Welcome to the First BACnet Middle East Journal

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With the DESIGO™ building automation system, you can significantly reduce energy consumption while at the same time optimize comfort. The system’s high control quality reduces energy consumption and ensures an especially pleasant room climate. Innovative energy saving functions allow you to sustainably preserve resources and therefore to lower costs. And an intelligent, easy-to-operate energy management system identifies saving potentials for all integrated building systems. For you, that means a system that really pays off and that can be used for all applications and expanded as needed – thanks to its high degree of flexibility.

For more information, please visit www.siemens.com/desigo

Answers for infrastructure.
Welcome to the First BACnet Middle East Journal

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Welcome to the First BACnet Middle East Journal

Cover picture
Atlantis The Palm Hotel located on Palm Jumeirah in Dubai
© Siemens Building Technologies

This issue can be downloaded from the service area of www.big-eu.org
Flexible design and highly adaptive: The BACnet multifunctional room operating panel WRF08

Combine various colours of enclosures with attractive design frames. We do not set any limits to your fantasy – just advice your individual and preferred combination of colour and material: glass, plastic, stone or wood.

Your advantages:
» Display functions: room temperature, setpoint adjustment, operation mode, fan steps, presence
» Operating functions: light on/off/dim, blind up/down/adjust
» Illuminated function buttons with coloured status indication
» BACnet MS/TP communication protocol

Standard colour of enclosure:
pure white, anthracite, aluminium

Flexible design:
Select from a variety of modern design frames.

NEW! The WRF08 – now with BACnet!
Dear Reader,

The BACnet Middle East Journal joins the BACnet Europe Journal, BACnet France Journal, BACnet Italy Journal and the BACnet China Journal as a leading source of information about BACnet.

In these pages you will be able learn about the many applications of BACnet in buildings of every description, from office and commercial buildings to hospitals, laboratories and educational facilities.

In addition to heating, ventilation, air conditioning and refrigeration, these applications include, among others, lighting, security and access control, fire and smoke control, and communication between building systems and utility providers. Product reports provide a broad view of devices currently available on the market and their respective fields of application. You will also find tutorial information on how BACnet works along with articles on the latest technical extensions to the protocol that make use of the developments in networking technology such as IPv6, XML and wireless communication.

Back in 2003, a BACnet Interest Group - Middle East (BIG-ME) was formed in Dubai in cooperation with the ASHRAE Emirates Falcon Chapter. Vijay Kumar’s editorial provides more information on the current status of the BIG.

I was privileged to attend the founding and was impressed by the enthusiasm and interest that was expressed. I was also impressed by the incredible building spree taking place in Dubai which, I understand, is continuing today.

The BACnet Middle East Journal is being introduced at a time of astounding growth in the worldwide adoption of BACnet and the simultaneous resurgence of BIG-ME, to which the Journal should contribute.

The rapidly expanding market for energy-efficient and technically sophisticated building automation and control equipment makes the future of BACnet look bright indeed and its deployment across the Middle East will help to ensure the success of the many building projects, both current and future.

Congratulations on the first BACnet Middle East Journal. I’m sure you will find it interesting, informative and useful, and I wish you happy reading!
Dear Reader,

BACnet has been recently generating a lot of interest in Dubai. Thanks to the joint BACnet booth at the Big5 2008 and to the workshop conducted by David Fisher of the BACnet standardizing committee, awareness of the benefits of BACnet is growing again.

In 2003 the BACnet Interest Group Middle East was formed under the auspices of the Emirates Falcon Chapter of ASHRAE located in the UAE. Initial objectives were the promotion of interoperability, setting up a permanent laboratory for testing, demonstration and certification, a quarterly magazine, and the development of free specification tools to help consultants. Founding sponsors were: Automated Logic Corporation, Corodex, Danway, Delta Controls, Globensol, Honeywell, Invensys, Novar, Siemens, Trane and York.

So far everything has gone well. We produced a logo, launched some successful exhibitions and started the communication with planners, consultants and end-users. But despite these widely appreciated technical activities, progress has been slow due to hurdles in registering the group as an association.

Given this situation, a major boost to our efforts was provided by MarDirect (publishers of the BACnet Europe Journal) who suggested a great idea to join forces to release a BACnet Middle East Journal. This publication will accumulate our comprehensive know-how on BACnet applications and installations in this region, and will provide a thorough outlook on the benefits and potential of BACnet.

Dubai can be reached by the booming markets in India, China and North Africa in just a few hours. And our prospering neighbors Abu Dhabi, Qatar, Kuwait and Saudi Arabia are only a stone’s throw from here. Given its strategic location, Dubai is the natural choice for the future activities of BIG-ME.

I cordially invite all the BACnet users, planners, system integrators, facility managers and manufacturers to join BIG-ME when it is re-launched again.

Vijay Kumar
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Atlantis, The Palm – Building Management for an Exotic Gulf Paradise

The DESIGO Building Management System (BMS) installed at the Atlantis project provides easy-to-use control and monitoring for all of the following areas: the Royal Tower Hotel, the conference center, the retail village and the water park.

The information is sent to the management station using building LAN, thus giving the client more flexibility to access all information from anywhere in the network, and also helping with troubleshooting.

