CONNECT

Watchdogs – The source of Event Notifications and Scoring.



What is a Watchdog?

The Watchdog is a tool that provides multiple functions;

- <u>Event Notifications</u>; Events of many types are provided by Watchdogs. Once a Profile has been created, a Device Class assigned and Objects mapped. The Watchdog may use the Templated Events provided by Connect.
- <u>Scoring</u>; Device scores may be provided in the Events and Scores window, Watchdog Reports and Scorecard reports from Watchdogs.

Watchdog creation or editing is done through the *Configuration Explorer* window.

The New Watchdog toolset is opened by clicking on the *New Watchdog* icon **Solution** in the Toolbar.

A second method to open the New Watchdog toolset is to r-click on the Watchdogs folder and choose New Watchdog from the dropdown.

dia Con	nect 2018	
Name	New Watchdog Properties	Delete CRefresh X Scan Ex Description
0	Home	Root Container
	Agents	Agent Container
•	Campuses	Campus Container
	AutoReports	Auto Report Container
0	Energy	Energy Monitor Container
0	Profiles	Profile Container
	Reports	Report Container
0	Watchdogs	Watchdog Container
(Search Results	Search Results





Name, Description and Profile – Event Notification Library

The Watchdog Editor General Settings tab window opens.

Enter a **Name** and **Description** (optional) for the new Watchdog. It is a good policy to include some text to identify the Agent or Site and the device or device type.

Click on the Profile dropdown Profile: (None) arrow and select the desired **Profile**.

KEYZALT.

The Profile provides the object set, device class and object mapping which in turn identifies the correct Event Template Rules sets.

When you select a Profile that contains a Device Class and Object Mapping. Templated Events are available. If this Watchdog does not contain previously entered Event Notifications, the Use Template Objects? pop up appears. If some Event Notifications already exist then a selector pop up window is provided to choose Event triggers from template library.

Select Yes if you wish to use the templated event notifications.

Notice that the External Objects and Event Notifications tabs are greyed out until after a Profile is selected.



Using Event Triggers from the Template Library

The Event Trigger window opens containing events from the Event Library as defined by the Device Class and Object Mapping selections from the selected Profile.

Click in the check box next the event triggers desired.

You may select the Check All check box if there are no invalid triggers identified in red text.

Note that if the profile does not contain a needed object, the trigger is invalid. It will be identified by red text.

Do not select a trigger with red text.

Once you have selected the desired triggers, click Next.



select th	e trigger(s) you would li	ke to add:
Name		Description
9 Z 🧊	Setpoint Selection	Rule Group
N	High Occ Cool	Occupied Cooling setpoint is above recommended value.
V	🗲 High Occ Heat	Occupied Heating setpoint is above recommended value.
N	High Unoce Cool	Unoccupied Cooling setpoint is above recommended value.
N	🐓 High Unocc Heat	Unoccupied Heating setpoint is above recommended value.
V	5 Low Occ Cool	Occupied Cooling setpoint is below recommended value.
N	🗲 Low Occ Heat	Occupied Heating setpoint is below recommended value.
Z	🗲 Low Unocc Cool	Unoccupied Cooling setpoint is below recommended value.
M	🗲 Low Unocc Heat	Unoccupied Heating setpoint is below recommended value.
9 V 🦳	Space Temperature Control	Rule Group
N	🗲 High Temp	Space Temperature is more than 3 degrees above the effective space temper.
Z	🗲 Low Temp	Space Temperature is more than 3 degrees below the effective space temper.



