

Application note

Wiser for KNX integration using BACnet

Wiser for KNX integration into StruxureWare Building Operation

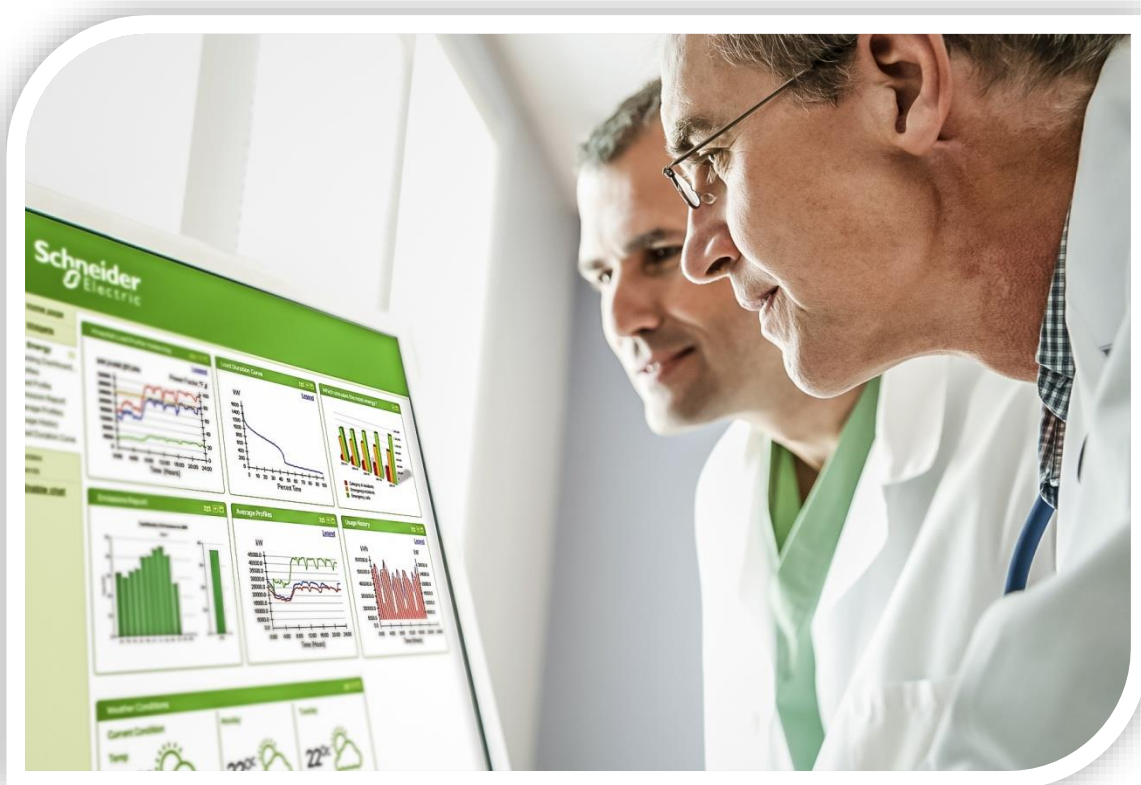


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1 Introduction

Integrating Wiser for KNX with StruxureWare Building Operation Enterprise allows you to:

- Connect room and building controls
- Increase your choice of room control devices
- Use services like visualization and data monitoring
- Lower cost compared to standard gateways
- Install new Wiser for KNX devices in existing spaces

Competencies

Before you start working with Wiser for KNX and BACnet you should read:

- Wiser for KNX User guide_EN.pdf (<http://www.schneider-electric.com>).
- StruxureWare Building Operation Workstation (SBO) (<http://buildings.schneider-electric.com>).

Note: You need to register on the site <http://buildings.schneider-electric.com>

You should be a trained electrician with experience installing building automation devices (see Safety Information)

System prerequisites

Before you begin, ensure you have the proper software. You can download the latest versions here:

Software	Version	Download
Wiser for KNX	2.1 and newer	http://www.schneider-electric.com
Building Operation WorkStation	1.4 and newer	http://buildings.schneider-electric.com
Enterprise Server	Latest version	http://buildings.schneider-electric.com

Table 1: software versions of used software

1.1 BACnet

BACnet is a data communication protocol for building automation and control field networks. This protocol is supported by BACnet International (www.bacnetinternational.org) and

- *American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)*
- *American National Standards Institute (ANSI)*
- *International Organization for Standardization protocol (ISO)*

BACnet was designed to allow communication of building automation and control systems for application such as heating, ventilation, air - conditioning control, lighting control, access control, fire detection systems and their associated equipment. BACnet protocol provides exchange information for building automation devices, regardless of the particular building service they perform.