The BMS fully controls and monitors the following main elements of the HVAC equipment:
- 160 air handling units
- 2,200 fan coil units
- 400 variable air volume boxes
- 100 supply & exhaust fans
- 120 chilled water & domestic pumps
- 70 building heat exchangers (including heat exchange for fish tanks)

Convenience with comfort
All guest rooms at Atlantis have their climate controlled by fan coil units. Altogether...
there are 1,705 fan coil units in 1,569 guest rooms. The guest room management system (Opera) is interfaced with the DESIGO BMS. Once the front office checks a guest in to a particular room, the information is available to the DESIGO BMS that the room status has been changed to “occupied”. The DESIGO BMS then automatically changes the room setpoint to “comfort temperature” by the time the guest actually arrives in the room. Once the guest checks out, the room setpoint is changed to “economy”. With this the client saves substantial energy when a room is not occupied.

All critical alarms are sent as SMS from the DESIGO BMS to the identified group of hotel operators. This enables the maintenance team to take quick action.

The DESIGO graphics are interlinked in a hierarchical structure, so that users can navigate easily throughout the system, moving from a floor plan or map of the entire building to sector and individual rooms, right down to the controllers, sensors or other devices within the system.

The complete DESIGO BMS can be accessed remotely from any part of the world using a web browser as long as the operator can connect to the Atlantis Network. Additional special wireless units allow the user to connect to the DESIGO BMS wirelessly over the network, thus providing flexibility to the operator to monitor and control the entire system from any part of Atlantis.

Energy consumption for each main distribution board is monitored, and reports are generated to enable the hotel operator to take remedial action to manage power consumption.

**DESIGO management station features**

The fully-integrated off-line and on-line trend features can be used for convenient analysis of both real-time data (on-line) and historical data (off-line) based on BACnet TrendLog objects.

**System access to the management station**

System access to the management station is granted only to authorised users. When a user enters a user-name and password, the system verifies the associated access privileges and grants access only to the relevant plant and programs.

The main purpose of the management station is to ensure a clear overall view and simple operation. This is particularly important in the context of alarm handling, and is one of the strengths of the overall building management system. Alarms are automatically registered, logged and routed to the printer and management stations. Both BACnet intrinsic reporting as well as BACnet algorithmic reporting are supported.

To alert the user quickly to an alarm situation, all alarms of sufficiently high BACnet alarm priority are displayed in pop-up windows. The pop-up alarm messages are even displayed in the foreground when the user is working in another Windows program. The user can acknowledge the alarm in the pop-up window, or jump directly to the associated plant graphic for more detailed information and analysis of the problem.

The log viewer displays events and user activities logged in chronological order in the database, providing a record of all past activities and events. This enables operators to see at a glance what has happened in their absence over the weekend, for example, or during the previous shift. It also provides a clear picture in cases where several users are working on the same HMI management station.

The Palm is a truly breathtaking resort complex that is state-of-the-art in many ways. Guests and visitors are sure to truly enjoy the luxury it affords. Thanks to the DESIGO Building Management System and BACnet, this jewel in the Gulf has it all when it comes to building management: comfort, flexibility, security and energy savings.
Succesful Reference in Switzerland – Hospital Integration with BACnet

La Chaux-de-Fonds is situated around 1,000 metres above sea level, placing it among Europe’s highest cities. It is one of Switzerland’s best known centres for the clock and watch-making industry. The town has a 150 bed hospital which, since 2006, has belonged to the Neuchâtel Hospital Group. The existing main building was constructed in 1966.

Ever greater demands are placed on hospital buildings with regard to their technical facilities. Integral building and room automation allows comprehensive control of the considerable energy consumption in a hospital, while increasing comfort and improving many processes. Luciano Vermot, the Technical Manager of Neuchâtel Hospital Group, had a clear objective for the complete renovation of the building automation. The new platform had to be based on an open standard. In 2008 when he attended the Hilsa Exhibition and learned about the new BACnet solution, from Saia Burgess in conjunction with Saia-Burgess.
Modern buildings need modern technology!

- Saia® product families are universally BACnet® certified
- Highest functionality on the market for demanding tasks
- The Saia® PCD AutomationServer* combines open BACnet communication with Web/IT technology

![Image of Saia® PCD AutomationServer](image)

The Saia® PCD AutomationServer is found in every Saia® PCD Automation Station, which speak all major Web/IT protocols (HTTP, FTP, DHCP, DNS, SNTP, SNMP, as well as SMTP for e-mail service).
ControlMaestro 2008, he was ready to place a corresponding contract with the co-exhibitor DPC SA as the system integration company.

Renovation while hospital business proceeds
The challenge included, among other things, carrying out the entire renovation in stages while business proceeded as usual, with exactly two days changeover time available per switchgear combination. All function descriptions and diagrams had to be re-edited. For each stage, DPC creates the entire switchgear combination in its own workshop. The installations are fully programmed and tested before they are assembled on site. By the end of 2009, renovation should be complete, comprising around 3000 data points and 1500 messages and alarms.

PCD3 type PLCs from Saia-Burgess are used, together with 5.7-inch web panels as local control elements. Saia BACnet Building Controllers are general purpose, open automation stations and can be seamlessly integrated into a BACnet network. The application is produced as usual with the PG5 Controls-Suite programming tool. It includes a BACnet configurator that allows complete freedom to set the parameters of all BACnet objects. As a result, a smart solution can be found for any conceivable task.

Simple BACnet engineering
Alexandre Mottas of DPC SA, an experienced automation practitioner, convincingly sums it up this way: “With the BACnet configurator in the PG5, EDE files are very easy to edit and import. We can therefore transfer all BACnet objects from substations electronically to the ControlMaestro 2008 management system.” Even complex communications tasks can be handled speedily and without errors. A BACnet Building Controller processes up to 1200 BACnet objects. Alongside the usual ones (such as analogue, digital, average, counter and pulse converter), complex objects are also available, e.g. scheduler and calendar, alarm, event and trendlog. As a result, La Chaux-de-Fonds Hospital has powerful, open building management at its disposal.

