American Dynamics

From Tyco Security Products

4.7.1 victor/BMS Integration Guide

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Introduction

In this chapter:

Architecture

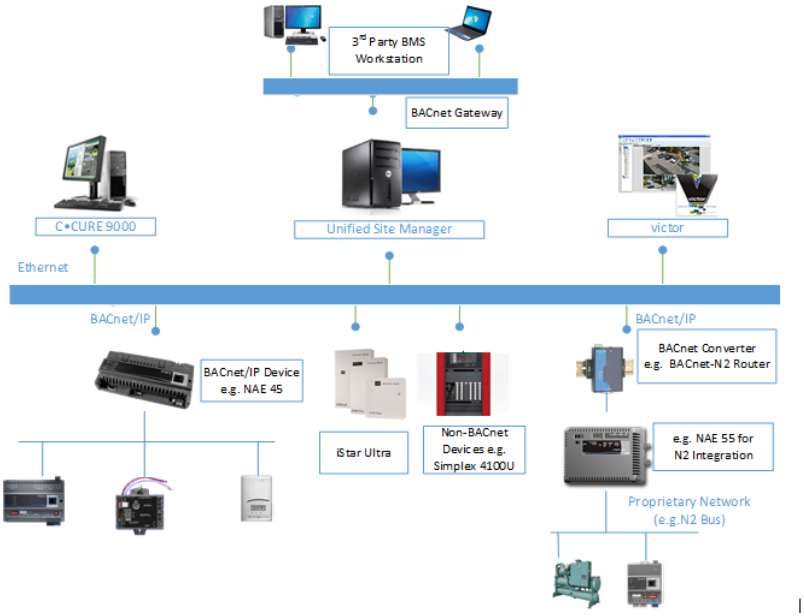
The essence of this integration is to provide the generic integration between the victor Application Server and building management devices based on BACnet protocol. If the device is based on other protocol(e.g. N2), a protocol converter to BACnet(e.g. BACnet – N2 router) is needed.

The BACnet Integration includes Device management, Alarm and Event management, Trending, Scheduling and Action management feature, which works as Supervisory Controller and controls BACnet device directly.

This integration also provides gateway function to map victor objects to BACnet objects. It provides the default gateway templates and a customizable gateway template.

In this phase the integration will partially bring functions of configuration and control the devices. Additionally, this integration provides a gateway mechanism for wrapping objects in victor to BACnet objects, so the third party system can monitor victor object change through BACnet protocol if necessary.

Figure 1: System Architecture



Features

The Unified victor Application Server integration software for BMS offers the following features:

- Support for up to 2000 BACnet objects
- BACnet Device Automatic Discovery and BACnet objects manually import
- All building activities are logged in the journal for future investigative reporting.
- Installation on Victor remote clients
- Multi-condition triggers by setting Additional Status on BACnet Object Editor
- BACnet Device, BACnet Object and BACnet Action as Ribbon button
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- BACnet Device and BACnet object status
- Supports BACnet/IP(Annex J) protocol:
  - Supports subscription to the change of value (COV) event notification for many properties
  - Supports the following Objects, with most properties of the standard object types supported: Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Multi-state Input, Multi-state Output, Multi-state Value, and Device.
  - Supported Services: Who-Is, I-Am, ReadProperty, ReadPropertyMultiple, WriteProperty, WritePropertyMultiple, SubscribeCOV, SubscribeCOVProperty, ConfirmedCOVNotification, UnconfirmedCOVNotification.
- Localization of GUI and Journaling
- Acknowledge event notification in alarm

- Alarm BACnet gateway function - map victor objects to BACnet objects
- Default gateway templates: iStar people counting and event gateway templates
- Customized gateway template
- View monitored objects that have been mapped onto BACnet objects

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Installation

This chapter details the installation process of the BMS integration with victor Application Server.

In this chapter

Adding BMS Integration to victor

1. Acquire the BMS Integration Installation Program from victor 4.6 DVD or download the program from the American Dynamics web site.
2. Right-click on **Setup.exe**, and then click **Run as administrator**.

