

# **BACnet Integration App-note**



# Contents

1. Introduction	4
1.1 Requirements	4
1.1.1 General Requirements	4
1.1.2 License Requirements	4
1.2 Integration Components	5
2. Device Addition	6
2.1 The Integration Devices Panel	6
2.2 Add a New Device	6
3. Configuration Section (Tabs)	7
3.1 Object Configuration Tab	7
3.1.1 Object Configuration Buttons	7
3.1.2 Object Configuration Right-Click Options	8
3.1.4 Edit Object	8
3.1.5 Configure Overlays	9
3.2 Objects Properties Tab	10
3.3 Device Events Tab	11
3.4 Groups Tab	11
3.4.1 Create a Group	11
3.4.2 Add or Remove Objects	12
3.5 General Tab	12
3.5.1 Configure a New Database	13
3.5.2 Select the Integration Database	15
3.5.3 General Settings Button	16
4. Database	17
4.1 Navigate to the Database	17
4.2 Database Interface	17
4.2.1 Scheduled Metadatabase Reports	19
4.2.2 Generate Metadatabase Reports	21
4.2.3 Metadata	22
4.2.4 Viewing an Entry's Associated Recording	22
5. Events	23
5.1 Event Window	23
5.2 Creating an Event	23
5.3 General Tab	24
05-20170517-131 Rev 1.1 21 July 2022	2



	5.4 Triggers Tab	. 24
	5.4.1 Set the Device as the Trigger	. 25
	5.4.2 Trigger Types (Trigger Using)	. 25
	5.4.3 While/When and Any/All	. 26
	5.4.4 Define the Trigger ("Any Device Event" Option)	. 27
	5.4.5 Define the Trigger ("Properties Meeting Criteria" Option)	. 29
	5.5 Actions	. 29
	5.5.1 Adding an Action	. 29
	5.5.2 Control Device	. 29
6.	Camera Tab Overlays	. 30
	6.1 Navigate to the Cameras Tab	. 30
	6.2 Video Feed Options Panel	. 30
	6.3 Select the Overlay	. 30
7.	Conclusion	. 31

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#### 1. Introduction

This document details the integration of the Building Automation and Control Networks (BACnet) system with CathexisVision. CathexisVision receives events from BACnet devices on the network and links them to video in the integration database.

Functionally this integration entails the triggering of standard CathexisVision Events, based on these received event messages from BACnet devices.

#### Note:

- 1. For information regarding the regular operation of a BACnet device, please consult the relevant documentation.
- 2. There is a General Integration section in the main CathexisVision manual. It has important information about creating an integration database, as well as a general introduction to the Integration Panel. **Read over this section.**

#### 1.1 Requirements

#### 1.1.1 General Requirements

• CathexisVision 2020.3 and later is recommended.

**Note**: BACnet is a general-purpose integration protocol. CathexisVision adheres to the ANSI/ASHRAE 135-2016 standard. Please confirm that the device that CathexisVision is to work with also adheres to this protocol. The protocol is backwards compatible with previous versions, although some features may not be available.

For queries, please contact support@cat.co.za.

#### 1.1.2 License Requirements

License No.	License Name	Description
CBAC-2000	BACnet Device license.	This license is the "base" license to integrate with the
		building automation and control system. It is applied to
		the server to which the BACnet device is connected. It
		will allow for the connection of a single BACnet device.

Note: In this integration, individual devices (integrated systems) will require a license for each device.



#### 1.2 Integration Components

All CathexisVision integrations have two component levels: Device and Object.

Device	The device is CathexisVision software's interface, which handles all the interaction between CathexisVision and the integrated hardware. When an integration is added to the CathexisVision system, a device is added. The messages received from the device are called Device events.	
Objects	Objects are the individual pieces of hardware that comprise the integration. There may be multiple "object types" under the objects group. For example, the main controller and door nodes of an access control system are both objects. They are different types of objects.	

**Note**: In this integration, the Device objects are named Device, and Object, Communication channel. The interface device should not be confused with the object named "Device."

#### A NOTE ON CAMERA CHANNELS

The CathexisVision software packages have **limits on camera channels**. A multi-sensor camera is physically a single device (camera) but it requires a camera channel for each one of the internal cameras. The same applies to an encoder: a 16-channel encoder will account for 16 camera channels on the CathexisVision software, even though it is a single device. Even when a camera or device only uses a single IP license, the camera channel limit will still apply.