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© DPC

Saia Building Controller with native BACnet communication in a switchgear combination.
Exemplary Dutch Solution – Rabobank’s New Head Office is Characterised by Transparency

Utrecht’s skyline will be enhanced by the construction of a new administration centre for Rabobank Nederland. The high-rise building has two towers reaching 105 meters tall which stand at a slight angle to each other and are connected by a double-skin facade made entirely of glass. ‘Transparency’ is the word that correctly typifies both the building and the technology within. SAUTER is the supplier of this energy-efficient building management system.

For these new and innovative buildings, sustainability and energy use are important aspects. Because energy is used efficiently, the Energy Performance Coefficient is 35% lower than what is currently prescribed by the government. When choosing from the various suppliers, the sustainability aspect was an undeniable factor. “That SAUTER produces all its products according to the RoHS (Restriction of Hazardous Substances) standard was one of the positive points”, according to Mr. Gerrit de Vries, responsible for the technical completion of the building at Rabobank Nederland.

Transparent technology
‘Transparent’ is the word that typifies both the building and the technology within. The transparency is expressed in the clear, uncomplicated installation set-up. A clever concept combines heat and cooling from the aquifers (cold and heat storage in the ground), heat pumps and additional heat from the district heating network. Furthermore, there is a distinction made between comfort cooling and process cooling. The almost 2,500 individual control devices in the building control the air-conditioning system, the window blinds integrated in the facade, and the lighting.

Future-proof with BACnet/IP
The transparency of the building has also been continued in the way that the building’s installations are networked with each other. In the design, it was decided that all installations would communicate via BACnet/IP. “By applying BACnet/IP, we are assured of an open protocol with a highly potential future perspective”, says Mr. de
Vries. For example, the air-conditioning system, the emergency power aggregates, the transport installations and the over 100 frequency regulators communicate via BACnet/IP and SAUTER novaPro Open, SAUTER’s BACnet building management system.

Integration of the assembly section
The heat pumps, the car-park ventilation system and the chillers are not yet able to communicate via BACnet/IP. They are connected via the Modbus RTU protocol on a SAUTER EY-modulo 5 controller to novaPro Open. This also applies to the energy meters that are connected by means of the M-bus protocol. The complete Security Management System (SMS), consisting of access control, CCTV, burglar alarm, evacuation, fire alarm and sprinkler systems, also communicates via BACnet/IP with the novaPro Open building management system. SAUTER’s new EY-modulo 5 series with BACnet/IP, is being employed for the installations’ building automation. This new modular solution kit fits in well with Rabobank’s flexible concept and offers the possibility of stepwise and individual extension.

BACnet objects
Within BACnet’s various work groups, work is being carried out to define new objects and to create new services. Because the control systems for the HVAC installations at Rabobank can be provided with various new BACnet objects and services, it is guaranteed that the installations will remain up to date. Many recent developments within BACnet, such as structured view object (SV) and others such as web services, have already been incorporated into the new SAUTER EY-modulo 5 series. Both examples clearly indicate that transparency and openness are of paramount importance to both Rabobank and SAUTER.

“The choice of BACnet/IP was a very conscious one made by Rabobank”, says Mr. de Vries. “Where BACnet was originally a communication medium for exchanging data, it is now clearly developing into a communication platform for integral installation technology. We are convinced that BACnet/IP is a future-orientated platform – and that matches the aims of our organisation very well.”
Another innovative design from the world’s BACnet leader.

With Delta Controls’ new touchscreen, operators are able to monitor and manage building systems from any wall or room in the building. It’s easy to customize 3D-animated graphics to depict floor plans, air handlers, boilers and chillers. Our seven-inch diagonal colour screen makes it simple to change occupancy schedules, adjust temperature setpoints and more. It connects to your facility via BACnet® over Ethernet. Conserve energy usage, reduce operations costs and maintain occupants’ comfort—all at a finger’s touch.

For an animated demonstration visit www.deltacontrols.com/hmi
Italian Pioneer Solution – Maximum Performance at Turin Provincial Headquarters

The largest BACnet network in an Italian public administration building to date is located in Turin. A Delta Controls system with native BACnet provides the complete HVAC automation solution at the Turin Provincial Headquarters.

The Turin Provincial headquarters facility is located right in the city centre, close to the central railway and metro stations. It replaces all the offices formerly scattered in different locations. Following a complete two-year renovation process, the building was inaugurated in October 2008. The offices on fourteen floors, the auditorium and the cafeteria, comprising 32,000 sq m, host more than 1500 people working in the provincial government on a daily basis.

In accordance with the owner’s requirements, BACnet was specified from early on as the required automation protocol in the project’s technical specifications. The HVAC supplier and service provider, Idro.Erre, S.p.A., made an exhaustive evaluation and concluded that the BACnet open protocol was indeed the right choice to meet the proposed facility’s optimum performance and operation needs.

Large energy savings
The Delta Controls system won the project tender process. It provides a complete HVAC automation solution with native BACnet at every level along with flexibility and scalability. The system furthermore provided efficiency, cost-effectiveness and energy savings, both during the installation and in subsequent maintenance. The BACnet network enables the entire installation to be supervised via the Internet, and the individual room control of every office in the building further increases energy savings. The Delta Controls solution, together with other building features, such as the façade insulation and an innovative HVAC system design (utilizing district heating and geothermal water), makes it possible to realise the annual energy savings target of three million Euros.

