Technical Document

Niagara Web Charts Guide

May 12, 2020

niagara4

Niagara Web Charts Guide

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Contents

About this Guide

This topic contains important information about the purpose, content, context, and intended audience for this document.

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 format. The information in this document is written primarily for Systems Integrators. In order to make the most of the information in this book, readers should have some training or previous experience with Niagara 4 software, as well as experience working with JACE network controllers.

Document Content

This document provides information on the charting feature that is available in Workbench or via a web browser connection to a station.

Included in the guide are basic procedures for working with charts, as well as the charting references which describe chart components and component views.

- To begin working with charts, see "Using charts".
- For detailed information on configuring chart components, see "Web charts reference".

Document change log

Updates (changes and additions) to this document are listed below.

May 12, 2020

Added Workbench component topics to support online help.

April 29, 2019

- Updated information about chart exports.
- Added the procedure, "Creating a default options chart file", in chapter 1.
- Edited the topics, "Chart commands" and "Chart settings" to add information on recent changes in web chart functionality (Niagara 4.6–Niagara 4.8).

July 16, 2018

Edited the procedure, "Exporting a chart", to add information on added support in web charts for resolving relative ords.

April 16, 2018

Edited the topic, "Chart commands", added new Export command properties for Ord Type and Base Ord.

April 5, 2018

Edited the topic, "Adding proxy points to a chart", added two notes at the end of the procedure clarifying details of the `n:history` tag, etc.

October 25, 2017

Minor changes in the topic, "Adding data to a chart", regarding information on adding bookmarked ords to a chart view in a browser station connection.

March 30, 2017

Document updated to reflect enhanced functionality in web charts.

- There are two new topics: "Adding a hierarchy to a web chart," (functionality added in Niagara 4.2), and "About adding a hierarchy" which explains the effect that relation traversal has on a hierarchy plotted in a web chart (functionality added in Niagara 4.3).

July 20, 2016

Edited topic, "About adding Proxy Points", to delete draft comment from the end of the last paragraph.

June 24, 2016

Updates related to Niagara 4.2

- In the topics "Adding data to a web chart" and "webChart-ChartWidget", added content describing N4.2 web chart enhancements that permit adding Proxy Points and Virtual Points to a web chart on a Supervisor.
- Added topics include, About adding data from the Supervisor", "About adding Proxy Points", "About adding Virtual Points" as well as procedures for "Adding multiple bindings to a web chart in a Px graphic", "Adding Proxy Points to a web chart", and "Adding Virtual Points to a web chart."

December 3, 2015

Several updates related to Niagara 4.1

- Added content to the topics titled, "Chart commands", "Chart settings" and "About Sampling" describing the added Stop command and sampling changes for N4.1.

September 21, 2015

Minor changes

August 31, 2015

Initial release publication

Related documentation

Additional information on the Niagara system and Workbench is available in the following documents.

- *Getting Started with Niagara*

Chapter 1 Using web charts

Topics covered in this chapter

- ♦ Web Charts overview
- ♦ Viewing a component in live mode
- ♦ Viewing an existing Chart file
- ♦ Adding data to a chart
- ♦ Adding multiple bindings to a web chart in a Px graphic
- ♦ Adding proxy points to a web chart
- ♦ Adding virtual points to a chart
- ♦ Adding a hierarchy to a chart
- ♦ Editing a chart title
- ♦ Hiding/showing chart data
- ♦ Removing data from a chart
- ♦ Setting a time range on a chart
- ♦ Displaying status colors
- ♦ Displaying sampling optimizations
- ♦ Configuring sampling settings
- ♦ Zooming on a chart
- ♦ Exporting a chart (Workbench or browser)
- ♦ Creating a Default Options chart file

This section provides instructions for commonly used charting tasks.

Web Charts overview

The Web Charts feature allows you to create, modify, and render dynamic, interactive web-based charts in Workbench or in a modern HTML5–capable web browser. The HTML5 functionality enables you to create richer reports and more easily monitor and diagnose system problems.

Web Charts provide a consistent experience for creating, editing, and presenting data, with a simplified chart creation process that is the same whether working in a web browser, Workbench Chart view, or a Px page. Also, the charts render consistently across Workbench, Px, and Hx, as well as in HTML5–capable web browsers.

Enhanced functionality makes it easy to add data, to combine different types of data, and combine data with different units of measure. The Chart settings facilitate customizing a chart for presentation via selectable data colors and chart type per component, axis orientation, data source zooming, as well as permitting you to turn on or off the chart grid, background color, data pop-ups, status colors and sampling.

Additionally, several enhancements facilitate monitoring performance and diagnosing problems. For example, when enabled, charts display the standard Niagara status colors, conveying the status of components at a glance, and the mouse-over value and fixed data pop-ups provide detailed information on data points. You can compare historical data with live data as it comes in. Also, you can hide, show, and remove data from a chart and zoom in to make it easier to examine the activity of remaining components.

Once you have created a chart you can export it as a `.chart` or `.csv` file in the station file space. If working in a web browser, export destination options include the station file space, your operating system user space, or a printer. Also, when you open an existing chart file and make changes you can then save your changes to that chart file or export the data to a new chart file with a different name.

Viewing a component in live mode

You can view live data for a component by opening a **Chart** view. The **Chart** view displays a continuing live plot that updates according to the configurable sample rate. If a point has a history extension, the history

data is charted and live point values are added as they come in. If the point does not have a history extension, the chart contains only live point values.

Prerequisites: You are connected to a station that contains points.

You can open a **Chart** view on the following types of components to view a continuing live plot:

- a Boolean, Enum or Numeric point (with or without a history extension)
- a record in the **History** space
- a schedule
- a Chart widget on a Px page
- a chart file that points to any of the above items

NOTE: The system cannot accommodate an unlimited amount of points in a webChart.

Step 1 Expand the station home and right-click on a Boolean, Enum, or Numeric point.

Step 2 Select **Views→Chart**

The **Chart** view opens and begins plotting live data in the chart according to the component's configuration.

Viewing an existing Chart file

You can open a previously saved or exported `.chart` file to view the historical and live data or to modify the chart.

Prerequisites:

- Connection to a station containing .chart files

Step 1 Navigate to the station home `Files/Charts` file space.

NOTE: When working in a web browser, `.chart` files also may be located in the operating system User\Downloads folder. For example: `C:\Users\userName\Downloads`

Step 2 Double-click on the desired `.chart` file to launch the Chart view.

Step 3 If desired, make any changes necessary to affect data display, monitor performance or diagnose a problem.

When finished, you can close the chart view without saving, save the chart file with your latest changes, or export the modified chart to save it with a different filename.

NOTE: When you open an existing `.chart` file you have the options to **Save** or **Export** the view. When you open a new Chart view only the **Export** command is available.

Adding data to a chart

Using the drag and drop technique you can add data to a Chart view while the chart is rendering. You can add one or more control points, histories, schedules, as well as bookmarked ords (in a browser station connection) to a Chart view.

Prerequisites:

- Connection to a station.

The following types of data can be added to a web chart:

- control points (Boolean, Enum or Numeric points, with or without history extensions)
- history records
- schedules
- containers with multiple child components such as a points folder

NOTE: When adding a points folder to a web chart, only the first 10 histories are plotted.

- data from Series Transform

  NOTE: Series Transform data must have a timestamp property and a non-String value in order to resolve into a chart. Also, "live mode" and Delta values are not available.

- bookmarked ords (station connection in a browser)
- real-time and historical data managed by the Niagara Analytics Framework

Step 1 Expand the Station node in the Nav tree.

Step 2 Open a **Chart** view (open either a new chart view or an existing .chart file).

Step 3 Add data using any of the following methods:

Method	Description
Drag and drop a single component	In the Nav tree, click to select a component and then drag and drop onto the Chart view.
Drag and drop multiple components	Using **Ctrl** + **Click**, select multiple components, drag and drop onto the Chart view.
Click Add Series to select multiple components or a container	Click (Add Series), in the **Add Series** dialog expand the Nav tree and use **Ctrl** + **Click** to make multiple selections and click **OK**.
In a web browser station connection, drag and drop a bookmarked ORD	First, bookmark the source component's ORD, open a Chart view and then drag and drop the bookmarked ORD onto your chart.

