Honeywell

WEBs-N4 Analytics Framework

REFERENCE GUIDE

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TABLE OF CONTENTS

About this reference

This reference documents the pre-defined algorithms, components, blocks, web charts, views, and ORD schemes used by the Niagara Analytics Framework.

Audience

The information in this document is for Systems Integrators and Facility Managers who are responsible for configuring the tools used to manage complex building systems.

Document Content

Chapters document the Analytics Tag Dictionary, algorithm library, components, views, windows, logic blocks, Px views, Ux charts and ORD schemes. An index is provided to help you find the specific information you are looking for.

Product Documentation

This document is part of the Niagara technical documentation library. Released versions of Niagara software include a complete collection of technical information that is provided in both online help and PDF formats.

Related Links

- *Document change log*
- *Related documentation*

Document change log

This topic provides a brief listing of changes made to the document.

June 18, 2019

Initial release

Related Links

- About this reference (Parent Topic)

Related documentation

These documents are available for learning how to use WEBs-N4 Analytics Framework.

- WEBs-N4 Analytics Framework Guide explains concepts and provides procedures (31-00279).
- WEBs-N4 Analytics Framework Web API Guide documents the code you can use to extend this product.
- Niagara Hierarchies Guide provides information about setting up logical hierarchies.
- Niagara Tagging Guide provides information about adding metadata to objects.
- Niagara Relations Guide explains how to configure relationships in a hierarchy.
- Niagara Graphics Guide provides general information about how to create Px graphics.

Related Links

- About this reference (Parent Topic)

Chapter 1 Analytics tag dictionary

The Analytics Tag Dictionary provides a set of tags and tag groups specifically designed for the framework. To create your own framework-related tag dictionary, you drag this Analytics dictionary from the analytics-lib palette to the **TagDictionaryService** in the Nav tree, then add tags, tag groups and relations as needed.

There are no unique relations definitions for the framework.

Related Links

- Tag Definitions
- Tag group definitions

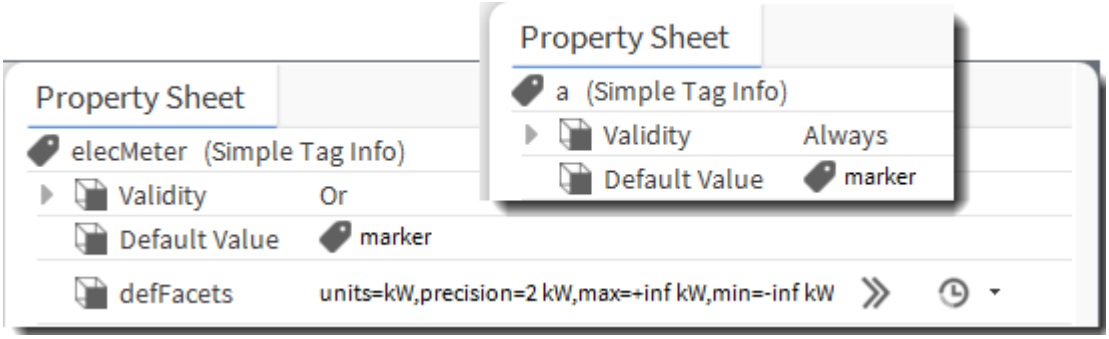
Tag Definitions

Tags and the hierarchies to which they belong provide powerful tools for configuring data analysis. This topic documents the tag definitions that come with the Analytics tag dictionary.

Properties

The properties on each Simple Tag Info Property Sheet may or may not include default facets.

Figure 1 Simple Tag Info Property Sheets



Property	Value	Description
Validity	Always or Or	Always Or
Default Value	marker or a value	A tag that is identified as a marker tag does not require a value. For value tags, use this property to configure a default value.
defFacets	units, precision, min, max, etc.	Clicking the chevron to the right of this property opens a standard Config Facets window. The facets you configure here serve as defaults for the point to which this tag is assigned. Other facet configurations can override these settings.

Pre-defined tag definitions

The framework comes with several pre-defined tag definitions in addition to the Haystack tags. You precede each of these tags with a:.

Tag definition	Description
a	This tag identifies a point as one used by the framework. Points tagged with this tag count towards the total allowed by your framework license.
status	
supply	
static	
elecMeter	Identifies an electric meter.
waterMeter	Identifies a water meter.

Related Links

- Analytics tag dictionary (Parent Topic)

Tag Group Definitions

These groups of tags are unique to the framework. This topic documents the group definitions that come with the Analytics tag dictionary.

The number of tags in each group definition varies. Assigning a group definition to a point assigns all tags that the group contains to the point.

Pre-defined tags

The tag group definitions that come with the framework contain all marker tags. You precede these tags with a:.

Figure 2 Pre-defined Tag Group Definitions

Analytics tag dictionary, tag group definitions and tags

Tag group definition	Tags	Tag group definition	Tags
chillerCmd	chiller cmd	coolingValveCmd	cooling valve cmd
chillerStatus	chiller status	supplyAirStaticPressure	supply air static pressure
supplyFanCmd	supply fan cmd	supplyairStaticPressureSp	supply air static pressure sp (setpoint)
supplyFanStatus	supply fan status	terminalUnitDamperPosition	terminal unit damper position
supplyAirTemp	supply air temp	EnergyTargetMonthly	energy target monthly
supplyAirTempSp	supply air temp sp (setpoint)	energyTargetYearly	energy target yearly
heatingValvePosition	heating valve position	chilledWaterSupplyTemp	chilled water supply temp
heatingValveCmd	heating valve cmd	chilledWaterSupplyTempSp	chilled water supply temp sp (setpoint)

Tag group definition	Tags	Tag group definition	Tags
coolingValvePosition	cooling valve position	chilledWaterReturnTemp	chilled water return temp

Related Links

- Analytics tag dictionary (Parent Topic)

Chapter 2 Algorithm library reference

The pre-defined algorithms documented in the following topics come with the software. You may be able to use one or more of them without modification, or as a reference when creating your own custom algorithms. Using these algorithms involves dragging them to a logic wire sheet and configuring algorithm object properties for your specific application.

Each algorithm description contains:

- a brief description of what the algorithm does
- a flowchart view of the algorithm logic
- an image of each algorithm's wire sheet
- a table that explains what each logic block is doing

Related Links

- Low Chilled Water Temp
- High Chilled Water Temp
- Chilled Water Mixing
- Simultaneous Heat/Cool
- High Supply Temperature
- Low Supply Temperature
- High Supply Static Pressure
- Low Supply Static Pressure
- Electricity Usage 5% Less Than Last Year
- Electricity Usage 5% More Than Last Year
- Water Usage 5% Less Than Last Year
- Water Usage 5% More Than Last Year
- Heating Valve Open 100%
- Cooling Valve Open 100%
- Low Outside Air Intake
- High Outside Air Intake
- Unscheduled Operation
- Prolonged 100% VAV Damper
- Electric EUI Exceeds Month Target
- Electric EUI Exceeds Yearly Target
- Chilled water usage minus 10% of last month
- Chilled water plus 10% of last month
- Chilled water usage minus 5% of last month

- Chilled water usage plus 5% of last month
- Non-conformance space temperature
- Non-conformance space humidity
- Space exhaust flow is high
- Space supply flow is high
- Low hot water temperature
- High hot water temperature
- Hot water mixing
- Pump not meeting setpoint
- Pump exceeding setpoint
- Space differential pressure high or low
- Economizer not running based on temperature
- Economizer not running — enthalpy based
- Damper open during warmup
- Unscheduled operation efan

Low Chilled Water Temp

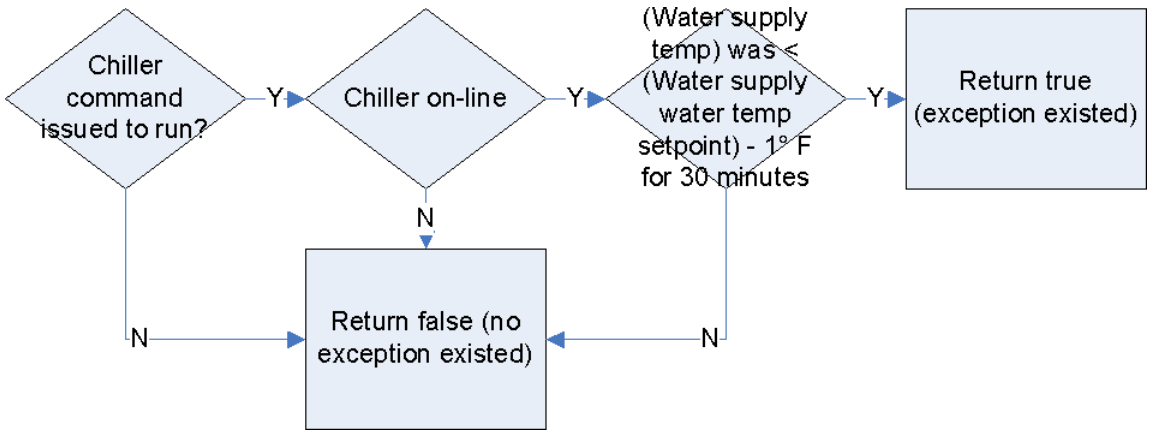
This algorithm evaluates trend data and returns a “true” result, indicating that an exception existed if a chiller was running, it was on line, and the chilled water supply temperature was less than 1 degree Fahrenheit below the chilled water supply water temperature setpoint. A “false” result indicates that nothing was wrong.

Input ORD

- slot:/Algorithm/English/Low_Chilled_Water_Temp
- slot:/Algorithm/English/Low_Chilled_Water_Temp

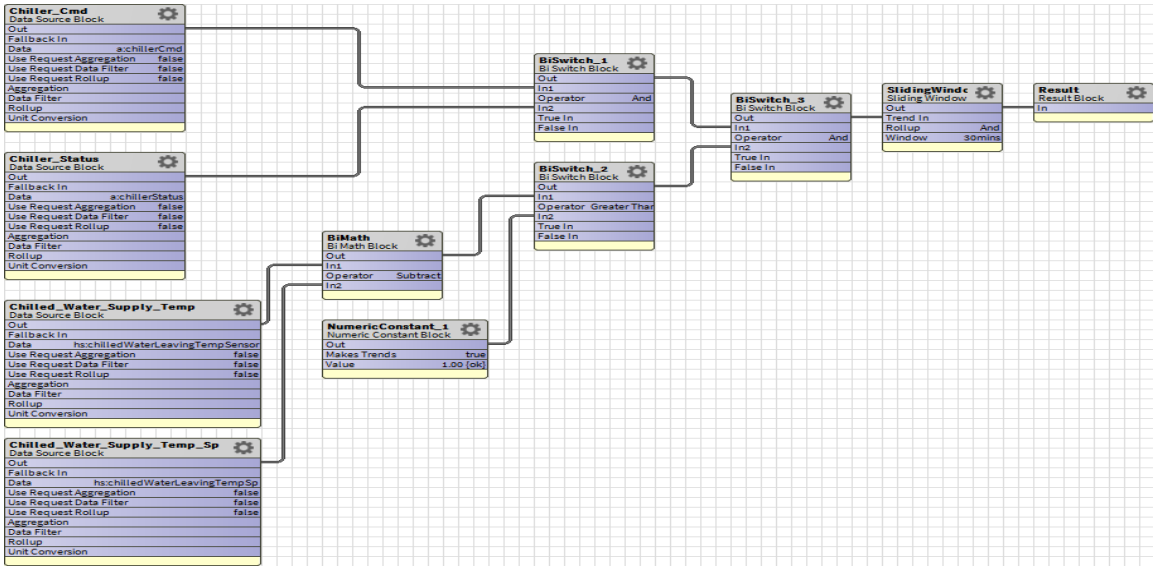
Flowchart

Figure 3 Low Chilled Water Temp algorithm



Wire sheet view

Figure 4 High Chilled Water Temp algorithm



Related Links

- Algorithm library reference (Parent Topic)

Chilled Water Mixing

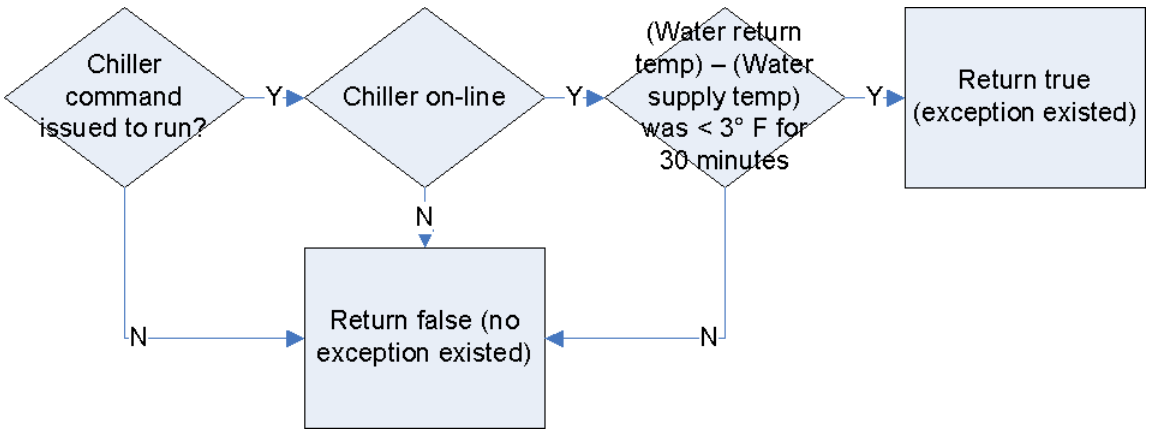
This algorithm analyzes trend data and returns a “true” result, indicating that an exception existed, if a chiller received the command to run, it was on line, and the chilled water return temperature minus the chilled water supply temperature was less than three degrees Fahrenheit for 30 minutes. A “false” result indicates that nothing was wrong.

ORDs

- slot:/Algorithm/English/Chilled_Water_Mixing
- slot:/Algorithm/Metric/Chilled_Water_Mixing

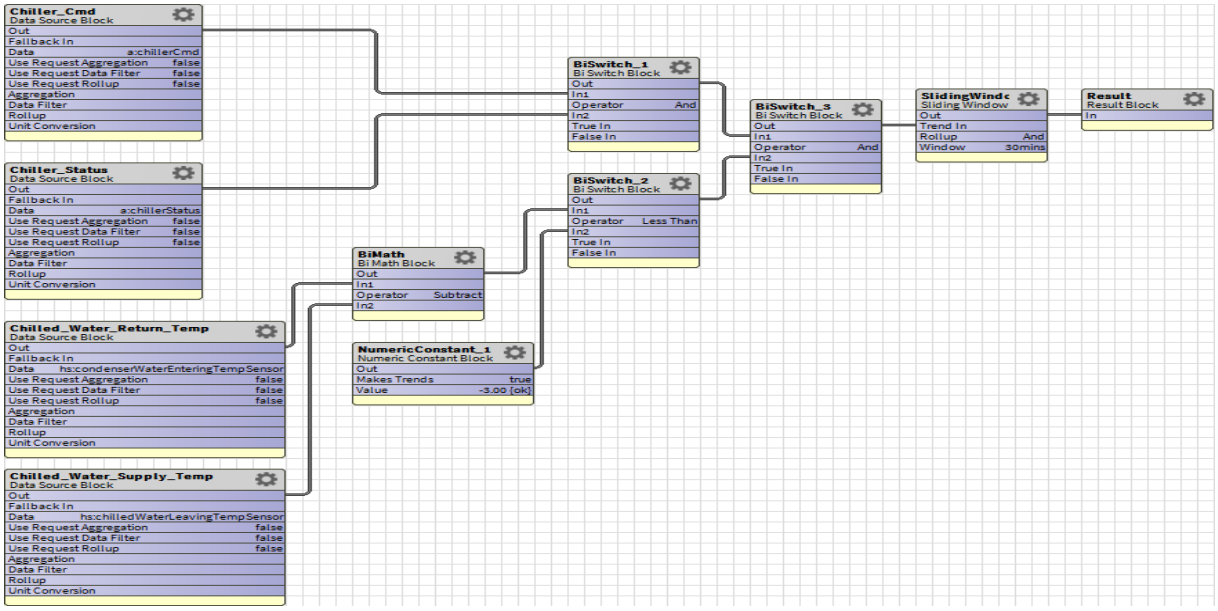
Flowchart

Figure 5 High Chilled Mixing algorithm



Wire sheet view

Figure 6 High Chilled Mixing algorithm



Related Links

- Algorithm library reference (Parent Topic)

Simultaneous Heat/Cool

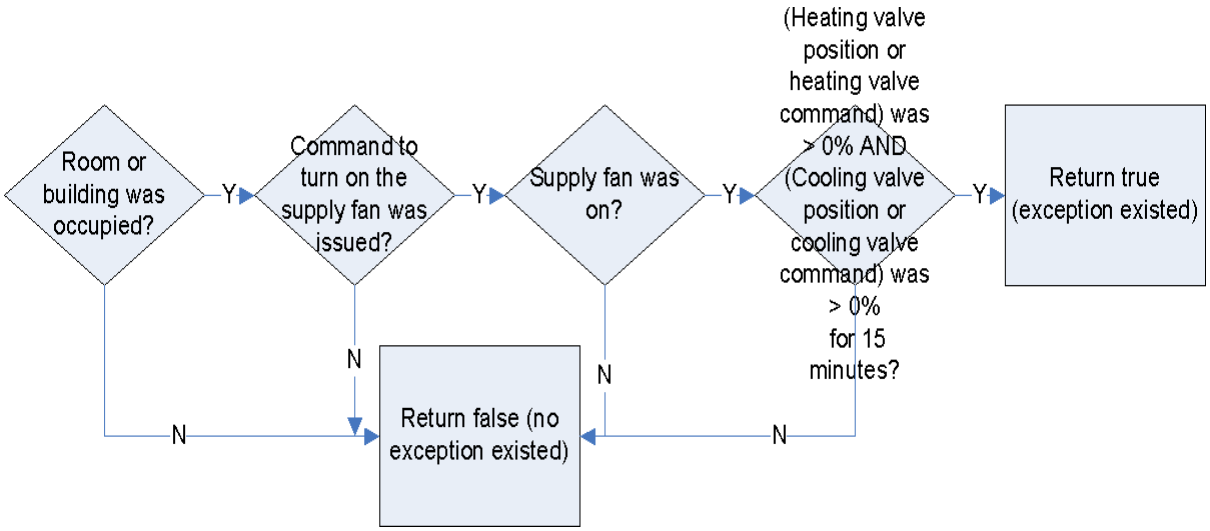
This algorithm analyzes trend data and returns a “true” result, indicating that an exception existed, if the building was occupied, the supply fan command was on, the supply fan status was on, the heating valve position or the heating valve command was greater than 0%, and the cooling valve position or cooling valve command was greater than 0% for 15 minutes. A “false” result indicates that nothing was wrong.

Input ORDs

- slot:/Algorithm/English/Simultaneous_Heat_Cool
- slot:/Algorithm/Metric/Simultaneous_Heat_Cool

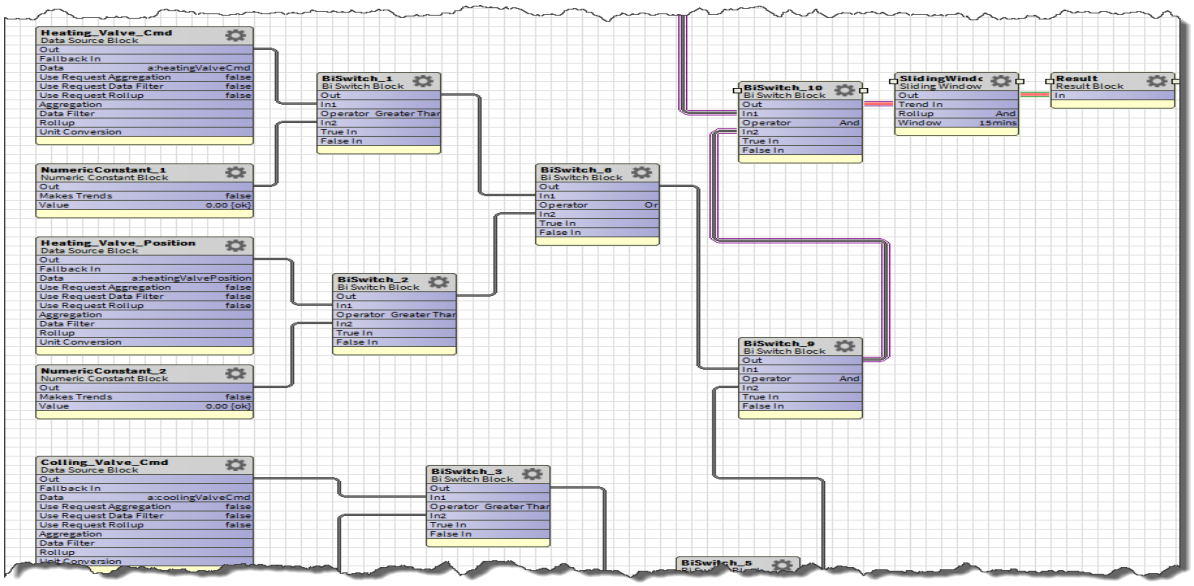
Flowchart

Figure 7 Simultaneous heat/cool flowchart



Wire sheet

Figure 8 Fragment of the Simultaneous Heat Cool algorithm wire sheet



Related Links

- Algorithm library reference (Parent Topic)

High Supply Temperature

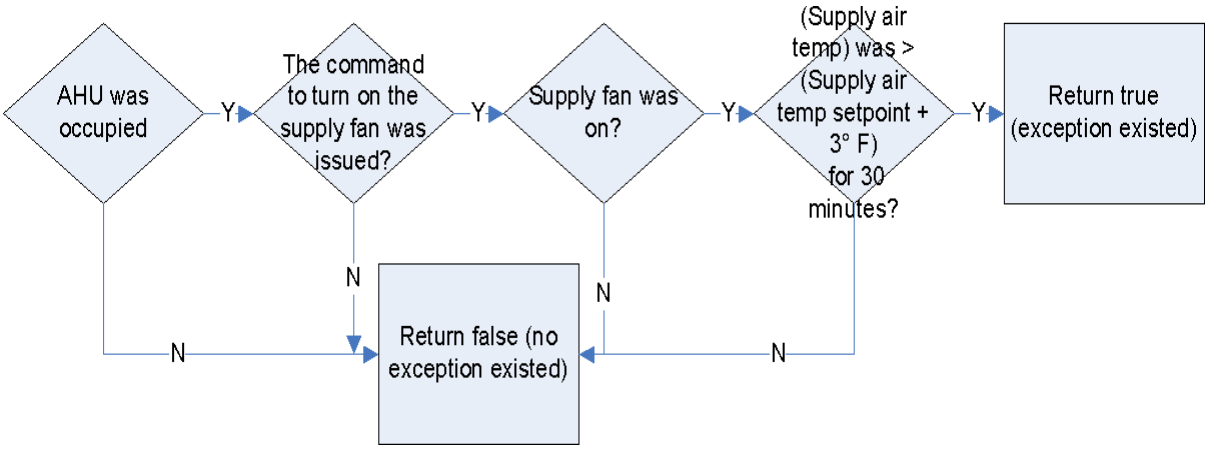
This algorithm evaluates supply temperature trend data. It produces a “true” result, indicating that an exception existed, if a building was occupied, the AHU unit’s supply fan was on, the supply fan status indicated that the fan was on, the supply air temperature was greater than the supply air temperature setpoint plus three degrees Fahrenheit, and all of these conditions existed for more than 30 minutes. A “false” result indicates that nothing was wrong.

Input ORD

- slot:/Algorithm/English/High_Supply_Temperature
- slot:/Algorithm/Metric/High_Supply_Temperature

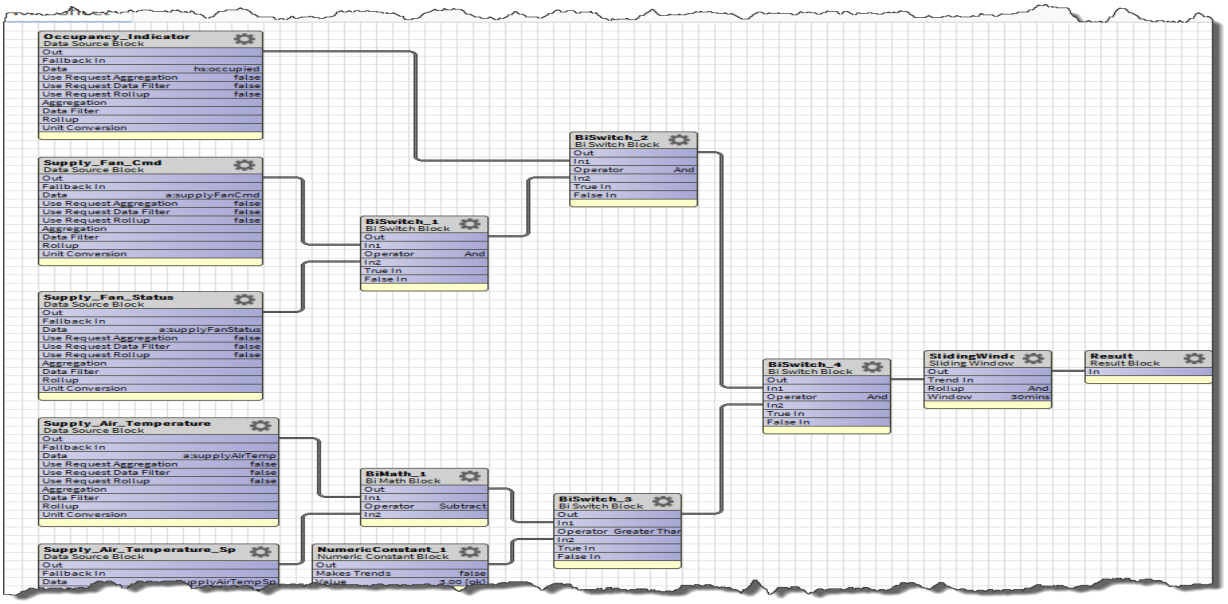
Flowchart

Figure 9 High Supply Temperature algorithm



Wire sheet

Figure 10 Fragment of the High Supply Temperature algorithm



Related Links

- Algorithm library reference (Parent Topic)

Low Supply Temperature

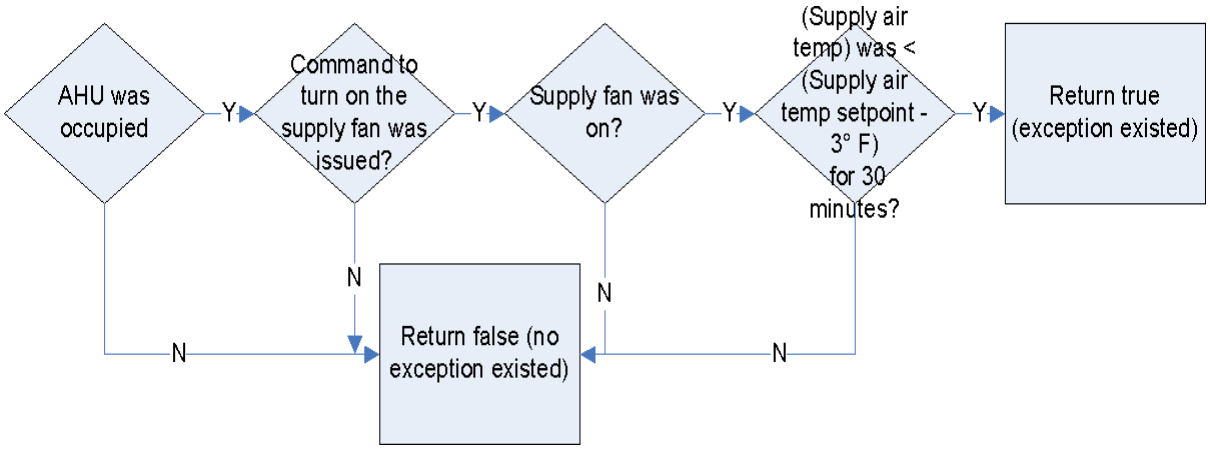
This algorithm evaluates supply temperature trend data. It produces a “true” result, indicating that an exception existed, if a building was occupied, the AHU unit’s supply fan was on, the supply fan status indicated that the fan was on, the supply air temperature was lower than the supply air temperature setpoint minus three degrees Fahrenheit, and all of these conditions existed for more than 30 minutes. A “false” result indicates that nothing was wrong.

ORDs

- slot:/Algorithm/English/Low_Supply_Temperature
- slot:/Algorithm/Metric/Low_Supply_Temperature

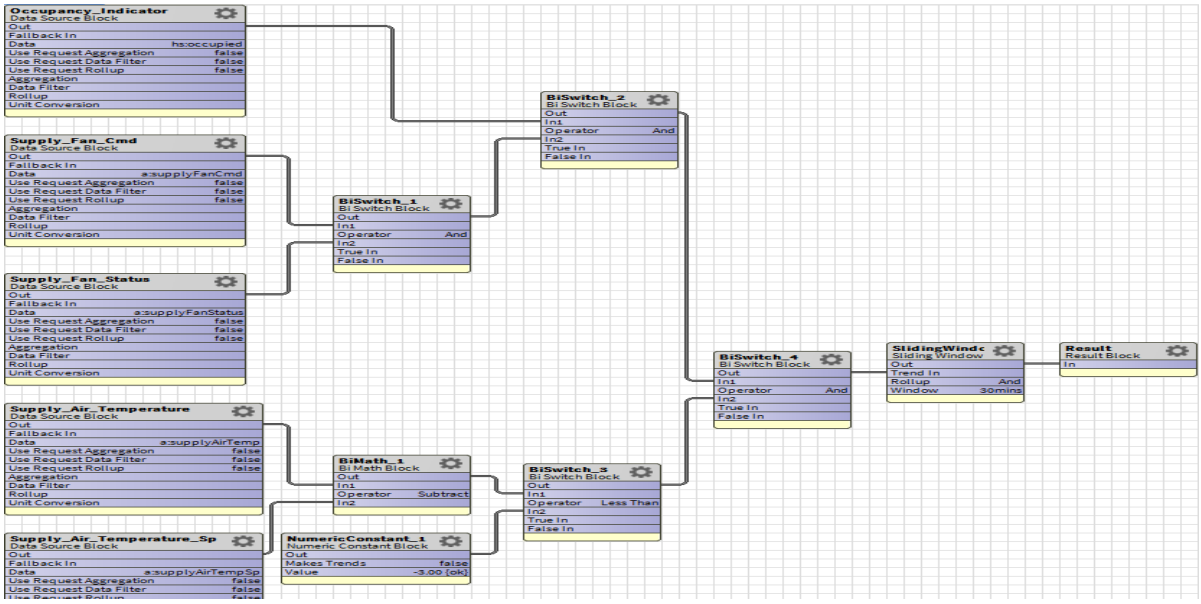
Flowchart

Figure 11 Low Supply Temperature algorithm



Wire sheet

Figure 12 Low Supply Temperature algorithm



Related Links

- Algorithm library reference (Parent Topic)

High Supply Static Pressure

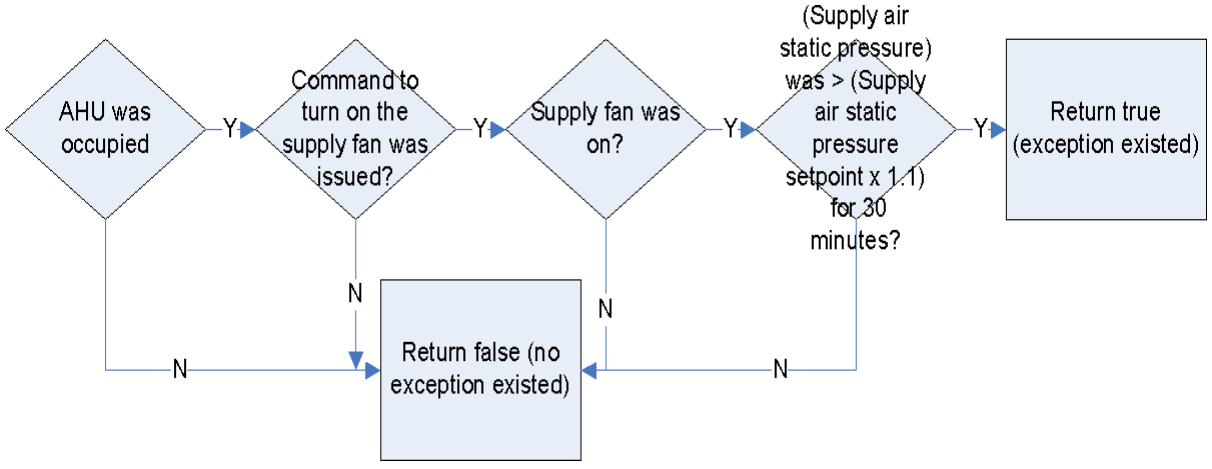
This algorithm evaluates static pressure trend data. It produces a “true” result, indicating that an exception existed, if a building was occupied, an AHU unit’s supply fan was on, the supply fan status indicated that the fan was on, the supply air static pressure was greater than 110% of the supply air static pressure setpoint, and all these conditions existed for 30 minutes. A “false” result indicates that nothing was wrong.

ORDs

- slot:/Algorithm/English/High_Supply_Static_Pressure
- slot:/Algorithm/Metric/High_Supply_Static_Pressure

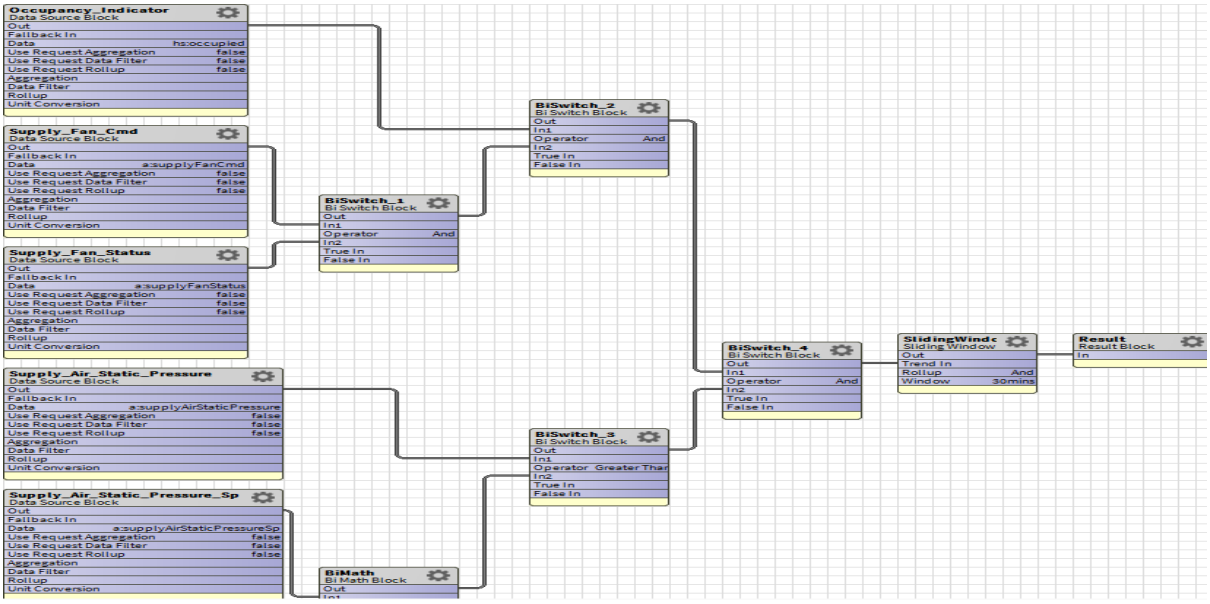
Flowchart

Figure 13 High Supply Static Pressure algorithm



Wire sheet

Figure 14 High Supply Static Pressure



Related Links

- Algorithm library reference (Parent Topic)

Low Supply Static Pressure

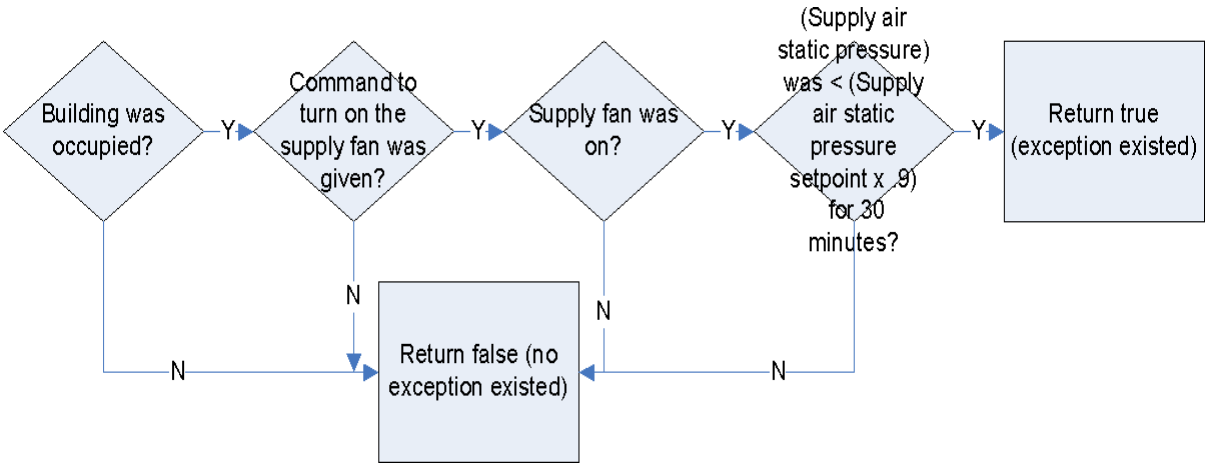
This algorithm evaluates static pressure trend data. It produces a “true” result, indicating that an exception existed, if a building was occupied, an AHU unit’s supply fan was on, the supply fan status indicated that the fan was on, the supply air static pressure was less than 90% of the supply air static pressure setpoint, and all these conditions existed for 30 minutes. A “false” result indicates that nothing was wrong.

ORDs

- slot:/Algorithm/English/Low_Supply_Static_Pressure
- slot:/Algorithm/Metric/Low_Supply_Static_Pressure

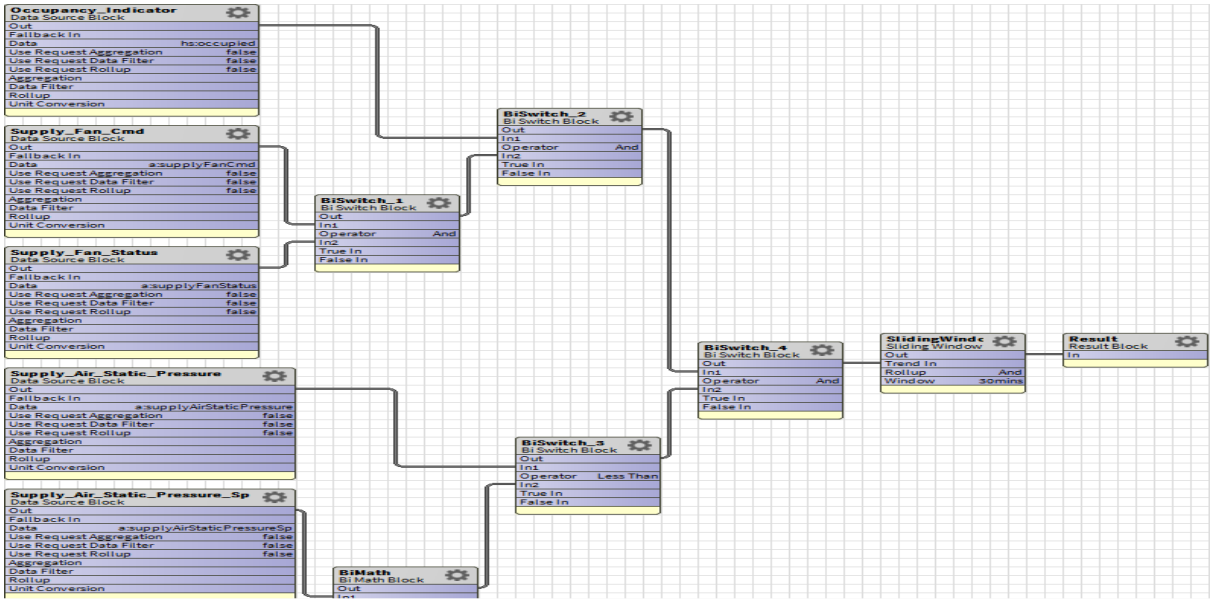
Flowchart

Figure 15 Low Supply Static Pressure algorithm



Wire sheet

Figure 16 Low Supply Static Pressure algorithm



Related Links

- Algorithm library reference (Parent Topic)

Electricity Usage 5% Less Than last Year

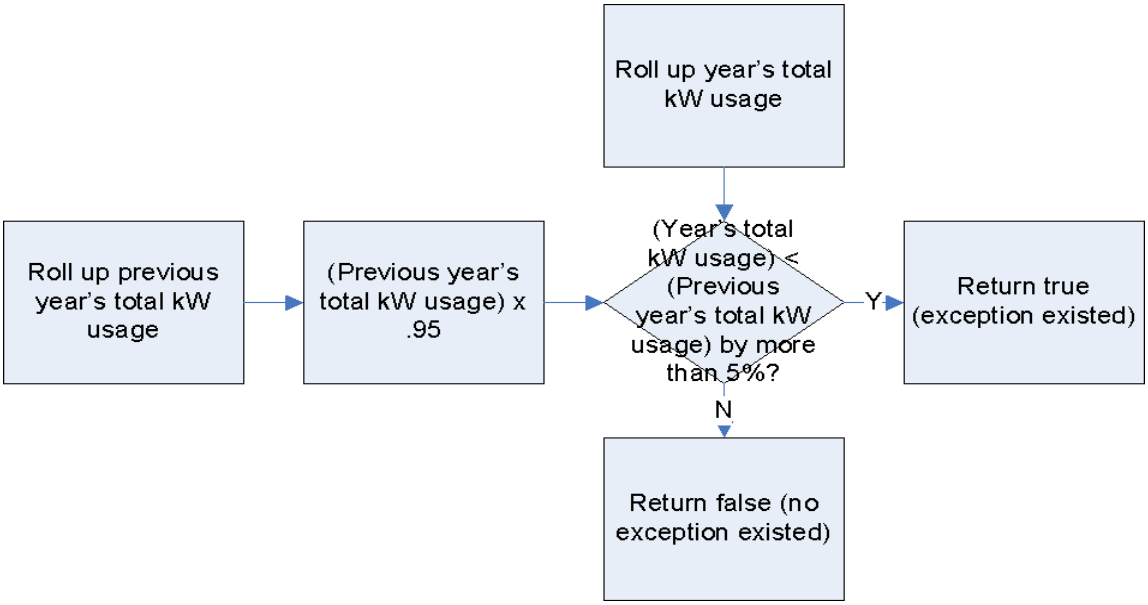
This algorithm compares electricity usage this year with last year's usage. It produces a "true" result, indicating that an exception exists, if the total monthly kW usage for this year is less than 95% of the total monthly kW usage for the previous year. A "false" result indicates that nothing was wrong.

ORDs

- slot:/Algorithm/English/ Electricity_Usage_5_Percent_Less_Than_Last_Year
- slot:/Algorithm/Metric/ Electricity_Usage_5_Percent_Less_Than_Last_Year

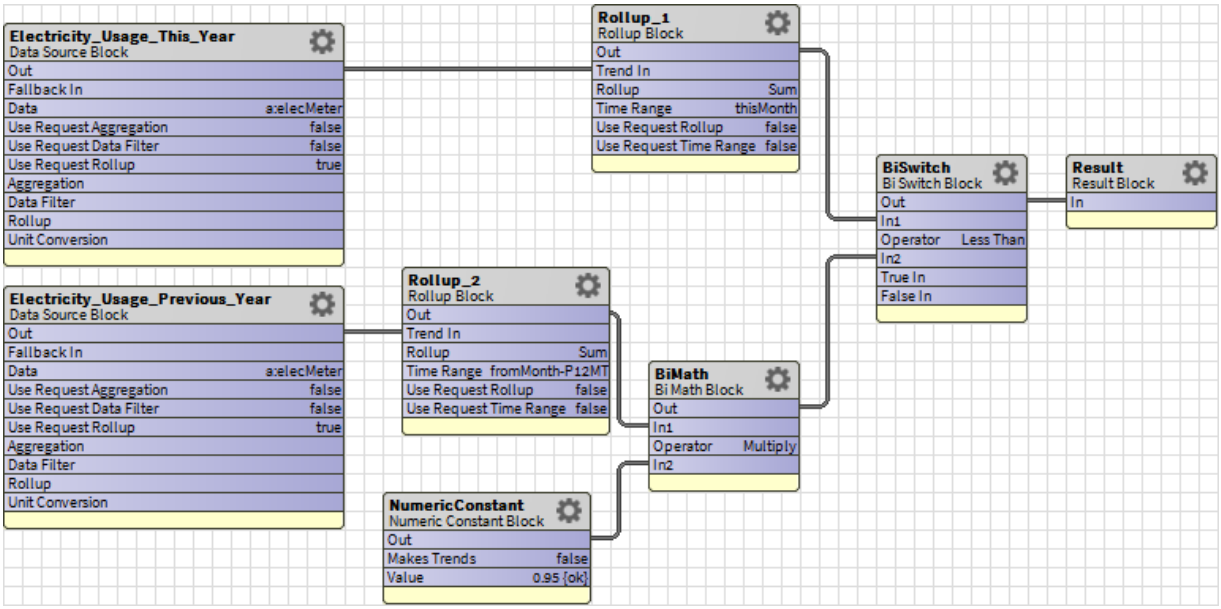
Flowchart

Figure 17 Electricity Usage Less Than 95% of Last Year



Wire sheet

Figure 18 Electricity Usage Less Than 95% of Last Year



Related Links

- Algorithm library reference (Parent Topic)

Electricity Usage 5% More Than Last Year

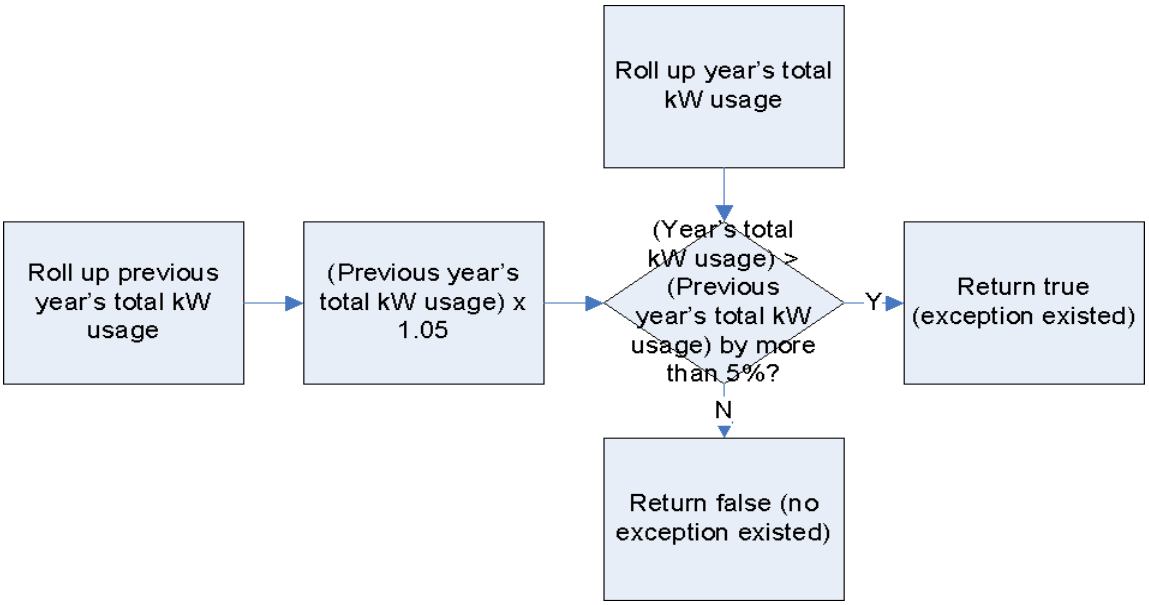
This algorithm evaluates trend data for electricity usage. It returns a “true” result, indicating that an exception existed, if electricity usage for the year in question was less than electricity usage in the previous year by more than 5%. A “false” result indicates that electricity usage was normal.

ORDs

- slot:/Algorithm/English/ Electricity_Usage_5_Percent_More_Than_Last_Year
- slot:/Algorithm/Metric/ Electricity_Usage_5_Percent_More_Than_Last_Year

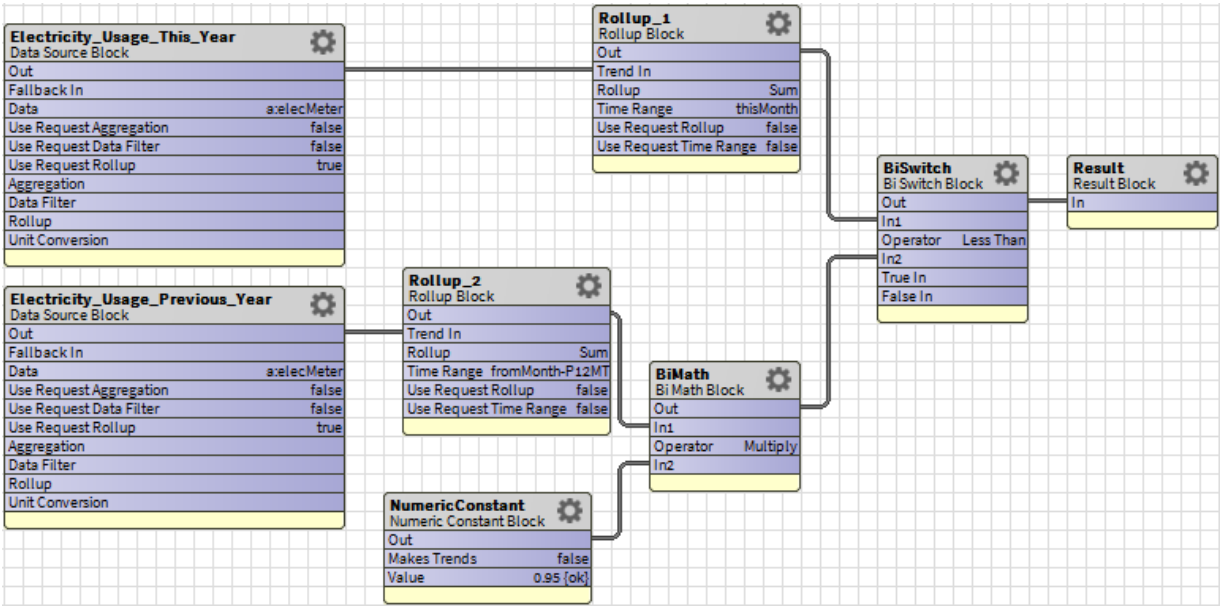
Flowchart

Figure 19 Electricity usage algorithm



Wire sheet

Figure 20 Electricity usage algorithm



Related Links

- Algorithm library reference (Parent Topic)

Water Usage 5% Less Than Last Year

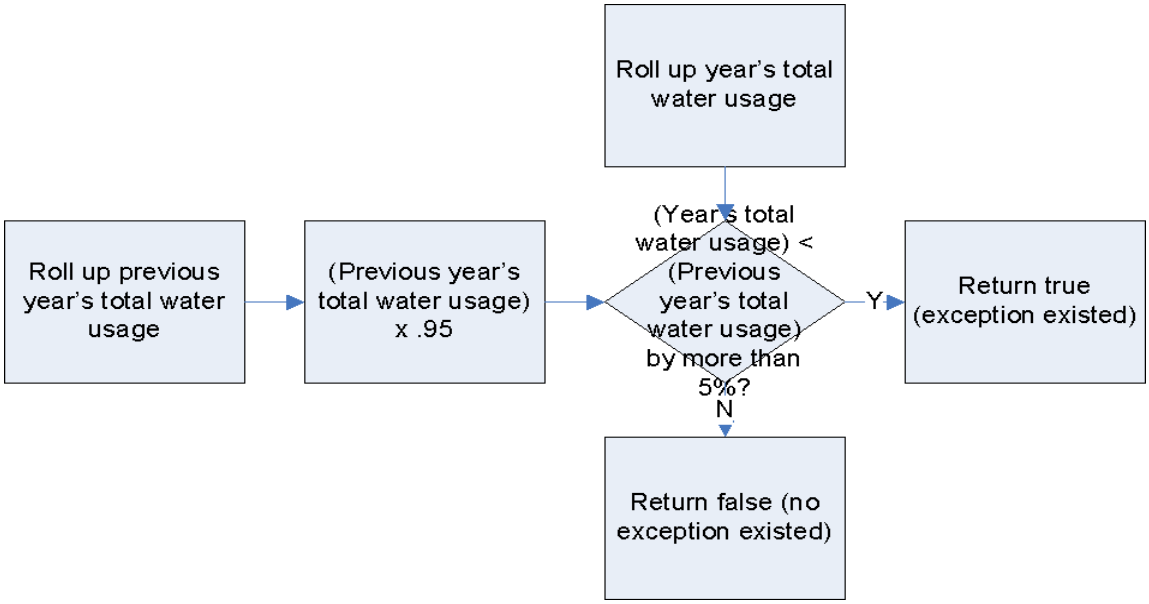
This algorithm evaluates trend data for water usage. It returns a “true” result, indicating that an exception existed, if water usage for the year in question was less than water usage in the previous year by more than 5%. A “false” result indicates that water usage was normal.

ORDs

- slot:/Algorithm/English/ Water_Usage_5_Percent_Less_Than_Last_Year
- slot:/Algorithm/Metric/ Water_Usage_5_Percent_Less_Than_Last_Year

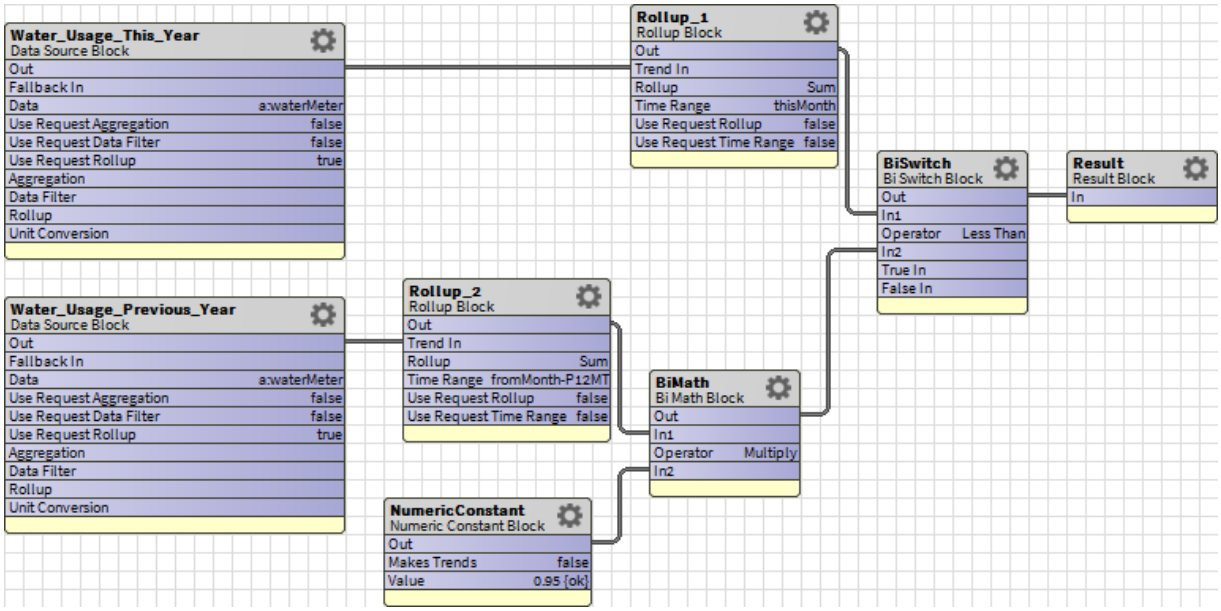
Flowchart

Figure 21 Water usage algorithm



Wire Sheet

Figure 22 Water usage algorithm



Related Links

- Algorithm library reference (Parent Topic)

Water Usage 5% More Than Last Year

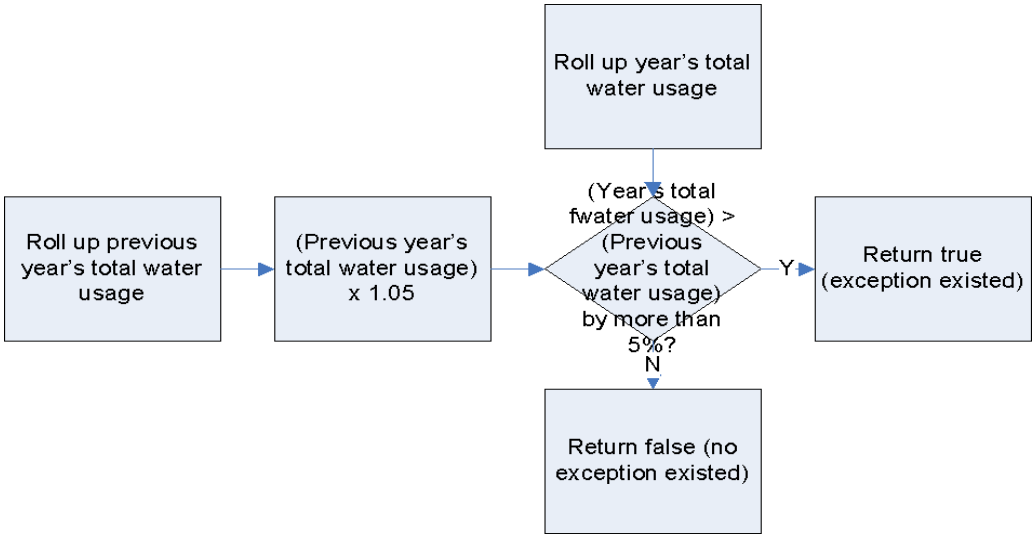
This algorithm evaluates trend data for water usage. It returns a "true" result, indicating that an exception existed, if water usage for the year in question was greater than water usage in the previous year by more than 5%. A "false" result indicates that water usage was normal.