The system is highly structured and implements all the features of a complete BACnet network.
Each piece of equipment is controlled by the ideal BACnet device profile. Heat exchangers, AHUs, fan-coil units, domestic water distribution and all the other equipment are controlled by the respective B-BC, B-ASC and B-AAC devices. All the B-BC devices are connected on an Ethernet backbone running from the second underground floor to the 15th floor. On each floor, a BACnet router is used to connect the Ethernet backbone to the MS/TP network extending across the entire floor area. The MS/TP network connects a minimum of 68 devices, including fan-coil unit controllers and electrical distribution controllers.

**BACnet is first choice**

In accordance with the design engineer’s technical specifications, BACnet was again first choice since it allowed the third party chillers and the variable speed drives to be connected without any additional cost. The entire system is made up of more than 1200 BACnet devices, over 900 of which reside on the MS/TP networks. User workstations are linked via the web into the Delta Controls ORCAWeb software, providing system access to a virtually unlimited number of different users. All users are identified by their personal access credentials and grouped by their access level. Each user has access to the respective data that they require for their given tasks.

A graphical interface has also been implemented in order to provide intuitive and user-friendly system navigation. Users can supervise the entire facility by means of this interface, exporting status and trend log reports in well known formats, such as CSV and XML for example. As a result, users can take maximum advantage of the collected data.

The same web interface is also used by the maintenance and energy service company, allowing them to remotely monitor and fine tune the operational behaviour and energy saving performance of the facility’s HVAC system.

The BACnet system architecture at the Turin Provincial Headquarters.
Focus on Building Applications –
An Introduction to BACnet

Hans Symanczik

The History of BACnet
The development of BACnet began in the United States in 1987, begun by ASHRAE, (the American Society of Heating, Refrigerating & Air-Conditioning Engineers), an American engineers’ society. But even while the protocol was being developed, there was considerable international interest. In June 1995, BACnet was officially accepted and published by ASHRAE and in the same year it was also recognised by ANSI as an American standard. The first products to communicate with one another via BACnet were brought to market in 1996, transforming BACnet from a paper tiger to a real-life protocol with actual applications.

BACnet then quickly advanced to becoming a candidate for a European standard (CEN) and a global standard (ISO) which became a reality in 2004. Some major projects were launched such as the German Parliament’s Technology Association buildings at the Reichstag in Berlin and Berlin’s Charité hospital. They have a whole series of devices from various manufacturers communicating with one another via BACnet, which demonstrates that this protocol is in tune with requirements.

With an ISO standard BACnet is the key global protocol in building automation equipment.

BACnet is not linked to any hardware
What benefits does BACnet offer which enable it to assert itself? Well, one thing is the fact that BACnet is suited to all kinds of building automation systems including HVAC and fire and security systems. It consists of an object-orientated data model that represents the configuration and operation of a wide variety of operating and control devices. It also defines messages and services exchanged between devices on the client-server principle. Varying local (LAN) and wide-area networks (WAN) can be used for transmitting information, and simple two-wire Ethernet and TCP/IP connections are available. This is pioneering new frontiers in state-of-the-art data communications. A major benefit is the fact that BACnet is not linked to any particular hardware so you don’t need either special chips or tailor-made communication media. BACnet is simply a protocol that can be implemented on virtually any hardware basis. That eliminates license fees for using BACnet, meaning only the medium – such as Ethernet 10 MBit/s – dictates the transmission speed.

The structure of BACnet
BACnet is based on the object model where each function of automation equipment (such as inputs, outputs, control circuits and schedules) are shown as a collection of information (i.e. an object). Each object has properties including current values, physical locations, scaling parameters, alarm limits and a description of the object function. These days, the standard provides 28 object types and each BACnet system is an accumulation of objects representing the system. For instance, a field unit with 16 digital inputs could be represented with 16 binary input objects. Systems with a random amount of complexity correspond to a number of these elementary objects of the same type and their properties. This model means that BACnet can be used for virtually any application.

The second essential component of BACnet is defining BACnet services (messages or services) that BACnet systems exchange with one another. The standard defines 35 services in five categories including:

- Alarm and event services,
- File access services,
- Object access services,
- Remote device management services
- Virtual terminal services.

Other objects and services are under discussion for being included in the standard, which also demonstrates that BACnet can be progressively expanded and developed. The latest components of BACnet include applicable network technologies such as speed, throughput, expenditures and degree of dissemination selected from existing standards according to the needs of building automation equipment. Ethernet networking is standard cabling in buildings these days, which means that it is easy to use this cabling for the needs of building automation equipment.

Since 1999, direct BACnet operation has been possible over IP (the Internet protocol), although another fascinating option is the PTP protocol, that enables BACnet via modem connections. That means that BACnet is the only communication standard that also constitutes rules for establishing and clearing communication. But BACnet can also be operated via twisted pair (MS/TP), ARCnet and even the Echelon LonTalk protocol (just using the infrastructure). What’s more, BACnet is constantly evolving in terms of its network technologies and new systems are being included in the BACnet standard whenever they come to the fore.

Right now, the radio standard ZigBee and BACnet transmission based on web services are being included in the standard.

Applying BACnet
BACnet was conceived exclusively for use in buildings. Present and

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future building requirements will be integrated into the BACnet standard. In other words, it is distinctly focused and narrowed down, meaning there are no plans for applying BACnet in process, restaurant or aviation technology.