NOTE The installation program determines if the correct version of victor is installed on your system. If it is not, a message is displayed stating that a supported version of victor is needed.

3. The Install Wizard and the BMS Integration Welcome screen appears. Click **Next**.
4. Select the "I accept the terms of the license agreement" button, and then click **Next**.
5. On the **Custom Setup** dialog box, click **Next**.

NOTE If this is a server installation, the Database Server Credentials dialog box appears allowing you to change the authentication method:

- Windows authentication credentials of current user – the default.
- Server authentication using the Login ID and password below – if you previously configured an SQL server, you can create a Login ID and Password to act as authentication credentials for the SQL database.

6. To continue with the installation, click **Next.**
7. On the **Ready to Install the Program** dialog box, click **Finish.**

NOTE The install process stops all Site Manager Services, these services must be restarted on victor site manager machines once the install is complete.

Minimum Requirements

Hardware

BMS integration has the same hardware requirements as victor Unified Client and victor Site Manager. Therefore, if the machine can successfully run victor then it will satisfy BMS integration requirements. BMS integration requires approximately 50MB of available hard disk space.

Software

- victor Site Manager: v4.6+
- victor Unified Client: v4.6+

Operating Systems

32-bit operating systems:

- Windows 8
- Windows 7 Enterprise

64-bit operating systems:

- Windows Server 2012 R2
- Windows Server 2008 R2
- Windows 7 Enterprise
- Windows 8

3

Operation

In this chapter:

Operation of BMS

Roles

BACnet device and BACnet object priviledges and context menu verbs are associated with victor roles. For more information on Roles, refer to the *victor Unified Client Configuration User Guide.*

Associations

BACnet device and BACnet object support victor's Object Association. This refers to the link between unrelated victor objects with the intent of enabling incident building capability. For more information on Associations, refer to the *victor Unified Client Configuration User Guide.*

Reports

BACnet device and BACnet object are included in the report selection tool and support the victor **Find in Journal** feature. And BMS Integration also support BACnet Device State Change, BACnet Object State Change and BACnet Object Value Change Activity Type in the report selection tool. For more information on Reports and the **Find in Journal** feature, refer to the *victor unified client Configuration and User Guide*.

Events

BACnet device and BACnet object support victor Events, allowing you to detect, monitor and record specific activities on the system. For further information on Events, refer to the *victor unified client Configuration and User Guide*.

Maps

BACnet device and BACnet object support victor Maps and the **Find on Map** feature. For more information on Maps and the **Find on Map** feature, refer to the *victor unified client Configuration and User Guide*.

BMS integration also supports animation feature on map by widget.

Administration Functions

BACnet device and BACnet object editor allows configuration of connection/communication details and associations. Configured BACnet devices are displayed as hardware objects in the victor Device List.

Access detailed hardware information

1. On the **Setup** tab, select **BACnet Devices or BACnet Objects**, and then click **Show All**.
2. Right-click the BACnet device or object, and then click **Edit**.

NOTE This information is also available by right-clicking the BACnet device in Device List and clicking **Edit**.

Auto Discovery of a BACnet Device

The integration can discover BACnet device and its objects automatically by broadcasting WHO-IS and receiving I-AM message through BACnet protocol. The user can choose and save the device and objects to be imported.

1. On the **Setup** tab, click **BACnet Devices**.
2. On the drop down menu, click **Auto Discovery**. This will open the **Auto Discovery BACnet Devices** window.

NOTE In the **Auto Discovery BACnet Devices** window, it will list the detected BACnet devices on the left grid and show the total number of detected BACnet devices right above this grid. The devices in gray are already imported into the system.

3. Select devices to be imported, and then click **Scan Selected Device**. The selected devices will appear as a list on the right-hand side of the screen.

NOTE By default, all BACnet objects will be selected. Clear devices if you do not want to import them. The objects displayed in gray are already imported into the system.

