

BACnet Questions & Answers

What is BACnet™?

BACnet stands for **B**uilding **A**utomation **C**ontrol **net**work. A data communication protocol developed by ASHRAE, BACnet is the international standard "ISO 16484-5" for all building services. Its purpose is to standardise communications between building automation devices from different manufacturers, allowing data to be shared and equipment to work together easily.



Why was the BACnet open protocol developed?

ASHRAE realised that automation systems for buildings needed an open protocol standard. Because of the proprietary nature of this industry, previous systems for the most part did not permit interconnection between different manufacturers' equipment.

In 1987, ASHRAE undertook the challenge to develop a standard set of rules (BACnet) governing communication between various devices used in building control systems. As the accepted world-wide ISO standard, BACnet has laid the foundation for cooperation and integration in every aspect of building services.

What do BACnet products look like?

BACnet devices look the same as other standard control devices, but their physical form isn't important. Because BACnet is simply a set of rules for communicating between building automation devices, the microprocessors on these devices are programmed so they will understand the same language and conform to BACnet requirements. The physical nature of the device itself remains unchanged.

Does a BACnet system provide anything special that any previous DDC system would not?

Absolutely. BACnet gives you options to choose the right piece of equipment for the right job, from any manufacturer you want, instead of being stuck with the brand of system that's already in place. An increased set of choices permits finer tuning of the installation for better operation. For new installations and retrofits, BACnet offers a future of easy expansions and modifications. When carefully selected, new devices will interface seamlessly with any BACnet system already installed.

As a wider variety of BACnet devices are developed, heavier system integration of services such as access control, security, fire-life-safety and direct utility company cooperation will become commonplace and easier to implement.

Will BACnet make any difference to packaged plant manufacturers?

Packaged plant manufacturers who incorporate an element of control within their products will increasingly use BACnet. BACnet chillers, BACnet fan coil units, BACnet Inverters, BACnet VRV Systems, and more, will all become the norm.

TOTAL CONTROL

The provision of control will swing away from the BMS control system specialist and towards the packaged plant manufacturer. With BACnet the manufacturers can have ownership of the way their plant is controlled and will no longer rely on an outsider for the performance of their equipment. This will encourage plant manufacturers to develop more and more sophisticated plant that they are able to ensure is controlled in the most effective without any loss of scope for integration to a BACnet BMS.

Is a BACnet system easily expandable?

System expansion was the major guiding force when the BACnet open protocol was developed. As a result, BACnet is very open-ended:

- It allows you a larger range of devices to choose from. By selecting the right equipment, not only may a system be expanded, it becomes even more efficient.
- The building automation industry can easily develop and integrate new products into today's BACnet systems, while providing the means to accommodate tomorrow's needs.

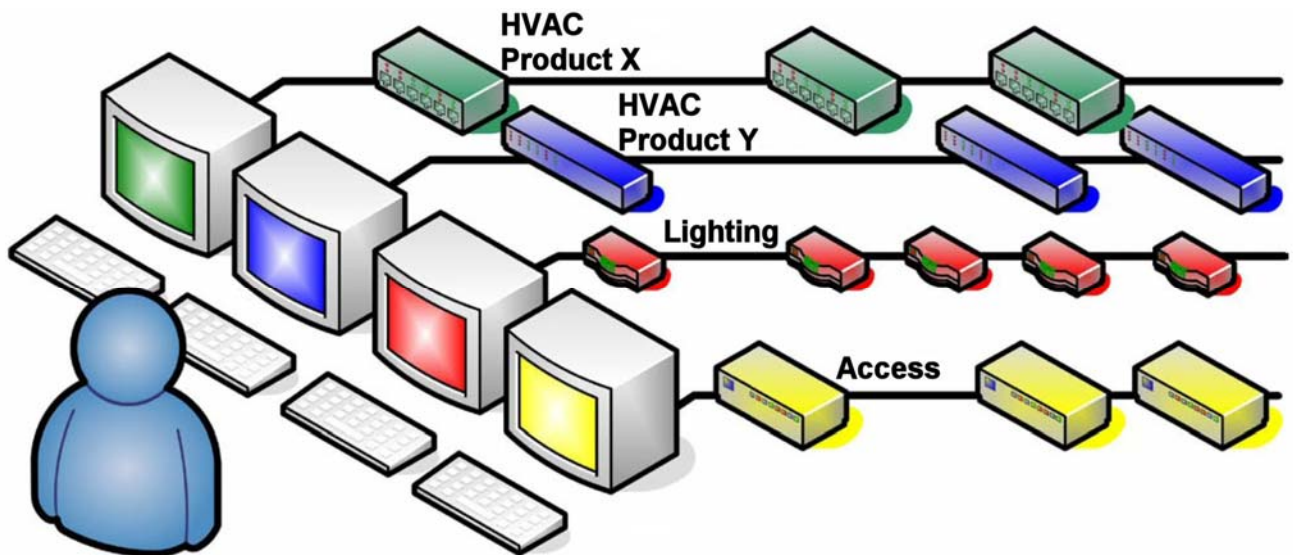


Figure 1 : Non-Integrated Pre-BACnet Systems

What type and size of buildings are best suited for BACnet product installation?

