BACnet Wrapper Settings Guide

ACFA PSIM 1.0

Last update 08/22/2022

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1 List of terms used in BACnet Wrapper Settings Guide

BACnet is a network protocol used in building automation system and access control networks.

BACnet Device is an authorisation system device (controller, sensor, executing mechanism), which supports the BACnet protocol.

BACnet Channel is a connection channel between the BACnet device and the *Axxon PSIM* system (analog, digital, etc), represented in the system as an object.

BACnet Property is a property of the system object that represents the data received from a BACnet device over a BACnet channel.

BACnet Rule is the microprogram in the *Axxon PSIM* system that is used to process the values of a BACnet property.

BACnet Provider is the microprogram in the *Axxon PSIM* system that allows forwarding events and/or parameters of *Axxon PSIM* objects to the selected port via the BACnet protocol.

2 Introduction to BACnet Wrapper Settings Guide

On the page:

2.1 Purpose of the document

The *BACnet Wrapper integration module settings guide* provides comprehensive setup and operational guidance for *BACnet Wrapper* module operators.

This Guide provides the following information:

1. General information about the *BACnet Wrapper* module
2. *BACnet Wrapper* module settings
3. Working with the *BACnet Wrapper* module.

2.2 General information about the BACnet Wrapper integration module

BACnet Wrapper integration module is designed for connecting any devices supporting *BACnet Ethernet* protocol. *BACnet Wrapper* integration module allows to perform data exchange and processing between *Axxon PSIM* and *BACnet devices*.

Note

All standard device types are supported. Non-standard device types operation is not guaranteed.

3 Licensing and systems supported by BACnet Wrapper

BACnet Wrapper is licensed for 1 device.

Systems which operation is guaranteed by *BACnet Wrapper* universal integration are as follows:

Name	Functionality in the Axxon PSIM software package
Sterownik FSG	• open/close of fire dumper; • set the angle of fire dumper; • receive the current state of connected devices; • receive states of fire dumper (open, close, damage); • control program which control all fire dumpers in case of damage; • show temperatures inside the ventillation tunnels; • control smoke exhaust fan.

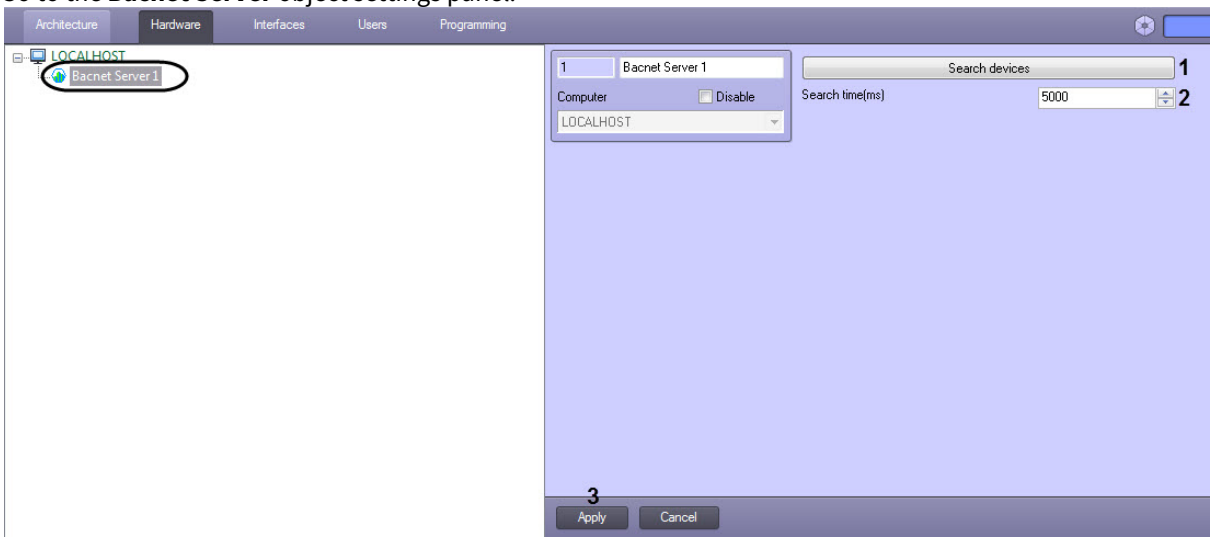
4 Configuration of the BACnet Wrapper integration module

4.1 Activation of the BACnet Wrapper module and the BACnet devices search

To activate the *BACnet Wrapper* integration module create the **Bacnet Server** object on the basis of **Computer** object on the **Hardware** tab of the **System settings** dialog box.