Regarding how web charts display units of measure, when adding an additional component that has the same unit of measure, the Y-axis scale changes to accommodate the added data.

When adding an additional component with a different unit of measure, the units display along the opposite Y-axis.

And in a chart containing three or more different types of data the chart displays two different units on the Y-axis at a time but you can switch the units displayed on the Y-axis by clicking on the visibly dimmed axis label.

NOTE: In Niagara 4.2 and later, when adding a proxy point from a Supervisor to the web chart, if the point does not have a local enabled history extension and the remote point on the controller does, the chart attempts to resolve the history on the Supervisor and use it to initialize the web chart. In order to detect the matching history, the history must have already been imported or exported to the Supervisor.

Adding multiple bindings to a web chart in a Px graphic

In Niagara 4.2 and later, you can easily load and plot multiple points onto a web chart in a Px graphic by using the **`Wb View Binding`** chart property to resolve an OrdList.

Prerequisites:

- In Workbench, a Px file open in PxEditor mode
- **`webChart`** palette open

Step 1 In the **`webChart`** palette, click and drag a **`Chart`** widget onto the **PxEditor CanvasPane**.

Step 2 Double-click on the **`Chart`** widget to open the **Properties** dialog.

Step 3 Under the **`Wb View Binding`** property, click on the selection icon for the **`ord`** parameter.

Step 4 In the **ord** dialog, click the directory dropdown and click history Ord Chooser to select an OrdList.

Step 5 Click **PxEditor→Toggle View/Edit Mode**

In the Px graphic, the web chart displays rendering multiple sets of data points.

NOTE: Regardless of the number of bindings added in this procedure, only the first 10 display in the webchart.

Adding proxy points to a web chart

When adding the Niagara Proxy Point to a web chart on a Supervisor, if the remote point on the controller has a history, the chart attempts to resolve the history on the Supervisor and use it to initialize the web chart. Note that in order to detect the matching history, the history must already be imported or exported from the controller to the Supervisor. And, in order for the `n:history` tag to be added to subscribed points, you must first enable the **`Persist Fetched Tags`** property on the Supervisor's NiagaraNetwork.

Prerequisites:

- Connection to a Supervisor station and a subordinate station
- Discovered points (configured with history extensions) on the subordinate station

Step 1 Open the **Property Sheet** view of the Supervisor's NiagaraNetwork, and set the **`Persist Fetched Tags`** property to `true`.

Step 2 Right-click the Supervisor's History space and click **History Import Manager**.

Step 3 In the **History Import Manager** view, select the discovered Histories on the subordinate station's points that you want to import and click **Add**.

Step 4 In the Supervisor's NiagaraNetwork under the subordinate station, double-click on the Points folder to open the **Point Manager** view.

Step 5 Select the discovered points that you want to subscribe to and click **Add**.

Step 6 Under the Supervisor Config node, open a **Chart** view on any component, and drag the points (or the Points Folder) onto the web chart.

The Supervisor station is now subscribed to the points on the subordinate station. When you add one of the proxy points to a web chart, the chart checks for a local enabled history extension as a child on the proxy point. If found, it uses the local history extension's **`HistoryConfig`** property to determine the history to plot in the chart. If not found, it uses a computed `n:history` tag value if the history exists on the Supervisor.

When you drag a points folder (of proxy points) onto a web chart, the chart detects the matching histories and the `n:history` tags which were added to the points when imported or exported to the Supervisor and is able to resolve the histories and initialize the web chart.

NOTE: Regarding adding a proxy point to a chart on the Supervisor, the history data is still imported or exported by a corresponding history import/export descriptor that is configured separately. Also, that import/export descriptor controls how frequently the history data is updated on the Supervisor.

NOTE: The `n:history` tag is an implied tag that is also added to local control points if they have an active history extension child. The tag is not limited only to Niagara proxy points on a Supervisor.

Adding virtual points to a chart

When adding the Niagara virtual point (via dragging from the Virtual space or some other means) to a web chart on a Supervisor, if the remote point on the controller has a history, the chart attempts to resolve the history on the Supervisor and use it to initialize the web chart. Note that in order to detect the matching histories for the points from the subordinate station, the histories must be already imported or exported to the Supervisor

Prerequisites:

- Connection to a Supervisor station and a subordinate station

- Discovered and added points (configured with history extensions) from the subordinate station

Step 1 Open the **Property Sheet** view of the NiagaraNetwork virtual component under the Supervisor's Virtual space, and set the **`Persist Virtual Fetched Tags`** property to `true`.

NOTE: On the NiagaraNetwork, the **`Persist Virtual Fetched Tags`** property works in conjunction with the **`Tags to Fetch`** property.

Step 2 Right-click the Supervisor's History space and click **Niagara History Import Manager**.

Step 3 In the **History Import Manager** view, select the discovered Histories on the subordinate station's points that you want to import and click **Add**.

Step 4 In the Supervisor's NiagaraNetwork under the subordinate station, double-click on the Points folder to open the **Point Manager** view.

Step 5 Select the discovered points that you want to subscribe to and click **Add**.

Step 6 Under the Supervisor Config node, open a **Chart** view on a folder or other component, and drag one or more points from the Virtual space onto the web chart.

With the Supervisor station subscribed to the points on the subordinate station, when you drag one or more individual virtual points from the Virtual space onto a web chart on the Supervisor, it is able to resolve the histories and initialize the web chart.

Adding a hierarchy to a chart

In Niagara 4.2 and later, you can directly add a navigation hierarchy to a web chart. When adding a **Hierarchy** node to a web chart on a Supervisor station, the chart navigates through the node looking for the hierarchy children based on the hierarchy definitions of that particular node, resolves them and initializes the web chart.

Prerequisites:

- **`Persist Fetched Tags`** property in the Supervisor's NiagaraNetwork is set to `true`
- An existing Hierarchy node in the Hierarchy space where all devices, points and other components are already tagged and any necessary relations are already added.
- Connected to a Supervisor station and subordinate station with hierarchy
- Discovered hierarchy child points (configured with history extensions) on the subordinate station

Step 1 In the Nav tree, right-click on the Supervisor's **History** space and select **Views→Chart**.

Step 2 From the **Hierarchy** space select the **Hierarchy** node you want to resolve and drag it onto the Chart.

The Hierarchy children under a **Hierarchy** node are added based on the Hierarchy LevelDef's (Query, Relation, Group and List LevelDef's) in the hierarchy definition.

When you drag a Hierarchy node to a webChart, the chart traverses through the Hierarchy children inside the node to find the furthest descendants (ones that have no children), examines those objects for any history extensions and plots their history. If no history extensions are found the webchart is initialized with data from the furthest descendant children of that **Hierarchy** node.

NOTE: Regardless of the number of hierarchy children in the node, only the first 10 display in the webChart.

Editing a chart title

When you open a Chart view on a component, the default chart title is based on component name. However, the title is an editable text field that you can modify as needed.

Prerequisites:

- Chart view open in Workbench or browser

Step 1 In the Chart view, click anywhere on the chart title text.

An editable text field displays with the current title selected.

Step 2 Type desired text and press `Enter`.

The revised chart title displays.

NOTE: On export, by default the filename that is based on the chart title. The filename can be changed during the export dialog

Hiding/showing chart data

A toggle effect allows you to alternately Hide or Show individual data plots displayed in a Chart view.

Prerequisites:

- Chart view open in Workbench or browser

Step 1 In the Chart view legend (opposite the chart title), click on a colored component icon.

The icon displays a hollow center and the data plot for that component disappears from the Chart view.

Step 2 Click the component icon once more to show the data on the Chart.

Removing data from a chart

You can easily remove data from a Chart view.