#### **USEFUL LINKS**

To view tutorial videos on CathexisVision setup, visit https://cathexisvideo.com/resources/videos

Find answers to Cathexis Frequently Asked Questions: https://cathexis.crisp.help/en/?1557129162258

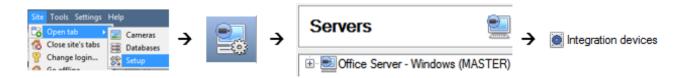


#### 2. Device Addition

Integrations are added on a server-by-server basis. They are managed in the Integration devices panel, under the **Setup Tab** of the servers to which they are added.

#### 2.1 The Integration Devices Panel

To get to the Integration devices Panel, follow this path: Site / Open tab / Setup / Configuration icon / Server / Integration devices.



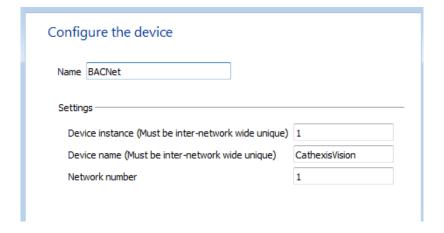
There are two sections in the Integration devices Panel:

- 1. The **Devices** list shows the integration devices attached to the integration database.
- 2. The **Configuration** section enables editing/reviewing the device selected in the **Devices** section.

#### 2.2 Add a New Device



- 1. In the Integration Panel, navigate to the Devices section.
- 2. Click on the **New device** button on the right-hand side. This will open the addition dialogue.
- 3. Select the **BACnet** driver.



Give the device a **descriptive name** for identifying it on the CathexisVision software.

Give the device a **unique Instance number** so that it can be identified across networks.

**Tip:** A good instance number would be some combination of the server's IP address.

Give the device a **unique name** for identifying it across networks.



## 3. Configuration Section (Tabs)

The configuration section is divided up into a number of Tabs. The available tabs are: **Object configuration**, **Object properties**, **Device events**, **Groups**, **General**.

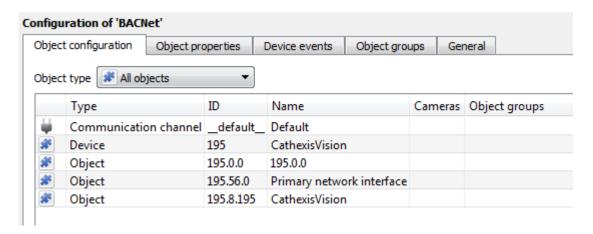
The BACnet driver automatically discovers all BACnet devices on the IP network, and the BACnet device objects will be automatically added to the system once the device is added.

A Device Object is created for each discovered BACnet device, while the objects for each device are queried and are represented by the objects (also named Object) which get created. See the image below.

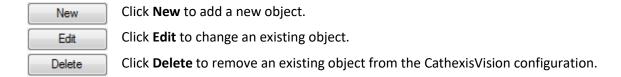
#### 3.1 Object Configuration Tab

The object configuration tab is the tab where the individual objects that comprise the integration may be viewed. The BACnet integration objects are **Device and Object**.

In this tab, the Names, Cameras and Groups assigned to each object are visible.

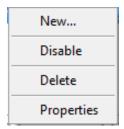


#### 3.1.1 Object Configuration Buttons





#### 3.1.2 Object Configuration Right-Click Options



New will open up the dialogue to add a new object.

**Disable/Enable** allows objects to be enabled/disabled manually.

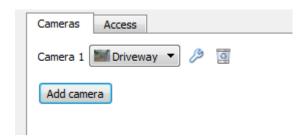
**Delete** will permanently remove this object from the list.

**Properties** will open up the object properties. The object may be edited from here. Specifically, assign cameras to this object, and define user access levels.

#### 3.1.4 Edit Object

#### 3.1.4.1 Properties: Cameras

Adding a camera to an object will mean that, whenever there is an event on that object, the recording from that camera will be related to the time and date of the object event, in the Integration database.





To **add** a camera, click Add camera, and select the relevant camera from the drop-down menu.



To **delete** a camera, click the trash icon.



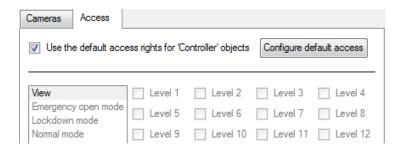
To configure the **overlays** for the specific object that has been selected, click the settings icon.

#### Note:

- 1. The settings icon only appears once a camera has been added.
- 2. This setting will only apply to the specific object that has been selected.
- 3. To configure overlays for **all** objects, please see the section below on defining the Default Settings for objects.
- 4. If *continuous recording* is not set up on associated cameras, it runs the risk of zones (objects) triggering while the cameras are not recording. To record only cameras when an object triggers, setup **Events** that trigger a recording, when one of these objects is activated.