ORDs

- slot:/Algorithm/English/Water_Usage_5_Percent_More_Than_Last_Year
- slot:/Algorithm/Metric/Water_Usage_5_Percent_More_Than_Last_Year

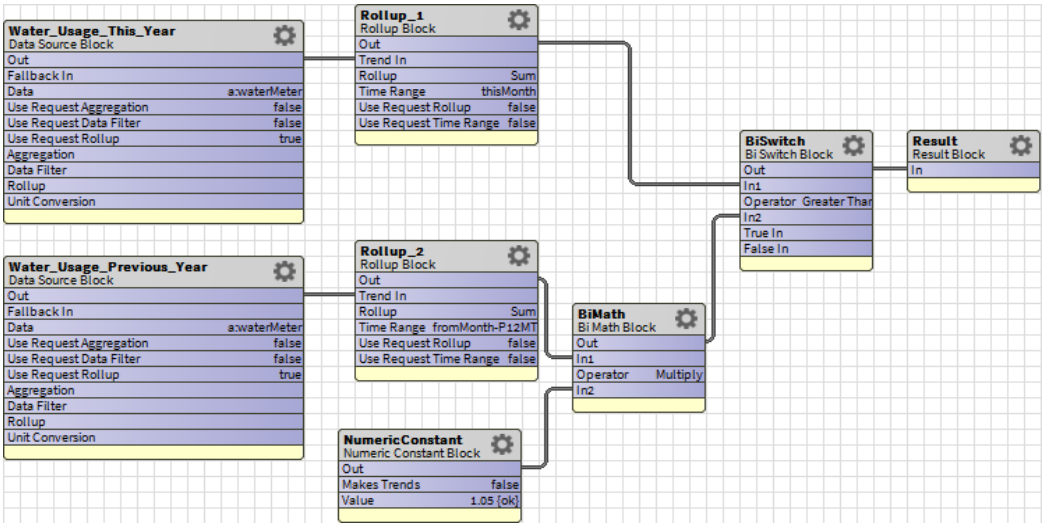
Flowchart

Figure 23 Water usage algorithm



Wire sheet

Figure 24 Water usage algorithm



Related Links

- Algorithm library reference (Parent Topic)

Heating Valve Open 100%

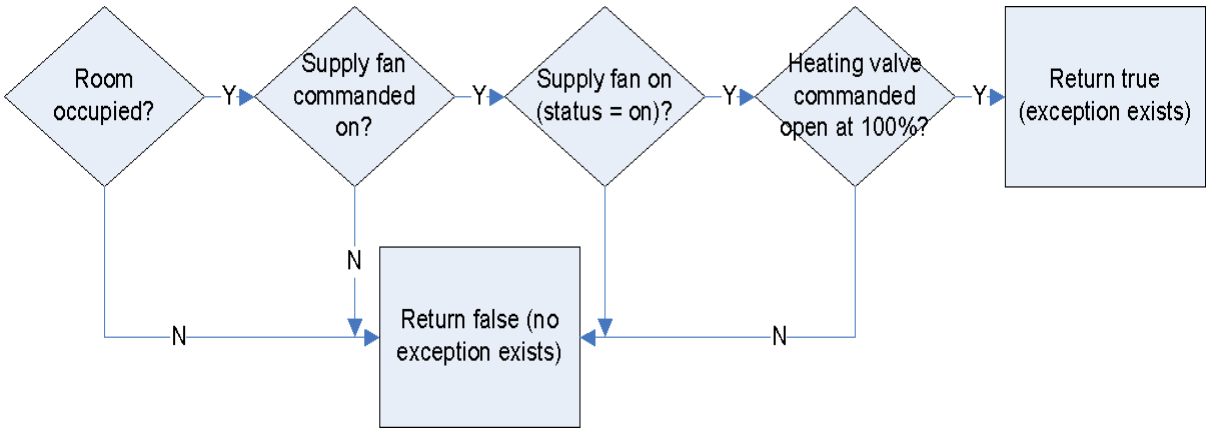
This algorithm evaluates trend data. It produces a “true” or “false” result for every 30 minutes of historical data, if a building was occupied, the supply fan was on, the supply fan status indicated that the fan was on, and the heating valve was wide open (100% open). A “true” result indicates that an exception existed; a “false” result that nothing was wrong.

ORDs

- slot:/Algorithm/English/Heating_Valve_Open_100_Percent
- slot:/Algorithm/Metric/Heating_Valve_Open_100_Percent

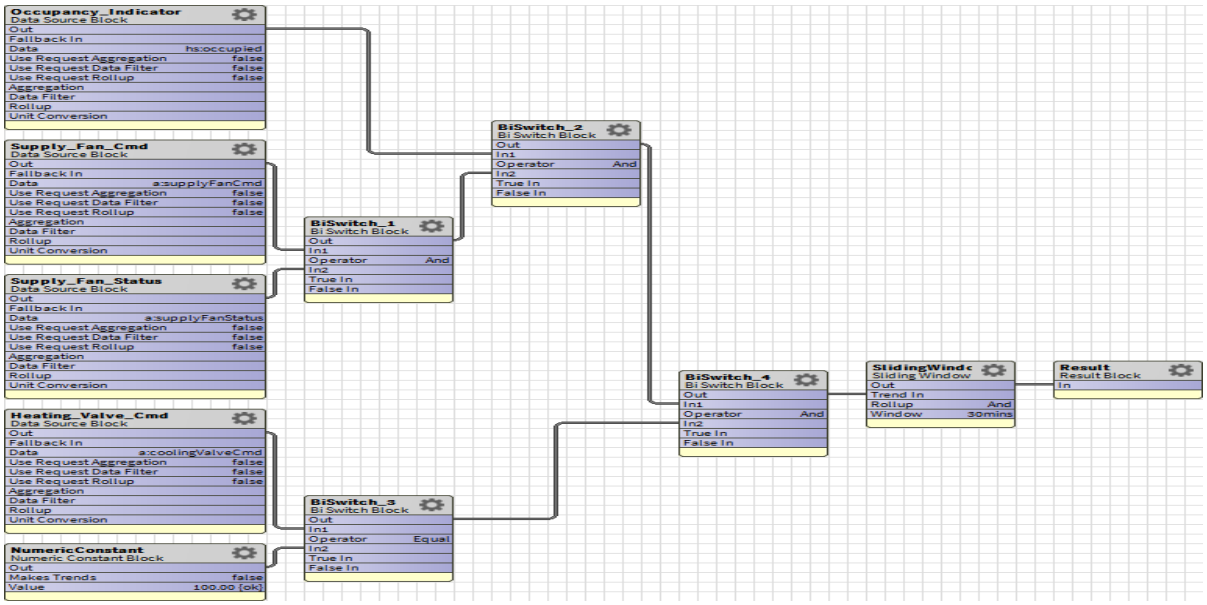
Flowchart

Figure 25 Heating Valve Open 100%



Wire Chart

Figure 26 Heating Valve Open 100%



Related Links

- Algorithm library reference (Parent Topic)

Cooling Valve Open 100%

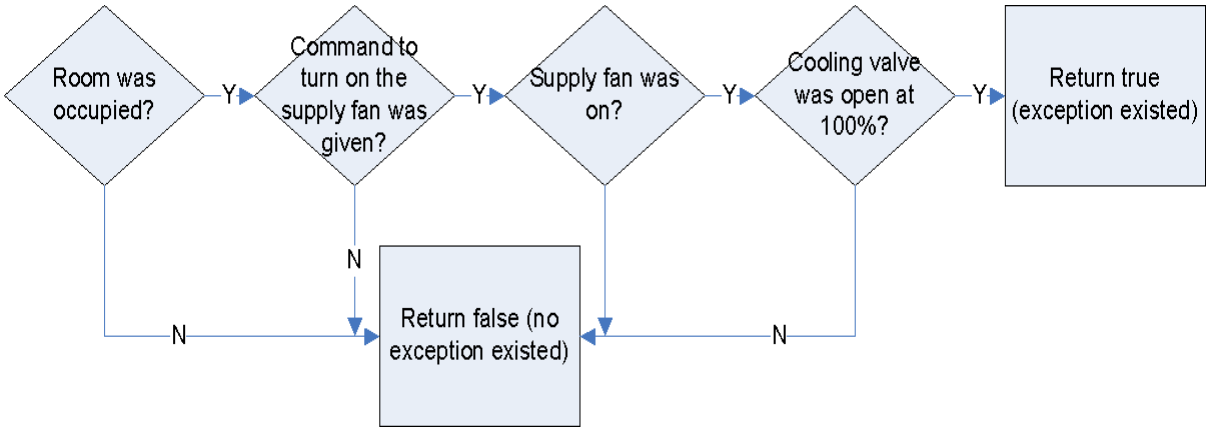
This algorithm evaluates trend data. It produces a “true” or “false” result for every 30 minutes of historical data, if a building was occupied, the supply fan was on, the supply fan status indicated that the fan was on, and the cooling valve was wide open (100% open). A “true” result indicates that an exception existed; a “false” result that nothing was wrong.

ORDs

- slot:/Algorithm/English/Cooling_Valve_Open_100_Percent
- slot:/Algorithm/Metric/Cooling_Valve_Open_100_Percent

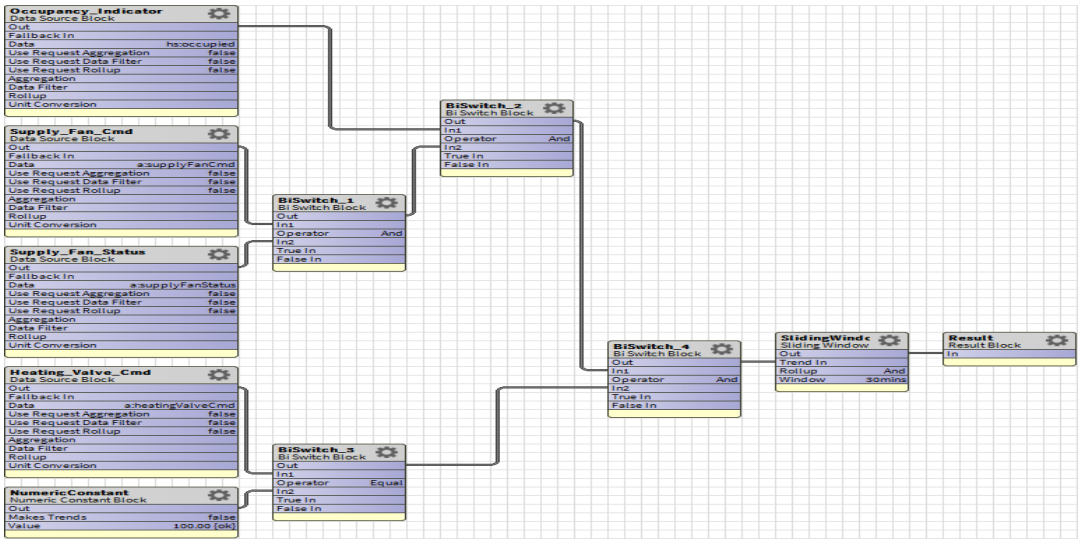
Flowchart

Figure 27 Cooling Valve Open 100% flowchart



Wire sheet

Figure 28 Cooling Valve Open 100% algorithm



Related Links

- Algorithm library reference (Parent Topic)

Low Outside Air Intake

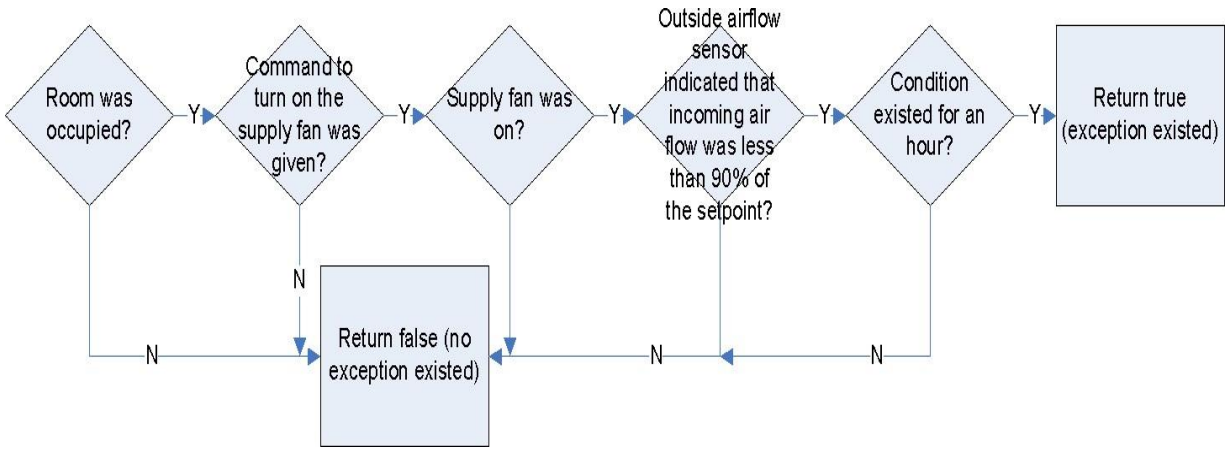
This algorithm evaluates trend data collected from an AHU unit. It returns a “true” result if four conditions are met for an hour. Otherwise it returns “false.” The four conditions are: the room serviced by the AHU was occupied, the command had been given to turn the supply fan on, the supply fan was on, and the outside air flow coming in was less than 90% of the outside airflow setpoint. A “false” result indicates that air coming in from the outside was normal.

ORDs

- slot:/Algorithm/English/Low_Outside_Air_Intake
- slot:/Algorithm/Metric/Low_Outside_Air_Intake

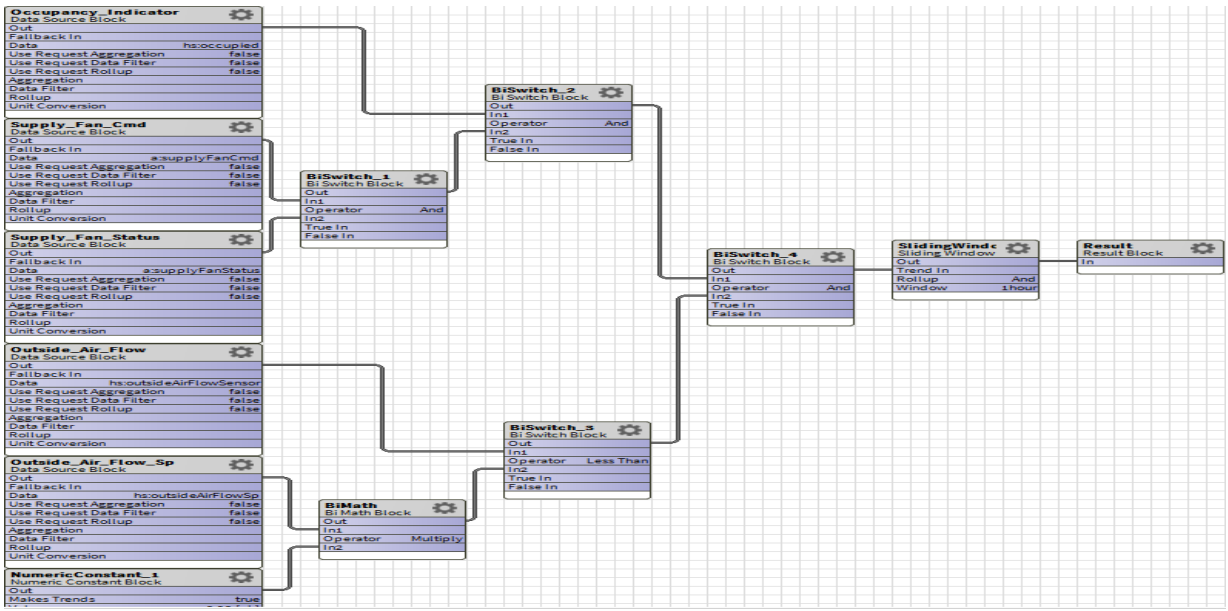
Flowchart

Figure 329 Low Outside Air Intake flowchart



Wire sheet

Figure 30 Low Outside Air Intake algorithm



Related Links

- Algorithm library reference (Parent Topic)

High Outside Air Intake

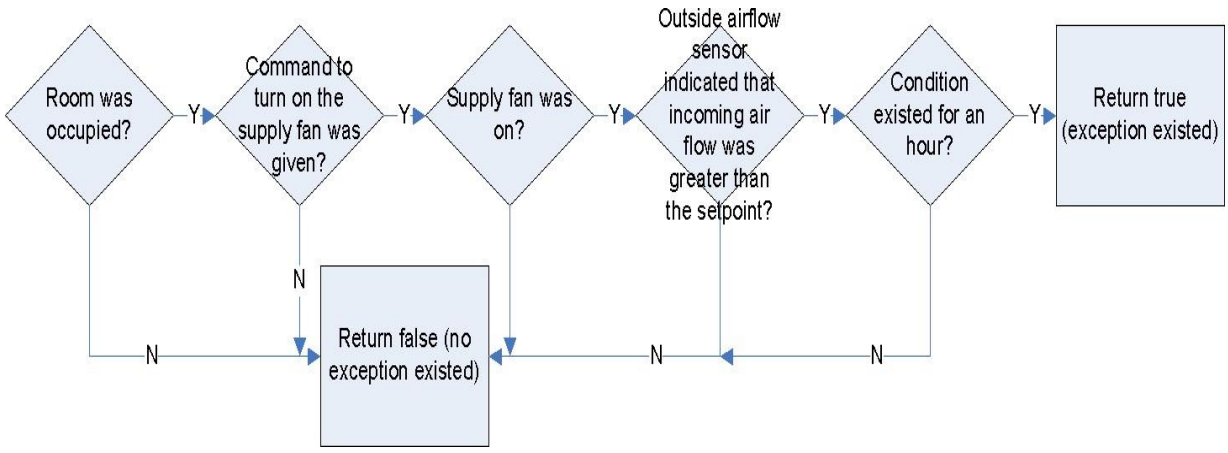
This algorithm evaluates trend data collected from an AHU unit. It returns a “true” result if four conditions are met for an hour. Otherwise it returns “false.” The four conditions are: the room serviced by the AHU was occupied, the command had been given to turn the supply fan on, the supply fan was on, and the outside air flow coming in was more than 100% of the outside airflow setpoint. A “false” result indicates that air coming in from the outside was normal.

Ords

- slot:/Algorithm/English/High_Outside_Air_Intake
- slot:/Algorithm/Metric/High_Outside_Air_Intake

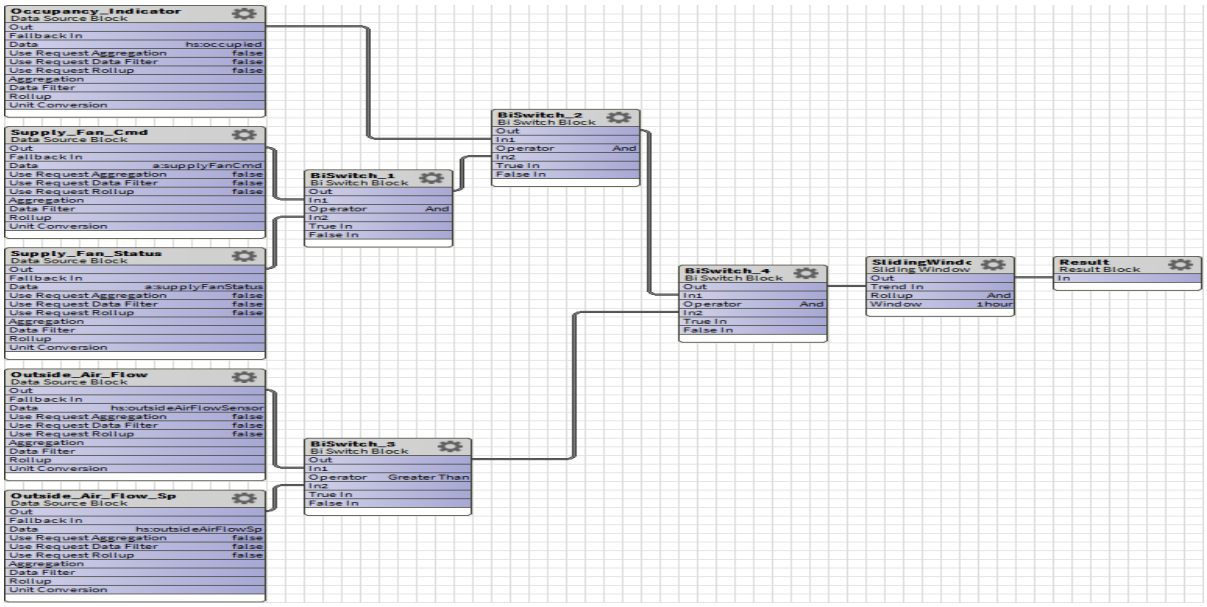
Flowchart

Figure 31 High Outside Air Intake flowchart



Algorithm

Figure 32 High Outside Air Intake algorithm



Related Links

- Algorithm library reference (Parent Topic)

Unscheduled Operation

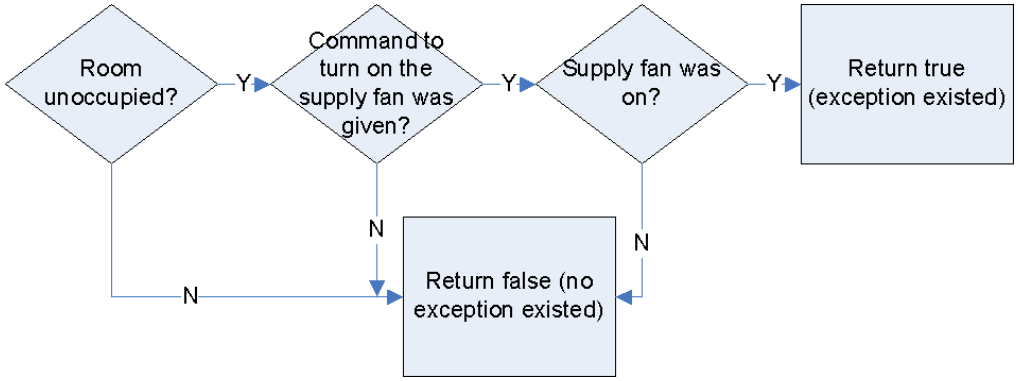
This algorithm evaluates trend data collected from an AHU unit. It determines if an AHU unit was running at an unscheduled time. It returns “true” if the facility is unoccupied, the command was given to turn the supply fan on, and the supply fan is on. It does not matter how long the supply fan was running. A “false” result indicates that the AHU ran on schedule.

ORDs

- slot:/Algorithm/English/Unscheduled_Operation
- slot:/Algorithm/English/Unscheduled_Operation

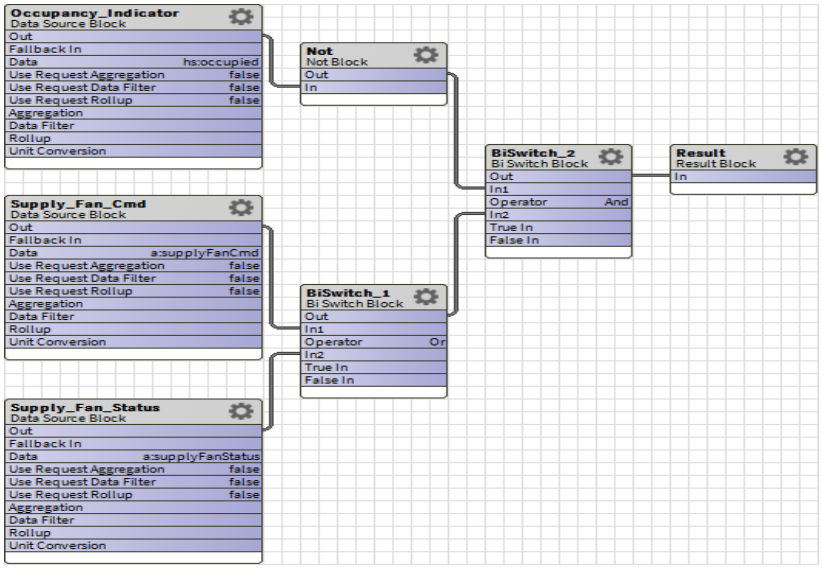
Flowchart

Figure 33 Unscheduled Operation flowchart



Algorithm

Figure 34 Unscheduled Operation algorithm



Related Links

- Algorithm library reference (Parent Topic)

Prolonged 100% VAV Damper

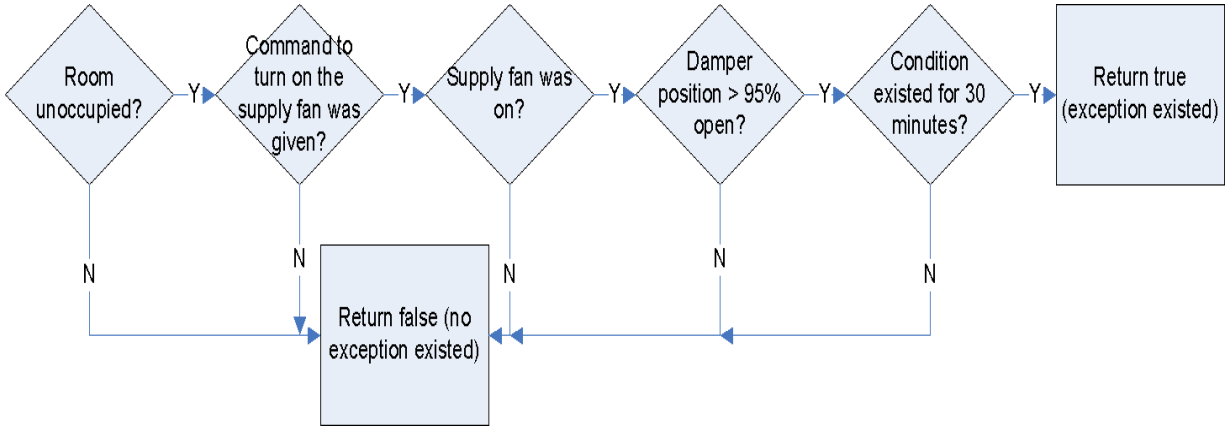
This algorithm evaluates trend data collected from an AHU unit. It returns “true” if the facility was occupied, the command to turn the supply fan on was given, the supply fan was on, and the position of the damper was more than 95% open for 30 minutes. A “false” result indicates that nothing was wrong.

ORDs

- slot:/Algorithm/English/Prolonged_100_Percent_VAV_Damper
- slot:/Algorithm/Metric/Prolonged_100_Percent_VAV_Damper

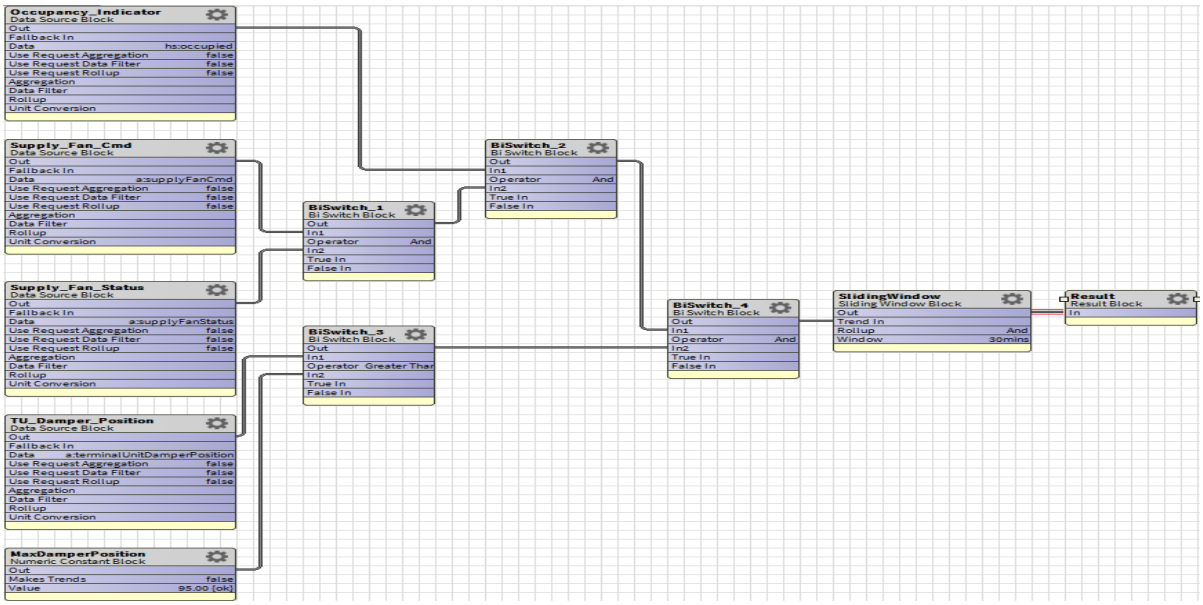
Flowchart

Figure 35 Prolonged 100% VAV Damper flowchart



Algorithm

Figure 36 Prolonged 100% VAV Damper algorithm



Related Links

- Algorithm library reference (Parent Topic)

Electric EUI Exceeds Month Target

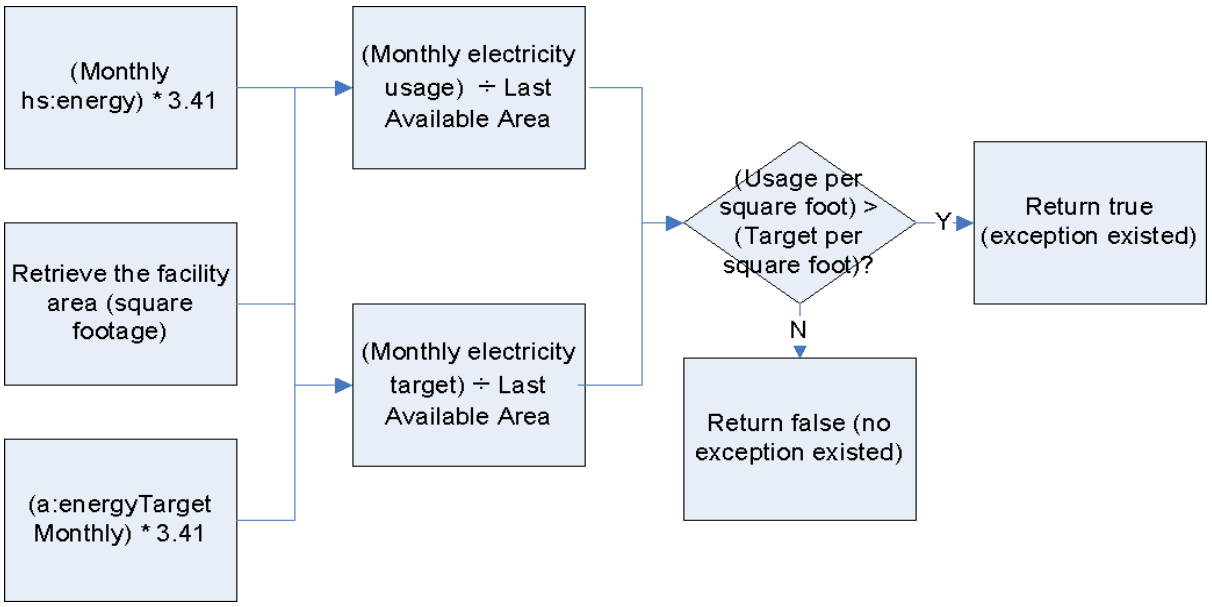
This algorithm evaluates electricity usage over the period of a month. It returns “true” if the monthly electric EUI for the site exceeds the target EUI (Energy Use Intensity, or energy per square foot per year). EUI is based on the last available Area. A “false” result indicates that EUI did not exceed the monthly target.

ORDs

- slot:/Algorithm/English/Electric_EUI_Exceeds_Month_Target
- slot:/Algorithm/Metric/Electric_EUI_Exceeds_Month_Target

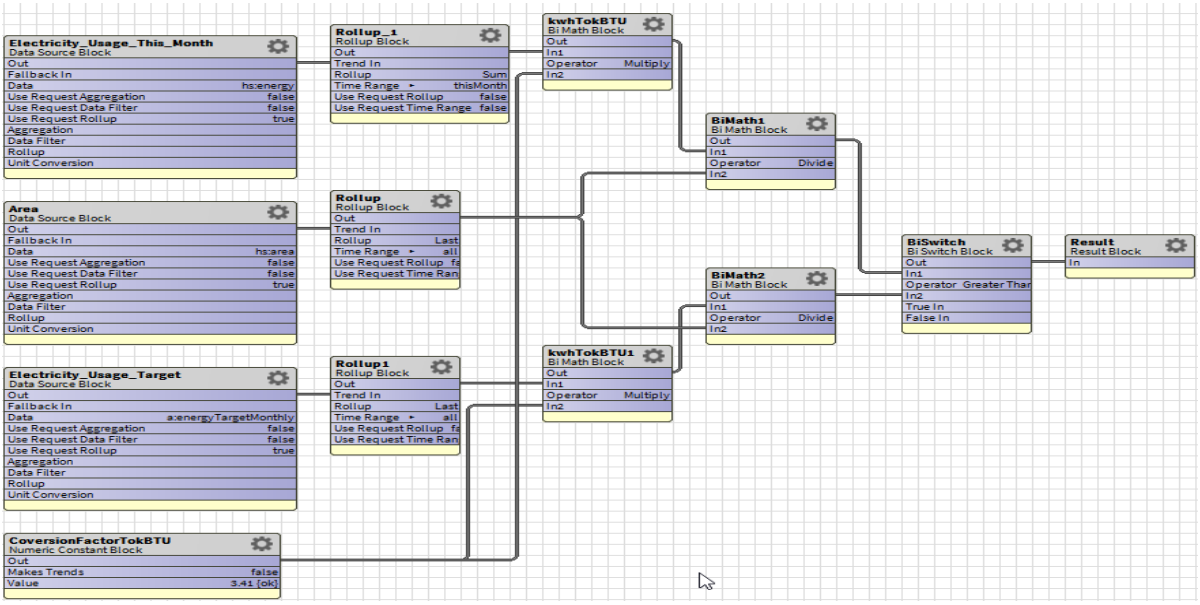
Flowchart

Figure 37 Electric EUI Exceeds Month Target flowchart



Algorithm

Figure 38 Electric EUI Exceeds Month Target algorithm



Related Links

- Algorithm library reference (Parent Topic)

Electric EUI Exceeds Yearly Target

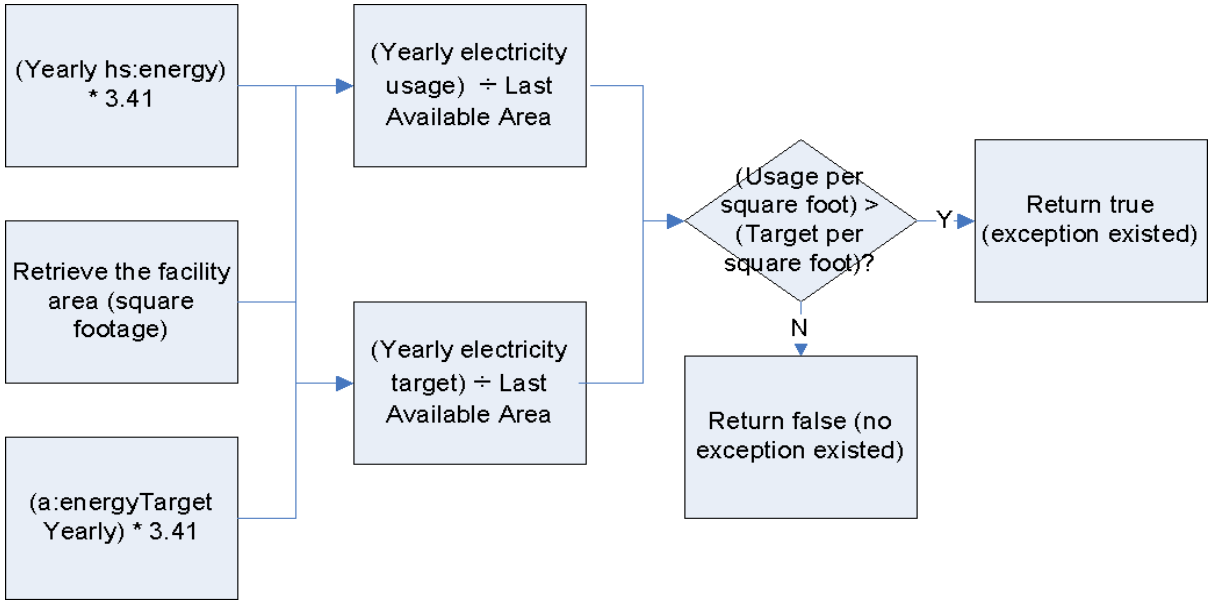
This algorithm evaluates electricity usage over the period of a year. It returns “true” if the yearly electric EUI for the site exceeds the target EUI (Energy Use Intensity, or energy per square foot per year). EUI is based on last available Area. A “false” result indicates that EUI did not exceed the yearly target.

ORDs

- slot:/Algorithm/English/Electric_EUI_Exceeds_Yearly_Target
- slot:/Algorithm/Metric/Electric_EUI_Exceeds_Yearly_Target

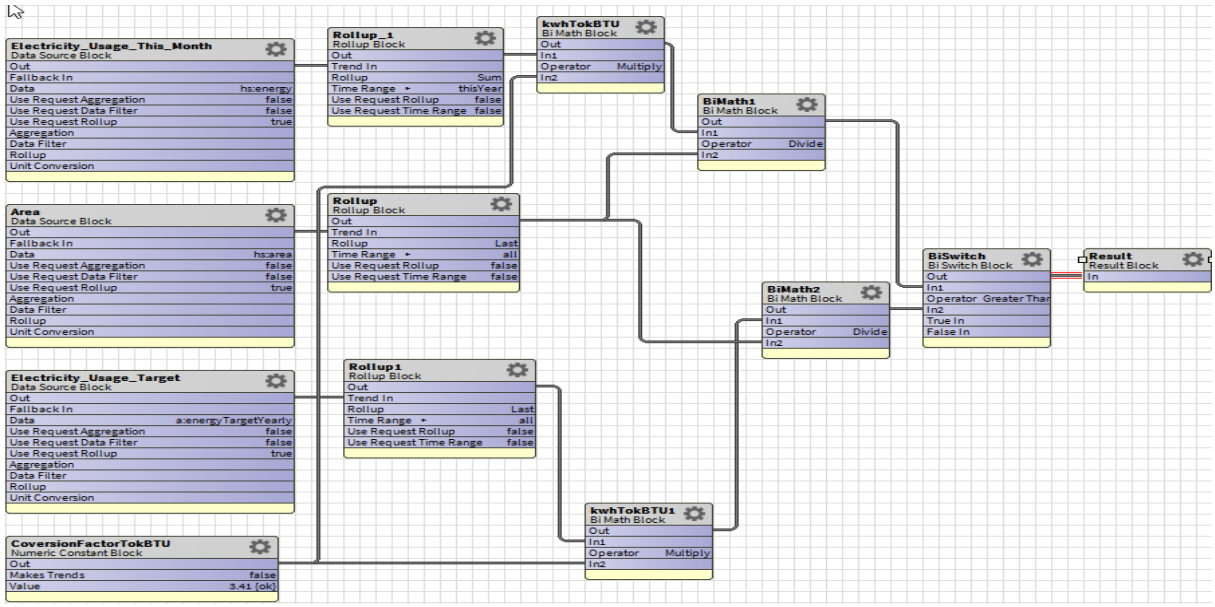
Flowchart

Figure 39 Electric EUI Exceeds Yearly Target flowchart



Algorithm

Figure 40 Electric EUI Exceeds Yearly Target algorithm



Related Links

- Algorithm library reference (Parent Topic)

Chilled water usage minus 10% of last month

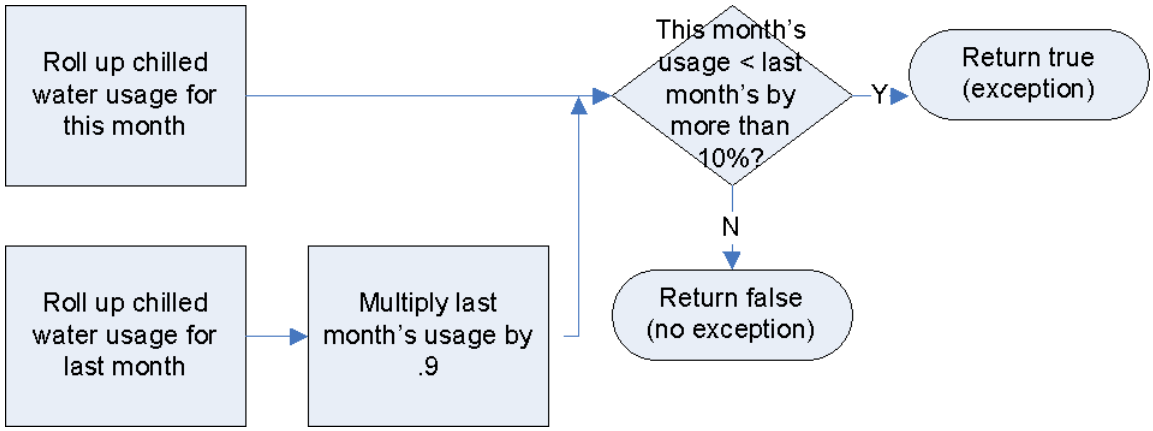
This algorithm reports an exception if chilled water usage this month is less than last month's usage by more than 10% (the negative delta between this month's and last month's chilled water usage is more than 10%).

Input ORD

- slot:/Algorithm/English/ Chilled_Water_Usage_minus_10_pc_of_last_Month
- slot:/Algorithm/Metric/Chilled_Water_Usage_minus_10_pc_of_last_Month

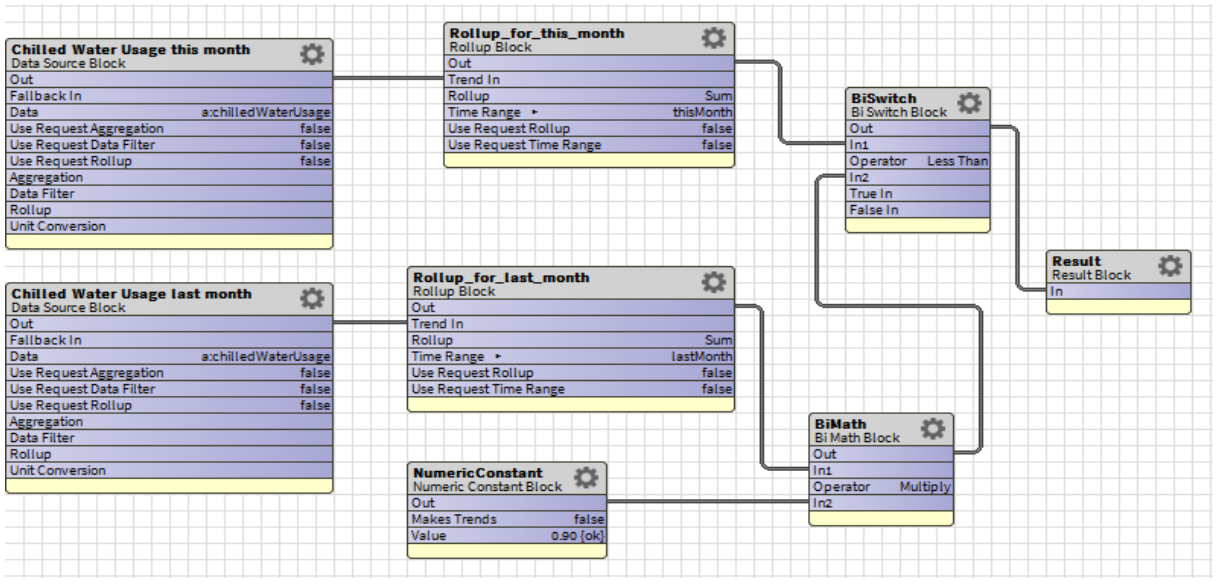
Flowchart

Figure 41 Chilled water usage flowchart



Wire sheet view

Figure 42 Chilled water usage wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Chilled water plus 10% of last month

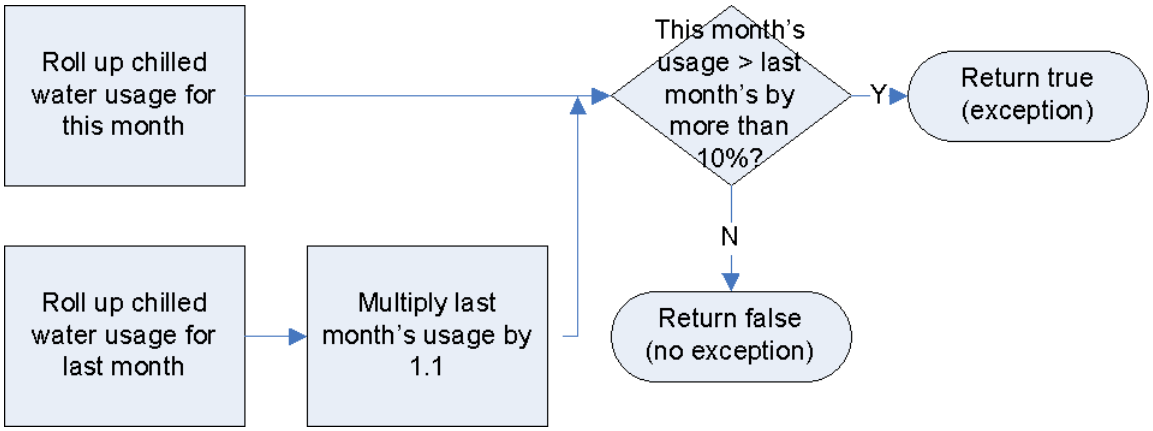
This algorithm reports an exception if chilled water usage this month is greater than last month's usage by more than 10% (the positive delta between this month's and last month's chilled water usage is more than 10%).

Input ORD

- slot:/Algorithm/English/Chilled_Water_Usage_Plus_10_PC_of_last_Month
- slot:/Algorithm/Metric/Chilled_Water_Usage_Plus_10_PC_of_last_Month

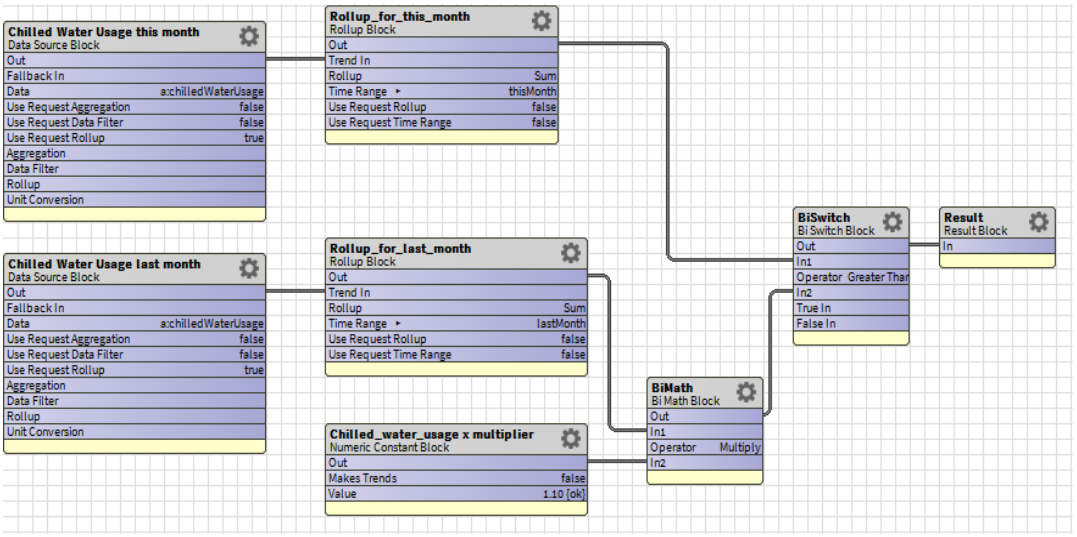
Flowchart

Figure 43 Chilled water usage flowchart



Wire sheet view

Figure 44 Chilled water usage wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Chilled water usage minus 5% of last month

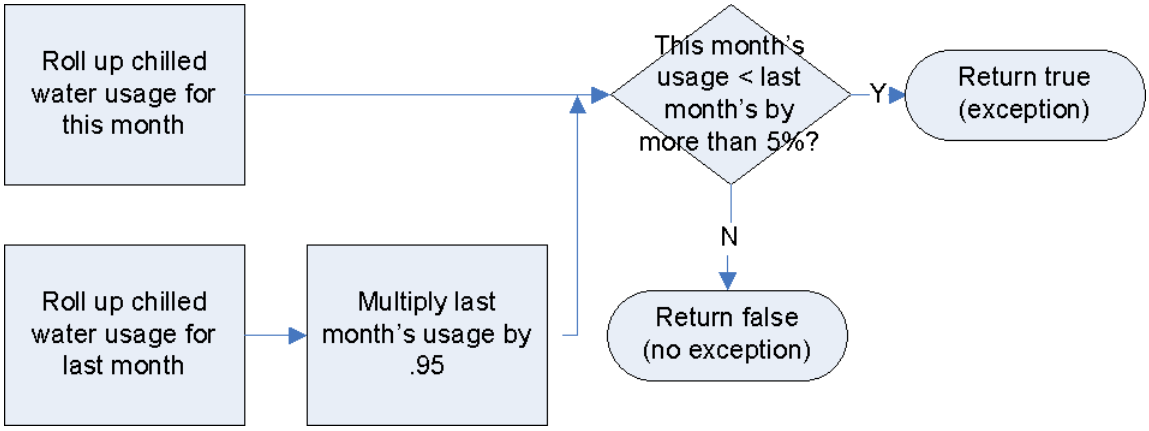
This algorithm reports an exception if chilled water usage this month is less than last month's usage by more than 5% (the negative delta between this month's and last month's chilled water usage is more than 5%).

Input ORD

- slot:/Algorithm/English/Chilled_Water_Usage_Minus_5_pc_of_last_Month
- slot:/Algorithm/Metric/Chilled_Water_Usage_Minus_5_pc_of_last_Month

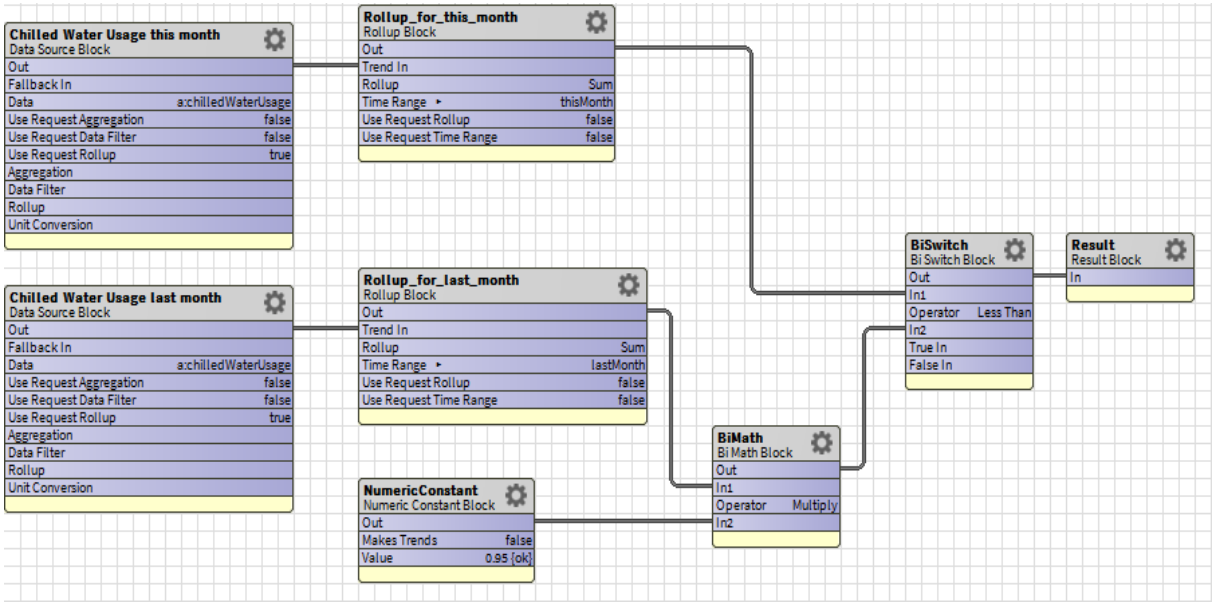
Flowchart

Figure 45 Chilled water usage flowchart



Wire sheet view

Figure 46 Chilled water usage wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Chilled water usage plus 5% of last month

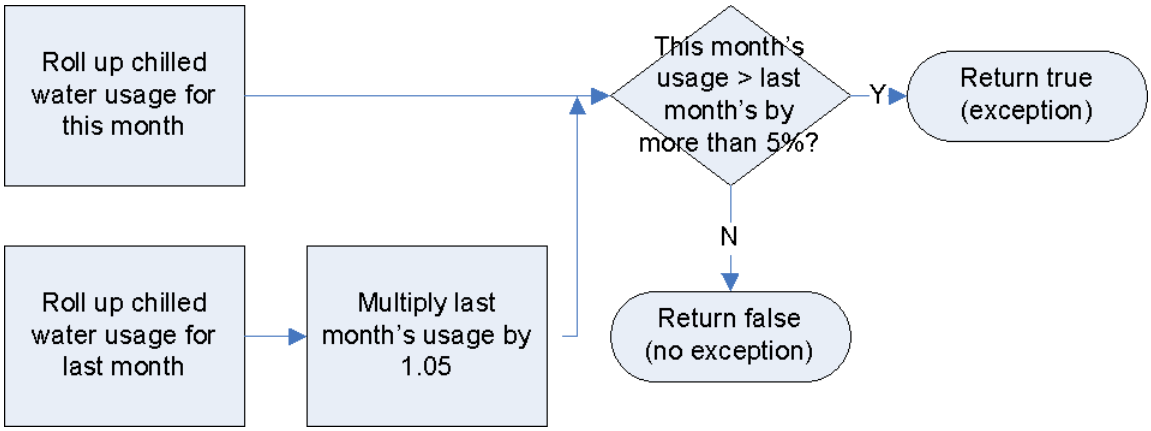
This algorithm reports an exception if chilled water usage this month is greater than last month's usage by more than 5% (the positive delta between this month's and last month's chilled water usage is more than 5%).

Input ORD

- slot:/Algorithm/English/Chilled_Water_Usage_P_5_pc_of_last_Month
- slot:/Algorithm/Metric/Chilled_Water_Usage_P_5_pc_of_last_Month

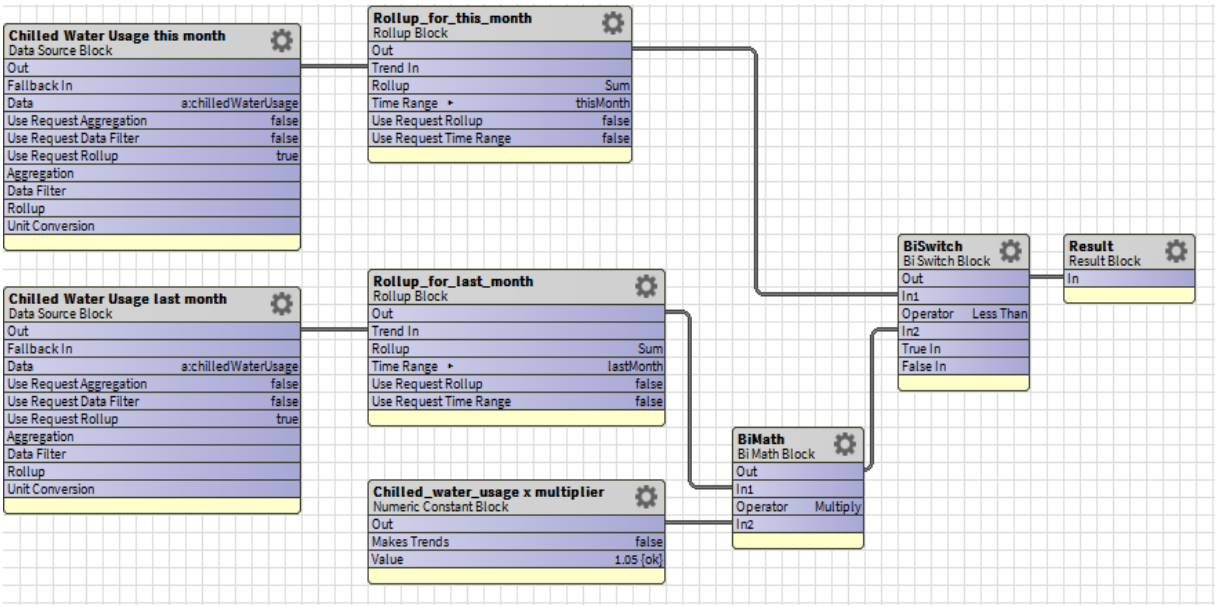
Flowchart

Figure 47 Chilled water usage flowchart



Wire sheet view

Figure 48 Chilled water usage wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Non-conformance space temperature

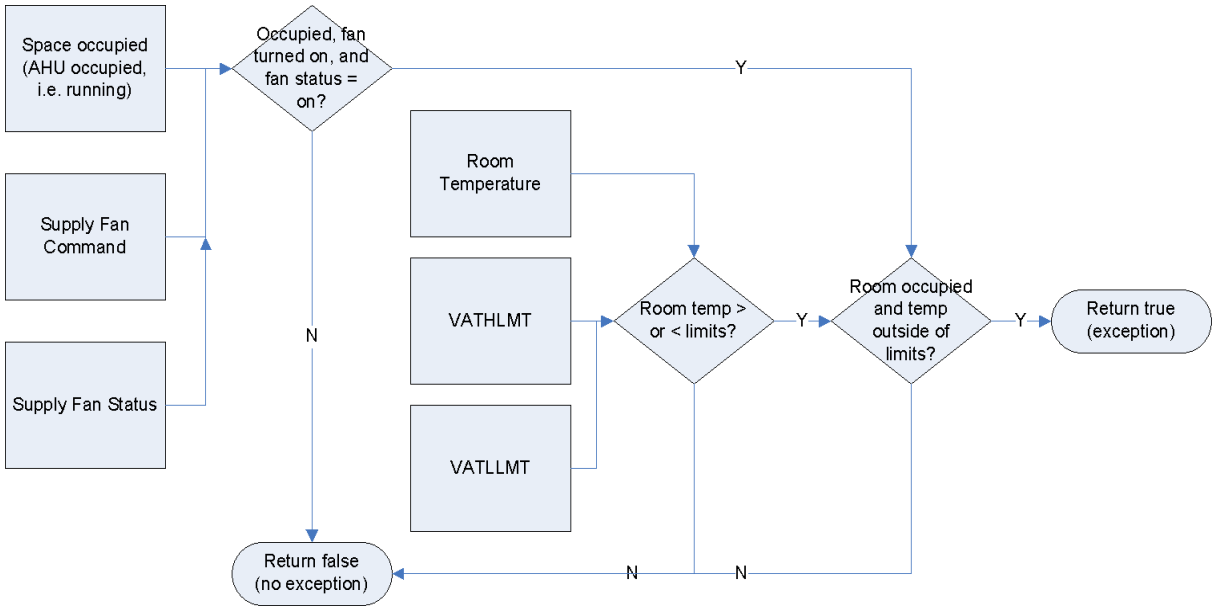
This algorithm returns “true,” when a room is occupied, the command to turn the supply fan on was issued, the supply fan is on, and the room temperature is greater than the VATHLMT (Variable Air Temperature High Limit) or less than the VATLLMT (Variable Air Temperature Low Limit).

