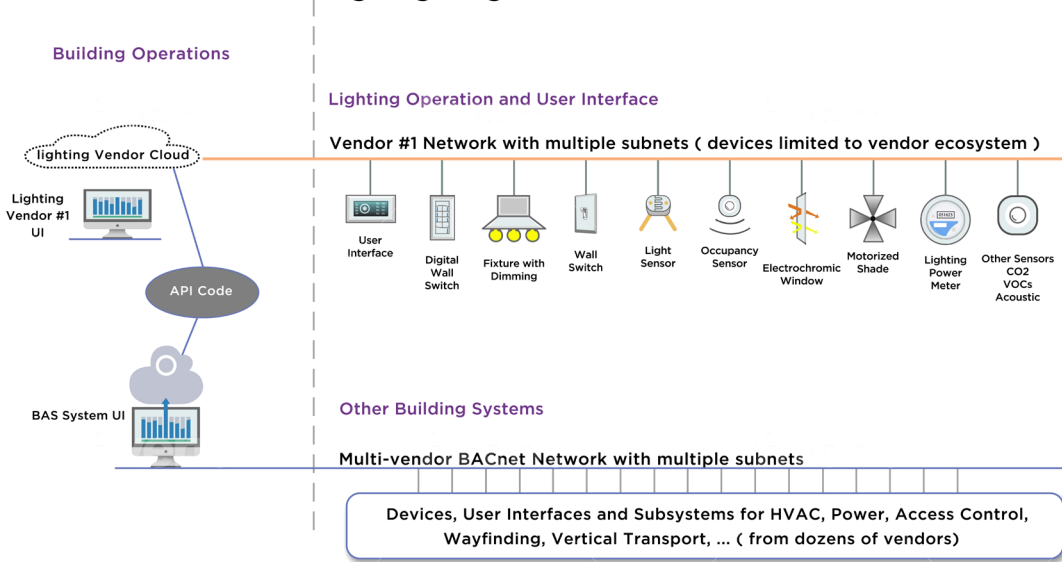
There are three different ways a provider can integrate lighting controls with BACnet systems. The most common and traditional integration is a gateway approach, in which lighting controls companies have a BACnet interface to their products via a gateway. The BACnet protocol stack sits inside a piece of hardware or gateway between the different systems. The lighting subsystem is on its own communication layer, but it has the gateway to connect to the building network.

There are different ways to define what a gateway is. It could be hardware, perhaps a third-party device translating signals to room or area controllers or virtual BACnet devices (preferred



In a device-level integration approach, every device in the network communicates via BACnet protocol. The BACnet stack is integrated directly into the end devices, including luminaires, so all data is exchanged in one consistent format. © BACnet International

Lighting Integration in the “Cloud”



A cloud-level approach to controls offers user interfaces over web services, but typically each supplier has its own application programming interface (API), which can complicate system integration. If the building automation system utilizes BACnet to integrate multiple subnets over the network with a single control interface, it can simplify the end user scenario.
© BACnet International

by Hubbell and Lutron). Any gateway acts as a translator between different protocols, so there can be issues with latency and translation.

Another approach is device-level integration, in which the BACnet stack is integrated directly into the fixture. Every fixture or end device speaks BACnet directly and is considered BACnet compatible. Therefore, the actual lighting control moves into the BACnet realm. Some consider this to be ideal as the whole system speaks one consistent protocol and data exchange format and is therefore natively integrated. Meanwhile, others argue that it requires additional device-level programming, which demands extra time. Many BACnet integrators get paid by the point, and some buildings have thousands of light fixtures, making programming expensive. For a long time, this approach had some limitations. The BACnet protocol did not support enough specific lighting capabilities to make this easy – for instance, color changing or color temperature setting. These capabilities are now available and directly supported in BACnet.

The third approach is a little controversial as different integration philosophies and programmer generations clash. It is the cloud-level approach, in which the vendors provide APIs, generally in the form of web services. While web service APIs are generally quite common in Internet of Things (IoT) software integrations today, the practice is far less common in the building automation community. Web service APIs are open in the sense that they are public and anyone can use them, but they are not standardized like BACnet. Instead, every supplier has its own API. So, while web

service APIs provide flexibility for connecting to new outside services, integration costs increase rapidly with the number of vendors that need to be integrated.

Another concern with integrating systems through web service APIs is the potential security risk inherent in having multiple web services accessing the building network. Again, this issue becomes more significant as the number of vendors involved increases.

Cloud-level integration works best when BACnet integrates all controls in the building (including lighting). The building automation system provides a web service API to integrate with cloud-based building operations platforms for tenant management, analytics, diagnostics, optimization, and other services. This creates a single-point cloud connection to the building, which is more secure, simpler, and cheaper to manage, providing great benefit to the building owner.

Functionality of BACnet

The BACnet protocol provides for all essential lighting functionalities with developed BIBBS or programming elements, including the recently added color-changing capabilities. Lighting controls vendors generally deliver access only to selected functionalities regardless of which integration approach they adopt. Which functionalities each individual vendor integrates into their control interfaces is up to them. Some vendors focus merely on power management, while others incorporate more sophisticated light scene control and/or color-changing capabilities.

This situation is currently not very transparent for the specifiers. This makes it difficult to compare vendors and their capabilities. They can have the required functionality already integrated, or they may be required to custom-build functionalities for a specific project, increasing integration cost. For owners/operators, the essential part is that the BACnet protocol provides the functionalities allowing the owner/operator to operate the building as one unified system. This means the lighting system is operated through BACnet and can be connected to other systems so functions can be streamlined and automated. Meanwhile, commissioning is always handled by the controls vendor through its own interface. The vendor provides the methodology on the front end and manages the programming in the back end.

From a building owner/operator’s point of view, the goal is maximizing the integration functionality to enable current and future applications at a reasonable cost. The key element is that they can operate the lighting through BACnet. Determining the integration functionality provided by specific vendors is not always easy, because they are not the same. That is why it is critical for building system specifiers to detail their requirements with more specificity than just requiring the lighting system to have a BACnet interface.

Lighting user interfaces

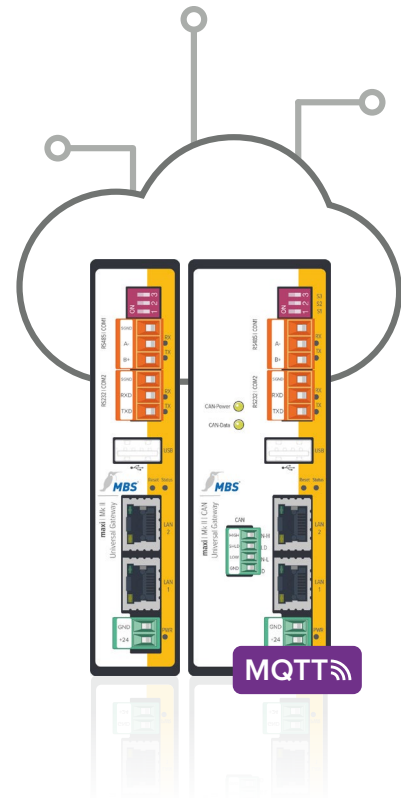
Currently, one of the lighting industry’s big topics of discussion is the quality of user interfaces and how intuitive they are. Traditionally they are developed by engineers and programmers and provide overly technical, non-intuitive interfaces for end users.