To perform a search in the local network of devices that support the BACnet protocol, do the following:

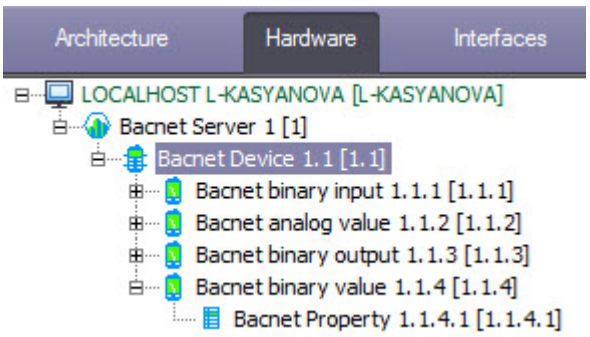
1. Go to the **Bacnet Server** object settings panel.



2. In the **Search time(ms)** field (**2**), specify the time period during which the system will query the network for the *BACnet* devices.
3. Click the **Search devices** button (**1**).

> **Note**
>
> If there are several network connections on the computer where the search is performed, it is recommended to disable all of them for the time of the search except the one that provides the connection to the local network with the *BACnet* devices.

As a result, the search for the *BACnet* devices will be performed, and the corresponding objects will be created in the hardware tree.

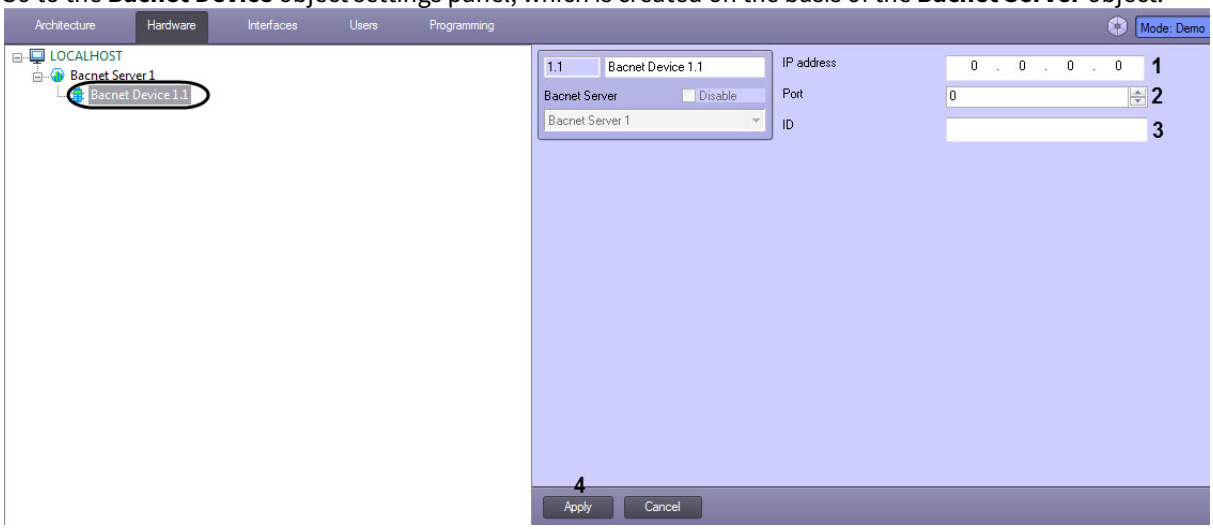


4.2 Configuring the BACnet device

The *BACnet* devices are created automatically during the devices search (see Activation of the BACnet Wrapper module and the BACnet devices search). No additional configuration is required.

To add a *BACnet* device manually or to configure a *BACnet* device, do the following:

1. Go to the **Bacnet Device** object settings panel, which is created on the basis of the **Bacnet Server** object.



2. In the **IP address** field (**1**) enter the IP address of the *BACnet* device.
3. In the **Port** field (**2**) enter the port of the *BACnet* device.
4. In the **ID** field (**3**) enter the identification number of the *BACnet* device.
5. Click the **Apply** button (**4**) to save the changes.