Prerequisites:

- Chart view open in Workbench or browser

Step 1 Remove data from the chart by one of the following methods:

- In the Chart view legend (opposite the chart title), right-click on the component you wish to remove and select `Remove from chart`.
- Right-click the Y-axis unit label for the component you wish to remove and select `Remove from chart`.

Setting a time range on a chart

You can configure the **Time Range** on a chart using pre-set options or by entering a custom range. The time range configuration is included in a chart file on Export or Save.

Prerequisites:

- Chart view open in Workbench or browser

The following procedure describes how to set a custom time range on a chart.

Step 1 In the Command Bar, click on the **Time Range** dropdown list and select the `Time Range` option.

Step 2 In the **Time Range** dialog **Start time** field, enter a specific start time using this format:

`yyyy-mm-dd hh:mm:ss:sss`

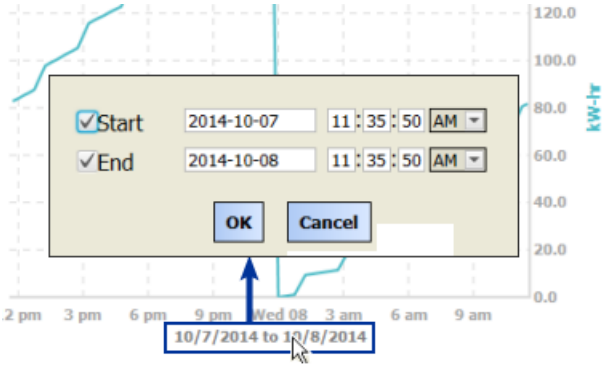
Step 3 If desired, click the **End** check box and enter a value for the end of the range.

NOTE: Providing an End time is optional. Leaving it blank allows live data to continue plotting.

Step 4 Click **OK.**

The Chart view updates immediately with the new time range.

NOTE: Whenever `Time Range` is the selected option shown in the dropdown list, you can easily make subsequent changes to the range by clicking on the time range where it is displayed below the Y-axis at the bottom of the chart, as shown here:



Displaying status colors

Displaying status colors makes it easy to determine the current state of a component. Also, for a component with a history extension, you can use status coloring in a chart to view trends of when the component was in alarm. A toggle effect in the Command Bar allows you to turn on or off the status coloring display. Alternately, you can configure chart Settings to display status colors and on Save or Export, this configuration is included in the chart file.

Prerequisites:

- Open chart view in Workbench or browser
- Component with a configured alarm extension

When `Status Coloring` is enabled a line chart displays a colored dot for each plot. When the status of the component is "ok," the dot color is the same as the line color. When the current status of the component is other than "ok" the dot color is the appropriate Niagara status color, for example: purple=overridden, red=alarm, yellow=down, etc. Additionally, the mouseover Value popup background color changes to match the status color and the Fixed Data popup displays status coloring.

Shade charts and Bar charts also display status colors via a color band at the top of each shaded area or bar. When the current status of the component is other than "ok" the color band changes to the appropriate Niagara status color.

The following procedure describes configuring chart settings to display status coloring.

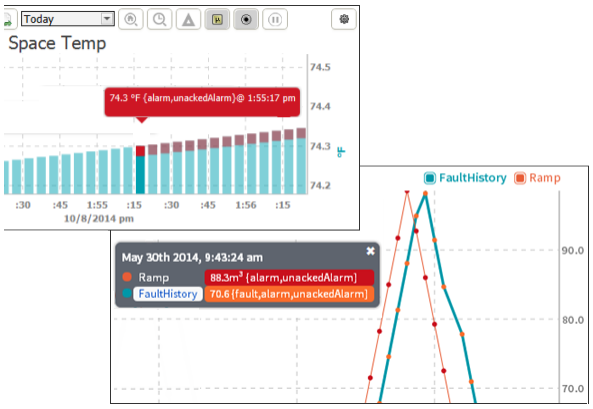
Step 1 Click the **Settings** icon in the upper right corner of the chart view.

Step 2 Click the **Layers** tab.

Step 3 Beside the default value for `Status Coloring`, click the selection icon and select `On`.

Step 4 Click **Ok**

The chart view updates, displaying status colors for any component with an other than "ok" status, as shown here.



Displaying sampling optimizations

Sampling improves chart rendering performance and it smooths out the chart data somewhat which can make it easier to interpret. By default, auto-sampling automatically turns on when the focused data set exceeds 2500 data points, and automatically turns off when a data set is below 2500. Additionally, a toggle effect allows you to alternately turn On or Off the sampling optimizations for any size data set.

Prerequisites:

- Open Chart view (in Workbench or browser) on a component that has a history extension with large amount of data

Step 1 Click (**Sampling**) to turn on sampling.

The chart is rendered using the optimized data set.

NOTE: When on, the Sampling icon in the command bar appears selected (has a gray background) .

Step 2 Click the **Sampling** button to turn off sampling.

NOTE: In addition to turning off sampling, it no longer turns on and off automatically with the size of the focused data set. It remains disabled until you reload the page.

Configuring sampling settings

Configuring sampling settings can improve chart performance and make the data easier to view and interpret.

Prerequisites:

- Open Chart view (in Workbench or browser) on a component that has a history extension with at least 200 data points. The number of data points in a chart can be determined by viewing the **`Available Data Points`** as shown in the **Settings→Sampling** tab.

This procedure describes turning on sampling and setting the sample size to reduce the number of data points in the chart. This is useful for devices with a small amount of memory, you can avoid loading a large chart on the device.

Step 1 Click the **Settings** icon

Step 2 In the **Settings** dialog, click the **Sampling** tab.

Step 3 On the Sampling tab, click the checkbox to deselect **`Auto Sampling`**.

Value = `false`, auto sampling is disabled.

Step 4 Click the checkbox to turn on **`Sampling`**

Value = `true`, sampling is turned on.

Step 5 In **Sample Size** field, change value to less than that shown in the Available Data Points field. For example, if Available Data Points are 200, change Sample Size to `100`.

Step 6 Click **OK**.

Sampling is turned on, The chart is immediately replotted according to sampling settings. The effect of this change on a line chart, for example, is that the line appears more segmented, you see fewer data points in the chart, which can make it easier to see individual data points and and interpret the data.

NOTE: The whole data set still exists but not all points are shown in the chart.

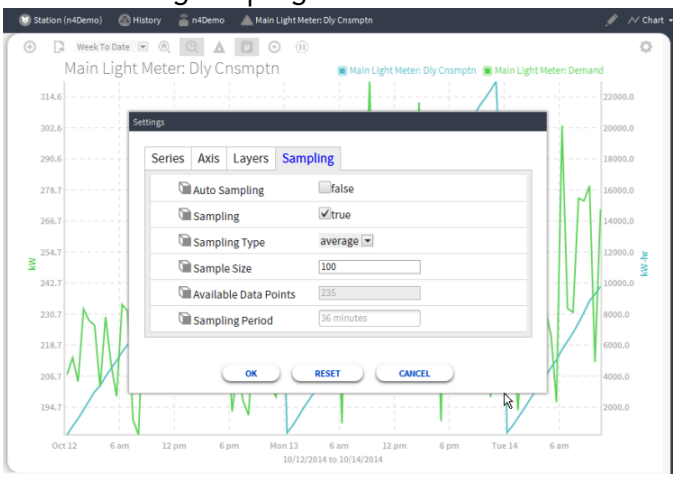
Step 7 Once sampling has begun, the sampling period is shown adjacent the time range summary at the bottom of the chart. Click on the sampling text to easily reopen the Sampling tab.

Notice the added property, **Sampling Period**, is now visible. The read only field displays an average of the amount of time between each of the points that have been sampled.

Step 8 Click **OK**.

At this point, you can export or save the chart with the sampling changes or turn sampling off if no longer needed. To turn off sampling, simply click to deselect **Sampling** in the **Command Bar**. The chart is immediately redrawn using the whole data set.

NOTE: Turning Sampling off in this manner also turns off Auto Sampling behavior until the chart is reloaded.