Input ORD

- slot:/Algorithm/English/NonConformanceSpaceTemp
- slot:/Algorithm/Metric/NonConformanceSpaceTemp

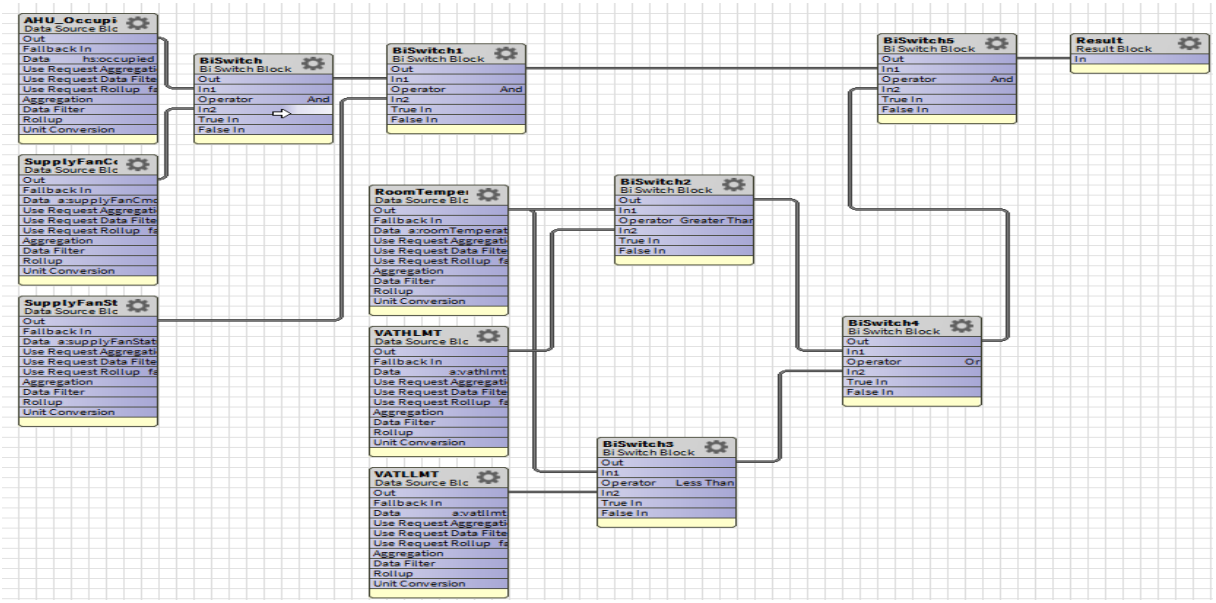
Flowchart

Figure 59 Non-conformance space temperature flowchart



Wire sheet view

Figure 50 Non-conformance space temperature wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Non-conformance space humidity

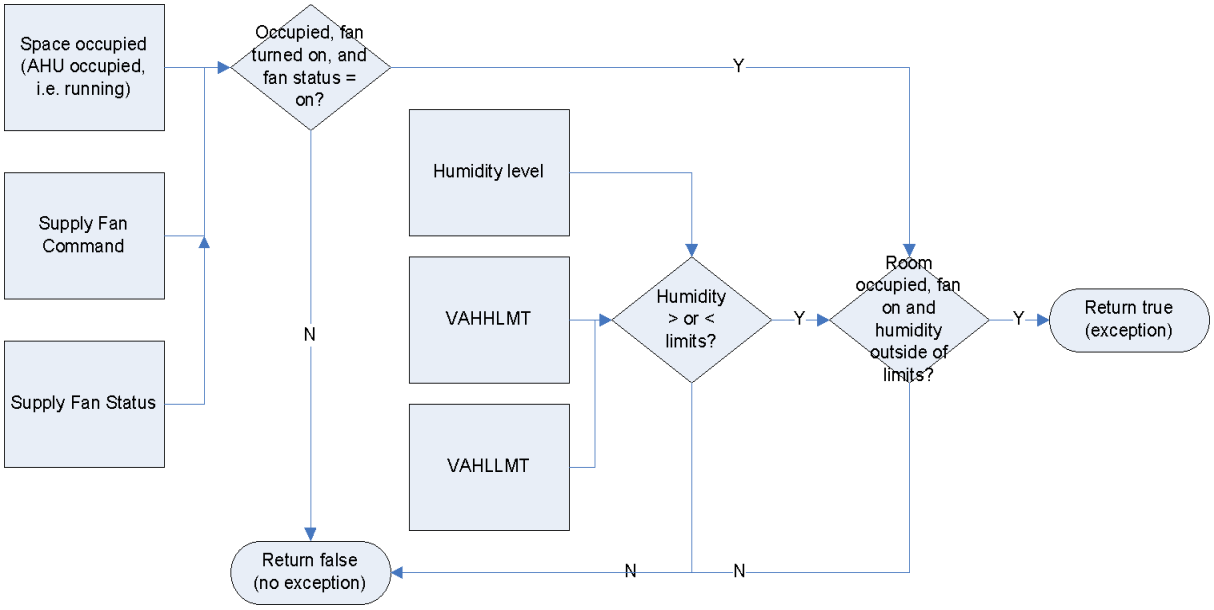
This algorithm returns “true,” when a room is occupied, the command to turn the supply fan on was issued, the supply fan is on, and the humidity is greater than the VAHHLMT (Variable Air Humidity High Limit) or less than the VAHLLMT (Variable Air Humidity Low Limit).

Input ORD

- slot:/Algorithm/English/NonConformanceSpaceHumid
- slot:/Algorithm/Metric/NonConformanceSpaceHumid

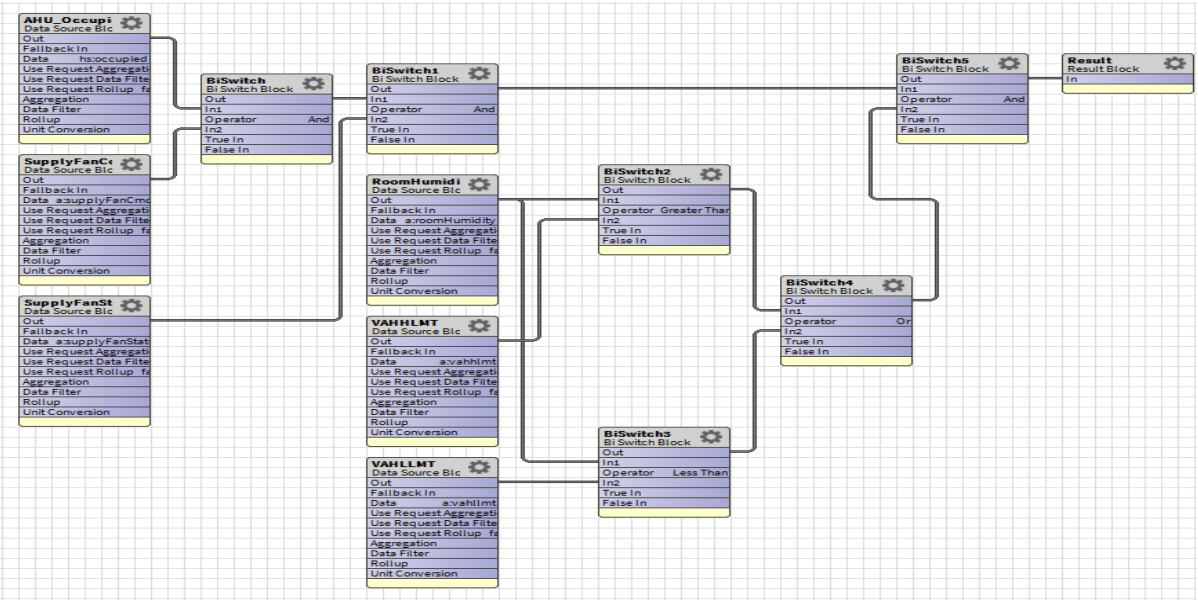
Flowchart

Figure 51 Non-conformance space humidity flowchart



Wire sheet view

Figure 52 Non-conformance space humidity wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Space exhaust flow is high

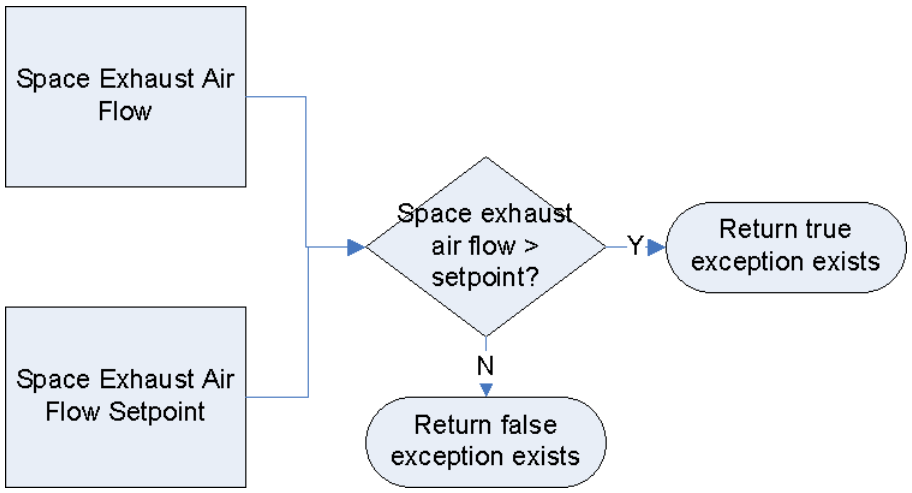
This algorithm returns “true” if the space exhaust air flow is greater than the space exhaust airflow setpoint.

Input ORD

- slot:/Algorithm/English/SpaceExhaustFlowIsHigh
- slot:/Algorithm/Metric/SpaceExhaustFlowIsHigh

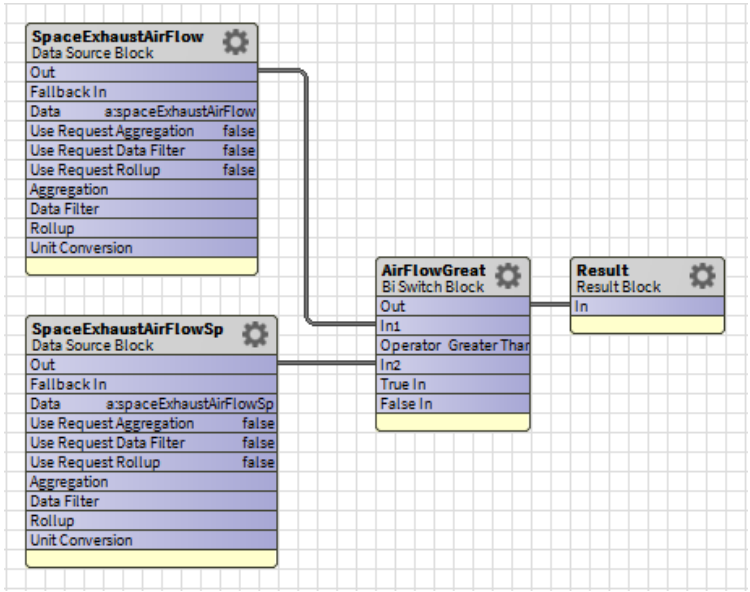
Flowchart

Figure 53 Space exhaust air flow high flowchart



Wire sheet view

Figure 54 Space exhaust air flow high wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Space supply flow is high

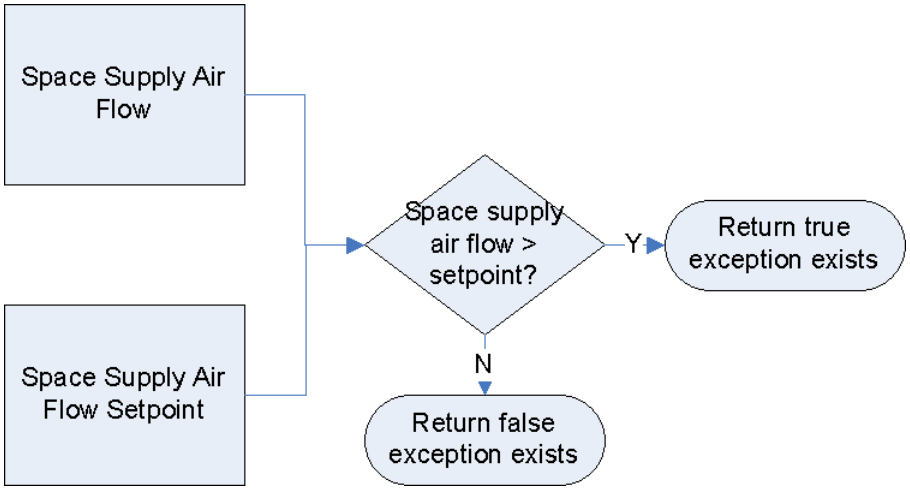
This algorithm returns “true” if the space supply air flow is greater than the space supply air flow setpoint.

Input ORD

- slot:/Algorithm/English/SpaceSupplyFlowIsHigh
- slot:/Algorithm/Metric/SpaceSupplyFlowIsHigh

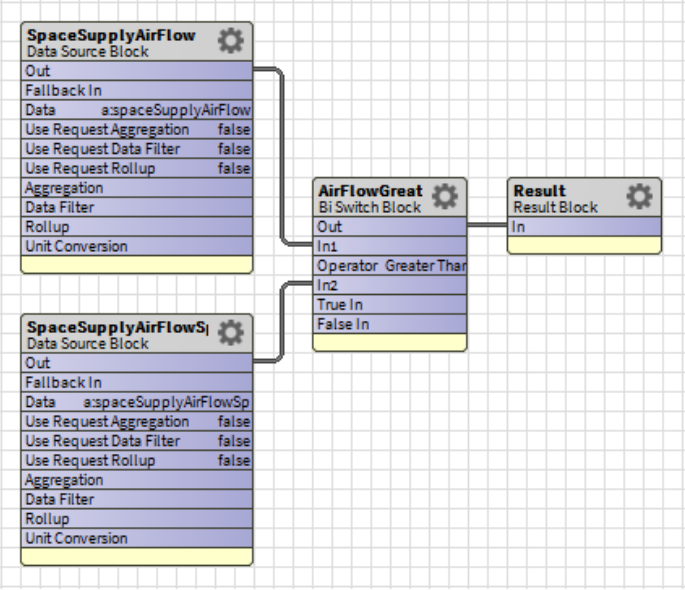
Flowchart

Figure 55 Space supply air flow high flowchart



Wire sheet view

Figure 56 Space supply air flow high wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Low hot water temperature

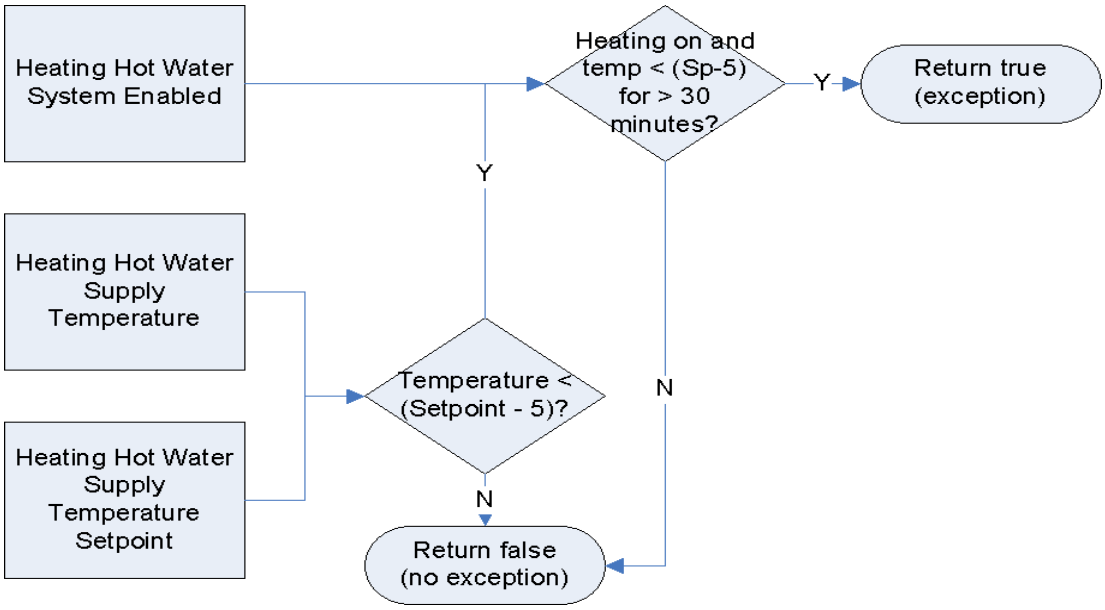
This algorithm returns “true” if, when the hot water system is running, the hot water temperature is less than the hot water supply temperature setpoint by more than five degrees for more than 30 minutes.

Input ORD

- slot:/Algorithm/English/LowHotWaterTemperature
- slot:/Algorithm/Metric/LowHotWaterTemperature

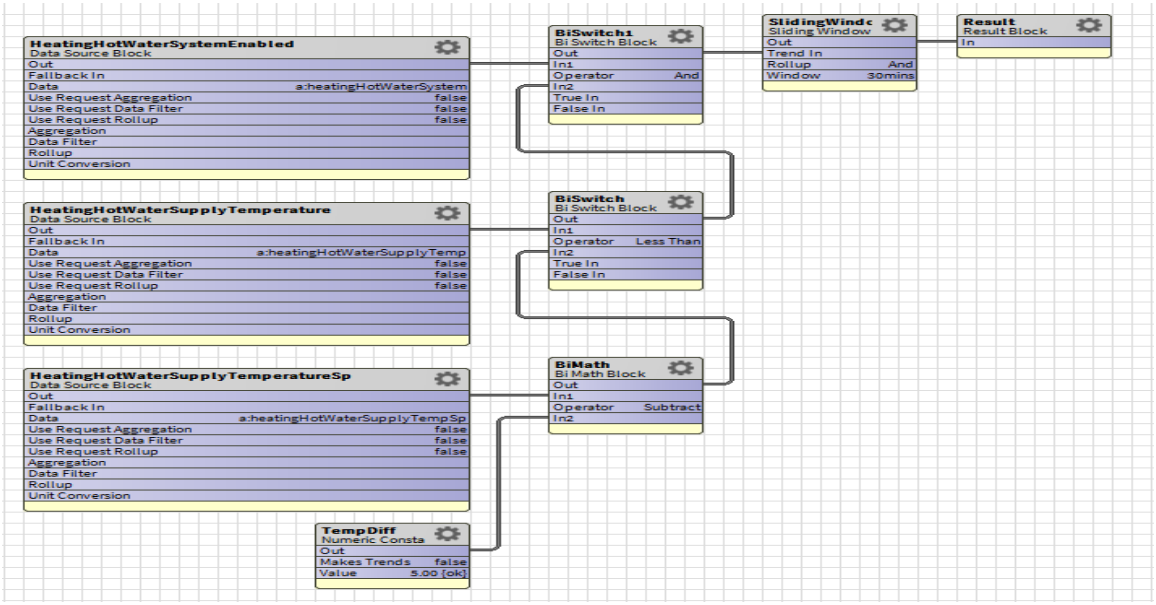
Flowchart

Figure 57 Low hot water temperature flowchart



Wire sheet view

Figure 58 Low hot water temperature wire sheet



Related Links

- Algorithm library reference (Parent Topic)

High hot water temperature

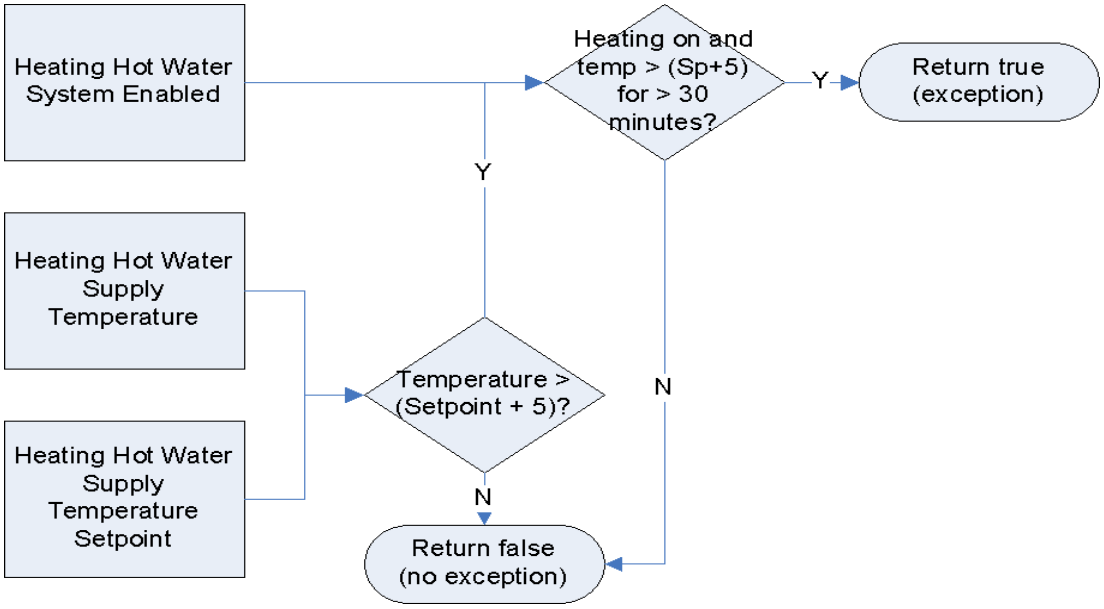
This algorithm returns “true” if, when the hot water system is running, the hot water temperature is greater than the hot water supply temperature setpoint by plus five degrees for more than 30 minutes.

Input ORD

- slot:/Algorithm/English/HighHotWaterTemperature
- slot:/Algorithm/Metric/HighHotWaterTemperature

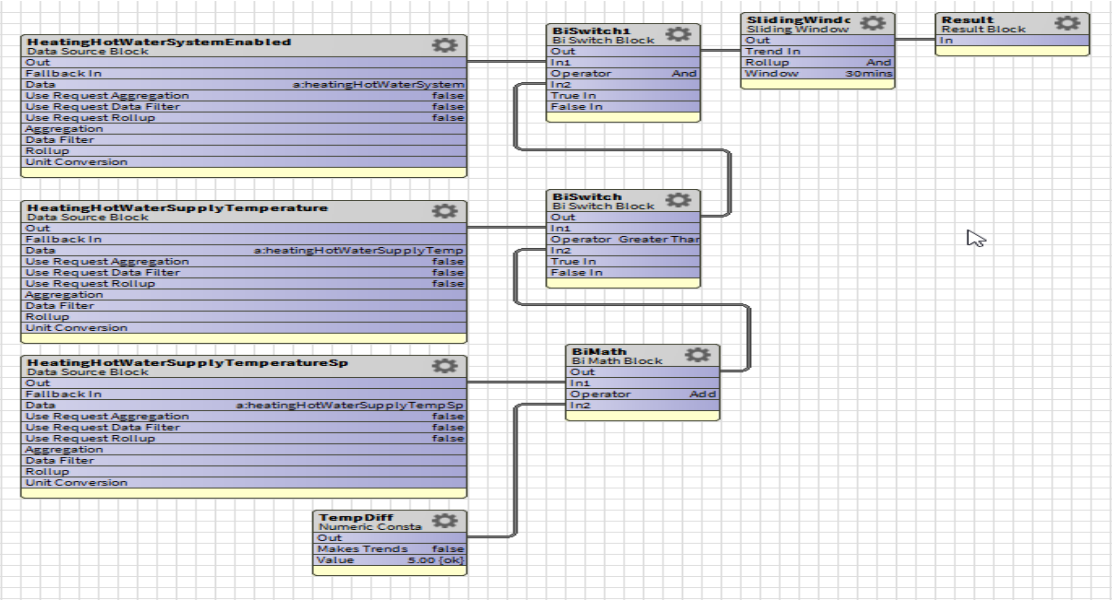
Flowchart

Figure 59 High hot water temperature flowchart



Wire sheet view

Figure 60 High hot water temperature wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Hot water mixing

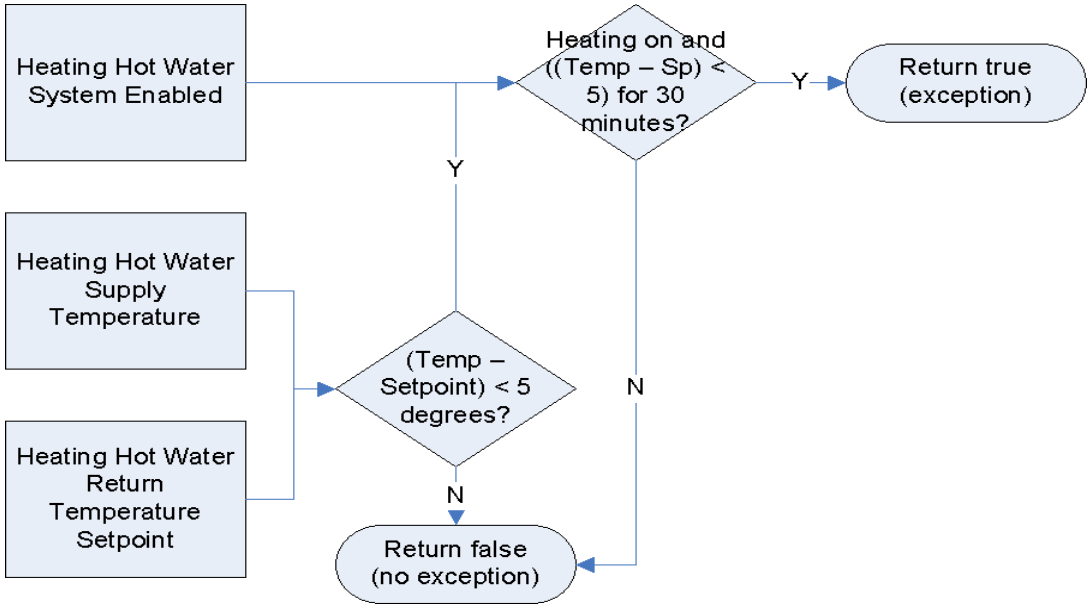
This algorithm returns “true” if, when the hot water system is running, the hot water supply temperature minus the hot water return temperature setpoint is less than five degrees for more than 30 minutes.

Input ORD

- slot:/Algorithm/English/HotWaterMixing
- slot:/Algorithm/Metric/HotWaterMixing

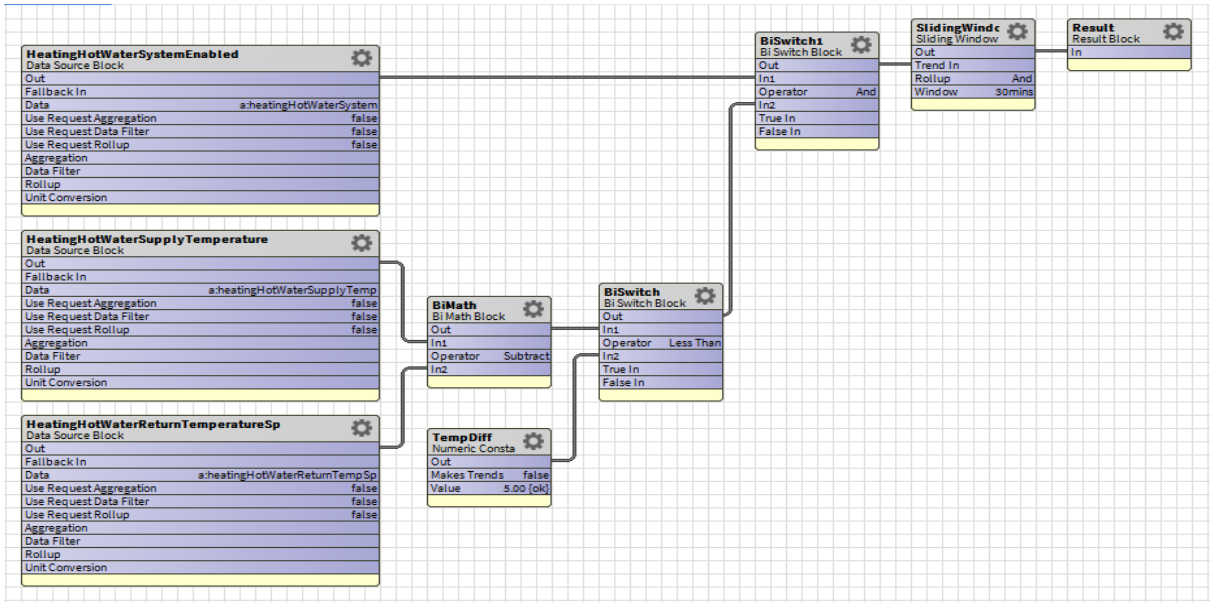
Flowchart

Figure 61 Hot water mixing flowchart



Wire sheet view

Figure 62 Hot water mixing wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Pump not meeting setpoint

This algorithm uses four inputs to determine if the pressure in a secondary chilled water pump is below the expected setpoint.

The conditions that must be met for this algorithm to return a value of “true” are:

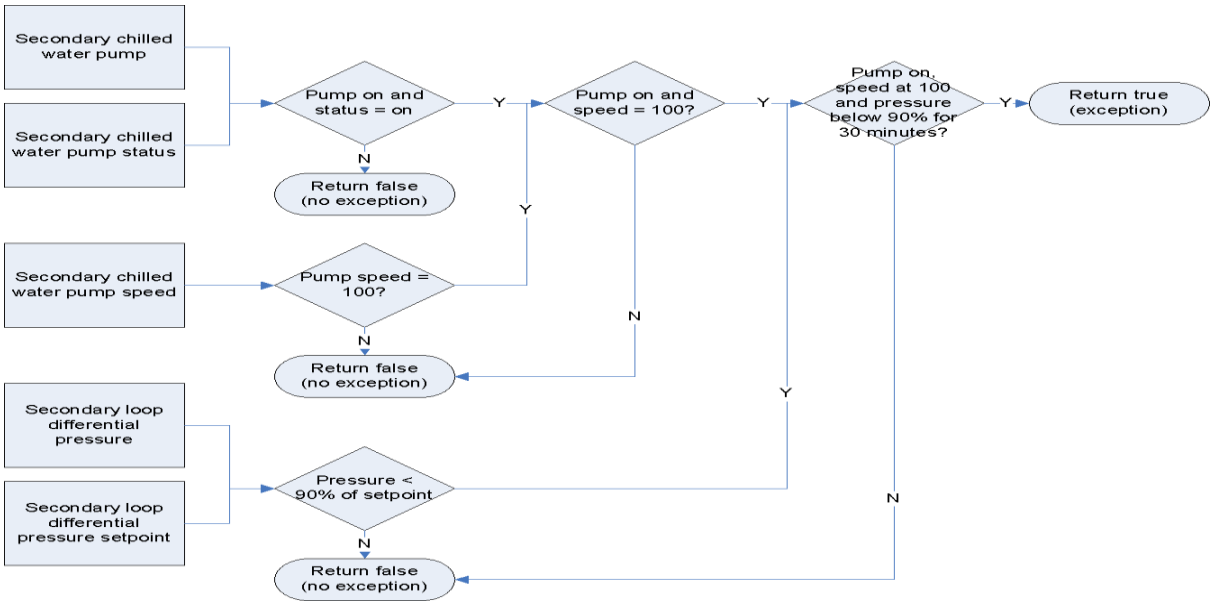
- Secondary chilled water pump is on.
- Secondary chilled water pump station is on.
- Secondary chilled water pump speed is 60 Hz (100%).
- Secondary loop differential pressure is below 90% of the setpoint for more than 30 minutes.

Input ORD

- slot:/Algorithm/English/PumpNotMeetingSetpoint
- slot:/Algorithm/Metric/PumpNotMeetingSetpoint

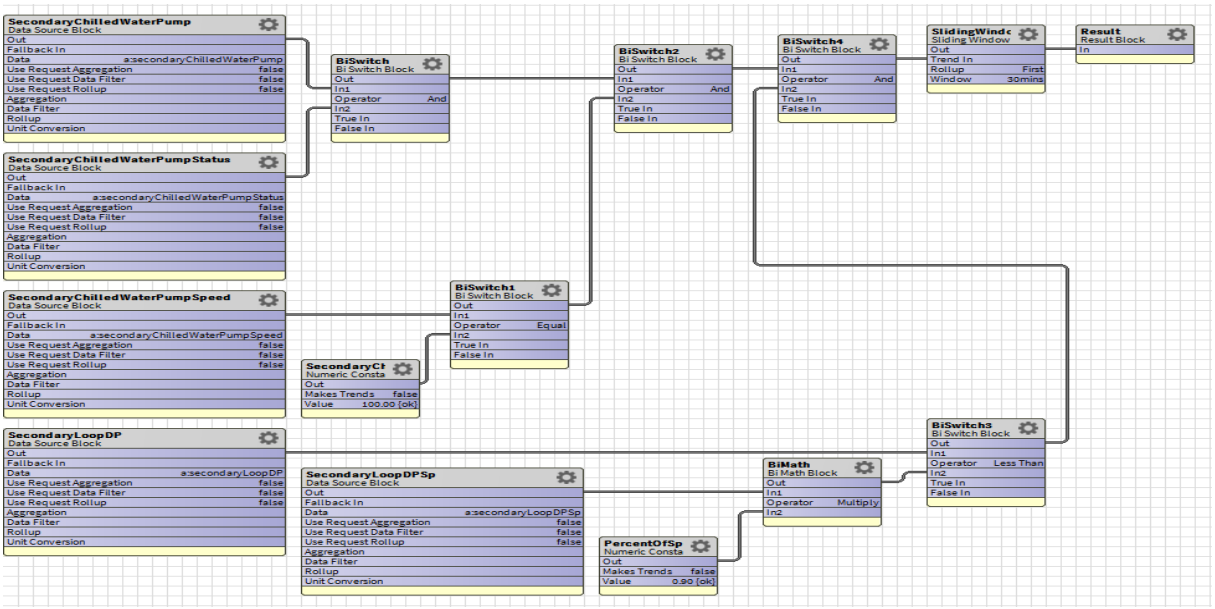
Flowchart

Figure 63 Pump pressure below setpoint flowchart



Wire sheet view

Figure 64 Pump pressure below setpoint wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Pump exceeding setpoint

This algorithm uses three inputs to determine if the pressure in a secondary chilled water pump exceeds the expected setpoint.

The conditions that must be met for this algorithm to return a value of “true” are:

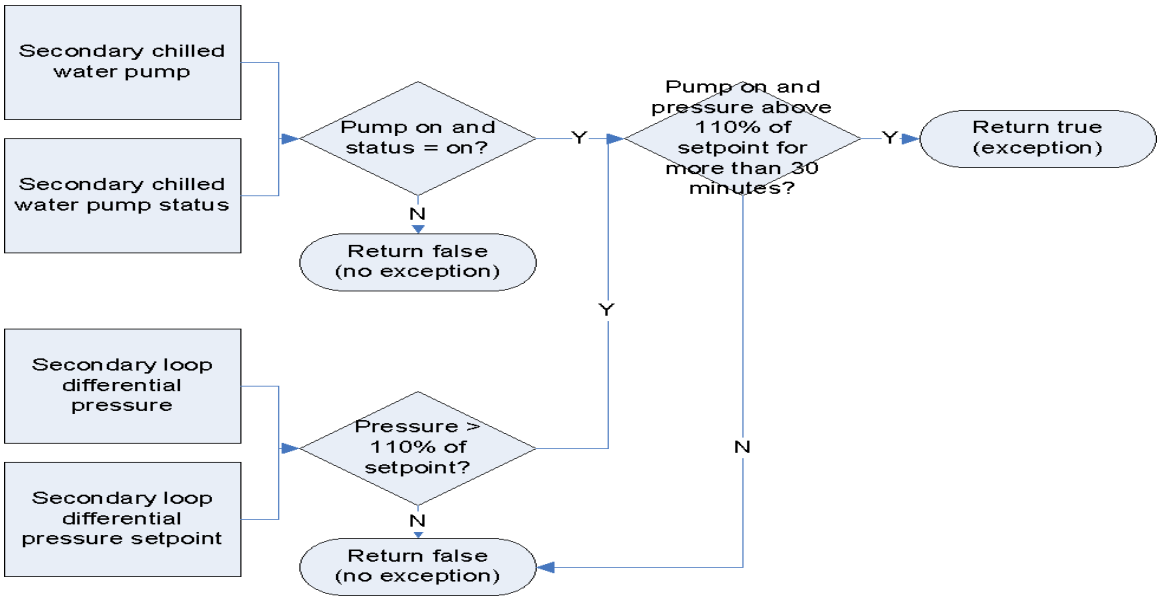
- Secondary chilled water pump is on.
- Secondary chilled water pump station is on.
- Secondary loop differential pressure is above 110% the setpoint for more than 30 minutes.

Input ORD

- slot:/Algorithm/English/PumpExceedingSetpoint
- slot:/Algorithm/Metric/PumpExceedingSetpoint

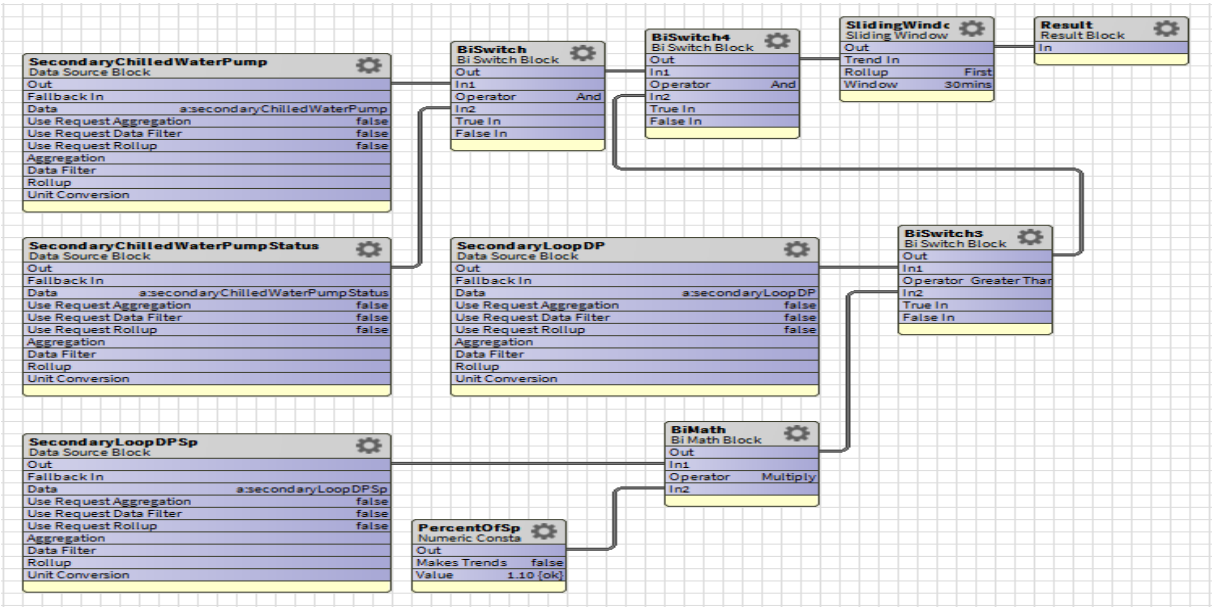
Flowchart

Figure 65 Pump pressure above setpoint flowchart



Wire sheet view

Figure 66 Pump pressure above setpoint wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Space differential pressure high or low

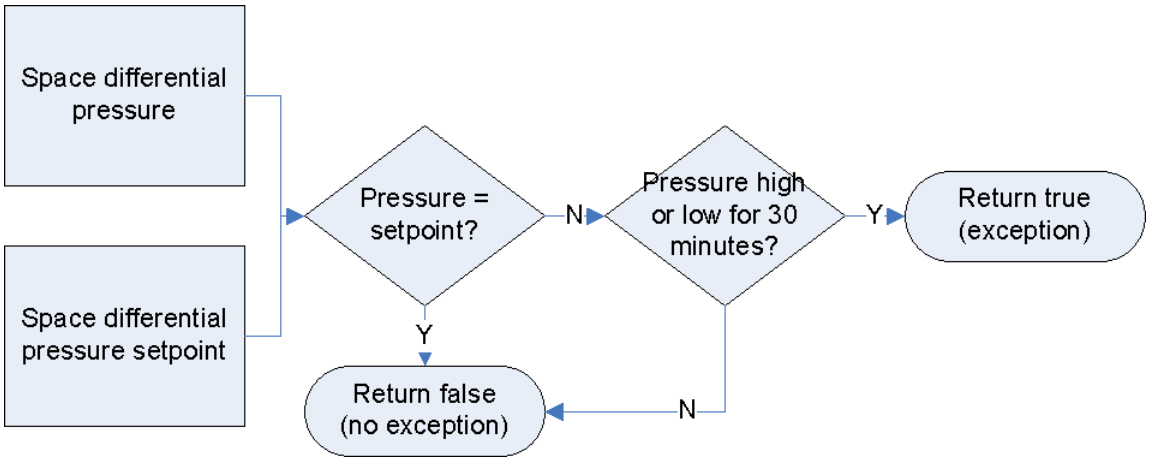
This algorithm returns “true” if the differential pressure in the space (room or building) is greater than or less than the setpoint for more than 30 minutes.

Input ORD

- slot:/Algorithm/English/SpaceDifferentialPressureHighLow
- slot:/Algorithm/Metric/SpaceDifferentialPressureHighLow

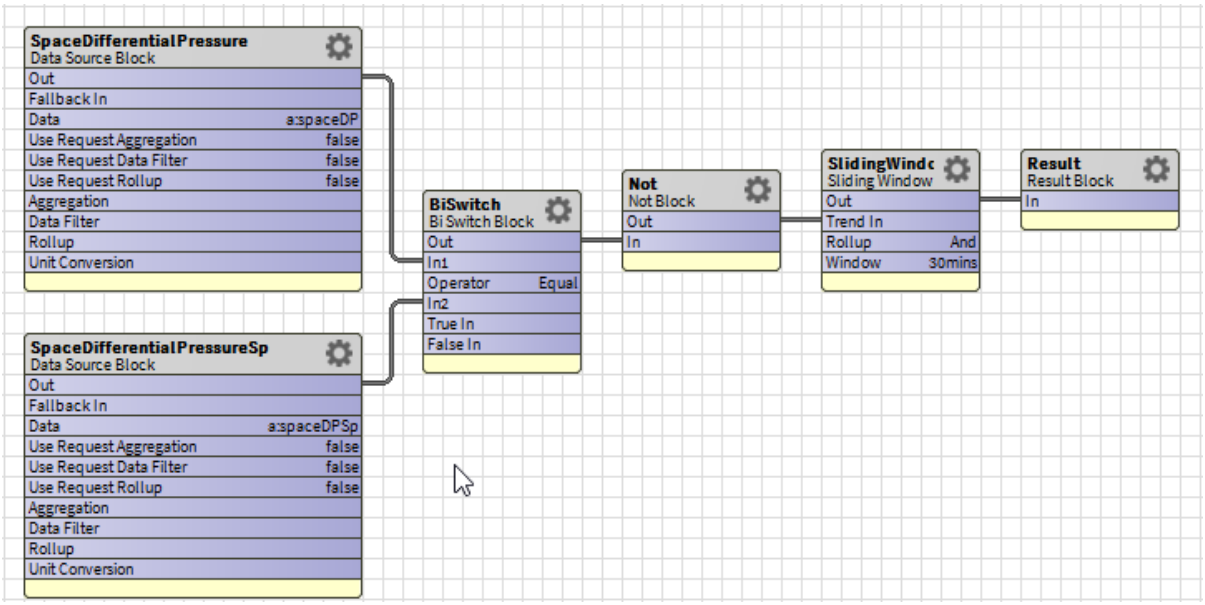
Flowchart

Figure 67 Space differential pressure flowchart



Wire sheet view

Figure 68 Space differential pressure wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Economizer not running based on temperature

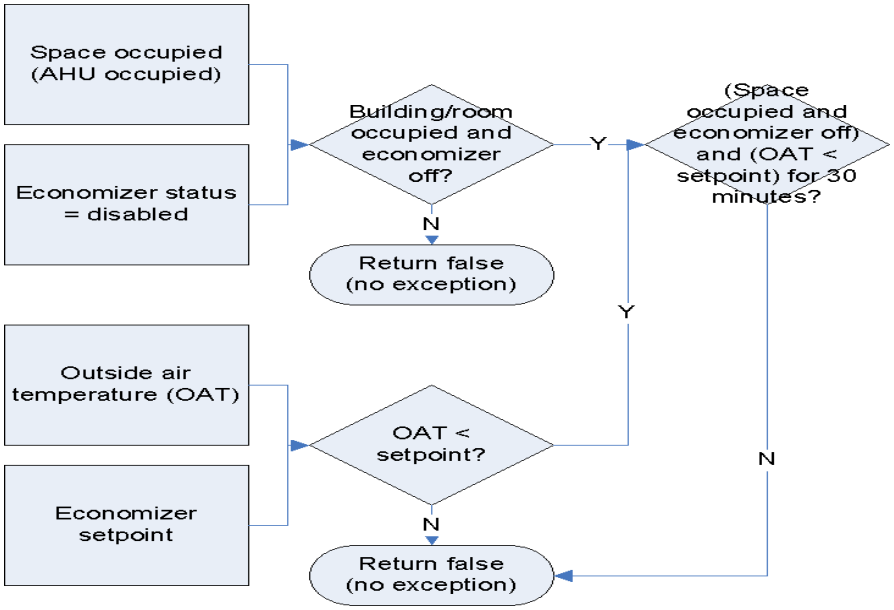
This algorithm returns “true” if, when a room or building is occupied, the economizer is off and the outside air temperature is lower than the economizer setpoint for more than 30 minutes.

Input ORD

- slot:/Algorithm/English/EconomizerNotRunning-TempBased
- slot:/Algorithm/Metric/EconomizerNotRunning-TempBased

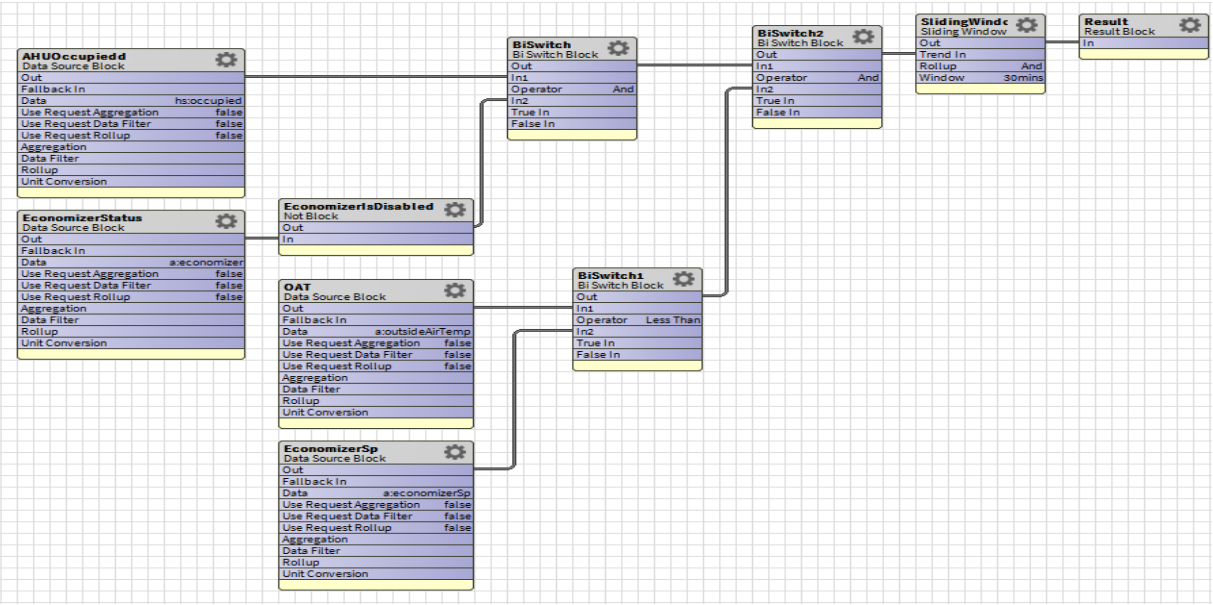
Flowchart

Figure 69 Economizer not running, temperature-based flowchart



Wire sheet view

Figure 70 Economizer not running, temperature-based wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Economizer not running — enthalpy based

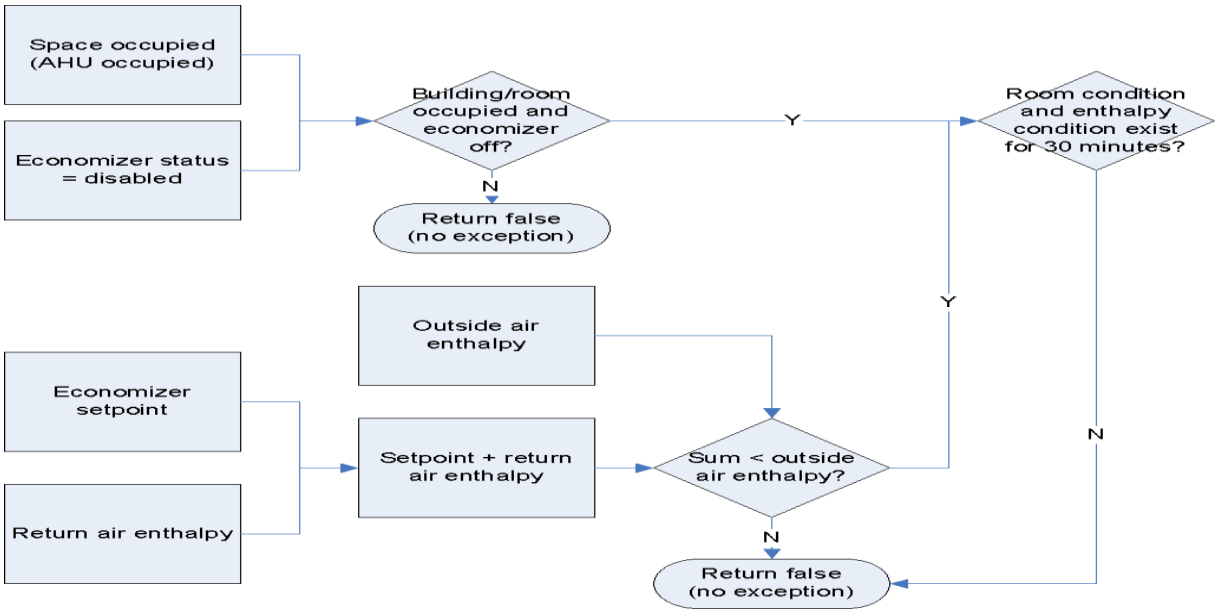
This algorithm returns “true” if, when a room or building is occupied, the economizer is off and the outside air enthalpy is less than the sum of the economizer setpoint and the return air enthalpy for more than 30 minutes.

Input ORD

- slot:/Algorithm/English/EconomizerNotRunning-EnthalpyBased
- slot:/Algorithm/Metric/EconomizerNotRunning-EnthalpyBased

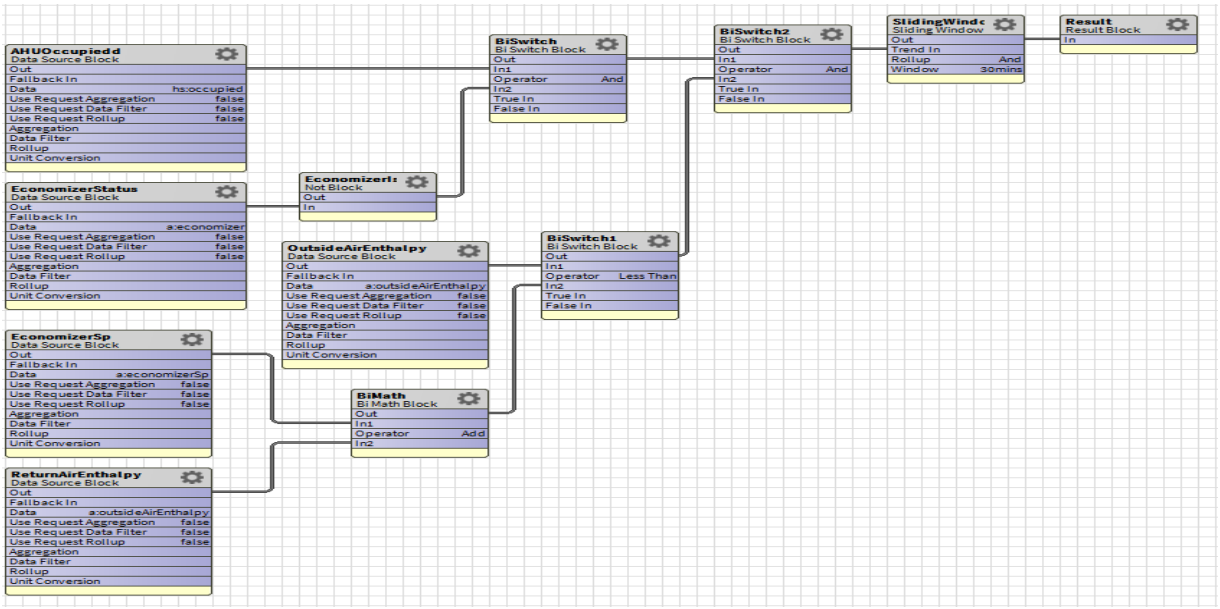
Flowchart

Figure 71 Economizer not running, enthalpy-based flowchart



Wire sheet view

Figure 72 Economizer not running, enthalpy-based wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Damper open during warmup

When an AHU is warming up in the morning, the outside air damper should not be on or open more than 5%.

This algorithm returns an exception if two conditions are met:

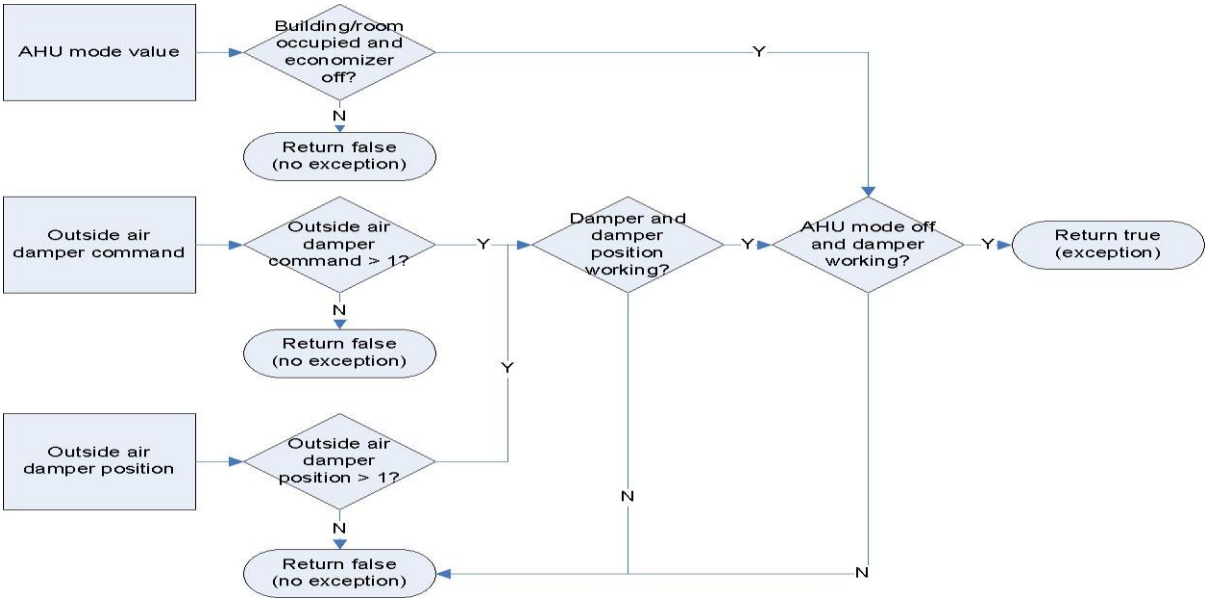
- An AHU is in warm-up mode and
- The outside air damper command is on or the outside damper position is more than 5% open.

