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BACnet Developers Q & A

By Steve Karg, Member ASHRAE

Over the years while being involved in the BACnet committee and developing BACnet products, I have fielded questions about BACnet product development. Some of those questions are answered by the official BACnet Testing Laboratories "Implementation Guidelines". However, some questions are beyond the general scope of that document.

Question: When I run my bacnet server device, it will broadcast an I-Am on start-up. In the Device object, the "I-Am" bit is set in the protocol-services-supported property. When I run a BTL pre-testing tool with my device, it flags an error that suggested "Only A-Devices (Client Devices) should EXECUTE I-Am. (Read Addendum K.5.1-K.5.4 carefully)" So I read K.5.1 and K.5.2 DM-DDB-B and the way I understand it, is that a server should "execute" Who-Is and then "initiate" I-Am and my device should not execute I-Am. What is correct?

Answer: BACnet protocol-services-supported property bit value "Execute" is equivalent to "consume" or "handle". In your BACnet code, you would determine which BACnet service are being decoded and "handled" to know which bits to set in the protocol-services-supported property. Your device, as configured, uses Who-Is and I-Am to bind addresses for COV & Alarm & Event notifications. Your device acts as a client device (also known as an "A" device) to bind addresses and "handles" the I-Am to determine the address. If your product doesn't implement or use those notification features, and therefore, doesn't "handle" the I-Am, you should not set the I-Am bit in the protocol-services-supported property.

BACnet devices can be a mix of client (A) and server (B), or server-only (B). A client- only device is not permitted since all BACnet devices must support ReadProperty as a server (B).

Question: I'm writing an open source BACnet software library implementation and was wondering what number I should put in the default Vendor-ID field. I quickly checked the official vendors list, but don't see any "not defined" or something like it. I'm reticent to ask for my own Vendor-ID because the software library will probably end up being used by a bunch of different people anyway. Is there a throwaway or undefined number for this kind of situation?

Answer: Although the BACnet committee reserved Vendor IDs 555, 666, 777, 888, and 999 to use in example documentation, open source software projects and libraries should use an official free BACnet vendor ID. A Vendor ID can be obtained by anyone, even non-companies and open source software libraries and applications. The official procedure is here:

<http://www.bacnet.org/DL-Docs/Procedures-Vendor-ID-rev3-15-2012.pdf>

Question: Could someone tell me the best way to organize firmware updating through BACnet communication? AtomicWriteFile, PrivateTransfer, or something else?

Answer: I have used AtomicWriteFile service in combination with ReinitializeDevice to perform firmware updating in products.

In one device (single board computer with RTOS and file system), a new firmware file is sent with AtomicWriteFile service and confirmed with AtomicReadFile service. Then the device was instructed to use the file as the new firmware using ReinitializeDevice service with a special password.

In another device (microcontroller), the device was instructed to go into bootloader mode using ReinitializeDevice service with a special password. Then the firmware was sent using AtomicWriteFile service and confirmed with AtomicReadFile service or by reading an object property value that represented the file checksum. Then the bootloader was instructed to use the new firmware using ReinitializeDevice service with a special password.

Note that sometimes writing or erasing flash memory takes longer than BACnet MS/TP timing allows for responses or token passing (if your device was using the MS/TP datalink layer), so buffering may be needed.

Of course, PrivateTransfer could be used for updating firmware, but then only your tools could be used to update your device firmware in the field.

About the Author

Steve Karg is a Senior Engineer at WattStopper, in Birmingham, Alabama. He has been an active member of ASHRAE SSPC 135 (BACnet) since 2001, and convenes their Lighting Applications working group. He wrote an open source BACnet Protocol Stack hosted on SourceForge.net, and continues to help maintain the BACnet decoder in Wireshark.