One of BACnet's value propositions is the ability to implement a unified control system across multiple subsystems (lighting, HVAC, and so on). However, BACnet only provides interoperability among devices and systems; it does not control the look and layout of user interfaces. Instead, user interfaces are designed and delivered by controls system vendors or system integrators.

BACnet ensures those user interfaces can access data and control points in all the connected equipment, but the interface design defines the use cases it enables and supports. So even if a system uses BACnet, that does not mean user interfaces from different vendors or integrators are equivalent. Moreover, it also suggests that lighting programming still needs to happen on two different levels: the product or device level (BACnet) and the end-user application, e.g., the lighting scenes provided by the lighting designer.

Conclusion

Progressive building owners/operators fully understand the value proposition of smart and connected buildings. To fully realize the benefits, it is essential to put the correct infrastructure in place. The infrastructure should be efficient, vendor agnostic, open to future enhancements, sustainable, and affordable. Lighting is a key element of many building control solutions, so lighting controls must be effectively integrated with other building automation systems. The best way to achieve that is to detail the requirements for substantive BACnet integration capability in lighting control systems early in the design process and for lighting controls vendors to be more transparent about their level of BACnet integration. 🌱



Building automation in the Internet of Things:

MBS gateways become edge devices in BACnet networks

Compatible with cloud services: a win-win for property operators

Gateways from MBS can also be outfitted with a driver for MQTT, which gives them a host of advantages:

- The parameters of the gateway and all bus protocol drivers can be configured using MQTT.
- BACnet scans can be started using MQTT.
- You can send the scan results elsewhere.
- The bus protocol driver or gateway can be reset/restarted using MQTT.
- Payloads are freely programmable in MQTT.

ABOUT THE AUTHORS

Andy McMillan, President & Managing Director BACnet International, and Beatrice Witzgall, Principal I3D, Inc. and Founder LumiFi.

Beatrice Witzgall is the Principal of the interdisciplinary design consultancy I3D, Inc. and Founder of the wireless lighting control platform LumiFi. Her expertise lies in how technology transforms space. Witzgall is an award-winning designer and architect with 20 years of experience, and has authored several articles on lighting controls and the Internet of Things for LEDs Magazine. She is a frequent speaker on smart buildings, lighting control systems, user experience, and systems integration.



Beatrice Witzgall
Principal | I3D, Inc.
beatrice@in3design.com
www.in3design.com

Bringing EnOcean Devices to BACnet

Low power, wireless EnOcean devices provide many features including a self-powered capability through solar power or kinetic energy. These can be useful where running wires for power or communications can be difficult. Because these devices are low power, their wireless messages are limited in size and cannot support the many features provided by BACnet. However, in their limited capacities, they can be useful in BACnet systems. An EnOcean to BACnet gateway can be used to bring EnOcean devices into BACnet systems.

EnOcean devices can be used to bring simple data into the BACnet system, such as temperature, humidity, presence, light levels, etc., where it is difficult to run wires to these sensors. This data can be useful to the BACnet system and allow it to help control zones, save energy, and provide better occupant comfort, such as indicating when zones are occupied, seeing large light levels, and providing more information about zone temperatures and humidity.

The EnOcean devices normally lack the ability to control zones themselves and must rely on BACnet systems to provide this control, as

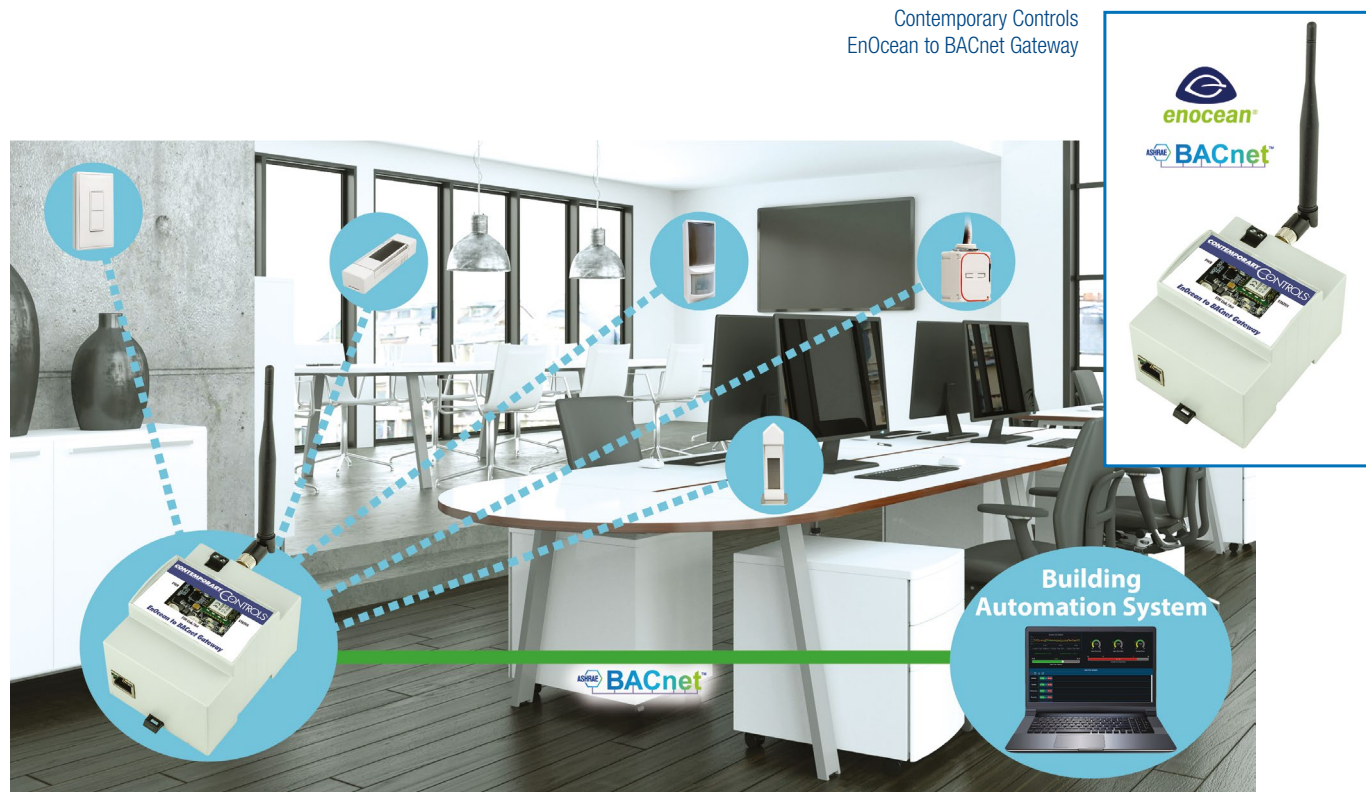
well as alarms, schedules, or trends. EnOcean is popular in lighting systems and individual EnOcean wall switches can be used to control individual LED lights. By adding an EnOcean to BACnet gateway, all lights can also be controlled by the BACnet system schedule. For example, during the day each light can be controlled by wall switches, and in the evening, as controlled by the BACnet schedule, all lights can be turned off at the end of the day to help conserve energy throughout the facility.