4. Click **Save and Close**.

Create a new BACnet Device manually

In case the BACnet Device is offline and cannot be discovered automatically, the user can add the BACnet Device manually.

1. On the **Setup** tab, click **BACnet Devices**.
2. On the drop down menu, click **New**. This will open the **BACnet Device Editor**.
3. Enter a name for the BACnet Device in the Name textbox.
4. Enter a description for the map in the Description textbox.

NOTE The **Enabled checkbox** is selected by default. To deactivate the BACnet Device, deselect the checkbox.

5. Enter the Device ID, IP Address, UDP Port of the created BACnet Device.

NOTE If the network ID of the BACnet Device is 0 (zero), MAC Address is not necessary. However, if the network ID is not 0 (zero), you must enter MAC Address to identify device.

6. Under the Associations section, click  .
7. Select an Association type from the left column. This will filter results in the right column
8. Select the required association from the right column, and then click OK.
9. If more associations are required, repeat steps 7-9.
10. Click **Save and Close**.

View BACnet Devices

The BACnet Device can be viewed after it is imported into victor Application Server. All properties will be read-only and cannot be edited.

1. On the **Setup** tab, click the **BACnet Device**.
2. Click **Show All**.

All configured BACnet Devices are displayed in an Object List.

Import BACnet objects manually

1. On the **Device List** or **BACnet Device Object List**, right-click the **BACnet Device**.
2. Click **Import Device Object**. This will open the Auto Discovery BACnet Devices window and will begin to retrieve BACnet objects in this device.

NOTE

- When retrieval of the BACnet objects are 100% completed, all available BACnet objects will be listed on the right grid.
- By default, all BACnet objects are selected. Unselect the objects if you do not want to import the object. The objects in gray are already imported into the system.

3. Click **Save and Close**.

Edit a BACnet Device or BACnet Object

The BACnet Device and BACnet Object Editor can be used to configure the Data Update Mechanism for a BACnet Device or BACnet Object.

1. Right-click the **BACnet Device** or **BACnet Object**, and then click **Edit**.
2. Enter a Name in the textbox
3. Enter a Description in the textbox.
4. Make edits in the **BACnet Device Editor** or **BACnet Object Editor**.
5. See the Table 1 on Page 18 regarding the Data Update Mechanism during the editing of a BACnet Device or a BACnet Object.

NOTE

- Increase the poll period accordingly when the BACnet object amount increases.
- Data Update Mechanism can be set for BACnet objects when the BACnet device is disabled. All BACnet objects' Data Update Mechanism will change accordingly once the change is confirmed.

6. Click **Save and Close**.

Table 1: Data Update Mechanism Definitions

Data Update Mechanism	
Subscribe COV/Event Notification	Use Subscribe COV: Update data by subscribing COV service. When Use Subscribe COV, the subscription period is 28800 seconds (8 hours) by default. BMS integration will automatically re-subscribe before subscription expires. You can change it by the following line in ConnectedPro.HardwareInterface.BACnet.DriverService.exe configuration file located under Installation path\Tyco\CrossFire\ServerComponents. Use Subscribe COV Property: Update Present Value and /or Status Flag by subscribe Present Value and /or Status Flag COV Property service. For Analog object, when check Present value, user can define COV Increment. Use Event Notification: Update status by subscribe Event Notification. To use this mechanism, Notification Class should be pre-configured on real BACnet Device, If subscribed Event Notification Class Required Ack, then BMS integration will list ACK-Required Event Notification. BMS integration uses 12505 network ID to communicate, you can change it by the following line in ConnectedPro.HardwareInterface.BACnet.DriverService.exe configuration file located under installation path\Tyco\CrossFire\ServerComponents.
Polling	Update data by polling the value and status. The polling period shares the value with the BACnet Device
None	None of the above mechanisms.

Delete a BACnet Device

1. Right-click the **BACnet Device**, and then click **Delete**.
2. Click **Yes** on the dialog box to confirm deletion.

View BACnet Objects

1. On the **Setup** tab, click **BACnet Objects**.
2. Click **Show All**.

An additional procedure to view BACnet Objects:

1. On the **BACnet Device Context Menu**, right-click the **BACnet Device.**
2. Click **View Objects**.

All configured BACnet objects are displayed in an Object List.