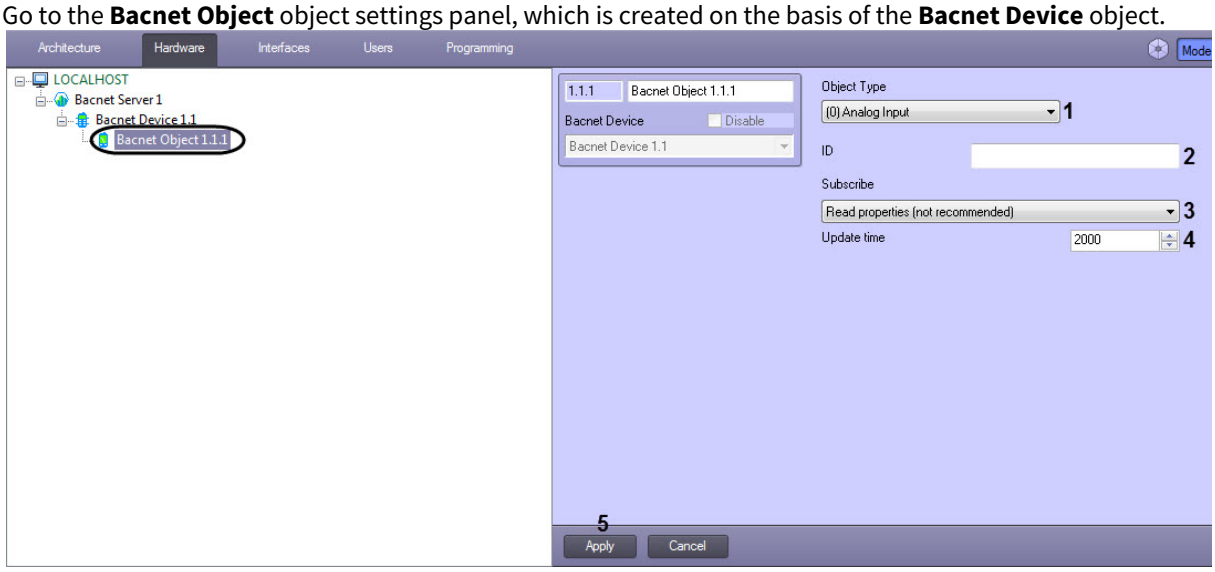
Configuring the *BACnet* device is complete.

4.3 Configuring the BACnet object

The *BACnet* object corresponds to the *BACnet* device channel. It is created automatically during the devices search (see Activation of the BACnet Wrapper module and the BACnet devices search).

To add a *BACnet* object manually or to configure a *BACnet* object, do the following:

1. Go to the **Bacnet Object** object settings panel, which is created on the basis of the **Bacnet Device** object.



2. In the **Object Type** drop-down list (**1**) select one of the channel types.
3. In the **ID** field (**2**) enter the identification number of the channel.
4. In the **Subscribe** drop-down list (**3**), select the method for monitoring the changes in the *BACnet* object values:
    a. **None** - No subscription. The object parameters changes are not monitored.
    b. **Normal** - Standard subscription type. When the object's parameter changes, the value is immediately sent to the *BACnet Wrapper* integration module.
    c. **Read properties (not recommended)** - Parameters reading at a specified time interval. If this subscription method is selected, the **Update time** field (**4**) becomes available. Enter the time period in milliseconds for reading the parameters of the *BACnet* object in this field.

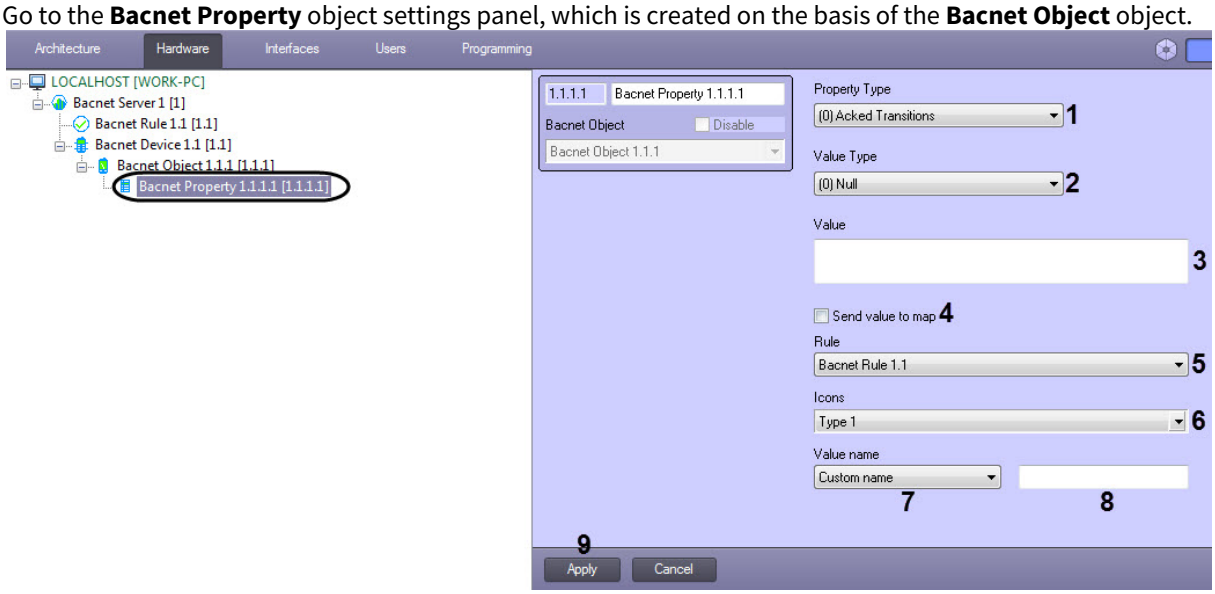
> **Note**
>
> Select the **Read properties (not recommended)** subscription method only if the standard subscription method does not work.