The Enterprise Server manages data from BACnet protocol. This includes:

- centralized logging
- display
- application version of a StruxureWare Building
- data management.

The Enterprise Server also serves as a single point of administration through your WorkStation or your WebStation for StruxureWare Building Operation.

When you configure Wiser for KNX with the BACnet protocol

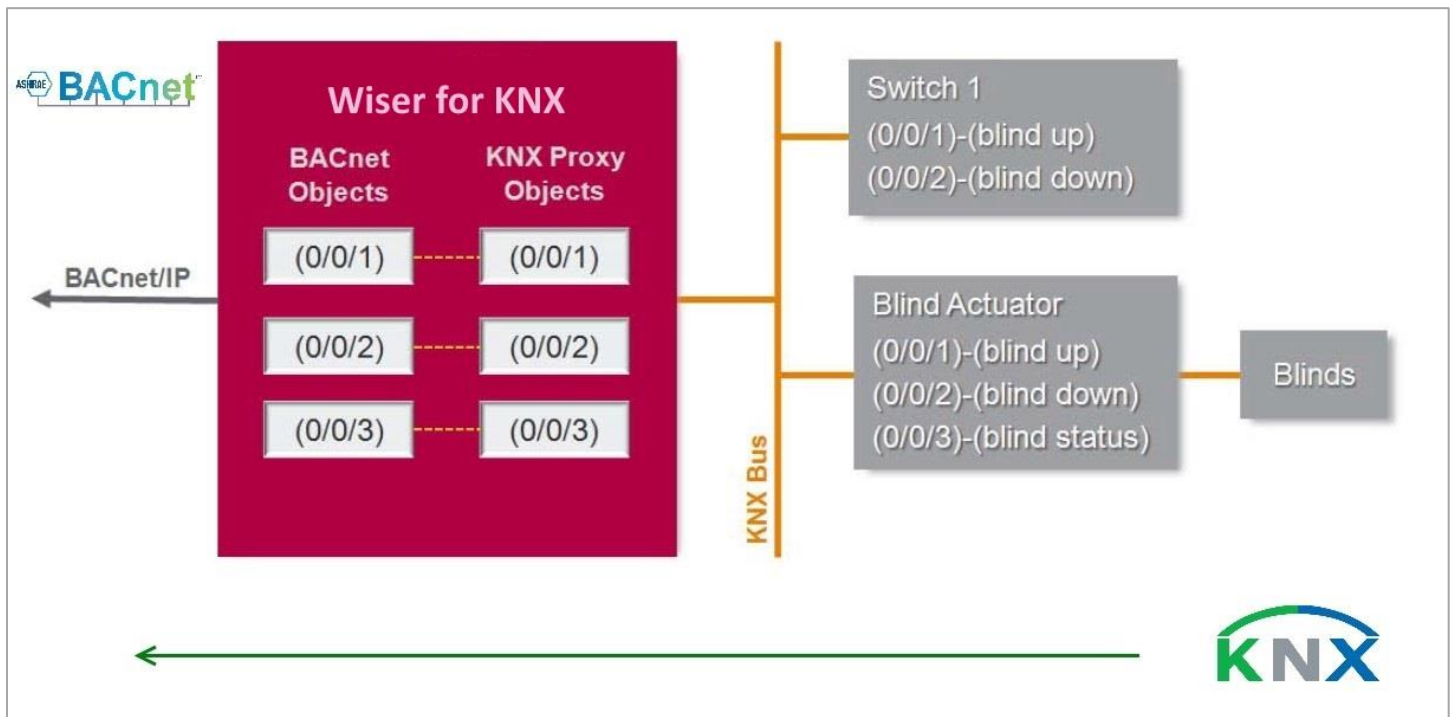
- The Wiser for KNX device acts as a BACnet server.
- StruxureWare Building Operation Enterprise Server acts as the client.

This configuration allows you to combine the benefits of both systems (KNX and BACnet), on both the room and building automation levels.

1.2 KNX objects and BACnet

Wiser for KNX is based on using KNX objects which can be optionally exposed to BACnet as a BACnet objects via BACnet / IP network.

Wiser for KNX controller creates proxy objects which interacts with BACnet and other supported networks as Modbus. Proxy objects behave the same as KNX group addresses.