Delete a BACnet Object

1. Right-click the **BACnet object**, then click **Delete**.
2. Click **Yes** on the dialog box to confirm deletion.

New BACnet Action

1. On the **Setup** tab, click **BACnet Actions**.
2. On the drop down menu, click **New**. This will open the BACnet Action Editor.
3. Enter a name for the BACnet Device in the Name textbox.
4. Enter a description for the BACnet Device in the Description textbox.
5. Click for BACnet Device field to open **Object Selector window**.
6. Select one BACnet Device, and then click **OK** to return to BACnet Action Editor.
7. Click for BACnet Object field to open **Object Selector window**.
8. Select a BACnet Object, and then click **OK**.
9. Set Target Value of selected BACnet Object.
10. Click **Save**.

View BACnet Actions

1. On the **Setup** tab, click **BACnet Actions**.
2. Click **Show All**.

Configured BACnet actions will be displayed in an Object List.

Edit BACnet Action

1. Right-click the **BACnet Action**, and then click **Edit**.
2. Made edits as required.

3. Click **Save**.

Handling Event Notification and Alarm Acknowledge

1. On the **Setup** tab, click **BACnet Devices.**
2. Click **Ack Required**.

All events will be listed in the Event Notification in Alarm form.

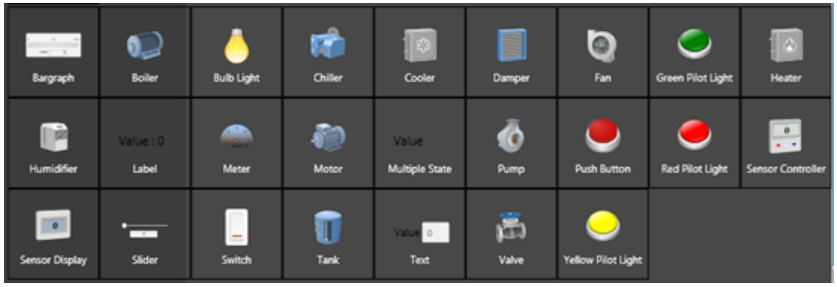
3. Right-click the event, and then click **Acknowledge.**

Wigets on Map

Overview

BMS integration supports Fan, Boiler, Chiller, Cooler, Damper, Heater, Humidifier, Meter, Motor, Bargraph, Bulb Light, Green Pilot Light, Red Pilot Light, Yellow Pilot Light, Pump, Push Button, Sensor Controller, Sensor Display, Slider, Switch, Tank, Label, Multiple State, Text, Valve widgets.

After the BMS integration is installed on victor map editor, there are additional widget icons available on the Icon Selector.



You can associate a victor object with a widget, then the widget is able to display the real time value, different animations for different state, additional alarm/fault/disable markup for alarm/fault/disable state.

Alarm markup is  , Fault markup is  , and Disable markup is  . The priority of these states are: Disable>Alarm>Fault.

Add a Widget on Map

To add a widget on Map, follow this procedure:

1. On **Map Editor**, click  .
2. On the bottom half of the **Icon Selector**, click the chosen Widget.

NOTE All widgets can be a binding input/value object. The widget is recommended to bind to an output object if it can be operated, such as the Sensor Controller, Switch, Tank, Bulb Light, Push Button, Bargraph, Slider, and Text.

3. Right-click the chosen widget, and then click **Drop** on the **Map Context** menu.
4. Click **Select Object** button. This will open the Object Selector which links a BACnet object to the widget.
5. Select the chosen widget, and then click **OK**.

NOTE

- Once the BACnet object is selected, the system will assign properties automatically if the widget's property name matches the object's property name. If the names does not match and the corresponding Assigned Property is empty, manual assignment is needed. Click the cell and select the property from the drop-down list.
- Every widget supports: Alarm Status, Enabled, Fault Status, Object Name, and Present Value properties.