Using Event Triggers from the Template Library

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	Event Trigger ×
	New Event Trigger
A summary of selected triggers will appear, click Finish.	The following Event Notifications will be added.
	High Occ Cool High Unocc Cool High Unocc Cool Low Occ Cool Low Unocc Cool Low Unocc Cool Low Unocc Heat High Temp Low Temp High Air Flow Low Air Flow
be Event Notifications Tab window will appear. A user may select an Event	Finish Cancel Watchdog Editor
lotification and choose to <i>Edit</i> or <i>Remove</i> a selected Event Notification or <i>Add</i> new	General Settings Event Notifications
vent Notifications.	Devices Occupied Cooling setpoint is above recommended value. Devices Uccupied Heating setpoint is above recommended value. Uccupied Cooling setpoint is above recommended value.
is important to click the Test button any time a change is made to an Event	External Objects Unoccupied Cooling setpoint is above recommended value. Occupied Cooling setpoint is below recommended value.
ptification. An even better test is to click <i>Ok,</i> close the watchdog and then reopen	Event Notifications Occupied Heating setpoint is below recommended value. Unoccupied Cooling setpoint is below recommended value.
e watchdog.	Scoring Unoccupied Heating setpoint is below recommended value. Space Temperature is more than 3 degrees above the effective space temperature setpoint.
an Event Natification has an issue, a non un window will identify the problem	Statistics Space remperature is more than 5 degrees below the enective space temperature serpoint. Airflow is above Airflow Setpoint. Airflow is below Airflow Setpoint.
vent Notification. Progression is not allowed until the problem Event Notification Removed or Edited.	EditRemove Add Test
KEYZALT.	Cancel

Watchdog Path

The Watchdog Path.

The default path to save a Watchdog into is the Watchdogs folder. Subfolders may be created by clicking on, the *Navigation Button* will open the Folder Browse window. Clicking on *New Folder* to add an additional folder.

Enter the new folder name and click on *OK* to close the New Folder Name box.

The new folder name will appear as a new node under the parent Watchdogs Folder.

Select the folder you wish to save the new Watchdog into. Click on *OK* again to close the Folder Browse window.

Note that when you create a new folder, it is not auto selected. Be sure to select the new folder before clicking Ok. Otherwise the Watchdog will be saved to the parent Watchdog folder.

-	General Settir	igs								
Devices	Name:									
5-4	Description:									
External Objects	Profile:	(None)					*			
Event Notifications	Path:	Watchdogs								
Scoring										
Statistics										
					[OK	Can	-al		
<u> </u>					l	OR	Carr	2001		
				Falder Deres			,			
				Folder brow	se					
				Name	atchdoos					
				Name ⊙ ■ W	atchdogs					
				Name	atchdogs					
				Name ⊙ ■ W	atchdogs					
				Name ⊘ ■ W	atchdogs					
				Name ⊙ IIII w	atchdogs					
			_	Name ()	atchdogs					
w Folder Name			I	Name	atchdogs					
w Folder Name nter a name for the	folder			Name ()	atchdogs					
w Folder Name nter a name for the	folder			Name	atchdogs					



Devices

The *Devices* Tab.

The Devices listed in the Devices Tab will be determined by the Profile selected in the General Settings Tab. These devices will not be selected by default, only listed.

When the user is ready to apply this Watchdog to the listed devices they may click in the Agents box or the Agent Name box to select all the devices using the selected profile.

A user may also decide to exclude a device or number of devices from this Watchdog by deselecting them.

General Settings	Devices	
Devices	🔻 Edit Filter 🍗 Clear Filter 🔚 Ungro	pup Devices
External Objects	Name	Description
External Objects	🕑 🗆 🔂 Agents	Agent Container
Event Notifications	9 🗆 🌑 💷	Agent
Scoring	VAV241_ROOM_	VAV241_ROOM_
county	VAV242_ROOM_	VAV242_ROOM_
Statistics	VAV243_ROOM_	VAV243_ROOM_
	VAV244_ROOM_	VAV244_ROOM_
	VAV245_ROOM_	VAV245_ROOM_
	VAV246_ROOM_	VAV246_ROOM_
	VAV247_ROOM_	VAV247_ROOM_



External Objects

The External Objects Tab.

The External Objects Tab provides a means to add an object value from a different profile to this watchdog.

An example would be a Variable Air Volume watchdog using a Variable Air Volume profile. The user may need to get the Supply Air Temperature and or the Duct Static Pressure from the Air Handler providing the Supply Air to the Variable Air Volume devices. Those objects would not be members of this Variable Air Volume profile but would instead be members of the Air Handler profile. They would therefore be external objects from the Variable Air Volume profile.