Input ORD

- slot:/Algorithm/English/Damper_Open_During_Warmup
- slot:/Algorithm/Metric/Damper_Open_During_Warmup

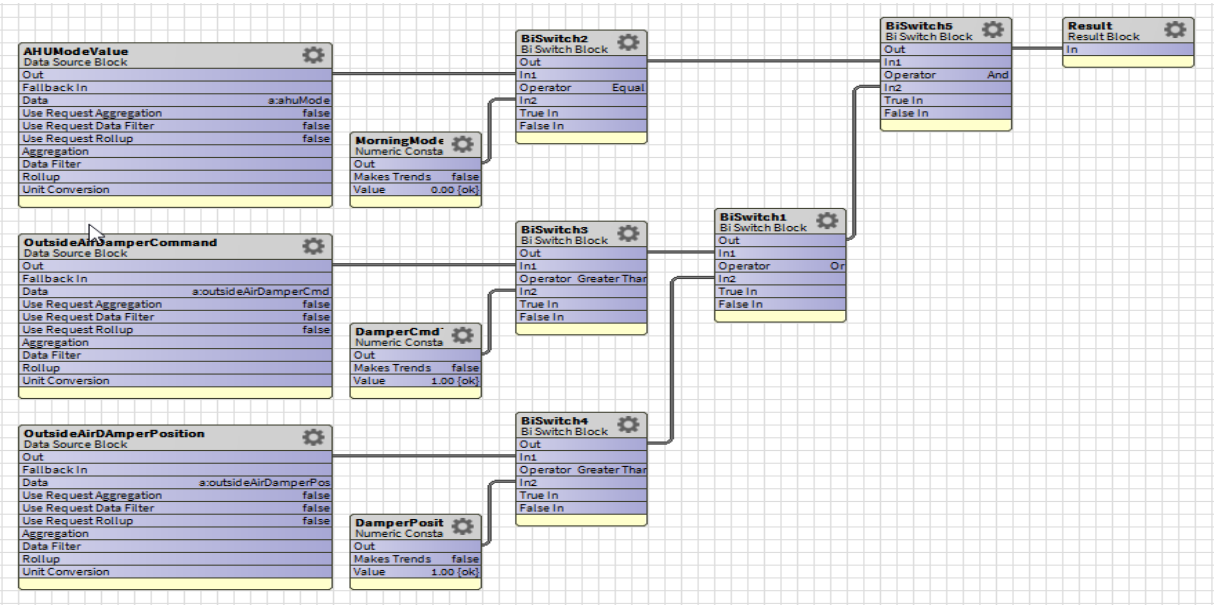
Flowchart

Figure 73 Damper open during warm-up flowchart



Wire sheet view

Figure 74 Damper open during warm-up wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Unscheduled operation efan

This algorithm returns “true” if a supply fan (EFAN) is on or its status is ok and a space (room or building) is unoccupied.

Three source blocks are required for this algorithm:

- occupied
- supplyFancommand
- supplyFanStatus

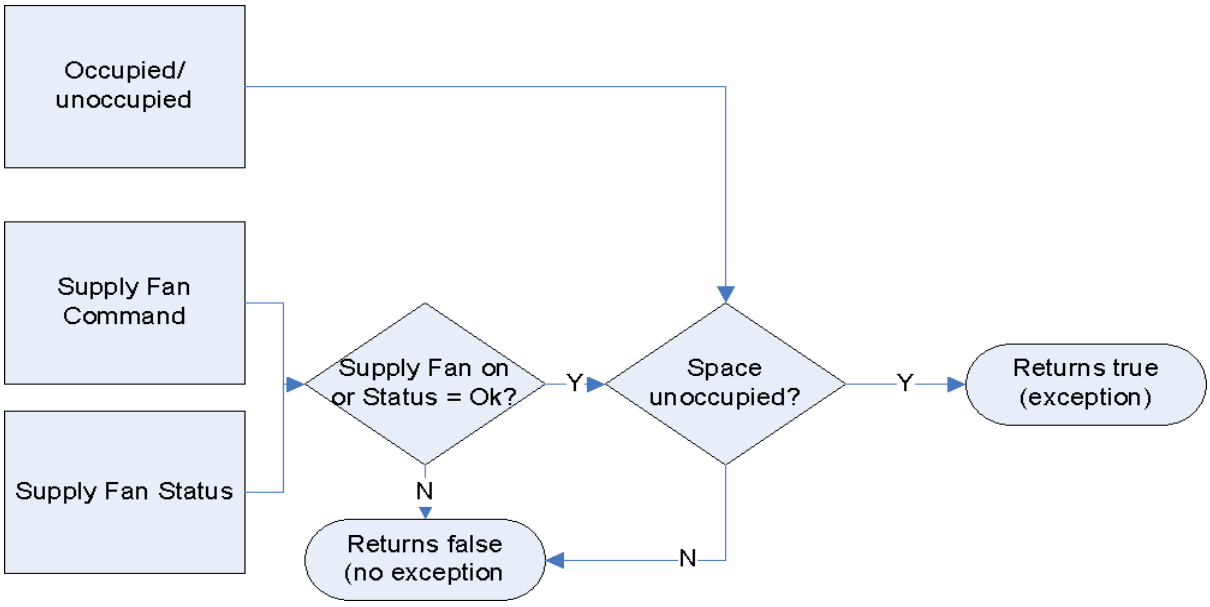
For the algorithm to work, tag your points with both a:supplyFanCmd and a:supplyFanStatus. Both blocks are required so that the algorithm can evaluate the “or” condition. Neither block can return null.

Input ORD

- slot:/Algorithm/English/Unscheduled_Operation_EFan
- slot:/Algorithm/Metric/Unscheduled_Operation_EFan

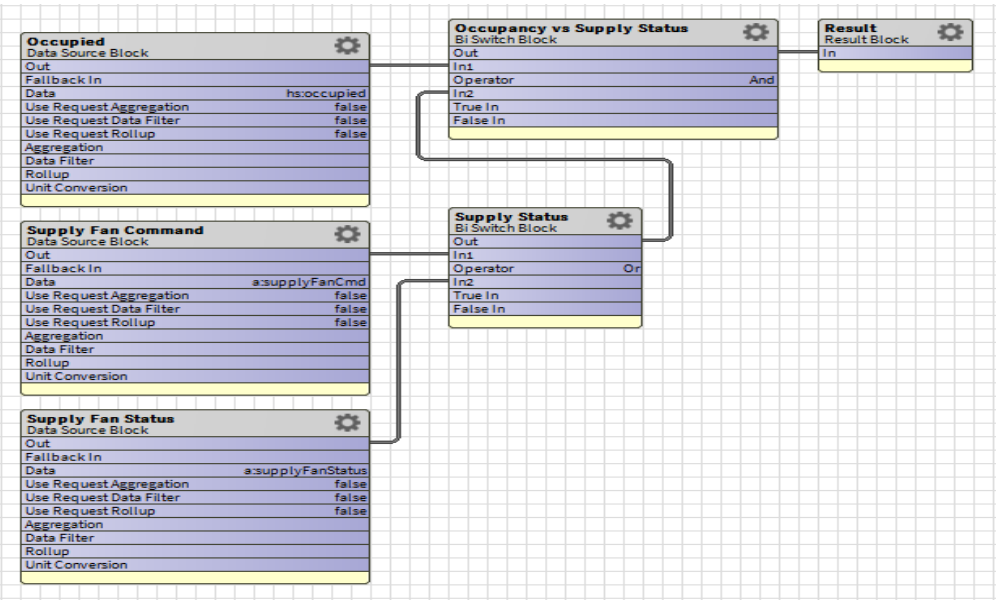
Flowchart

Figure 75 Unscheduled operation — EFan flowchart



Wire sheet view

Figure 77 Unscheduled operation — EFan wire sheet



Related Links

- Algorithm library reference (Parent Topic)

Chapter 3 Components, views and windows

The user interface includes components, views and windows, which provide the means for communicating with the system.

The Help topics include context sensitive information about each component and view, as well as information about individual windows.

Related Links

- AnalyticService (BAnalyticService)
- Alerts folder
- Algorithms folder
- Definitions Folder
- Pollers folder
- Proxy extension (BAnalyticProxyExt)
- Combination (BCombination)
- Interval (BInterval)

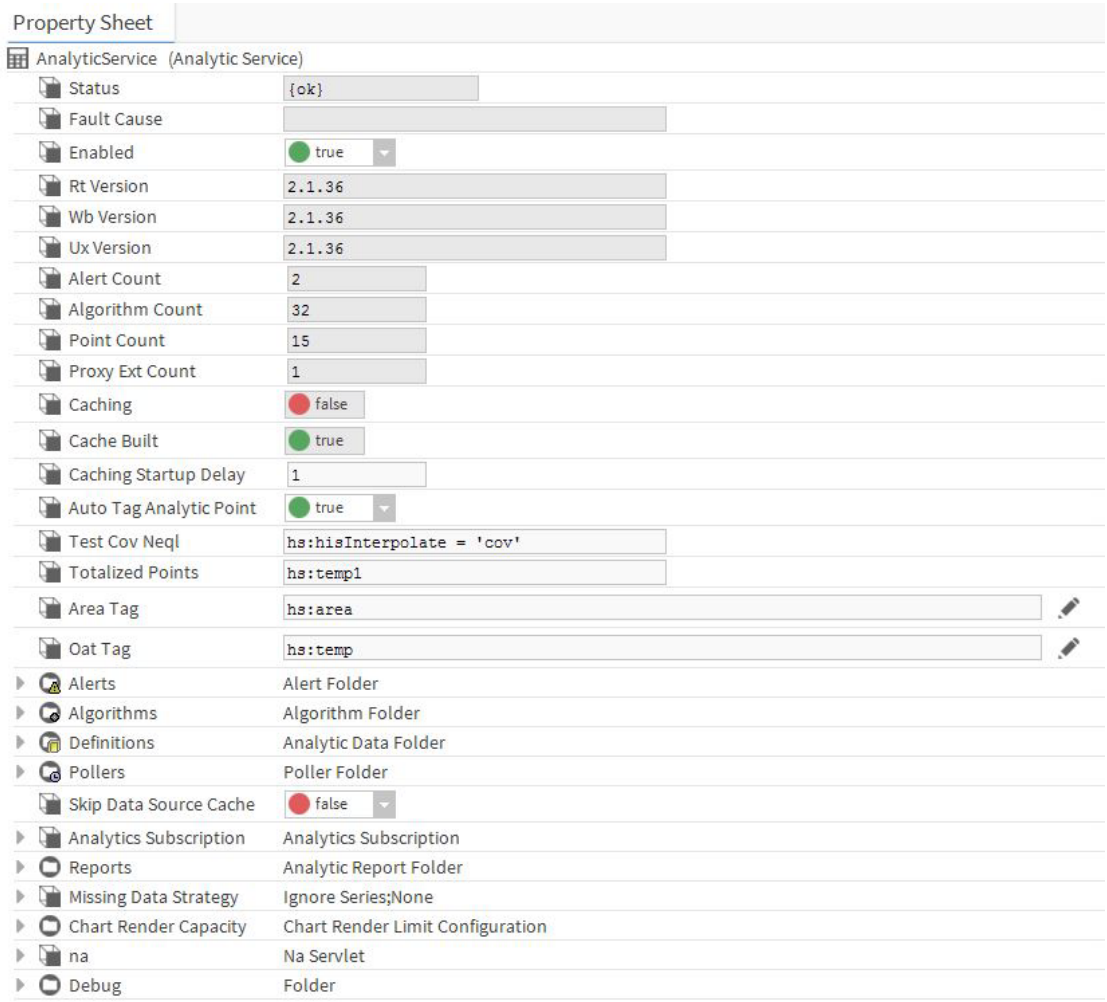
AnalyticService (BAnalyticService)

This is the root container of nearly all analytical components except analytic proxy points, which are scattered throughout the station tree. The properties on this component configure global aspects of the framework.

Property Sheet

To view the component's Property Sheet in Workbench, right-click the **Config > Services > AnalyticService container** in the Nav tree, and click **Views > Property Sheet**. The same properties are available in the web UI.

Figure 78 AnalyticService Property Sheet



Properties

Property	Value	Description
Status	read-only	Indicates the condition of the component at the last check. {ok} indicates that the component is licensed and polling successfully. {down} indicates that the last check was unsuccessful, perhaps because of an incorrect property, or possibly loss of network connection. {disabled} indicates that the Enable property is set to false. {fault} indicates another problem. Refer to Fault Cause for more information.
Fault Cause	read-only	Indicates the reason why a system object (network, device, component, extension, etc.) is in fault. This property is empty unless a fault exists.
Enabled	true or false	Activates and deactivates use of the component.

Property	Value	Description
Rt Version	read-only	Displays the installed version of the Niagara Analytics Framework runtime (Rt) modules.
Wb Version	read-only	Displays the installed version of the Workbench modules.
Ux Version	read-only	Displays the installed version of the Ux chart modules.
Alert Count	read-only number	The sum of all configured alerts used by the framework.
Algorithm Count	read-only number	The sum of all algorithms used by the framework.
Point Count	read-only number	The sum or all points used by the framework.
Proxy Ext Count	read-only number	The sum of all proxy extensions used by the framework
Caching	read-only true or false	Returns true if the framework is currently in the process of caching memory. Otherwise, returns false.
Cache Built	read-only true or false	Returns trueif the framework has completed the process of caching memory. Otherwise, returns false.
Caching Startup Delay	Number (Defaults to 1 second)	Configures the amount of time to delay before refreshing cache.
Auto Tag Analytic Point	true or false (default)	False ignores the counts when rebuilding cache memory (right-click **AnalyticService** > **Actions** > **Refresh Cache Full).** These counts are visible on the AnalyticService Property Sheet: **Alert Count**, **Algorithm Count**, **Point Count**, and **Proxy Ext Count**. True updates the counts when rebuilding cache memory. Knowing how many points are used by the framework is related to licensing. Auto tagging continues until it reaches the maximum number of points allowed by your license. When it reaches the maximum, it stops tagging.
Test Cov Neql	namespace:tagnam e= ‘value’; defaults to hs:hisInterpolate = ‘cov’	The Analytics engine uses this expression to identify cov points. The engine automatically inserts cov points using the interval mentioned in the request.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
Area Tag	text	Defines the value tag from the tag dictionary to use for the Floor Area normalization calculation on the Average Profile and Load Duration reports.
Oat Tag	text	Defines the outside air temperature used by the Average Profile and Load Duration reports in

Property	Value	Description
		their Degree Day normalization calculation.
Alerts	container	Serves a container for all diagnostics.
Algorithms	container	Serves as a container for all algorithms.
Definitions	container	Serves as a container for all data definitions.
Pollers	container	Serves as a container for all pollers used to execute diagnostics and analytic proxy points.
Skip Data Source Cache	true or false (default)	The framework automatically caches the data source in memory. If you do not want this feature, set this property to true.
Analytics Subscription	additional properties	As with other Niagara features, use of this framework is based on a subscription, which you must renew periodically. The Analytics Subscription properties configure an alarm to remind you that your subscription is about to expire. Refer to Analytics Subscription properties.
Reports	container	Serves as a location for analytic reports.
Missing Data Strategy or Algorithm, Use This Value	check box	Enables and disables missing data interpolation for the current value.
Missing Data Strategy, Aggregation Strategy	drop-down list	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
Chart Render Capacity	additional properties	These properties are only visible after removing the hidden flag on the chartRenderCapacity slot. Refer to Chart Render Capacity (advanced property)

Actions

Action	Description
Refresh Cache	Calculates data memory requirements again without searching all hierarchies. You should invoke this action after you make changes that affect data availability. This includes removing the a:a tag from a point.
Refresh Cache Full	Calculates data memory requirements again by searching all hierarchies. A full re-cache requires more system resources and time than a simple re-cache.
Stop Caching	Terminates caching.

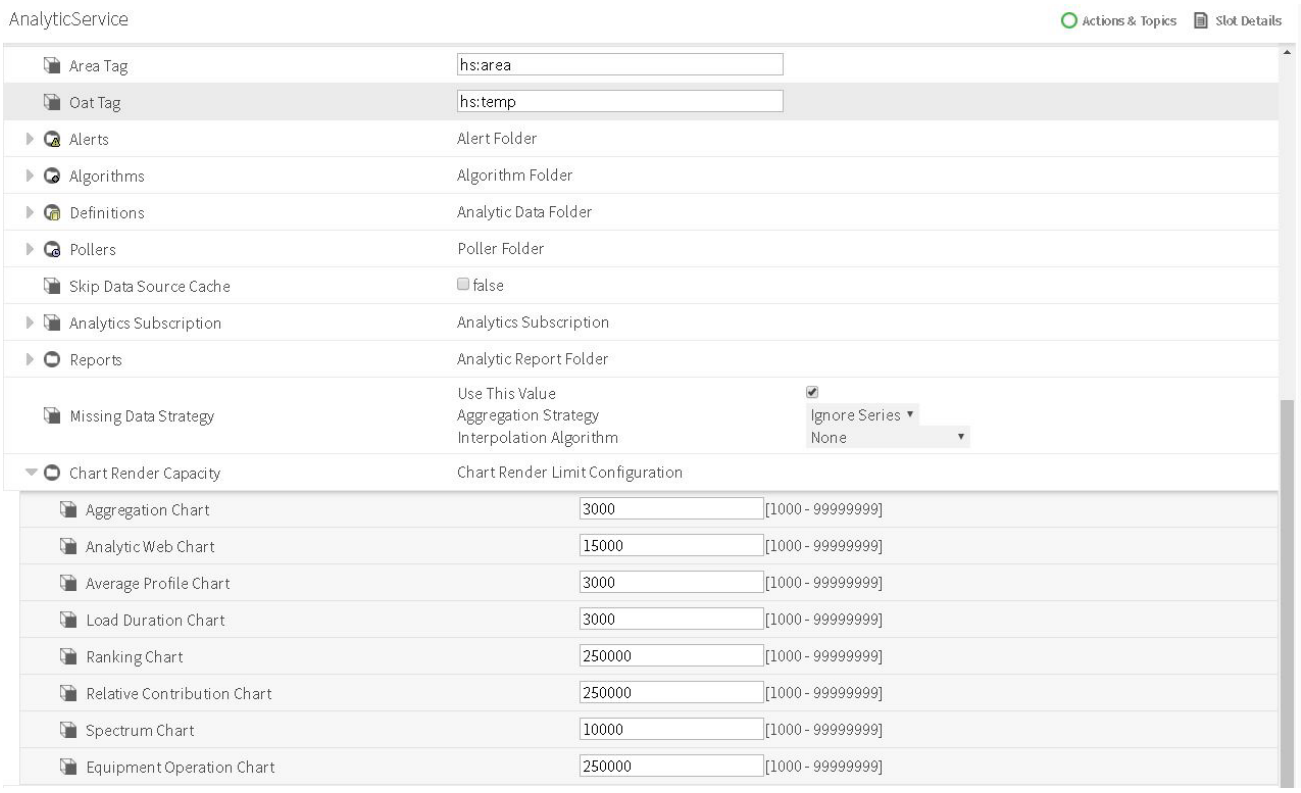
Chart Render Capacity (advanced property)

This property configures the default number of records used to render data on charts and reports. The default limitations help to provide acceptable framework performance.

IMPORTANT: Increasing these values may significantly degrade framework performance.

To access the Chart Render Capacity property you must first un-check the chartRenderCapacity hidden flag on the slot sheet, then expand the AnalyticService node in Workbench or the web UI.

Figure 79 Chart Render Capacity property as it appears in the web UI

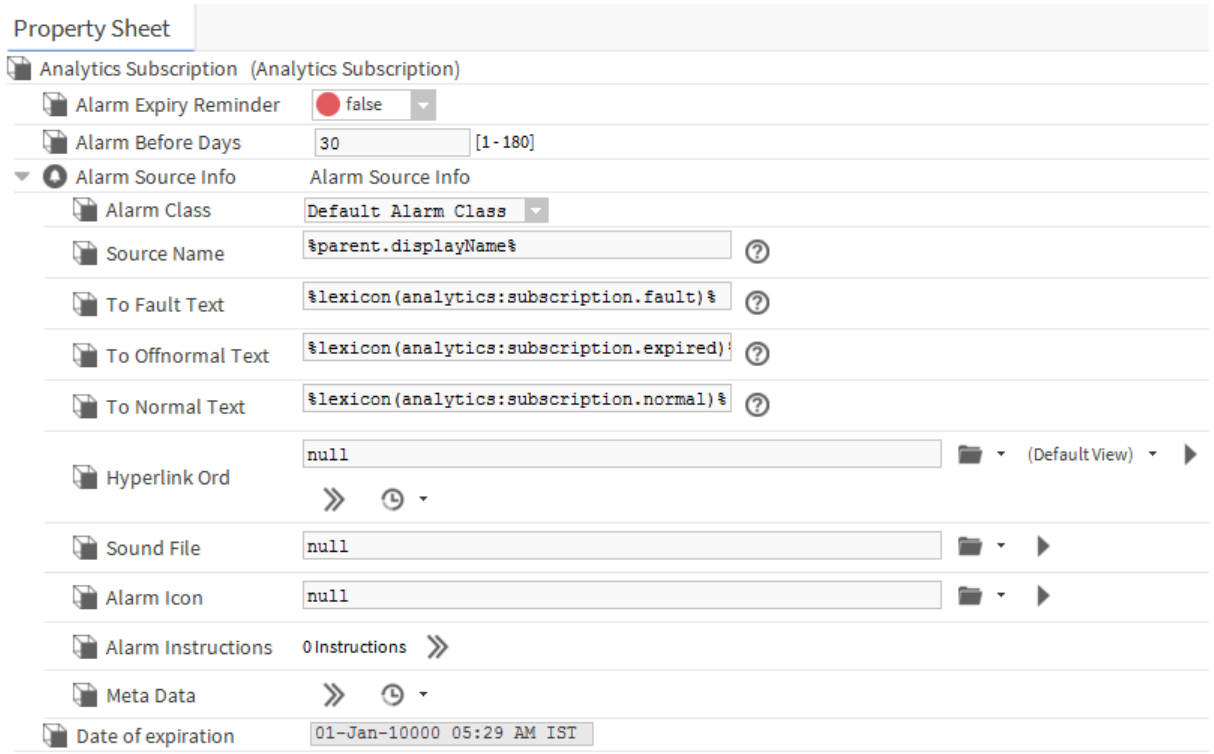


Related Links

- Analytics Subscription properties
- Analytic Service View
- Automatic conversion of metric values in tables
- Components, views and windows (Parent Topic)

Analytics Subscription properties

Figure 80 Subscription properties view



Property	Value	Description
Alarm Expiry Reminder	true or false (default)	Enables and disables the sounding of an alarm to remind you that your subscription is expiring.
Alarm Before Days	number	Before the subscription expires, sets when to sound the alarm.
Alarm Source Info	additional properties	Contains a set of properties for configuring and routing alarms when this component is the alarm source.
Date of expiration	read-only	Indicates when the subscription expires.

Related Links

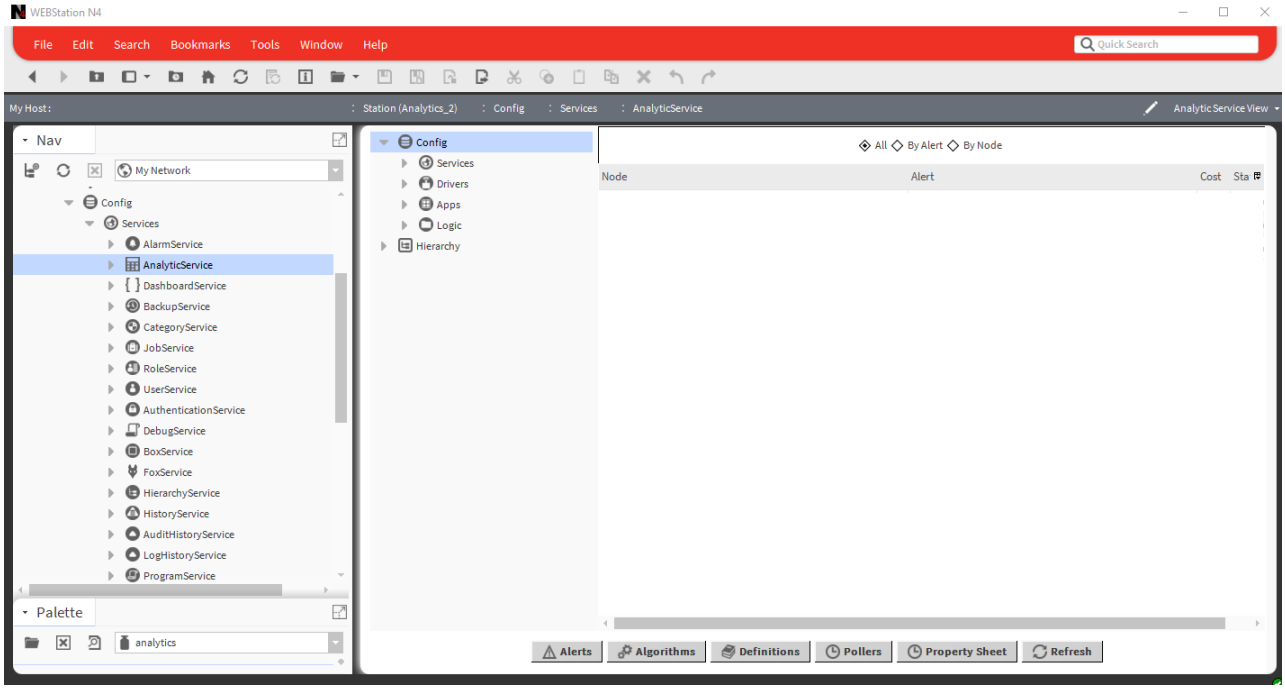
- AnalyticService (BAnalyticService) (Parent Topic)

Analytic Service View

This view provides access to all framework features

You access this view by expanding the Services folder in Workbench followed by double-clicking the **AnalyticService node**.

Figure 81 Analytic Service View



Columns, radio buttons and action buttons

Element	Column, radio button or action button	Description
Selection options	radio buttons	**All** displays all data. **By Alert** displays data in alert order. **By Node** displays data in node order.
Node	column	Identifies the name of the node.
Alert	column	Identifies the alert name.
Cost	column	Displays the calculated cost, which is based on a variety of factors.
State	column	
Alerts	button	Opens the Analytic Alert Manager view.

Element	Column, radio button or action button	Description
Algorithms	button	Opens the Algorithm Manager view.
Definitions	button	Opens the Analytic Data Manager view.
Pollers	button	Opens the Poller Manager view.
Property Sheet	button	Opens the AnalyticService Property Sheet view.

Related Links

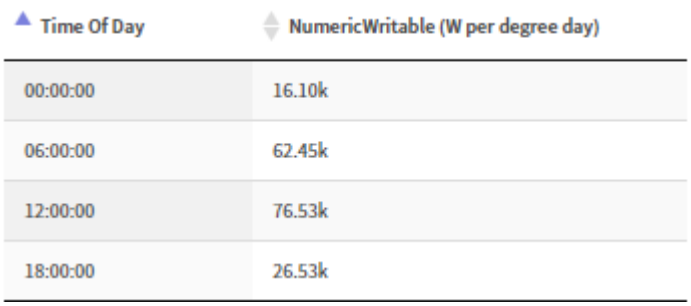
- AnalyticService (BAnalyticService) (Parent Topic)

Automatic conversion of metric values in tables

When the system converts one unit, such as KW, to another, such as W, it automatically shortens the unit's metric value and adds a suffix. This improves the readability of large data and data with multiple decimal places in report tables.

For example, a value of 16100 converts in the table as 16.10k.

Figure 82 A table with converted values



Time Of Day	NumericWritable (W per degree day)
00:00:00	16.10k
06:00:00	62.45k
12:00:00	76.53k
18:00:00	26.53k

Number conversion

These abbreviations are for values that are greater than 1,000.

Suffix symbol	Name	Positive orders of 10
T	trillion	1,000,000,000,000
G	billion	1,000,000,000
M	million	1,000,000
k	thousand	1,000

Decimal number conversion

These abbreviations are for values that are less than 1.

Suffix symbol	Name	Negative orders of 10
m	thousandth	0.0001
µ	millionth	0.000 001
n	billionth	0.000 000 0001
p	trillionth	0.000 000 000 001

Related Links

- AnalyticService (BAnalyticService) (Parent Topic)

Alerts folder

This folder contains alerts, which run periodically (based on pollers) to collect real-time and historical data. It may contain other alerts folders. Double-clicking this component opens the Analytic Alert Manager.

Related Links

- Alert (BAnalyticAlert)
- Analytic Alert Manager view
- Alert Nodes View
- New/edit alert windows
- Components, views and windows (Parent Topic)

Alert (BAnalyticAlert)

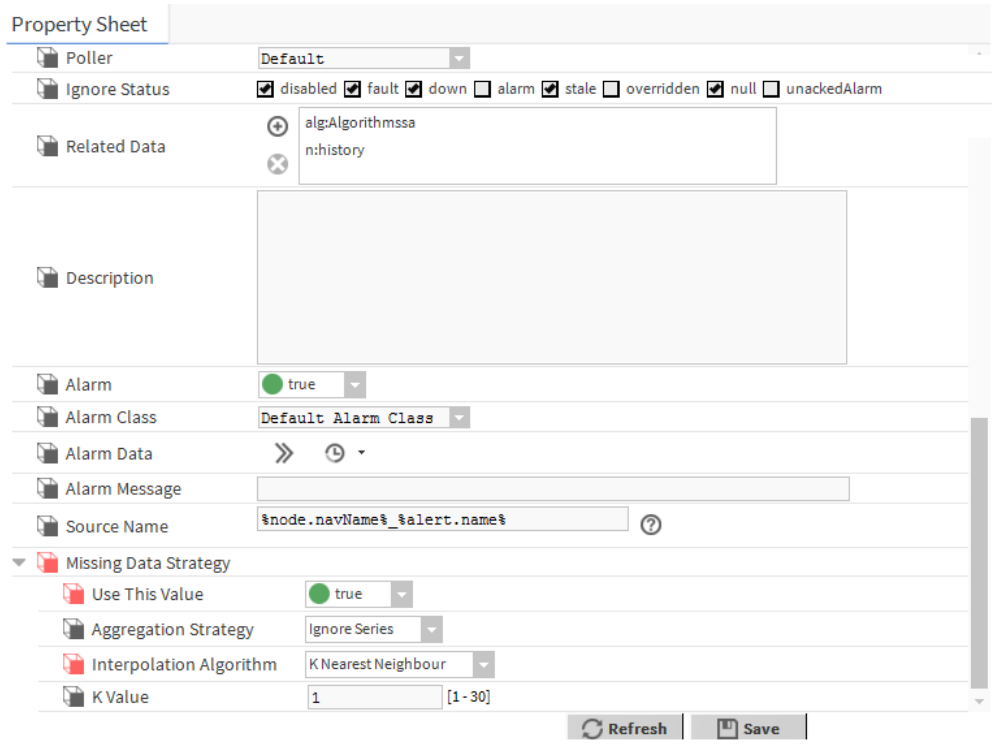
This component works behind the scenes to provide the alert feature. Using Boolean values, it determines if nodes are in an alert condition. This alert can generate an alarm.

Property Sheet

There are two ways to view an alert's properties: right-click the alert, and click **Views > Property Sheet**.

- Open the Analytic Alert Manager (double-click **Config > Services > AnalyticService > Alerts**) folder in the Nav tree, and double-click the alert row in the table. This opens the Edit window.
- Open the Alert Nodes View (double-click an alert in the **Alerts** folder, and click the **Property Sheet** button at the bottom of the window.

Figure 83 A fragment of the Alerts Property Sheet



Property	Value	Description
Enabled	true or false	Activates and deactivates use of the component.
Status	read-only	Indicates the condition of the component at the last check. {ok} indicates that the component is licensed and polling successfully. {down} indicates that the last check was unsuccessful, perhaps because of an incorrect property, or possibly loss of network connection. {disabled} indicates that the Enable property is set to false. {fault} indicates another problem. Refer to Fault Cause for more information.
Fault Cause	read-only	Indicates the reason why a system object (network, device, component, extension, etc.) is in fault. This property is empty unless a fault exists.
Roots	ORD	Beginning from the root of the Nav tree, this property defines the ORD from which to start scanning for alert conditions. The framework eliminates nodes listed in the Exclusions property before it evaluates each node for an alert condition.
Exclusions	ORD	Identifies the nodes (and their subtree) to exclude when scanning for points to monitor.
Node Filter	NEQL query	Further refines the nodes that contain the desired data. Leave this property empty to include everything.

Property	Value	Description
Node Count	read-only number	For the selected root, and taking into consideration the exclusions, this property reports the total number of nodes that could contain alerts.
Alert Count	read-only number	Out of all nodes (points) that could be in an alert state, this property reports the total number of nodes that are in an alert state.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Time Range	drop-down list	Defines the beginning and end of a period of time over which to count the number of occurrences or weight. If the alert depends on a certain number of occurrences or weight over time, this property is required. Otherwise, it is optional.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination— the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination.

Property	Value	Description
		Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by clicking the Edit button () , followed by clicking the Settings button () on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination— the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination.

Property	Value	Description
		Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
Alert Mode	drop-down list	Defines the alert condition to use when you specify a time range. If you specify no time range, the system ignores this property. Options include: Occurrences identifies the number of times an algorithm must output a result of “true” over the configured time range for there to be an alert condition. Runtime Seconds identifies the number of seconds an algorithm must maintain a result of “true” over the configured time range for there to be an alert condition. Runtime Minutes identifies the number of minutes an algorithm must maintain a result of “true” over the configured time range for there to be an alert condition. Runtime Hours identifies the number of hours an algorithm must maintain a result of “true” over the configured time range for there to be an alert condition.
Cost, totalCost	dollars	Calculates the total cost by multiplying the cost of the alert by the Alert Mode. For example, if Alert Mode is Runtime Minutes, the total cost is the cost-per-minute multiplied by the number of minutes the algorithm maintained a result of “true.” This value indicates the severity of the alert.
Poller	name	Identifies which poller to run.
Ignore Status	series of check box status flags	Setting these flags prevents the associated alert condition.
Related Data	tags	Defines a set of tags that represent data related to the alert.
Description	string	Describes the alert. The system adds this string to an alarm record when it creates the alarm. You can access this string in real time using the alert ORD scheme. The string can contain BFormats and can be resolved when requested. BFormats must begin with the alert or node token to access the corresponding entity. See Alarm Data BFormats properties.
Alarm	true or false (default)	Indicates alarm status for the point. If true, the framework generates an alarm record.

Property	Value	Description
Alarm Class	Default Alarm Class (default)	Selects an alarm class from the option list. The alarm class specifies the alarm routing options for this component.
Alarm Data	text	Defines the data to add to the alarm data facets of the alarm record. The system treats strings as BFormats and resolves them at alarm record creation time. BFormats must begin with the alert or node token to access the corresponding entity. See Alarm Data BFormats properties.
Alarm Message	string	Creates a message value for the alarm record. The string can contain BFormats that resolve when requested. BFormats must begin with the alert or node token to access the corresponding entity. See Alarm Data BFormats properties.
Source Name	text	Displays the name in an alarm record that identifies the source of the alarm.
Missing Data Strategy or Algorithm, Use This Value	check box	Enables and disables missing data interpolation for the current value.
Missing Data Strategy, Aggregation Strategy	drop-down list	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
Missing Data Strategy, K Value	number	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.

Alarm Data BFormats properties

BFormat	Value	Description
%node.parent.displayName%	BFormat	Identifies the display name of the parent for the node that is going into alert
%alert.name%	BFormat	Identifies the slot name of the alert object. Do not use **%alert.message%**.

Actions

Action	Description
Find Related Data	If the alert data include an algorithm, the system recursively scans the algorithm and all of its data sources and adds all IDs to the Related Data property.

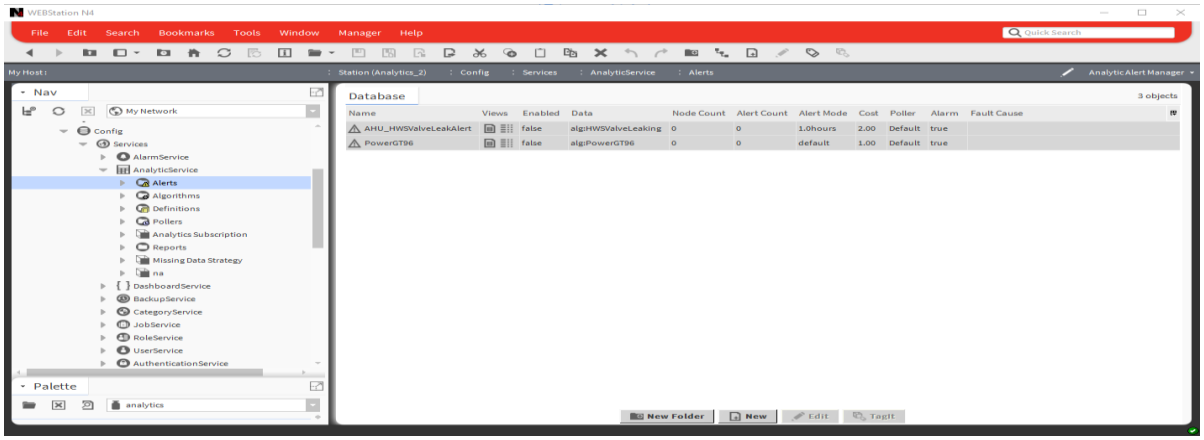
Related Links

- Alerts folder (Parent Topic)

Analytic Alert Manager view

This table view lists the alerts that the framework uses to monitor points. Using this view you can group alerts (in folders), create and edit alerts as well as tag them. To view a table of points that are currently in alert, expand the **AnalyticService > Alerts** folder in the Nav tree and double-click the alert.

Figure 84 Alert Manager View



Columns

Column	Value	Description
Name	text	Identifies the type of alert.
Views		
Enabled	true or false	Activates and deactivates use of the component.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Node Count	read-only	Displays the total number of nodes that are part of the calculation. Use this information to confirm that the result of a formula looks reasonable.
Alert Count	number	The number of this type of alert.
Alert Mode		
Cost	currency	Defines the cost incurred by a single alert. The system uses the Alert Mode multiplied by this value to calculate the total cost of an alert.
Poller	name	Identifies which poller to run.
Alarm	true or false	Indicates if the alert generated an alarm.
Fault Cause	read-only	Indicates the reason why a system object (network, device, component, extension, etc.) is in fault. This property is empty unless a fault exists.

Buttons

Button name	Description
New Folder	Opens a new container folder you can use to group alerts.
New	Opens the New alert window.
Edit	Opens the Edit alert window.
TagIt	Opens the Edit Tags window.

Related Links

- Alerts folder (Parent Topic)

Alert Nodes View

This table lists all points that currently meet the condition(s) monitored by the selected alert. These points are in alert.

You access this view by expanding the **Config** > **Services** > **AnalyticService** > **Alerts** container in the Nav tree, followed by double-clicking an alert node in the container.

Columns

Column	Description
Node	Identifies the node in the Hierarchy on which this alert condition exists.
State	Reports the state of the alert.
Cost	Reports the total cost of the alert condition.

Related Links

- Alerts folder (Parent Topic)

New/edit alert windows

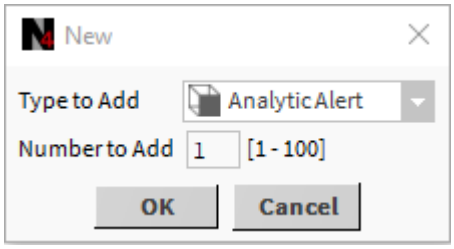
These windows create and edit alerts.

New alert window

You create and edit alerts by double-clicking the **AnalyticsService** node in the Nav tree and clicking

New Alert

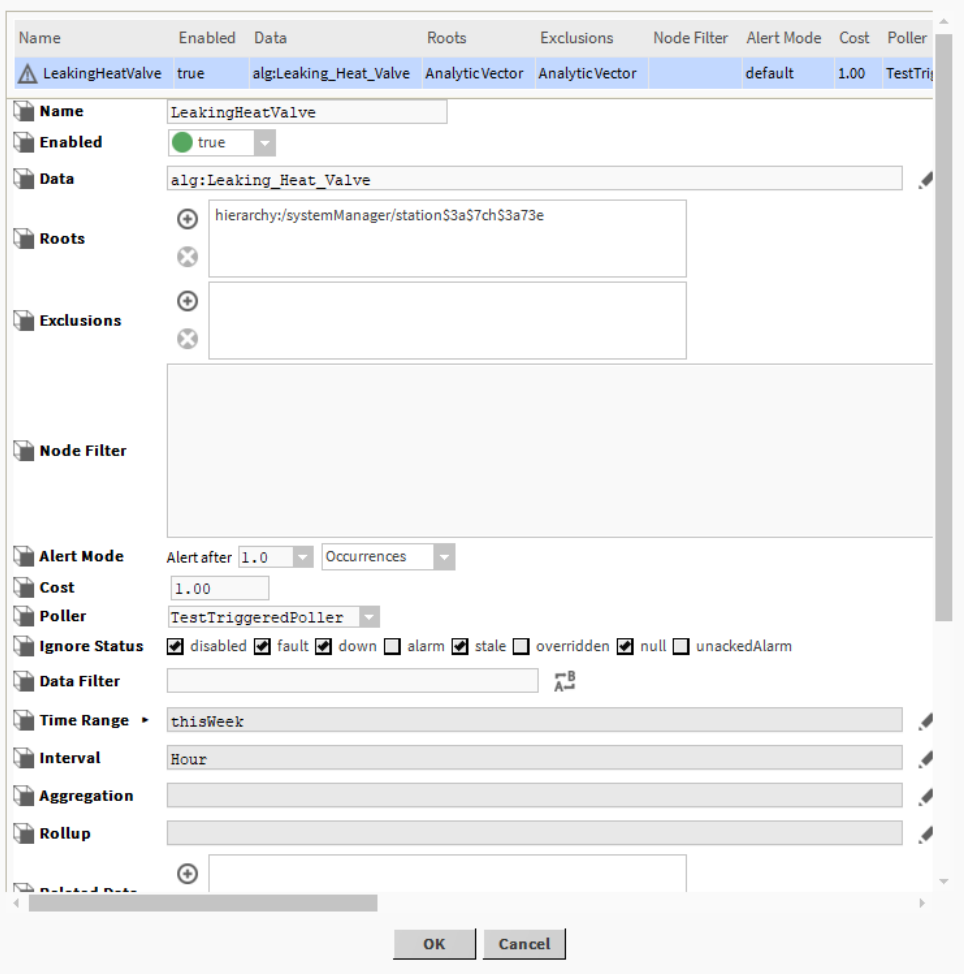
Figure 85 New alert window



Property	Value	Description
Type to Add	drop-down list	Defines the type of alert.
Number to Add	number between 1 and 100	Defines how many alerts to create.

New Alert properties

Figure 86 New Alert properties



The top two rows of this window display the database view of each added alert.

Property	Value	Description
Name	text	Defines a descriptive name for the alert.
Enabled	true or false	Activates and deactivates use of the component.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Roots	ORD	Identifies one or more nodes in the Nav tree to use as the starting point for searching the tree.

Property	Value	Description
Exclusions	ORD	Identifies one or more nodes in the database to ignore when searching for data.
Node Filter	NEQL query	Further refines the nodes that contain the desired data. Leave this property empty to include everything.
Alert Mode	two drop-down lists	The first drop-down list, Alert after, configures when to generate the alert. The second drop-down list identifies how many of what to use to generate the alert. Occurrences generates an alert after the selected number of the same event occurs. Seconds, Minutes and Hours define how much time must pass for an alert to be generated. This value is part of the total cost calculation.
Cost	currency	Defines the cost incurred by a single alert. The system uses the Alert Mode multiplied by this value to calculate the total cost of an alert.
Poller	name	Identifies which poller to run.
Ignore Status		Provides status flags that prevent an alert condition.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values

Property	Value	Description
		and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination —the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination.

Property	Value	Description
		Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination —the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Related Data	tags	Defines a set of tags that represent data related to the alert.
Description	text	Provides a place to include additional information about the alert.
Alarm	true or false	Indicates if the generation of this alert should also raise an alarm.
Alarm Class	List, console column, or field or %alarmClass% on a report.	Specifies or returns the alarm routing option for the component.
Alarm Data	read-only	Presents a detailed list of alarm data, including this information: • Status • toState • msgText • Count • fromState • Timezone
Alarm Message	text	Defines the text the operator sees when the system generates the alarm.
Missing Data Strategy or Algorithm, Use This Value	check box	Enables and disables missing data interpolation for the current value.

Property	Value	Description
Missing Data Strategy, Aggregation Strategy	drop-down list	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
Missing Data Strategy, K Value	number	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.

Valid and invalid source names

When using BFormat to identify an alert source name, make sure you are using valid syntax.

Valid Source Name	Invalid Source Name
Eastern USA/Florida/Boca Raton/Florida Atlantic University.Athletic Center	Eastern USA/Florida/Boca Raton/Florida Atlantic University.Athletic Center_%node.navNameeee%
%node.navName%_%alert.name%_ MyBuildingName	%node.navName123%_%alert.nameZZZ %_MyBuildingName
%node.navName%_%alert.name%	%node.navNaaaame%_%alert.naaaame%
%node.navName%	%nodeee.navNameee%

Related Links

- Alerts folder (Parent Topic)

Algorithms folder

This folder contains all framework algorithms. Double-clicking this component opens the Algorithm Manager.

Related Links

- Algorithm (BAlgorithm)
- Algorithm Manager view
- New/Edit algorithm windows
- Components, views and windows (Parent Topic)

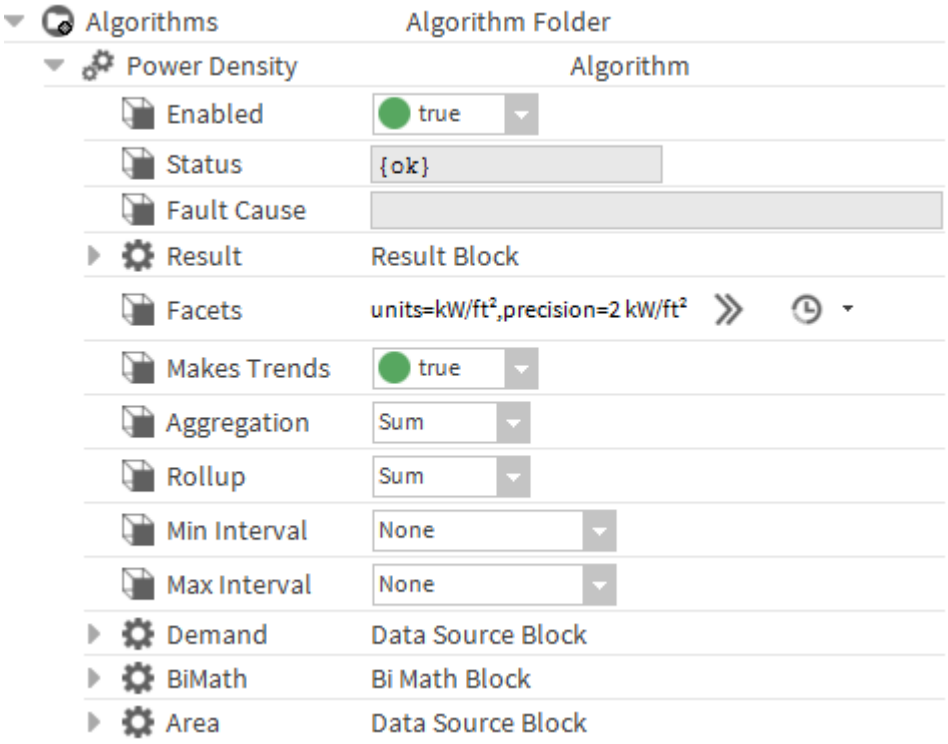
Algorithm (BAlgorithm)

This component is a complex object that analyzes data and produces a result that can be viewed on a chart or used as input to other logic. Algorithms are implemented with logic blocks linked together using a Wire Sheet. They can combine historical and real-time data to produce both trends and single values.

Property Sheet view

To view an algorithm's Property Sheet, open the Algorithm Manager (double-click **Config > Services >AnalyticService > Algorithms**), right-click the algorithm, and click **Views > Property Sheet**.

Figure 87 Example of an Algorithm Property Sheet



Properties

The Property Sheet view contains these properties. Each added block contains additional properties.

Property	Value	Description
Enabled	true or false	Activates and deactivates use of the component.
Status	read-only	Indicates the condition of the component at the last check. {ok} indicates that the component is licensed and polling successfully. {down} indicates that the last check was unsuccessful, perhaps because of an incorrect property, or possibly loss of network connection. {disabled} indicates that the Enable property is set to false. {fault} indicates another problem. Refer to Fault Cause for more information.
Fault Cause	read-only	Indicates the reason why a system object (network, device, component, extension, etc.) is in fault. This property is empty unless a fault exists.
Result	Block	This block is the default block in an algorithm. It contains the result of the calculations contained in additional blocks.
Facets	units, precision, min, max, etc.	Define or report the units of measure for real-time, historical and calculated (by an algorithm) values. A unit is a standard facet that applies to both data input and data output. You use it for viewing a point's value or algorithm's result. While a unit need not match the same unit of the data definition, it must be correct for the raw value, and must be convertible to the corresponding unit specified in the data definition or algorithm.
Make Trends	true or false	When false, the block outputs a single value. When true, the rollup applies to the trend request on the input even if the override Request Rollup is false.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values.

Property	Value	Description
		Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination.

Property	Value	Description
		Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Min Interval	drop-down with time intervals	The minimum allowed interval when requesting a trend.
Max Interval	drop-down with time intervals	The maximum allowed interval when requesting a trend.

What follows in the Property Sheet are containers for the various logic blocks. Logic block properties vary depending on the type of block. Each block is documented in the Logic blocks chapter.

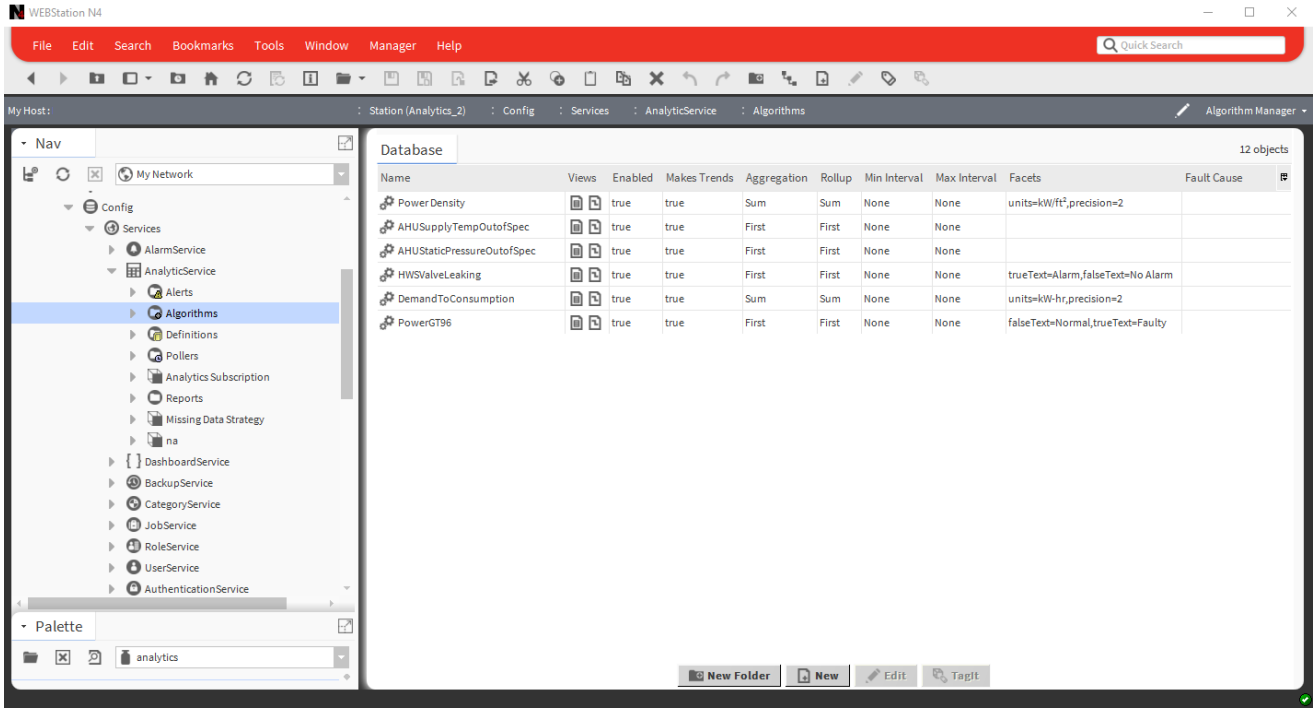
Related Links

- Algorithms folder (Parent Topic)

Algorithm Manager view

This table view manages the algorithms used by alerts, Px views, and standard Niagara logic. Using this view you can group algorithms (in folders), create and edit algorithms as well as tag them.

Figure 88 Algorithm Manager view



Columns

Column	Value	Description
Name	text	Provides a unique name for each formula.
Enabled	true or false	Activates and deactivates use of the component.
Make Trends	true or false	When false, the block outputs a single value. When true, the rollup applies to the trend request on the input even if the override Request Rollup is false.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet.

Column	Value	Description
		First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
ollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/ settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a

Column	Value	Description
		sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Min Interval	drop-down with time intervals	The minimum allowed interval when requesting a trend.
Max Interval	drop-down with time intervals	The maximum allowed interval when requesting a trend.
Facets	units, precision, min, max, etc.	Define or report the units of measure for real-time, historical and calculated (by an algorithm) values. A unit is a standard facet that applies to both data input and data output. You use it for viewing a point’s value or algorithm’s result. While a unit need not match the same unit of the data definition, it must be correct for the raw value, and must be convertible to the corresponding unit specified in the data definition or algorithm.

Buttons

Button	Description
New Folder	Creates a folder for grouping rows in the table.
New	Opens the property sheet for a new row in the table.
Edit	Opens the property sheet for the selected row in the table.
TagIt	Adds a tag to the selected row in the table.

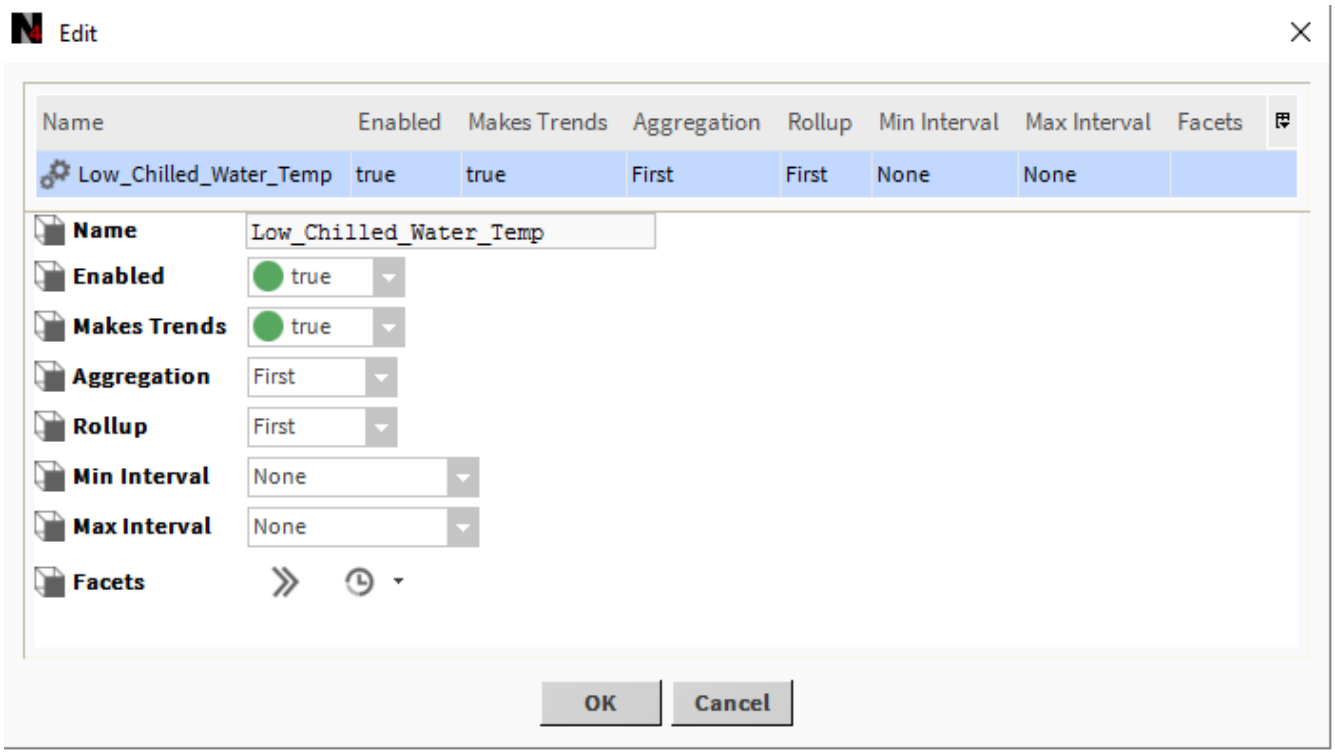
Related Links

- Algorithms folder (Parent Topic)

New/Edit algorithm windows

These windows create and edit algorithm properties.

Figure 89 Edit algorithm window



Properties

Property	Value	Description
Name	text	Provides a unique name for each formula.
Enabled	true or false	Activates and deactivates use of the component.
Make Trends	true or false	When false, the block outputs a single value. When true, the rollup applies to the trend request on the input even if the override Request Rollup is false.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables.

Property	Value	Description
		And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet.

Property	Value	Description
		First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Min Interval	drop-down with time intervals	The minimum allowed interval when requesting a trend.
Max Interval	drop-down with time intervals	The maximum allowed interval when requesting a trend.
Facets	units, precision, min, max, etc.	Define or report the units of measure for real-time, historical and calculated (by an algorithm) values. A unit is a standard facet that applies to both data input and data output. You use it for viewing a point's value or algorithm's result. While a unit need not match the same unit of the data definition, it must be correct for the raw value, and must be convertible to the corresponding unit specified in the data definition or algorithm.

Related Links

Algorithms folder (Parent Topic)

Definitions Folder

The Definitions folder contains the data definitions that are associated with tags. Double-clicking this folder opens the Analytic Data Manager.

