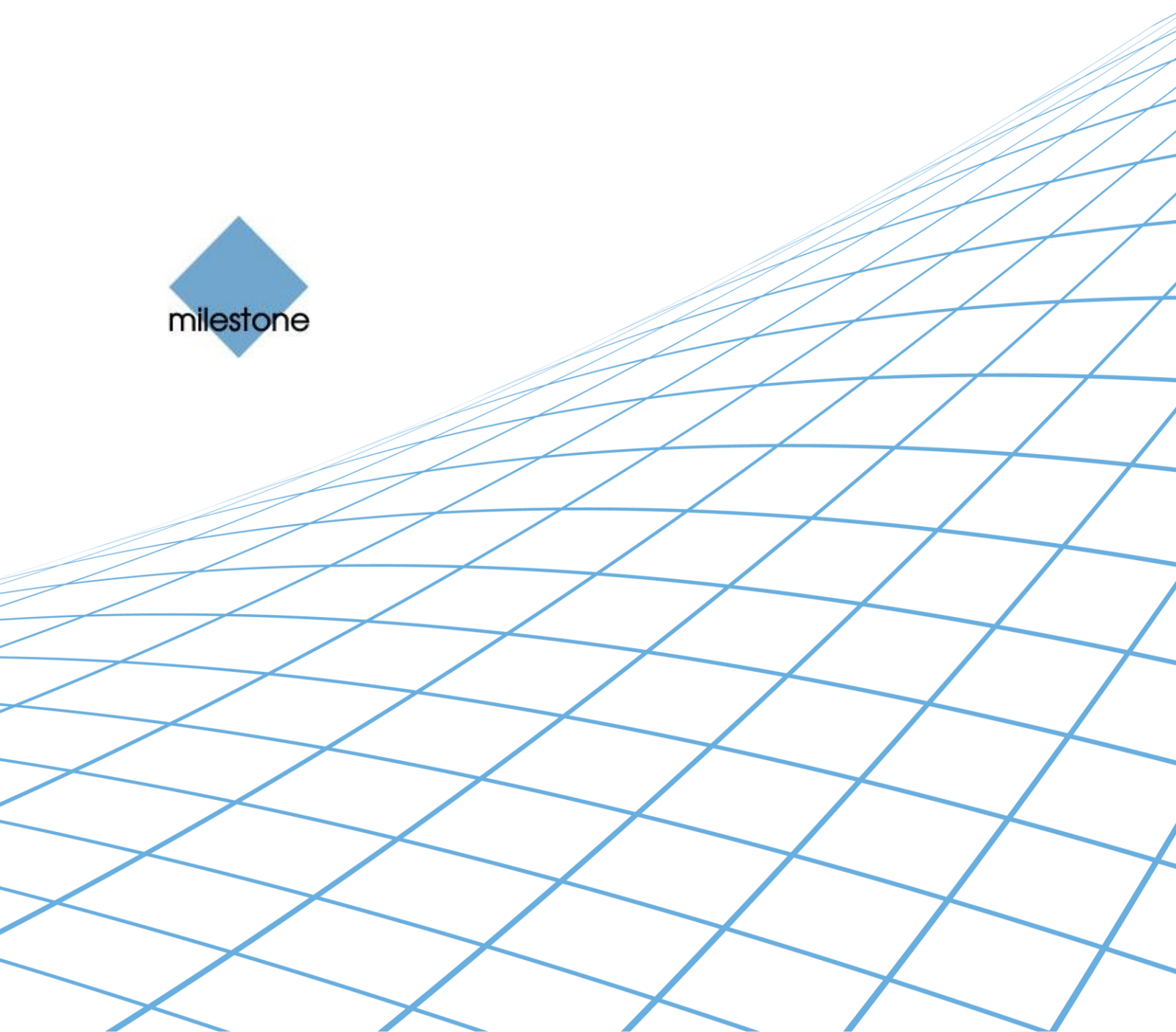




BACnet Integration User's Manual





Target Audience for this Document

This document is aimed at system operators and provides a description of how to install and configure the Milestone BACnet Integration. Knowledge and experience with both the Milestone VMS system and the BACnet protocol is required for proper configuration.



Contents

.....	1
COPYRIGHT, TRADEMARKS & DISCLAIMERS	4
Copyright	4
Trademarks.....	4
Disclaimer	4
INTRODUCTION	5
Prerequisites	5
INSTALLATION	6
License	7
CONFIGURATION	8
OPERATION	15



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Introduction

The Milestone BACnet Integration provides the ability for BACnet Clients to integrate to the Milestone VMS as a BACnet Device as well as it provides the ability for the Milestone VMS to act as a client and trigger an event when a BACnet property changes or matches a specific expression from a BACnet device on the network.

Prerequisites

The Milestone BACnet Integration is compatible with *Milestone XProtect® Corporate 2017 R1*.