Picture 1: Exposing objects to BACnet

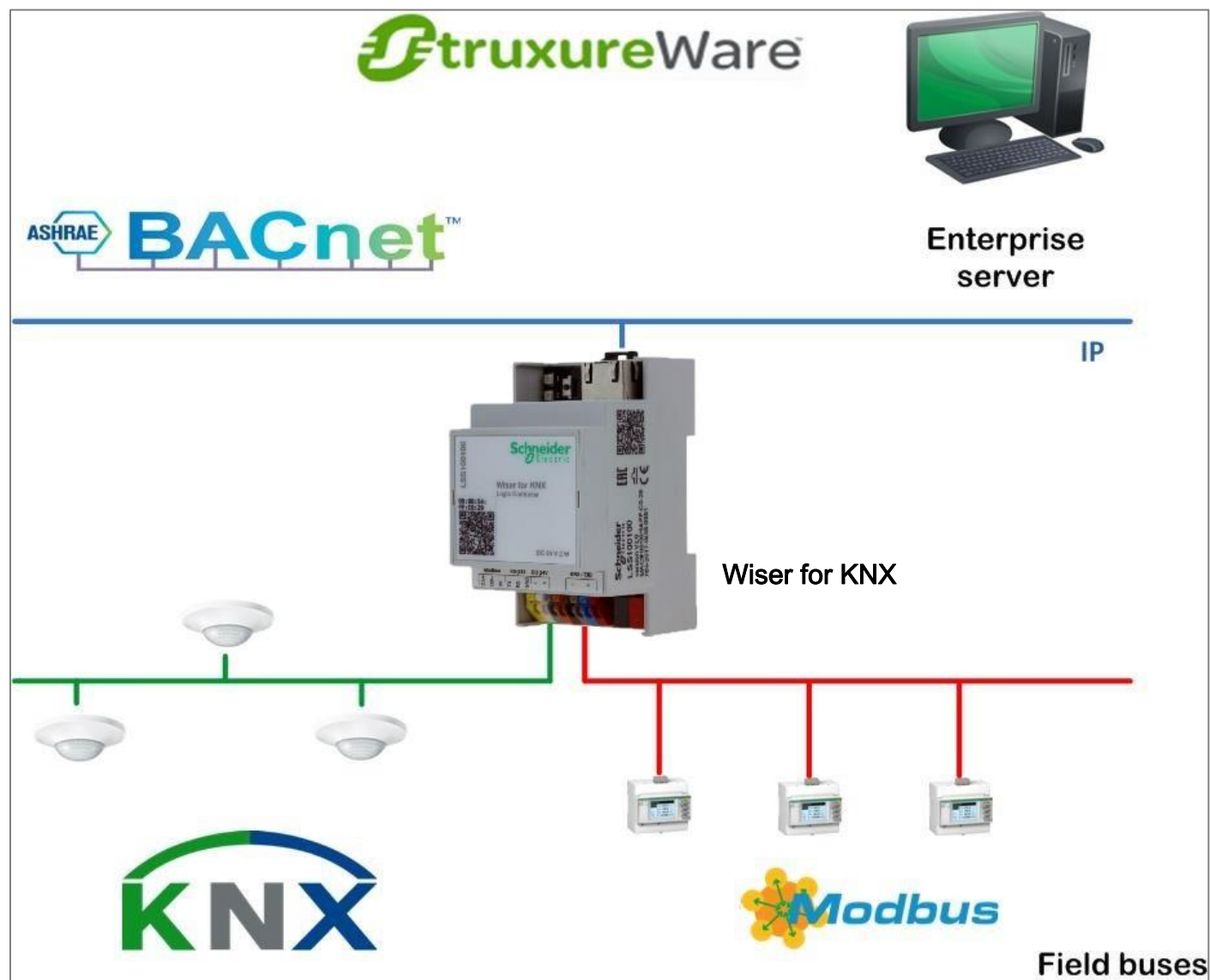
Wiser for KNX executes an internal *WRITE* operation to the *Present_Value* of the BACnet object according change value of the proxy object.

Value of the proxy object occurs when:

- Wiser for KNX program or scheduler changes the value
- value is updated from network
- value is changed from Wiser for KNX's user interface
- WriteProperty request is made by a BACnet client (SBO)

Note: KNX system can have multiple controls for a particular actuator. For example, a dimming actuator can be controlled by two pushbuttons. Each pushbutton has unique group address and own proxy object and, if exposed, its own BACnet object. When one of pushbuttons is pressed then only its proxy object is updated and the second one is not updated in BACnet client. In this scenario keep attention to correct using binding between KNX objects and proxy objects in SBO.

2 Design



Picture 2: Architecture of Wiser for KNX integration into a StruxureWare Building Operation Enterprise

3 Configuration

For integration of Wiser for KNX using BACnet into a a Enterprise server is necessary to follow next steps.

- 1) Configure Wiser for KNX
- 2) Import objects
- 3) Export Objects
- 4) Configure BACnet

3.1 Configure Wiser for KNX to enable BACnet feature

Configure Wiser for KNX to set up data sharing between Wiser for KNX and a supervising system, BACnet server.