Configuring the *BACnet* object is complete.

4.4 Configuring the BACnet Property

To configure the *BACnet* channel properties, do the following:

1. Go to the **Bacnet Property** object settings panel, which is created on the basis of the **Bacnet Object** object.



2. From the **Property Type** drop-down list (**1**) select the type of the property that will be sent and stored on the device.
3. From the **Value Type** drop-down list (**2**) select the data type tha will be used to send and store the property on the device.
4. In the **Value** field (**3**) specify the default value of the property.
5. Set the **Send value to map** checkbox (**4**) if it is necessary to display the property value on the map.
6. From the **Rule** drop-down list (**5**) select the rule for processing property values. For details on rules configuration, see Configuring the rules for BACnet properties.
7. From the **Icons** drop-down list (**6**) select the icons preset that will be used to indicate the property on the map. For details, see Managing the BACnet channel properties on the map.
8. From the **Value name** drop-down list (**7**), select the value that will be displayed on the map when the property is displayed in text form:
   - **Value** - the value of the channel property.
   - **Axxon PSIM name** - the name of this object in *Axxon PSIM*.
   - **Custom name** - custom value. If the **Custom name** is selected, the field (**8**) will be displayed in which it is necessary to enter the corresponding value.

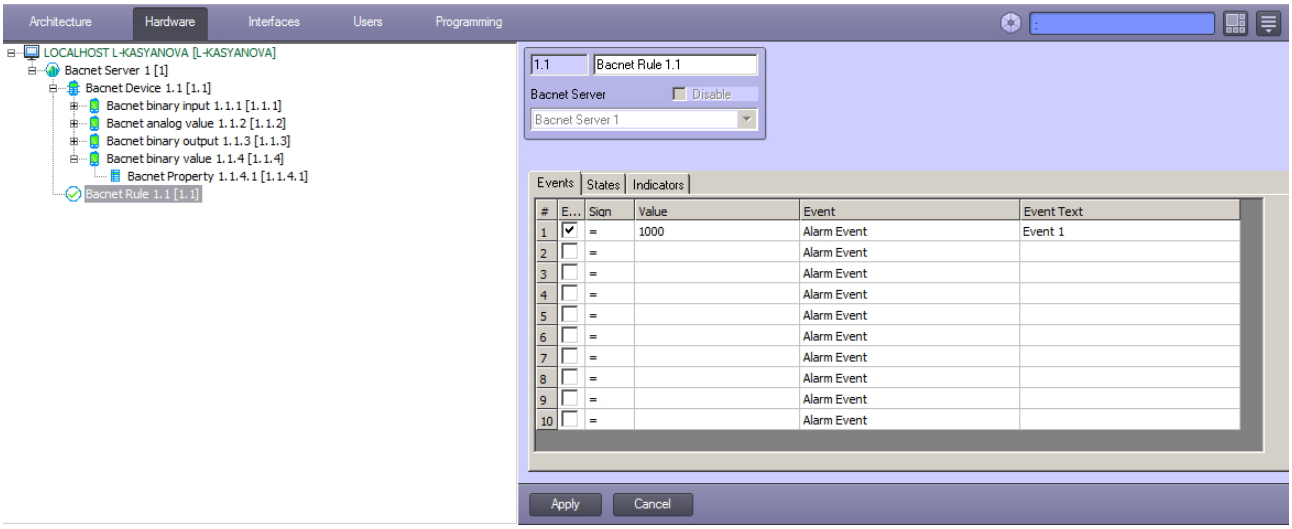
   > **Note**
   >
   > The display on the map will be changed as soon as a new channel property value is received.