Installation

The BACnet Integration is developed as a Milestone MIP plugin and consist of one installation file:

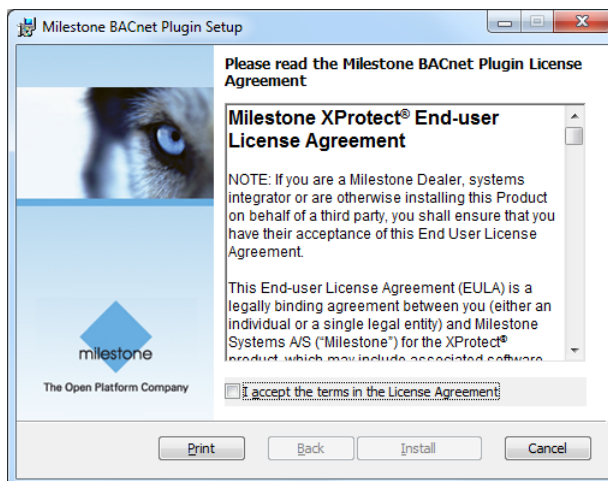
- BACnetPluginInstaller.msi

The BACnet Integration plugin should be installed on the following computers:

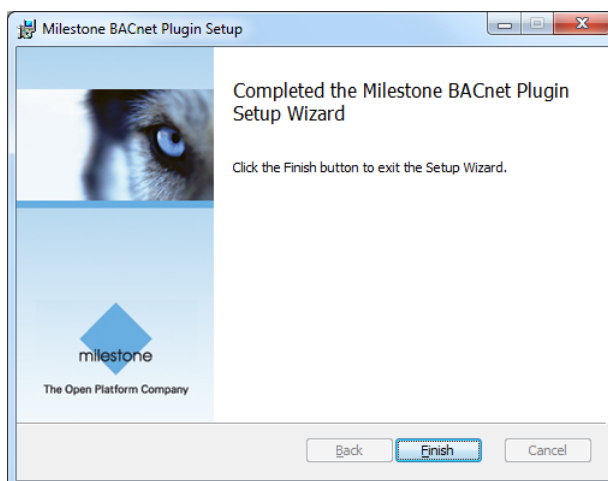
- On the computer where the Milestone Event Server service is running.
- On the computers where the Milestone Management Client is installed.

Installation steps for the BACnetPluginInstaller.msi:

1. Launch the installation file (BACnetPluginInstaller.msi).



2. Read the License Agreement and to continue click "I accept the terms in the License Agreement".
3. Click "Install" and wait for the installation to complete.



4. Click "Finish".
5. Restart the Milestone Management Client or Milestone Event Server Service depending on which machine the plugin was installed.



After installation the BACnet Integration will instantly provide a BACnet server and a BACnet client. The BACnet server is providing a BACnet device with the default instance number 1234. The BACnet device will have a list of objects containing a BACnet object for each Camera and User Defined Event hosted on the Milestone VMS.

The BACnet properties of the Milestone device, camera object and triggered event object is specified in the appendix.

The BACnet client is monitoring changes in BACnet objects properties. The BACnet client will start gathering information about the other BACnet devices, but no interaction towards the Milestone system will be made until the BACnet client has been configured to trigger Milestone analytic events based on changes in the BACnet object properties.

License

The license is obtained by updating the XProtect VMS SLC with MIP component *BACnet integration*. When the update is acquired the XProtect VMS must be reactivated, online or offline. The license allows an unlimited number of BACnet Objects and Properties to be added to the integration. The plugin can be used in a trial period of 30 days. When the license has been updated please restart the event server.

License Information

Type	Total - All Sites		Current Site			
	Obtained	Activated	Activated	Temporary	Expired	Missing
Hardware Device	25	6	6	0	0	0
XProtect BACnet Integration	1	1	1	0	0	0



Configuration

The configuration of the BACnet integration consist of setting up event mappings and configuring the communication settings.