Zooming on a chart

There are many ways to change the zoom level on a chart. You can use options in the Command Bar and Settings dialog, as well as mouse action and keystroke combinations.

Command bar options

Two zooming commands are available in the **Command Bar**:

- **Home Zoom**

  Selected by default, zooms to the X-axis of the primary data set. If you change the zoom level, you can click the **HomeZoom** button in the Command Bar to revert to the original zoom level.

  NOTE: If the primary data set is numeric, the default zoom level focuses on the Y-axis.

- **Time Zoom**

  Zooms on the X-axis to show the time period specified in the **Time Range** dropdown menu.

Settings option — Data Zoom Scope

Located in the **Settings→Axis** tab.

Options	Description
`primary`	Selected by default, zooms to the X-axis of the primary data set only. If the primary data set is numeric it zooms on the Y-axis.
`all`	Changes the X-axis to accommodate all available data, including live data as it comes in.

Mouse and keystroke zooming controls

Numerous zooming actions are possibly using a combination of mouse wheel actions and keystrokes. Roll the mouse pointer over the tick labels on either X- or Y-axis until the pointer changes to a double arrow and do any of the following:

To do this	Use this keystroke + mouse action
Zoom out X and Y	Alt + Roll mouse wheel Down
Zoom in X and Y	Alt + Roll mouse wheel Up
Zoom out X axis only	Roll mouse wheel Down
Zoom in X axis only	Roll mouse wheel Up
Zoom in X and Y axis by power of 2	Alt + Double click
Zoom out X and Y axis by power of 2	Alt + Shift + Double click
Zoom in X axis by power of 2	Double Click
Zoom out X axis by power of 2	Shift + Double click
Pan X and Y	Alt + Click and drag
Pan X axis Only	Click and drag
Zoom top Y, lock bottom Y	Drag +Y axis tick label
Zoom bottom Y, lock top Y	Drag -Y axis tick label
Zoom Left time, lock Right Time	Drag X axis tick label

Phone zooming controls

The following typical touch zooming action is available when using a phone or tablet.

To do this	Use this touch action
Zoom in/zoom out	Touch the screen with two fingers and slide them apart (zoom in) and back together (zoom out)
Zoom X-axis	Drag on the X-axis
Zoom Y-axis	Drag on the Y-axis
Pan (left or right)	Drag your finger across the screen

Exporting a chart (Workbench or browser)

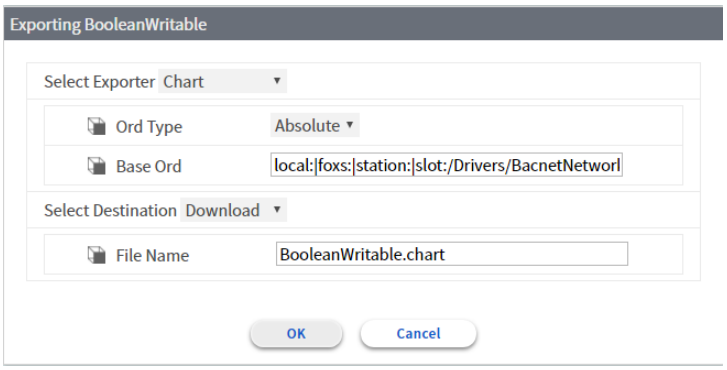
You can export a Chart view as a chart file (`chartName.chart`) or as a csv file (`chartName.csv`).

Prerequisites: Chart view open in Workbench.

NOTE: In Niagara 4.6 and later, there is added support in web charts for resolving relative ords. When exporting a web chart there is now an option to specify Absolute or Relative ord types. Once you finish configuring a web chart (e.g. setting time range, colors, chart types, etc.) and export the chart to a file using the Relative ord option, the chart file can be embedded in a relative Px page assigned to components in the station which match the same base ord structure.

Step 1 In the **Command Bar**, click (**Export**).

Step 2 In the **Export** wizard, do the following:

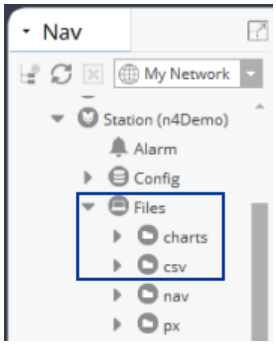
Action	Description
Select File Type	`chart` (default) or `csv`
Select Ord Type	`Absolute` (default) or `Relative`. **NOTE:** For the Relative and Absolute ord type, the additional **`Base Ord`** property displays in an editable field. 
Select Destination	`Station` **NOTE:** In Workbench, `Station` is the only option available. While in web browser two options are available: the `Station` file space, Download to your operating system user space.
Select View on Export	`true` or `false` (default)

Step 3 If `csv` file format is chosen, following additional properties are displayed:

Action	Description
Include Headers	`true` or `false` (default)
Include BOM	`true` or `false` (default)
Encode To String	`true` or `false` (default)
Use CRLF Line Endings	`CRLF (\r\n)` or `LF (\n)` (default)
Delimiter	Enter the delimiter for the file.
Status Column	`true` or `false` (default)
Max Records	text

Step 4 Click **OK**.

The file is exported to the selected destination.



NOTE: Most options in the **Command Bar** provide fine tuning for viewing purposes only. Changes made with those options are of a temporary nature and are not included when the chart is saved or exported. For example, if you turn on time zoom and Delta using buttons in the command bar and then export the chart, the chart file displays with the original default settings for those options. Exceptions to this are changes made with the `Time Range`, `Sampling`, and `Status Coloring` options, which are included on export or save.

If you want to export the chart and retain all of the changes that you have made, you need to do the following:

1. Export the modified chart to a Station File.
2. Create a **Px** view for this chart and load the exported Station File to this **Px** view. The chart will display with the modifications included.

Creating a Default Options chart file

In Niagara 4.4 and later there is added support for creating a Default Options chart file. The defaultOptions file does not exist automatically, rather you must create and save an appropriately named file. It is used to configure common settings on the **Axis**, **Layers** and **Sampling** tabs plus the **Time Range**. Chart files will load their options from this file if it exists and the user has permissions to view it.

Prerequisites:

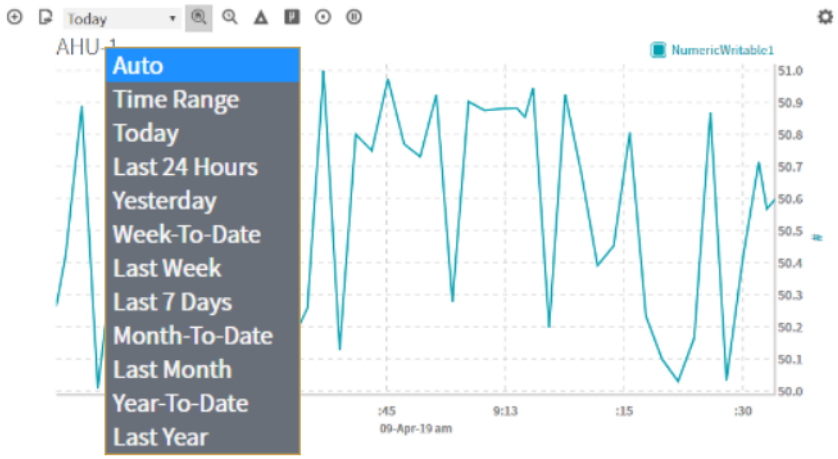
- You have a station connection open in Workbench.
- There is an existing Px page on the station that contains a WebChart widget.

In prior releases, if you were not using a chart file to load a WebChart, there was no way to preset any options. In Niagara 4.4 and later, in a Px page the WebChart widget (WebWidget) has an added property named defaultOptions with a default ord of `file:^charts/defaultOptions.chart`. The property is used to configure a source chart file which defines settings used each time the WebChart loads. Even when not on a Px page, WebChart files will load their options from this file if it exists and the user has permissions to view it.