Related Links

- Definition (BAnalyticDataDefinition)
- Analytic Data Manager view
- New/Edit Definition windows
- Components, views and windows (Parent Topic)

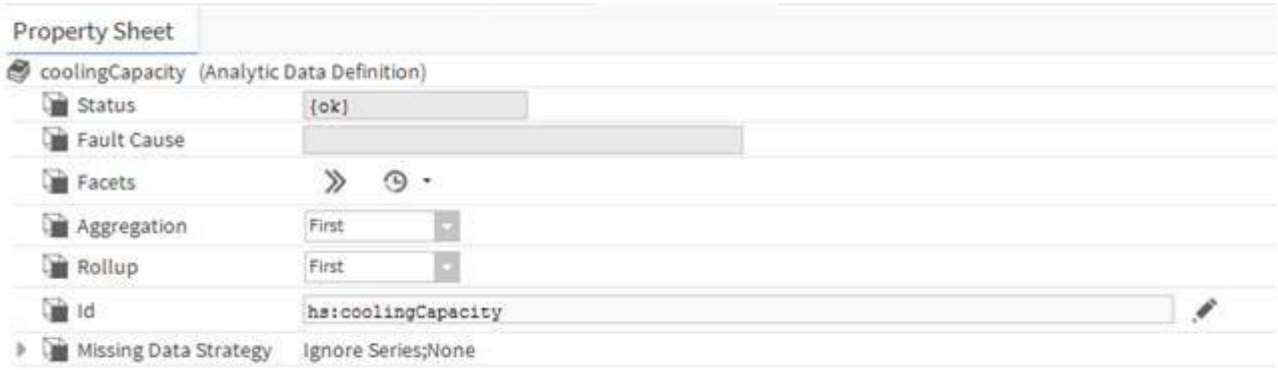
Definition (BAnalyticDataDefinition)

This component configures the default values for facets, aggregation and rollup properties. Each tag from the Haystack, Niagara or a custom dictionary requires a definition. An algorithm or a graphics binding (Px view or Ux chart) defines the tag to use for searching a hierarchy and the node at which to begin the search. Using this information the framework retrieves trend data. It then combines the retrieved data using the facets, aggregation and rollup properties defined on the definition that is associated with the tag.

Property Sheet

To view a definition's Property Sheet, open the Analytic Data Manager (double-click **Config > Services> AnalyticService > Definitions**), right-click the definition, and click **Views > Property Sheet**.

Figure 90 Example of a Data Definition Property Sheet



Properties

Property	Value	Description
Status	read-only	Indicates the condition of the component at the last check. {ok} indicates that the component is licensed and polling successfully. {down} indicates that the last check was unsuccessful, perhaps because of an incorrect property, or possibly loss of network connection. {disabled} indicates that the Enable property is set to false. {fault} indicates another problem. Refer to Fault Cause for more information.
Fault Cause	read-only	Indicates the reason why a system object (network, device, component, extension, etc.) is in fault. This property is empty unless a fault exists.
Facets	units, precision, min, max, etc.	Clicking the chevron to the right of this property o pens a standard Config Facets window. If no facets are defined, these values default to the default facets configured in the tag associated with the point. The facets you configure here override the default facets.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a

Property	Value	Description
		sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values.

Property	Value	Description
		Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Id	namespace:name	namespace is the name of a tag dictionary. name is the tag name used to collect point output in a hierarchy. Tagging a data definition automatically associates the properties defined by the definition with the tag that shares the same name.
Missing Data Strategy or Algorithm, Use This Value	check box	Enables and disables missing data interpolation for the current value.
Missing Data Strategy, Aggregation Strategy	drop-down list	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
Missing Data Strategy, K Value	number	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.

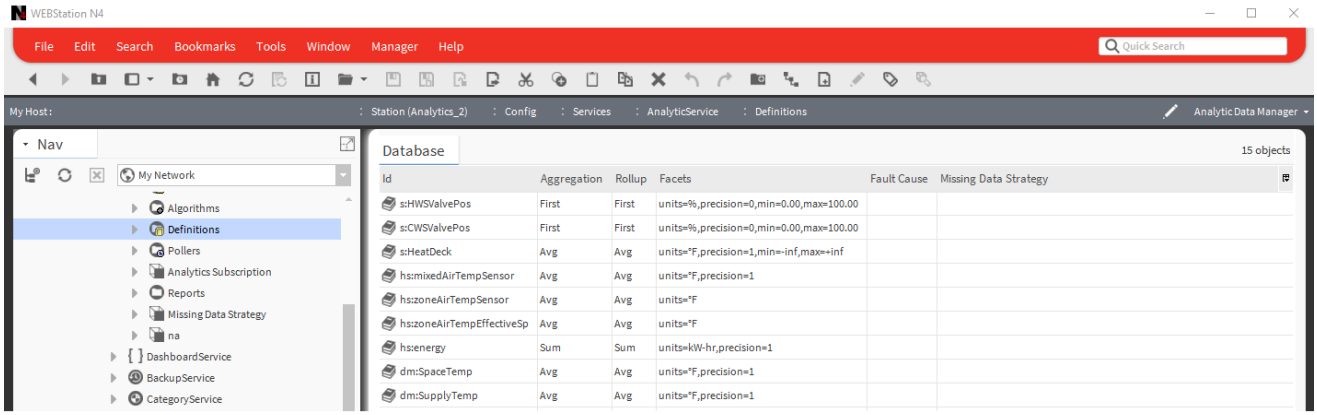
Related Links

- Definitions Folder (Parent Topic)

Analytic Data Manager view

This view lists the tags that identify the data to be analyzed, such as real energy, zone temperature, air flow quantity, set point, phase A amperage, phase B amperage, etc. Rather than retrieving data from a specific point, the framework retrieves data from all points identified by the **Id**.

Figure 91 Analytic Data Manager view



Columns

Column	Value	Description
Id	text	Identifies the tag name.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet.
		First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower

Column	Value	Description
		half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/ settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination.

Column	Value	Description
		Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Facets	units, precision, min, max, etc.	Define or report the units of measure for real-time, historical and calculated (by an algorithm) values. A unit is a standard facet that applies to both data input and data output. You use it for viewing a point's value or algorithm's result. While a unit need not match the same unit of the data definition, it must be correct for the raw value, and must be convertible to the corresponding unit specified in the data definition or algorithm.
Fault Cause	read-only	Indicates the reason why a system object (network, device, component, extension, etc.) is in fault. This property is empty unless a fault exists.

Buttons

Button	Description
New Folder	Creates a folder for grouping rows in the table.
New	Opens the property sheet for a new row in the table.
Edit	Opens the property sheet for the selected row in the table.
TagIt	Adds a tag to the selected row in the table.

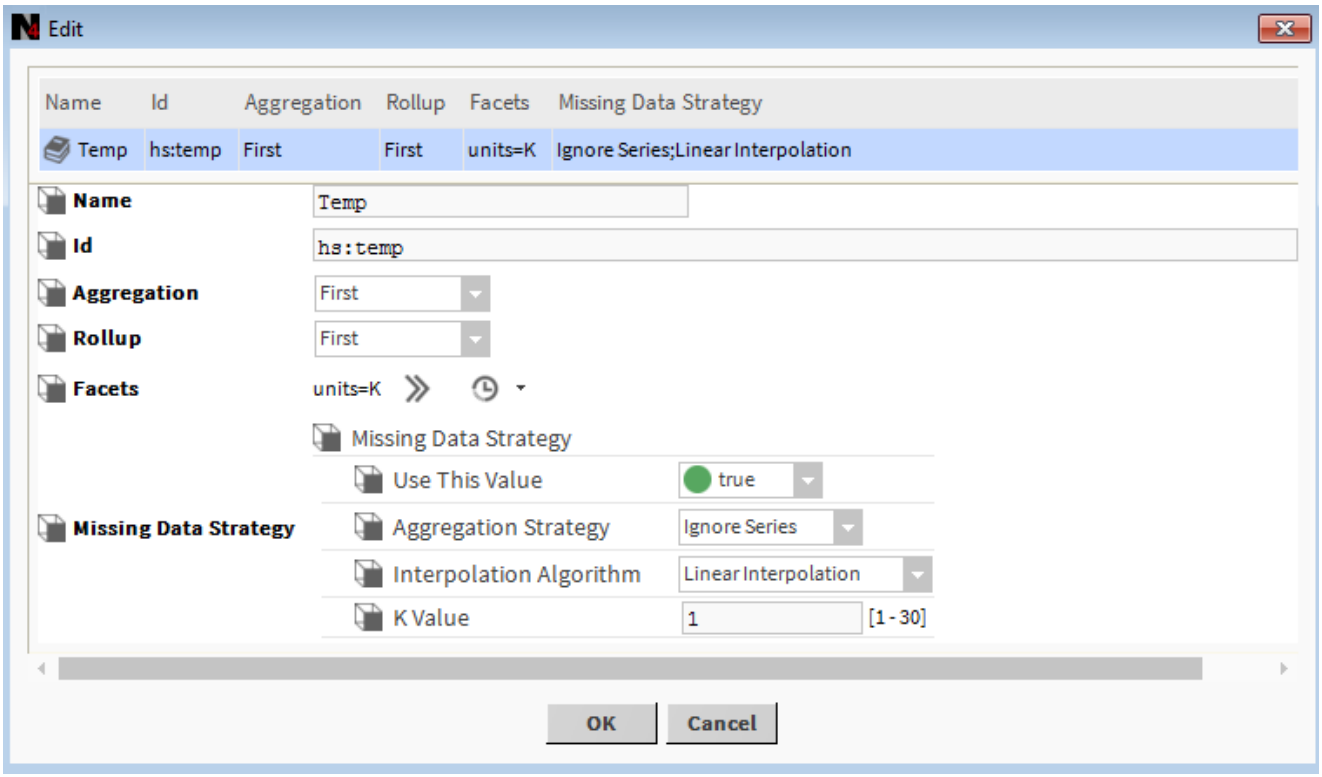
Related Links

- Definitions Folder (Parent Topic)

New/Edit Definition windows

These windows create and edit data definition properties.

Figure 92 New definition window



Properties

Type	Value	Description
Name	text	Provides a descriptive name for the definition.
Id		
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system

Type	Value	Description
		counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination.

Type	Value	Description
		Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Facets	units, precision, min, max, etc.	Define or report the units of measure for real-time, historical and calculated (by an algorithm) values. A unit is a standard facet that applies to both data input and data output. You use it for viewing a point's value or algorithm's result. While a unit need not match the same unit of the data definition, it must be correct for the raw value, and must be convertible to the corresponding unit specified in the data definition or algorithm.
Missing Data Strategy or Algorithm, Use This Value	check box	Enables and disables missing data interpolation for the current value.
Missing Data Strategy, Aggregation Strategy	drop-down list	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.

Type	Value	Description
Missing Data Strategy, K Value	number	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.

Related Links

- Definitions Folder (Parent Topic)

Pollers folder

The Pollers folder contains poller objects, which define how frequently the framework polls points for alert conditions. Double-clicking this component opens the Poller Manager.

Related Links

- Cyclic poller (BCyclicPoller)
- Triggered poller (BTriggeredPoller)
- Poller Manager view
- New/Edit poller window
- Components, views and windows (Parent Topic)

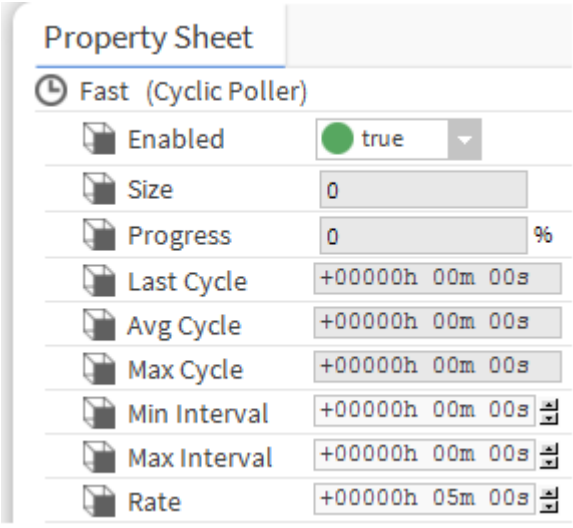
Cyclic poller (BCyclicPoller)

This poller interrogates framework proxy points and runs alerts at even intervals across the time span as defined by the Min Interval, Max Interval and Rate.

Property Sheet

To view a cyclic poller Property Sheet, open the Poller Manager (double-click **Config > Services > AnalyticService > Pollers**), right-click a poller of type Cyclic Poller, and click **Views > Property Sheet**.

Figure 93 Examples of cyclic pollers



Properties

Property	Value	Description
Enabled	true or false	Activates and deactivates use of the component.
Size	read-only number	
Progress	read-only percentage	
Last Cycle	read-only time	
Avg Cycle	read-only time	
Max cycle	read-only time	
Min Interval	drop-down with time intervals	The minimum allowed interval when requesting a trend.
Max Interval	drop-down with time intervals	The maximum allowed interval when requesting a trend.
Rate	number	Determines how frequently the poller runs each item.

Related Links

- Pollers folder (Parent Topic)

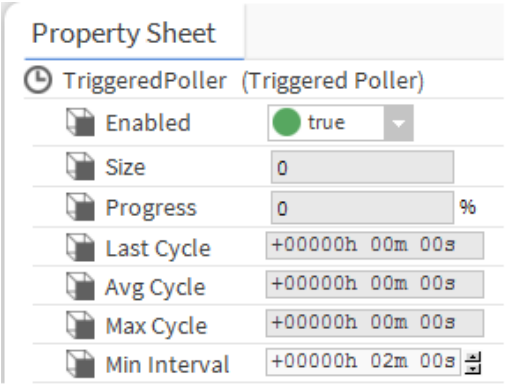
Triggered poller (BTriggeredPoller)

When you invoke execute action, this poller executes analytic proxy points and diagnostics.

Property Sheet

To view a triggered poller Property Sheet, open the Poller Manager (double-click **Config > Services > AnalyticService > Pollers**), right-click a poller of type Triggered Poller, and click **Views > Property Sheet**.

Figure 94 Example of a triggered poller Property Sheet



Properties

Property	Value	Description
Enabled	true or false	Activates and deactivates use of the component.
Size	read-only number	
Progress	read-only percentage	
Last Cycle	read-only time	
Avg Cycle	read-only time	
Max Cycle	read-only time	
Min Interval	drop-down with time intervals	The minimum allowed interval when requesting a trend.

Actions

Execute executes each item exactly once. This action has no effect if you invoke it during an execution. You can link this action to a trigger schedule as well as to the cycle complete topic of other triggered pollers.

Related Links

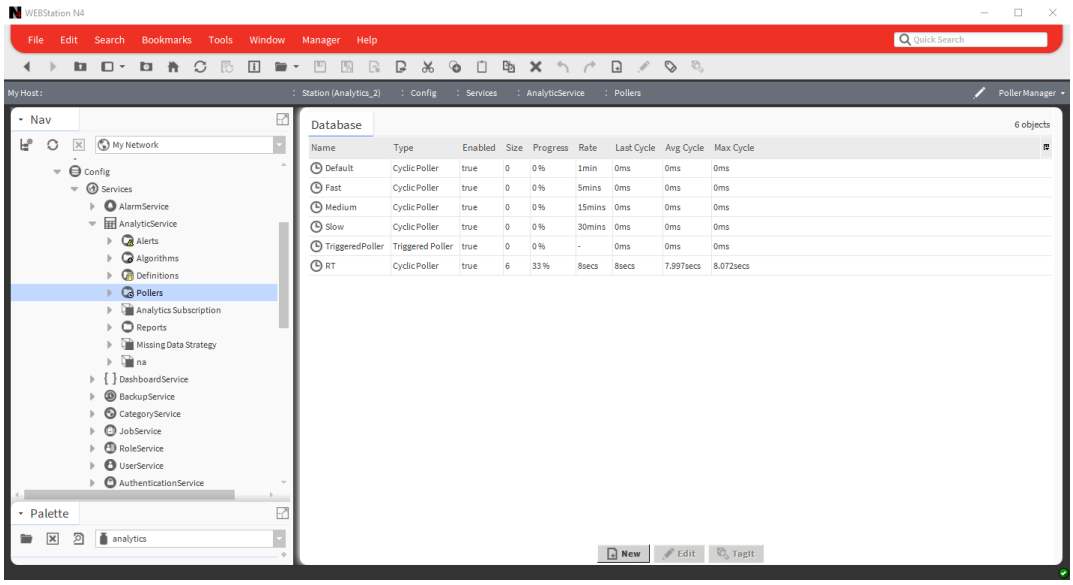
- Pollers folder (Parent Topic)

Poller Manager view

This table view lists the pollers that monitor framework points.

You access this view by double-clicking the **Pollers** folder under **Config** > **Services** > **AnalyticService** in the Nav tree.

Figure 95 Poller Manager view



Columns

Column	Value	Description
Name	text	Displays the poller's name.
Type	Cyclic Poller or Triggered Poller	Identifies the type of poller.
Enabled	true or false	Indicates if the component is active or deactivated.
Size		
Progress	percentage	Indicates when the poller is running.
Rate	time	Indicates how often the poller runs.
Last Cycle	time	Indicates how long it took to complete the last poll.
Avg Cycle	time	Indicates the average amount of time it takes to complete a poll.
Max Cycle	time	Indicates the longest time it took to complete a poll.

Buttons

Button	Description
New	Opens the property sheet for a new row in the table.
Edit	Opens the property sheet for the selected row in the table.
TagIt	Adds a tag to the selected row in the table.

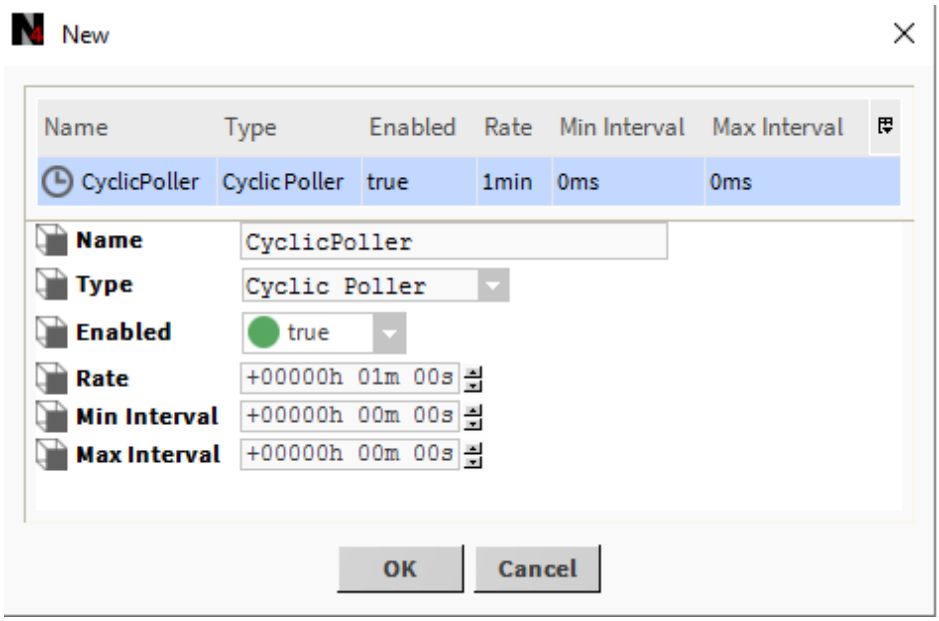
Related Links

- Pollers folder (Parent Topic)

New/Edit poller window

This window creates a new poller.

Figure 96 New Poller window



Properties

Property	Value	Description
Name	text	A name to refer to the poller.
Type	drop-down list	A Cyclic poller
Enabled	true or false	Activates and deactivates use of the component.
Rate	hours minutes seconds	Specifies the amount of time between cyclic polls.
Min Interval	hours minutes seconds	Specifies a minimum pause between each poll.
Max Interval	hours minutes seconds	Specifies a maximum pause between each poll.

Related Links

- Pollers folder (Parent Topic)

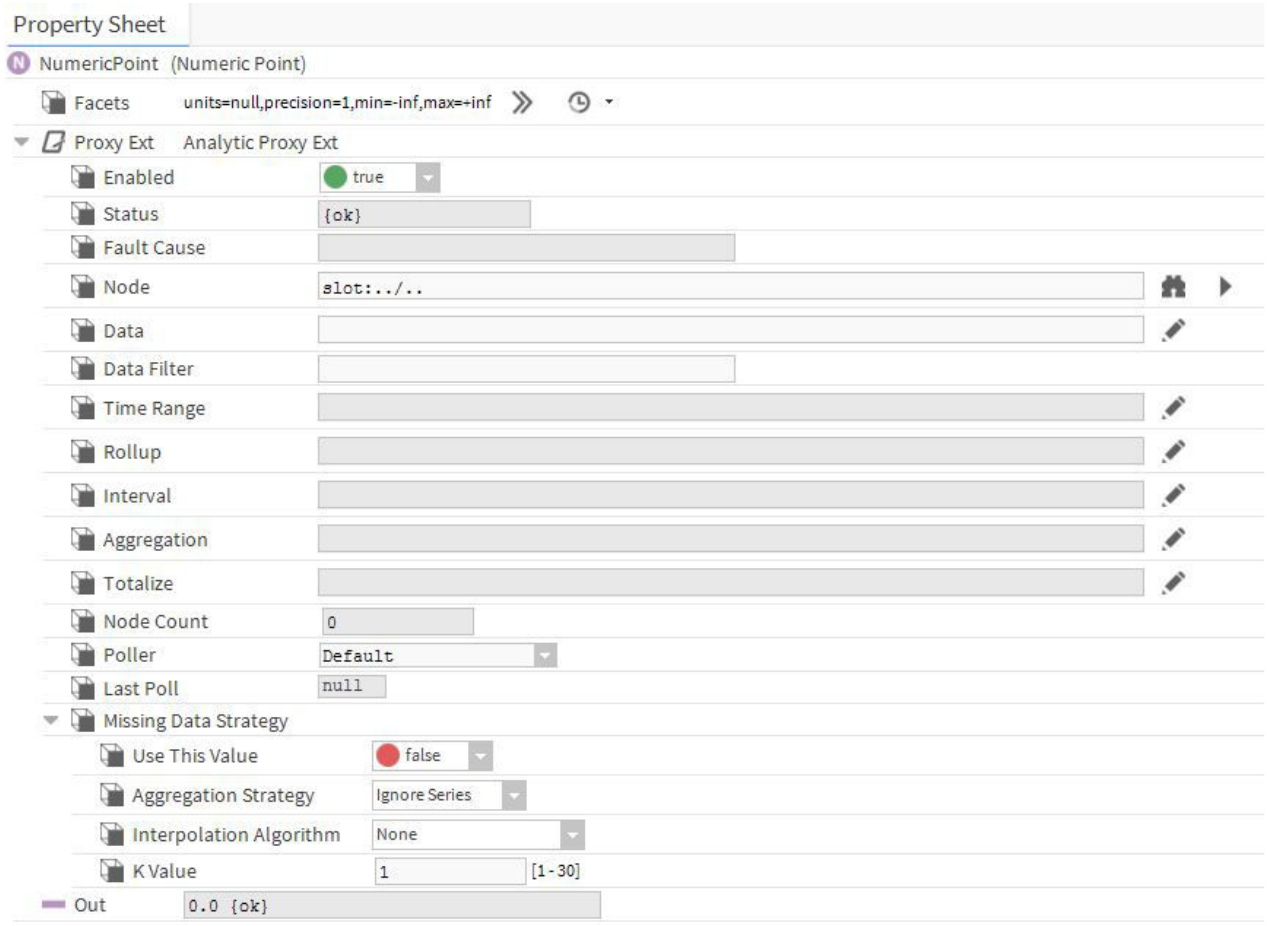
Proxy extension (BAnalyticProxyExt)

This component routes values into a station as points. On writable points, the proxy extension writes to priority level 16.

Property Sheet

The framework's proxy extensions are located in the **Points** folder of the analytics palette. The property sheets for configuring the Analytic Proxy Extensions associated with framework points are what set framework points apart from standard Niagara numeric, Boolean, enum and string points. When you drag these points to any location in a station, the Analytic Proxy Extension comes along with the point.

Figure 97 Example of an Analytic Proxy extension



Properties

Properties	Value	Description
Enabled	true or false	Activates and deactivates use of the component.

Properties	Value	Description
Status	read-only	Indicates the condition of the component at the last check. {ok} indicates that the component is licensed and polling successfully. {down} indicates that the last check was unsuccessful, perhaps because of an incorrect property, or possibly loss of network connection. {disabled} indicates that the Enable property is set to false. {fault} indicates another problem. Refer to Fault Cause for more information.
Fault Cause	read-only	Indicates the reason why a system object (network, device, component, extension, etc.) is in fault. This property is empty unless a fault exists.
Node or node (required)	ORD	Defines the ORD to the desired slot.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables.

Properties	Value	Description
	elsewhere, defaults to the value as defined in the data definition)	And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by clicking the Edit button () , followed by clicking the Settings button () on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.

Properties	Value	Description
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Poller	name	Identifies which poller to run.
Last Poll, Last Poll Time	read-only	Indicates the date and time that the system polled this point last.
Last Poll	read-only	Reports the most recent poll.
Missing Data Strategy or Algorithm, Use This Value	check box	Enables and disables missing data interpolation for the current value.

Properties	Value	Description
Missing Data Strategy, Aggregation Strategy	drop-down list	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
Missing Data Strategy, K Value	number	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.

Related Links

- Components, views and windows (Parent Topic)

Combination (BCombination)

This component works behind the scenes to define how to combine multiple pieces of data, such as points. When used for aggregation, it defines how the framework combines data from multiple individual points. When used for rollups, it defines how the framework combines multiple values in a single interval of a trend.

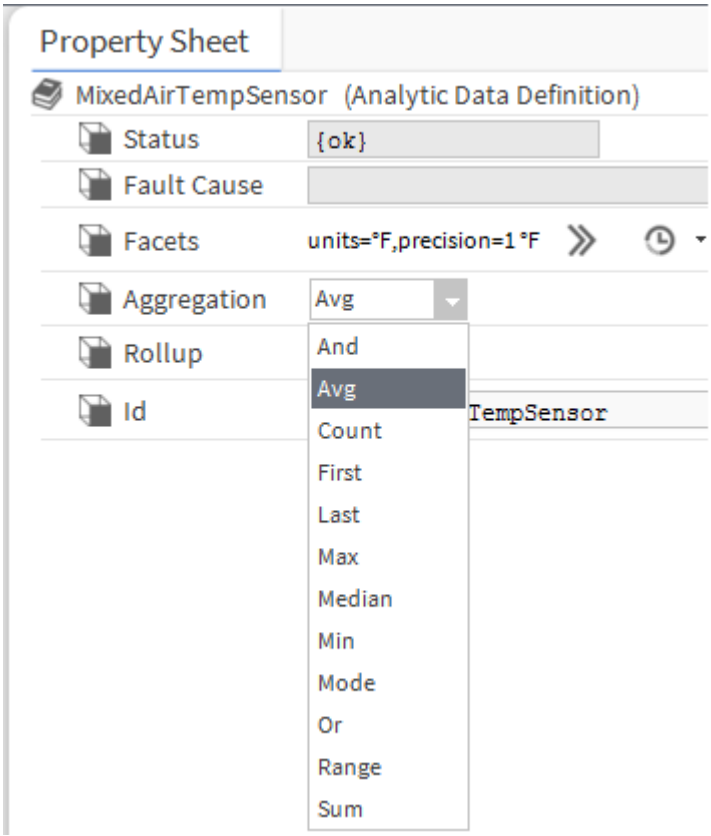
A combination excludes data with an invalid status, unless everything being combined has an invalid status. Invalid status values are: disabled, down, fault, stale and null.

Aggregation and rollup options

This component is responsible for the list of options that drop-down to configure the **Aggregation** and **Rollup** properties on an Analytic Data Definition. To view one of these Property Sheets, open the

Analytic Data Manager (double-click **Config > Services > AnalyticService > Definitions**), right-click a definition, and click **Views > Property Sheet**.

Figure 98 Aggregation drop-down list on an Analytic Data Definition



Combination values

Value	Description
And	Logical “and” of Boolean values.
Avg	The statistical mean, which is determined by adding all of the values together and dividing by the number of values.
Count	The number or quantity of values in a combination.
First	The very first value in a combination. This is the default and fastest combination.
Last	Last the very last value in a combination.
Max	The largest value in a numeric combination.
Median	The value in the middle of a sorted numeric combination. It is the number that separates the higher half from the lower half.
Min	The smallest value in a numeric combination.
Mode	Statistically, the most frequently-occurring number in the combination.
Or	Logical “or” of Boolean values.
Range	Statistically, the difference between the largest and smallest

Value	Description
	values in the combination.
Sum	The result of adding together all values in the combination.

Related Links

- Components, views and windows (Parent Topic)

Interval (BInterval)

This component works behind the scenes to define the period of time the framework uses to separate values in a trend (time series). Whenever an interval is specified, a rollup is required to combine all values that fall within a single interval.

The following components require an interval:

- Request overrides logic block
- Algorithm component
- Cyclic Poller component
- Triggered Poller component

Default Interval

When a request does not specify the default interval, the system calculates one based on the time range:

- If the time range is >= one year, the interval is one month.
- If the time range is >= one month, the interval is one day.
- If the time range is >= one week, the interval is six hours.
- If the time range is >= one day, the interval is fifteen minutes.
- If the time range is >= twelve hours, the interval is five minutes.
- If none of the conditions above match, the interval is one minute.

Values

- None, that is, no interval. This effectively defines the interval as a single millisecond.
- Second
- Five Seconds
- Ten Seconds
- Fifteen Seconds
- Thirty Seconds
- Minute

- Five Minutes
- Fifteen Minutes
- Twenty Minutes
- Thirty Minutes
- Hour
- Two hours
- Three Hours
- Four Hours
- Six Hours
- Twelve Hours
- Day
- Week
- Month
- Quarter, that is, three months
- Year

Related Links

- Components, views and windows (Parent Topic)

Chapter 4 Logic blocks

These blocks consist of logic that are used to analyze both real-time values and trend data. You access block properties by double-clicking the block on the Wire Sheet or the block name in the Nav tree.

Related Links

- Data Source (BDataSourceBlock)
- Result block
- Constant blocks
- Filter blocks
- General blocks
- Math blocks

Data Source (BDataSourceBlock)

This block supplies data to an algorithm. In addition to algorithms, a request for data may also come from a variety of sources, such as graphics bindings and alerts.

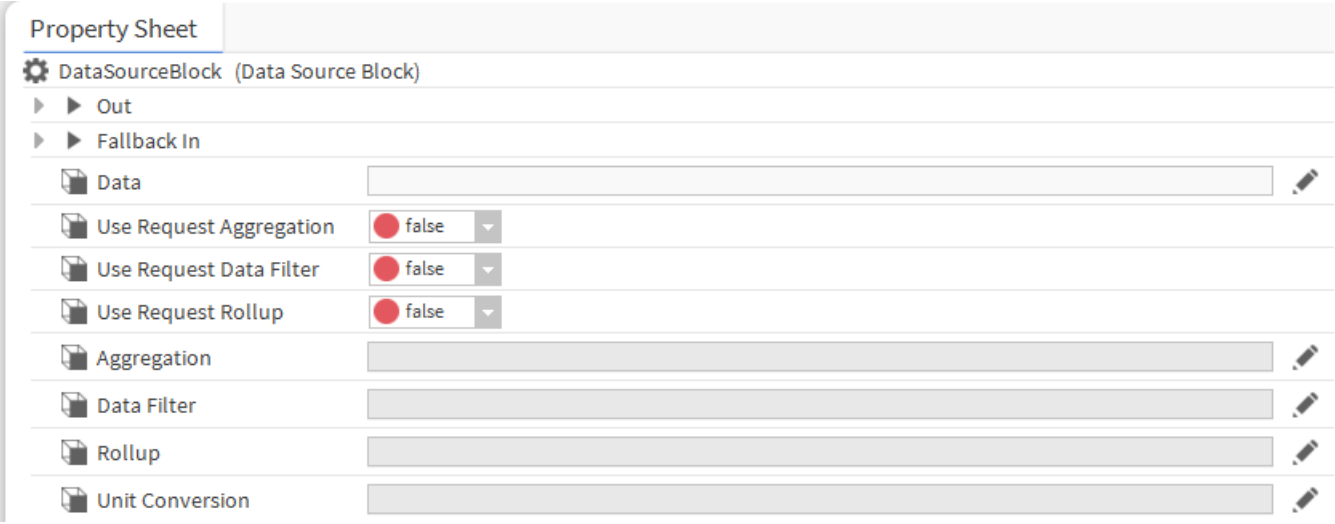
This block supports both real-time values and trend requests if the underlying data support them.

This block can override some properties of the request. In the process, it generates a modified request for data and supplies the results to the blocks that are linked to its out property.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 99 Data Source Block Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Fallback In	value slot	Links from the output of other logic blocks or data sources to supply an alternate input source. If the data source is not available for a point, the framework uses this alternate input. The input could be another data source object like this one, or it could be something, such as a constant. The framework does not use the Fallback Input if this data source is available.
Use Request Aggregation	True or false (default)	The data definition associated with each tag defines the default aggregation method. An incoming request from a data source block can override this default aggregation method. true causes the framework to use the aggregation method from the incoming request. false causes the framework to use the method defined by the data definition associated with the tag.
Use Request Data Filter	True or false (default)	true uses the rollup of the incoming request to combine data in the window rather than the Rollup property specified on the Property Sheet for this block. false uses the Rollup value defined on the Property Sheet. If Rollup is not specified on the Property Sheet, this block uses the Rollup value specified by the data definition of the tag.
Use Request Rollup	True or false (default)	The data definition associated with each tag defines the default method to roll up data. An incoming request from a data source, rollup, sliding window or today builder block may override this default method. True causes the framework to use the method defined by the incoming request. false causes the framework to use the method defined in the data definition associated with the tag.

Property	Value	Description
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node’s subtree for additional values (including the root node).

Property	Value	Description
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Unit conversion	optional	If set, the system converts values supplied using the units defined in the data policy of the data source to the units defined by this property.

Related Links

- Logic blocks (Parent Topic)

Result block

This block receives the result of the algorithm calculation.

Related Links

- Logic blocks (Parent Topic)

Constant blocks

This component supplies a constant value to algorithm blocks. The value it supplies can be a trend (historical data) or a real-time value.

Related Links

- Boolean constant (BBooleanConstantBlock)
- Enum constant (BEnumConstantBlock)
- Numeric constant (BNumericConstantBlock)
- String constant (BStringConstantBlock)
- Logic blocks (Parent Topic)

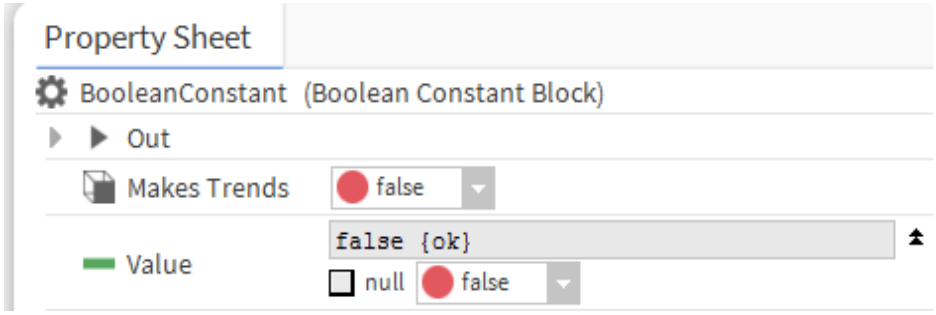
Boolean constant (BBooleanConstantBlock)

This constant block outputs a Boolean value of True and False.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 100 Boolean Constant Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Makes Trends	true or false (default)	When set to true, the constant generates a constant trend. When set to false it supplies a constant value.

Property	Value	Description
Value	true or false	Can be set on the Property Sheet or the **Set** action. To view the null check box, click the down arrows to the right of the **Value** property.

Related Links

- Constant blocks (Parent Topic)

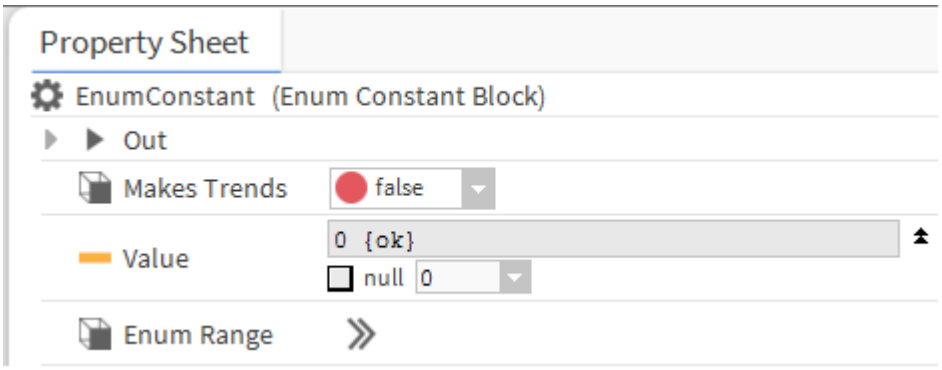
Enum constant (BEnumConstantBlock)

This constant block outputs the value of an enum (enumerated type).

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 101 Enum Constant Property Sheet



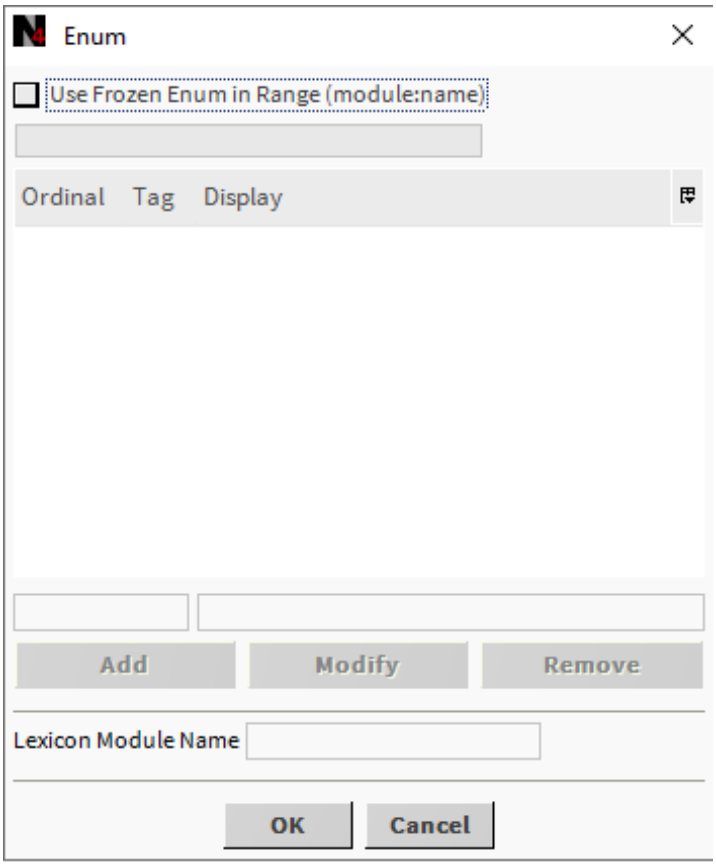
Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Makes Trends	true or false (default)	When set to true, the constant generates a constant trend. When set to false it supplies a constant value.
Value	text	Can be set on the Property Sheet or the **Set** action. To view the null check box, click the down arrows to the right of the **Value** property.
Enum Range	additional window	Click the chevron to the right of this property to open the Enum facets window.

Related Links

- Enum facets window
- Constant blocks (Parent Topic) Enum facets window

Enum facets define the possible enumerated states (operating range) of the component. Each state pairs an integer with a value (value-to-text or ordinal-tag). A point's Facets slot is blank until you edit the **Enum Range** properties and supply the ordinal-tag values.

Figure 102 Enum facets window



Property	Value	Description
Use Frozen Enum in Range (module:name)	module:name	Identifies well-known enumerations as defined in various installed modules. When you enable this option, the system provides a drop-down list from which to select ordinal-tag pairs by module and enumeration type.
Ordinal column and box	a unique integer	The box to the left above the Add button is where you enter the integer.
Tag column and box	unique text	The box to the right of the ordinal box is where you enter the tag.

Property	Value	Description
Display column	text	Shows how the enum value appears in the system.
Lexicon Module Name	text	Identifies the name of a lexicon that contains enum facets. When tag strings match lexicon keys, the system displays the lexicon strings (values) for the ordinals instead of the tag text.

Related Links

- Enum constant (BEnumConstantBlock) (Parent Topic)

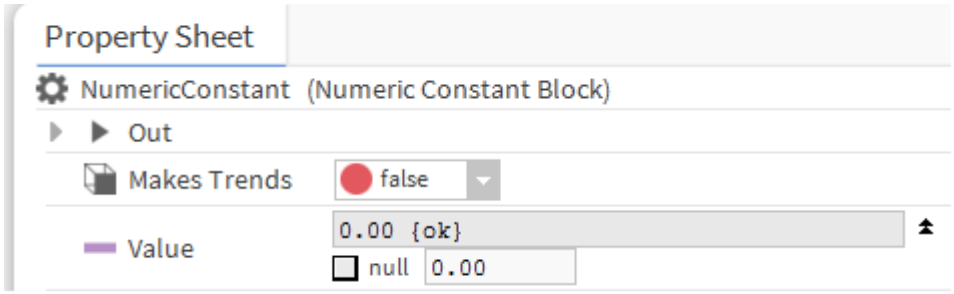
Numeric constant (BNumericConstantBlock)

This constant block outputs a numeric value.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 103 Numeric Constant



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Makes Trends	true or false (default)	When set to true, the constant generates a constant trend. When set to false it supplies a constant value.
Value	number to two decimal places	Can be set on the Property Sheet or the **Set** action. To view the null check box, click the down arrows to the right of the **Value** property.

Related Links

- Constant blocks (Parent Topic)

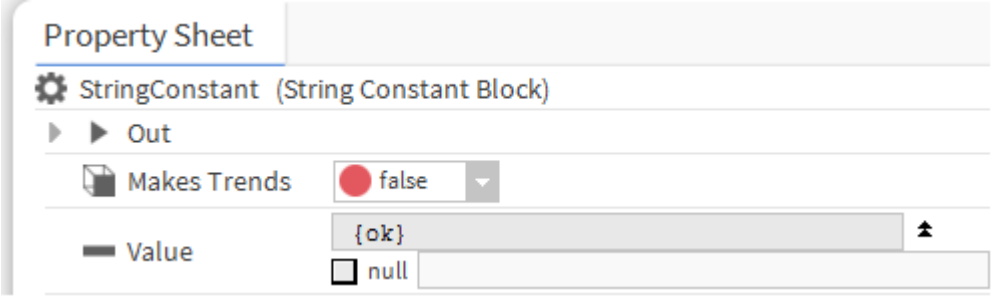
String constant (BStringConstantBlock)

This constant block outputs a text value.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 104 String Constant Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Makes Trends	true or false (default)	When set to true, the constant generates a constant trend. When set to false it supplies a constant value.
Value	text	Can be set on the Property Sheet or the **Set** action. To view the null check box, click the down arrows to the right of the **Value** property.

Related Links

- Constant blocks (Parent Topic)

Filter blocks

These components provide practical limits on input and output values.

Related Links

- Deadband filter (BDeadbandFilter)
- Invalid Value filter (BInvalidValueFilter)
- Logic filter (BLogicFilter)
- Range filter (BRangeFilterBlock)

- Time Filter (BTimeFilterBlock)
- Logic blocks (Parent Topic)

Deadband filter (BDeadbandFilter)

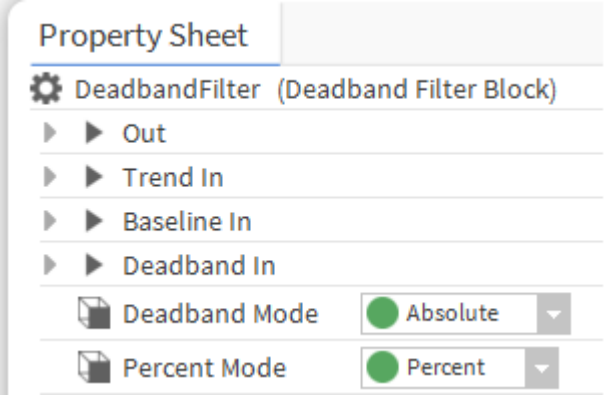
This logic block filters numeric data that are out of range. You can use it for real-time values or trends. In the case of real-time values, a null value results if the input is out of range.

A deadband is an interval of time where no action occurs (the system appears to be “dead,” that is, output is zero).

Properties

To view these properties, double-click the block on the Wire Sheet block or the block name in the Nav tree.

Figure 105 Deadband filter Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Baseline In	required numeric value slot	Links from the output of other logic blocks or data sources to supply a trend. This trend provides a baseline value upon which to apply a deadband.
Deadband In	required numeric value slot	Links from the output of other logic blocks or data sources to supply one or more input values that represent a dead or neutral zone around a baseline.
Deadband Mode	drop-down list	Absolute, configures a specific value to use as the deadband. Percent, configures the deadband as a percentage. For this option, the Deadband In value(s) should be in the range 0-1.

Property	Value	Description
Percent Mode	drop-down list	If the **Deadband Mode** is a percentage, **Percent Mode** determines the form in which the constant appears. Percent(the default) treats the value as a percent (0-100). For example, value of 30% would be represented as 30. Decimal treats the value as a decimal number (0-1). For example, a value of 30% would be represented as .3.

Related Links

- Filter blocks (Parent Topic)

Invalid Value filter (BInvalidValueFilter)

This component evaluates an input and outputs only the valid values.

These conditions make a value invalid:

- It is NaN (Not a Member)
- Its status is: down, disabled, fault, null or stale
- It is an infinite number and the property sheet is configured for this to be an invalid condition (the default)

Properties

To view these properties, double-click the block on the Wire Sheet block or the block name in the Nav tree.

Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Infinite is Valid	true or false (default)	Defines whether or not infinite values should be considered valid. False means that infinite is invalid.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.

Related Links

- Filter blocks (Parent Topic)

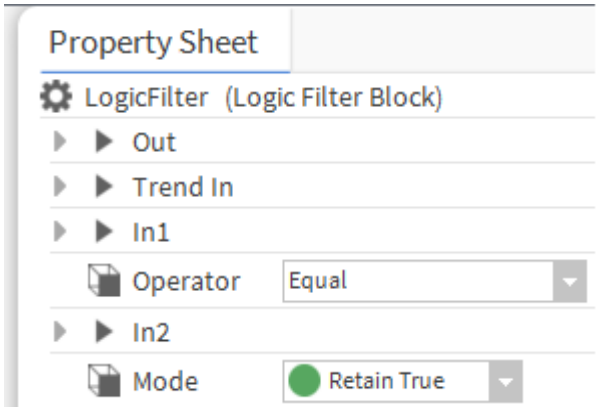
Logic filter (BLogicFilter)

This block evaluates a two-operand Boolean expression to filter values from the primary input.

Properties

To view these properties, double-click the block on the Wire Sheet block or the block name in the Nav tree.

Figure 106 Logic Filter Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
In 1	operand	The left-hand side of the operation. Links from the output of other logic blocks or data sources to supply one or more input values to the logic block.
Operator	Equals, Greater Than, Greater Than Equal To, Less Than, Less Than Equal To, Not Equal, And, Or	Defines the function to perform.
In 2	operand	The right-hand side of the operation. Links from the output of other logic blocks or data sources to supply one or more input values to the logic block.
Mode (save)	Retain False(default), Retain True	Determines whether to save true or false values.

Related Links

- Filter blocks (Parent Topic)

Range filter (BRangeFilterBlock)

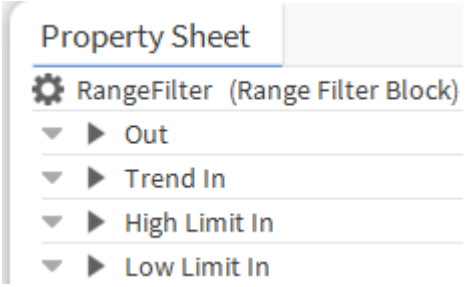
This block removes out-of-range values from a trend.

Values are considered in range if they are greater than or equal to the low limit and less than or equal to the high limit. Only trend requests are supported, value requests return null. The status of the resulting value is the combination of the in, high limit, and the low limit values.

Properties

To view these properties, double-click the block on the Wire Sheet block or the block name in the Nav tree.

Figure 107 Range filter Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
High Limit In	numeric value slot	Links from the output of other logic blocks or data sources to supply one or more values to define the maximum valid value.
Low Limit In	numeric value slot	Links from the output of other logic blocks or data sources to supply one or more input values to define a minimum valid value.

Related Links

- Filter blocks (Parent Topic)

Time Filter (BTimeFilterBlock)

This block uses time to include data from an input trend. While this block is primarily intended for trends, it also works for real-time values.

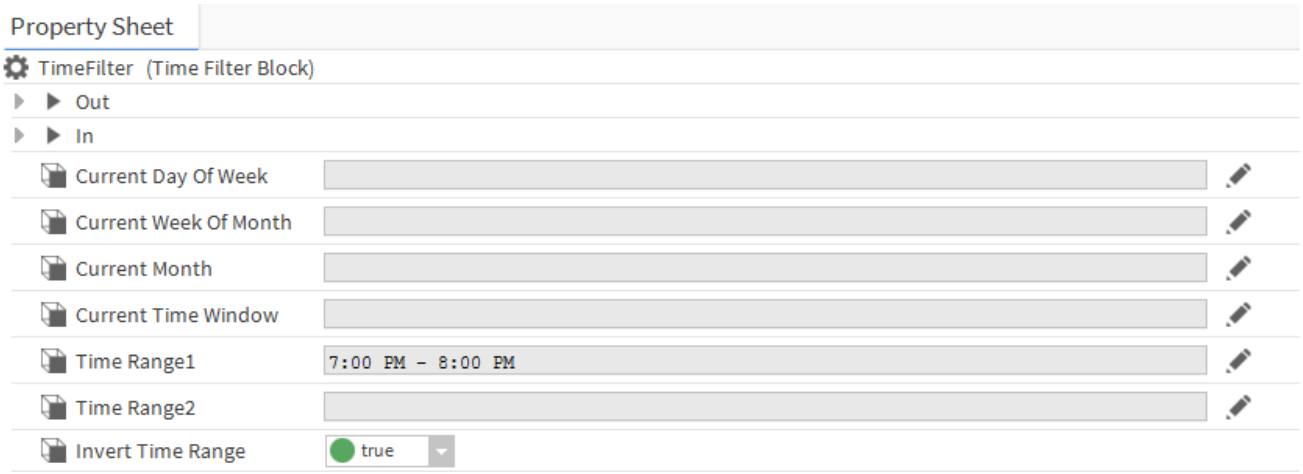
Time filter block is an inclusive block by default, which means that it includes in the output any record whose timestamp falls between Time Range 1 and Time Range 2.

If the result of a value request does not match the criteria, the system sets the null status flag. One or more criteria can be enabled. If multiple criteria are enabled, the value timestamp must pass them all.

Properties

To view these properties, double-click on the Wire Sheet block or the block name in the Nav tree.

Figure 108 Time filter Property Sheet



Property	Value	Description
Current Day of Week	true or false (default)	If true, a value's timestamp must match the real-time day of the week.
Current Week of Month	true or false (default)	If true, a value's timestamp must match the real-time week of the month.
Current Month	true or false (default)	If true, a value's timestamp must match the real-time month.
Current Time Window	hours minutes seconds	If set, a value's time of day must be within the current time minus this value. The value ends with the current time plus the value.
Time Range 1	Start Time and End Time	If set, the value's time of day must be within the range defined here.
Time Range 2	Start Time and End Time	If set, the value's time of day must be within the range defined here.
Invert Time Range	true or false (default)	Excludes from the output the time range given in Time Range 1 and Time Range 2. **NOTE:** If the time range spans to the next day, configure End Timefor Time Range 1as 11:59 PM and not 12 AM.

Related Links

- Filter blocks (Parent Topic)

General blocks

These objects are grouped as miscellaneous blocks because they do not fit into any of the other object categories.

Related Links

- Debug (BDebugBlock)
- Consumption To Demand (BConsumptionToDemandBlock)
- Demand to Delta Consumption (BDemandToConsumptionBlock)
- Intersection (BIntersectionBlock)
- Interval count (BIntervalCountBlock)
- Logic folder (LogicFolder)
- Not (BNotBlock)
- Psychrometric (BPsychrometricBlock)
- Request overrides (BRequestOverridesBlock)
- Rollup (BRollupBlock)
- Runtime (BRuntimeBlock)
- SlidingWindow (BSlidingWindowBlock)
- Time range offset (BTimeRangeOffsetBlock)
- Timestamp offset (BTimestampOffsetBlock)
- Today Builder (BDayBuilderBlock)
- Value duration (BValueDurationBlock)
- Value Map (BValueMapBlock)
- Logic blocks (Parent Topic)

Debug (BDebugBlock)

This block provides tools to debug algorithms.

Properties

Property	Value	Description
Debug Mode	See Debug mode check boxes	The mode properties allow you to control specific results to that you can better understand and explain the results you are receiving.
Print Trend to Console	true or false	When true, the framework prints every row of a trend to the console where you can view each row in the Application Director.
Results	data	Provides details about the request parameters and, for value requests, the resulting value.

Debug mode check boxes

Debug mode check box	Description
All Requests	When enabled, updates the result field for every request.
All Trend Requests	When enabled, updates the result field with trend requests only.
All Value Requests	When enabled, updates the result field for value requests only.
Next Request	When enabled, updates the result field for the next request, then disables itself.
Next Trend Request	When enabled, updates the result field for the next trend request, then disables itself.
Next Value Request	When enabled, updates the result field for the next value request, then disables itself.

Related Links

- General blocks (Parent Topic)

Consumption To Demand (BConsumptionToDemandBlock)

This block converts consumption values into demand values.

The system supports both trend and value requests. With value requests, demand is calculated by taking the real time value and using the time delta from the last record in the underlying trend.

Property	Value	Description
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.

Related Links

- General blocks (Parent Topic)

Demand to Delta Consumption (BDemandToConsumptionBlock)

This block converts demand values into consumption values.

The framework supports both trend and value requests. With value requests, the framework calculates consumption by taking the real-time value and using the time delta from the last record in the underlying trend.

Property

Property	Value	Description
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.

Related Links

- General blocks (Parent Topic)

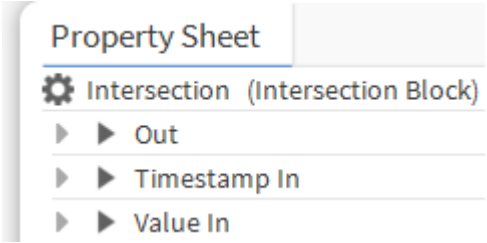
Intersection (BIntersectionBlock)

This component combines two trends. The framework includes only rows with identical timestamps from both inputs. This object was designed for the scenario where the timestamps from a filtered trend are needed to extract values from another trend.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 109 Intersection Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Timestamp In	value slot	Links from the output of other logic blocks or data sources to identify values from this trend to ignore.

Property	Value	Description
Value In	value slot	Links from the output of other logic blocks or data sources to identify values to use from this trend.

Related Links

- General blocks (Parent Topic)

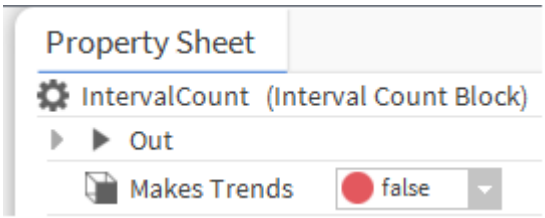
Interval count (BIntervalCountBlock)

This component outputs the number of intervals for the given time range and interval. The purpose for this object is to distribute a value, such as cost, among all rows in a trend. However, this object does not produce a trend.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 110 Interval Count Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trendsproperty.
Makes Trends	true or false (default)	When set to true, the constant generates a constant trend. When set to false it supplies a constant value.

Related Links

- General blocks (Parent Topic)

Logic folder (LogicFolder)

This folder provides the Wire Sheet on which to build algorithm logic. It contains a single Result Block that contains an In slot. There are no properties to configure. You drag this folder from the analytics palette to a location in the Nav tree.

Related Links

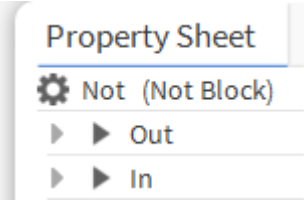
- General blocks (Parent Topic)

Not (BNotBlock)

This component outputs the Boolean opposite of the input. It contains no properties to be configured.

Slots

Figure 111 Not Property Sheet



Slot	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trendsproperty.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.

Related Links

- General blocks (Parent Topic)

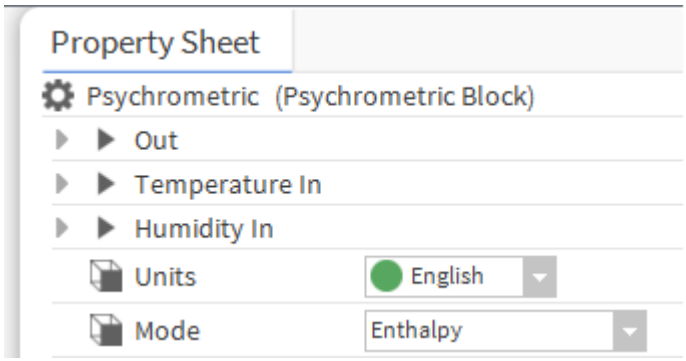
Psychrometric (BPsychrometricBlock)

This block calculates various properties of moist air given the temperature (Fahrenheit or Celsius) and humidity (% relative humidity) inputs. Both trend and value requests are supported. The Mode property determines the calculation.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 112 Psychometric



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Temperature In	required value slot	Links from the output of other logic blocks or data sources to supply degrees of temperature. **NOTE:** Make sure the Unitsproperty matches the units of this property.
Humidity In	required value slot	Links from the output of other logic blocks or data sources to supply the percentage of humidity.
Units	drop-down list	Identifies the units: Metricor English (default). The unit the system uses to display temperature values depends on this property and on your selection for Mode. See Metric and English units.
Mode	drop-down list	Identifies the psychrometric calculation to perform: Dewpoint Temp, Enthalpy (default), Saturation Pressure, Vapor Pressureor Wetbulb Temp.