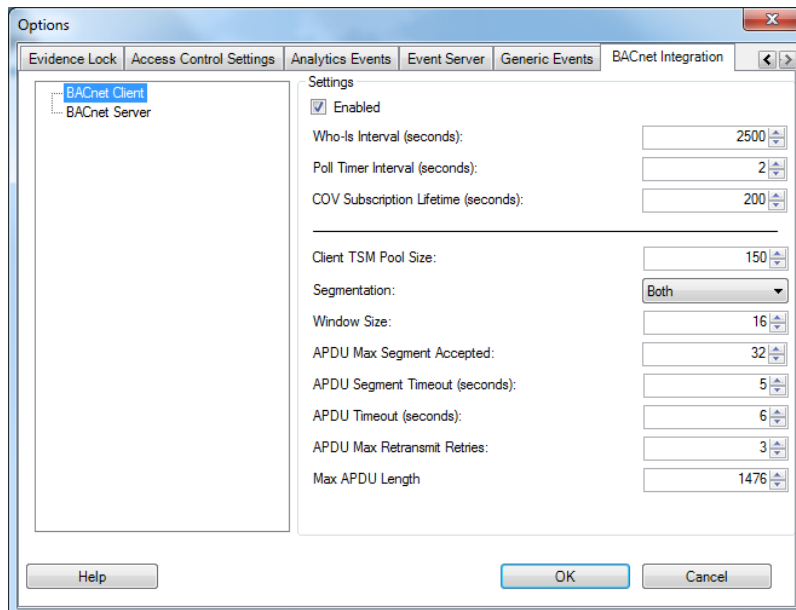
Communication Settings

Configuring the BACnet integration communication settings is done in the Milestone Management Client by accessing the menu item Tools -> Options. In the options dialog click on the arrow pointing right in the top right corner of the dialog to change tab until you get the "BACnet Integration" tab.

In the left part of the dialog window a tree structure is present with two top tree nodes "BACnet Client" and "BACnet Server". Selecting a node in the tree structure provides the settings for that area of the BACnet integration.

BACnet Client

The BACnet client executes as a Milestone event server plug-in and acts a BACnet client monitoring for changes of value in the properties on BACnet objects.



The BACnet Client settings is divided by a horizontal ruler. The upper part of the settings is the most likely settings to be used in an integration. The lower part of the settings is BACnet communication specific settings. Milestone recommend to use the default settings for the communication specific settings and only change these based on a detailed knowledge about how to setup BACnet clients.

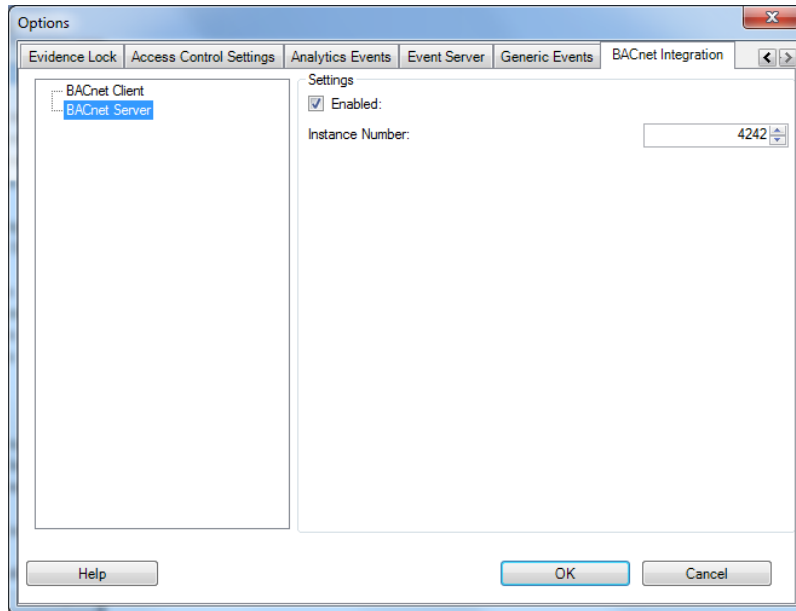


Name	Description
Enabled	Enables or disables the BACnet client functionality
Who-Is Interval	The amount of time in seconds between sending a who-is message. In case of network problems some of the BACnet devices on the network might not be recognized by the BACnet client. To improve reliability of the BACnet client it will at regular intervals send a who-is message to update its internal list of BACnet devices.
Poll Timer Interval	The amount of time in seconds between polling of BACnet properties to identify whether values matches a configured event filter.
COV Subscription Lifetime	The amount of time in seconds defining the lifetime of the COV subscriptions
Client TSM Pool Size	The maximum number of outstanding client confirmed requests
Segmentation	Whether the device supports segmentation for transmission, reception, or both
Window Size	The proposed size of a segmented message for a client request - or - the maximum allowed value for the actual window size in case of a server indication
APDU Max Segment Accepted	The maximum number of segments of an APDU that this device will accept
APDU Segment Timeout	The amount of time in seconds between retransmission of an APDU segment
APDU Timeout	This property defines the APDU-Timeout, which indicates the amount of time in milliseconds between retransmissions of an APDU requiring acknowledgment for which no acknowledgment has been received.
APDU Max Retransmit Retries	The maximum number of times that an APDU shall be retransmitted if the APDU-Timeout has expired for an APDU requiring acknowledgment and no acknowledgment has been received
Max APDU Length	The maximum number of octets that may be contained in a single, indivisible application layer protocol data unit



BACnet Server.

The BACnet server executes as a Milestone event server plug-in and acts a BACnet server enabling other BACnet clients to monitor the exposed functionality (for details please refer to the appendix) for changes.



