BACnet Quick Start

Description: This application note guides you how to setup, browse and use BACnet data.

Introduction

BACnet is "a data communication protocol for **B**uilding **A**utomation and **C**ontrol **net**works." A data communication protocol is a set of rules governing the exchange of data over a computer network. The rules take the form of a written specification that spells out what is required to conform to the protocol. What makes BACnet special is that the rules relate specifically to the needs of building automation and control equipment, i.e., they cover things like how to ask for the value of a temperature, define a fan operating schedule, or send a pump status alarm.

Since there can be a huge number of BACnet devices running on the network and periodically browsing all of them would have a negative impact on the system, we implemented a feature called BACnet cache to decrease the network load. You need to add BACnet devices to the cache before using them but the whole network gets scanned only once, when you are adding BACnet devices into the cache.

BACnet Client-Server Architecture

BACnet is based on a "client-server" model; BACnet messages are called "service requests." A client machine sends a service request to a server machine that then performs the service and reports the result to the client. BACnet currently defines 35 message types that are divided into 5 groups or classes. For example, one class contains messages for accessing and manipulating the properties of the objects described above. A common one is the "ReadProperty" service request. This message causes the server machine to locate the requested property of the requested object and send its value back to the client. Other classes of services deal with alarms and events; file uploading and downloading; managing the operation of remote devices; and virtual terminal functions.

Please notice that ICONICS is compliant with ANSI ASHRAE Standard 135-2004.

BACnet specification (135-2004) supports the following objects:

- Binary Input
- Binary Output
- Binary Value
- Analog Input
- Calendar
- Notification Class
- Command
- LifeSafetyPoint
- Analog Output
- Analog Value
- Averaging
- Life Safety Zone
- Multi-state Input
- Multi-state Output
- Multi-state value
- Loop
- File
- Program
- Schedule
- Trend Log
- Group
- Event Enrollment
- Device

NOTE: Types which are part of the specification above are supported by ICONICS as well as other BACnet standards. ICONICS supports the read/write property for all BACnet objects, but only the objects defined in ANSI ASHRAE Standard 135-2004 would be correctly shown in ICONICS clients (e.g. GraphWorX64).

Adding BACnet devices into cache and database in Workbench-SL

Because BACnet application pool is generated in runtime and it can be browsed only remotely (it is expected that you have your BACnet device placed on the network), it is not possible to browse for local ICONICS BACnet Simulation data. Therefore, you need another machine running ICONICS Simulator or real BACnet device, which will provide the application pool for you to browse.

To be able to browse BACnet devices in Genesis64 you need to add them into the cache first and optionally into the BACnet database.

1. Open Workbench-SL and select BACnet provider
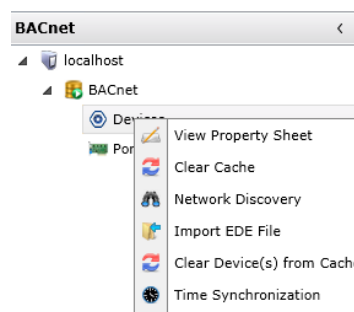2. Right click on the Devices and select Network Discovery

Figure 1 – Network discovery in Workbench-SL

3. Click Scan button and system will start looking for all available devices on the network and list them
4. Clicking the "Plus" button you can add them into the cache. Or you can select them and use "Add Selected Device(s) to cache" button for the same

5. After closing this window you will be able to see all your new added BACnet devices directly under Devices folder
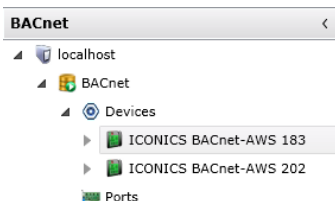

Figure 2 – New added BACnet devices via Network discovery

NOTE: If you select a specific BACnet device and check the Database checkbox you will place this device directly into BACnet database – in most cases you don't need to use this feature, because all the devices are stored in the cache, but in case you want to rewrite some properties of a specific BACnet device or you cannot browse a BACnet device directly you need to add them into the database.
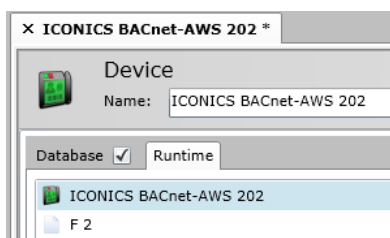

Figure 3 – Database checkbox in Workbench-SL

Connecting to BACnet tags in GraphWorX64

1. Start GraphWorX64
2. Create a new process point on your GraphWorX64 display by selecting Dynamics from the menu bar and select Process Point. Left click anywhere on the display to insert the process point.
3. When Unified Data Browser is opened you need to click on BACnet folder, browse through the object hierarchy and select an appropriate input.
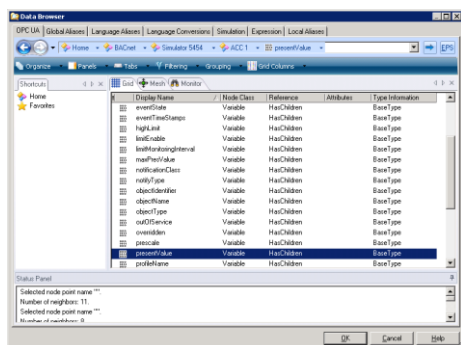

Figure 4 - Browsing BACnet Device in GraphWorX64

4. Click on OK to confirm the selection.
5. Switch to Runtime and you should see the data tag value.

Manually adding devices in Workbench-SL

In some cases when you are not able to browse directly the BACnet devices in Workbench-SL you can manually add in Workbench-SL and browse them in GraphWorX64.

1. In Workbench-SL BACnet provider, double-click on the "Devices" item.
2. Enter the settings for: APDU Timeout, APDU Segment Timeout, and APDU Retries in the 'Communication' tab and Default Polling Rate and Default Priority in the 'General tab'
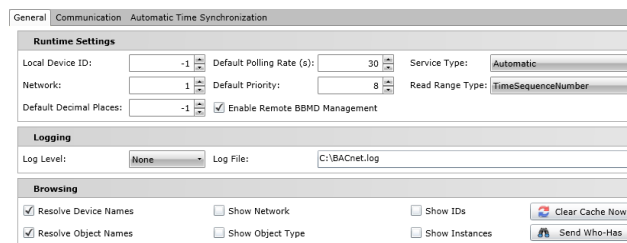

Figure 5 - BACnet Settings for Devices, General Tab

3. Now, you need to add a **New Device**. Right-click on Devices and choose "Add Device to Database" or click the ➕ button from the toolbar.
4. Under the device you need to add a new object and under the new object you may add all relevant properties.

NOTE: Please notice that default BACnet communication is based on IP protocol, where default port (47808) can be changed (under the Ports) if you really need it, but in most of the cases you can run with the default settings.