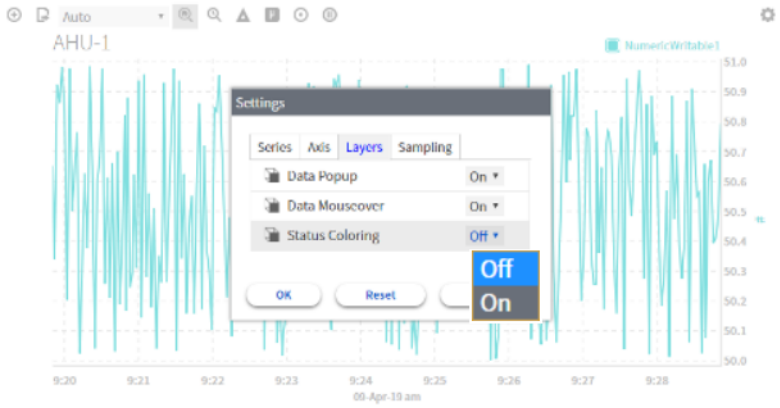
NOTE: The defaultOptions file is used only to configure common settings on the **Axis**, **Layers** and **Sampling** tabs plus the **Time Range**.

Step 1 Open the Px page and in **PxViewer** mode.

Step 2 In the chart set your preferred **`Time Range`** (e.g., click the dropdown and select **Auto**).



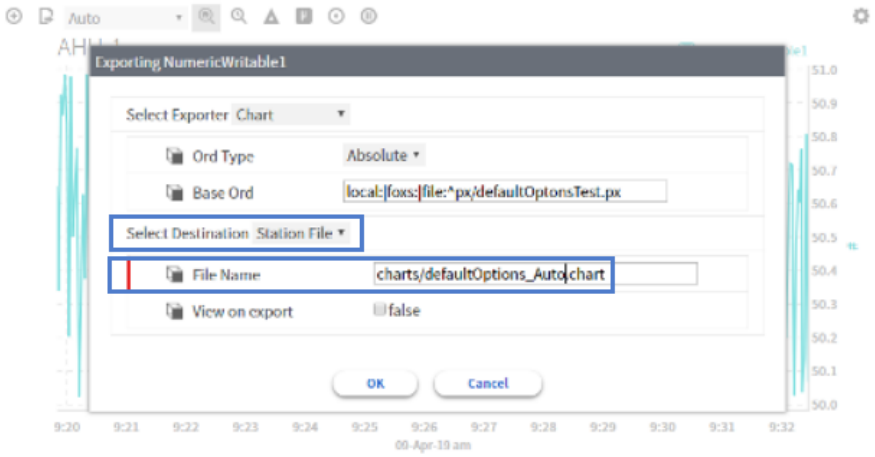
Step 3 Click on the chart **Settings** icon and select your preferred settings for charts. As an example, on the **Layers** tab, click the **Status Coloring** dropdown, set it to **On** and click **OK**.



Step 4 Click the chart **Export** icon and in the **Exporting** window make the following selections:

a. Click the **Select Destination** dropdown and click on **Station File**.

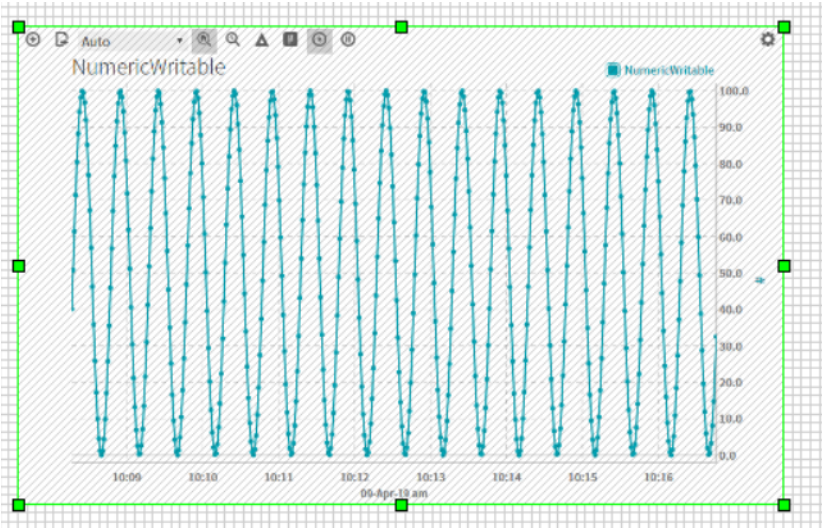
b. In the **File Name** field, edit the file name as needed.



Step 5 Click **OK** to export the default options file.

Your preferred chart settings are exported to this location in the station: `file:^charts/defaultOptions_Auto.chart`

To use your new default options file, simply add another webchart to the Px page and in **PxEditor** view, double-click on the chart to open the **Properties** window. For the **`defaultOptions`** property, enter the name of your newly exported defaultOptions file and click **OK**. The chart now shows the Time Range and Status Coloring settings as those saved to the exported defaultOptions file.



Note that you can create and export multiple chart files saved with different file names, each with different settings that you commonly use. Each WebChart widget in a Px view can use a different chart file to load the WebChart with different options.

Chapter 2 Web charts reference

Topics covered in this chapter

- webChart-ChartWidget
- webChart-CircularGaugeWidget
- workbench-WebWidget
- workbench-WebBrowser
- jxBrowser-JxWebBrowserImpl
- workbench-WebBrowserView

Charting views and components are described in detail in the following topics.

webChart-ChartWidget

Located in the **webChart** palette, this bajaux HTML5-based WebWidget component allows you to add a Chart widget to a Px page or Hx page, or to a Dashboard pane. The widget allows you to create, modify, and render dynamic, interactive web-based charts in Workbench or in a late version HTML5-capable browser.

Enhancements in Niagara 4.2

Niagara 4.2 provides the capability to render data from Proxy Points and Virtual Points added to a web chart from a Supervisor. For details, see About adding data from a supervisor, page 33.

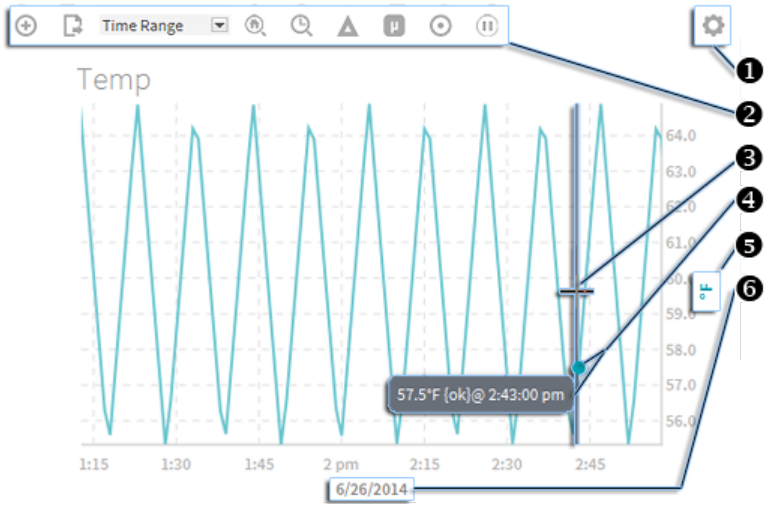
Another supported feature is adding multiple bindings to a web chart in a Px graphic. Using **PxEditor** you can configure the Wb View Binding property to resolve an OrdList. For details, see Adding multiple bindings to a web chart in a Px graphic, page 9

About the Chart view

The **Chart** view (shown below) is the default view for History records in Workbench and in the HTML5 Hx profile, and a secondary view on schedules, as well as Enum, Numeric, and Boolean points.

NOTE: Legacy charts, those created in earlier releases, are available as secondary **History Chart** views on History records.

Figure 1 Chart view description



❶ Settings icon — click to access chart Settings dialog

❷ Command bar — click icons to launch chart commands

❸ Cursor position indicator

❹ Data Value popup — displays when cursor is on a point

❺ Y-Axis label — default orientation of Y-axis for primary data

❻ X-Axis label — default orientation of X-axis. Once you have defined a specific `Time Range` for the chart, you can click this label to reopen the **Time Range** dialog to modify the range.