Metric and English units

Based on the Mode you select, use this table to interpret the temperature values reported by the DataSource block in your algorithm.

Mode units in Metric and English

Mode property	Metric	English
Dewpoint Temp (Dewpoint Temperature)	°C (degrees Celsius)	°F (degrees Fahrenheit)
Enthalpy	kj/kg (kilo joule per kilo gram)	BTU/lb (British thermal unit per pound)
Saturation Pressure	kPa (kilo Pascal)	lbs (pounds)
Vapor Pressure	hPa (hectopascals)	inHg or in.Hg (inch of mercury)
Wetbulb Temp (Wetbulb Temperature)	°C (degrees Celsius)	°F (degrees Fahrenheit)

Related Links

- General blocks (Parent Topic)

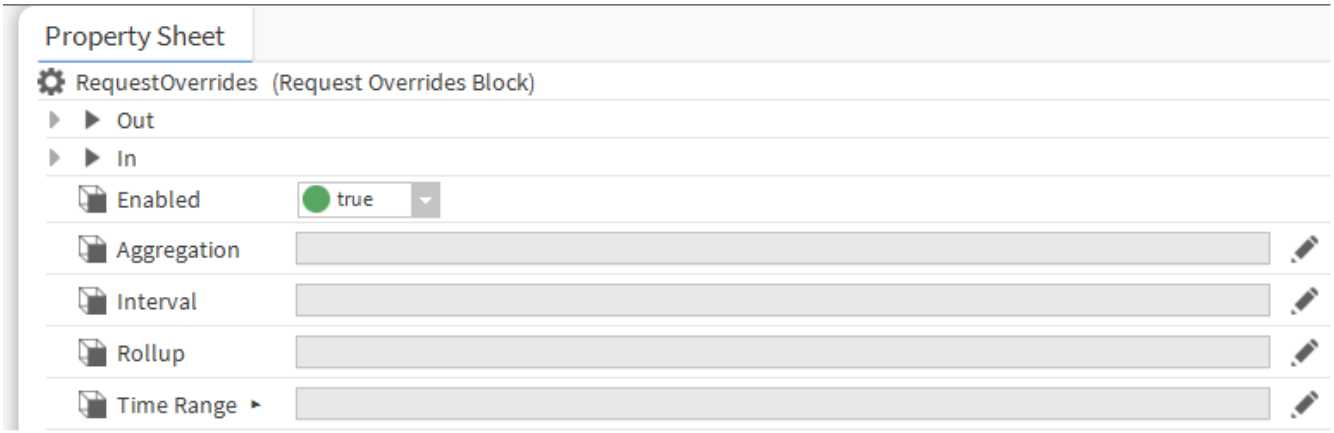
Request overrides (BRequestOverridesBlock)

The block overrides properties of the incoming request

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 113 Request Overrides Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination.
		Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the

Property	Value	Description
		values in the combination.
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by clicking the Edit button (), followed by clicking the Settings button () on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination.

Property	Value	Description
		Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point’s current value.

Related Links

- General blocks (Parent Topic)

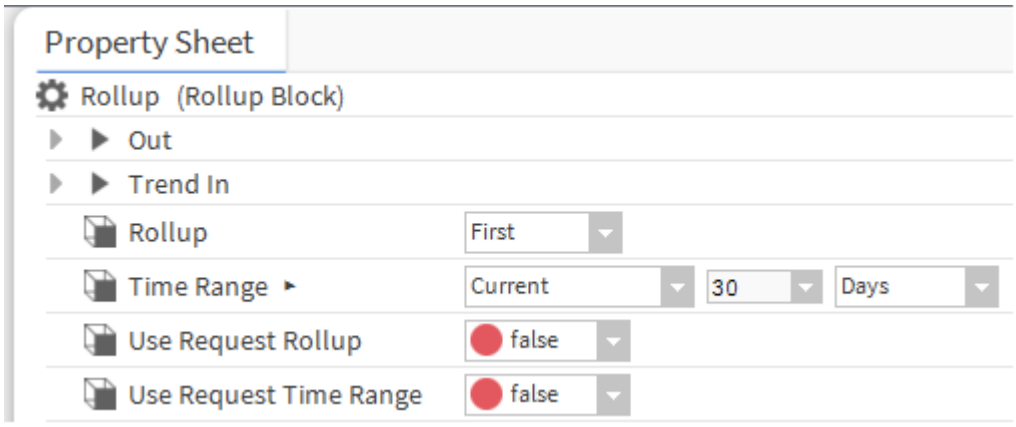
Rollup (BRollupBlock)

This block combines all values of a trend into a single value. It supports only value requests, but the input must support trend requests. This block does not modify the request rollup. If used in an algorithm, it supports only a value binding.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 114 Rollup Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and

Property	Value	Description
	value)	rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
Use Request Rollup	true or false (default)	The data definition associated with each tag defines the default method to roll up data. An incoming request from a data source, rollup, sliding window or today builder block may override this default method. true causes the framework to use the method defined by the incoming request. false causes the framework to use the method defined in the data definition associated with the tag.
Use Request Time Range	true or false (default)	The data definition associated with each tag defines the default time range for aggregating and rolling up data. An incoming request from a rollup, runtime or today builder block may override this default time range. true causes the framework to use the time range defined by the incoming request. false causes the framework to use the time range defined in the data definition associated with the tag.

Related Links

- General blocks (Parent Topic)

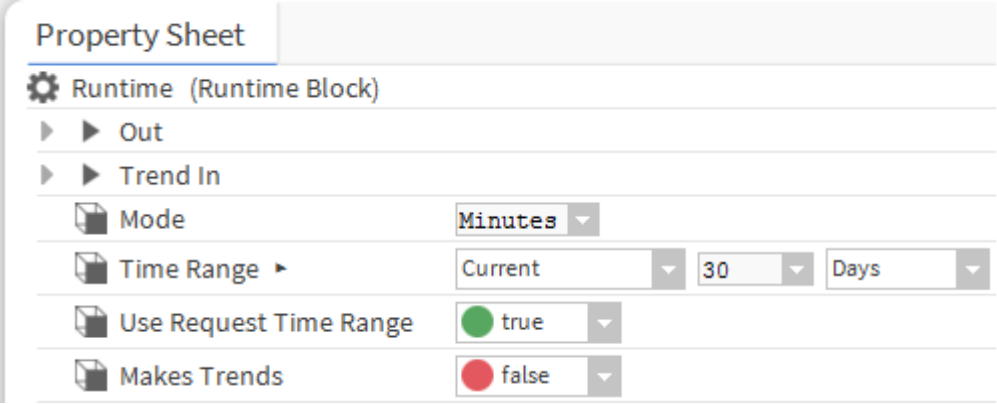
Runtime (BRuntimeBlock)

This block accumulates the amount of time the input is true (on or running). Both trend and value requests are supported. Value requests result in the amount of time the value was true by performing a trend request on the input. In trend requests, each row represents the accumulation of true time since last false (off or not running).

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 115 Runtime Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Mode	drop-down list; default is Minutes	Defines how to represent the total time, in: • Millis(milliseconds) • Seconds • Minutes • Hours
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today(current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
Use Request Time Range	true (default) or false	When set to true, and the incoming request specifies a time range, the system uses the request time range rather than the value of the Time Range property.
Makes Trends	true or false (default)	When set to true, the constant generates a constant trend. When set to false it supplies a constant value.

Related Links

- General blocks (Parent Topic)

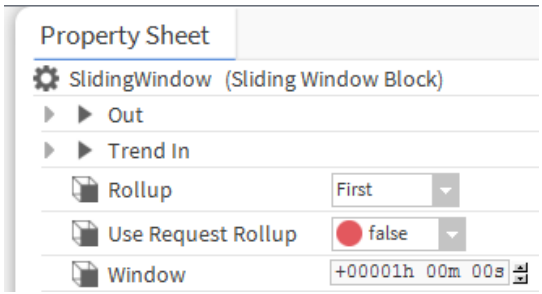
SlidingWindow (BSlidingWindowBlock)

This component returns a value that is a rollup of the time period given in the Window property until the current time.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 116 SlidingWindow Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest

Property	Value	Description
		result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Use Request Rollup	true or false (default)	The data definition associated with each tag defines the default method to roll up data. An incoming request from a data source, rollup, sliding window or today builder block may override this default method. true causes the framework to use the method defined by the incoming request. false causes the framework to use the method defined in the data definition associated with the tag.
Window	hours minutes seconds milliseconds	Relative time of the window.

Related Links

- General blocks (Parent Topic)

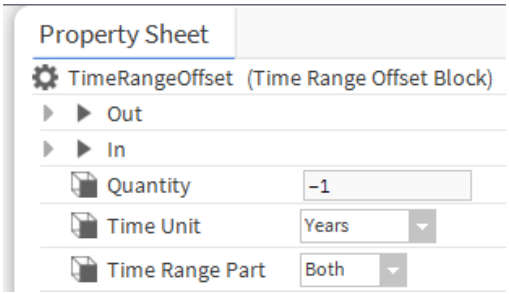
Time range offset (BTimeRangeOffsetBlock)

This component adjusts time ranges. The resulting time range is an absolute value of two fixed timestamps, which is important when you have additional time offsets in an algorithm.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 117 Time Range Offset Block Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Quantity	number	Defines the numeric amount to offset. Use negative numbers to go back in time.
Time Unit	drop-down list; defaults to Years	Defines the unit to use for the offset from Yearsto Seconds.
Time Range Part	drop-down list; defaults to Both	Determines where to begin making an adjustment: from the Start, End, or Both ends of the time range.

Related Links

- General blocks (Parent Topic)

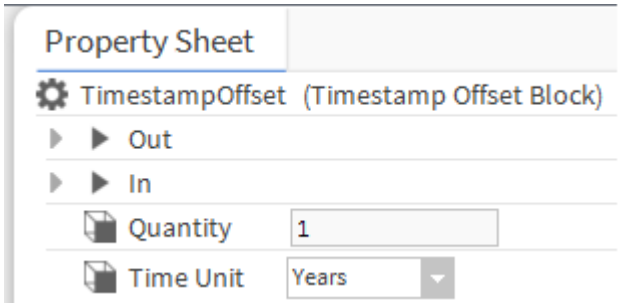
Timestamp offset (BTimestampOffsetBlock)

This component adjusts time ranges. The resulting time range is an absolute time range of a fixed timestamp; this is important when there will be additional time offsets in your formula.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 118 Timestamp Offset Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Quantity	number	Defines the numeric amount to offset. Use negative numbers to go back in time.
Time Unit	drop-down list	Defines the unit to use for the offset from Years(default) to Seconds.

Related Links

- General blocks (Parent Topic)

Today Builder (BDayBuilderBlock)

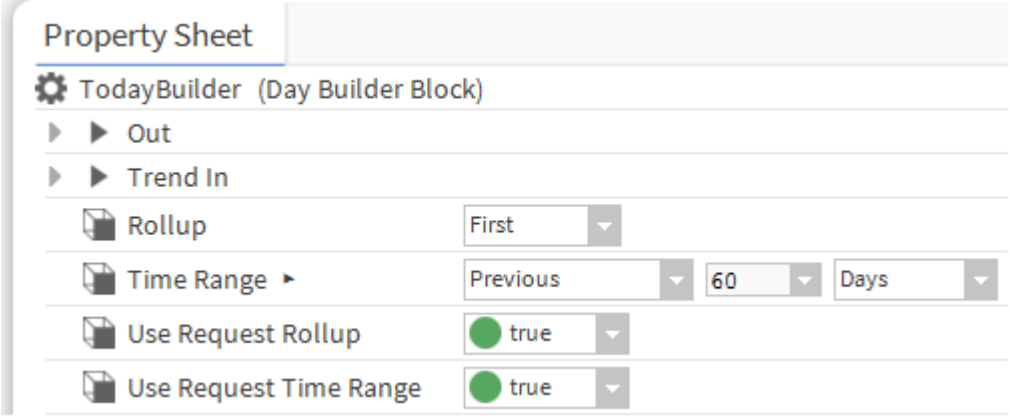
This block generates a trend that uses past historical data to represent “today.” The system converts timestamps by changing the date to today while preserving the time of day. When there are multiple values for the same timestamp, the rollup determines how to combine them.

This block supports both trend (historical) and real-time value requests. For real-time value requests, the trend request rolls up according to the value defined for Rollup.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 119 Today Builder Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the

Property	Value	Description
		combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point’s current value.
Use Request Rollup	true or false (default)	The data definition associated with each tag defines the default method to roll up data. An incoming request from a data source, rollup, sliding window or today builder block may override this default method. true causes the framework to use the method defined by the incoming request. false causes the framework to use the method defined in the data definition associated with the tag.
Use Request Time Range	true or false (default)	The data definition associated with each tag defines the default time range for aggregating and rolling up data. An incoming request from a rollup, runtime or today builder block may override this default time range. true causes the framework to use the time range defined by the incoming request. false causes the framework to use the time range defined in the data definition associated with the tag.

Related Links

- General blocks (Parent Topic)

Value duration (BValueDurationBlock)

This block determines how long the input has been at the current value.

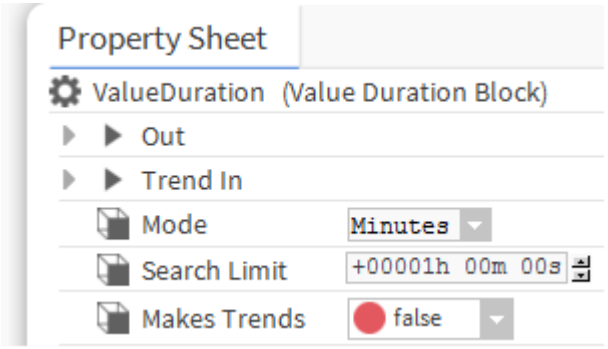
It reaches its maximum at the search limit property, so the value may not be accurate. In reality, almost all algorithms have a limit on how much time they care about, otherwise the entire history would have to be scanned since the database does not support bi-directional cursors.

Both value and trend requests are supported. A trend request results in values that reflect the duration of the current value within the trend.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 120 Value Duration Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Mode (time)	drop-down list; default is Minutes	Defines how to represent the total time, in: • Millis (milliseconds) • Seconds • Minutes • Hours
Search Limit	hours minutes seconds miliseconds	Defines how far back in time to search. The system subtracts this value from the current time to create a time range.
Make Trends	true or false	When false, the block outputs a single value. When true, the rollup applies to the trend request on the input even if the override Request Rollup is false.

Related Links

- General blocks (Parent Topic)

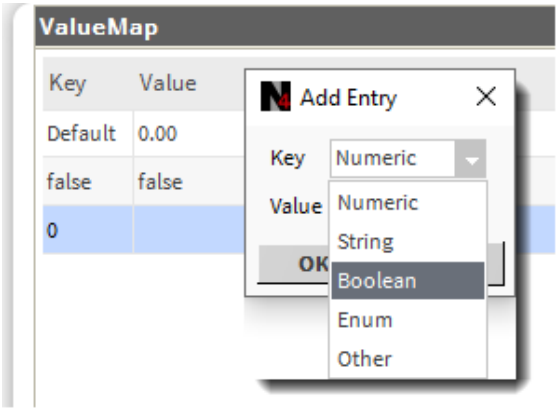
Value Map (BValueMapBlock)

This block represents a map of substitution values. The block supports both trend and real-time value requests, and retains the timestamp and status of input values. For value requests, where the input is unmapped, and the mode is filter out, the input value passes through with a status of null.

Columns

To view the map, double- click the block on the Wire Sheet or on the block name in the Nav tree.

Figure 121 Value Map Add Entry window



Column/drop-down lists of options	Value	Description
Key	drop-down list; defaults to Numeric	Selects a data type for the key: Numeric, String, Boolean, Enum, or Other.
Value	drop-down list; defaults to Numeric	Selects a data type for the value: Numeric, String, Boolean, Enum, or Other

Related Links

- General blocks (Parent Topic)

Math blocks

These components provide basic mathematical expressions for use in the framework formulas.

Related Links

- BiMath (BBiMathBlock)
- Uni math (BUniMathBlock)
- Logic blocks (Parent Topic)

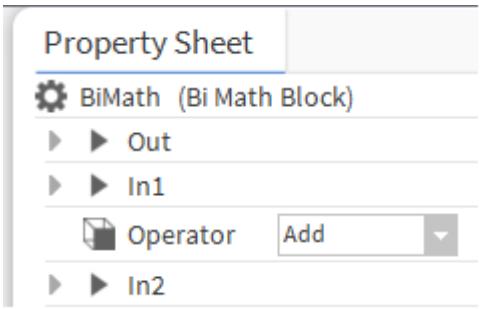
BiMath (BBiMathBlock)

This component provides a two-operand math expression. Both operands are required. Calculations using this component produce trends and real time values. If generating a trend at least one of the operands must be a trend.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 122 BiMath Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In 1	operand	The left-hand side of the operation. Links from the output of other logic blocks or data sources to supply one or more input values to the logic block.
Operator	drop-down list	Defines the logical operation to perform: Add outputs the sum of the operands. Subtract outputs the difference between the operands. Multiply outputs the product of the operands. Divide outputs the result of dividing the first operand by the second. Modulo outputs the remainder after the division of one number by another. Exponent outputs the value raised to the power of the exponent. Min outputs the minimum value between the operands. Max outputs the maximum value between the operands. Avg outputs the average of the operands.

Property	Value	Description
In 2	operand	The right-hand side of the operation. Links from the output of other logic blocks or data sources to supply one or more input values to the logic block.

Related Links

- Math blocks (Parent Topic)

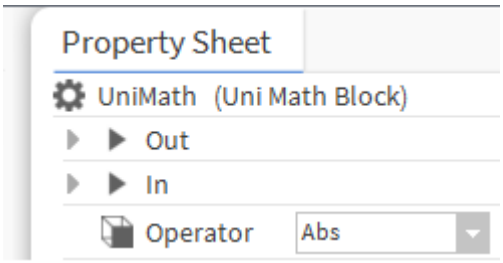
Uni math (BUniMathBlock)

This component provides a single operand math expression.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 123 UniMath Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Operator	drop-down list	Defines the math function to perform: Abs outputs the absolute value of inA: =abs(inA) Acos outputs the ArcCosine: =acos(inA) Asin outputs the ArcSine: =asin(inA). Cell specifies a column and row in a table. Cos outputs the Cosine: =cos(inA) Exp outputs the Exponent Floor maps a real number to the smallest following integer. Log returns the natural logarithm (base e) of a double value (www.tutorialspoint.com/java/lang/math_log.htm).

Property	Value	Description
		Negate outputs the opposite of a statement of proposition. Rint outputs the double value that is closest in value to the argument, and is equal to a mathematical integer. If two double values that are mathematical integers are close, the result is the integer value that is even (www.tutorialspoint.com “Round” outputs a rounded value to the requested decimal point. Sin outputs the sin: =sin(inA). Sqrt outputs the square root of inA: =sqrt(inA) Tangent outputs the tangent of inA: =tan(inA) To Degrees converts the argument value into degrees. To Radians converts the argument value to radians. A radian is a unit of angular measure (www.mindprod.com/gloss/radian.html).

Related Links

- Math blocks (Parent Topic)

Switch blocks

A switch evaluates a Boolean condition to select one of two possible inputs or outputs.

Related Links

- BiSwitch (BBiSwitchBlock)
- CovSwitch (BCoVSwitchBlock)
- DeadbandSwitch (BDeadbandSwitch)
- Invalid Value Switch (BInvalidValueSwitchBlock)
- Range switch (BRangeSwitchBlock)
- TransitionSwitch (BTransitionSwitchBlock)
- UniSwitch (BUniSwitchBlock)
- Logic blocks (Parent Topic)

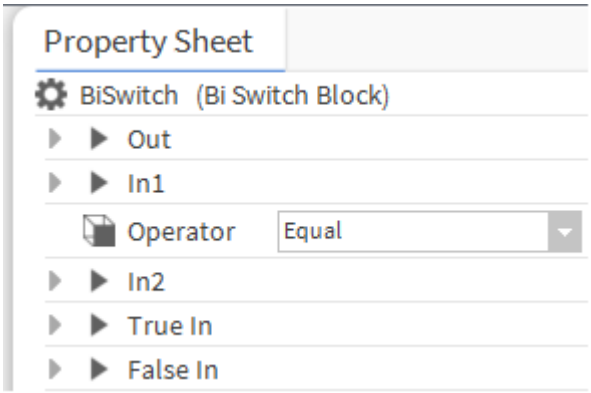
BiSwitch (BBiSwitchBlock)

This block evaluates the Boolean condition of two inputs and outputs either the true input or the false input. It supports both trend and value requests. Only one input has to have a trend for this block to make a trend.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 124 BiSwitch Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In 1	operand	The left-hand side of the operation. Links from the output of other logic blocks or data sources to supply one or more input values to the logic block.
Operator	Equals, Greater Than, Greater Than Equal To, Less Than, Less Than Equal To, Not Equal, And, Or	Defines the function to perform.
In 2	operand	The right-hand side of the operation. Links from the output of other logic blocks or data sources to supply one or more input values to the logic block.
True In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more valid values to the logic block.
False In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more invalid values to a logic block.

Related Links

- Switch blocks (Parent Topic)

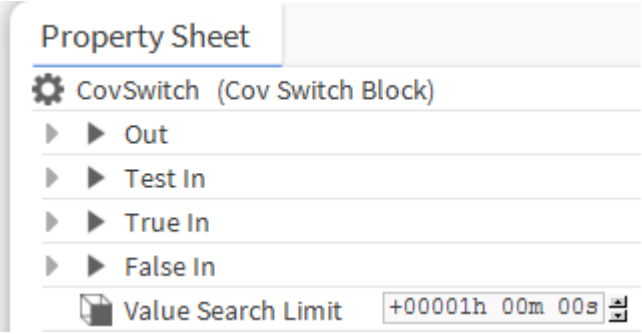
CovSwitch (BCoVSwitchBlock)

This component evaluates a change of value input.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 125 CovSwitch Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Test In	value slot	Links from the output of other logic blocks or data sources to supply one or more input values to be tested for validity in the logic block.
True In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more valid values to the logic block.
False In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more invalid values to a logic block.
Value Search Limit	hours minutes seconds	Limits the search to a specific time.

Related Links

- Switch blocks (Parent Topic)

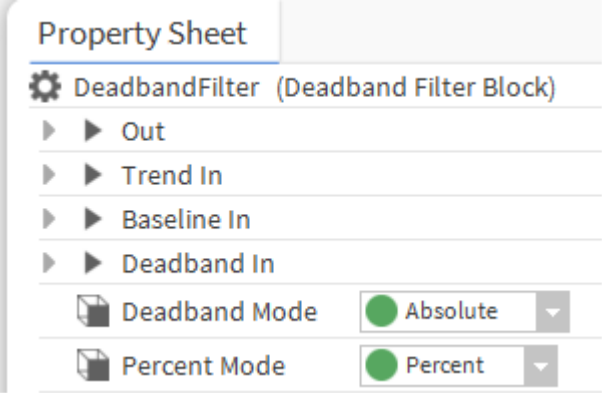
DeadbandSwitch (BDeadbandSwitch)

This component determines if data is out of range and outputs a valid or invalid value.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 126 DeadbandFilter Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
In or Trend In	required value slot	Links from the output of other logic blocks or data sources to supply trend data to the current logic block.
Baseline In	required numeric value slot	Links from the output of other logic blocks or data sources to supply a trend. This trend provides a baseline value upon which to apply a deadband.
Deadband In	required numeric value slot	Links from the output of other logic blocks or data sources to supply one or more input values that represent a dead or neutral zone around a baseline.
Deadband Mode	drop-down list	Absolute, configures a specific value to use as the deadband. Percent, configures the deadband as a percentage. For this option, the Deadband In value(s) should be in the range 0-1.
Percent Mode	drop-down list	If the **Deadband Mode** is a percentage, **Percent Mode** determines the form in which the constant appears. Percent(the default) treats the value as a percent (0-100). For example, value of 30% would be represented as 30. Decimal treats the value as a decimal number (0-1). For example, a value of 30% would be represented as .3.

Related Links

- Switch blocks (Parent Topic)

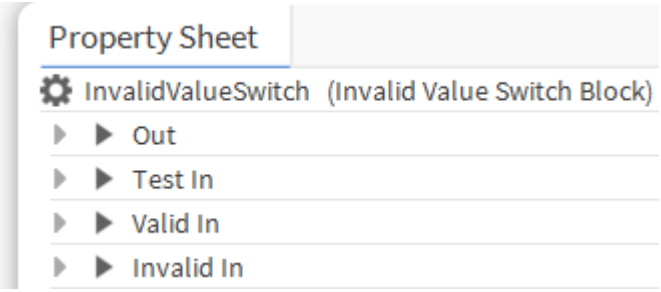
Invalid Value Switch (BInvalidValueSwitchBlock)

This removes invalid values from a trend. Invalid values are NaN, infinity and the following status: disabled, down, fault, stale or null. Only trend requests are supported, value requests return null.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 127 Invalid Value Switch Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Test In	value slot	Links from the output of other logic blocks or data sources to supply one or more input values to be tested for validity in the logic block.
Valid In	value slot	Links from the output of other logic blocks or data sources to supply a valid value to the logic block.
Invalid In	value slot	Links from the output of other logic blocks or data sources to supply an invalid value to the logic block.

Related Links

- Switch blocks (Parent Topic)

Range switch (BRangeSwitchBlock)

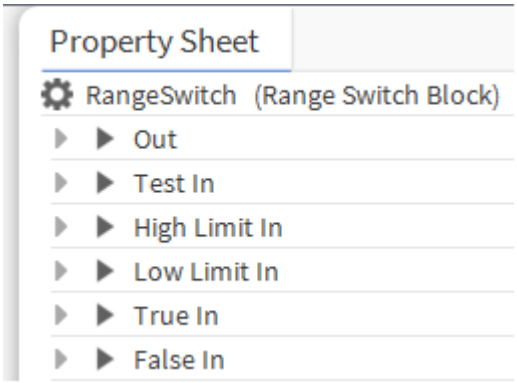
This block tests whether or not values are within a numeric range.

Values are considered in range if they are greater than or equal to the low limit and less than or equal to the high limit. If values are in range, the result is taken from the true input. Both trend and valid requests are supported. The status of the resulting value is the combination of the test, high limit, low limit and the result status.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 128 Range Switch Property Sheet



Property	Value	Description
Test In	value slot	Links from the output of other logic blocks or data sources to supply one or more input values to be tested for validity in the logic block.
High Limit In	numeric value slot	Links from the output of other logic blocks or data sources to supply one or more values to define the maximum valid value.
Low Limit In	numeric value slot	Links from the output of other logic blocks or data sources to supply one or more input values to define a minimum valid value.
True In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more valid values to the logic block.
False In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more invalid values to a logic block.

Related Links

- Switch blocks (Parent Topic)

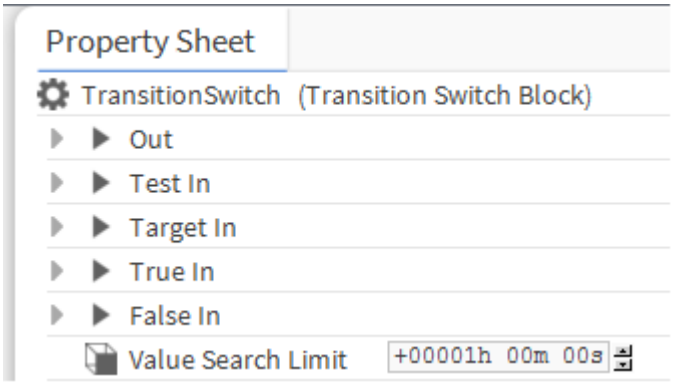
TransitionSwitch (BTransitionSwitchBlock)

This component evaluates the transition between states and outputs a valid or invalid value.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 129 Transition Switch Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Test In	value slot	Links from the output of other logic blocks or data sources to supply one or more input values to be tested for validity in the logic block.
Target in	optional ORD	Links from an ORD to supply a target input value.
True In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more valid values to the logic block.
False In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more invalid values to a logic block.
Value Search Limit	hours minutes seconds	Defines how far back in time to request a trend from the Test In (input) for value requests. The system compares the last record of this trend to the result of a value request on the Test In to determine if there was a COV (change of value).

Related Links

- Switch blocks (Parent Topic)

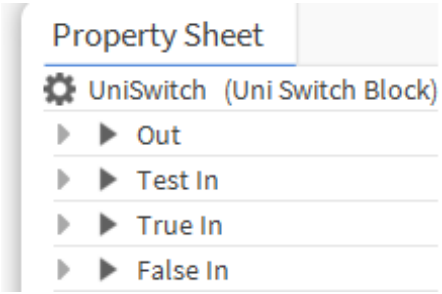
UniSwitch (BUniSwitchBlock)

This block evaluates a Boolean input and outputs the true or false input accordingly.

Properties

To view these properties, double-click the block on the Wire Sheet or the block name in the Nav tree.

Figure 130 UniSwitch Property Sheet



Property	Value	Description
Out	value slot	Outputs a constant value or constant trend based on the value of the Makes Trends property.
Test In	value slot	Links from the output of other logic blocks or data sources to supply one or more input values to be tested for validity in the logic block.
True In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more valid values to the logic block.
False In	optional value slot	Links from the output of other logic blocks or data sources to supply one or more invalid values to a logic block.

Related Links

- Switch blocks (Parent Topic)

Chapter 5 Graphics bindings

This section documents the framework graphics binding properties that work with standard Niagara Px Views.

Related Links

- Analytic web chart binding
- Analytic rollup binding
- Analytic table binding
- Analytic value binding
- Analytic web rollup binding

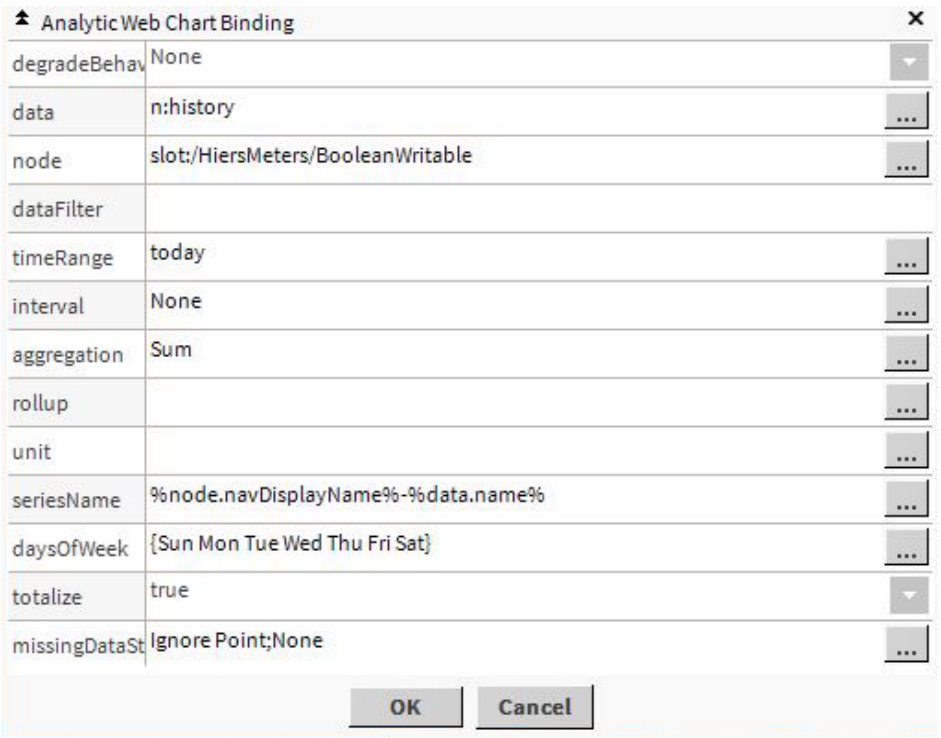
Analytic web chart binding

This binding creates an analytic trend. You can use it wherever a traditional table chart binding can be used.

Analytic Web Chart Binding properties

For each chart, the framework requires you to configure the following set of AnalyticWebChartBinding properties.

Figure 131 AnalyticWebChartBinding Property Sheet



You access this view of the Analytic Web Chart Binding properties when you double-click the chart's web widget in the Px view.

Property	Value	Description
Degrade Mode, degradeBehavior	DisableNone	Determines what to do when a value Ord or history returns nothing or an invalid value. Disable ignores the point and reports no configuration error. None reports a configuration error.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Node or node (required)	ORD	Defines the ORD to the desired slot.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by clicking the Edit button ( ) , followed by clicking the Settings button ( ) on the chart). The availability of this box provides an easy way

Property	Value	Description
		for a user to enable and disable the use of the intervals in chart calculations.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination.

Property	Value	Description
		Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
unit	unit of measure	Selects the unit name and display symbol to associate with a data source.
Series Name (property) or seriesName (ORD scheme)	BFormat (property) or text string (ORD parameter) with the following syntax: %node.navDisplayName-data.name%	Defines either a display name (text string) and a BFormat that identifies the node responsible for the charted data. As a BFormat, it can be configured, for example, to search for an ord, etc. node identifies a name in the nav tree. navDisplayName is a text string. It lets you to add a descriptive name associated with this binding. data.name is a tag that identifies the points to use. If you enter an invalid value, the system displays, "Problem with seriesName BFormat," and logs a message in the station console. The name you enter here displays as the legend and tool tip in the Web chart. If left blank, no legend displays for the tool tip.
daysOfWeek (property) or dow (ORD scheme)	days-of-the-week selector (property) or dow=option (ORD scheme parameter)	Defines the day(s) of the week to exclude from the binding.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
missingDataStrategy	chooser	Selects the strategy to use when data are missing from the beginning, interspersed, or

Property	Value	Description
		end of a set of historical data.

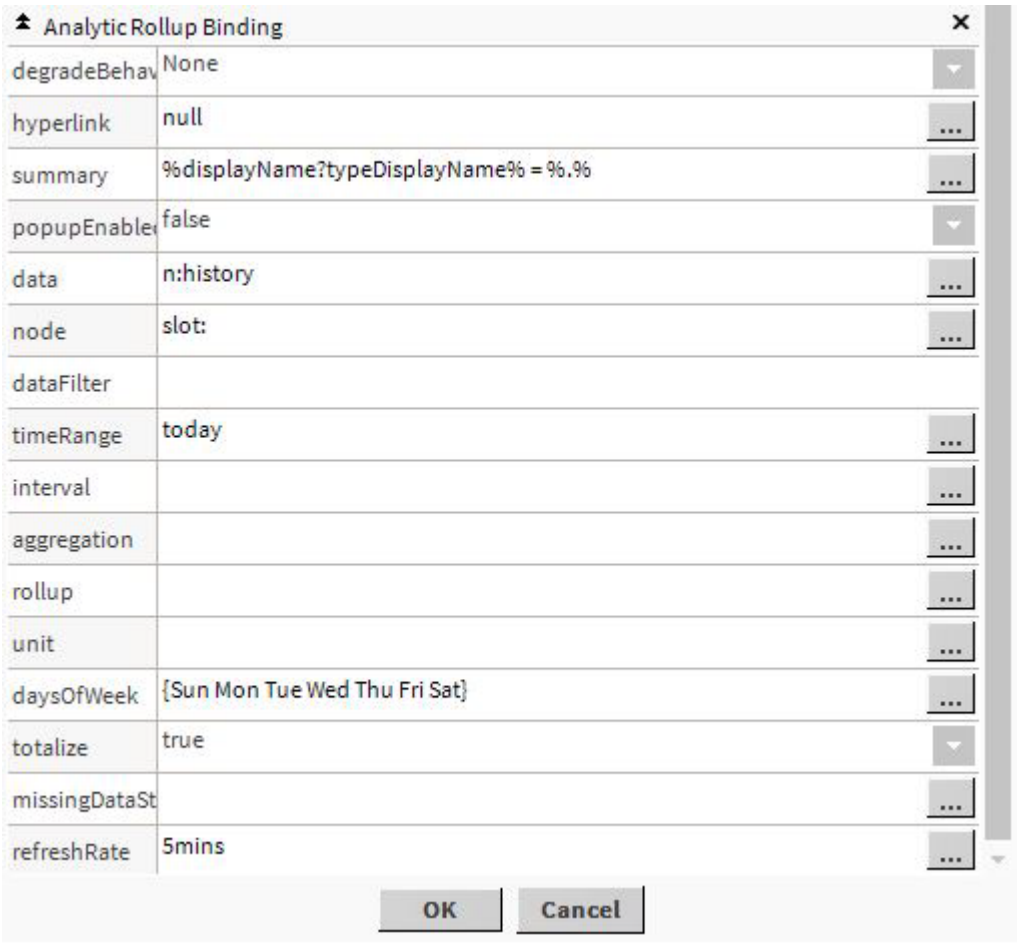
Related Links

- Graphics bindings (Parent Topic)

Analytic rollup binding

You can use this binding wherever a traditional value ORD binding can be used.

Figure 132 Analytic Rollup Binding properties



You access this binding after double-clicking the chart in the Px view by clicking the add binding button ( ) in the Properties WebWidget panel to the right of the wire sheet, and selecting analyticsAnalytic Rollup Binding from the Add Binding drop-down list. The scroll down to the Analytic Rollup Binding properties.

Under the hood, this binding creates an analyticRollup: ord. However, since analytic values cannot be subscribed to like points, this binding automatically refreshes the value.

Property	Value	Description
degrade Behavior	drop-down list	This bound label property controls the display of information on a chart when the binding communications are not available. None indicates that nothing happens. Disable causes the chart to be unavailable. Hide shows the chart without data.
hyperlink	ORD	Provides a link to another object. When this property contains an ORD, the hyperlink is active in the browser or in the Px Viewer.
summary	text or BFormat	Specifies a display name for the widget in text or by means of a script.
popupEnabled	true or false (default)	true allows a second popup (right-click menu) to open when a user clicks on this label from a browser or from the Px Viewer. false disables the popup action. You would use this setting to prevent actions from being executed at a control point from a specific Px graphic while allowing access to the action from a different Px graphic or property sheet.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Node or node (required)	ORD	Defines the ORD to the desired slot.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
Interval	chooser	Configures the frequency with which the framework creates a history record.

Property	Value	Description
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of

Property	Value	Description
		values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
unit	unit of measure	Selects the unit name and display symbol to associate with a data source.
daysOfWeek (property) or dow (ORD scheme)	days-of-the-week selector (property) or dow=option (ORD scheme parameter)	Defines the day(s) of the week to exclude from the binding.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
missingDataStrategy	chooser	Selects the strategy to use when data are missing from the beginning, interspersed, or end of a set of historical data.
refreshRate	hours minutes seconds	Determines how frequently the screen refreshes.

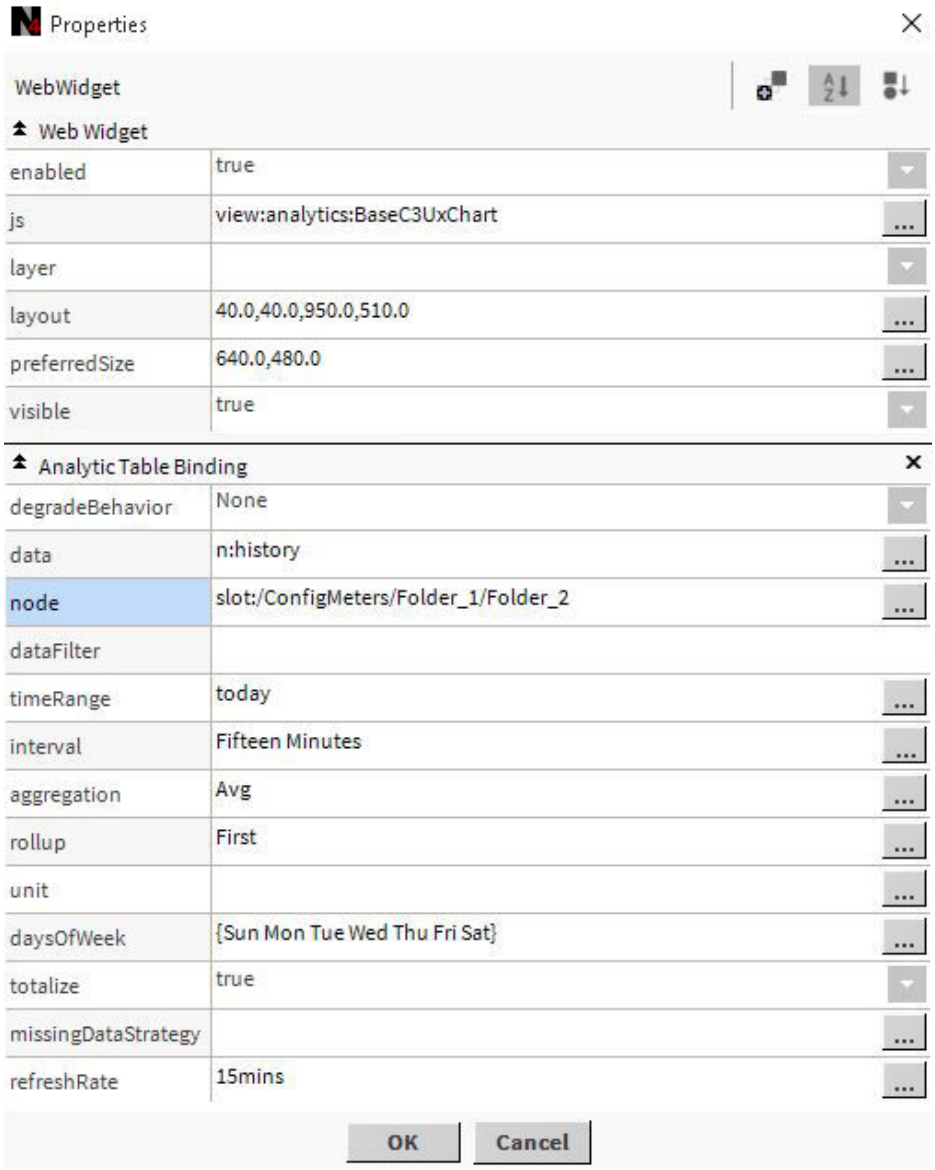
Related Links

- Graphics bindings (Parent Topic)

Analytic table binding

You can use this binding wherever a traditional value ORD binding can be used.

Figure 133 Analytic table binding including missingDataStrategy window



You access these properties when you add a BoundTable widget, click the Px binding button ( ) select an analytics Table Binding, and click **OK**.

Property	Value	Description
degrade Behavior	drop-down list	This bound label property controls the display of information on a chart when the binding communications are not available. None indicates that nothing happens. Disable causes the chart to be unavailable. Hide shows the chart without data.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Node or node (required)	ORD	Defines the ORD to the desired slot.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by

Property	Value	Description
		clicking the Edit button () , followed by clicking the Settings button ( ) on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.

Property	Value	Description
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
unit	unit of measure	Selects the unit name and display symbol to associate with a data source.
daysOfWeek (property) or dow (ORD scheme)	days-of-the-week selector (property) or dow=option (ORD scheme parameter)	Defines the day(s) of the week to exclude from the binding.

Property	Value	Description
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
missingDataStrategy	chooser	Selects the strategy to use when data are missing from the beginning, interspersed, or end of a set of historical data.
refreshRate	hours minutes seconds	Determines how frequently the screen refreshes.

Related Links

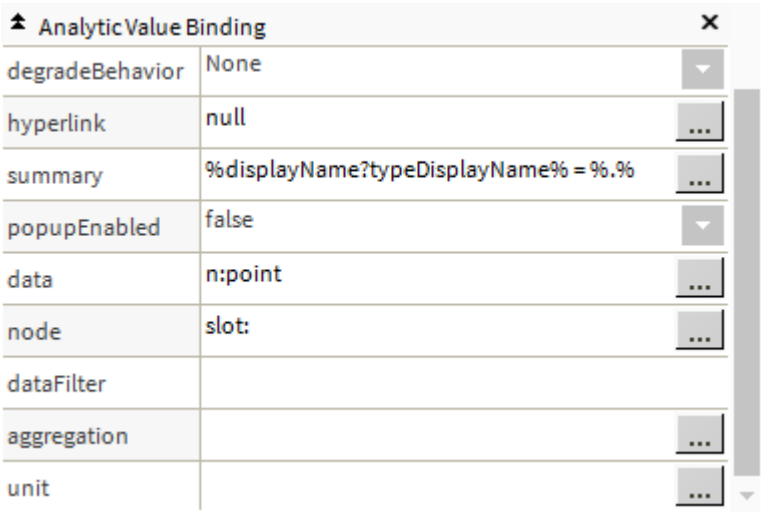
- Graphics bindings (Parent Topic)

Analytic value binding

This binding associates a traditional value ORD with the Px View.

Under the hood, this binding creates an analyticValue: ord. However, since analytic values cannot be subscribed to like points, this binding automatically refreshes the value.

Figure 134 Analytic Value Binding properties



Property	Value	Description
degrade Behavior	drop-down list	This bound label property controls the display of information on a chart when the binding communications are not available. None indicates that nothing happens. Disable causes the chart to be unavailable. Hide shows the chart without data.
hyperlink	ORD	Provides a link to another object. When this property contains an ORD, the hyperlink is active in the browser or in the Px Viewer.
summary	text or BFormat	Specifies a display name for the widget in text or by means of a script.
popupEnabled	true or false (default)	true allows a second popup (right-click menu) to open when a user clicks on this label from a browser or from the Px Viewer. false disables the popup action. You would use this setting to prevent actions from being executed at a control point from a specific Px graphic while allowing access to the action from a different Px graphic or property sheet.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Node or node (required)	ORD	Defines the ORD to the desired slot.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the

Property	Value	Description
		properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
unit	unit of measure	Selects the unit name and display symbol to associate with a data source.

Related Links

- Graphics bindings (Parent Topic)

Analytic web rollup binding

This binding works exclusively with the Ranking Chart. The system automatically binds it to a Ranking Chart when you create the chart.

Based on how you configure the chart's Interval, Time Range and Rollup properties, this binding ensures that it returns the correct value corresponding to the time range.

Related Links

- Graphics bindings (Parent Topic)

Chapter 6 Charts

Charts support standard Px views and views designed to display in a browser. For more information about charts in a browser, refer to the Web Charts Guide.

Related Links

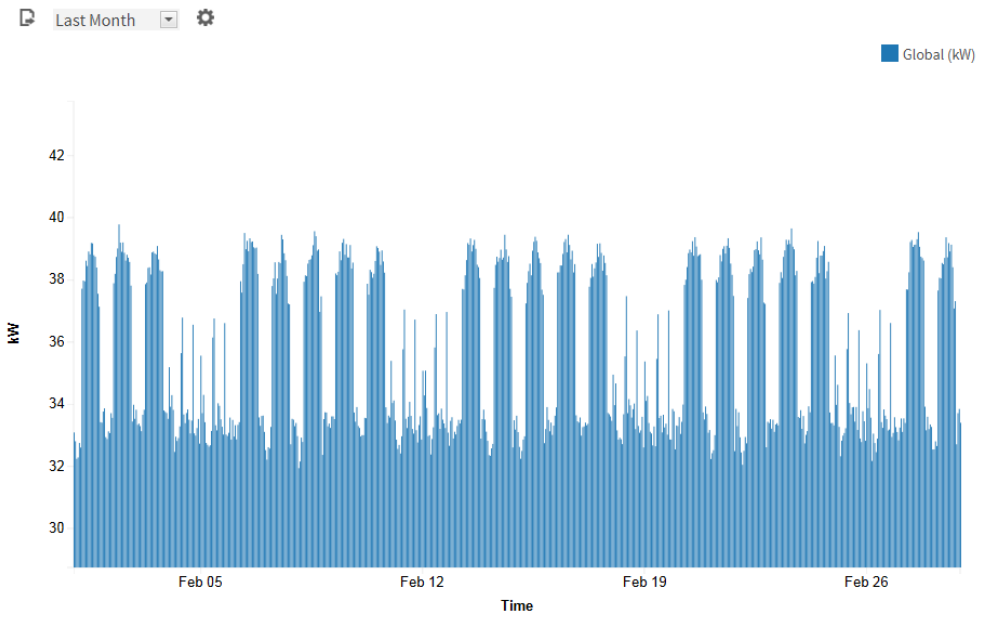
- Aggregation chart
- AnalyticWebChart
- Average Profile chart
- Equipment Operation chart
- Load duration chart
- Ranking chart
- Relative contribution chart
- Spectrum chart

Aggregation chart

This chart displays aggregated data, that is, disparate data that has been combined for viewing.

You create this chart by dragging the AggregationChart component from the analytics palette's Charts folder to a new Px view. Once created, you access the chart by double-clicking the chart name in the Nav tree.

Figure 135 Aggregation chart



This chart supports a single binding and is useful for combining a value for the root of a hierarchy.

Related Links

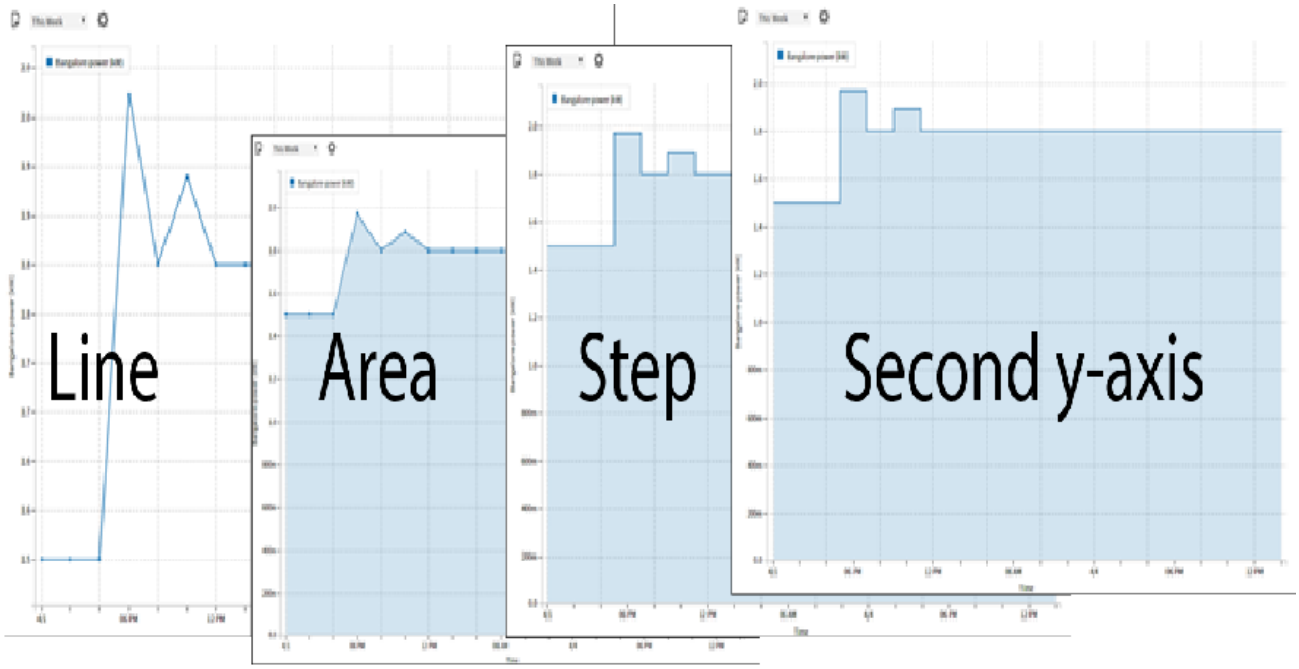
- Charts (Parent Topic)

AnalyticWebChart

This multipurpose chart is capable of generating a line chart, area chart, and an area step chart. In addition you can enable a second y-axis. This chart requires a Px view. You can configure it on a dashboard in a Px view.

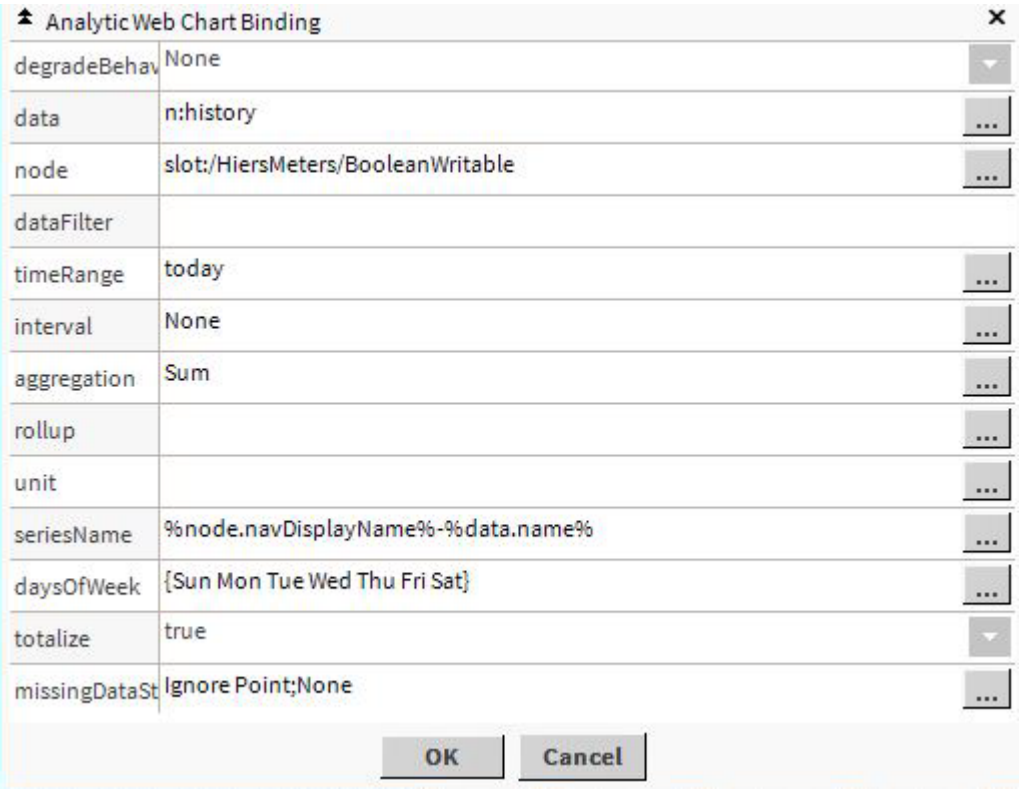
You create one of these charts by dragging the AnalyticWebChart component from the analytics palette's Charts folder to a new Px view. Once created, you access the chart by double-clicking the chart name in the Nav tree.

Figure 136 AnalyticWebCharts



To configure the chart type you open the Configuration tab in the Px view and select the type of chart from the Chart Type drop-down list.

Figure 137 AnalyticWebChart configuration properties



Analytic Web Chart Binding properties

All charts that support multiple bindings provide this binding Property Sheet. Some of the same properties are available to be configured in the Settings window that opens when you click the settings icon at the top of the chart.

To view these properties, double-click the chart name in the palette or nav tree.

Property	Value	Description
Degrade Mode, degradeBehavior	DisableNone	Determines what to do when a value Ord or history returns nothing or an invalid value. Disable ignores the point and reports no configuration error. None reports a configuration error.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Node or node (required)	ORD	Defines the ORD to the desired slot.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree

Property	Value	Description
		for additional values (including the root node).
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by clicking the Edit button ( ), followed by clicking the Settings button ( ) on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the

Property	Value	Description
		combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the

Property	Value	Description
		number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
unit	unit of measure	Selects the unit name and display symbol to associate with a data source.
Series Name (property) or seriesName (ORD scheme)	BFormat (property) or text string (ORD parameter) with the following syntax: %node.navDisplayName-data.name%	Defines either a display name (text string) and a BFormat that identifies the node responsible for the charted data. As a BFormat, it can be configured, for example, to search for an ord, etc. node identifies a name in the nav tree. navDisplayName is a text string. It lets you to add a descriptive name associated with this binding. data.name is a tag that identifies the points to use. If you enter an invalid value, the system displays, "Problem with seriesName BFormat," and logs a message in the station console. The name you enter here displays as the legend and tool tip in the Web chart. If left blank, no legend displays for the tool tip.
daysOfWeek (property) or dow (ORD scheme)	days-of-the-week selector (property) or dow=option (ORD scheme parameter)	Defines the day(s) of the week to exclude from the binding.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
missingDataStrategy	chooser	Selects the strategy to use when data are missing from the beginning, interspersed, or end of a set of historical data.

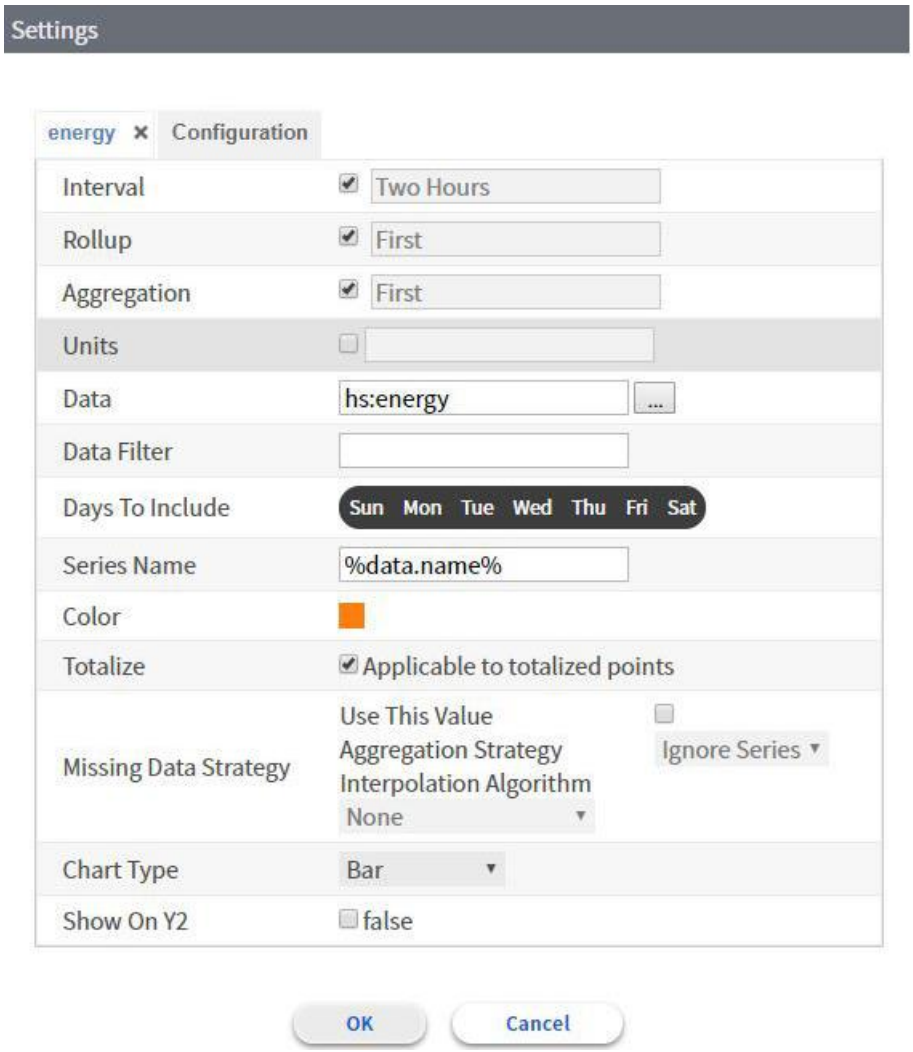
Related Links

- Web chart Ux settings window
- Charts (Parent Topic)

Web chart Ux settings window

This window configures AnalyticWebChart properties.