EnOcean communications are very different from BACnet communications and may cause some issues for the EnOcean to BACnet gateway. For example, most EnOcean devices transmit their data when it is appropriate, such as after a large temperature change or after a user has pressed a button. This means that the gateway may not have the most up to date data from the EnOcean device. The gateway should provide some information about the age of the data it is making available to BACnet.

Some EnOcean devices, such as wall switches, send a message when the button is pressed and another when the button is released in quick

succession. If the pressed message is missed, the BACnet system will be unaware of the button press. The gateway should communicate these messages to the BACnet system via change of value (COV) so listening devices can learn about these button presses and not miss the event. In order for an EnOcean output device to have its state modified, it must be "linked" to an input device or gateway before it can be controlled. In BACnet you simply address a message to a device to control its behavior.

The Contemporary Controls EnOcean to BACnet gateway allows BACnet devices to receive EnOcean data from EnOcean input devices, such as temperature sensors, and to control EnOcean output devices through the BACnet objects it exposes to the network. Every EnOcean device registered with the gateway is given its own virtual BACnet device. Under this virtual BACnet device are a series of BACnet objects which, for input devices, represent the data produced by the EnOcean device. For output devices, the objects represent the data that must be written so the gateway can transmit a full EnOcean message in order to control the output EnOcean device. Once the BACnet head-end or client has




Contemporary Controls
EnOcean to BACnet Gateway

A building automation system that utilizes an EnOcean to BACnet gateway to allow EnOcean devices to be linked to and controlled by devices in the system's BACnet network. © Contemporary Controls

written all of the objects in the virtual output EnOcean device, it will transmit an EnOcean message to the output EnOcean device. The gateway supports remote commissioning, allowing the gateway to be linked to the output EnOcean device via the gateway's webpages.

The Contemporary Controls gateway provides COV to communicate EnOcean messages and can be useful when working with wall switches where the button press is only provided in a single message.

The gateway's BACnet objects provide additional information for the input EnOcean devices. For example, the received signal strength (RSSI) and the last time a message was received are provided as BACnet objects to help verify the network is working reliably.

The Contemporary Controls EnOcean to BACnet gateway brings together the best of both BACnet and EnOcean technologies for the benefit of the building owner/operator. 

ABOUT THE AUTHOR

Bennet Levine is the Research & Development Manager at Contemporary Controls which designs and manufactures BACnet building controls and networking equipment. Levine's group designs many of the building automation products from Contemporary Controls. He also sits on the advisory board of the HVAC/R program at the College of DuPage near Chicago, Illinois.



Bennet Levine
R & D Manager | Contemporary Controls
blevine@ccontrols.com
www.ccontrols.com

© Contemporary Controls

The Value of Remote BMS Access For Healthcare Organizations



The doctors prefer to have the OR turned down to 62 degrees for operations, and brought back up in between. ODIN empowers them to make rapid adjustments from anywhere with a phone.

© iStockphoto/kupicoo

A facilities manager and an HVAC contractor were frustrated with the inefficient processes needed to operate a hospital's outdated BMS and infrastructure. ODIN lowered the learning curve, streamlined operations, and provided instant access from anywhere in the palm of their hands. This led to improved HVAC performance and confident technicians who could do more with less work.

Meet CCHC & Sagamore

Cape Cod Healthcare (CCHC) has been working together with HVAC contractor Sagamore Plumbing & Heating for years. As the leading provider of healthcare services in the Cape, CCHC has 450 physicians, 5,300 employees, 790 volunteers, and countless patients counting on safe, comfortable, and reliable care facilities every day. Facilities Manager David Thorniley at Cape Cod Hospital and General Foreman Marc Tatlow of Sagamore are the two people who most closely oversee that mission.

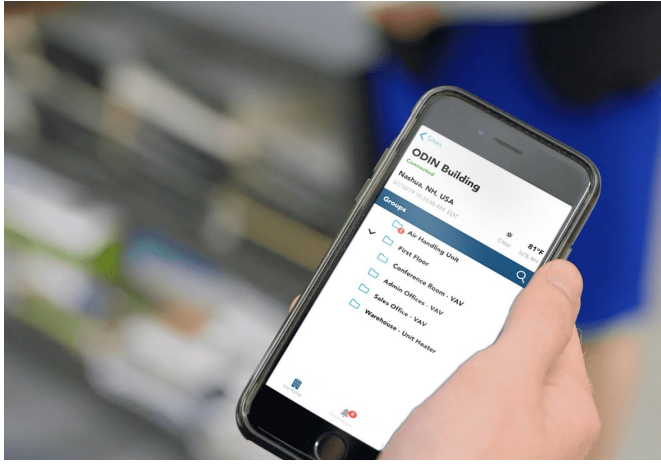
The physical locations of CCHC include two hospitals (in Hyannis and Falmouth), a rehabilitation facility, and an assisted living facility. Sagamore knows CCHC's facilities well, and assists in maintaining them all.

The largest is Cape Cod Hospital in Hyannis. David Thorniley's in-house team handles a lot of the day-to-day building management for Cape Cod Hospital, but Marc Tatlow will get a call from someone on-site when there's a problem they need help to resolve.

ODIN has been a lifesaver for them both.

The Challenge

Cape Cod Hospital has an aging infrastructure and an aging facilities workforce. The in-house techs could keep a small city running, but complex computing systems aren't their strongest suit. Before ODIN, the only way to control the dated units with the BMS was to have one worker up on the roof while another was elsewhere on a computer. Both positions were less than ideal and also inefficient from a manpower perspective.