9. Click the **Apply** button (**9**).

Configuring the *BACnet* channel properties is complete.

4.5 Configuring the rules for BACnet properties

Rules enable event generation, system state change and/or indicator state change in case the property value falls in a given range. Rules are configured on the settings panel of the **Bacnet Rule** object which is created on the basis of the **Bacnet Server** object.



This object is a group of rules, which may contain rules of any type. Only one group of rules may be assigned to each BACnet property and channel.

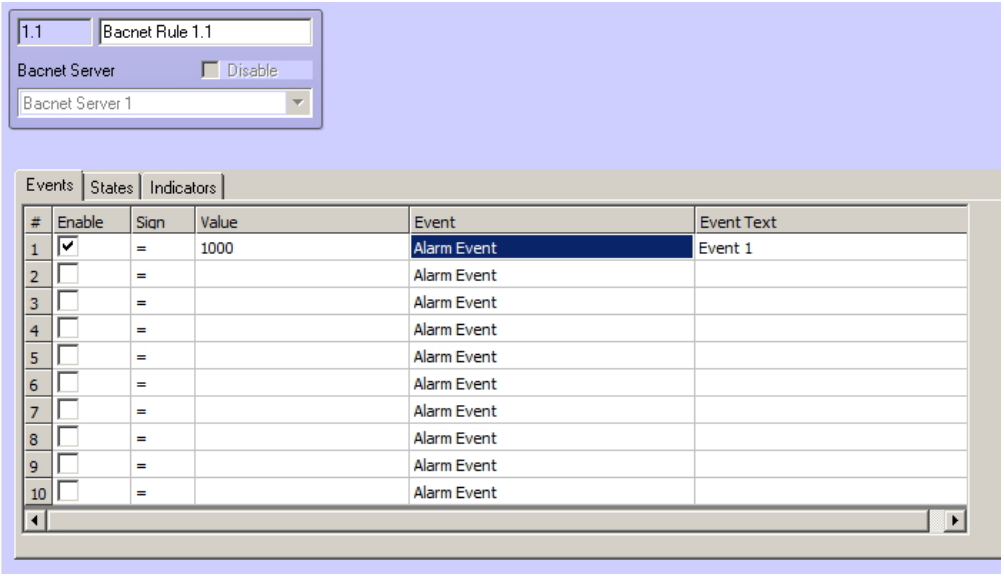
4.5.1 Configuring the rules of event generation

Rules of event generation enable the generation of events in case of value of a property falls into a given range.

To configure these rules, set the following parameters in the **Events** tab on the settings panel of the **Bacnet Rule** object:

1. Check the **Enable** box to activate the rule.
2. In the **Sign** column: select the sign that will define the value range. The list of recognized signs differs for each supported value type, see the table below.
3. In the **Value** column: enter the property value that will define the value range. The value must match the formatting rules for the data type of the BACNet property the rule is configured for, see Configuring the BACnet Property and the table below.
4. In the **Event** column: select the event to be generated.
5. In the **Event text** column: enter the message which will appear when the property value falls in the specified range.
6. Click the **Apply** button to save the changes.

It is possible to create up to 10 rules.



The signs available for different value types are listed in the table below:

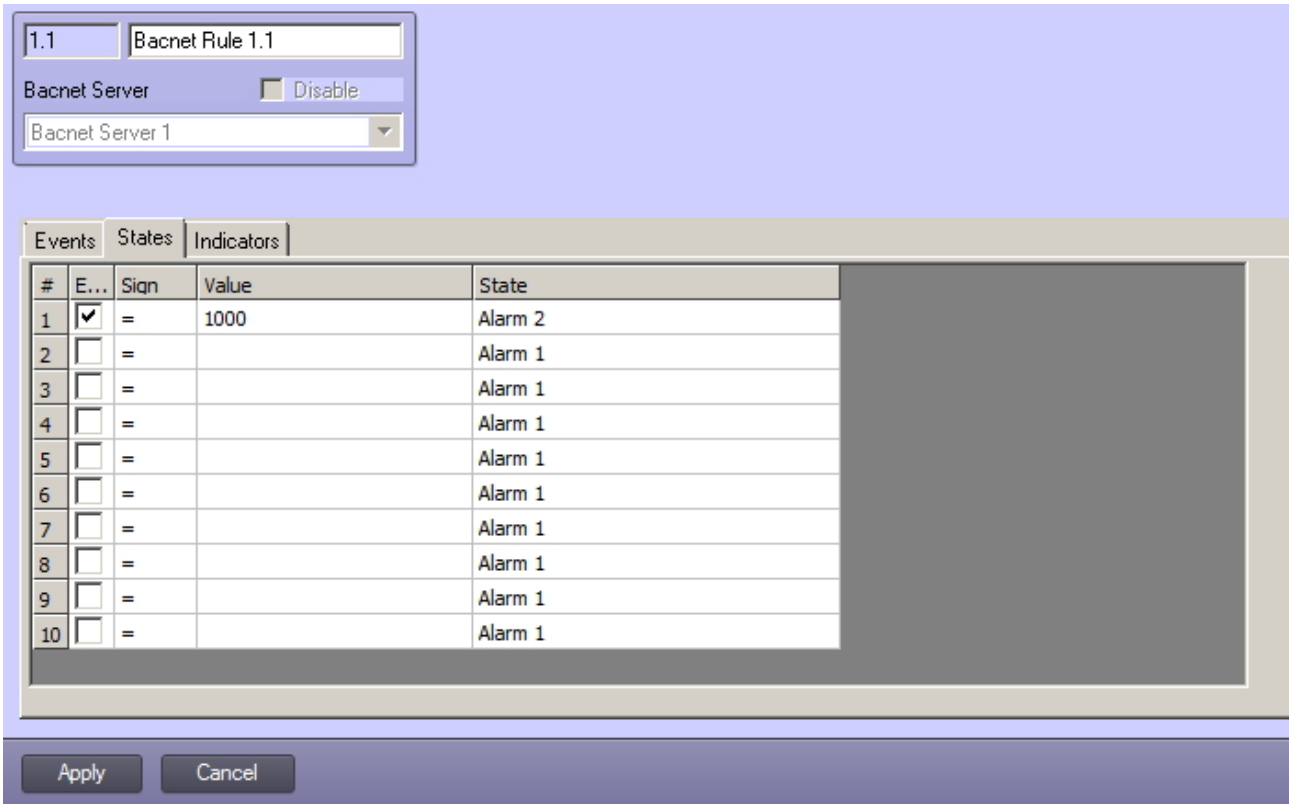
Value Type	Formatting Rule	Signs
Boolean		=, !=
Unsigned Int		=, !=, <, >, <=, >=
Signed Int		=, !=, <, >, <=, >=
Real	Both "." and "," can be used	=, !=, <, >, <=, >=
Double	Both "." and "," can be used	=, !=, <, >, <=, >=
Octet String		=, !=
Character String		=, !=
Bit String		=, !=
Enumerated	Is actually Unsigned Int	=, !=
Date	Example: 2.3.2001, 01.01.1988	=, !=, <, >, <=, >=
Time	Example: 3:4:6, 03:04:06, 13:24:56	=, !=, <, >, <=, >=

4.5.2 Configuring the rules of system state change

Rules of event system states change enable changing system states in case of value of a property falls in a given range.

To configure these rules, set the following parameters in the **Events** tab on the settings panel of the **Bacnet Rule** object:

1. Check the **Enable** box to activate the rule.
2. In the **Sign** column, select the sign that will define the value range. The list of recognized signs differs for each supported value type, see the table in Configuring the rules of event generation.
3. In the **Value** column, enter the property value that will define the value range. The value must match the formatting rules for the value type of the BACNet property the rule is configured for, see Configuring the BACnet Property.
4. In the **State** column, select the state that will be generated.
5. Click the **Apply** button to save the changes.