**BACnet lobby**

Global interest and user groups have sprung up in connection with BACnet with German manufacturers represented in the European BACnet Interest Group that was set up in 1998. These groups bring together users and manufacturers of BACnet products who have the common interest of promoting the marketing, training and certification of BACnet. These different user groups are in communication with one another to make sure that BACnet stays a universal protocol and does not develop national dialects or varieties. The bottom line is the fact that open communication always starts with verbal understanding. Another thing members do is to talk to one another and exchange information over national and continental borders in order to meaningfully transform and adapt the BACnet standard.

A major priority of the BACnet interest groups and BACnet International (formerly the BACnet Manufacturers Association) in the United States is finding a uniform testing and certification mechanism for BACnet products. The BACnet BT/L test laboratory was set up to test BACnet systems according to globally uniform and thus comparable test criteria and test scripts. This generated the first tested systems while uniform certification according to European measures is a prospect for the future.

**How will BACnet progress?**

All of the initial applications were in heating, ventilation and air conditioning equipment, although there are more and more products from companies for alarm, security and lighting equipment. In other words, BACnet is not simply tailor-made to the needs of any special sector, although there is a common focus on building applications.

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**Users Profit from BACnet and IT Synergies**

Joachim Krusch1
Oliver Greune2

Every day we hear it on the radio or see it on the news: we live in a time of ever scarcer resources and finances. We can no longer afford to draw on them indefinitely. Words like ‘green’ and ‘efficient’ have become frequent marketing slogans to call our attention.

BACnet is not in itself a green technology; it is a communications protocol. Equally, IT technology also uses power. So what’s it all about? This is the kind of question people ask about the fundamental meaning of today’s developments. To keep energy, resources and manpower affordable now and in the future, it is time to exploit the greatest potential: synergies! In building and installation technology, open communication is the way to unlock synergies. It is also the way to build bridges over all the barriers put up by manufacturers of proprietary systems.

**BACnet**

With BACnet, end-user customers and planners are now able to select the best solution for their tasks from the wealth of automation systems available, without being tied to a particular manufacturer. For building automation, BACnet has in the figurative sense the same function as the English language to us humans: almost anywhere in the world, it is the only way to surmount barriers and enter into dialogue with one another. It goes without saying that we use this common basis to exchange information. Therefore, everyone benefits from the experience and knowledge of their neighbours. This bears analogy to automation systems, which can only work truly efficiently when they are in a network. It is precisely when every use of resources must be optimized, that exchanging information has the greatest importance.

**Web/IT technology in automation**

Web and IT technology has experienced enormous growth in recent years, not only in the form of increased investment, but also in use. Web browsers have become general knowledge. Mobile telephones, PCs, notebooks, and e-mail have abolished our location dependency. DSL, cable, wireless and broadband provide the necessary speed. Automation stations with integral web/IT technology benefit from this infrastructure to the same extent. Using web pages, it is possible to obtain current data and history data directly from the controller and make it accessible to the user, or archive it in large quantities on flash file systems (SD card).

Data acquired in this way can be further processed using standard IT communications services (CGI, FTP, etc.), from ERP (enterprise resource planning) systems to the control and optimization of operational processes. The controller uses SMS and e-mail to provide information about any selected system state, either regularly or when triggered by an event (alarm). All this is available anywhere in the world, at no extra cost or effort, day and night, around the clock.

**Limits of technology**

Both systems – whether based on BACnet or web/IT technology – have their strengths and weaknesses. For example, IT technology requires a minimum amount of computing capacity that would not be economically feasible to provide in every system. However, it is still present on every computer, PC, web panel, etc., and can be used immediately at no expense. On PCs, BACnet does not yet belong to the standard operating system and therefore always needs separately installed client software, which also requires engineering. For world-wide internet communication, VPN connections (virtual private network) are also necessary. Additional hardware and set-up costs are the consequence.

**Synergy**

An automation station that unites both the BACnet and web IT technology systems can make full use of the strengths of both sides. Obviously, such systems are scalable and can be tailored to user requirements at no added expense. This gives rise to important advantages:

For end-user customers:
- Investment protection through open, freely expandable web/IT functions
- Vendor-independent data communication solution with BACnet
- On-site data management for systems and processes
- Cost reduction through uniform, world-wide web service for an unlimited number of users or work stations
- Access to history data (.csv, .txt, etc.) by means of standard technology, e.g. via FTP or the storing of documents, program backups, etc. on SD flash via file systems
- Reduction of network traffic, no polling necessary (BACnet event or e-mail service)
- Lower expenditure service and administration

For planners:
- Simplified tendering procedure
- Due to standard network structure and network transitions
- No specification of data interfaces is required
- Simplified acceptance procedure

The synergy between BACnet and IT technology can contribute to the deliberate, responsible use of resources throughout the world.

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Since that time, both BACnet and LonWorks protocols have gained wide acceptance among manufacturers of BAS components.

It is worth noting that LonWorks depends upon a special hardware chip called the Neuron Chip that is built into each controller. It handles the protocol for communication to and from the chip, the application program, and input/output information as well as between Neurons in an automation network. The Neuron Chip is not manufactured by Echelon, but by other parties such as Toshiba and originally Motorola.

Some third party companies make Neuron Emulators that use traditional microprocessor cores, such as ARM7, and firmware emulation in order to replicate Neuron functionality.

BACnet, on the other hand, was developed specifically for building automation, where HVAC, fire alarm, lifts, access control, etc. are the relevant constituents. It does not rely on any particular hardware platform to work. This gives product designers a much wider latitude in using the most modern components and taking advantage of each new innovation.

Specifying BAS

Before the 1990s, specifiers were either forced to choose the lowest bidder, or to determine a short list of qualified BAS vendors, only one of whom could be the successful supplier for the project. Because of proprietary communications technologies, the end users were boxed in. They were obliged to deal with the nominated vendor forever, or face a costly total replacement.