Step 1: Configure Wiser for KNX

- 1) Configure IP address, date and time, user access etc. according to the User guide
 - User Guide is located at <http://www.schneider-electric.com>

Step 2: Import objects

- 1) Click **Utilities**
- 2) Click **Import ESF file**

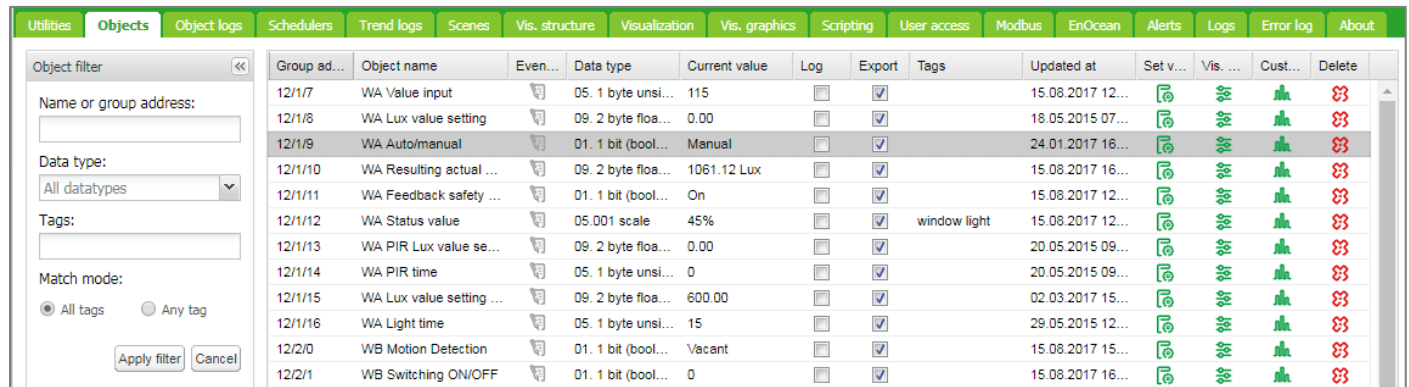


Picture 3 : Import ESF file

- 3) Navigate to your import file (*.esf) on your hard drive and click **open**
 - System builds KNX objects list, which contains all data (group addresses, name, data type, etc.).

Step 3: Exporting objects

- 1) Click **Objects** tab
- 2) Click **Export** checkbox on desired objects



Group ad...	Object name	Even...	Data type	Current value	Log	Export	Tags	Updated at	Set v...	Vis. ...	Cust...	Delete
12/1/7	WA Value input		05. 1 byte unsi...	115	<input type="checkbox"/>	<input checked="" type="checkbox"/>		15.08.2017 12...				
12/1/8	WA Lux value setting		09. 2 byte floa...	0.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>		18.05.2015 07...				
12/1/9	WA Auto/manual		01. 1 bit (bool...	Manual	<input type="checkbox"/>	<input checked="" type="checkbox"/>		24.01.2017 16...				
12/1/10	WA Resulting actual ...		09. 2 byte floa...	1061.12 Lux	<input type="checkbox"/>	<input checked="" type="checkbox"/>		15.08.2017 16...				
12/1/11	WA Feedback safety ...		01. 1 bit (bool...	On	<input type="checkbox"/>	<input checked="" type="checkbox"/>		15.08.2017 12...				
12/1/12	WA Status value		05.001 scale	45%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	window light	15.08.2017 12...				
12/1/13	WA PIR Lux value se...		09. 2 byte floa...	0.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>		20.05.2015 09...				
12/1/14	WA PIR time		05. 1 byte unsi...	0	<input type="checkbox"/>	<input checked="" type="checkbox"/>		20.05.2015 09...				
12/1/15	WA Lux value setting ...		09. 2 byte floa...	600.00	<input type="checkbox"/>	<input checked="" type="checkbox"/>		02.03.2017 15...				
12/1/16	WA Light time		05. 1 byte unsi...	15	<input type="checkbox"/>	<input checked="" type="checkbox"/>		29.05.2015 12...				
12/2/0	WB Motion Detection		01. 1 bit (bool...	Vacant	<input type="checkbox"/>	<input checked="" type="checkbox"/>		15.08.2017 15...				
12/2/1	WB Switching ON/OFF		01. 1 bit (bool...	0	<input type="checkbox"/>	<input checked="" type="checkbox"/>		15.08.2017 16...				