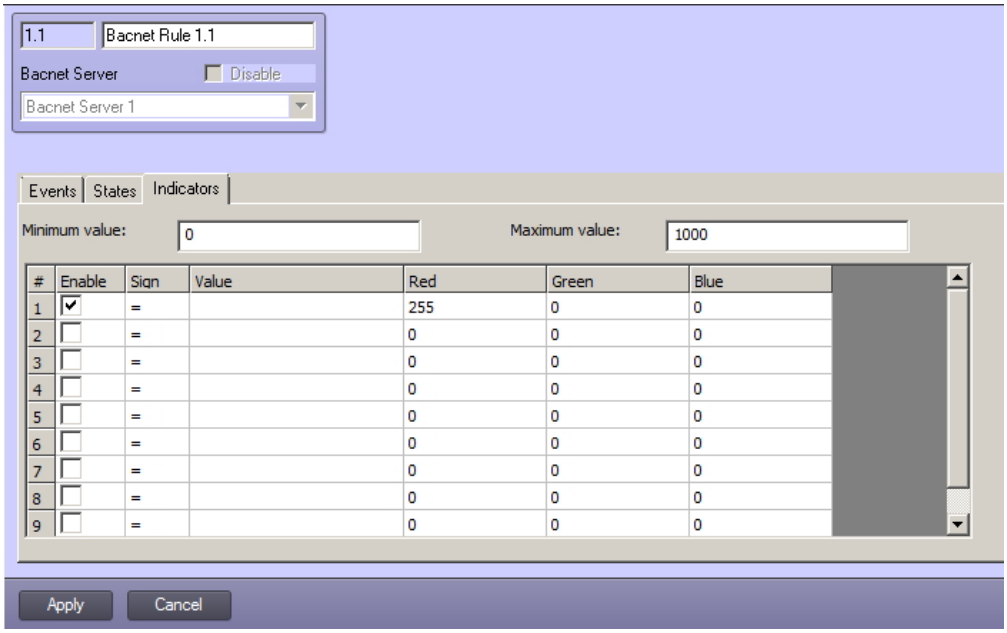
4.5.3 Configuring the rules of indicator state change

Rules of the indicator state change enable changing the BACnet object indicator on the map in case the value of a property falls into a given range.

The indicator and its value are displayed in the map (see Managing the BACnet channel properties on the map).

Configuring of this rule is performed on the **Indicators** tab on the settings panel of the **Bacnet rule** object. The settings description is presented below. It is possible to specify not more than 10 states of the indicator.

1. Check the **Enable** box to activate the rule.
2. In the **Sign** column, select the sign that will define the value range. The list of recognized signs differs for each supported value type, see the table below.
3. In the **Value** column, enter the property value that will define the value range. The value must match the formatting rules for the data type of the BACNet property the rule is configured for, see Configuring the BACnet Property.
   OR
   In the **Minimum value** and **Maximum value** fields, specify the interval the value must fall into.
4. In the **Red**, **Green** and **Blue** columns, define the indicator colour according to the RGB model.
5. Click the **Apply** button to save the changes.



Attention!

If the value of the property falls into several intervals, the indicator will take the colour according to the rule with the least order number.

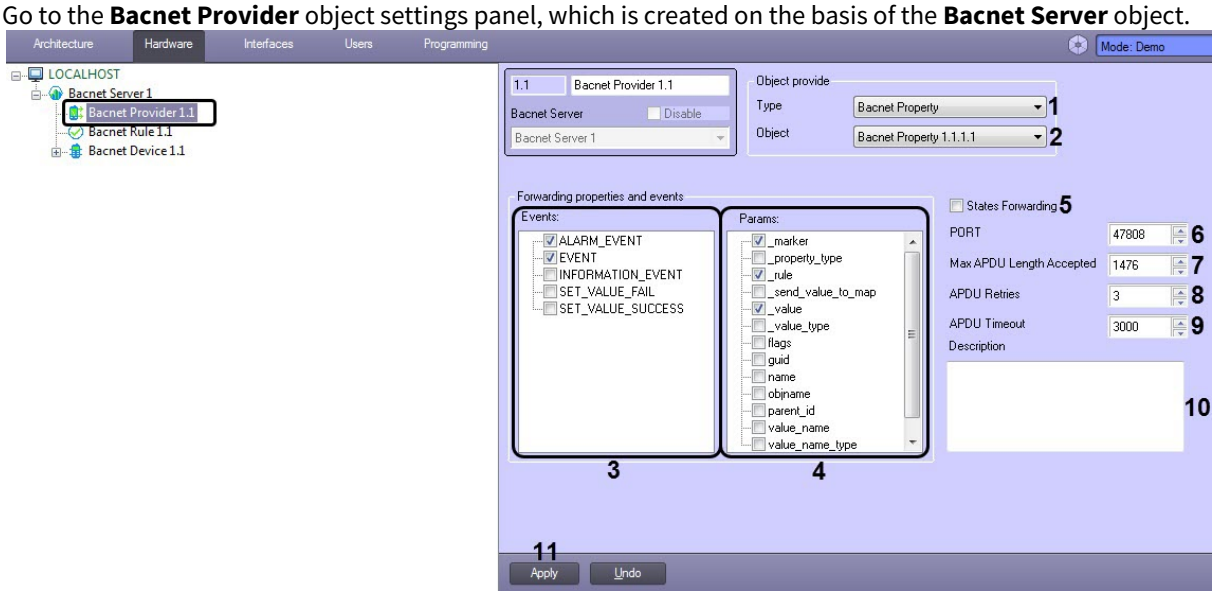
The signs available for different value types are listed in the table below:

Value Type	Signs
Unsigned Int	=, !=, <, >, <=, >=
Signed Int	=, !=, <, >, <=, >=
Real	=, !=, <, >, <=, >=
Double	=, !=, <, >, <=, >=

4.6 Configuring the BACnet Provider

To configure the *BACnet* provider, do the following:

1. Go to the **Bacnet Provider** object settings panel, which is created on the basis of the **Bacnet Server** object.



2. From the **Type** drop-down list (**1**) select the required type of object in *Axxon PSIM*.
3. From the **Object** drop-down list (**2**) select the required object in *Axxon PSIM*.
4. In the **Events** list (**3**) set the check boxes for the object events that need to be forwarded.
5. In the **Params** list (**4**) set the check boxes for the parameters that need to be forwarded.
6. Set the **States Forwarding** check box (**5**) if it is necessary to enable the forwarding of the *Axxon PSIM* object states.
7. In the **PORT** field (**6**) enter the port within the BACnet network.
8. In the **Max APDU Length Accepted** field (**7**), enter the maximum number of octets (eight binary digits) depending on the type of connection (Bacnet IP, Bacnet MS/TP, etc.).
9. In the **APDU Retries** field (**8**), enter the number of attempts to receive the events and/or parameters from the object in case the request was unsuccessful.
10. In the **APDU Timeout** field (**9**), enter the time interval in milliseconds after which an attempt will be made to re-request if the previous attempt was unsuccessful. Also, this time sets the COV polling period.

> **Note**
>
> COV stands for COV Subscriptions, i.e. subscription to BACnet device objects, in this case it is a subscription to the *Axxon PSIM* object. The BACnet server waits for the notification about the events and/or *Axxon PSIM* object parameter changes in order to forward them.

11. In the **Description** field (**10**), enter the description of the forwarded data, if necessary.
12. Click the **Apply** button (**11**) to save the changes.

The *BACnet* provider configuration is now complete.

5 Working with BACnet Wrapper integration module

5.1 General information on working with BACnet Wrapper integration module

The events from BACnet devices are sent to the *Events protocol*.

The icon and indicator states and the values of BACnet parameters are displayed on the map.

The information on the configuration of the **Events protocol** and the **Map** interface objects is given in details in the *Axxon PSIM* software package. Administrator's Guide.

Working with the **Events protocol** and the **Map** interface objects is described in details in the *Axxon PSIM* software package. Operator's Guide.

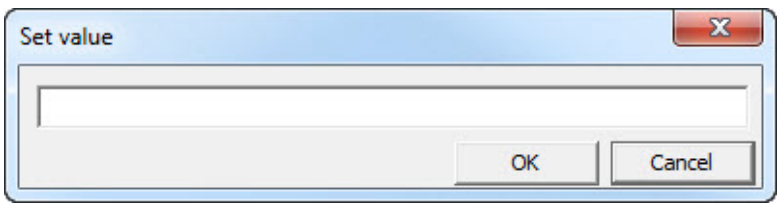
It is possible to configure reactions to some parameter values with the help of scripts and macros. Working with scripts and macros is described in details in the *Axxon PSIM* software package. Programming Guide and *Axxon PSIM* software package. Programming Guide (Jscript).

> **Note.**
>
> The current versions of all the above documents are stored in the AxxonSoft documentation repository.

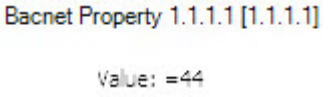
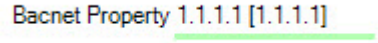
5.2 Managing the BACnet channel properties on the map

The *BACnet* channel properties are managed in the **Map** interactive window using the **Bacnet Property** object functional menu:

The commands for managing the BACnet channel properties are described in the table.

Menu command	Function performed
Set value	Displays a window in which the value of the channel property is set. 

The BACnet channel property can be added to the map in the following forms:

As an icon of state	
As an icon of state and indicator	
As text (parameter value)	
As a graphic indicator of state - a line	
As a graphic indicator of state - a polygon	
As a graphic indicator of state - an ellipsis	

Note

The type of object display on the map is selected when it is added (see *Axxon PSIM* software package. Administrator's Guide).