Today there are real options for specifiers. At least since 2001, and arguably since 1995, open systems products have been available that are based on real consensus standards. Those consulting engineers that are still thinking in the 90s need to change their approach for choosing a BAS vendor. They should specify an open protocol, preferably the international standard BACnet, so that different vendors can start, from day one in the project, installing workstations, DDCs, sensors, actuators and other components that adopt the same protocol. In this case, no gateways or translators will be required for data exchange and even interoperability among the various BAS suppliers. This means, “lock-in” has come to an end. It also means that the end user can get competitively priced offers from different vendors, whether at the beginning of the project, or in the case of replacement/expansion.

It behooves all consulting engineers to specify the international standard BACnet, not only for BAS, but for chillers, lighting, fire alarm, access control, etc. as well, to ensure the potential for interoperability of the respective systems in the project.

In the spring of 2002, the countries that voted to approve BACnet as an ISO Standard were Australia, Belgium, Canada, China, Denmark, Egypt, Finland, France, Germany, Greece, Italy, Japan, Korea, Norway, Russia, South Africa, Spain, Sweden, the United Kingdom, and the United States. There were no negative votes. From the Arab World, Egypt was participating.

Since several countries and organizations in the world have already adopted BACnet as a national/international standard, standardization bodies in the Arab World, such as the Egyptian Organization for Standardization & Quality (EOS) (http://www.eos.org.eg/Public/en-us/Default), are now invited to consider BACnet protocol or adopt it as a national standard for building management systems (BMS).

On the other hand, the Housing & Building National Research Center (http://www.hbrc.edu.eg/ehbrc/) in Egypt, issued many codes for building activities, such as fire fighting, fire alarm, electrical works, HVAC & R, and control. The code of HVAC & R and control needs to be revised to incorporate the term “protocol” in the part of building management system (BMS).

The Center is also invited to start the process of translation of BACnet. In China the Chinese translation of BACnet was already released in 2000.

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Johnson Controls Metasys® Field Equipment Controllers

The Metasys® FECs by Johnson Controls are a complete range of BACnet compatible field controllers (wired and wireless) and accessories, such as wireless commissioning tools, that are designed with the flexibility to meet a wide range of HVAC control applications. Built on the ASHRAE standard for building automation system control and communication, these controllers support the commitment at Johnson Controls to open communication standards and greater control options.

Metasys® FECs support standard BACnet® objects, thus enabling open system strategy at all levels with such key features as Continuous Tuning Adaptive Control, advanced diagnostics for failure detection, resolution and prevention, and application-specific programs designed to decrease engineering time. Additionally, their installation is designed to be simple, and they are flexible and scalable to meet the requirements of a variety of applications.

**Network Control Engine**

The network control engine (NCE) provides a built in web server with the functionality of supervisory and equipment control in a single IP-connected package. It is available with a local display, built in TCP/IP port and is BTL listed. The most common applications for the device are chiller plant applications and lab applications, where end users need local scheduling and trending functions. It has a real-time clock, standard internet browser based user interface, and a 32 device field bus for BACnet and optional LON/N2 bus.

There are many special control applications where operators desire a local display that can be used to check inputs and outputs for troubleshooting or local operation. For this reason all FEC controllers are available with a local four line by twenty character display that is programmed via the Controller Configuration Tool (CCT). The display can be an integral part of the controller or remotely mounted and connected via the SA bus.

The BACnet compatible field controller Metasys® FEC.

**Metasys® Zigbee Wireless System**

Wireless controllers can co-exist with hardwired Metasys FEC and NCE controllers. Up to 30 wirelessly-enabled FECs/VMA1600s per NAE/NCE trunk can coexist with hardwired devices. They can also coexist with wireless Terminal Equipment Controllers (TEC).

**VAV Applications**

The VMA 1600 series with built-in actuator is the BACnet MS/TP version of the VAV modular assembly. It has many advanced control features. The VMA 1600 is combined with a new line of network sensors that communicate with the controller via the sensor and actuator bus.

The new balancing sensor allows you to easily adjust and set the required parameters for VAV applications that reside on the VMA 1600 series or FEC series controllers. You use the dial and two buttons on the sensor to navigate through simple and intuitive menus to balance the VAV box. The menus automatically adjust based on the type of application residing in the controller.

**Comprehensive product range**

The full line of BACnet controllers, sensors, and accessories from Johnson Controls meet the needs of both conventional and complex system types.

- Network Control Engine
- Field Equipment Controllers
- Terminal Equipment Controllers
- Input/Output Modules for FEC and IOM
- Standard panels
- VAV Modular Assembly
- Network sensors, Controller Configuration Tool
- Wireless commissioning tool

These BACnet compatible products are designed for ease of engineering, installation, commissioning, operation, and maintenance.
PcVue V9.0 – ARC Informatique’s Latest Update to its Management Software Package

PcVue V9.0 combining all building management parameters in a single tool, including heating and air-conditioning, lighting, security, low-voltage electricity supply, fire alarms and other functions. It features innovative building energy optimization modules and a unique capacity to incorporate AutoCAD files directly.

Energy management
PcVue V9.0 has the capacity to optimize the energy efficiency of all types of buildings, from the service sector and industry to airports and hospitals, thus making them more economical and more ecological. The software incorporates the protocols necessary for processing information from energy-consuming subsystems: BACNet® (controller management), LonWorks® (building partitioning), DALI (lighting control). It continuously optimizes the operation of HVAC units, (whether simultaneous or separately), lighting systems and sunshades, plus the allocation of energy sources (solar, etc.) as required.