Figure 138 AnalyticWebChart properties



Property	Value	Description
Interval	drop-down list (options range from None to a Year)	Identifies the time between values in a trend (time series). By default, the framework intelligently selects this value to provide the optimal number of records on reports.

Property	Value	Description
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables.

Property	Value	Description
		And returns the logical “and” of Boolean values.
		Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values.
		Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet.
		First returns the first value in the combination. This generates the fastest result.
		Last returns the last value in the combination.
		Max returns the highest value in the combination.
		Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half.
		Min returns the lowest value in the combination.
		Mode returns the statistically most frequently occurring number in the combination.
		Or returns the logical “or” of Boolean values.
		Range returns the statistical difference between the largest and smallest values in the combination.
		Sum adds together all values in the combination resulting in a single value.
		Load Factor returns the average value divided by peak (Max) value.
		Std Dev returns the standard deviation of the values in the combination.
unit	unit of measure	Selects the unit name and display symbol to associate with a data source.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node’s subtree

Property	Value	Description
		for additional values (including the root node).
Days to Include	graphic with the days	Selects which days of the week to include on the report.
Series Name (property) or seriesName (ORD scheme)	BFormat (property) or text string (ORD parameter) with the following syntax: %node.navDisplayName-data.name%	Defines either a display name (text string) and a BFormat that identifies the node responsible for the charted data. As a BFormat, it can be configured, for example, to search for an ord, etc. node identifies a name in the nav tree. navDisplayName is a text string. It lets you to add a descriptive name associated with this binding. data.name is a tag that identifies the points to use. If you enter an invalid value, the system displays, "Problem with seriesName BFormat," and logs a message in the station console. The name you enter here displays as the legend and tool tip in the Web chart. If left blank, no legend displays for the tool tip.
Color	color chooser	Configures the color to use on the chart.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
Missing Data Strategy or Algorithm, Use This Value	check box	Enables and disables missing data interpolation for the current value.
Missing Data Strategy, Aggregation Strategy	drop-down list	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority

Property	Value	Description
		value recorded for the item's nearest neighbors.
Chart Type	drop-down list	Selects the type of AnalyticWebChart: bar, line, spline, area, area step, scatter, etc. Choosing a type changes the chart rendering.
Show on Y2	true or false (defaults to false)	Displays the data for the selected series on the y2–axis.

Related Links

- AnalyticWebChart (Parent Topic)

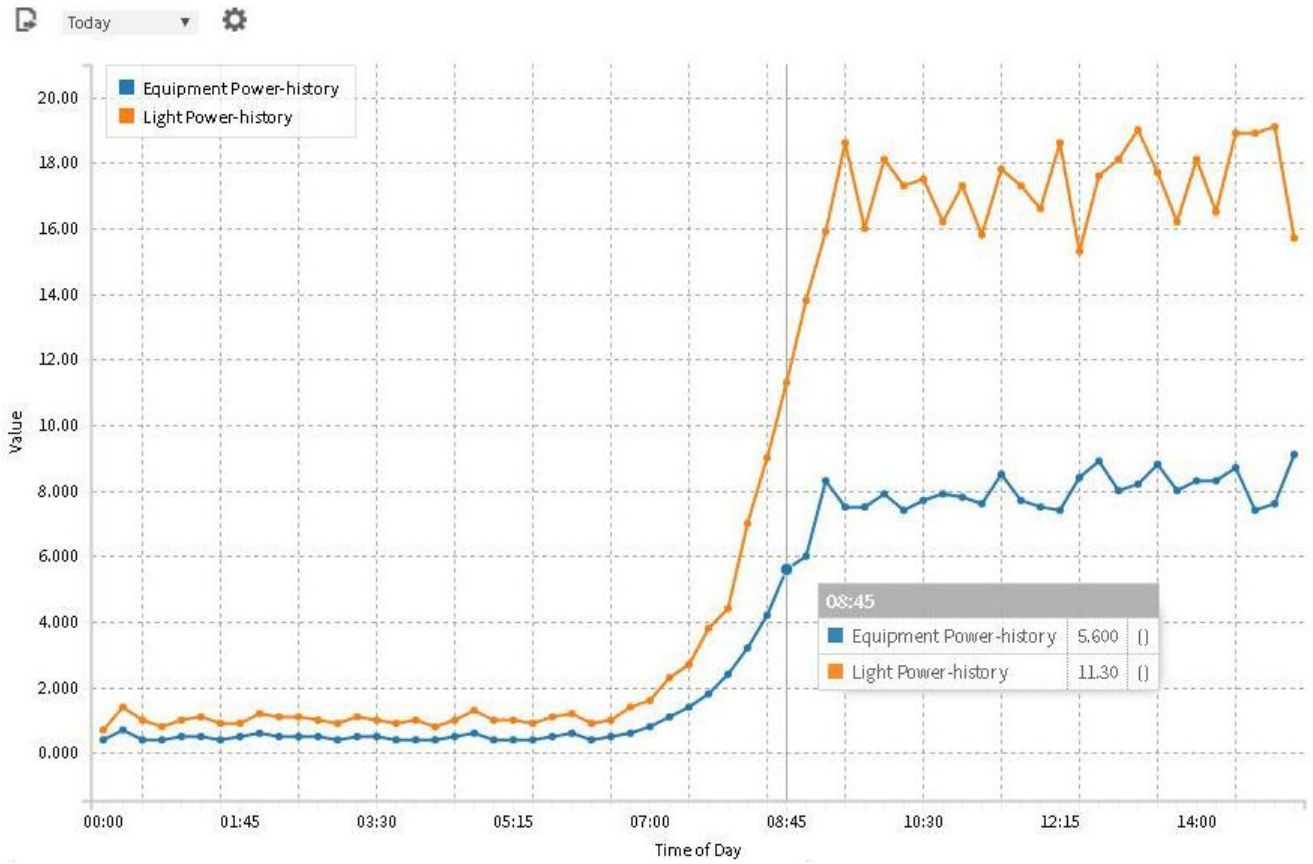
Average Profile chart

This chart shows a pattern that represents the average of a data value over a specified time period. It provides flexibility when identifying high values at various times within a selected time period. This chart supports multiple bindings.

This chart supports multiple bindings.

You create this chart by dragging the AverageProfileChart component from the analytics palette's Charts folder to a new Px view. Once created, you access the chart by double-clicking the chart name in the Nav tree.

Figure 139 Average Profile chart



This chart plots time of day (x-axis) against the average of the data values (y-axis). This example has been exported. Exported charts show the maximum data. Each binding displays using a color identified by the color key in the upper right corner of the chart. The tool tip shows the value for each binding at the interval selected.

The drop-down list in the upper left defines the Time Range, which requires a value greater than or equal to one day.

Clicking the configuration icon ( ) next to the drop-down list opens the Settings window:

- Configure Interval to be less than one day.
- Configure Time Range to be at least one day.

Related Links

- Charts (Parent Topic)

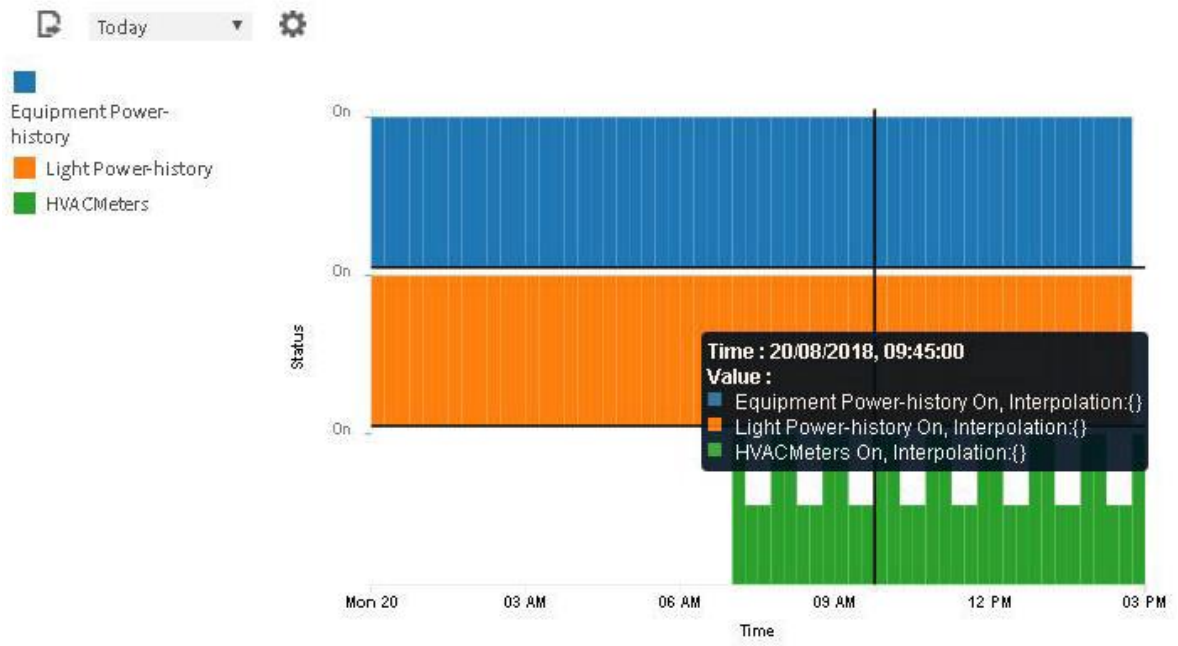
Equipment Operation chart

This chart indicates when a piece of equipment is on and off. It supports multiple bindings, each binding representing a piece of equipment. You can use it in a Px view as well as in a browser.

You create this chart by dragging the EquipmentOperationChart component from the analytics palette's Charts folder to a new Px view. Once created, you access the chart by double-clicking the chart name in the Nav tree.

When observing at what time the power to a piece of equipment went off and on, this chart can expose a trend. Comparing the same time period, for example, with a temperature spike that appears on an aggregation chart may indicate a problem. This chart is useful in a dashboard.

Figure 140 Equipment Operation chart



The tool tip identifies the node and indicates the time. When you can drag onto the view an additional equipment point the system automatically assigns a color.

Click the settings icon ( ) to modify chart properties, such as Interval. You can export and save this chart.

Related Links

- Charts (Parent Topic)

Load duration chart

This chart summarizes how long a value was above a certain level. It can help you observe the duration of peak demand levels for the purpose of identifying correct demand limiting strategies.

Added nodes may have the same names.

Figure 141 Load Duration chart

Related Links

- Charts (Parent Topic)

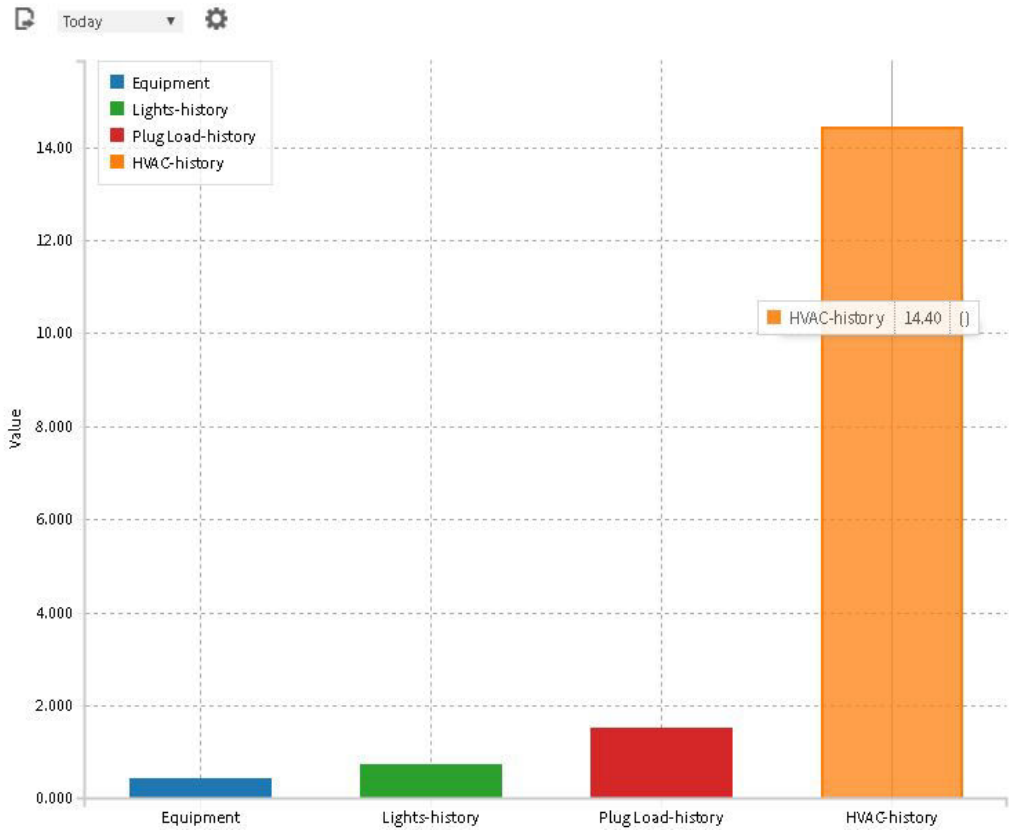
Ranking chart

This chart compares values from selected nodes using vertical bars. It supports multiple bindings.

You create this chart by dragging the RankingChart component from the analytics palette's Charts folder to a new Px view. Once created, you access the chart by double-clicking the chart name in the Nav tree.

The important properties to set are Interval and Time Range, which should be the same. For example, if the Time Range is 1 week, the Interval should also be 1 week.

Figure 142 Ranking chart



Supports multiple bindings.

The location of the columns on this chart is based on the order defined in the Property Sheet, which can be either Ascending or Descending. This order may not be the same as the order displayed by the legend.

The text at the top of each bar includes the bar name. Depending on the number of bars and the length of the names, text may overlap. As a best practice, configure short names.

The y-axis legend normally displays using a linear scale. If the values are large, the system converts and displays them as log scales.

Using this chart you can quickly identify values that are unexpectedly high or low. If you question why a particular value, view it in an aggregation chart. Go to the actual date (Today, Yesterday, etc.) and view the result.

Related Links

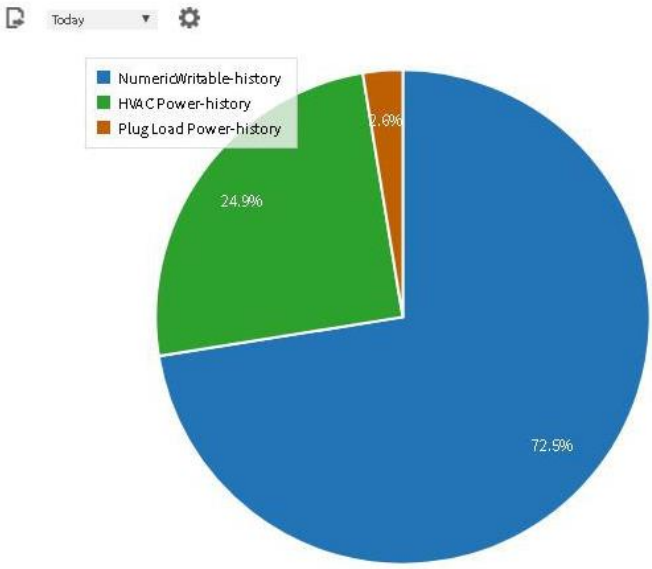
- Charts (Parent Topic)

Relative contribution chart

This pie chart plots the contributions from individual pieces of equipment (or any data model node) to the total value of a group or a site. For example, if meters are grouped appropriately, you can identify that HVAC consumption is 45%, lighting consumption is 35%, and other loads contribute 20% to the total consumption of a particular building or campus.

You create this chart by dragging the RelativeContributionChart component from the analytics palette's Charts folder to a new Px view. Once created, you access the chart by double-clicking the chart name in the Nav tree.

Figure 143 Relative Contribution chart



This chart can display 20 dynamic colors. It is sorted in descending order beginning the largest segment at 90 degrees from the top. This ensures that the smallest segments appear in the 12 o'clock to 3 o'clock quadrant where there is room for their labels. The color legend along the top, right side of the chart also presents in order from largest to smallest.

Related Links

- Charts (Parent Topic)

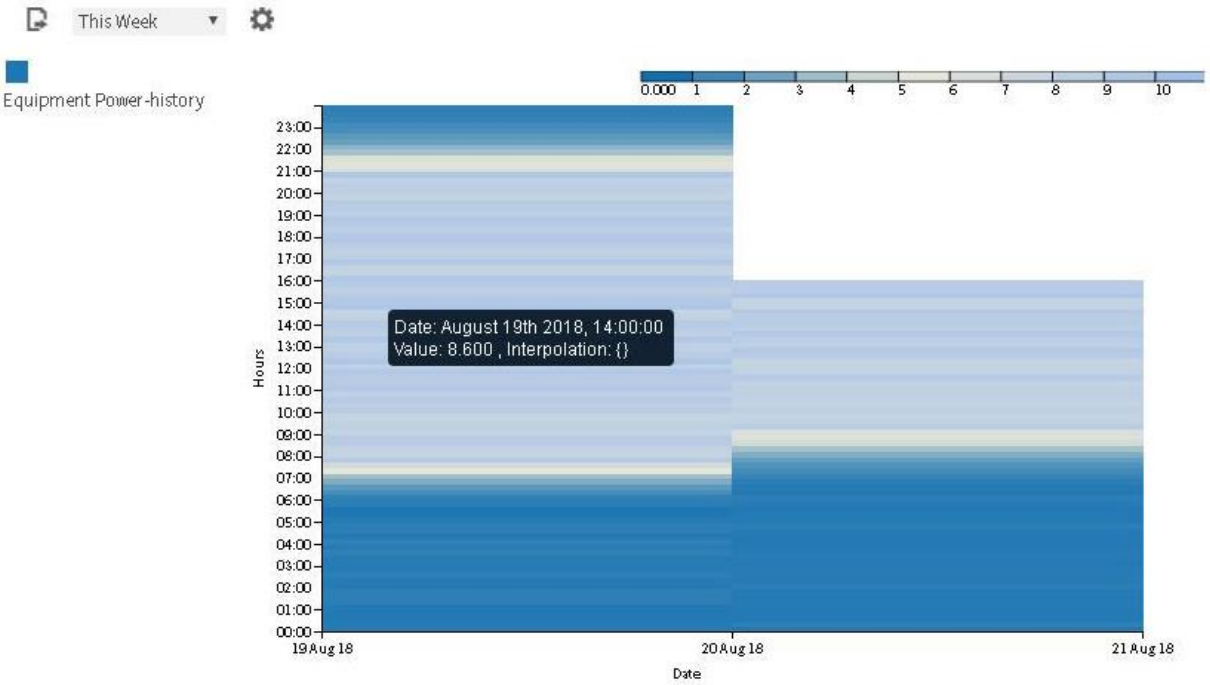
Spectrum chart

Using color coding, the Spectrum Chart provides insight into the reasonableness of the value obtained from a data or aggregated point. A quick glance at a consistent color pattern, which indicates valid data, can visually confirm an expected condition, allowing you to move on to other functions. A quick glance at an inconsistent color pattern can draw immediate attention to a situation requiring further analysis.

You create this chart by dragging the SpectrumChart component from the analytics palette's Charts folder to a new Px view. Once created, you access the chart by double-clicking the chart name in the Nav tree.

When the chart loads a specific pattern emerges based on the arrangement of colors.

Figure 144 Spectrum Summary chart



This chart plots time (x-axis) against the hours in a day (y-axis). Outliers in the data appear as an inconsistent pattern. Passing the cursor over the chart rectangles opens a tool tip that identifies the date the system collected the data. Clicking the wrench icon in the top left opens the settings window shown superimposed on the chart.

This chart is limited to a single binding with a minimum Time Range of 1 Day, a maximum Interval of 1 Day, and a minimum of three data points. To calculate the data points, divide Time Range by Interval. If the quotient is less than three (3) adjust the Time Range or Interval so that the quotient is three or more.

Chart controls

You can use the chart controls to configure the chart without going back to the Property Sheet.

- The document icon in the upper left ( ) opens the Export Wizard.
- The time range drop-down list next to the document icon (This Week) selects the x-axis.
- The settings icon ( ) opens the configuration window.
- The name above the legend on the right side of the chart (labeled TestPoints in the example) identifies the specific point(s) plotted by the chart. When you hover the curser over this name, the system displays the ORD for the point.
- The Value legend in the upper right identifies the meaning of each color.

NOTE: For best results, do not reduce the height of this chart below 480 Abs.

Related Links

- Charts (Parent Topic)

Chapter 7 Ord schemes

You use ORD schemes to extract information from the Niagara Analytics Framework.

Related Links

- Value requests (analyticValue:)
- Rollup requests (analyticRollup:)
- Trend requests (analyticTrend:)
- Analytic multi-trend requests (analyticMultiTrend)
- Analytic multi-rollup requests (analyticMultiRollup)
- Analytic alerts requests (alerts:)

Value requests (analyticValue:)

Value requests generate BStatusValues. You can use this binding wherever a traditional value ORD binding is allowed. Under the hood it creates an analyticValue: ord. However, since analytic values cannot be subscribed to like points, this binding automatically refreshes the value.

The scheme is similar to the query string of a URL, where parameters follow a colon, name and values are joined with an equal sign, and pairs are separated with the ampersand. For example:

slot:/Drivers/foo|analyticValue:data=n:realPower&aggregation=sum

Parameters

Parameter	Value	Description
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables.
		And returns the logical “and” of Boolean values.
		Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values.
		Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet.
		First returns the first value in the combination. This generates the fastest result.

Parameter	Value	Description
		Last returns the last value in the combination. Maxreturns the highest value in the combination. Medianreturns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Minreturns the lowest value in the combination. Modereturns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factorreturns the average value divided by peak (Max) value. Std Devreturns the standard deviation of the values in the combination.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
useCache	optional ORD parameter true or false	true causes the framework to request cache memory for value, trend and rollup requests that take longer than 200ms. false uses no cache. This parameter is not related to the data availability cache.
unit	unit of measure	Identifies the name of the unit to include in the ORD scheme string.

Related Links

- Ord schemes (Parent Topic)

Rollup requests (analyticRollup:)

Rollup requests generate a StatusValue by combining all values of an underlying trend. You can use this binding wherever a traditional value ORD binding can be used. Under the hood, it creates an analyticRollup: ord. However, since analytic values cannot be subscribed to like points, this binding automatically refreshes the value.

This ORD scheme is similar to the query string of a URL, where parameters follow a colon, name and values are joined with an equal character, and pairs are separated with an ampersand character. For example:

slot:/Drivers/foo|analyticRollup:data=n:realPower&timeRange=last year

Parameters

Parameter	Value	Description
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical

Parameter	Value	Description
		difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by clicking the Edit button () , followed by clicking the Settings button () on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.
normalizeTime	true (default) or false	When true, the system converts time to the time zone of the request. This preserves time fields, such as the hour of day, while changing the time zone.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables.

Parameter	Value	Description
	in the data definition)	And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point’s current

Parameter	Value	Description
		value.
useCache	optional ORD parameter true or false	true causes the framework to request cache memory for value, trend and rollup requests that take longer than 200ms. false uses no cache. This parameter is not related to the data availability cache.
Series Name (property) or seriesName (ORD scheme)	BFormat (property) or text string (ORD parameter) with the following syntax: %node.navDisplayName-data.name%	Defines either a display name (text string) and a BFormat that identifies the node responsible for the charted data. As a BFormat, it can be configured, for example, to search for an ord, etc. node identifies a name in the nav tree. navDisplayName is a text string. It lets you to add a descriptive name associated with this binding. data.name is a tag that identifies the points to use. If you enter an invalid value, the system displays, “Problem with seriesName BFormat,” and logs a message in the station console. The name you enter here displays as the legend and tool tip in the Web chart. If left blank, no legend displays for the tool tip.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
daysOfWeek (property) or dow (ORD scheme)	days-of-the-week selector (property) or dow=option (ORD scheme parameter)	Defines the day(s) of the week to exclude from the binding.
aggStrategy	aggStrategy=option	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
intpAlgorithm	intpAlgorithm=option	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the

Parameter	Value	Description
		missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
knnValue	knnvalue=n	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.
unit	unit of measure	Identifies the name of the unit to include in the ORD scheme string.

Related Links

- Ord schemes (Parent Topic)

Trend requests (analyticTrend:)

Trend requests generate Niagara BITables representing a time series.

This ORD scheme is similar to the query string of a URL, where parameters follow a colon, name and values are joined with an equal character, and pairs are separated with an ampersand character. For example:

slot:/Drivers/foo|analyticTrend:data=n:realPower&timeRange=lastYear

Columns

Column	Value	Description
Timestamp	hours:minutes:seconds%timestamp % (on a report)	Specifies the date and time the event occurred.
value	data type	BBoolean, BDouble, BEnum, or BString
status		Reports the BStatus for the value.

Parameters

Parameter	Value	Description
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination.

Parameter	Value	Description
		Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by clicking the Edit button ( ) , followed by clicking the Settings button ( ) on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.
normalizeTime	true (default) or false	When true, the system converts time to the time zone of the request. This preserves time fields, such as the hour of day, while changing the time zone.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere,	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value

Parameter	Value	Description
	defaults to the value as defined in the data definition)	configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes

Parameter	Value	Description
		the framework to return a point's current value.
useCache	optional ORD parameter true or false	true causes the framework to request cache memory for value, trend and rollup requests that take longer than 200ms. false uses no cache. This parameter is not related to the data availability cache.
Series Name (property) or seriesName (ORD scheme)	BFormat (property) or text string (ORD parameter) with the following syntax: %node.navDisplayName-data.name%	Defines either a display name (text string) and a BFormat that identifies the node responsible for the charted data. As a BFormat, it can be configured, for example, to search for an ord, etc. node identifies a name in the nav tree. navDisplayName is a text string. It lets you to add a descriptive name associated with this binding. data.name is a tag that identifies the points to use. If you enter an invalid value, the system displays, "Problem with seriesName BFormat," and logs a message in the station console. The name you enter here displays as the legend and tool tip in the Web chart. If left blank, no legend displays for the tool tip.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
daysOfWeek (property) or dow (ORD scheme)	days-of-the-week selector (property) or dow=option (ORD scheme parameter)	Defines the day(s) of the week to exclude from the binding.
aggStrategy	aggStrategy=option	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
intpAlgorithm	intpAlgorithm=option	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value.

Parameter	Value	Description
		K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
knnValue	knnvalue=n	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.
unit	unit of measure	Identifies the name of the unit to include in the ORD scheme string.

Related Links

- Ord schemes (Parent Topic)

Analytic multi-trend requests (analyticMultiTrend)

Analytic multi-trends are similar to trend requests, but they also consolidate trend data from multiple ORDs into a single BITable.

The list of ords formed depends on the multiOrd parameter passed as part of ORD query. The consolidation depends on the aggMode and agg properties. If aggMode is true, the system consolidates the data from multiple ORDs using the combination defined by the agg parameter. Else, it creates a multi-column table, which has a column for the output of each ORD query.

For example:

station:|slot:|analyticMultiTrend:data=hs:power&dow=7f&timeRange=today&unit=celcius

Parameters

Parameter	Value	Description
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.

Parameter	Value	Description
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by clicking the Edit button () , followed by clicking the Settings button on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.
normalizeTime	true (default) or false	When true, the system converts time to the time zone of the request. This preserves time fields, such as the hour of day, while changing the time zone.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently

Parameter	Value	Description
		occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
useCache	optional ORD parameter true or false	true causes the framework to request cache memory for value, trend and rollup requests that take longer than 200ms. false uses no cache. This parameter is not related to the data availability cache.
Series Name (property) or seriesName (ORD scheme)	BFormat (property) or text string (ORD parameter) with the following syntax: %node.navDisplayName-data.name%	Defines either a display name (text string) and a BFormat that identifies the node responsible for the charted data. As a BFormat, it can be configured, for example, to search for an ord, etc. node identifies a name in the nav tree. navDisplayName is a text string. It lets you to add a descriptive name associated with this binding. data.name is a tag that identifies the points to use. If you enter an invalid value, the system displays, "Problem with seriesName BFormat," and logs a message in the station console. The name you enter here displays as the legend and tool tip in the Web chart. If left blank, no legend displays for the tool tip.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).

Parameter	Value	Description
daysOfWeek (property) or dow (ORD scheme)	days-of-the-week selector (property) or dow=option (ORD scheme parameter)	Defines the day(s) of the week to exclude from the binding.
aggStrategy	aggStrategy=option	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
knnValue	knnvalue=n	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.
unit	unit of measure	Identifies the name of the unit to include in the ORD scheme string.
multiOrd	comma separated list of nodes	Identifies the nodes to add to the multi trend ord scheme.
aggMode	true or false	true enables agg. false returns a multi column response, which results in a union of the time stamps
agg		Aggregates the result of all the trend requests that correspond to each of the nodes. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the

Parameter	Value	Description
		combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak value. Std Dev returns the standard deviation of the values in the combination.

Related Links

- Ord schemes (Parent Topic)

Analytic multi-rollup requests (analyticMultiRollup)

These requests are similar to trend requests, but they consolidate trend data from multiple Ords into a single value.

The list of ORDs formed depends on the multiOrd parameter passed as part of ORD query. The consolidation depends on the aggMode and agg properties. If aggMode is true, the system consolidates the data from the multiple ORDs using a combination defined by the agg parameter. Else, it creates a multi-column table, which has a column for the output of each ORD query.

For example:

station:|slot:|analyticMultiRollup:data=hs:power&dow=7f&timeRange=today&unit=celciu

Parameters

Parameter	Value	Description
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Data (property) or data (ORD parameter)	tag or algorithm name	Specifies the tag used to retrieve data. This tag can be from the Haystack dictionary, Niagara dictionary or any other custom tag dictionary. Instead of a tag, this value can specify an algorithm. This is how output from one algorithm becomes the input data source to another algorithm. The prefix for algorithms is alg:.

Parameter	Value	Description
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node's subtree for additional values (including the root node).
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from None to a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Interval in the Settings window (you access this window by clicking the Edit button ( ) , followed by clicking the Settings button ( ) on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.
normalizeTime	true (default) or false	When true, the system converts time to the time zone of the request. This preserves time fields, such as the hour of day, while changing the time zone.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a

Parameter	Value	Description
		sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Time Range or timeRange	drop-down list or ORD parameter (timerange=option); the default is Today (current value)	Defines the time period over which to combine the data in a rollup. This property is required for rollup requests (analyticRollup), trends (analyticTrend), and rollup bindings. It is optional elsewhere. It is not used on components whose Use Request Time Range property is true and the request specifies a time range. Options range from From to All. Time Range defaults to Today, which causes the framework to return a point's current value.
useCache	optional ORD parameter true or false	true causes the framework to request cache memory for value, trend and rollup requests that take longer than 200ms. false uses no cache. This parameter is not related to the data availability cache.
Series Name (property) or seriesName (ORD scheme)	BFormat (property) or text string (ORD parameter) with the following syntax: %node.navDisplayName-data.name%	Defines either a display name (text string) and a BFormat that identifies the node responsible for the charted data. As a BFormat, it can be configured, for example, to search for an ord, etc. node identifies a name in the nav tree. navDisplayName is a text string. It lets you to add a descriptive name associated with this binding. data.name is a tag that identifies the points to use. If you enter an invalid value, the system displays, "Problem with seriesName BFormat," and logs a message in the station console. The name you enter here displays as the

Parameter	Value	Description
		legend and tool tip in the Web chart. If left blank, no legend displays for the tool tip.
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
daysOfWeek (property) or dow (ORD scheme)	days-of-the-week selector (property) or dow=option (ORD scheme parameter)	Defines the day(s) of the week to exclude from the binding.
aggStrategy	aggStrategy=option	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
intpAlgorithm	intpAlgorithm=option	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
knnValue	knnvalue=n	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.
unit	unit of measure	Identifies the name of the unit to include in the ORD scheme string.
multiOrd	comma separated list of nodes	Identifies the nodes to add to the multi trend ord scheme.
aggMode	true or false	true enables agg. false returns a multi column response, which results in a union of the time stamps

Parameter	Value	Description
agg		Aggregates the result of all the trend requests that correspond to each of the nodes. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak value. Std Dev returns the standard deviation of the values in the combination.

Related Links

- Ord schemes (Parent Topic)

Analytic alerts requests (alerts:)

Alert requests generate Niagara BITables representing all active alerts.

The ORD scheme is similar to the query string of a URL, where parameters follow a colon, name and values are joined with an equal character, and pairs are separated with an ampersand character. For example:

slot:/|alerts:

The ORD you use in the bound table needs to be in the same scope as your alert is configured. If you have alerts configured to run on a hierarchy, configure something like this for the ORD in the table binding:

hierarchy:/AnalyticDataModel|alerts:
You would not use both examples simultaneously.

Columns

Column	Description
alert	The ORD to the active alert.
node	The ORD to the node on which there is an alert.
state	Alert or Normal.
totalCost	The cost of the alert multiplied by the corresponding alert mode.

Related Links

- Ord schemes (Parent Topic)

Chapter 8 Reports

In general, a report is a document that contains information, which is organized as a narrative, graphic, or table. Reports are prepared on an ad hoc, periodic, recurring, regular, or as-required basis. They may refer to specific periods, events, occurrences or subjects. In the framework, a report contains information about one or more points, which is displayed as a table and a graphic. Reports identify trends and analyze digital and analog values, such as energy, temperatures, production, and facility data. Depending on the combination of values and the report you select, reports easily identify correlations to see how building characteristics and equipment affect energy consumption and demand profiles. Armed with such information, you can adjust operations and schedules accordingly.

The framework reports are located in the analytics palette. They mirror the charts by the same names. Each report has the flexibility to analyze an unlimited number of values, turning raw data into useful information for easy interpretation.

Related Links

- All Reports view
- Report editor
- Aggregation report
- Average Profile report
- Equipment Operation report
- Load Duration report
- Ranking report
- Relative Contribution report
- Spectrum Summary report
- All Reports view

All Reports view

This view provides a graphical representation of each Ux (User Experience) report in the system.

Figure 145 Ux reports view

To view this report, double-click on the folder that contains your reports. Every thumbnail corresponds to a single report. You click on the thumbnail icon to open the report. Each thumbnail includes the same details.

Detail	Description
Name	This is the name given to the report by its creator.
Command options	To the right of the report name are three icons: Clone creates a new report based on the selected report. Edit opens the report properties window so you can make changes. Delete removes the report from the station so that no longer appears in the All Reports view.
Description	Summarizes the purpose of the report and what the report shows.
Location	Indicates the ORD for the BFolder component under reports where the report is saved.
Last Updated	Indicates the last time the data in the report was refreshed.

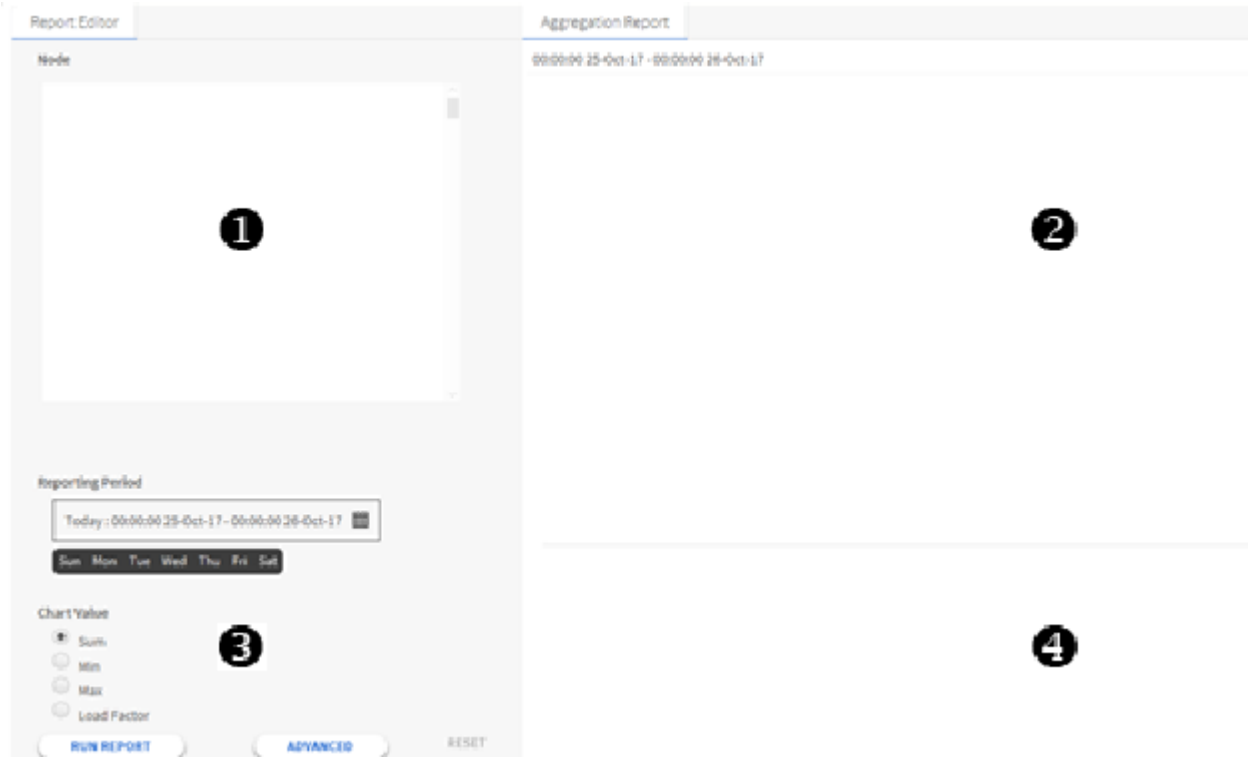
Related Links

- Reports (Parent Topic)

Report editor

All reports share the same report editor.

Figure 146 Report Editor pane



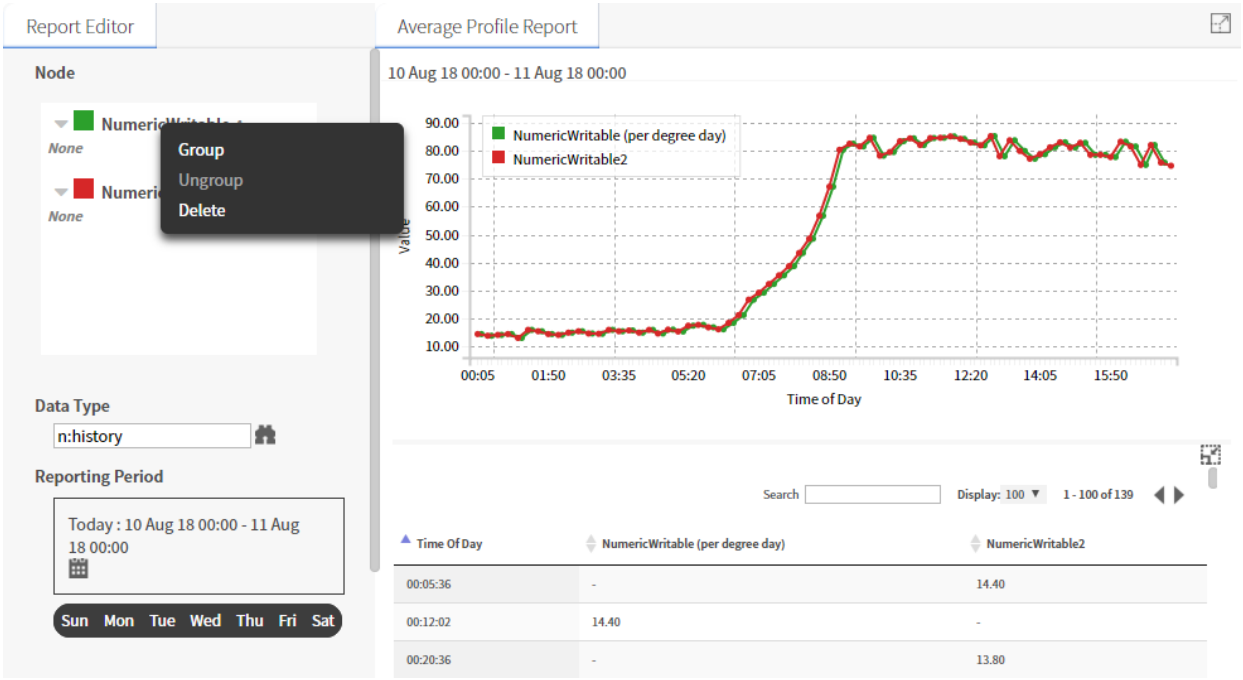
Editor areas

1	The node selection editor identifies and groups the data record(s) of interest.
2	The graph area contains the graphical representation of the data.
3	The minimal settings contains basic configuration properties.
4	The table area provides a summary of the raw data for each group.

Node selection editor

This area identifies the record types included in the report.

Figure 147 Node selection area



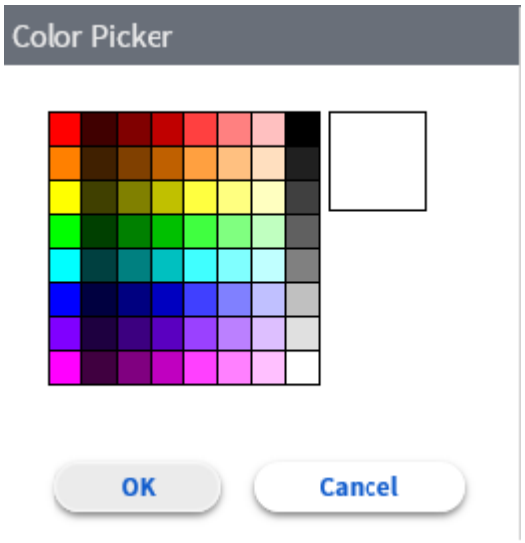
NOTE: If you modify any node using the configuration editor (nav tree of the station) and that node is part of a report, the node selection editor shows red text for that particular node. This indicates that the node was modified and needs to be re-configured on the report.

When you right-click a node in the node selection editor, four options for managing nodes and groups open in a drop-down list.

Option	Node	Description
Group	Not applicable.	Groups two selected groups.
Ungroup	Not applicable.	Converts all nodes inside the group to multiple nodes.
Rename	Not applicable.	Renames the group.
Delete	Deletes the node from the group.	Deletes the group and the nodes it contains.

Clicking the colored square next to the record type in the Node selection editor opens the color picker.

Figure 148 Color picker window

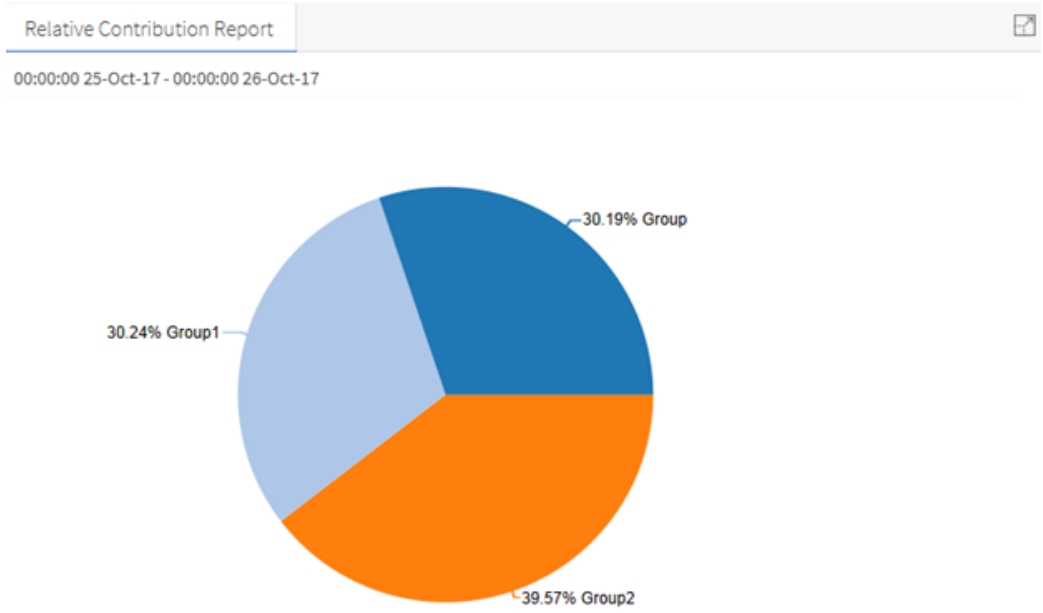


You click a color to select it. The points configured with color are groups. The nodes inside the groups are nodes.

Chart area

This area represents the selected data in the form of a pie chart, graph or time line.

Figure 149 Chart area



The time and dates included in the report appear at the top of the chart area. A legend identifies the points on the chart. Passing the cursor over the chart activates a tool tip that displays the date, time and value of the selected record.

Minimal settings area

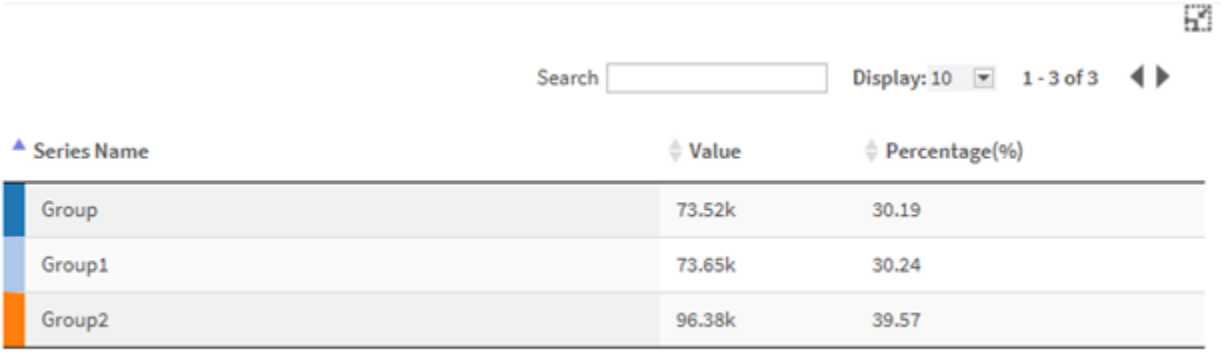
These properties provide basic configuration options. Individual reports may or may not include these properties.

Property	Value	Description
Data Type	Chooser	Selects the source point.
Reporting Period	drop-down list	Provides a calendar with which to select records from between specific dates. The days of the week limit the included data within the selected time range based on the day of the week. For more information, refer to the Time Range topic.
Chart Value	radio buttons	Sum adds together all values in the combination resulting in a single value. Min returns the lowest value in the combination. Max returns the highest value in the combination. Load Factor calculates the average divided by peak value.
Baseline	additional properties	Refer to Baseline configuration.
Normalization	additional properties	Refer to Value Normalization.
Run/Update Report	button	**Run** executes the report for the first time. **Update** refreshes the selected data.
Advanced	button	Opens another configuration window. This window provides a standard set of properties. Only the Aggregation report provides a slightly different set. For the standard properties refer to Advanced Settings window.

Table area

This area of the report displays a table of the raw data used to draw the chart. You can search for a specific record and configure the number of records that display on each page.

Figure 150 Table area



Property	Value	Description
Search	general search function	Locates a specific record.
Display	drop-down list	Controls how many records appear in the table at a time.
Previous and next buttons	buttons	Display additional records.

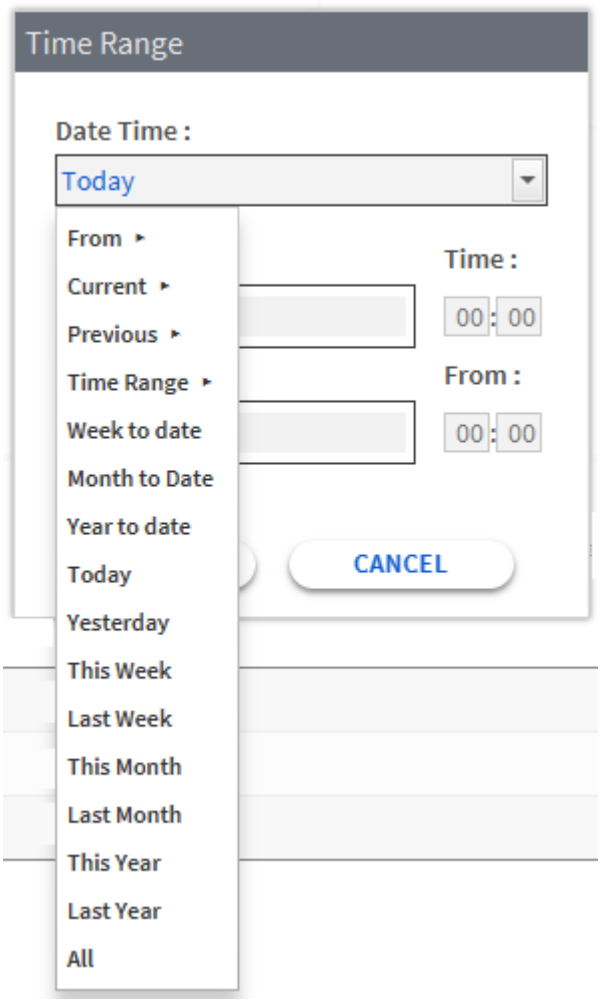
Related Links

- Time Range window
- Baseline configuration
- Value normalization
- Advanced window
- Reports (Parent Topic)

Time Range window

This window selects a general time range (Today, Year to date, etc.) or defines a specific time and date range.

Figure 151 Time Range

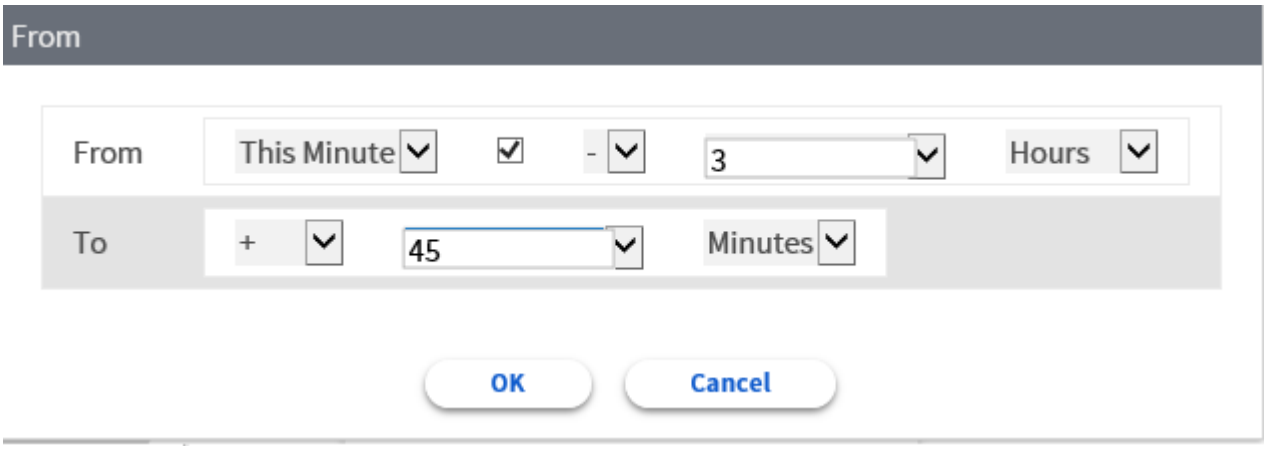


This window opens when you click the calendar icon next to the default Reporting Period in the minimal settings area.

Type	Value	Description
Date Time	drop-down list	Selects the period to include using a single option. Refer to the sections that follow this table.
From	drop-down list	Configures when to start reporting data.
To	drop-down list	Configures when to end reporting data. This value is not inclusive.

From window

Figure 152 From Window

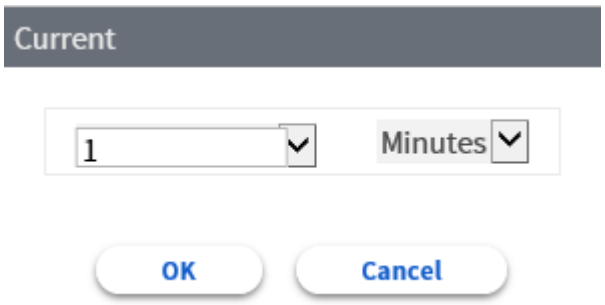


This window fine tunes from and two dates and times without requiring you to specify calendar dates and clock times. For Example, the screen capture begins data reporting three hours ago and ends 45 minutes later.

Property	Value	Description
From: This Minute	drop-down list (defaults to This Minute)	Specifies a period of time from which to add or subtract minutes through years. It establishes the starting point for data reporting.
From check box	defaults to checked	Enables and disables the addition or subtraction of minutes through years.
From +	drop-down list (defaults to +)	Indicates addition (+) or subtraction (-).
From 1–365	drop-down list (defaults to 1)	Specifies the number of minutes through years to add or subtract.
Minutes	drop-down list (defaults to Minutes)	Defines what the number to the left means (minutes through years).
To +	drop-down list (defaults to +)	Indicates addition (+), subtraction (-) or Now (the current time)
To 1–365	drop-down list (defaults to 1)	Specifies the number of minutes through years to add to or subtract from the end time.
To Minutes	drop-down list (defaults to Minutes)	Defines what the number to the left means (minutes through years).

Current window

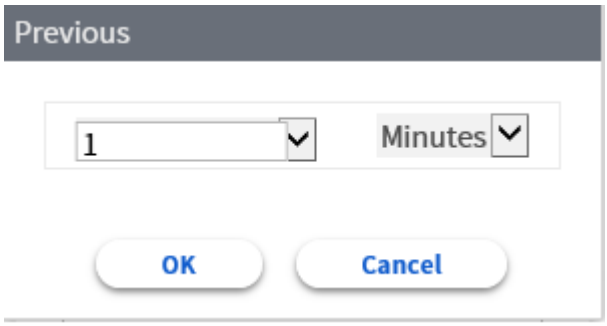
Figure 153 Current Window



This window adds the number of minutes through years to the current time.

Previous window

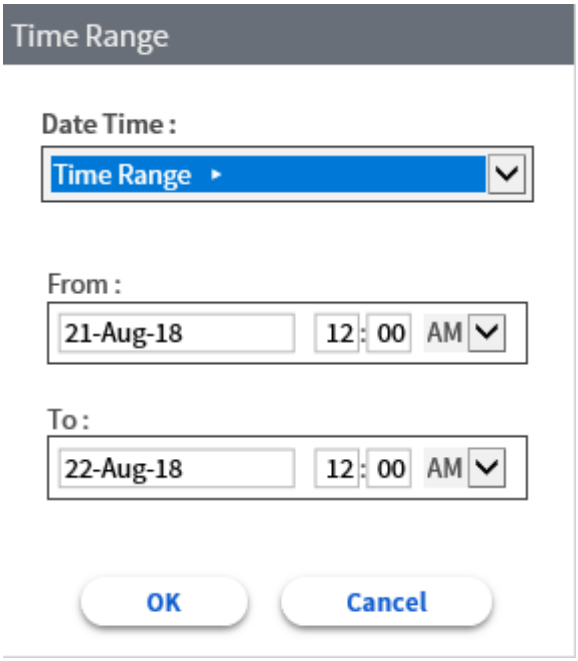
Figure 154 Previous window



This window subtracts the number of minutes through years to the current time.

Time Range window

Figure 155 Time Range window



Selecting Time Range activates the From and To properties, which configure a calendar date and clock time.