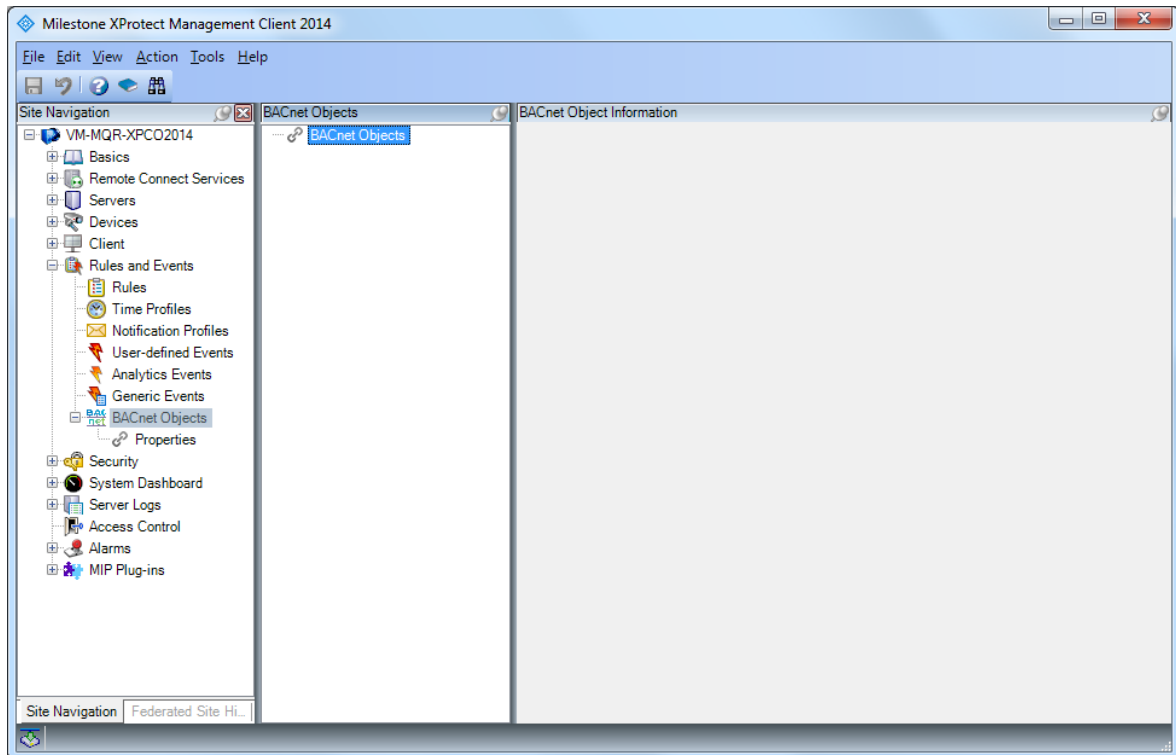
The BACnet Server settings should most likely be changed in all installations to specify an instance number that is unique for the specific BACnet.

Name	Description
Enabled	Enables or disables the BACnet Client functionality
Instance Number	The Instance Number of the BACnet Device hosted by the BACnet Server to publish the Milestone VMS system towards BACnet

Event Mappings

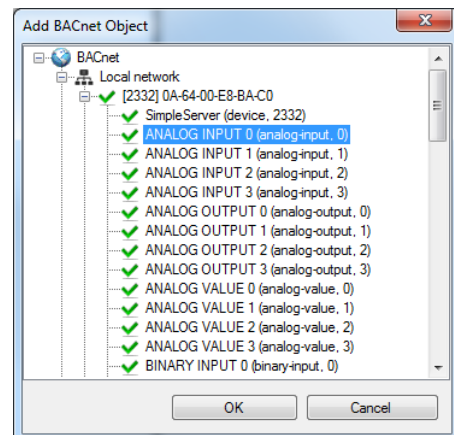
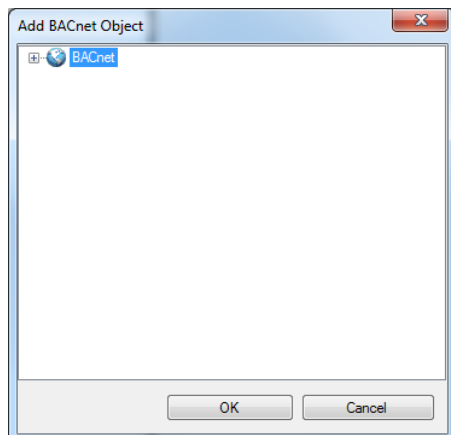
Configuring the BACnet integrations event mappings is done in the Milestone Management Client by accessing the "BACnet Objects" node located under the category "Rules and Events".

An event mapping is a mapping describing which BACnet Properties to monitor and whether to trigger a Milestone event based on value change and/or based on if the new value matches a filter.