Data that can be rendered in a chart includes historical data, live historical data, live data, as well as schedules.

Although chart type is configurable via the **Settings→Series** tab dialog, the default chart type is determined by the type of data being presented. For example:

Component type	Default chart type
Numeric histories and points	Render as lines with interpolation, display as a line chart.
Numeric schedules	Render as discrete lines with no interpolation, display as a line chart.
Boolean and Enum points	Render as shaded areas referred to as "swim lanes," displayed as a shaded chart. Opacity of the swim lanes fill is based on the ordinal of the Enum.
Boolean and Enum schedules	Render as shaded areas referred to as "swim lanes," displayed as a shaded chart. Opacity of the swim lanes fill is based on the ordinal of the Enum.

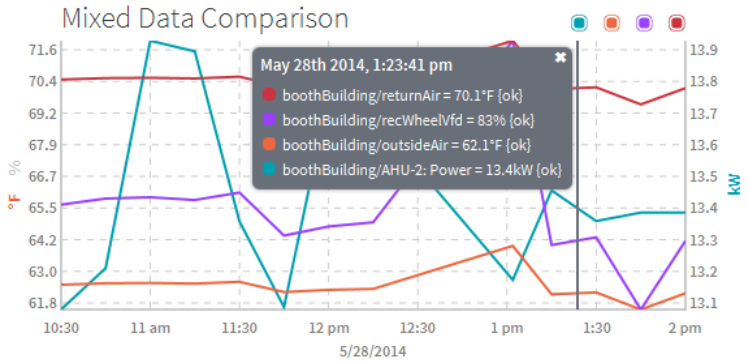
Different types of data (Numeric and Boolean or Enum) can be combined on the same chart. In that situation, the swim lanes representing Boolean and Enum data display with a dimmed opacity to allow you to more clearly view the lines representing the numeric data. Also, you can modify the default chart type of one or more components in a chart. For example, you can set a boolean writable point to display bars while the data for another component plots a line.

The interactive Chart view allows you to make modifications while a chart is rendering. For example, while viewing a chart you can add one or more points, history records, schedules, or even containers of data such as a points folder or a hierarchy component.

When adding data to a chart, the Y-axis automatically adjusts the units and can accommodate different units of measure by displaying multiple Y-axes. On a chart containing data with three or more different units of measure, such as that shown below, the display still shows dual Y-axes. You can switch the units displayed on the secondary Y-axis by clicking on the dimmed axis label. For example, on the left-side Y-axis in the figure below, the dimmed % symbol indicates an alternate Y-axis with percent as the unit of measure. Clicking that **%** symbol switches the Y-axis units from displaying degrees to percent.

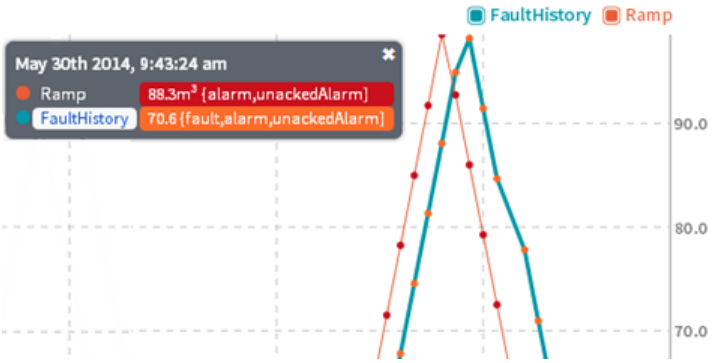
You can alternately hide or show specific data or even completely remove data from a chart via the right-click menu. Additionally, chart settings permit you to customize the appearance of a chart via selectable data colors and chart type per component, axis orientation, data source zooming, as well as permitting you to turn on or off the chart grid, background color, data popups, and status colors.

Figure 2 Multiple Y-axes accommodate data with different units of measure



Web charts utilize standard Niagara status colors to indicate current status. As shown in the chart below where the Status Coloring command is invoked, a red dot indicating `Alarm` status marks each plot in the **Ramp** line while an orange dot indicating `Fault` status marks each plot in the **FaultHistory** line. Also, status colors shown in the Fixed Data Popup dialog confirm the status of charted data.

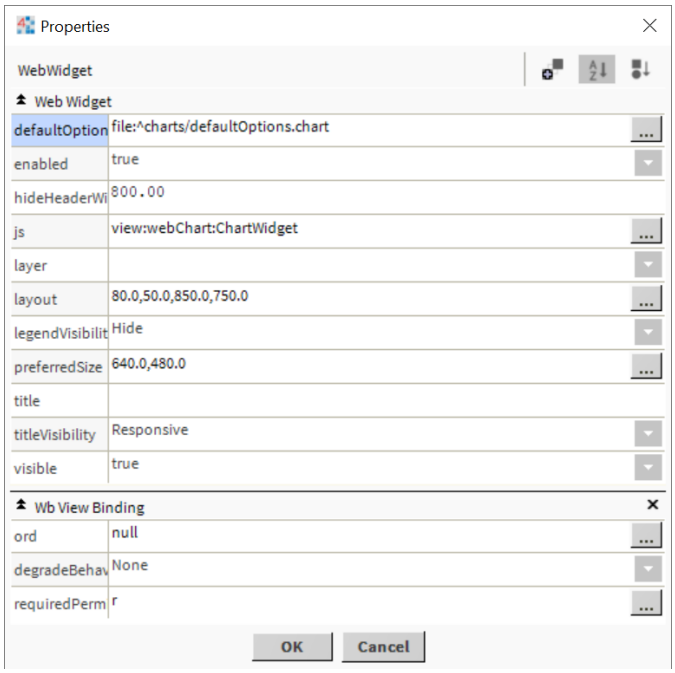
Figure 3 Line chart displaying status colors



Shade and Bar charts also display status colors. When enabled, if there is a non-ok status a color band at the top of the shaded area or bar indicates the status.

Configurable properties for the Chart widget

Figure 4 Chart widget properties



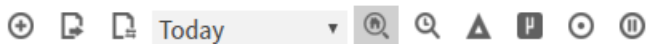
Property	Value	Description
defaultOption	file:^charts/defaul-tOptions.chart	Provides ord for the defaultOption widget. You can browse to select another widget.
hideHeaderWidth	number	All headers are visible when you set the value 800 pixel and above.
Visible	true (default), false	Enables/disables display of the widget.
Enabled	true (default), false	Enables and disables use of the component.
Layout	Default values: X=0.00, Y=0.00, Width=000.00, Height=000.00 Fill=on, off (default)	Provides X and Y positioning coordinates for the widget as well as, Width, Height, and Fill. X and Y units can be specified as Absolute or Percent. While Width and Height dimensions can be specified as Absolute, Percent, or Preferred units. The Fill checkbox turns fill on or off.
Js	view:webChart: ChartWidget (default)	Provides ord for the Javascript widget. You can browse to select another widget.
layer	drop-down	null
legendVisibility	drop-down	Provides legendVisibility as per set value. (for example `Responsive`, `Show`, `Hide`)
preferredSize	Default values: Width=000.00, Height=000.00	preferredSize can use to set the values of height and width of widgetbar.
title	text	You can add the title.

Property	Value	Description
titlevisibility	drop-down	Provides titleVisibility as per set value. (for example `Responsive`, `Show`, `Hide`)
wbViewBinding	Binding null —>WebWidget (default)	Provides ord for bound label. You can browse to select the Ord. Also provides selectable options for Degrade Behavior (None, Disable, and Hide).

Chart commands

Options in the **Chart** view **Command Bar** allow you to fine tune data presentation.