ODIN allows for simple and fast off-site resolutions with permission-based mobile access for hospital staff, technicians, and contractors.
© ODIN Building Automation System

“Not only is it a time saver and a resource saver but it’s also one of the easier ways to keep an organization in compliance with what they need to do.”
— David Thorniley —

The Results

OFF-SITE RESOLUTIONS

Marc no longer needs to be on-site to resolve most issues. Most often, he’ll get a call from someone in the building to check trends, temperatures, functionality, and make adjustments using ODIN on his phone. It’s quick and he can immediately let CCHC’s folks know that everything is working properly and taken care of.

NO BACK AND FORTH

Even when he does come on location to work on a unit, Marc can handle everything while standing right in front of the unit with his phone or iPad. The low learning curve helped him pick up ODIN’s capabilities quickly, and the tiered controls have made it easy to collaborate with other users (like the in-house techs) with different permissions.

FASTER ACCESS TO DATA

The remote access has made David and Marc’s lives a lot easier. Before, the system of checks and safeties to engage remote access to the BMS from a computer were time consuming and often more trouble than they were worth for a simple piece of information. ODIN has bypassed all that. A few clicks on the mobile app and a user can see or adjust anything they need to.

“I love that the data and information is in real time. We can troubleshoot faster because we can see the issue right away, from anywhere, and make adjustments before we even show up.”
— Marc Tatlow —

WIDESPREAD ADOPTION

At least 11 members of David’s team at Cape Cod Hospital are actively using the ODIN application and loving it. Setting up users, new items, different user groups, and permissions has been easy. The team has appreciated the familiarity of an easy-to-learn mobile app on their phones – a device and interface style that they’re comfortable with from their daily lives. Best of all, they no longer must be in two places at once to handle routine tasks like adjusting temperatures or checking system vitals.

They were also juggling two overlapping building management systems with unique interfaces and unit responsibilities.

Meanwhile, Marc found himself taking calls and needing to physically drive out to the location to check the BMS from a stationary computer on their network. Even once he got there, the process to fix a system was arduous. He’d be standing at the unit and have to walk to wherever the site’s computer was located, turn the unit on, walk back to see if it was working, go back to the computer to troubleshoot, and so on.

What Cape Cod Healthcare needed was a more mobile solution that was intuitive and user-friendly for the in-house techs, and which could also eliminate the back-and-forth relay race between units and computers.

How ODIN Helped

The HVAC system of a major hospital is complex. Variable Air Volume (VAV) boxes supply air to each OR in David’s hospital. They regulate airflow and heating locally for each of the building’s 14 ORs and it’s critical to keep them as close to the set point as possible. Those ORs are served by a much larger air handling unit that pulls in and exhausts fresh air from outside.

The doctors prefer a colder environment for operations, and want the thermostats turned down to 62 degrees for each procedure, but brought back up in between to reduce the load on the cooling systems. David found ODIN to be an extremely unique solution with simplicity and versatility:

- It seamlessly fit in with their existing BMS
- The intuitive interface was easy and fast to pick up
- He had rapid visibility into the system from anywhere (including at home)

- ODIN’s mobile app let his team make adjustments with their phones, a device with which they were familiar and comfortable

Of all these advantages, mobility is what stood out the most to David. While ODIN has a lot of great features, the ability to do things from the palm of his hand while accomplishing other tasks has been life-changing. When an OR, clean room, or anywhere else needs an adjustment, no one needs to find a computer with the BMS on it. They can just check their phones.

Here are a few examples of scenarios in which ODIN has come in especially handy:

- **Setup:** During the initial setup, ODIN’s device discovery mode found every unit in the BMS instantly and accurately.
- **Contractors:** Sagamore, CCHC’s primary HVAC contractor, was able to quickly gain narrow access to specific buildings without needing to download a full program for the BMS controls.
- **Compliance:** When the Joint Commission came on behalf of CMS to examine the hospital for compliance, ODIN made it easy to display data trends and show compliance with Joint Commission regulations.
- **Alarms:** One of the hospital’s air handling units recently went down on a high static discharge. David worked with ODIN to set up a series of alarms that will alert him when something like this goes wrong in the future so that downtime is minimized.
- **Off-Hours Requests:** While at home on the weekend with limited staff in the hospital, David was able to handle a doctor-requested OR temperature adjustment from his phone and save a busy technician from coming down off a roof.
- **Covering Gaps:** When a system went down, Marc at Sagamore was able to manipulate other on-site systems with ODIN to cover the gaps while they worked on a fix.

IMPROVED HVAC PERFORMANCE

The ability to quickly and remotely override damper positions or the BMS schedule has helped Cape Cod Hospital produce more air in the room and shorten the time it takes to clean the air in an OR after any aerosolizing event.

ACH Improvements at Cape Cod Hospital:

- Number of ORs Managed: 14
- Peak Air Changes per Hour (ACH): 30
- Wait per Aerosolizing Procedure: 7 minutes

Personalized features

The only major obstacle David encountered early on was that every unit in their BMS began in a catch-all menu. Some of his team only needed to see the hospital but nothing outside of it. Others needed to see certain outbuildings but nothing in the hospital. In a very short period, the ODIN team adjusted the app's programming to silo each area with simple-to-set permissions and groups.

This was a shining example of why CCHC enjoys their relationship with the ODIN team. They had input, it was taken seriously, and ODIN made adjustments within short order.

Looking Ahead for CCHC & ODIN

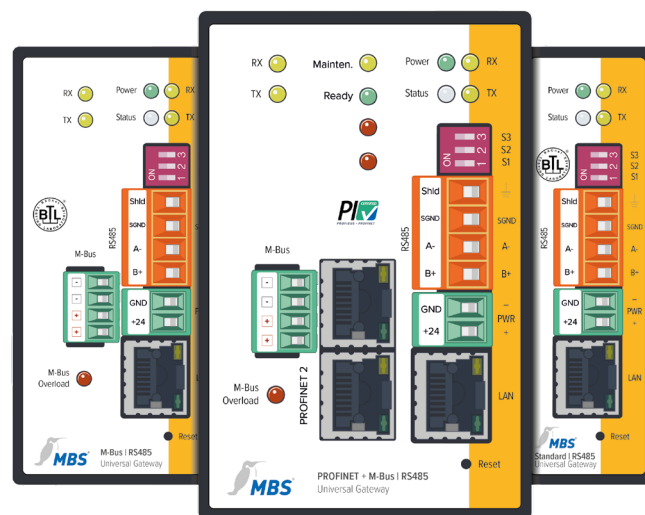
When asked if he would recommend ODIN to other healthcare organizations, David was clear: "Absolutely, without a doubt." The ODIN system solved every pain point. It unified the BMS, provided faster and easier remote access, streamlined manpower, and offered a comfortable experience to an aging workforce. David has been so pleased with the convenient mobile phone functionality that he usually does not use the larger format of his tablet or a computer.

