

the **EXTENSION**

A Technical Supplement to Control Network

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Contemporary Controls Assists in the BACnet® Interoperability Demo During AHR Expo 2009

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Sixteen companies participated in the BACnet international booth.

During AHR Expo 2009 held in Chicago, Illinois, Contemporary Controls assisted with a BACnet interoperability demonstration at the BACnet International booth by providing a managed Ethernet switch and BACnet routers towards this effort. The sixteen BACnet International members, who each manned a kiosk, were invited to participate by connecting their BACnet products to an Ethernet network that had our Blue Line EISB 24-port managed Ethernet switch at the center. For those BACnet products that did not have a BACNET/IP device but had a BACnet MS/TP device, we offered the use of our BAS Router to make the connection. American Auto-Matrix, ABB Drives and Alerton took us up on the offer. The other participants either had a direct BACnet/IP connection or were using a different router. For our portion of the demonstration, we used one of our BAS Remotes which had a direct BACnet/IP connection.

Michael Wilson of Lumisys organized the interoperability demonstration. On Sunday before the show, Bennet Levine of Contemporary Controls assisted by configuring the routers and providing the managed Ethernet switch. To ensure no addressing conflicts, certain rules were established. Each BACnet device, regardless of type, had to have a unique device ID on a single BACnet internetwork.

Each MS/TP network that is attached to a router is assigned a unique network number. Even with unique network numbers, BACnet devices (regardless of network location) must still have unique device IDs.

It was decided to have a six-digit device ID numbering scheme with the 3-digit vendor's number (which is unique) occupying the left-most digits of the six-digit number. The remaining three digits, beginning with 1, would be assigned to individual BACnet devices from this vendor. For example, Contemporary Controls had three attached devices with assignments 245001, 245002, and 245003. The "245" is the Contemporary Controls vendor ID which we were granted because we produce a BACnet compliant product. Each BACnet router from Contemporary Controls was required to have a device ID as well.

A similar scheme was devised for IP addressing, but the scheme had potential flaws. The private network address of 172.16.0.0/16 was to be used by all participants. This is a Class B address with 16-bits (two octets) devoted to host addressing. The first octet was to be the BACnet vendor ID, but newer vendors have IDs above this number. The second octet is devoted to unique devices on the IP network from this vendor.



Software Engineer Harpartap Parmar in Contemporary Controls' kiosk.

These schemes are used for convenience at interoperability demos and at Plugfests, but they do not have to be followed on actual job sites. However, some addressing scheme is needed to avoid conflicts. Once the addresses are known they can be loaded into each device, including any laptop computers on the network. Notice that there is no DHCP

server on the network to serve up IP addresses. All loading of IP addresses is done manually.

Once all devices were attached to the Ethernet network and the routers configured, Bennet ran a PolarSoft utility program called BACnet Quick Test from his laptop computer.



Joe Marian of American Auto-Matrix

Demonstrating one of the great features of BACnet, Bennet was able to “discover” all the devices on the BACnet network whether they were directly connected to the IP network or accessible to IP through a BACnet router. Not only could he learn the BACnet device IDs of all devices, he could determine all the BACnet objects supported in each device ID. A BACnet object has properties and he could read all the properties of

the object. Depending on the type of object, he could even modify a property from his laptop by writing to it.

Bennet could observe all this information from any location on the IP network — demonstrating the benefits of attaching to an IP network.



Michael Olson of ABB Drives

Once you are on an IP network you have the flexibility to browse for other information using the laptop’s web browser. Some of the BACnet devices served up web pages like Contemporary Controls’ BAS Remote and BAS Router. At this point Bennet was using the laptop’s web browser and not using PolarSoft’s BACnet Quick Test. If Bennet knew the IP addresses

of the web servers, he could load in a particular address and view the web page on his browser.

If he was not sure of the exact address, he could send out a Broadcast Ping that would return the IP addresses on this sub-net. This would not work with all devices.

One web server of interest was our EISB managed Ethernet switch. By examining the switch’s numerous web pages, Bennet learned the port status of all 24 ports. Information such as port-up, port-down, data rate, frames received and frames sent, and any fault conditions were displayed on the web browser. This information was also available via an SNMP client on the network.

The power of BACnet and the power of being attached to an IP network were evident in this interoperability demonstration. Contemporary Controls was happy to participate.



(left to right) Contemporary Controls’ EISB24M switch, the BAS Router and the BAS Remote I/O Master were used in the BACnet interoperability demonstration.

List of Participating Companies

- ABB
- KMC Controls
- Siemens Building Technologies
- TAC
- Contemporary Controls
- Carel USA
- Alerton
- Trend
- Kele
- Delta Controls
- Lumisys
- American Auto-Matrix
- Reliable Controls
- Honeywell International
- Zigbee Alliance
- Automated Logic Corporation



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