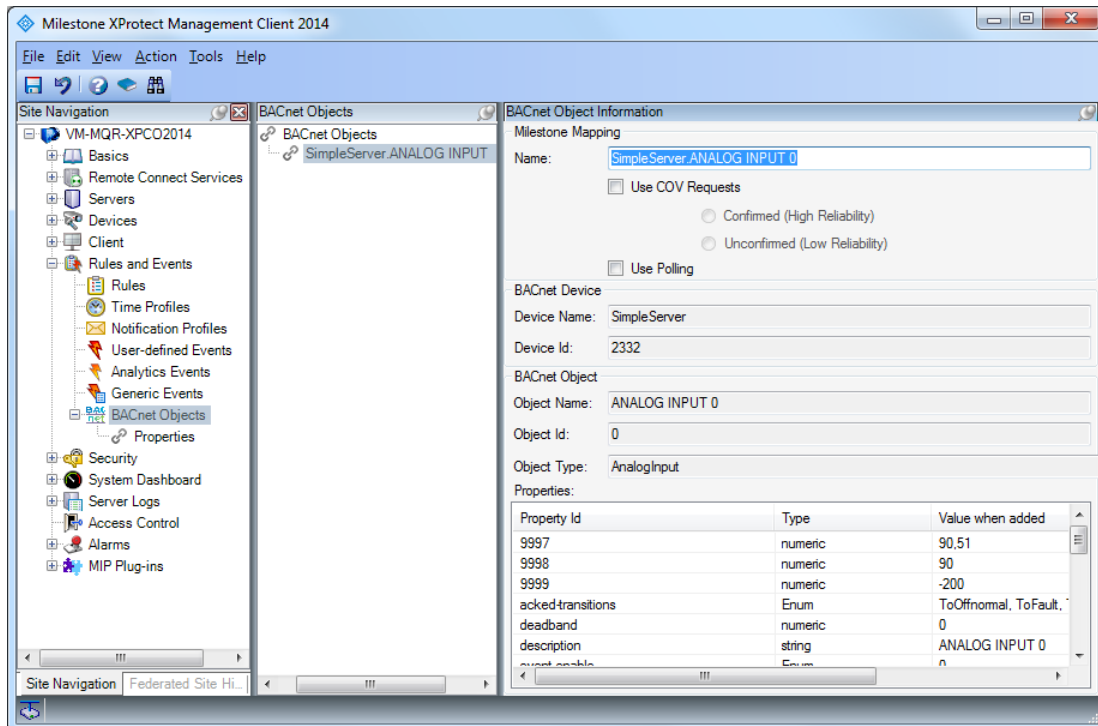
To set up an event mapping first the BACnet object hosting the property has to be selected. This is done by right clicking on the “BACnet Objects” node and selecting “Add New ...”.

This will display the “Add BACnet Object” dialog.



Now expand the tree. Locate the BACnet Device hosting the BACnet Object to which the Property that should be monitored belongs. Expand the BACnet Device object and select the right BACnet Object.

Click “OK”.



The selected BACnet object will now be displayed.

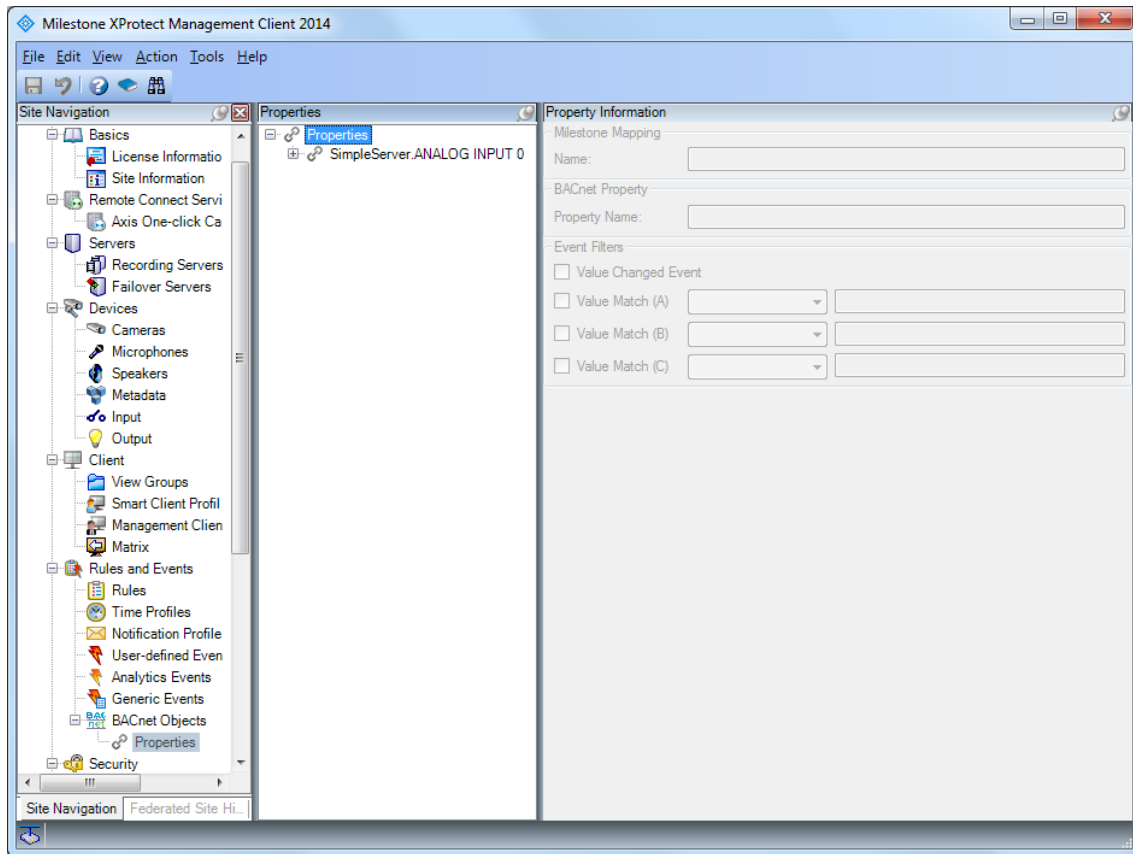
It is possible to change the name of the Milestone mapping of the object as well as to select which method should be used to identify changes to the BACnet properties.