"It's great for hospitals and healthcare and pharma because it's so important to maintain the HVAC systems, and you can't have downtime."
— Marc Tatlow —



ODIN Building Automation System
contactus@connectwithodin.com
www.connectwithodin.com

Building automation in the Internet of Things: MBS gateways become edge devices in BACnet networks



Gateways of the X series by MBS.

© MBS GmbH

Compatible with all cloud services: a win-win for property operators

Gateways from MBS have been outfitted with a bus protocol driver for communication over MQTT, which offers far more than just pure data communication. This transforms the gateways into true edge devices. They provide building automation with access to a cloud service provider's network and are able to exchange data packets between the different network structures.

Following installation, the gateway can sign into a cloud by itself using MQTT. It's possible to configure the gateway and make settings from a cloud using MQTT. In the same way, a BACnet scan can then be initiated automatically or manually to communicate with the existing devices or query which data points with which properties are available in the system. Finally, the scan results are sent from the gateway to the cloud. A configuration can then be created in the cloud and sent back to the gateway using MQTT. The transferred data points are activated there without the need to restart communication in BACnet. This makes life significantly easier for distributed properties, as an on-site technician is no longer required.



MBS GmbH
info@mbs-solutions.de | www.mbs-solutions.de

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, manufacture, installation, commission and maintenance of control and other equipment that use BACnet for communication.

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

New Gold

Panasonic Life Solutions India Pvt. Ltd.

Panasonic Life Solution India Pvt Ltd is one of the largest producers of electrical products and its ancillaries. It is a part of the Panasonic Group Japan. It has more than 3,000 products in its product line catering to different segments like wiring devices, wires and cables, lighting, IoT, home automation, solar, Indoor Air Quality products, wires and cables, etc. It is one of the biggest brands and a leader in many segments of electrical products in India.

3rd Floor, B Wing, i Think Techno Campus,
Pokhran Road No-2, Thane (West),
Thane, Maharashtra
400 607
India

New Gold



LynxSpring

LynxSpring is changing the way devices, systems, and people communicate and collaborate across enterprises and out to the edge and creating a world that is the Intelligence of Things. Embracing open, interoperable IoT-based software and hardware platforms, they design, manufacture and distribute automation and cyber security technology and edge-to-enterprise solutions for Intelligent Buildings, Energy Management, Cyber Protection, Equipment Control and other Specialty applications. Their technologies simplify the automation and information architecture across the enterprise and the edge, significantly lowering cost and enabling users to go further to manage and operate their facilities and equipment smarter, safer, securely, more efficiently, and at peak performance levels.

2900 NE Independence Ave
Lee's Summit, MO 64064
United States
www.lynxspring.com

New Silver



Packet Power

Packet Power offers an easy way to monitor power usage and environmental conditions in critical facilities such as data centers, plants, universities, stores, hospitals and event centers. They work closely with facility managers to understand their needs and then provide secure, pre-configured, ready-to-install systems that save time and money. Companies in 30 countries rely on their wireless IIoT platform to meet their critical monitoring needs.

2716 Summer Street NE
Minneapolis, MN 55413
United States
www.packetpower.com

New Silver

Rogerwell

Rogerwell Control Systems Limited

Rogerwell Control System (Guangzhou) Co., Ltd. was established in 2010. The company's main business is building automation systems, energy management systems, central air conditioning, room monitoring, central air conditioning operation and maintenance, environmental monitoring systems, low-voltage frequency conversion cabinets, and energy-saving control cabinets, R & D and production of complete sets of low-voltage electrical appliances. They provide customers with preliminary design, system debugging, equipment and system maintenance.

Rm8, Ground Floor, Qiaozhong Middle Road, Liwan District
Guangzhou, Guangdong
510163
www.rogerwell.com

New Silver



Somfy

For 50 years, Somfy has been making life easier for millions of people around the world by providing intelligent home and building management solutions. Somfy innovates to automate and connect roller shutters, blinds and curtains, gates, garage doors, locks, heaters, lighting, cameras and alarms by placing the occupant at the heart of its concerns. Day after day, the brand is committed to creating reliable and sustainable solutions that promote the best way of living and well-being for all.

50 avenue du Nouveau Monde
F- 74 300 Cluses
France
www.somfy.com

10 Years

BACnet Testing laboratory

**We will get you ready for
the BACnet market with a
certificate and the BTL logo**

Standard-setting certified products

MBS GmbH has its own testing laboratory manned by ten experienced employees, which has been accredited by DAkkS since 2012. At this facility, the company deploys its extensive experience as an equipment and software manufacturer for building automation and its twenty years of involvement in international committees.

You could even say that MBS has BACnet in its DNA. This means customers benefit from an array of services, which are also available as a complete package. These include development aids for companies getting started, detail-level training on the standard and assistance with product development and implementation.

Rely on automated processes, which guarantee high-quality results and are reproducible at the same time.

Benefit from our experience and get in touch with us!



Announcing New BACnet International Board of Directors

BACnet International is pleased to announce the individuals who will serve on the 2022 BACnet International Board of Directors. The new board is comprised of ten industry executives, including: Andy McMillan, Brad Hill (chair), Paul Bartunek (vice-chair), James Burke, Raj Jayaraman, Erica Johnson, Todd Lash, Raymond Rae, Dennis Swoboda, and Michael R. Wilson. The board of BACnet International will continue to focus on expanding the successful use of the BACnet building automation protocol.



Andy McMillan, BACnet International President & Managing Director

Andy McMillan is president and managing director of BACnet International, where he works with users and suppliers to expand and enhance the BACnet community. Formerly he served as president and general manager of a building automation unit of Philips Lighting. McMillan's background includes broad open systems industry development and marketing experience, as well as strong technical knowledge of distributed automation and information management systems. McMillan has co-founded several companies and has been a featured speaker on open systems and automation at conferences in North America, Europe, Japan and Australia. McMillan co-authored a book on open systems networking and holds a dozen patents in sensors, automation and software. He has MBA and BSEE degrees from the University of Michigan and is a member of ASHRAE, AEE, IEEE.

Brad Hill, Honeywell International (Chair)

Brad Hill is currently working as the Senior Director of Engineering Operations and Transformation for Honeywell Building Technologies where he is involved in progressing the advancement of the new product development organization. Hill has over 30 years' experience in the building controls industry, beginning with Honeywell in 1990 where he was involved in the design and programming of complex integrated control solutions for large projects, and commenced involvement with BACnet in 1996. He has worked in a variety of roles relating to R&D, solutions delivery, program management, product management, and portfolio governance; and has worked in the United States, Europe, and Asia Pacific. Hill holds an MBA, MES (Sustainable Energy), and a Bachelor of Computer Science.