Picture 4: Objects export using Objects tab

Selected KNX objects will send values to BACnet

- 3) Click **System**

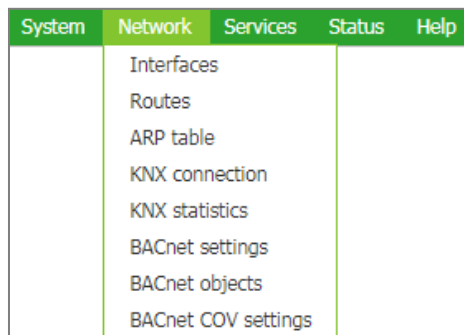


Picture 5: System

- System opens a new page

Step 4: Configuring BACnet

- 4) Click **Network** and select **BACnet settings**



Picture 6: BACnet settings

- System opens the BACnet settings window

- 5) Click **Server enabled** checkbox and click **OK**

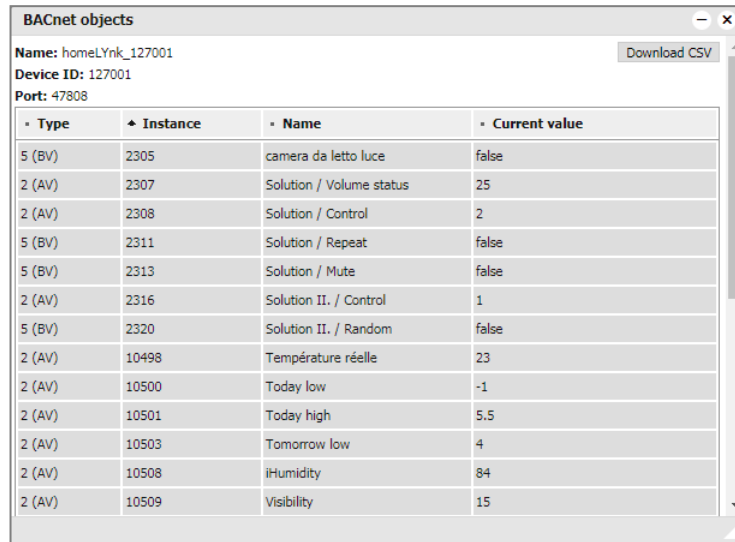
A screenshot of a 'BACnet settings' dialog box. It contains several fields and checkboxes. The 'Server enabled' checkbox is checked. The 'Device ID' field contains '127001', 'Password' contains 'mybacpwd', and 'Object priority' contains '16'. There are checkboxes for 'Add group address to object name' and 'Use comment as object description', both of which are unchecked. Below these are fields for 'Port' (47808), 'BBMD IP', 'BBMD port', and 'BBMD lease time (seconds)'. At the bottom right are 'OK' and 'Cancel' buttons.

Picture 7: BACnet settings

Property	Description
Server enable	Enable / Disable BACnet server
Device ID	BACnet device ID which must be unique on BACnet network. Range (0 – 4194302)
Password	BACnet password
Object priority	Define to which priority array Wiser for KNX will write to.
Port	BACnet port, default 47808

Table 2: BACnet properties

Shared data are shown on *Network -> BACnet object*



BACnet objects

Name: homeLYnk_127001
Device ID: 127001
Port: 47808

Download CSV

Type	Instance	Name	Current value
5 (BV)	2305	camera da letto luce	false
2 (AV)	2307	Solution / Volume status	25
2 (AV)	2308	Solution / Control	2
5 (BV)	2311	Solution / Repeat	false
5 (BV)	2313	Solution / Mute	false
2 (AV)	2316	Solution II. / Control	1
5 (BV)	2320	Solution II. / Random	false
2 (AV)	10498	Température réelle	23
2 (AV)	10500	Today low	-1
2 (AV)	10501	Today high	5.5
2 (AV)	10503	Tomorrow low	4
2 (AV)	10508	iHumidity	84
2 (AV)	10509	Visibility	15

Picture 8: BACnet objects

Property	Description
Device name	Device name is combined from hostname and device ID
Download CSV	Download BACnet objects in CSV file

Table 3: BACnet objects properties

Note: We recommends using object priority 16 in StruxureWare Building Operation. Downloaded file name and format is depending of the browser, not Wiser for KNX itself.

3.2 Building Operation WorkStation configuration

Schneider Electric StruxureWare (SBO) is a BACnet certified Building Management System capable of discovering values exported from Wiser for KNX (HL). Exported data can be used for information, control, or visualization. Communication between SBO and HL is bi-directional.

Enterprise server acts as a BACnet client.