#### 3.1.4.2 Properties: Access



**Access** allows sensitive objects to be protected by only allowing certain levels users access to them.

A list of objects for which access levels may be set, is visible.

**Note**: If *Use default access rights* is checked, make sure that those default rights have been correctly defined. Click on **Configure default access** to do this.

#### 3.1.5 Configure Overlays

Overlays may be configured individually, or globally.

- If individual, then the overlay settings are applied only to the selected object. If global, then the overlay settings are applied to all objects of the selected type.
- The only difference in the configuration process, however, is navigating to the overlay settings window for each option. Thereafter, the overlay settings window is the same.

See below for navigating to the overlay configuration window for individual/global overlays.

**Note**: Overlays can only be configured for **Device** and **Object** objects.

#### 3.1.5.1 Configure Individual Overlays

- 1. Right-click the individual object and open the Properties window.
- 2. Add a camera to the object.
- Click the Edit Overlays icon.
- 4. Check Enable to enable overlays on the object.



#### 3.1.5.2 Configure Global Overlays

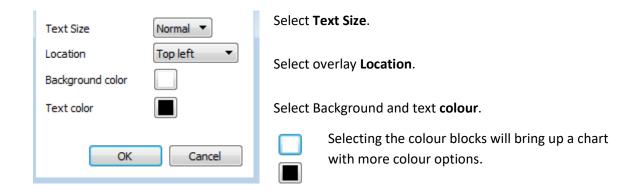
Select the object type from the Object type drop-down menu in the Object Configuration tab.

Click the Default Settings icon.

Use defaults

Click Enable to enable overlays on the object.

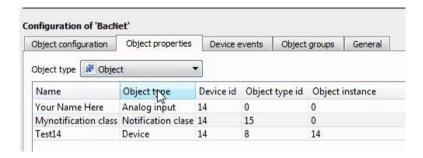
#### **Overlay Configuration Window**



Click **OK** to complete.

#### 3.2 Objects Properties Tab

The Object properties tab allows objects to be viewed, sorted by type.

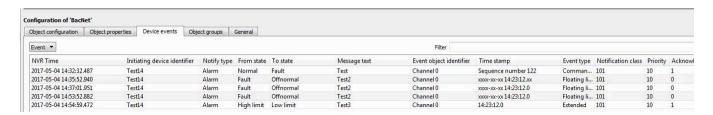


In the case of the BACnet device, the object types available are **Device and Object.** 



#### 3.3 Device Events Tab

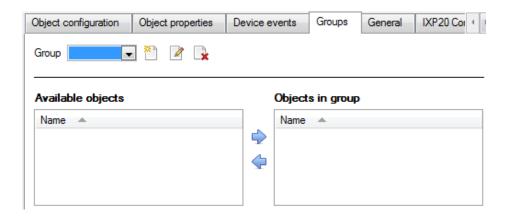
The Device events tab lists real-time events happening on this device. Installers can ensure that the integration is functioning, and monitor the Events happening on site.



**Note**: When navigating away from this window, the device events for that session will disappear but will still be accessible in the integration metadata base. Please see **Section 4 Database** for more information about the database.

#### 3.4 Groups Tab

Groups of the same type of object may be created.



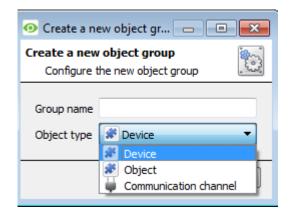
**Tip:** This is useful when setting up Events, because events can be triggered by an object group. (I.e. a group will trigger, if any of the objects in that group are triggered.)

#### 3.4.1 Create a Group

- To **create** a group, click on this icon.
- To **edit** a group, click on this icon.
- To **delete** a group, click on this icon.

A new dialogue box will pop up.





Give the group a descriptive Group name.

Click on the drop-down menu to select the **object type** to group.

Note: Once a group has been created, the object type of the group may not be edited.

The next step is to add individual objects to the group.

#### 3.4.2 Add or Remove Objects

After creating a group, a list of all the available objects for that group will be displayed in the Available objects panel, on the left-hand side. These are ready to be added to the group.



To add these objects to the group, select them from the list, and click on the right arrow.

To **remove** these objects from the group, select them and **click on the left arrow**.

Note: Multiple objects may be selected at a time.



Once individual objects have been added to the group using the arrows (above), they will appear in the section on the right-hand side.