The Visual Manager module is used for analyzing energy management. It can monitor not only the metering of primary and secondary energy usage but also the operation of equipment that is involved in metering. Visual Manager can also handle any other influencing factors as well as consumption forecasts, so that the user can compare and analyze all the information relating to energy tracking; this is referred to as targeting. Continuous monitoring enables rapid measurement and analysis of any drifts and the results of corrective actions implemented. An easy-to-use web scheduler is also provided as a task planning aid for heating on/off times, lighting of particular areas, etc.

BACnet driver
The new PcVue BACnet driver integrates all necessary discovery services, as well as features for accessing BACnet objects’ properties (Data Sharing). Static as well as dynamic device binding can be used over BACnet IP, Ethernet and MS/TP networks. A native watchdog mechanism is also integrated.
to help detect losses of communication.

**Broad compatibility**
PcVue V9.0 also innovates with the latest upgrades of its Smart Generator tool, which now handles the importing of AutoCAD® files, making it the world’s only tool of this type that is fully AutoCAD®-compatible. To produce the supervisory application, the Smart Generator module enables the use of data from third-party software, such as Wago CoDeSys®, Schneider Electric Unity®, ISaGRAF, Siemens STEP7® or Echelon, and automatically generates the human-machine interfaces (object models and behaviors). In particular, the supervisory mimics and associated objects can be generated automatically from AutoCAD® building drawings and automatic controller information.

PcVue is installed in several thousand buildings and infrastructures in over 20 countries around the world, including Airbus Industries, Paris-Charles de Gaulle Airport, Central China TV (Beijing) and many others.

---

**BACnet Integration Products**

Universal-Gateway //compact
Universal-BACnet-Router
I/O Modules

Software Solutions:

- BACnet OPC-Client
- BACnet OPC-Server
- BACnet Protocol Analyzer
- BACnet Test-Framework

**MBS GmbH**
Roemerstr. 15
D-47809 Krefeld
Germany

Tel: +49 (0) 21 51 / 72 94 - 0
Fax: +49 (0) 21 51 / 72 94 - 50

E-Mail: info@mbs-software.de
Internet: www.mbs-software.de
The German MBS company completes its product line of BACnet infrastructure components. With more than 10 years BACnet experience MBS is a competent partner for all BACnet related issues.

**Gateways**

To integrate non-BACnet plant components to BACnet networks, the series of Universal-Gateways/compact allows connectivity as a universal protocol translator. More than 60 communications protocols are ready to be used to combine BACnet networks with devices which formerly required integration by connecting them over wired contacts or 0-10V I/O, which was often complex and expensive.

The series of Universal-Gateways as cabinet controllers, industry PCs and 19” rack-mount devices are continued as integration products as well.

The gateways support the B-AAC device profile and allow highly reliable processing of up to 250 BACnet objects. Gateways for larger quantities of data points are available as well.

**Router**

To connect BACnet/IP, Ethernet and MS/TP networks, the UBR-01 (Universal BACnet Router) links these media to form a single BACnet internetwork.

Using the integrated web server makes the configuration process like child’s play. As a unique feature a memory space of 200MB may be used to store project documentations directly on the device, accessible using the web server.

**BBMD (BACnet Broadcast Management Device) and FD (Foreign Device) mode is additionally supported. For MS/TP Auto-Slave-Discovery, Manual-Slave-Address-Binding and Slave-Proxy is available.**

**I/O Modules**

To integrate digital or analog input signals without any controls function or to realize digital output switching functions, the series of BACnet I/O modules can be used for integration jobs.

The digital signals are locally displayed with a signal LED per channel; a manual override operation for digital output is integrated as a standard function as well.

**BACnet OPC Client**

This software product for Microsoft Windows connects one or more OPC-Servers and provides the data through a single BACnet server device. Analog, binary and multi-state objects are supported; calendar and schedule objects and intrinsic alarming supporting the notification-class object can be provided as well.

**BACnet OPC Server**

This software product for Microsoft Windows allows connecting BACnet devices to SCADA systems. The software transfers the data from BACnet devices to OPC presenting the objects and properties as OPC server tags.

**BACnet Protocol Analyzer**

This software product for Microsoft Windows allows capturing BACnet data on the network and data-communication analysis plus statistics functions. The same product is available as a (PC based) long-term logging product called BACnet Datalogger.

**BACnet Test Framework**

This software product for Microsoft Windows is intended for manufacturers and to help testing BACnet devices for conformance to BACnet or in quality assurance processes. A powerful BACnet API with more than 370 functions allows it to perform all BACnet communication specified in the BACnet standard.
Technical Symbiosis –
Thermokon Combines BACnet and EnOcean

Why use only one of the numerous network technologies in your building automation? By means of the new BACnet EnOcean gateway SRC65-BACnet, Thermokon combines two established network technologies to enable energy-efficient and environmentally friendly “green buildings”.

During the indoor development at Thermokon great importance was given to compliance with BACnet standards, thus guaranteeing smooth interoperability as well as easy modification of already existing projects. The SRC65-BACnet is designed as a gateway between the wireless low-power technology by EnOcean and BACnet.

The function of the SRC65-BACnet includes a radio receiver for EnOcean radio telegrams and is always operated with other BACnet automation systems or control technologies, such as BACnet operating work stations. All parameterization and configuration properties can be set over the BACnet network. The protocol used is the internationally standardized BACnet MS/TP which enables connections to automation stations or BMS. The baud rate is arbitrarily adjustable via a DIP switch.