To configure the Building Operation WorkStation, follow these five steps:

- 1) Log into SBO
- 2) Add BACnet interface into Automation Server
- 3) Configure IP network
- 4) Discover devices and upload BACnet objects
- 5) Set required priority to reveal actual exported values

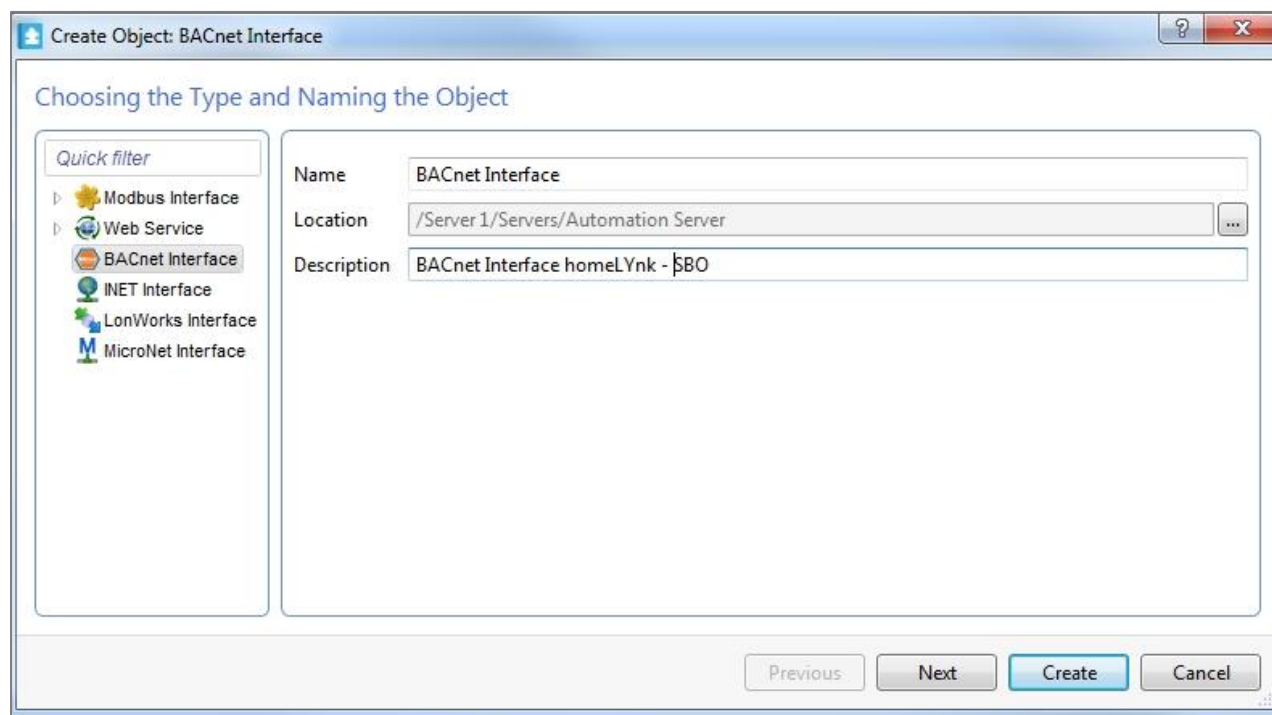
*Note: Server name in this application note is **Automation Server**. In case of change this name following steps you must reflect this change.*

Step 1: Log into SBO

- 1) Open your SBO program and enter your user name and password.
 - Main page of SBO program opens.

Step 2: Add BACnet interface into Automation Server

- 1) Right click **Automation server**
- 2) Click **New**
- 3) Click **Interface**
- 4) Click **BACnet interface**
- 5) Type your BACnet interface **Name**. You can leave preset name "BACnet interface"
- 6) Type your **Location**. You can leave the default location
- 7) Click **Create**
 - Your BACnet interface is now available in system menu.



Picture 9: add BACnet Interface into Automation Server

Note: If BACnet interface must be added to additional servers

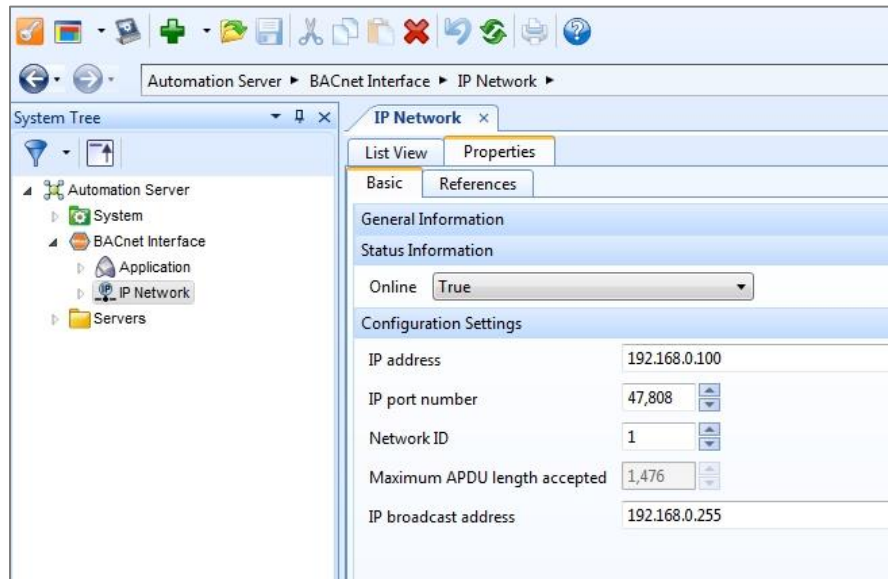
- 1) Create your new server
- 2) Change **Location** for BACnet Interface object
- 3) Select your new location

Step 3: Configuring your SBO IP network

Configuring SBO IP network allows you to establish connection between Wiser for KNX and SBO to use Device discovery function to discover Wiser for KNX device on the network.