#### 3.5 General Tab

The General tab of the Configuration section (Integration panel) deals with the integration database. Setup must be completed here, before the Databases tab can be used to search events and view associated footage.

From the General tab, the user must:

- Select an existing database, or
- Configure a *new* database for BACnet, and then select.



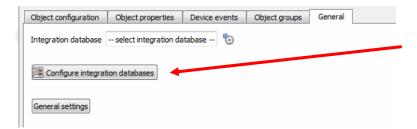
**Note**: Each integrated device needs to be attached to an integration database. Without setting up/adding a database here, the integration will not function properly within the CathexisVision system.

#### 3.5.1 Configure a New Database

- The first time an integration database is added, the general integration database will need to be initialised.
- If the database has already been initialised, then a database for a *specific integration* (i.e., BACnet) can be created.

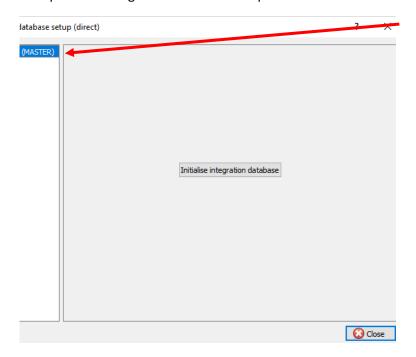
#### 3.5.1.1 Initialise the Integration Database

If an integration database has not yet been created, follow the steps below.



Click the **Configure integration** databases button from the General tab.

This opens the Integration database setup window.

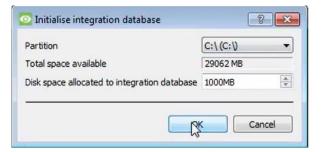


**Select the unit** to which the database will be added, from the list on the left.

Then, click **Initialise integration** database.

Initialise integration database





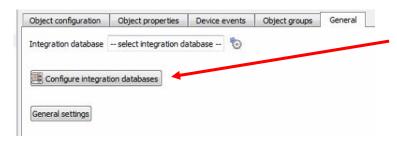
Choose the **partition** on which the database will be created.

Select disk space allocation.

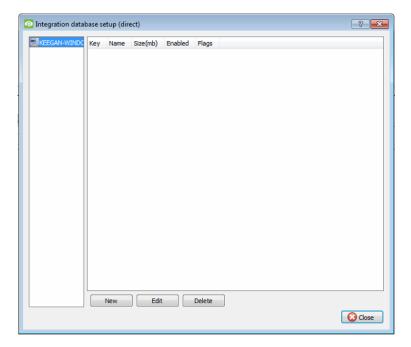
Click OK.

#### 3.5.1.2 Add a New Devices Database

After initialisation, the database can be added to the integration.



To add a new database, click the Configure integration databases button from the General tab.

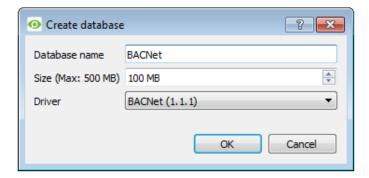


This opens the integration database setup window.

New Click the New button.

A dialogue will appear for creating the integration database.

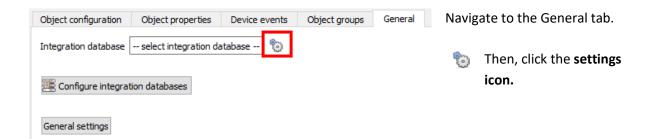




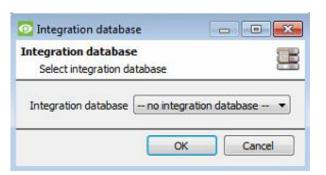
- Give the database a descriptive Database Name.
- Select the Size of the new database.
- Select the BACNet driver from the drop-down list.
- Click **OK** to create the database.

**Note**: The information on setting up an integration database may be found in the **Integration Devices General Settings** section of the CathexisVision Setup Manual.

#### 3.5.2 Select the Integration Database



A dialogue will appear. Only databases which relate to the device being added should appear.

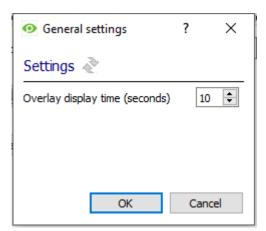


**Select** the **BACNet database** from the drop-down menu.

Then click OK.



#### 3.5.3 General Settings Button



Set the time (in seconds) that event overlays should be displayed for.