Event Notifications Tab - Editing Event Triggers

	Watchdog Editor	×
The <i>Event Notifications</i> Tab. Editing an existing event. Select the Event Trigger you wish to change. Click <i>Edit</i> .	General Settings Devices External Objects Event Notifications Scoring Statistics	Event Notifications HiUnoccCoolSp LoUnoccCoolSp HiOccCoolSp LoCccCoolSp LoUnoccHeatSp LoUnoccHeatSp LoCocMeatSp High Space Temp Low Air Flow Low Air Flow Hw Reheat Fail Reheat Too Hot
The Event Editor General Settings Tab window will appear. In the General Settings section a user may change the Description: text. In the Trigger Settings section a user may change the Trigger Delay (Minutes) value. Note that if the sample time is 15 minutes and the Trigger Delay is 15 minutes then the actual resulting delay will be 30 minutes as 2 samples will be required to generate an event. The Event Type dropdown provides the options; Standard, Change of State and Aggregate.	Event Editor General Settings Criteria Actions	OK Cancel K Cancel Ceneral Settings Image: Concerce of the set o



OK

Editing Event Triggers

Trigger Settings

Trigger Delay (Minutes)

Event Type Standard

The *Standard* option will trigger the defined Actions when the event expression result is true for the duration of the Trigger delay.

The <i>ChangeOfState</i> option provides a COS Threshold dropdown. This threshold
defines the amplitude of change required of the Criteria expression product to
rigger an event.

Example; The Criteria Expression has calculated a value of 2.1. The Change of State Threshold is set to 2.0.

If this change of value remains greater than the Change Of State Threshold for a time span greater then the Trigger Delay. Then the event Actions will trigger.

Keep in mind that the Change Of State is applied to the product value of the Event Criteria Expression. When the product of the Event Criteria Expression value is greater than the Change Of State Threshold, the event criteria is true. If a Trigger Delay spans across multiple samples. The event criteria must remain true across the required number of samples.

Trigger Settings		
Trigger Delay (Minutes) :	15 ‡	
Event Type:	ChangeOfState	-
COS Threshold:	0 ‡	

0 ‡



A Change of State example

EXAMPLE

General Settings Provide a Description of the event. *Trigger Settings* The Trigger Delay is set to zero. The Event Type is set to ChangeOfState. The COS Threshold is set to 7.

Criteria

The object being monitored is an object named "Ramp_oBIX_Test". This particular object value ramps from 0 to 100 over a time period of 1 hour. The sample time of this object is 5 minutes. That produces 12 samples per hour and results in a change of state of 100/12= 8.33 every 5 minutes.

Trigger Criteria

The object name is "Ramp_oBIX_Test". The "Ramp_oBIX_Test" value will change by 8.33 every 5 min.

Therefore an event will be recorded every 5 minutes because 8.33 exceeds the COS Threshold of 7.0.

Criteria	Description: Chan	geOfState	
Actions			
Trig	ger Settings		
Trig	gger Delay (Minutes) :	0 ‡	
	Event Type: Chan	geOfState	*
	COS Threshold:	7 🗘	





Editing Event Triggers - Aggregate

The *Aggregate* option provides a powerful set of tools to filter for exacting conditions of alert. Notice a new side tab, *Aggregation Settings* has been provided.

The Aggregation Window defines the set of data samples that will be used in the expression.

- Available aggregation types are;
- Note that First through Delta aggregations return a Numeric result.
- First = The first collected value in the Aggregation Window.
- Last = The last collected value in the Aggregation Window.
- Sum = The sum of all collected values in the Aggregation Window.
- Avg = The average of all collected values in the Aggregation Window.
- Min = The minimum of all collected values in the Aggregation Window.
- Max = The maximum of all collected values in the Aggregation Window.
- Delta = The last sample minus the first sample in the Aggregation Window.
- Note that to achieve a true delta, the user must apply the Absolute operator to the criteria. Example "ABS{val}"
- OccurenceCount = The sum of occurrences where the expression result value is true in the Aggregation Window.
- ChangeCount = The sum of occurrences where the expression result value changed in the Aggregation Window.
- PercentActive = The percentage of occurrences where the expression result is true in the Aggregation Window.
- TotalDuration = The total duration of time in minutes where the expression result is true in the Aggregation Window.