Paul L. Bartunek, III, ABB (Vice-Chair)

Paul L. Bartunek, III is the Vice President of HVAC Sales and Marketing for ABB Drives USA. ABB is an international pioneering technology leader in developing and deploying energy efficient products and systems that are transforming industry in globally sustainable ways. With over 25+ years of experience in the electronic manufacturing industry and a demonstrated history of successful relationship building, Bartunek is a skilled development professional. In his role, Bartunek leads sales and marketing initiatives for the commercial family of variable frequency drive products. He has impact with mergers and acquisitions, new product development, team building, and creating energy efficient solutions for customers.

James Burke, Johnson Controls

James Burke is the Vice President of HVAC Construction Sales, North America and is responsible for the strategic and executive leadership to achieve market share growth and secured results. Burke has been with Johnson Controls for more than 18 years. He started his career in the Controls product engineering business before transitioning to the NA Branch Organization where he took on increasing responsibility within the HVAC & Controls businesses, serving in roles such as Construction Account Executive, Branch General Manager and Area Construction Sales Manager. Most recently, Burke served as Vice President and General Manager, Building Automation Systems, Global Products, where he was responsible for the product roadmap and execution of the product strategy for the Metasys, Verasys, and other BAS Global Brands.

Raj Jayaraman, Burton Medical

Raj Jayaraman currently serves as the President of Burton Medical, a leader in medical lighting applications. Prior to joining Burton Medical, Jayaraman was Vice President of Philips Lighting, where he 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. Jayaraman was deeply involved in the connected lighting strategy and business at Philips Lighting, and also had extensive experience with M&A activities there. He received his PhD from MIT in Microelectronics and holds 9 patents.

Erica Johnson, QA Cafe

Erica Johnson is the Chief Executive Officer at QA Cafe, a dynamic software company providing test and analysis solutions to the broadband, consumer, and enterprise networking communities. In this position she utilizes her industry experience in networking and data communications to oversee the operations of the company as well as deliver on strategies for continued growth. Prior to joining QA Cafe, she was the Director of the University of New Hampshire's InterOperability Laboratory (UNH-IOL) in Durham, NH, for over 10 years. In recognition of her ability to drive technical innovation, Johnson 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, 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.

Todd Lash, Siemens

Todd Lash is the Segment Head for Siemens Building Automation Products in the Americas region and is responsible for growth, profitability, and innovation of the automation products business. Todd has over 32 years of experience in the building automation industry, beginning at Battelle Pacific Northwest Laboratories supporting the development of the ASHRAE 90.1 energy standard technical committees with digital models of building and equipment performance. In 1994, Todd made the transition to Siemens (Landis and Gyr Powers) to start up Siemens building performance and energy services/contracting business. Since then, he has held multiple positions in business segment leadership, product and portfolio management, marketing, service and channel development throughout the Americas and Asia Pacific regions. He is currently responsible for all major Siemens product automation lines in the Americas including APOGEE, Desigo, Talon and Climatix. Todd is currently a Project Haystack board member and holds MBA, MS and BS in Mechanical Engineering.

Raymond Rae, CopperTree Analytics

Raymond Rae is an active principal in CopperTree Analytics. He also co-founded ESC Automation, Delta Connects and Delta Controls, a full line manufacturer of native BACnet Direct Digital Control (DDC) systems for building automation systems which is now a part of the Delta Group under Delta Electronics Inc. Rae has been an active supporter of BACnet since its inception, serving on the board of directors and/or contributing to BMA, BIG-NA, BIG-CA, BIG-CN and BACnet International. He has enjoyed more than 45 years in the HVAC industry and has an extensive background, which includes: energy auditing, computerized building simulations, system commissioning, controls, engineering, product certifications, design and marketing. Rae has been a member of ASHRAE since 1984.

Dennis Swoboda, Blue Ridge Technologies

Dennis Swoboda is the Vice President of Sales and Marketing for Blue Ridge Technologies, a manufacturer of native BACnet lighting control solutions designed for open communication with most building automation systems. In his role, Swoboda oversees global sales and marketing initiatives for the sale and installation of Blue Ridge Technologies lighting control systems. In addition, he works with engineers, end users, owners and controls contractors to help lower life cycle costs, increase energy savings, and reduce carbon emissions by taking control of the largest energy loads in a building. Swoboda has over 20 years of lighting control experience, and gives frequent talks and presentations on energy codes, lighting, and BACnet. He has been a member of BACnet International for over a decade, and has previously served as the BACnet International marketing committee chair.

Michael R. Wilson, Automated Logic

Michael R. Wilson is the Product Marketing and Sales Operations Manager for Automated Logic, an industry-leading building solutions manufacturer that helps deliver healthier, safer, and more productive indoor environments. Wilson works closely with product management, engineering, channel customers, and the sales organization to specify product requirements, pricing, and delivery timescales. He produces comprehensive product launch kits and sales enablement collateral for managed products. Wilson has volunteered at BACnet International for over 14 years, serving as the marketing committee chair, a steering committee member, and on the Board of Directors. 

Third Party Manufacturer Opportunity



Do the Customers Who Brand Your Products Want to Use the BTL Mark?

Your customers recognize the importance of the **BTL Mark** in providing assurance that your product has been tested and complies with the global BACnet standard. Did you know that customers who brand your BTL product as their own can also use the BTL Mark on their product or in their marketing? BACnet International Corporate Membership is not required for this.

All your customer needs to do is apply for BTL Certification and retain their own active [listing](#) for the product, and maintain it annually with the US \$2,000.00 listing fee per product. (Listing discounts are available for Corporate Members.)

In order for them to start the process toward receiving a BTL OEM Certification, and have access to use the BTL Mark, your customer

should visit the following link:
https://BACnetTestingLaboratories.formstack.com/forms/btl_certification_listing_application_v22.bi-lingual

In the application, the third-party company will be asked to provide the following information:

- A copy of the original manufacturer's final test report (PDF and excel file, if applicable) for the product they buy from you
- PICS – *Protocol Implementation Conformance Statement*
- Product image – *For BACnet International Corporate Member Companies ONLY*
- Product description – *For BACnet International Corporate Member Companies ONLY*

The completed application form will be automatically sent to BACnet Testing Laboratories (BTL) for processing.

In addition to the BTL Certification Application, third parties will need to complete and return two other documents, which will be forwarded to them once BTL processes their application:

1. BTL Distributor Listing and Certification Agreement, if not already on file for your company
2. BTL OEM Product Attestation Form

Note that on the BTL OEM Product Attestation Form, signatures by both the company submitting the request for BTL Certification and the company referenced in the final test report (FTR) are required.

If you have any questions about this opportunity, send an email to certifications@bacnet-international.org. Please use "Third Party Manufacturer" in the subject line.