Use COV Request: Uses the BACnet protocol to subscribe for COV (Change of Value) on the BACnet object. A COV subscription must be either confirmed or unconfirmed. Confirmed will provide the highest reliability since the BACnet Server will retry sending the message several times if no acknowledgement is retrieved. Unconfirmed will provide a lower reliability since only one message is sent and no acknowledgement is sent from the client.

Use Polling will periodically poll the BACnet server for the value of the BACnet Properties to identify whether a BACnet property has changed its value.

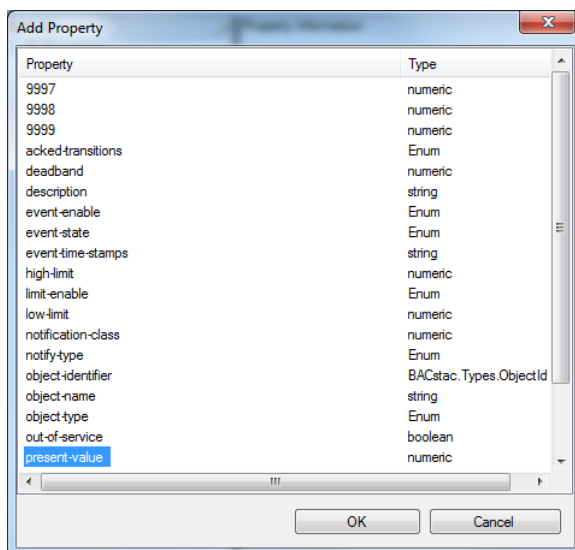


Now select the “Properties” child node of the “BACnet Object” in the Site Navigation. After having added new objects a refresh of the Management Client is required (press F5).



Right click on the newly added BACnet object and select “Add New ...”

This will display the “Add Property” dialog.





Select the property that should be added and click “OK”.

The selected Property will now be displayed.

It is possible to change the name of the Milestone mapping of the property as well as to setup event filters. It is possible to configure up till three (A, B and C) match filters for each property.