Aggregation Settings Description: Cooling is active and the discharge temp is less Criteria Trigger Settings Actions Trigger Delay (Minuce): 0 \$ Bisable this event OK Care OK General Settings Aggregation Settings Aggregation Settings Aggregation Type: First • Aggregation Settings Aggregation Window (Minutes): 0 \$ Criteria Aggregation Expression Actions Edet.	General Settings	General Settings
Criteria Actions Trigger Settings Trigger Settings Trigger Delay (Minutes): 0 \$ Event Type: Aggregate OK Can OK Can OK Can OK Can Aggregation Settings Aggregation Type: First Aggregation Type: 0 \$ Criteria Actions Aggregation Expression Edit. Filter Edit.	Aggregation Settings	Description: Cooling is active and the discharge temp is less
Actions Trigger Settings Trigger Delay (Minutes): 0 \$ Event Type: Aggregate Disable this event OK Care OK Aggregation Settings Aggregation Type: Aggregation Settings Aggregation Type: Criteria Aggregation Expression Actions Edit. Filter Edit.	Criteria	
Ingger Secury Trigger Delay (Minutes): 0 \$ Event Type: Aggregate OK Car OK Car OK Car OK Car OK Car OK Car OK Car OK Car OK Car OK Car OK Car OK Car OK Car OK Car OK Car OK Car Aggregation Settings Aggregation Window (Minutes): Other Edit. Filter Edit. Edit. Edit. Edit. Car OK Car Aggregation Settings Aggregation Expression Edit. Edit. Edit.	Actions	Tringer Sattings
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OK Car ent Editor Age Cation Settings Aggregation Settings Aggregation Type: First • Aggregation Settings Aggregation Window (Minutes): Criteria Aggregation Expression Actions Edit Filter Edit		
General Settings Aggregation Settings Aggregation Settings Aggregation Type: First • Criteria Aggregation Window (Minutes): 0 • Actions Edit Filter Edit	Disable this quant	OK Can
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Criteria Aggregation Window (Minutes): 0 Aggregation Expression Edit. Filter Edit. Edit.	ent Editor General Settings	Agg thation Settings
Actions Aggregation Expression Edit. Filter Edit. Edit.	ent Editor General Settings Aggregation Settings	Agg-mation Settings
Edit	General Settings Aggregation Settings Criteria	Aggregation Type: First Aggregation Window (Minutes) : 0 \$
Filter	General Settings Aggregation Settings Criteria Actions	Aggregation Settings Aggregation Type: First Aggregation Window (Minutes): 0 Aggregation Expression
Edit.	General Settings Aggregation Settings Criteria Actions	Aggregation Settings Aggregation Type: First Aggregation Window (Minutes): 0 Aggregation Expression Edit.
Edit.	General Settings Aggregation Settings Criteria Actions	Aggregation Type: First Aggregation Window (Minutes): 0 Aggregation Expression Edit. Filter
	General Settings Aggregation Settings Criteria Actions	Aggregation Settings Aggregation Type: First Aggregation Window (Minutes): 0 C Aggregation Expression Edit.

An Aggregate example

EXAMPLE

General Settings Provide a Description of the event. Trigger Settings The Trigger Delay is set to zero. The Event Type is set to Aggregate.

Aggregation Settings

Aggregation Type

A First Aggregation Type is selected.

Aggregation Window

A set of samples over 60 minutes will be monitored.

This example will then monitor the First sample from a set of samples collected over the last 60 minutes . The sample rate is set to 5 minutes. Therefore the Aggregation set will contain 12 samples. The *Criteria* will be monitoring the first member of this set. That member will have been entered into that set 60 minutes prior. The effect will be to provide a 60 minute delay in the first occurrence of this alert action.

Aggregation Expression

The expression of "Ramp_oBIX_Test" – 91 will produce values from -91 to 9 changing by a 8.33 every 5 min.

Filter

No filter is applied in this example. Each sample is compared to the filter before application to the aggregate set. A filter will exclude or allow the addition of a sample to the aggregation set.





An Aggregate example

EXAMPLE

Criteria

Trigger Criteria

The Trigger Criteria produces a true false result. The object {val} is the product of the *Aggregation Settings*. In this example if the *Aggregation Settings* expressions produce a {val} greater than 1, then an event is triggered.