BACnet Testing Laboratories (BTL) Testing Updates



BTL Testing and BTL Test Package Information

A BTL Certification indicates that the BACnet Stack of the product has successfully passed rigorous industry standard testing and demonstrates that the device correctly implements all of the BACnet functionality it contains as governed by ASHRAE standard 135.1. The BTL Listing, the BTL Certificate of Conformance, and the right to use the BTL Mark are the three elements that indicate a product has passed the testing and achieved BTL Certification.

The BTL Working Group defines the BTL Test Plan and governs the testing. The BTL Test Package and BTL Testing Policies are published on the BTL website: bacnetlabs.org/test_documentation.

New BTL Test Package

The BTL Working Group published Test Package 20.0 on January 18, 2022. This test package includes testing up through Protocol Revision 20 of the BACnet standard (ANSI/ASHRAE 135-2020). Test Package 20 also includes testing for BACnet/Secure Connect (addendum bj).

Test Package Transition Period has Ended

The Transition Period for Test Package 20.0 (during which vendors with products claiming Protocol_Revision 18 and less could test with either Test Package 18.1.4 or 20.0) ended April 15, 2022. All products entering BTL Testing now must test with Test Package 20.0.

Products that started testing before publication of Test Package 20.0 will complete their testing with Test Package 18.1.4.

Minimum Protocol Revision

As part of the Certification and Listing program, BACnet International requires that products keep up with the changes made to the standard over time. To fulfill this goal, the Certification and Listing requires that products being tested for BTL Certification claim a Protocol_Revision equal to or greater than a moving minimum. The minimum Protocol_Revision is determined each January 1st and is the highest Protocol_Revision which has been available in a **BTL Test Plan** for at least 4 years.

As of January 1, 2022, the minimum Protocol_Revision is 15. This does not apply to unchanged products applying for BTL Certificate Renewal Testing.

Existing BTL Certifications and BTL Listings are not affected. However, if a product is updated and is submitted for re-testing with changed or new BACnet functionality, then the product must be PR_15 or higher.

All products that were already testing as of January 1 will continue testing at their existing Protocol_Revision.

Improvements to Clarification Request Repository

Members of the BACnet Community may request explanation or identify an error concerning the BTL Test Package or BTL Testing Policies. The question or error is reported in the form of a BTL Clarification Request.

Any BTL Clarification Request Response that affects the applying or results of a test in the BTL Test Package must be applied during BTL Testing. Additionally, Fix Addenda (addenda to fix a problem found in the BTL Test Package) must be applied.

BTL has recently updated the [BTL Documentation page](#) to assist developers and testers in determining which Clarification Request Responses and which Fix Addenda are applicable to their testing. The addenda that must be applied to the BTL Test Package are included in the zip file that is downloaded when selecting the BTL Test Package on the Test Documentation page. The applicable BTL Clarification Request Responses are included in a zip file below the BTL Test Package.

Archived BTL Clarification Request Responses are available at the bottom of the BTL Test Documentation Page. These do not need to be applied to the current BTL Test Package.



BACnet Resources Available to the BACnet Community

This **BACnet Secure Connect (BACnet/SC) Reference Stack** was developed as part of BACnet International's BACnet/SC Interoperability Acceleration Program. It is available to anyone in the BACnet Community. You can download it here: sourceforge.net/projects/bacnet-sc-reference-stack/.

BACnet International conducted three educational webinars, as part of the program. These BACnet/SC Webinars were recorded and uploaded to the BACnet International YouTube channel in September 2021 and can be found here: youtube.com/c/BACnetInternational.

For additional information on BACnet Secure Connect resources, visit the BACnet International website at bacnetinternational.org/secureconnect.




BRITE Testing Resource

BRITE (BACnet Remote Interoperability Test Environment) provides a confidential, supplier-independent environment for remote interoperability testing of BACnet devices. This resource was created to focus on BACnet Secure Connect product interoperability testing. It utilizes BACnet/SC to achieve secure connections over the Internet.

BRITE is built around a collection of cloud-based BACnet/SC hubs along with interoperability support and diagnostic tools. Test sessions typically involve two suppliers and are arranged through BACnet International. Each session is private, only allowing access to the specific suppliers participating in that test session.

BRITE is built around a collection of cloud-based BACnet/SC hubs along with interoperability support and diagnostic tools. Test sessions typically involve two suppliers and are arranged through BACnet International. Each session is private, only allowing access to the specific suppliers participating in that test session.

Suppliers can enroll in the program, register their devices, and schedule and attend live test sessions. BRITE is free for BACnet International corporate members through 2022. 

For more information, and to enroll in BRITE, visit bacnetinternational.org/brite.

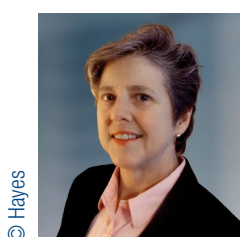
BRITE should not be confused with BTL Testing for BTL Certification.

ABOUT THE AUTHOR

Emily Hayes began work with BACnet International in 2014 as BTL-Coordinator, coordinating BTL Testing at the BTL Lab. In 2017, Emily took over leadership of the BTL Working Group as chair. Additionally, she led the transition from the BTL Listing Program to the BTL Certification Program. She became BTL Manager in January 2019.

Emily maintains professional membership in the Project Management Institute (PMI), North Carolina Chapter of PMI (NCPMI), and Institute of Electrical and Electronics Engineers IEEE.

Emily has a BEE from Auburn University and an MSEE from Duke University. She has maintained a Project Management Professional (PMP) Certification since 2010.



Emily Hayes
BTL Manager, Certifications and Listings
Manager and BTL Working Group Chair
btl-manager@bacnetinternational.org | www.bacnetinternational.org