As with standard DDC systems, buildings of all sizes are capable of being controlled by BACnet systems. BACnet control systems may be simple with few devices or very complex. The BACnet standard is open-ended, yet has stringent criteria for device conformance. Thus, it is economically viable for even small facilities to adopt BACnet control systems. As manufacturers develop BACnet products to fill all corners of the industry, more and more devices will appear to satisfy all building requirements and sizes, from the simplest to the most complex.

Does a BACnet system provide better building control performance than conventional DDC systems?

Not necessarily. Because BACnet is basically a system of communication rules for building automation equipment, it will not automatically provide better control. However, what makes the difference in how well any given system performs is how carefully, accurately and to what sophistication data is acquired, manipulated and distributed to the controlling devices. The BACnet standard is designed to be open for future expansions, even to the point of allowing devices to contain exclusive proprietary functions, yet overall, retain their BACnet conformance.

For example, manufacturer A can provide a complete BACnet system fully capable of accepting and integrating devices from manufacturers B, C, D, etc. however, manufacturer A's system may also include a few exclusive enhancements that would only be accessible by other manufacturer A products. This by no means excludes manufacturers' B, C & D's equipment from working on manufacturer A's BACnet system. It simply means that manufacturer A has added some additional features to further promote the company's products. You'll want to carefully study what extra proprietary features a BACnet system includes before making a purchasing decision.

What's the advantage for the building owner if a BACnet system is used?

If an owner becomes unhappy with product availability, service, replacement cost, or any other aspect of a specific vendor's installed BACnet product, chances are there's a suitable replacement readily available from another company. The owner can be comforted by knowing that matched BACnet products will perform in the system regardless of the manufacturer. Additionally, if a BACnet product is no longer manufactured, the owner won't have to replace the entire system or keep repairing old devices.

Here are some of the other benefits owners can look forward to:

- Choice of adding more sophisticated devices to their system as they become available.
- Savings through reduced equipment cost as the whole world competes to produce BACnet products.
- Simple integration of BACnet controllers pre-installed on purchased equipment like boilers, chillers AHUs and terminal units.

Will a property management company see any benefits from having BACnet controls in buildings they manage?

Yes. BACnet will make the industry more competitive, allow more choices and provide capability for future expansion. It enables the property management company not to be dependent on a single vendor. As with standard DDC systems, the BACnet protocol allows for the capability of remote monitoring. For smaller installations, this off-site service results in cost savings because they can monitor many sites from one or more central property management locations. One operator interface can be used for many systems.

An additional benefit will allow you to choose one operator interface for multiple vendors' equipment. Your choice may be based upon graphics capabilities, data logging, tenant billing or any other feature of the BMS.