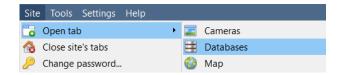
#### 4. Database

The databases tab will allow the user to navigate the records in each individual database. In the databases tab each database is presented as a table. It has built in filters, and the ability to navigate by timestamp. If a database record has an associated recording, the user will also be able to launch this recording, from within the databases tab.

Most integrations will have a different database presentation, and unique filters, due to the different parameters sent to CathexisVision by the integrated device.

#### 4.1 Navigate to the Database

To view information stored in the Integration, first navigate to the Databases Tab.



Follow the path on the left: Site / Open tab / Databases.



**Hover** over the arrow on the left-side of the camera image to bring up the database panel on the left.



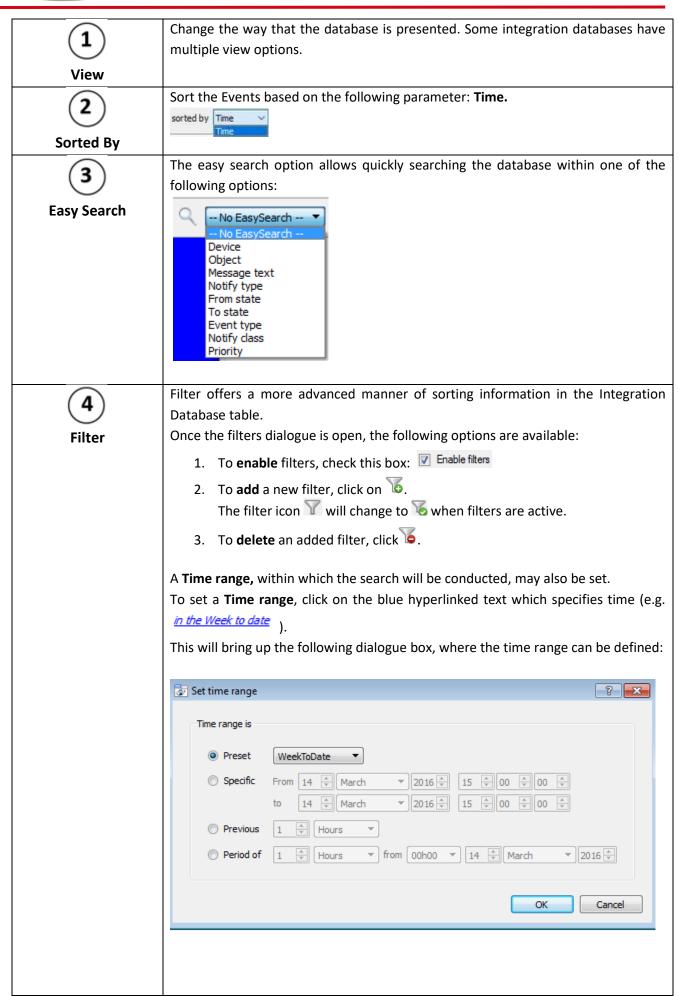
Once in the databases tab, **select** the relevant integration database.

The databases are ordered under the NVRs that they are attached to.

#### 4.2 Database Interface









	Note:	
	<ol> <li>Multiple filters may be run simultaneously. Filters with the same parameters may be run more than once.</li> </ol>	
	2. To change a filter, click on the blue hyperlinked text.	
5	Generate metadatabase reports in PDF or CSV format. See below.	
Export		
6	Generate scheduled metadatabase reports. See below.	
Manage Reports		
7	This navigates to a specific point in time, down to the second. To navigate to a timestamp, set the time using the time and date boxes.	
Go to Time	Then click on the arrow icon.	

#### **4.2.1 Scheduled Metadatabase Reports**



Click the save icon to open the scheduled report window.



All created reports will be listed here.

First, click **Add** to create a report. Then **edit** to define the reporting schedule. See below for more detail.

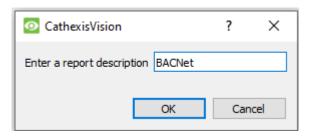
To edit, or delete a report, select the entry and click on the corresponding button.

#### 4.2.1.1 New Scheduled Report



Click Add.





Give the report a description.

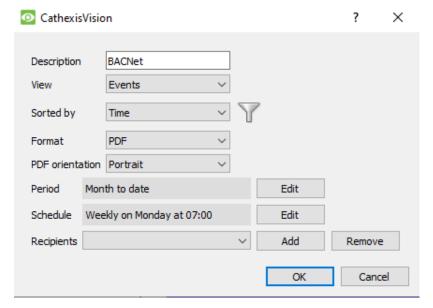
Click OK to complete.