Summary

The aggregation time is 60 min, the aggregation type is First. The aggregation expression of "Ramp_oBIX_Test" – 91 will produce values from -91 to 9 changing by 8.33 every 5 min.

The next sample will this value will become the Last entry into the aggregation set. As each subsequent sample occurs, this value will index down in the aggregate set. When the sample reaches the Last position of the set. "60 minutes later" The Trigger Criteria of the expression value being greater than 1 will occur and Event Actions will be executed.

General Settings	Trigger Criteria		
Aggregation Settings	{vai} > 1		
Criteria			
Actions			



Scoring

The Scoring Tab.

Scoring provides a set of tools to define methods of gauging and rating the performance of a particular Control Loop.

All controllers contain Control Loops that calculate the value of an output based on the comparison of an input value to a setpoint value. The giveaway is to look for a setpoint, then find the input. Some general knowledge of the equipment design and specified sequence is helpful.

Please see the Scoring Presentation for a complete explanation of Scoring Techniques.

General Settings	Scoring Parameters			
General Genings	Name		Percent of To	tal Score
Devices	RoomTemp		50	
External Objects	AirFlowSensor		50	
-				
Event Notifications				
Scoring				
Statistics				
	Edit Scoring Filter Edit.	Remove	Add	Т
			ОК	Can
-				
		>		
Score Properties				
Score Properties	a-			
Score Properties Nam	e:			
Score Properties Nam Type	e: e: e: e: FB vs SP			
Score Properties Nam Type	e: © FB vs SP O FB vs SP w/ Deadband O EB vs Constant			
Score Properties Nam Typ	e: © FB vs SP ○ FB vs SP w/ Deadband ○ FB vs Constant ○ FB vs 2 SP			
Score Properties Nam Typ	e: © FB vs SP O FB vs SP w/ Deadband O FB vs Constant O FB vs 2 SP O FB vs 2 SP w/ Deadband			
Score Properties Nam Typ	e:			
Score Properties Nam Type Feedback Objec	e: B: B: FB vs SP w/ Deadband FB vs Constant FB vs 2 SP FB vs 2 SP w/ Deadband Custom t: (None)	¥		
Score Properties Nam Type Feedback Object	e: B: B: FB vs SP w/ Deadband FB vs Constant FB vs 2 SP FB vs 2 SP w/ Deadband Custom t: (None) t: (None)	*		
Score Properties Nam Type Feedback Objec SP Objec	e: B: B: FB vs SP w/ Deadband FB vs Constant FB vs 2 SP FB vs 2 SP FB vs 2 SP w/ Deadband Custom t: (None) t: (None)	u v		
Score Properties Nam Type Feedback Objec SP Objec	e: B: B: FB vs SP w/ Deadband FB vs Constant FB vs 2 SP FB vs 2 SP w/ Deadband Custom t: (None) t: (None)			
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Score Properties Nam Type Feedback Objec SP Objec M Weight of Over	e: e: e: e: e: e: e: e: e: e:			
Score Properties Nam Typ Feedback Objec SP Objec N Weight of Over	e: e: e: e: e: FB vs SP w/ Deadband FB vs 2 SP FB vs 2 SP w/ Deadband Custom t: (None) t: (None) lax Error: 5 \$ all Score: 1 \$			
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Statistics

The Statistics Tab

This window provides a view of the scores from the devices included in the Watchdogs selected profile.

These scores are based on a set of collected data samples occurring after the creation of the scoring criteria. Therefore a few hours of data collection must occur before scores will be visible in this tab.

The Events and Scores window under the Events and Notifications main menu provide a view of scores obtained from the current Date Time range of that page. The default date range there is the Current Day.

A user may validate the result of the Watchdog scoring by opening the Events and Scores window.

General Settings	Statistics		
	Name	Current Score	
Devices	AHU-07BoardRoom	94	
External Objects	AHU-11Bar	92	
	AHU-10MainDining	86	
Event Notifications	AHU-05Office	84	
Scoring	AHU-01PresDining	74	
Statistics	AHU-12	73	
	AHU-02Lakeview	72	
	AHU-03Ballroom	68	
	AHU-04Riverdale	68	
	AHU-09LadiesCard	67	٦.
	13 devices use this Watchdog		