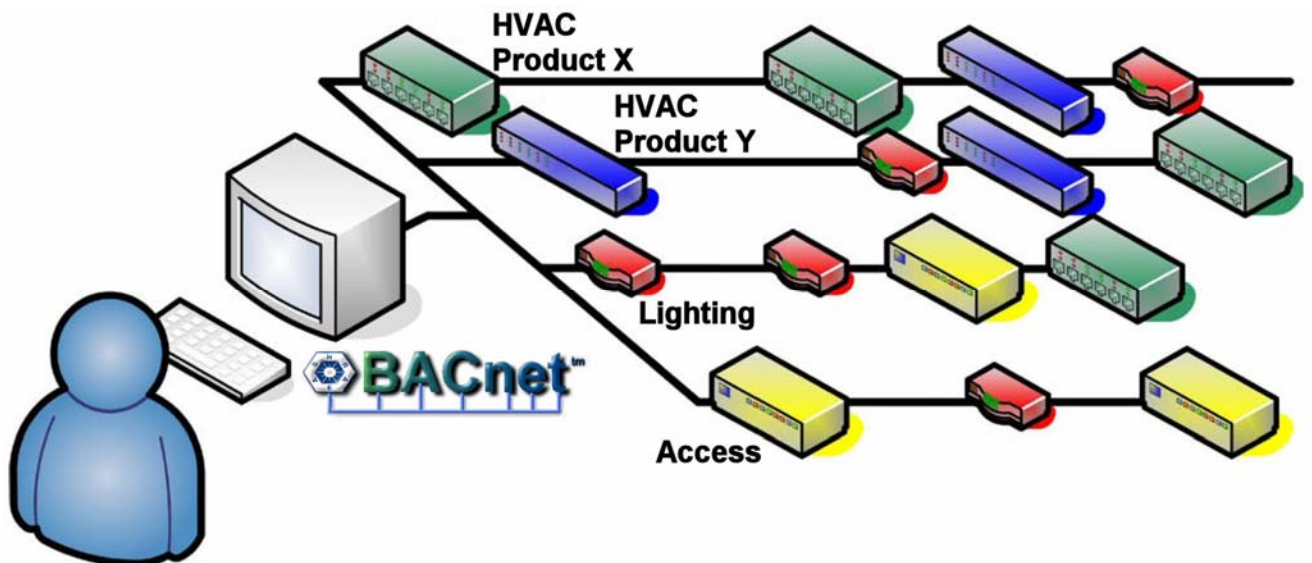


Figure 2 : A Single Integrated System using BACnet

Are there cost benefits to using BACnet verses conventional DDC controls?

Definitely. As smoother integration of various building services comes to pass, facility monitoring and operation costs will fall. Here's what you can expect:

- Higher quantity and quality of building operational data.
- Tighter evaluations and analysis.
- Better financial planning and facility management cost control.

As closer ties with utility providers are forged, more accurate energy provision and consumption data will be available to us all. As an end result, there will be more cost-effective energy management and better cooperation between utility provider and consumer.

Can BACnet products be used for building retrofits?

Yes. One of BACnet's strongest points is open-ended, multiple interfaces. As more manufacturers embrace BACnet, an increasing array of products is emerging on the marketplace to take advantage of this. Some of the current devices allow existing non-BACnet systems to interface with BACnet devices. Once the proper interface has been selected, other BACnet compliant products may be matched, selected and used in conjunction with existing facility components.

Previously, total system replacement was often the only choice if a meaningful upgrade was to be accomplished. With the introduction of the BACnet protocol, that may never happen again.

How are consulting engineers going to be affected by the introduction of the BACnet protocol?

There is a strong need for professionals who can thoughtfully recommend products that can integrate seamlessly into BACnet systems. Engineers need to further educate themselves regarding BACnet, its products and networks. It is important to follow BACnet prerequisite when specifying a BACnet system. It's not enough to say "the system should be BACnet compliant."

As the developer of the BACnet protocol, ASHRAE is the definitive source for BACnet educational materials. As facility environmental controls are further integrated with access/security, transport systems, fire and others, engineers will be called upon for their knowledge of BACnet.

Because the same protocol qualifications must be met by each manufacturer, pricing for BACnet devices will be competitive. This bodes well for any engineer desiring to bring together a complete system, with as many features as possible, for the lowest price.

BACnet systems are by design flexible and expandable. Fewer proprietary systems will be seen as these new ideas are further accepted by the industry.

Because of BACnet's inherent nature of communications, many BACnet devices are being designed with extensive remote access capabilities. Computer dial-up or internet access to a building's control systems from the engineer's office is becoming commonplace. This access to supervising BACnet installations translates into saved time and money for the consultant in charge of monitoring installations.

Will the system operator require retraining in order to efficiently monitor and control a BACnet equipped system?

Probably not. If an operator is familiar with a company's front-end products, there should be little retraining when moving up to a BACnet conforming system.

The BACnet communications part of an installation will be nearly transparent to the system operator. The system will display at the front-end just as it does now for any given manufacturer. Typically, monitoring and control points with corresponding values will be displayed along with descriptors. Also, a given manufacturer's operator terminal may communicate with other manufacturers' control systems. This means once an operator is familiar with one front end, he can continue to use it even if controllers from other manufacturers are used.

However, as various products reach the market for any given BACnet manufacturer, an operator may need more in-depth training since installation and programming requirements may differ. Of course, this would also be true of any new control system.

Does BACnet provide a means for networking more than one building?

Yes, internetworking has been designed into current BACnet products. Campus buildings on a site may be networked with existing or new LAN systems. Buildings not directly connected by LANs may be remotely monitored and controlled by dial-up capabilities of a front-end, modems and phone lines.