#### 4.2.1.2 Edit Scheduled Report

Once the new report is listed with the other reports, select it for editing to define the reporting schedule.

Schedule

Either right-click the entry and select schedule, or select the entry and click the schedule button at the bottom of the screen.



Edit the **description** if needed.

Edit Viewing options.

Select the **Sorted by** option.

Select the Format.

Select the **orientation** of the Format.

Select the **period** to be reported on.

Define the **Schedule** for the report.

#### **Add/Remove Recipients**

Add/remove recipients to whom reports will be sent.

Add recipient: Click Add and enter the email address of the recipient. Multiple recipients

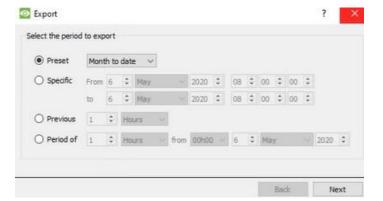
may be added. All will receive emails.

**Remove recipient**: Select the recipient from the dropdown menu and click **Remove**.



#### 4.2.2 Generate Metadatabase Reports

Click the save icon to open the Export window.



Select the **Period** to export, and enter the required details.

Click Next.



Select the **Format** to export the report in; either CSV or PDF.

See below for the two options.

#### 4.2.1.1 Export CSV



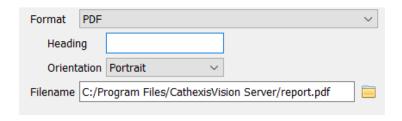
Select CSV Format.

Edit the **Filename** by entering it directly in the text field (replacing **report.csv**).



Or, click the folder to choose a new save folder and filename.

#### **4.2.1.2 Export PDF**



Select PDF Format.

Give the PDF a Heading.

Select either Landscape or Portrait **Orientation** of the PDF.

Edit the **Filename** by entering it directly in the text field (replacing **report.csv**).



Or, click the folder to choose a new save folder and filename.



#### 4.2.3 Metadata

2017-05-11 **NVR Time** 15:04:58 Initiating device Test14 **Event object** Calender 0 Message text check Notify type Alarm From state High limit To state Low limit Change of Event type bitstring Notification class Priority 11 Acknowledgement 1 required Sequence Time stamp number 200

On the right-hand side of the database, metadata about the event entry is displayed.

#### 4.2.4 Viewing an Entry's Associated Recording

If cameras are attached to device objects in the Integration setup, and these cameras are set up to record continuously, each Integration database entry will have a corresponding recording.

- To view an associated recording, simply left-click on a database entry which has the camera icon in the **Links** column.
- Then click **play** in the video player.



## 5. Events

A CathexisVision event has a trigger, which causes an action. Integrated devices may be set to act as triggers, or as actions. This document will detail the BACnet specific aspects of Events. There is a comprehensive guide to CathexisVision Events in the main setup manual.

Most of the data that CathexisVision receives from a device is presented in the Events interface. This is in order to give the user a full range of options. As a result, some of the options presented in the interface may be *impractical* for being used as an event trigger, or action.

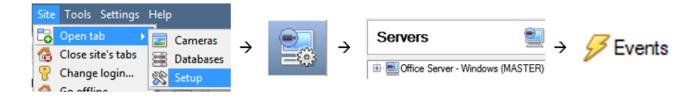
#### 5.1 Event Window

Events in CathexisVision are set up via the Event Window, which has four tabs.

- In the **General Tab**, an event is given a name, description, schedule and priority.
- In the **Triggers Tab** the trigger/s for the event is defined.
- In the Actions Tab the action/s which the event takes, is defined.
- In the **Resources Tab** the various site resources which can be used as part of an event are defined.

#### **5.2 Creating an Event**

To create an event using the BACnet device, navigate to the Events management area by following the sequence: **Open Tab / Setup / Servers / Master Server / Events**. This is shown below.



This will allow the user to enter the Events management area:



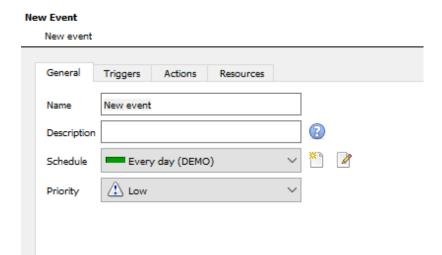
Once in Events management area, click the **New** icon at the bottom of the screen. This will open up the **New Event window**. Alternatively, right-click and select **New**.

The new event window has four tabs which can be used to set up the event: General, Triggers, Actions, and Resources.



#### 5.3 General Tab

Create a new event under the General tab by filling in the fields.