Figure 5 Command Bar

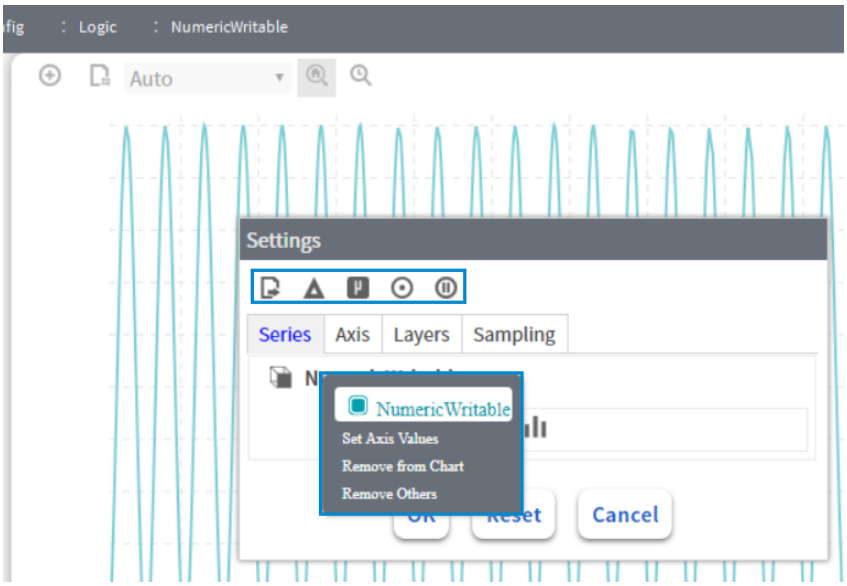


NOTE: Most options in the **Command Bar** provide fine tuning for viewing purposes only. Changes made with those options are of a temporary nature and are not included when the chart is saved or exported. For example, if you turn on time zoom and Delta using buttons in the command bar and then export the chart, the chart file displays with the original default settings for those options. Exceptions to this are changes made with the `Time Range`, `Sampling`, and `Status Coloring` options, which are included on export or save.

If you want to export the chart and retain all of the changes that you have made, you need to do the following:

1. Export the modified chart to a Station File.
2. Create a **Px** view for this chart and load the exported Station File to this **Px** view. The chart will display with the modifications included.

Figure 6 Narrow chart width changes the chart display (Niagara 4.6 and later)



Any time the chart width is less than 800 pixels the following changes in the chart occur. This prevents the chart from appearing overcrowded which helps maintain legibility. Once the chart window is resized to greater than 800 pixels, the changes revert.

- Chart title and data series legend become hidden.
- Several of the commands icons move from the chart **Command Bar** into the **Settings** window.

- In the **Settings** window, a right-click menu is available on data series in the **Series** window. The right-click menu allows you to hide or show specific data or even completely remove data from a chart.

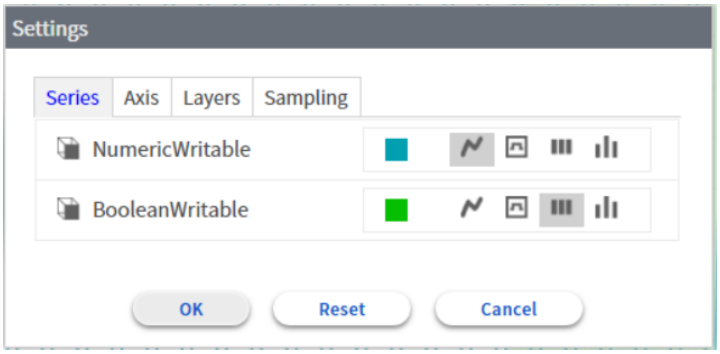
Command Bar	Options	Description
Add Series		Add components to the chart. Select one or more components via the File Chooser. Use `Ctrl + Click` to select multiple individual components or select a folder that contains multiple components.
Save Chart		Available only when you open an existing `.chart` file and make changes. `Save Chart` — saves the file (chart or csv format) to the Station space (`Files/charts/chartName.chart` or `Files/csv/chartName.csv`).
Export Current View or Object	• `Select Exporter` • `Ord Type` • `Base Ord` • `Select Destination` • `File Name` • `View On Export`	Available in a new chart and when you open an existing chart file. **`Select Exporter`** — Choose the exported file type. Options are `Chart` (default), `CSV`, and in a browser connection `Print` is also available. **`Ord Type`** — `Absolute` or `Relative` (default) . **NOTE:** InNiagara 4.6and later, there is added support for "relativized" Ords to better accommodate Px page reuse. **`Base Ord`** — Used only for chart exports with the Relative Ord Type. Allows you to specify a base ord to use to "relativize" all of the ords in the series for that chart. **`Destination`** — (in Workbench) — `Station File` Exports file to station File space (`Files/charts/chartName.chart`) or (`Files/csv/chartName.csv`)
Time Range **Time Range**	• `Auto (default)` • `Time Range` • `Today` • `Last 24 Hours` • `Yesterday` • `Week To Date` • `Last Week` • `Last 7 Days` • `Month To Date` • `Last Month` • `Year To Date` • `Last Year`	Specifies time range for data display. Selecting the `Time Range` option launches a window where you can enter custom **`Start`** and **`End`** times for the range. Leave the **`End`** time property blank for live data to continue plotting on the chart.
Toggle Home Zoom	• `On` (default) • `Off`	Turns On/Off Home Zoom.

Command Bar	Options	Description
		`On` — zooms to the X-axis of the primary data set. **NOTE:** If the primary data set is numeric, it zooms on the Y-axis. `Off` — reverts to Home Zoom.
Toggle Time Zoom	• `On` • `Off` (default)	Turns On/Off Time Zoom. `On` — zooms X-axis to the time period specified by the **Time Range** drop-down list. `Off` — reverts to Home Zoom.
Toggle Delta Command	• `On` • `Off` (default)	Turns On/Off Delta. `On` — plots the rate of change between points. `Off` — resumes plotting data points.
Toggle Sampling Command	• `On` • `Off` (default)	Turns On/Off Sampling. `On` — sampling is enabled `Off` — turns off sampling and disables auto-sampling behavior.
Toggle Status Coloring	• `On` • `Off` (default)	Turns On/Off data Status Coloring. `On` — displays data points with status colors in a line chart and in shade or bar chart displays a status color band at the top of each bar. `Off` — hides status coloring, data points/ color bands.
Toggle Pause	• `On` • `Off (default)`	Turns On/Off pause in live data plotting. `On` — pauses live data plotting. No longer in live mode when paused `Off` — resumes live data plotting
Stop	• `On` • `Off (default)`	Visible only during data loading. Turns data chunking On/Off. `On` — stops the data chunking process, halts data coming from the server. While stopped, the button displays a red border. `Off` — reloads all of the data.

Chart settings

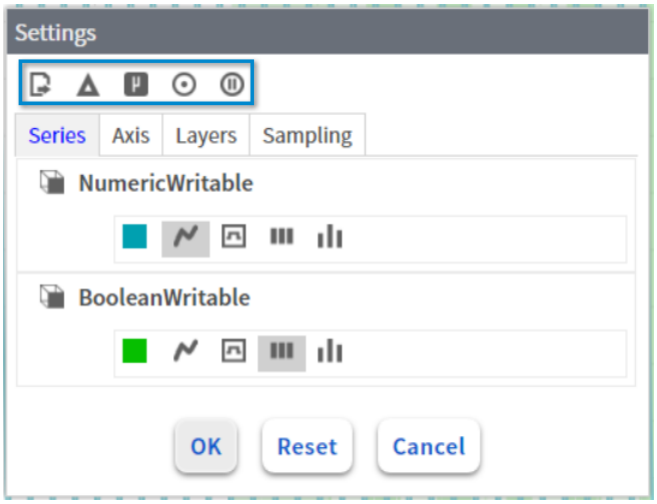
Options in the **Chart** view **Settings** window allow you to make data presentation changes that are of a persistent nature, meaning the changes are retained when the chart is exported or saved.