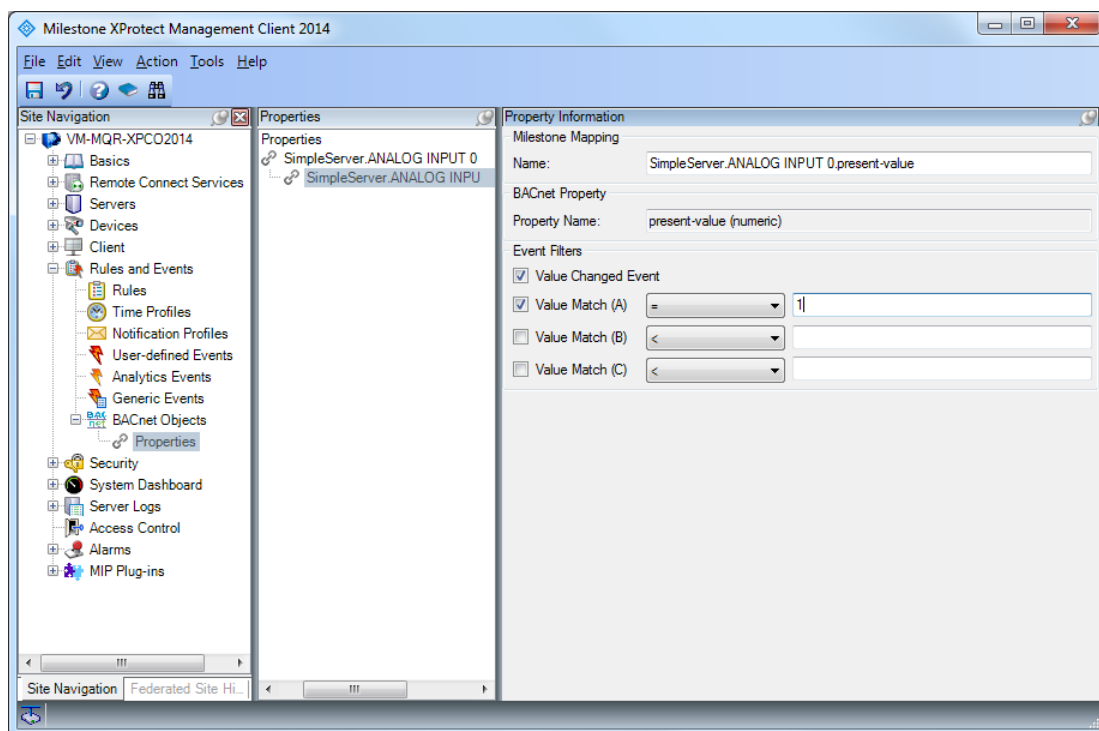
Checking the “Value Change Event” will cause the BACnet client to trigger the Milestone event “BACnet Events / Value Changed” when a change in the property value is registered.

Checking the “Value Match (A)” will cause the BACnet client to trigger the Milestone event “BACnet Events / Value Match A” when a change in the property value is registered that matches the filter defined after the “Value Match (A)” label.

Checking the “Value Match (B)” will cause the BACnet Client to trigger the Milestone event “BACnet Events / Value Match B” when a change in the property value is registered that matches the filter defined after the “Value Match (B)” label.

Checking the “Value Match (C)” will cause the BACnet Client to trigger the Milestone event “BACnet Events / Value Match C” when a change in the property value is registered that matches the filter defined after the “Value Match (C)” label.

Depending on the data type of the property different filters will be available when configuring the Value Match A, B and C filters.



Note: In order for the BACnet Client to trigger any Milestone events it needs to register a change in the property value of the BACnet property. This is done either by the use of COV (Change of Value) subscriptions or by polling the property. Selecting the method (or methods) is done on the BACnet object.

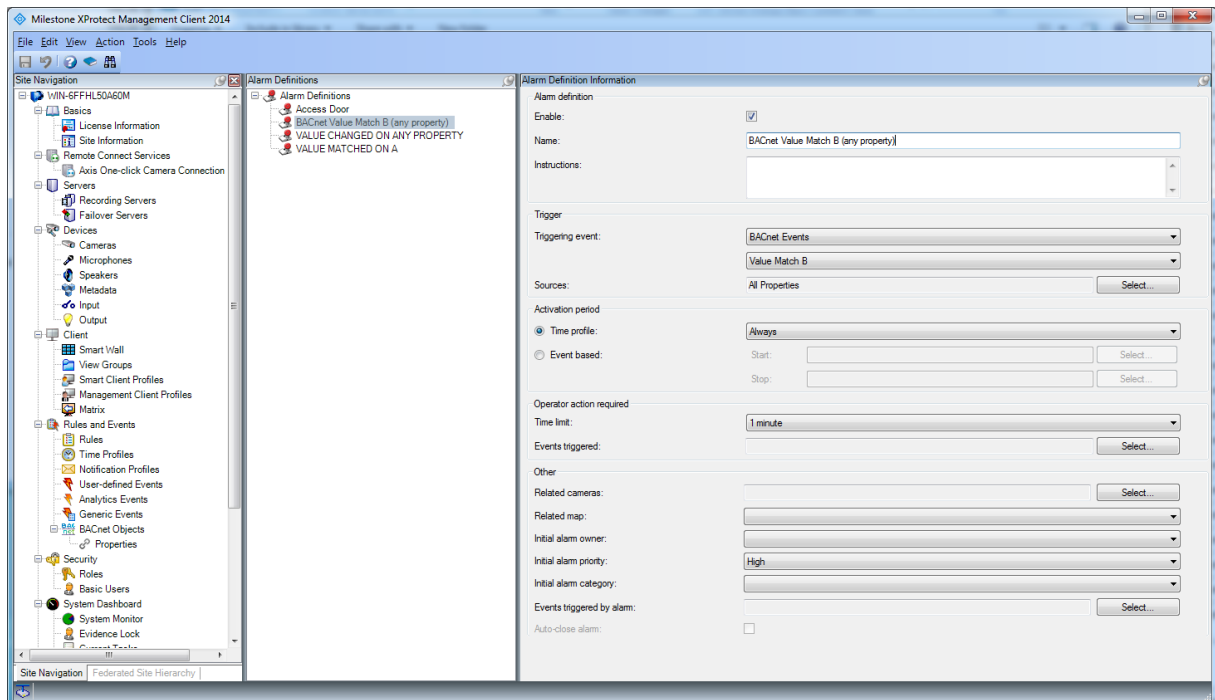


Operation

In daily operation the BACnet integration will trigger Milestone events equal to standard Milestone events. These events can be used to create alarms that can be managed in the Milestone XProtect Smart Client “Alarm Manager” Workspace.