Give the event a descriptive Name.

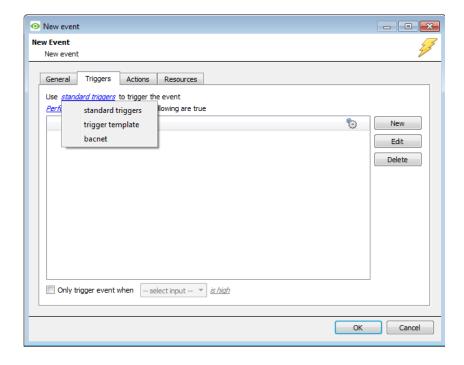
Set up a **Schedule** if desired by clicking the icon.

Select a Priority.

Modify the **Description** if relevant. See below.

#### 5.4 Triggers Tab

A trigger is the input that tells the event to start. The trigger causes the subsequent action (which the user will also define).



In this window, define the rules and constraints which will trigger an event on the BACnet device.

To add/edit/delete a rule use the New, Edit, and Delete buttons on the right-hand side.



# New Event New event General Triggers Actions Resources Use <u>standard triggers</u> to trigger the event <u>Perform actions while any</u> of the following are true Description

The user will need to click on the hyperlinks (depicted alongside) to set up the trigger.

The subsections below provide instructions.

#### 5.4.1 Set the Device as the Trigger

Choose the Master Trigger type here.

For a new event, the trigger type will default to "standard triggers". The user will need to change this to BACnet.



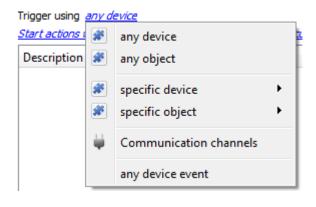
To change the event trigger, **click on "standard triggers"** (the hyperlink after the word "Use").

This will open a drop-down menu with more options.

To set the BACnet device as the trigger, **select the device name** from the drop-down menu.

#### **5.4.2 Trigger Types (Trigger Using)**

Choose whether certain device objects or any device event will trigger an event.



**Click on** the **hyperlink** after the words "Trigger using".

This will open a drop-down menu with more options.

**Click an option** from the menu to select.

See the table below for descriptions of the options on the drop-down menu.

Note: If object groups have been created, the option to trigger using specific/any group will appear here.

MENU OPTION	DESCRIPTION	
Any	will trigger using any of the listed objects.	
Objects in group	will trigger using any of the objects in that group.	
Specific object	will trigger using only a specific object.	
Any device event	will trigger when any trigger occurs on the BACnet device.	



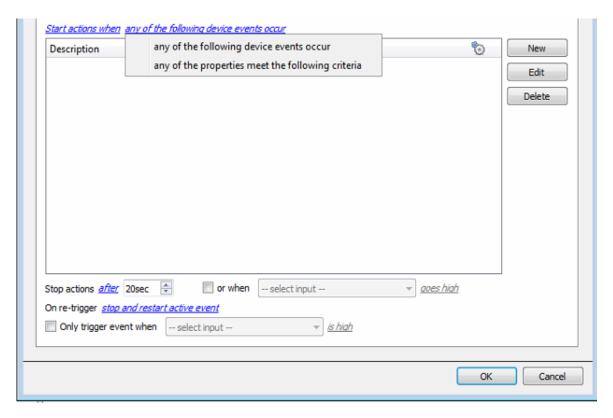
**Note for group triggers**: To database this event under the name of a specific object, and not the name of the triggering group, modify the Description field in the **General tab** of the Event setup.

Click on the question mark to see a list of available descriptions. For example:



In this example, replace 'value' with the name the event should be databased under.

#### 5.4.3 While/When and Any/All



The user can choose the option to:

- start actions when any of the properties meet user-configured criteria, or any user-configured device
  events occur, or
- perform actions while any/all of the properties meet user-configured criteria.

Start actions when	any of the properties meet the following criteria
	any of the following device events occur
Perform actions while	<u>any</u> of the properties meet the following criteria
	<u>all</u> of the properties meet the following criteria



Start actions when any of the following device events occur

To change these settings, click on the blue hyperlinks.

#### 5.4.4 Define the Trigger ("Any Device Event" Option)

After selecting a master trigger type, add a new trigger to the event.

If the user has selected the hyperlink *any of the following device events occur*, they will need to follow the steps below to add a new device event trigger.