Important: To use Device Discovery, you must set the IP settings of SBO to the same IP range as Wiser for KNX.

- 1) Go to **Automation server**
- 2) Expand **BACnet Interface**
- 3) Click **IP Network**
- 4) Type your IP configuration



Picture 10: BACnet Interface configuration

IP address of your SBO is now set.

Note: In case of network collision change the value of the SBO IP port number.

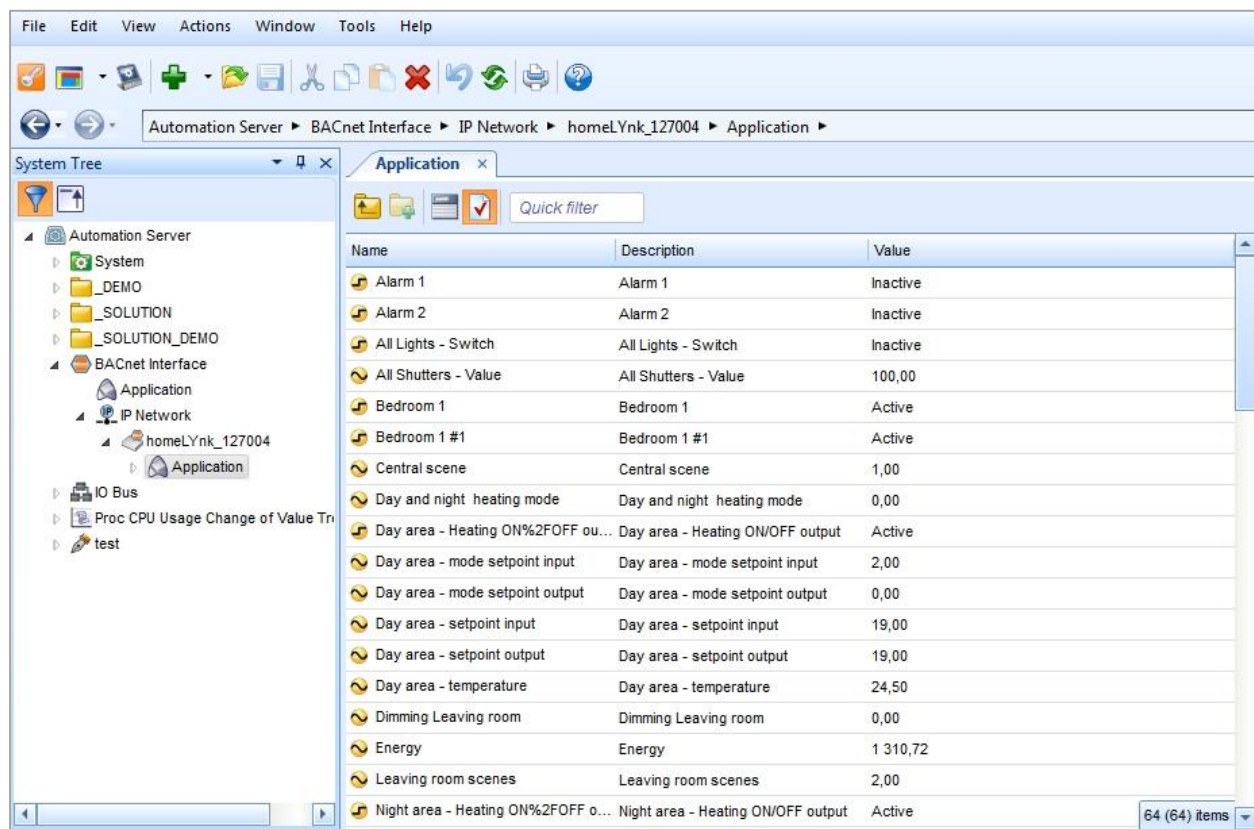
Step 4: Discovering devices and uploading BACnet objects

- 1) Click **Automation Server**
- 2) Click **Device Discovery** and select **BACnet devices** from pull down menu
 - List of all discovered devices displays
- 3) Drag and drop your **Wiser for KNX** to **BACnet Interface**
 - IP network is displayed in System Tree
 - A pop up message informs you, that objects must be uploaded to the database in SBO
- 4) Right click your **Wiser for KNX** and then select **Upload**

Objects from your Wiser for KNX are now synchronized with your SBO application.