6. To finish, click **OK**.

Description of Widgets

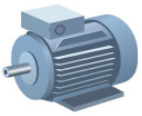
The following table illustrates the descriptions, properties and options of available animated widgets.

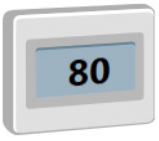
Table 2: Widget Descriptions

Name	Description	Properties	Options	Animation
Heater	The widget reflects heating output percent (0~100%).	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false.	 Heater is off  Heater is on, and the red frame size will adjust according to the heating output.
Cooler	The widget relfects cooling output percent (0~100%).	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false.	 Cooler is off.  Cooler is on, and the blue snowflake size will adjust according to the cooling output.
Boiler	The widget reflects boiler output percent (0~100%).	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false.	 Boiler is off.  Boiler is on and the red flame size will adjust according to the boiler output.

Chiller	The widget reflects chiller output percent (0~100%).	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false.	 Chiller is off.  Chiller is on.
Humidifier	The widget reflects humidifier output (0~100%).	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false.	 Humidifier is off.  Humidifer is on.
Fan	The widget reflects fan output percent (0~100%).	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Rotation: 0-360 Show Present Value: True or False. True means to display the present value in view mode. Default value is false.	 Fan is off.  When fan output is higher than 0, the fan leaf will go round. The speed will adjust according to the fan output.

Pump	The widget reflects pump output percent (0~100%).	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Rotation: 0-360 Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false.	 Pump is off.  When pump output is higher than 0, the pump leaf will go round. The speed will adjust according to the pump output.
Damper	The widget reflects damper output percent (0~100%).	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false.	 Damper is off.  When damper output is higher than 0, the grid of damper will sway. The speed will adjust according to the damper output.
Valve	The widget reflects valve position range of 0~100%.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Rotation: 0-360 Show Present Value: True or False. True means to display the present value in view mode. Default value is false.	 Valve is closed.  When valve output is higher than 0, the valve will open. The valve position will adjust according to the valve output.

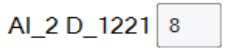
Motor	The widget reflects motor on/off state, and provides motor speed value, e.g. 1,800 rpm.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false.	 Motor is off.  Motor is on.
Tank	The widget reflects how what percent the tank is filled (1~100%).	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Large Change: click PAGE UP or PAGE DOWN to change value. Default value is 1. Maximum Valve: 100 Minimum Valve: 0 Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false. Small Change: click the arrow key to change value. Default value is 0.1.	 Tank is off.  Tank is on and the scale will adjust according to the tank output.

Meter	The widget displays an analog value.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Maximum Value: 180 Minimum Value: 0 Show Present Value: True or False. True means to display the present value in view mode. Defualt value is false.	
Sensor Controller	The widget displays the sensor analog value together with its unit e.g. 72.9°	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Maximum Value: 100 Minimum Value: 0 Step Value: the increase or decrease of step value. Default value is 1. Unit: the unit of value.	 Click the **Up** arrow to increase sensor value by one step. Click **Down** arrow to decrease sensor value by one step.
Sensor Display	The widget displays the sensor analog value together with its unit e.g. 72.9°	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Maximum Value: 100 Minimum Value: 0 Step Value: the increase or decrease of step value. Default value is 1. Unit: the unit of value.	

Switch	The widget reflects on/off state of binary input/value. Click this widget to change the binary input/value status.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide	 Switch is off.  Switch is on.
Bulb Light	The widget reflects on/off state of binary output/value. Click this widget to change the binary input/value status.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Rotation: 0~360	 Bulb is off.  Bulb is on.

Polit Light	The widget reflects on/off state of binary output/value.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide	 Polit light is off.  Green polit light is on.  Yellow polit light is on.  Red polit light is on.
Push Button	The widget reflects on/off state of binary output/value. Click this widget to change the binary input/value status.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide	 Push button is off.  Push button is on.
Bargraph	The widget displays an analog value together with the Name. The user can change the value in the textbox.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Maximum Value: 100 Minimum Value: 0 Unit: the unit of value. The unit/maximum/minimum is configurable.	