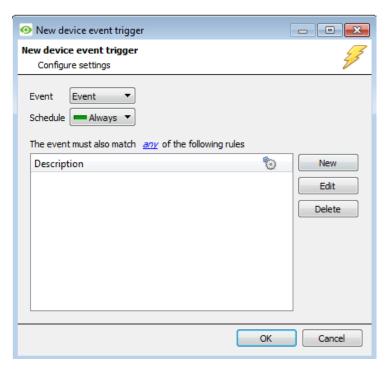


Click on **New** in the Triggers tab.

Clicking on New will bring up the New device event trigger dialogue box.

#### 5.4.4.1 New Device Event Trigger

The user will then need to configure the new device event trigger.



- Select the Event type.
- Define the Schedule.
- Click on the blue hyperlink to define whether the any or all of the configured device event rules should trigger an event.
- Next, add rules to the device event trigger.

**Note**: Rules for different event types must be added individually. E.g. switching from Access to Door event types in this window will lose any rules configured for Access Control events.



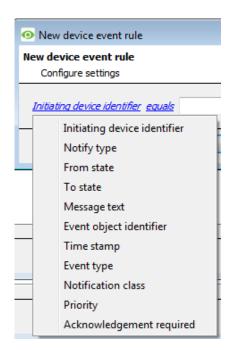
#### 5.4.4.2 New Device Event Rule

**Note**: From within the **New device event trigger** window (above), it is necessary to set further constraints. Multiple constraints can be set. If constraints are not defined, every device event will trigger this event.

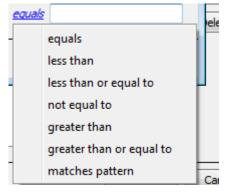


To configure a New device event rule, **click on New** in the New device event trigger window.

This will bring up a further window, called **New device event rule**.



To change the constraint, **click on the first hyperlink.** This will bring up the full list of available rules.



To modify the way this rule will be treated, click on the **second hyperlink** ( equals in the example).

This will display the rules options show alongside.

**Note**: When all available options are known to CathexisVision, they will be visible in a drop-down menu. When these variables are not pre-defined, they will need to be filled in manually. The information pulled through to the events is information sent to CathexisVision from the BACnet device, see the BACnet settings for the strings needed here.



#### 5.4.5 Define the Trigger ("Properties Meeting Criteria" Option)

If the user has defined the trigger by choosing according to *properties meeting criteria*, the *New object property trigger* dialogue box will open.

- In these instances, further constraints do not need be set, since they are being added one at a time.
- This option is better if a few triggers have been selected.
- This is also true for groups, since a group may only be made up of one object type.
- The dialogue will appear as the New device event rule window did previously.
- Click the hyperlinks to modify the constraints.

#### 5.5 Actions



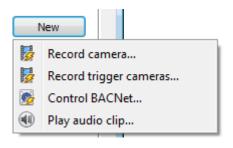
Having defined the triggers that will initiate an event, the user will need to define Actions.

Select the Actions tab from the New event window.

#### 5.5.1 Adding an Action



To add an action, click New in the Actions tab.



A list of **available actions** will appear. The drop-down contains all the available **action types**.

Select an option, for example, Record Camera.

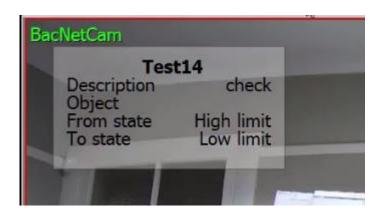
#### 5.5.2 Control Device

Although listed, it is **not possible** to control the BACnet device.



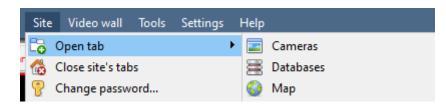
#### 6. Camera Tab Overlays

Once all the relevant settings have been configured, the overlays can be pulled through over the relevant camera feed.



**Note**: Cameras must have already been added to the objects.

#### 6.1 Navigate to the Cameras Tab



To see the camera feeds, go to the Cameras tab by following this path.

Site / Open tab / Cameras

#### **6.2 Video Feed Options Panel**



To bring up the overlay, click the arrow to the left of the screen, to pop out the Video feed options panel.

The Video feed options panel will present a number of options specific to the settings configured for that video feed.

#### 6.3 Select the Overlay





**Clicking** this icon will bring up the overlay options for this video feed.

**Select** the **device** and **enable** the overlay.



# 7. Conclusion

This document was designed to deal specifically with this integration. For further information about the CathexisVision software please consult the main manual (<a href="http://cathexisvideo.com/">http://cathexisvideo.com/</a>).

For support, please contact <a href="mailto:support@cat.co.za">support@cat.co.za</a>.