Configuring a Milestone event to trigger a Milestone alarm is done in the Management Client by setting up a new Alarm Definition (under the top node “Alarms”).

An example of an alarm triggered by a value match property from any BACnet device:





BACnet Object generation

The BACnet server automatically generate camera and trigger event objects based on the items defined with the Milestone VMS. These objects are automatically mapped to an object instance number. The mapping between the two consist of a GUID assigned by the Milestone VMS and an integer value used as identifier on the BACnet network. The mapping for each of the types are stored in local files where the Event Server is running the plug-in. The files are located in the following folder:

C:\ProgramData\Milestone\BACnetPlugin\

One csv file for each type of object is created:

- CameraType.csv
- TriggerType.csv

The mapping of the objects can be changed by editing these files. For the changes to become effective a restart of the event server is required.

Whenever a camera or user-defined event has been defined in the Milestone VMS a restart of the event server is required before an associated BACnet object will be generated. Newly added objects will be assigned with consecutive numbers starting from the highest number of predefined objects.

To reset the existing mapping, delete the files.

Note:

After the configuration of a system has been completed, it is recommended to backup these files.



Appendix

BACnet objects

The BACnet plugin provides a BACnet device representation of the Milestone VMS. This is defined by a BACnet standard device object having the required properties. Additionally, the following proprietary object types are used: CameraObjectType and TriggerEventObjectTypes, each defining a camera or user-defined event of the system. This section describes these object types.

Device Object

The Device object includes the standard required properties for a BACnet device. Additionally, a '1000' property which contains a GUID that identifies the Milestone VMS master site has been included. The BACnet supports COV service functionality and therefore includes the ActiveCOVsubscription property.

Device Object addons: BACnet Properties list

Property Identifier	Property Datatype	Description
VideoOS_Id (1000)	CharacterString	GUID identifying the object in the VideoOS
ActiveCovSubscriptions (152)	BACnetLIST of BACnetCOVSubscriptions	List of active COV subscriptions that are active at any given time.

Camera Object

The Camera Object type has a collection of properties which provides status information of a camera. The included properties are listed in the table below. The proprietary object is defined by ObjectType '785'. The '1000' property contains a GUID which is a unique ID of the camera in the Milestone VMS. The '1001' property has a textual description of the latest event registered with the camera. The integer value of the PresentValue property is set by the system whenever an event occurs, the value is auto-reset to '0' after 3 seconds.

Camera Object: BACnet Properties list

Property Identifier	Property Datatype	Description
ObjectIdentifier (75)	BACnetObjectIdentifier	Numeric code uniquely identifying this object
ObjectName (77)	CharacterString	Alphanumeric string identifying this object
ObjectType (79)	BACnetObjectType	Decimal: 785
VideoOS_Id (1000)	CharacterString	GUID identifying the object in the VideoOS
VideoOS_EventMsg (1001)	CharacterString	Description of the latest event type
PresentValue (85)	Unsigned32	0: Not set 1: Motion detected 2: Motion ended 3: Device responding 4: Device not responding 9: Unknown



Trigger Event Object

The Trigger Event Object type has a collection of properties which provides status information and trigger functionality of a User-defined Event. The included properties are listed in the table below. The proprietary object is defined by ObjectType '786'. The '1000' property contains a GUID which is a unique ID of the User-defined Event in the Milestone VMS. The Integer value of the PresentValue property is set to '1' by the system whenever the User-defined Event has been triggered, the value is auto-reset to '0' after 3 seconds. The Trigger property is a writable property which is used for triggering the User-defined Event from a BACnet client. Whenever writing to the Trigger property the User-defined Event will be triggered.

Trigger Event Object: BACnet Properties list

Property Identifier	Property Datatype	Description
ObjectIdentifier (75)	BACnetObjectIdentifier	Numeric code uniquely identifying this object
ObjectName (77)	CharacterString	Alphanumeric string identifying this object
ObjectType (79)	BACnetObjectType	Decimal: 786
VideoOS_Id (1000)	CharacterString	GUID identifying the object in the VideoOS
PresentValue (85)	Unsigned32	0: Not set 1: Set
Trigger (205)	Boolean	Always "false", write any value to the property to activate the trigger.

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