Step 5: Setting required priority to reveal live exported values

- 1) Click your **Wiser for KNX** in System Tree
- 2) Expand Wiser for KNX to show the **Application** folder
- 3) Click **Application** folder
 - Sub window with list of Wiser for KNX objects appears
- 4) Right click on Description to see a list of possible BACnet properties to be displayed such as priority, data type, etc.
- 5) Select the check box of properties of your BACnet object to display them



Picture 11: Uploaded BACnet objects with values

Application tab collects all exported values from Wiser for KNX to BACnet. Values of BACnet objects are dynamically changed according to their current values. Live update of your Wiser for KNX proves successfully established connection between HL and SBO. You can manually change values of your data to test the connection.

3.3 Building Operation WorkStation performance

Wiser for KNX can distribute up to 150 Objects to BACnet. Due this fact it is necessary to secure suitable response times.

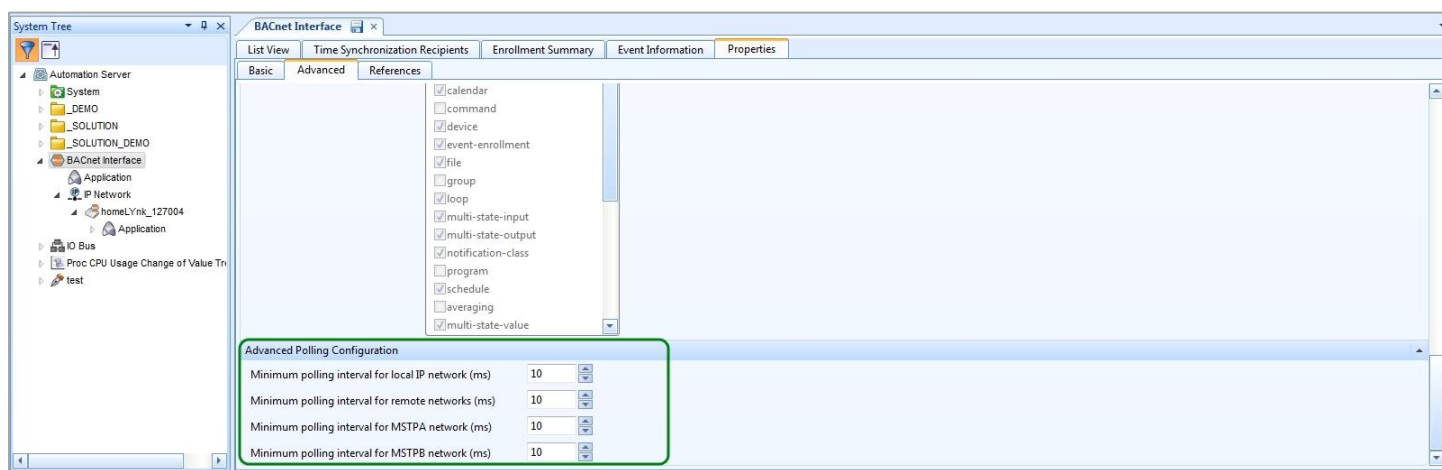
Response times

Wiser for KNX supports single *ReadProperty* request as well as *ReadPropertyMultiple* request. When single *ReadProperty* request increases respond time of subsequent requests *ReadPropertyMultiple* pool multiple values in a single request and make request done in a shorter time.

Wiser for KNX supports *COV* (Change of Value) subscriptions too. When a *COV subscription* is established between a BACnet client and server (Wiser for KNX) then server immediately notifies the client in case of value change. Wiser for KNX supports 32 *COV subscriptions*. Building Operation automatically will use *COV* for the first 32 objects and will use pooling, via *ReadProperty* or *ReadPropertyMultiple*, for the remainder of the objects.

To achieve faster response times set minimum pooling interval.

In Building Operation go to *BACnet Interface -> Properties -> Advanced*



Picture 12: Minimum pooling interval settings

4 Conclusion

Procedures contained in this application note describe integration of Wiser for KNX into a Enterprise server using BACnet. Wiser for KNX functionality described in this application note brings benefits to system integrator to create robust automation system complying with international standards as well as optimization of performance between BACnet server and client.

5 Appendix

5.1 Glossary

The following table describes the acronyms and defines the specific terms used in this document.

Abbreviation	Description
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ANSI	American National Standards Institute
BACnet	A data Communication Protocol for Building Automation and Control Networks
ISO	International Organization for Standardization protocol.
SBO	StruxureWare Building Operation

Table 4: specific terms

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