**Wireless meets wired**
The RS485 standard works as an interface on the bus side. The maximum number of bus sharing units is preset by the RS485 transceiver and enables 128 devices per bus segment. The addressing of the devices for the identification in the network is also realized with a DIP-switch and is individually assigned to each device.

The gateway works with the BACnet Application Specific Controller (B-ASC) device profile which offers a multiplicity of the BIBBs described above. It is possible to seamlessly connect and use up to 32 EnOcean-based devices. After a successful “learning” procedure of the sensors to the SRC65-BACnet, combined operation with both network technologies is immediately possible.

To operate with networks means an immense step in technical evolution. Different systems work together and problems are solved in a collective way. Now this symbiosis enters building automation as well, and the SRC65-BACnet by Thermokon connects the wireless network technology with the advantages of a bus system – seamless.
BACnet on the Move in Middle East
Since the 2008 Big 5

For the first time BACnet professionals from America, Europe and the Middle East joined for common marketing activities. They were exhibitors at the Big 5 in Dubai in November 2008. The “big five” days of building and construction exhibition are the largest ones in the Middle East.

Four BACnet technology providers and three BACnet user groups presented the open standard at a common booth. Future-proof controllers were interconnected among the providers. “This is real interoperability, not just a sales pitch! Customers can actually see competing BACnet systems interoperate seamlessly at this booth”, stressed Vijay Kumar, Vice President of the BACnet Interest Group Middle East (BIG-ME). “Our building industry needs BACnet open solutions. They go perfectly with the huge multi-vendor projects that are now common throughout the Middle East region. Eventually it is all about giving customers a wider choice: BACnet ensures fair play and a level playing field within the building automation and controls industry.”

BACnet “made real”
At the booth, demonstrations were done by Automated Logic, Delta Controls, DEOS AG and Siemens. With BACnet the different building subsystems can be easily controlled. A/C, ventilation, heating, security and more – the open standard links all devices to one system. The show was supported by the American BACnet International (BI), by the BACnet Interest Group Europe (BIG-EU) and the BIG-ME. It was the starting point for more common BACnet activities in the Middle East.

MarDirect
Dortmund, Germany
info@mardirect.de
BIG-ME Joins Forces in Dubai

At the Big 5 last year, the BACnet Interest Groups from the Middle East, Europe and USA were represented for the first time with a joint stand. Motivated by the great start last year, the BACnet organizations will continue to expand Dubai as a center for BACnet marketing in the future.

Dubai is the preferred center of business for the booming markets in India, China and North Africa as well as in Saudi Arabia, Abu Dhabi and Kuwait. Advantageous relationships ought to be created between BACnet users in these countries and the members of the large BACnet Interest Groups in Europe and the US. To this end, the BIG-EU marketing office, MarDirect will strengthen the BACnet Interest Group Middle East (BIG-ME) with its own website and its own magazine, the BACnet Middle East Journal.

Free Subscription Request
There are 3 ways to receive a free subscription to the BACnet Middle East Journal.

1. Order by simple E-mail to MiddleEast@MarDirect.de
2. Cut out or copy this form, complete it and mail it to:
   MarDirect
   Droste-Hülshof -Str. 1
   44141 Dortmund
   Germany
3. Complete the form and fax it to FAX No +49 231 42 78 67 32

Name

Company/Organization

Address

Postal Code

City/State/Country

E-mail

New Pcvue version – BACnet compliant

www.pcvuesolutions.com
### Calendar of BACnet Events

<table>
<thead>
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<th>Date</th>
<th>Location</th>
<th>Event</th>
<th>Information</th>
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<td>23.-26.11.2009</td>
<td>Dubai, UAE</td>
<td>Big 5</td>
<td>MarDirect, Dortmund, D., <a href="mailto:willems@mardirect.de">willems@mardirect.de</a></td>
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<td>Orlando, USA</td>
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<td>BACnet booth Mostra Convegno</td>
<td>MarDirect, <a href="mailto:italy@mardirect.de">italy@mardirect.de</a>, BIG-EU Office, <a href="mailto:info@big-eu.org">info@big-eu.org</a></td>
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<td>International Training of the BACnet Europe Academy</td>
<td>Britta von Helden, MarDirect, <a href="mailto:vonhelden@mardirect.de">vonhelden@mardirect.de</a></td>
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**An integrated, comprehensive controls solution.**

With Metasys®, you can create a modular, scalable building automation system, featuring a web based user interface. FEC field controllers provide direct closed loop control over mechanical and HVAC equipment. Supervisory controllers (NAE) give you system wide coordination for building operations. Metasys® Field Equipment Controllers (FEC) offer unparalleled advantages such as:

- Uses standard BACnet protocol with Peer to Peer communication.
- Web based user interface.
- Local User Interface Display options.
- Wireless commissioning tools.
- BACnet Testing Laboratories (BTL) listed.
- Advanced Diagnostics for failure detection.
Whenever open building automation is under discussion, talk turns to **BACnet**. And if it has to be modular, extensible and energy efficient as well, talk turns to **SAUTER**.

**SAUTER EY-modulo 5: with BACnet/IP**

Energy efficient, open and economical – module for module for module. Modular, native BACnet stations of the SAUTER EY-modulo 5 series are the intelligent solutions in every respect for any needs relating to building management and room automation. With its optimal function modules, integrated web connection and comfortable intelligent unitary control, SAUTER sets new standards. Because it is freely programmable, SAUTER EY-modulo 5 provides perfect system integration (e.g. M-Bus, Modbus) and smooth operation. Find out more about its versatility:

**SAUTER Middle East**
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