NEW BTL-LISTED PRODUCTS, August 2021 – February 2022

Manufacturer	Product Name	Model
ABB	Programmable Logic Controller AC500 V3	PM5072-2ETH, PM5630-2ETH, PM5650-2ETH, PM5670-2ETH, PM5675-2ETH
Azbil Corporation	Variable Air Volume Controller with Actuator for BACnet MS/TP Communication	WJ-1201C5021, WJ-1201C5031, WJ-1201C5041, WJ-1201C5051
BELIMO	ECON-ZIP-BASE + ECON-ZIP-COM	1
Condair Group AG	Integrated Controller 2.0 (IC2.0)	DL, RS, EL, ME, GS, HP DRS, RO, SE
Delta Controls	enteliWEB 4.20	eWEB-4.20
Envision Digital International Pte Ltd	EnOS Edge	EnOS Edge Gateway, EnOS Edge Extensive
evon GmbH	evon XAMControl	evon Controller
Kaiterra	Sensedge Mini	SE-200, SE-200P
LOYTEC electronics GmbH	BACnet Building Controller, L-INX Automation Server, L-GATE Universal Gateway, L-ROC Room Controller, L-DALI Lightning Control, L-IP Router	LINX-150, LINX-151, LINX-153, LINX-154, LINX-202, LINX-203, LINX-212, LINX-213, LINX-215, LINX-220, LINX-221 LGATE-902, LGATE-950, LGATE 951, LGATE 952 LROC-100, LROC-101, LROC-102, LROC-400, LROC-401, LROC-402 LDALI-PLC2, LDALI-PLC4, LDALI-ME201U, LDALI-ME204U LIP-ME201C, LIPME202C, LIP-ME204, LIP ME204C
LOYTEC electronics GmbH	BACnet L-IOB Controller and I/O Modules	LIOB-550, LIOB-551, LIOB-552, LIOB-553, LIOB-554 LIOB-580, LIOB-581, LIOB-582, LIOB-583, LIOB-584 LIOB-585, LIOB-586, LIOB-587, LIOB-588, LIOB 589 LIOB-590, LIOB-591, LIOB-592, LIOB-593, LIOB-594, LIOB-595, LIOB-596 LIOB-AIR1, LIOB-AIR2, LIOB-AIR13, LIOB AIR20
LOYTEC electronics GmbH	L-VIS Touch Panel, LPAD-7 Programmable Touch Panel	LVIS-3ME7-G1, LVIS-3ME7-G2, LVIS-3ME12-A1, LVIS-3ME15-A1, LVIS-3ME15-G1, LVIS-3ME15-G2, LVIS-3ME15-G3 LPAD7-31G2, LPAD7-41G2, LPAD7-31G3, LPAD7-41G3
Lynxspring, Inc.	BACxxxx-yyyy-LX	Bxyyy-zzz-LX, B848-LX, BP848-LX, BP848-IO-LX, BW324-LX, BW437-LX, BW437HC-LX, BW437MH-LX, BW437MHC-LX, BZ122-LX, BZ424-LX, BZ424D-LX, BZ424N-LX
MBS GmbH	MBS Universal-Gateway	Single-X, Double-X, Triple-X
Panotec Co., Ltd.	Omni BEMS Controller	OMC14-PAN, OMC20-PAN, OMC40-PAN
Price Industries	Antec Controls	CAVA
SAUTER	EY-modulo 6 Building Controller	EY6AS60F011, EY6AS80F021

Manufacturer	Product Name	Model
Schneider Electric	Smart Field UC Controller	SF-UC-18A-F, SF-UC-24A-F
SOMFY	IB+ TouchBuco BACnet	IB+ 4 Zone TouchBuco BACnet (CE): 1870474, IB+ 8 Zone TouchBuco BACnet (CE): 1870475, IB+ 4 Zone TouchBuco BACnet (UL): 1860308, IB+ 8 Zone TouchBuco BACnet (UL): 1860309
Strato Automation Inc	BACxxxx-yyyy	Byyyy-zzz, B848, BP848, BP848-IO, BW324, BW437, BW437HC, BW437MH, BW437MHC, BZ122, BZ424, BZ424D, BZ424N
TROX Air Conditioning Components (Suzhou) Co. Ltd.	TROXNETCOM AS-Interface Communication Controller	TP070/101/215, TP070N/TP101N/TP215N, TP70EC
Vector Controls GmbH	CS2-BAC-001	TRI2-FU-TH-221.202C-WIB, TRI2-FU-T-221.202C-WIB, TRI2-FA-T(H)-221.202C-WIB, TRI2-FA-T-221.202C-WIB, TRI2-FC-T(H)-221.202C-WIB, TCX2-40863-WEB, TCX2-40863-ETB, TCX2-24273-WEB, TCX2-24273-ETB, TCI2-204.202UC-WEB-L, TCI2-204.202UC-WEB, TCI2-204.202UC-ETB, SOC2-TH-210.102U-WIB-1, SDC2-THCQ-210.102U-WIB-1
WAGO Kontakttechnik GmbH & Co. KG	Touch Panel 600 / Edge-Controller	762-4301/8000-0002, 762-4302/8000-0002, 762-4303/8000-0002, 762-4304/8000-0002, 762-4305/8000-0002, 762-4306/8000-0002, 762-5303/8000-0002, 762-5304/8000-0002, 762-5305/8000-0002, 762-5306/8000-0002, 762-6301/8000-0002, 762-6302/8000-0002, 762-6303/8000-0002, 762-6304/8000-0002 752-8303/8000-0002

light+building

Frankfurt am Main
02.-06.10.2022

BE PART OF OUR BOOTH
BOOK NOW lb@tema.de

Expand your European Network

Calendar of BACnet International Events

2022	Event	Location
April 20 – 22, 2022	PlugFest Interoperability Event	Sandestin, FL
October 4 – 6, 2022	PlugFest Interoperability Event	Durham, NH

Second Quarter BTL Working Group Meetings

2022	Event	Location
April 25, 2022	BTL Working Group Meeting	Sandestin, FL
May 5, 2022	BTL Working Group Meeting	Teleconference
May 19, 2022	BTL Working Group Meeting	Teleconference
June 2, 2022	BTL Working Group Meeting	Teleconference
June 16, 2022	BTL Working Group Meeting	Teleconference
June 23, 2022	BTL Working Group Meeting	Toronto, ON (ASHRAE)
June 30, 2022	BTL Working Group Meeting	Teleconference

Simplify BACnet/BMS Integration



- BACnet routers link IP networks to BACnet MS/TP
- Gateways adapt Modbus and EnOcean devices to BACnet
- Supervisors provide BACnet/IP client functionality and control in one package
- Communicating Thermostats feature BACnet functionality over MS/TP or Wi-Fi
- BACnet/IP controllers do the work

CONTEMPORARY CONTROLS

Building on BACnet

Learn more at www.ccontrols.com/bas

630-963-7070 • info@ccontrols.com

BACnet International Journal 21

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.

Online Distribution

The BACnet International Journal is posted to www.bacnetinternational.org and distributed to all members.

Editor

TEMA Technologie Marketing AG
Hans Symanczik
Responsible according to the press law
Aachener-und-Münchener-Allee 9
52074 Aachen, Germany
Phone: +49-172 4160537
Fax: +49-241 88970-999
URL: www.bacnetjournal.org

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Publisher

BACnet International
2900 Delk Road
Suite 700, PMB 321
Marietta, GA 30067
Phone: 770-971-6003
Fax: 678-229-2777
info@bacnetinternational.org

Advertising

TEMA Technologie Marketing AG
Phone: +49-241-88970-810
Fax: +49-241-88970-999
E-mail: sistemich@tema.de

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