Slider	The widget displays an analog value. THe user can change the value by slider or input the value in the textbox directly.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Large Change: click **PAGE UP** or **PAGE DOWN** to change value. Default value is 1. Maximum Valve: 100 Minimum Valve: 0 Small Change: click the arrow key to change value. Default value is 0.1. Unit: the unit of value. The minimum/maximum is configurable.	
Label	The widget displays a read-only analog value together with the Name.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Unit: the unit of value. The unit/name is configurable.	AI_2 D_1221 : 8
Multiple State	The widget displays a read-only multi state value together with the Name. the Name is configurable.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide State Text: split with ","	MI_2 D_1221 : off

Text	The widget displays an analog value togher with Unit or Name. The user can change the value in the textbox.	Alarm Status Enabled Fault Status Object Name Present Value	Alarm Annunciation: Blink, Normal, Hide Fault Annunciation: Blink, Normal, Hide Maximum Value: 100 Minimum Value: 0 Unit: the unit of value. The unit/name/maximum/minimum is configurable.	

Edit a Widget on Map

1. On the **Map Editor**, right-click the widget.
2. Select the **Edit Context** menu to enter the **Widger Editor**.
3. Make edits.
4. To finish, click **OK**.

Delete a BACnet Object

1. On the **Map Editor**, right-click the widget.
2. From the **Map Context** menu, click **Remove**.
3. To finish, click **Yes**.

4

BACnet Gateway

In this chapter:

Overview

BACnet Gateway provides a mechanism for wrapping Crossfire Objects to BACnet Objects. It also implements BACnet services such as Alarm and Event Services, Object Access Services, and Remote Device Management Services. If necessary, Crossfire Object changes and notifications can be monitored through BACnet protocol.

BACnet Gateway Template

The BACnet Gateway template defines the mapping definition on how to map victor object to BACnet objects.

The BMS Integration provides the default gateway templates and also provides the way to customize the Gateway template.

BMS Integration provides the following default Gateway templates:

- iSTAR people counting Gateway template - this template maps the UserCountStatus property of Area to the present value of BACnet Analog Input.
- Default Event Template - this template maps the ActiveStatus of Event to present value of BACnet Binary Input.

Perform the following steps to establish a BACnet Gateway:

Add a new BACnet Gateway Template

1. On the **Setup** tab, click **BACnet Gateway Template**.
2. On the drop-down menu, click **New**.
3. Enter Name in textbox.
4. Enter Description in textbox.
5. Click **Save and Close**.

Create a Gateway Device

1. On the **Setup** tab, click **BACnet Gateway Device**.

2. On the drop-down menu, click **New**.
3. Enter Name in the textbox.
4. Enter Description in the textbox.
5. Click **Save and Close**.

The newly created Gateway Device will appear in the Device List under "BACnet Gateway Devices".

Monitored Mapping

1. On the **Device List**, right-click the created Gateway Device.
2. On the drop-down menu, click **Create Mapping**.
3. On the Gateway Template Form, select a template and click **Generate**.
4. On the Gateway Mapping and Binding Form, select one Mapping Definition and the Binding Instances to be mapped. After these are chosen, click **Generate**.

NOTE When objects have been mapped, there is a function to view whole monitored objects.

5. When finished viewing the process results, click **OK**.

Edit a BACnet Gateway Object

1. On the **Setup** tab, click **BACnet Gateway Object**.
2. On the drop-down menu, click **Show All**.
3. On the BACnet Gateway Obejct tab, right-click the chosen object name.
4. Click **Edit**.
5. Make edits as required.
6. Click **Save and Close**.

Manage a BACnet Gateway Template

1. On the **Setup** tab, click **BACnet Gateway Template**.

2. On the drop-down menu, click **Show All**.
3. Right-click selected Template, and then click **Edit**.
4. Make edits as required.
5. Click **Save and Close**.