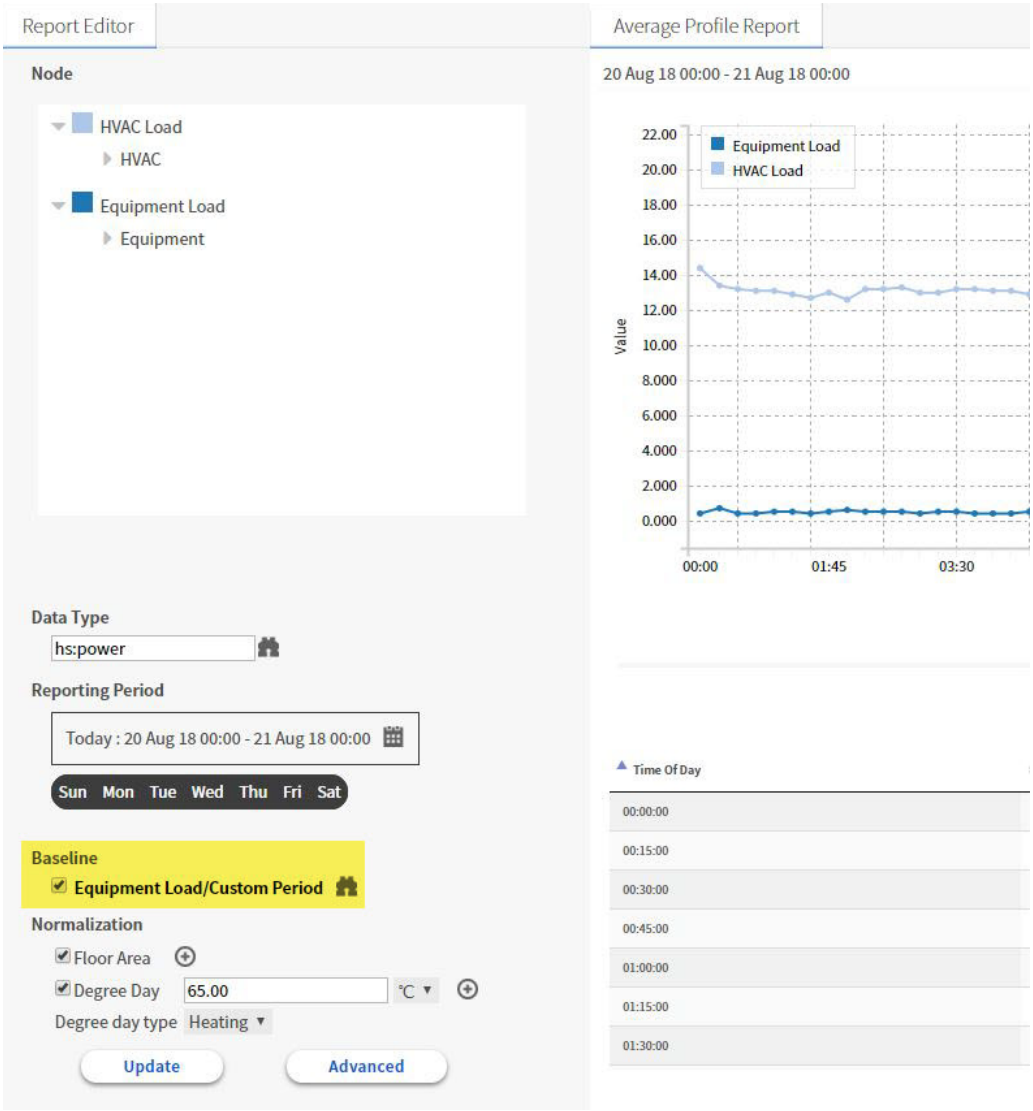
Related Links

- Report editor (Parent Topic)

Baseline configuration

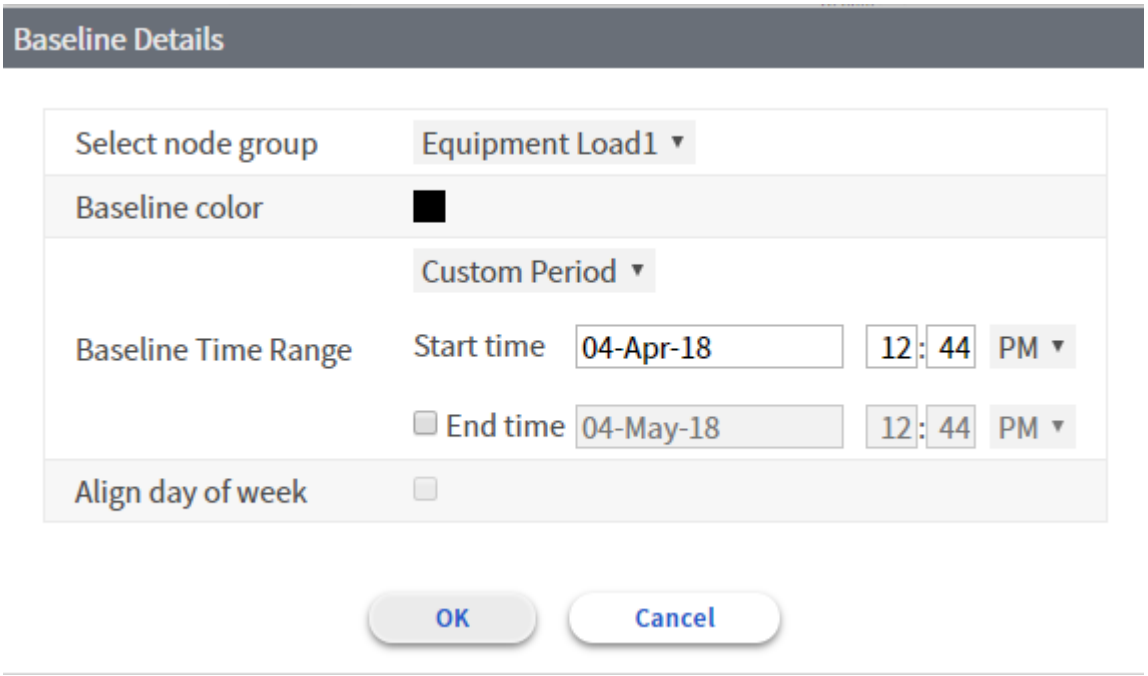
Both the Average Profile and Load Duration Reports require a set of data values within the trended log to which to compare the rest of the data. This baseline makes it possible to compare a current data value against itself at a previous period of time. For example you set a baseline to compare Main kWh for last week with Main kWh for the same week in the previous year.

Figure 156 Baseline properties on an Average Profile Report



You establish a baseline by enabling the check box under Baseline on the Report Editor. To configure baseline details, you click the Show Details button ( ).

Figure 157 Baseline Details window



To open this window, click the binoculars icon next to Equipment Load/Custom Period.

Baseline properties

Property	Value	Description
Select Node Group	drop-down list	Selects the node group to use for baseline data. You select one node group at a time to establish the baseline.
Baseline Color	Color chooser	Selects a series color for the baseline data.
Baseline Time Range, time period	drop-down list	Calculates the baseline in relationship to the other Baseline Time Range properties. Refer to The baseline calculations.
Baseline Time Range, Start time	date and 12-hr time selector	Selects what time of day to establish the baseline. These values are only valid if the Custom Period option is in use. Otherwise, the framework automatically calculates the start date and time.
Baseline Time Range, End time check box	check box (defaults to disabled, that is, no check mark)	Enables and disables the ability to edit the End time property. The default automatically calculates the end date. These values are only valid if the Custom Period option is in use. Otherwise, the framework automatically calculates the end date and time.
Baseline Time Range, End time	date and 12-hr time selector	Selects the time of day to stop the collecting of baseline data.

Property	Value	Description
Align day of week	check box (defaults to disabled, that is, no check mark if Custom Period is in use, otherwise, it defaults to enabled)	Plays a critical role in the automatic calculation of the start and end dates and times for the selected baseline. Refer to The baseline calculations.

The baseline calculations

All baseline calculations reference the Reporting Period as defined in the Report Editor.

If Custom Period is selected for Baseline Time Range, the framework activates the Start time properties and provides optional End time properties. If no End time is defined, the framework uses the selected time range (the main time range) to determine when the baseline period ends. If End time is enabled and a time selected, the framework uses this date and time to end the baseline period.

When you select a Baseline Time Range, such as 1 Week prior or 1 Month prior, the framework calculates the baseline start and end dates and times based on the selected time range and the Align day of week property. If Align day of week is disabled, the framework subtracts the time range from both start and end date times of the selected range.

If the Align day of week is enabled, the framework takes the start date of the selected time range as a reference and calculates the same day of the week in the previous month. For example, if the start date is the second Wednesday of this month, the baseline starts the second Wednesday of previous month. The framework calculates the end date and time by adding the duration of the time range to the calculated baseline start date and time.

When 1 Year prior is selected for Baseline Time Range, the framework calculates the baseline start and end dates based on the selected time range and the Align day of week property. If the Align day of week is disabled, the framework subtracts one year from both start and end date times of the selected time range.

If the Align day of week option is enabled, the framework takes the start date of the selected time range as a reference and calculates the same day of the week in the previous year. For example, if the start date is the Wednesday in the eighth week of the year, the baseline starts the Wednesday in the eighth week of the previous year. The framework calculates the end date and time by adding the duration of the time range to the calculated baseline start date and time.

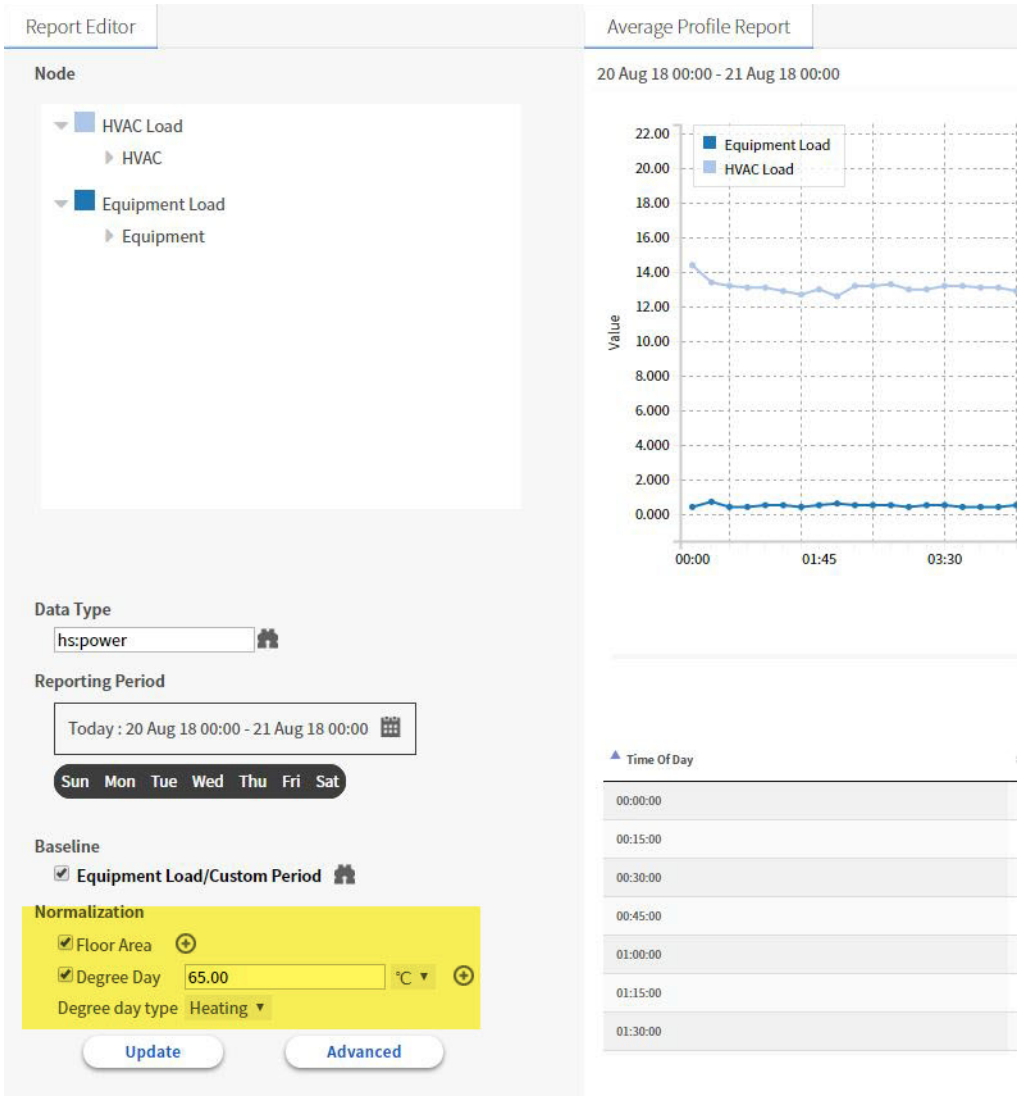
Related Links

- Report editor (Parent Topic)

Value normalization

All reports, except the Spectrum and Equipment Operation reports, can benefit from normalizing data values to improve the usefulness of energy consumption comparisons.

Figure 158 Normalization properties



Properties

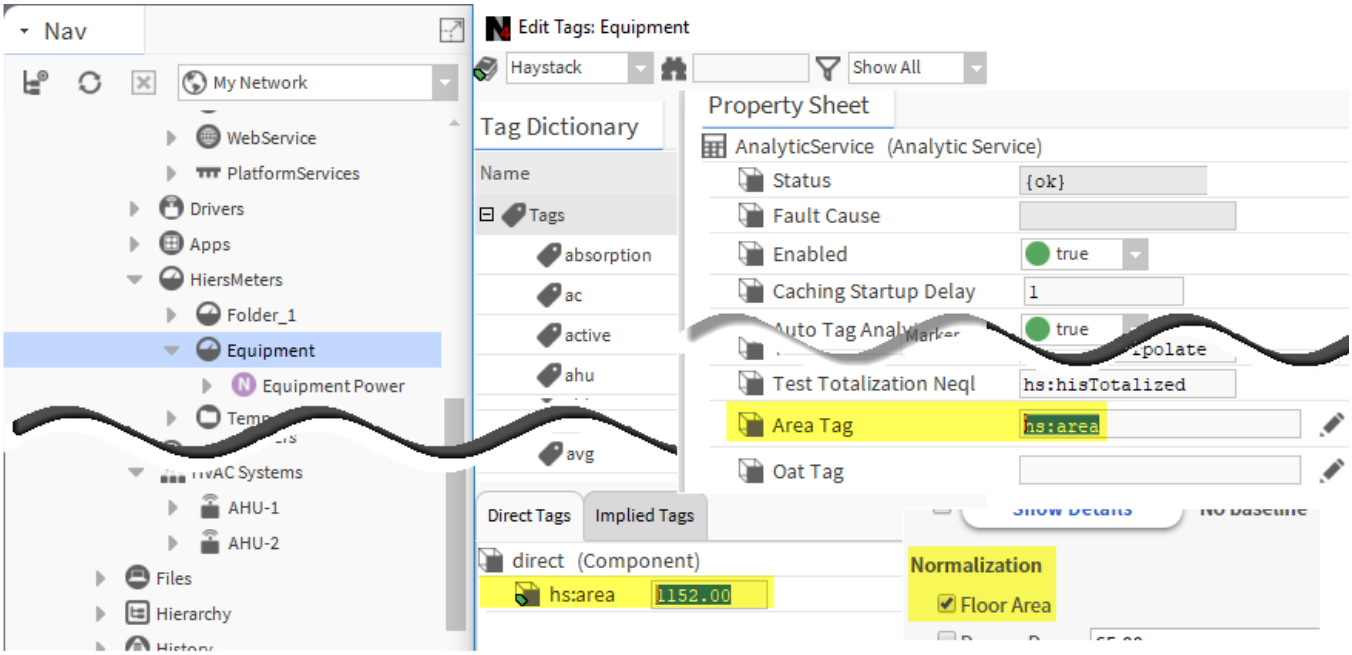
Property	Value	Description
Normalization, Floor Area	check box	Enables the use of the floor area of the facility to normalize the values used in the resulting chart. Refer to Floor area normalization.
Normalization, Degree Day	check box	Enables normalization based on the degree-day calculation. Refer to Degree-day temperature normalization.
Normalization, base outside air temperature	number with two decimal places (defaults to 65.00, which is a Fahrenheit temperature measurement)	Selects a base outside air temperature, which is used to calculate degree-day normalization. This base temperature is the outside air temperature at which neither heat nor air conditioning is required inside the building.

Property	Value	Description
Normalization, scale	drop-down list	Selects the temperature scale to use: Fahrenheit, Centigrade or Kelvin in the degree-day normalization calculations.
Plus icon to the right of the Degree Day row	Node editor	Opens a window to configure the node from which to pick up the outside air temperature.
Degree day type	drop-down list	Selects the temperature supplementation being used: Heating or Cooling.

Floor area normalization

Normalizing the floor area of a facility evens out the energy consumption or demand differences caused by large and small spaces. This results in more useful comparisons.

Figure 159 Floor area configuration



To set up your system for area normalization, you enter the area (square units) in a tag, such as the hs:area tag of the Haystack tag dictionary, associate that tag with each piece of equipment, configure the Area Tag property on the **AnalyticService** to use the tag for this purpose, and enable the Floor Area property under Normalization in the Report Editor.

For multiple groups, the framework aggregates (sums) the area of each group into a single total figure.

Degree-day temperature normalization

Degree-day normalization answers the question, “What would the value of energy consumption be if the temperature during the report period was equal to some base temperature?” Degree-day normalization applies only to temperature-dependent points. This type of normalization works for building areas and equipment that are subject to changes in outside air temperature. For example, you would not use this calculation with lighting.

The normalization calculation requires actual air temperature values taken at different times of day and a base outside air temperature value with which to compare the actual values. The point used to collect OAT (Outside Air Temperature) values must be tagged with a unique OAT Tag. You connect the OAT Tag

to the calculation on the AnalyticService Property Sheet.

The base outside air temperature is usually set to 65 degrees Fahrenheit, which is the balance at which no cooling or heating is required to maintain a comfortable indoor air temperature. Starting with the days of the Reporting Period, the base outside air temperature, and multiple OAT readings taken at intervals during the day, the calculation normalizes temperature using a simple ratio as follows:

1. For each day, it calculates the average of the differences between the base outside air temperature and each actual OAT reading. This calculation excludes days that were not included in the Reporting Period days of the week. If the interval is greater than a day, the calculation sums (rolls up) the values to match the interval.

   The result is a value for each day (degree-day value), which indicates when cooling and heating was required.

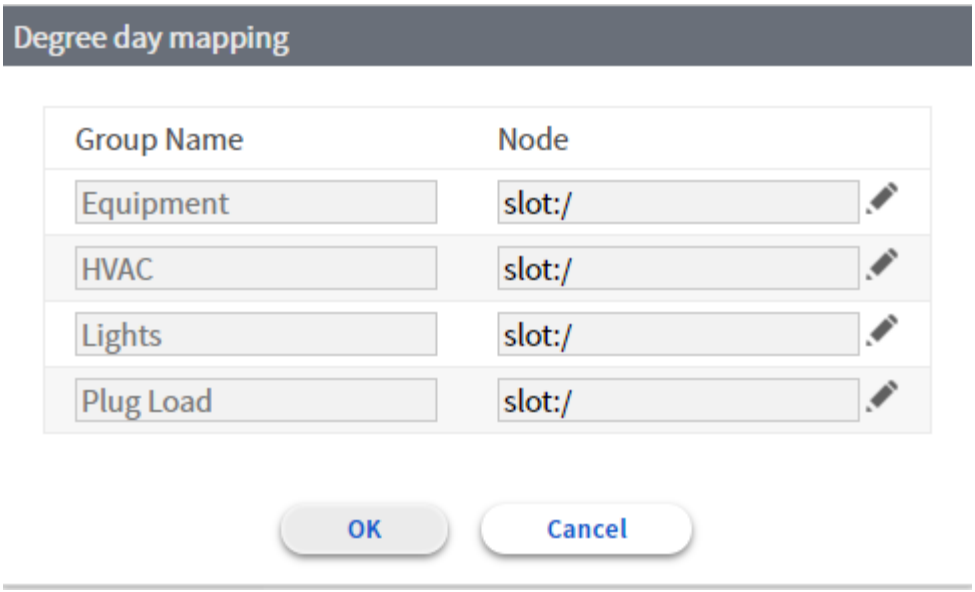
2. Then, it divides the energy consumption for each day by the degree-day value. This gives the kWh per degree-day. In theory, dividing by the degree-day value factors out the effect of outside air temperature so you can compare the resulting kWh fairly.

Some people use a five-year average degree-day multiplier; some use a 10- or 20-year average, and others use a standard degree-day multiplier to normalize the temperature values used to compare regions. Provided you use just one value (that is, do not use rolling averages) it should not matter which multiplier you use. Your figures will, at least, be proportionally comparable.

Node editor

This editor (Degree day mapping window) shows the mapping between configured tag groups and the root node used to search for outside air temperature.

Figure 160 Degree day mapping window



Property	Value	Description
Group	name	Identifies a collection of tags assigned to a component.
Node	ORD	Identifies the location in the station database that contains the temperature data.

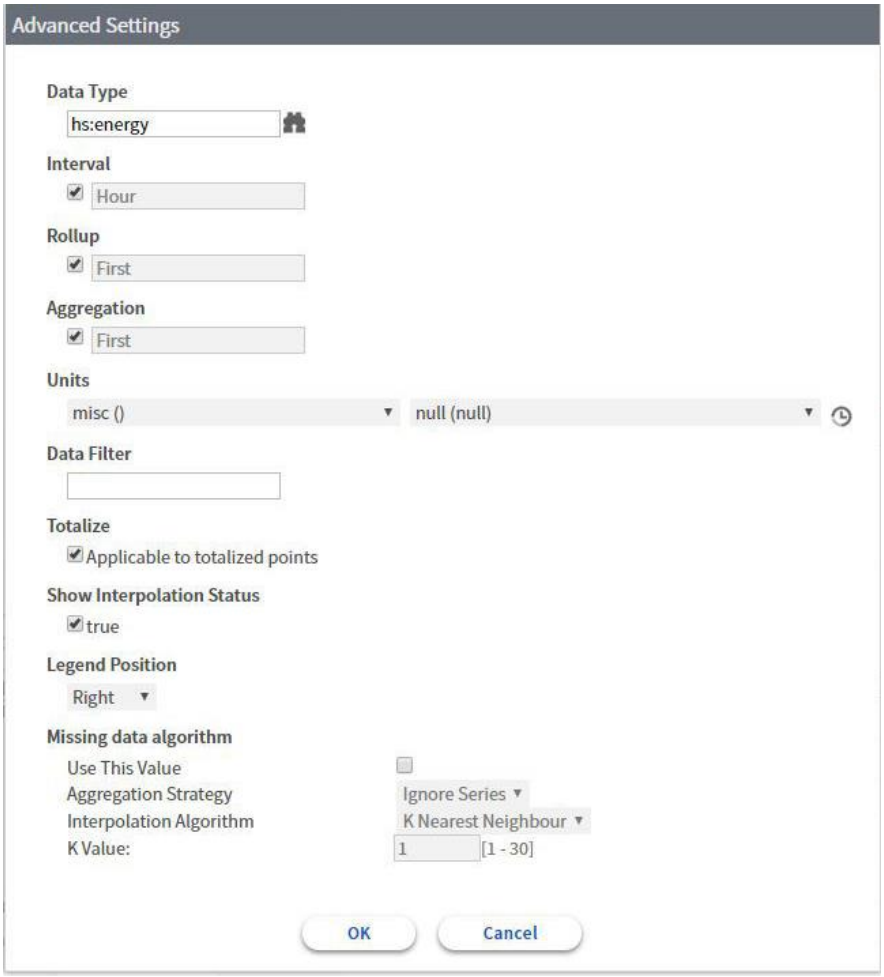
Related Links

- Report editor (Parent Topic)

Advanced window

This window opens when you click the Advanced button in for all reports except the Aggregation report, which requires different advanced settings.

Figure 161 Advanced Settings window



Property	Value	Description
Data Type	Chooser	Selects the source point.
Interval	drop-down list (options range from None to a Year)	Identifies the time between values in a trend (time series). By default, the framework intelligently selects this value to provide the optimal number of records on reports.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop- down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop- down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/ settings window, the aggregation value defined

Property	Value	Description
		in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Load Factor returns the average value divided by peak (Max) value. Std Dev returns the standard deviation of the values in the combination.
Units	drop-down list of units of measure	Defines the unit of measure for the data gathered from each point.
Data Filter (property) or dataFilter (ORD parameter)	optional NEQL query (property) or ORD parameter (dataFilter=query)	Identifies data sources in the subtree of the request node. When a predicate accepts a node that contains the desired data, the system does not search the node’s subtree for additional values (including the root node).
Totalize (property) hisTotEnabled (ORD scheme)	true or false (property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).

Property	Value	Description
Show Interpolation Status	false check box	Enables and disables the display of the interpolation status columns in report tables. Clicking this check box removes the status columns leaving only the record value columns.
Legend Position	drop-down list (defaults to Inset)	Changes the position of the legends that label graphical elements in charts. Three positions are possible: None removes the legend from the chart. Inset places the legend inside the chart area. Bottom places the legend below the chart area. Right places the legend to the right of the chart area.
Missing Data Strategy or Algorithm, Use This Value	check box	Enables and disables missing data interpolation for the current value.
Missing Data Strategy, Aggregation Strategy	drop-down list	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Series tells the system to ignore the entire series if the record for even one interval in the series is missing.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
Missing Data Strategy, K Value	number	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.

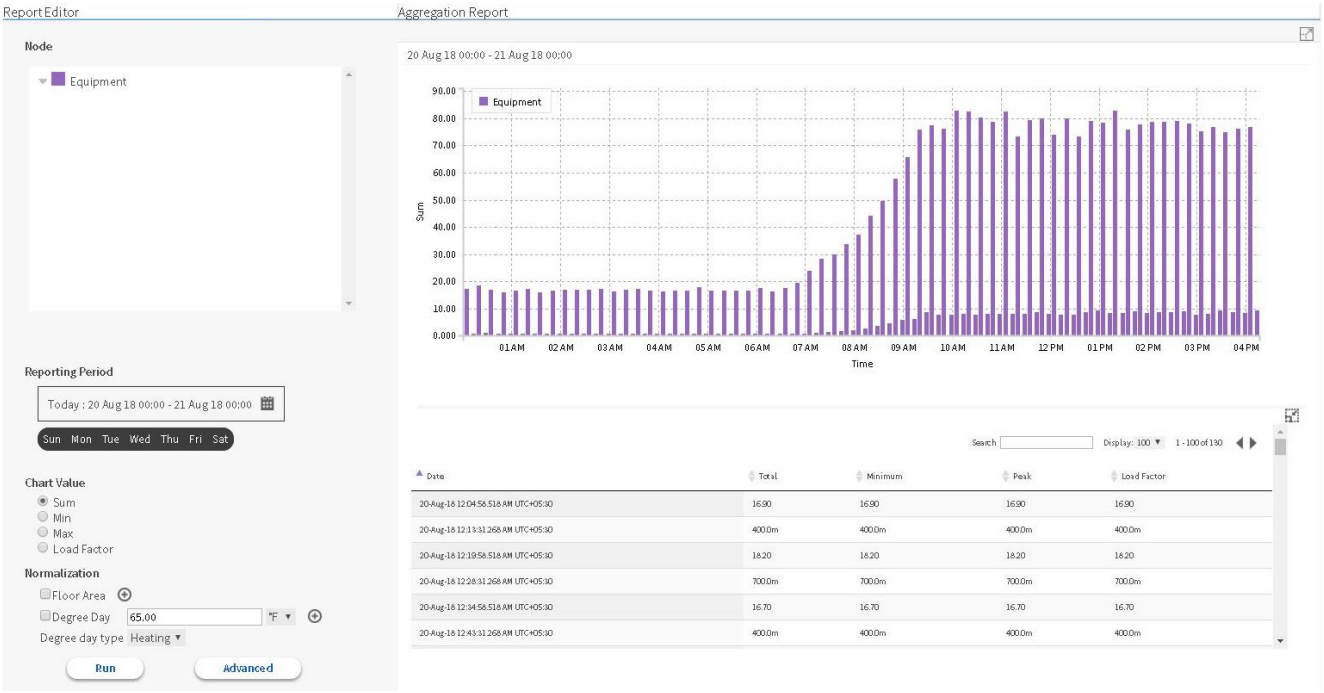
Related Links

- Report editor (Parent Topic)

Aggregation report

This report plots aggregation (consumption) against demand using total, peak, minimum, and load factor values at various sites, meters, time periods and commodities. With this information you can increase total energy procured and determine complementary loads to improve your load factor.
When negotiating a contract, this information can provide accurate consumption patterns versus the arbitrary classifications used by commercial and industrial customers.

Figure 162 Aggregation report



This report supports only one group. You add multiple nodes under this group.

NOTE: In this multi-node group, the system aggregates the data for all records based on the **Aggregation** property defined in the Advanced Settings window.

Chart Value

In addition to the standard properties, this report allows you to select a single Chart Value to apply to the graph:

- Sum
- Min
- Max
- Load Factor

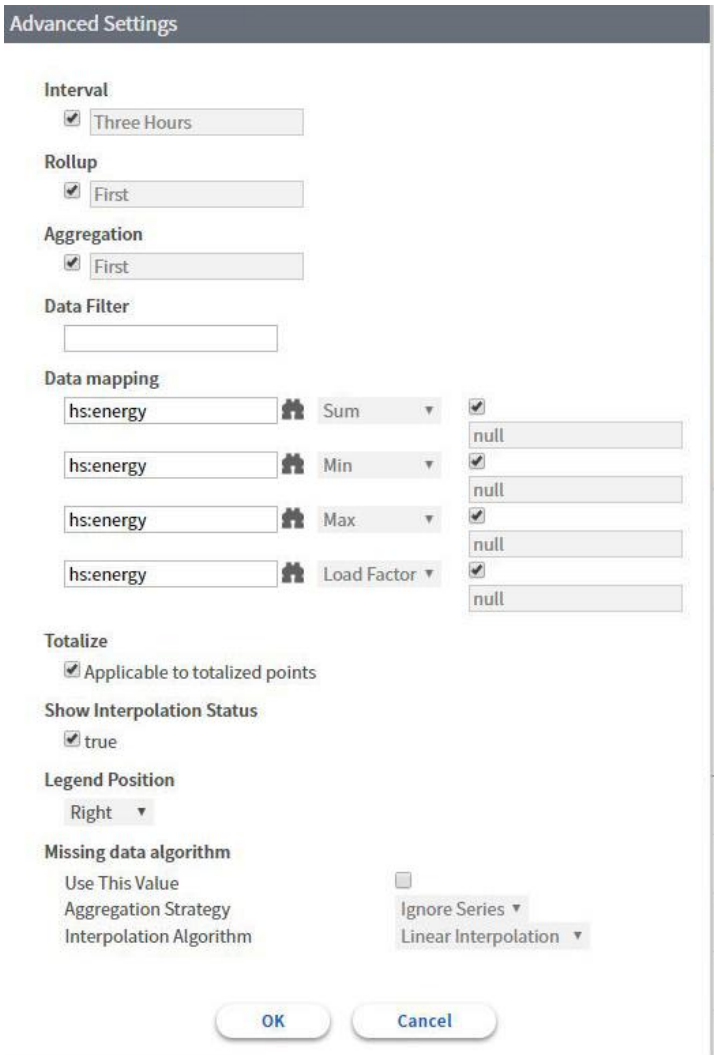
Table area columns

The table area shows information for each node.

Column	Description
Date	Identifies the date the record was written to the database.
Minimum	Reports the minimum rollup applied to the resulting set.
Total	Reports the rollup sum applied to the resulting set.
Peak	Reports the rollup maximum applied to the resulting set.
Load Factor	Reports the load factor applied to the resulting set.

Advanced Settings window

Figure 163 Advanced Settings



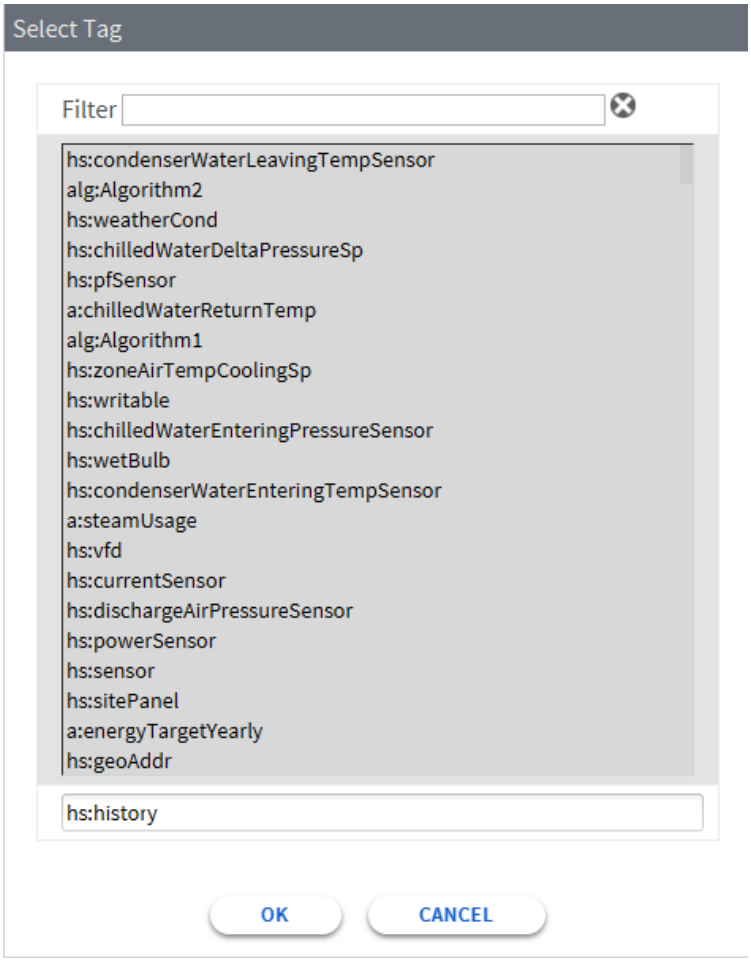
Property	Value	Description
Interval or interval	optional drop-down list or ORD parameter (interval=option); defaults to Minute	Refers to the BInterval component, which the framework uses to identify the time between values in a trend (time series). When specified, a rollup is required, which causes the system to combine all values that fall into a single interval. Options range from Noneto a Year. Above the drop-down list, the Use This Value check box turns on and off the check box next to Intervalin the Settings window (you access this window by clicking the Edit button () , followed by clicking the Settings button () on the chart). The availability of this box provides an easy way for a user to enable and disable the use of the intervals in chart calculations.
Rollup (property) or rollup (ORD parameter)	check box (if optional, and) drop-down list or ORD parameter (rollup=option) (when configured in the data definition, defaults to First, when configured elsewhere, defaults to the value as defined in the data definition)	Defines the mathematical function to be used to combine data from a single source. If rollup is not enabled in the binding/settings window, the rollup value configured in the data definition applies to all chart bindings, reports and tables. And returns the logical “and” of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm’s property sheet. First returns the first value in the combination. This generates the fastest result. Last returns the last value in the combination. Max returns the highest value in the combination. Median returns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Min returns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical “or” of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sum adds together all values in the combination resulting in a single value. Std Dev calculates the standard deviation of the values in the combination. Load Factor calculates the average divided by peak (Max) value.

Property	Value	Description
Aggregation (property) or aggregation (ORD parameter)	check box (if optional, and) drop-down list (defaults to First) or ORD parameter (aggregation=option)	Defines the mathematical function to use to combine data from multiple data sources. If aggregation is not enabled in the binding/settings window, the aggregation value defined in the data definition applies to all chart bindings, reports and tables. And returns the logical "and" of Boolean values. Avg returns the statistical mean, which is determined by calculating the sum of all values and dividing by the number of values. Count returns the total number or quantity of values in a combination. If you request this value on a binding in a PX view, the system counts the number of values based on the properties defined by the data source block and the algorithm's property sheet. Firstreturns the first value in the combination. This generates the fastest result. Lastreturns the last value in the combination. Maxreturns the highest value in the combination. Medianreturns the value in the middle of a sorted combination—the number that separates the higher half from the lower half. Minreturns the lowest value in the combination. Mode returns the statistically most frequently occurring number in the combination. Or returns the logical "or" of Boolean values. Range returns the statistical difference between the largest and smallest values in the combination. Sumadds together all values in the combination resulting in a single value. Load Factorreturns the average value divided by peak (Max) value. Std Devreturns the standard deviation of the values in the combination.
Data Mapping	Tag Choosers for Sum, Min, Max, and Load Factor	The four options are tags associated with each point record. Clicking the Tag Chooser opens a standard Select Tag window.
Totalize (property) hisTotEnabled (ORD scheme)	trueor false(property, defaults to true) or hisTotEnabled=option (ORD scheme parameter)	Turns on and off value accumulation. By default, the framework totalizes (accumulates) all consumption history values in charts, tables and reports. To prevent cumulative values, disable this property (set it to false).
Show Interpolation Status	false check box	Enables and disables the display of the interpolation status columns in report tables. Clicking this check box removes the status columns leaving only the record value columns.

Property	Value	Description
Legend Position	drop-down list (defaults to Inset)	Changes the position of the legends that label graphical elements in charts. Three positions are possible: None removes the legend from the chart. Inset places the legend inside the chart area. Bottom places the legend below the chart area. Rightplaces the legend to the right of the chart area.
Missing Data Strategy or Algorithm, Use This Value	check box	Enables and disables missing data interpolation for the current value.
Missing Data Strategy, Aggregation Strategy	drop-down list	Selects the missing data aggregation strategy, which defines how to handle data in a series when even a single record for an interval is missing. Ignore Point tells the system to ignore any missing records and aggregate the values in the existing records. Ignore Seriestells the system to ignore the entire series if the record for even one interval in the series is missing.
Missing Data Strategy or Algorithm, Interpolation Algorithm	drop-down list	Selects the missing data interpolation algorithm, which defines the value to replace a missing value. Linear Interpolation replaces a missing value by linearly interpolating the missing value. K-Nearest Neighbor is for numeric, enum and Boolean records. This strategy replaces a missing value by calculating the majority value recorded for the item's nearest neighbors.
Missing Data Strategy, K Value	number	Indicates the number of neighbors to a missing data item that the interpolation algorithm should include in its calculation.

Select Tag window

Figure 164 Select Tag window



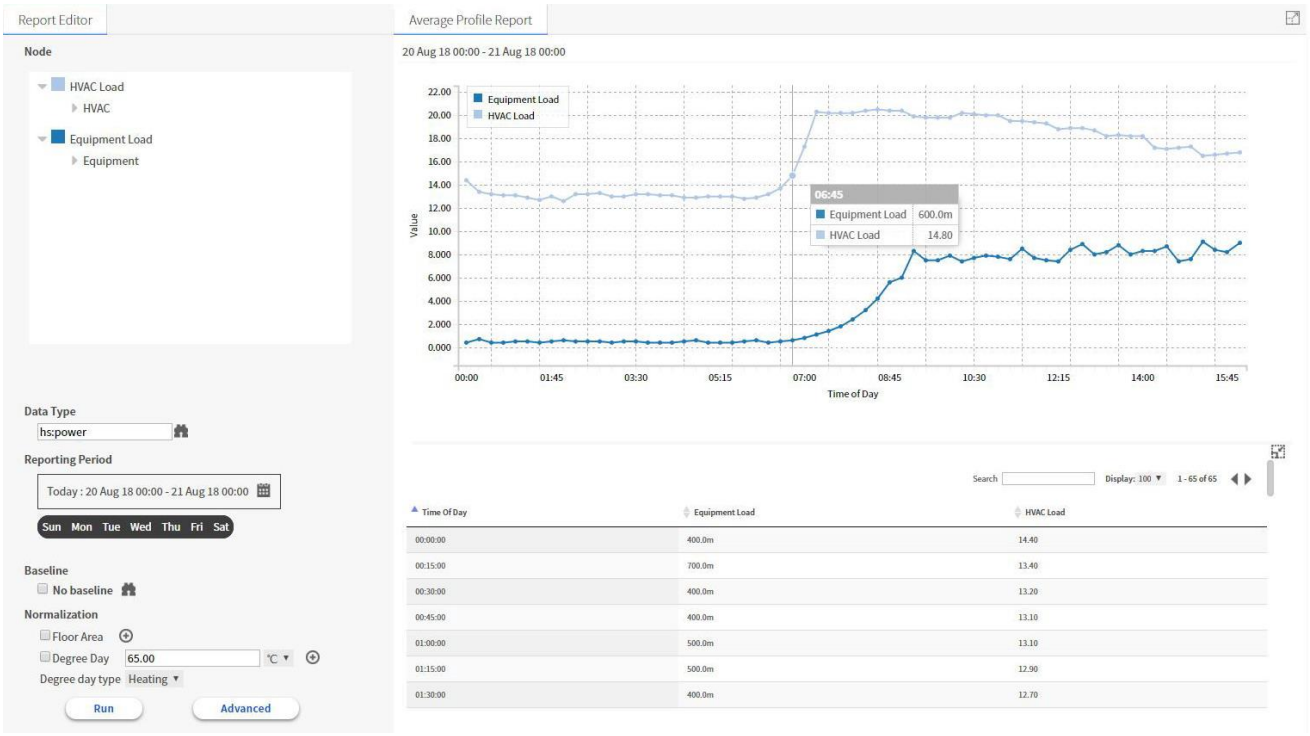
Related Links

- Reports (Parent Topic)

Average Profile report

This report analyzes energy consumption by identifying unfavorable peaks and patterns. Using it you can adjust device behavior as part of your energy procurement strategy. This information helps reduce consumption volatility, and makes the load more attractive for energy providers, which can reduce your energy costs.

Figure 165 Average Profile report



The report plots the average load (y-axis) for one or more pieces of equipment against the time of day (x-axis). The data included in the report depends on the points you are monitoring. This report's Advanced Settings window provides the standard set of properties. Refer to Advanced Settings window in this chapter.

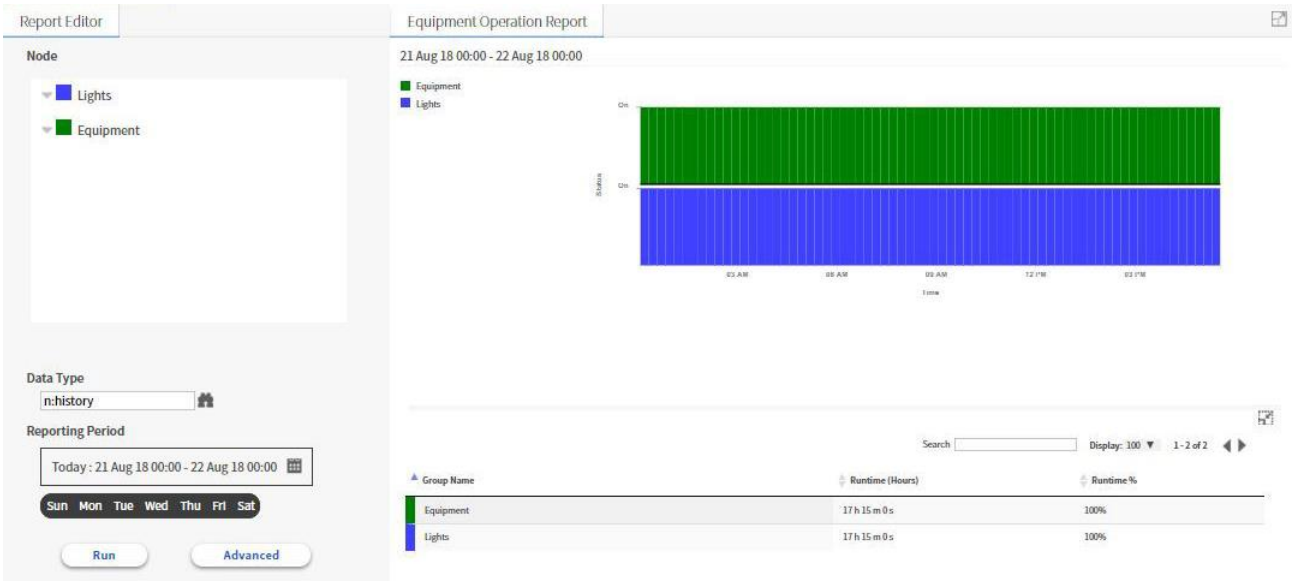
Related Links

- Reports (Parent Topic)

Equipment Operation report

This report runs exceptions on a piece of equipment to determine run times compared to similar equipment in the enterprise. The report can identify the run times for the points associated with various pieces of equipment, such as HVAC, lighting, fans, refrigeration, chillers, and more. The report expresses results in both time and as a percentage using both tabular and graphical formats. With this information, you can determine if the run time for piece of equipment is in line with the manufacturer's specifications and schedule maintenance accordingly.

Figure 166 Equipment Operation report



The chart in the report shows the On Off status of the selected pieces of equipment stacked over each other vertically. The table below shows the runtime in hours and the percentage of time the equipment was running within the given time range.

This report supports multiple node groups from which to select a different series color for each group.

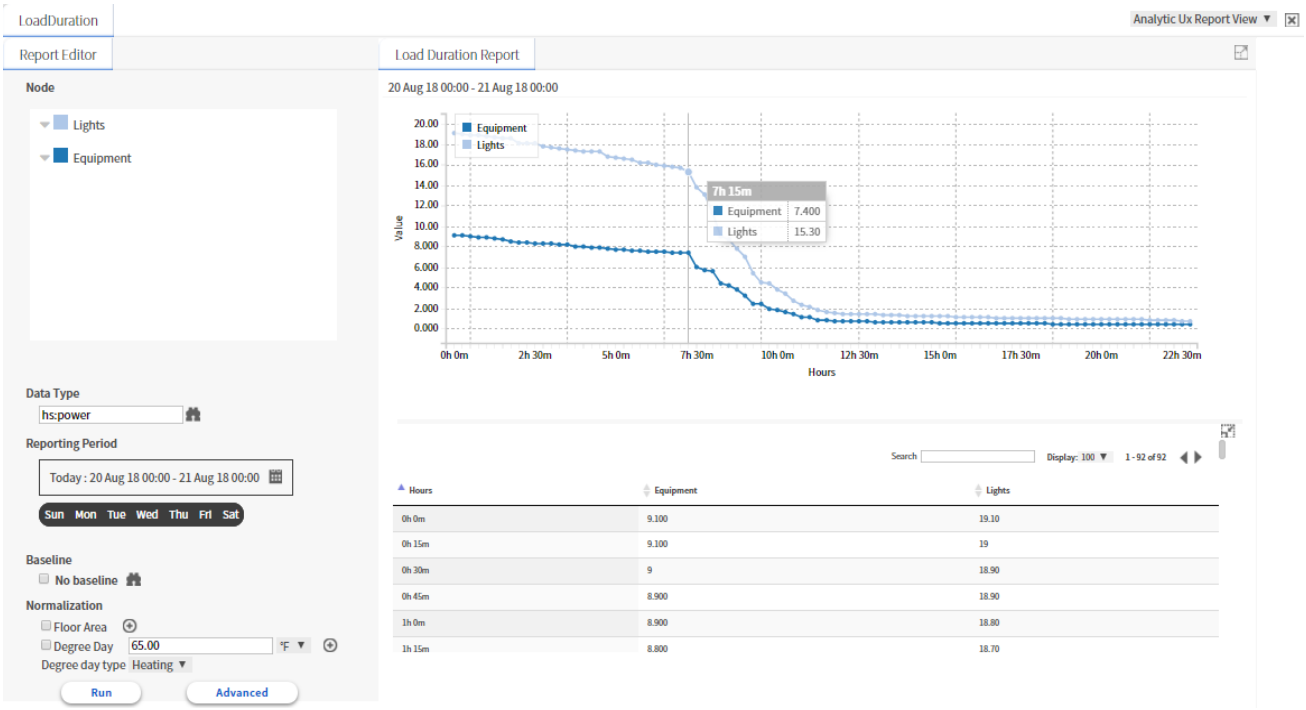
Related Links

- Reports (Parent Topic)

Load Duration report

This report identifies the duration, or length of time, that demand (or consumption) for a point, aggregate point, or group of points exceeds certain levels. The load duration report provides input when considering demand-limiting strategies and possible capital investments. For example, this report can identify the peak for a demand meter and then indicate how much time (duration) that kW is above certain levels near the peak.

Figure 167 Example of a load duration report



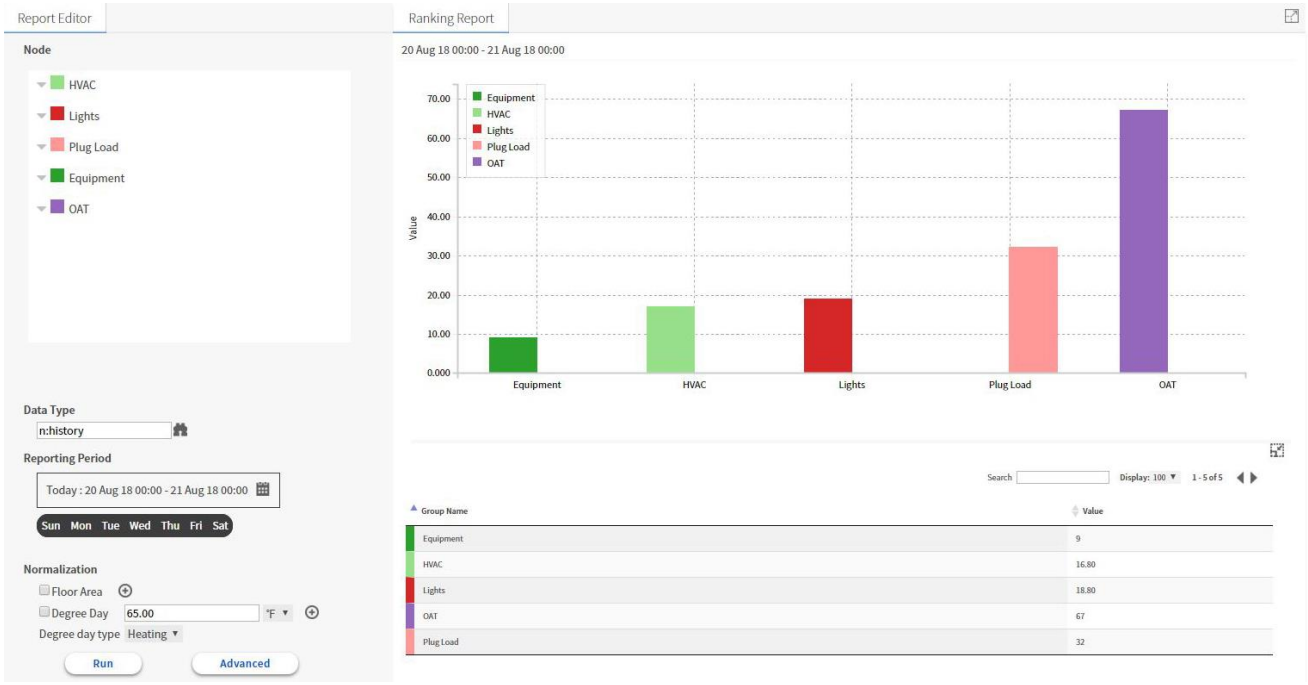
Related Links

- Reports (Parent Topic)

Ranking report

This report identifies the highest and lowest sites or points with a common characteristic. Using this report you can identify the most efficient facilities in your enterprise and benchmark against other facilities, or determine the least efficient facility and perform further analysis. Energy managers also use this report to rank lighting, HVAC, and refrigeration strategies within an enterprise. With this information, you can identify best-in-class equipment for energy consuming loads and reduce energy consumption across the enterprise.

Figure 168 Example of a ranking report



This report supports multiple groups (nodes). You can select colors and rename groups.

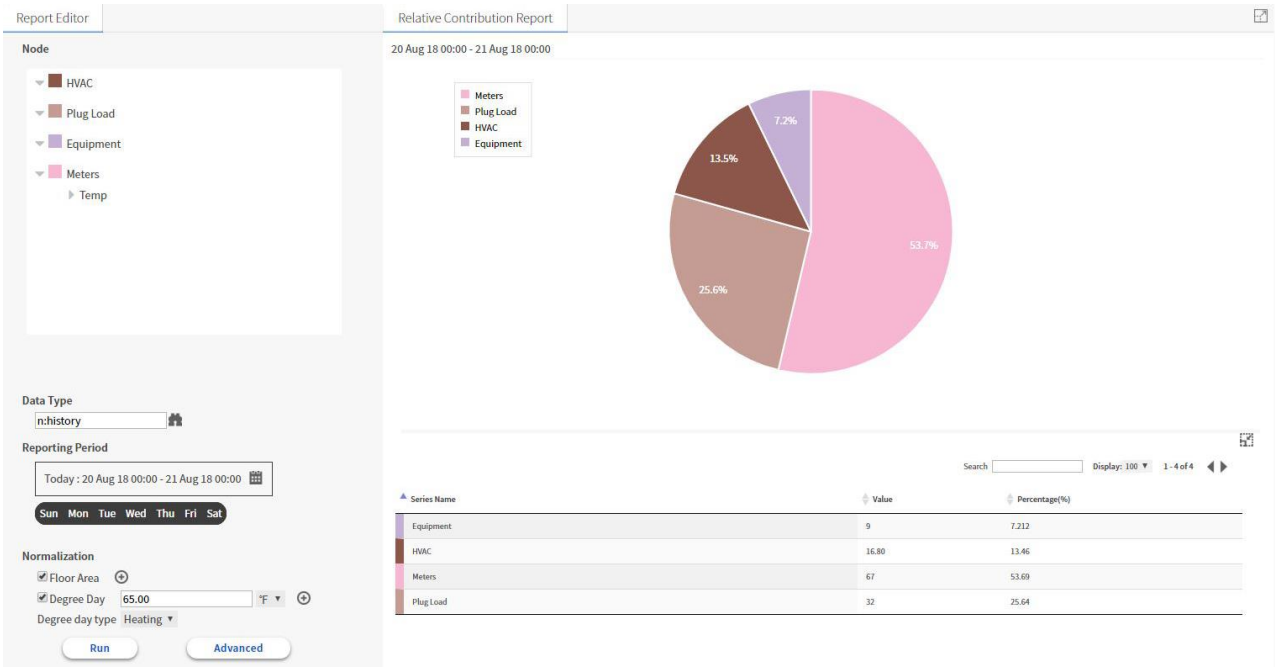
Related Links

- Reports (Parent Topic)

Relative Contribution report

This report calculates the total energy consumption and displays the individual contribution of each underlying component. You use it to indicate how appliances within a building contribute to the total energy load at a facility or how different buildings contribute to an aggregated load. This becomes especially powerful when normalized for square footage and weather. Armed with this insight, you can identify the most logical place to allocate capital expenditures.

Figure 169 Example of a relative contribution report



This report supports multiple groups and data points.

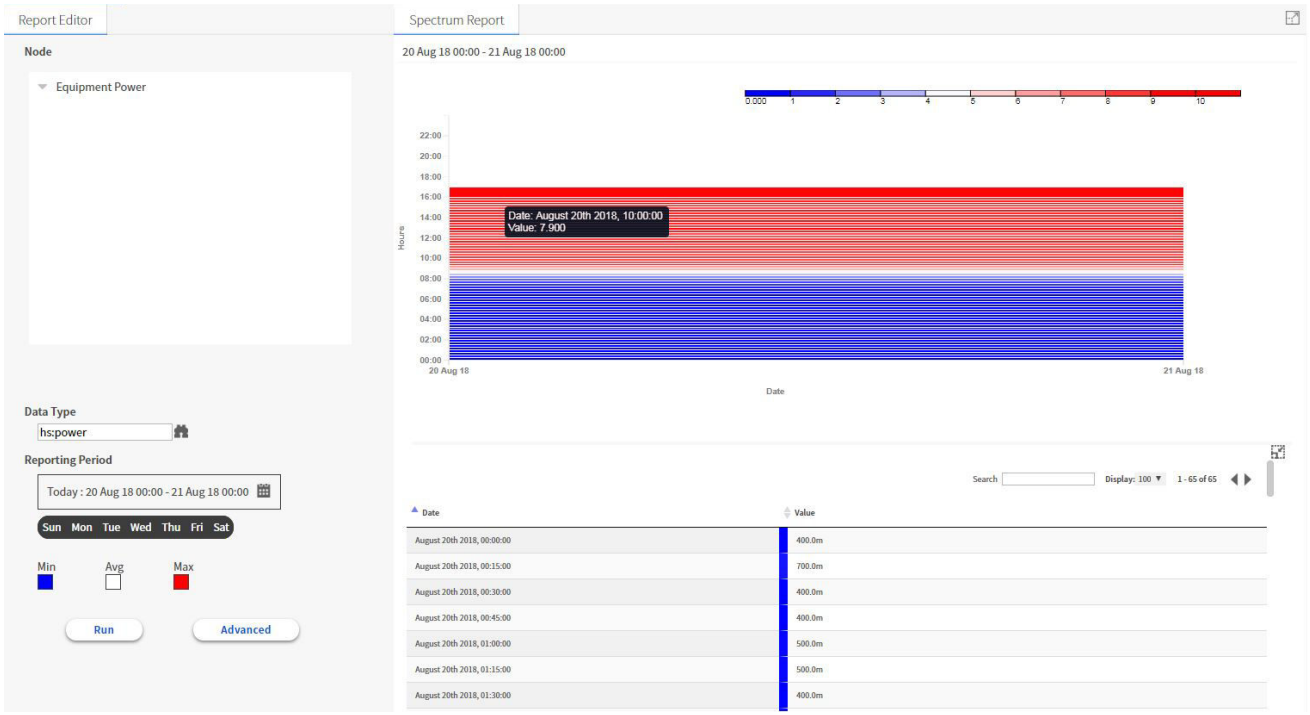
Related Links

- Reports (Parent Topic)

Spectrum Summary report

This report provides a quick view of any point or aggregated point with color coding, which identifies the reasonableness of the data value. The colors make evaluation quick and easy.

Figure 170 Example of a spectrum report



If all data values are within historical ranges, the report colors display a consistent pattern. You can move on to other functions. If data values are unusual or inconsistent, the pattern captures the consistency. A quick glance then demands further analysis.

Related Links

- Reports (Parent Topic)

Glossary

alert	A warning regarding a condition identified by a Niagara Analytics Framework that can be routed to an alarm or used to visualize real- time and historical data.
algorithm	A formula that uses real-time values, historical trend data, and the results of calculations made by other algorithms to analyze data collected by the system and automatically manage remote devices.
direct tag/relation	A tag or relationship that has been manually associated with an entity.
indirect tag/relation	A tag or relationship tag automatically assigned by the system to an entity.
request	The query for input data that seeks either a point's current or most recent historical value.
scope	In programming, the range within a program's source code within which an element name is recognized without qualification. Variable definitions are not limited to the beginning of a block of code, however, they must be declared before they can be used. In Niagara, the scope of an action applies to the selected components. The component tree is hierarchical. If you delete or move a component that contains other components, you are deleting or moving all items that are contained in that container component (its scope).
tag	A piece of semantic information (metadata) associated with a device or point (entity) for the purpose of filtering or grouping entities. Tags identify the purpose of the component or point and its relationship to other entities. For example, you may wish to view only data collected from meters located in maintenance buildings as opposed to those located in office buildings or schools. For this grouping to work, the metering device in each maintenance building includes a tag that associates the meter with all the other maintenance buildings in your system. JACEs are associated with Supervisors based on tags; searching is done based on tags. Tags are contained in tag dictionaries. Each tag dictionary is referenced by a unique namespace.

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