Figure 7 Settings Window in Workbench

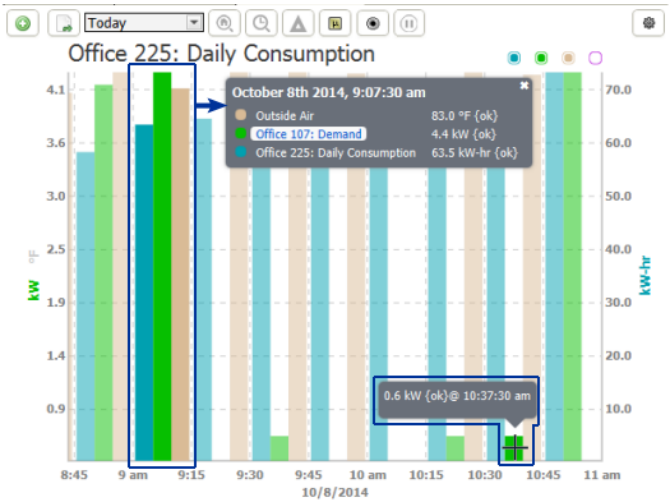


NOTE: In the Niagara 4.8 Workbench and later, if the chart width is less than 800 pixels several of the chart commands icons are moved into the **Settings** window above the tabs. When the chart is resized wider than 800 pixels, those icons revert back to the Commands Bar in the chart.

Figure 8 Commands icons in the Settings window



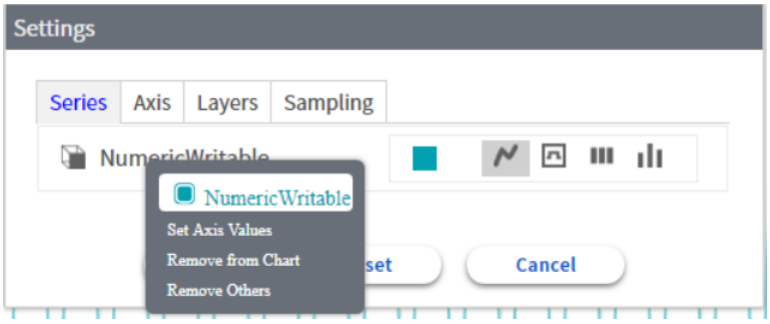
Series tab

Settings	Options	Description
Color	Color block assigned to each component	Change default data color by clicking color block and selecting different color via Color Picker.
Chart type	• Line, • Discrete line, • Shade, • Bar	Line — plots a smooth line with interpolation. The default chart type for Numeric points and histories. Discrete line — plots a "stepped" line without interpolation. Shade — plots shaded areas, known as "swim lanes," representing state change. The default chart type for Boolean and Enum points. Bar — plots vertical bars. Samples data into common intervals based on available width, When you have more than one component in a chart using bar chart type, they become a Bar Group, where the individual bars are adjacent (no space between). As shown below, clicking on a Bar Group selects the entire group and the values for all components in the group are shown in the Fixed Data Popup. While the mouseover Data Value Popup, shows the value of a single component. 

Right-click menu

A right-click menu is available on data series in the **Series** tab. The right-click menu allows you to hide or show specific data or even completely remove data from a chart.

Figure 9 Right-click menu options



Axis tab

Settings	Options	Description
Y-Axis Orientation	• left • right (default)	Aligns Y-axis of primary data to either the left or right side of the chart.
Data Zoom Scope	• primary (default) • all	Sets the Data Zoom Scope to primary or all. Primary — zooms to the X-axis of the primary data set only. If the primary data set is numeric, it zooms on the Y-axis. All — changes the X-axis to accommodate all available data, including live data as it is recorded.
Show Grid	• true (default) • false	Turns on/off the chart grid. true — the grid displays in chart behind data. false — the grid does not display.
Background Color	• On • Off (default)	Turns on/off the background area color for the current theme. On — the background area color displays in chart behind data. Off — the background area color does not display.
Chart Cursor	• Crosshair (default) • None	Sets the appearance of mouse pointer while positioned over a chart. Crosshair — the mouse pointer appears as a crosshair. None — turns off the mouse pointer visibility (while positioned over a chart), hiding it completely.
Facets Limit Mode	• Off (default) • Inclusive • Locked	Configures whether the WebChart uses a point's facets for **Min** and **Max**. Off (default) — the WebChart ignores a point's facets for **Min** and **Max**. Inclusive — the WebChart includes a point's facets for **Min** and **Max**. Locked — forces the WebChart to use a point's facets for **Min** and **Max**. **NOTE:** In each of these settings **chartMin** and **chartMax** facet keys can be used as a higher priority substitute to "min" and "max". Even if the Facet Limit Mode is "Off" it can be overridden for specific series if a facet key of **chartLimitMode** is supplied with the corresponding values of "Inclusive" or "Locked".

Settings	Options	Description
		NOTE: Previously, if you were not using a chart file to load a WebChart, there was no way to preset any options. In Niagara 4.6 and later, there is a **`Default Options`** WebProperty on a Px page which you can modify to preset WebChart default options. By default, modifications are saved to `file:^charts/defaultOptions.chart`. Even when not on a px page, non-chart files will load their options from this file if it exists and the user has permissions to view it. This includes the ability to change all options, so even the default time range can be preset.
`Show Start Trend Gaps`	• `Yes` (default) • `No`	Configures the behavior when drawing the chart line, providing a visual indication (a line gap) of an interruption in data collection. For example, a station restart or that history collection was disabled and re-enabled. `Yes` — if there is a start trend flag on a record the chart does not connect the dot for that record to the previous record, resulting in a gap in the line `No` — allows the dots to be connected, eliminating any such gaps.
`Show Data Gaps`	• `Yes` • `No` (default)	Configures the behavior when drawing the chart line, it providing a visual indication (a line gap) for records that have either the hidden flag set or invalid values (+inf, -inf, NaN). `Yes` — if a record has a hidden flag set or invalid values (+inf, -inf, NaN) the record's dots are not connected to adjacent records. `No` — if a record has a hidden flag set or invalid values (+inf, -inf, NaN) the record's dots are connected to adjacent records.

Layers tab

Settings	Options	Description
`Data Popup`	• On (default) Displays • OffPauses	Enables/disables the **Fixed Data** popup. `On` — clicking on chart data displays the recorded date and time, as well as the name, value and status for each component in the chart at the point where you click. The persistent data popup remains visible until you close it. `Off` — suspends display of fixed data popup.
`Data Mouseover`	• On (default) • Off	Enables/disables the mouseover **Data Value** popup. `On` — mouse position on chart data displays the recorded component value, status, and the time for that mouse position. `Off` — suspends display of mouseover data value popup.
`Status Coloring`	• On • `Off` (default)	Turns On/Off data status coloring. `On` — displays data points with status colors in a line chart and in a bar chart displays a status color band at the top of each bar. `Off` — hides status color data points/color bands in the chart.

Sampling tab

Settings	Options	Description
`Auto Sampling`	• `true` (default) • `false`	Enables/disables automatic sampling optimizations. `true` — automatically begins sampling if the focused data set exceeds 2500. `false` — automatically stops sampling if the focused data set is below 2500.
`Sampling Type`	• `Average` (default)	Sets the Sampling type.

Settings	Options	Description
	• Min • Max • Sum	Average - samples average values for the selected rollup period. Min - samples minimum values for the selected rollup period. Max - samples maximum values for the selected rollup period. Sum - samples the total of the values in the selected rollup period.
Desired Period	• Best Fit (default) • 1 Minute • 15 Minutes • 30 Minutes • Hour • Day • Week • Month • Year • Custom	Configurable setting allows you to choose the desired sampling interval. By default, set to Best Fit which finds the best sampling period that fits the page that is one the standard collection intervals which are: Year, Month, Day, Hour, 30 minutes, 15 minutes,1 minute, and other smaller common intervals.
Sample Size	2500 (default)	Specifies the number of points in the data set to sample. Range is 1–50000. **NOTE:** The default auto sampling size is configurable in the system.properties file.
Sampling	• true • false (default)	Enables/disables sampling for any size data set. true — turns on sampling false — turns off sampling **NOTE:** For performance reasons, sampling cannot be turned off once the focused data set exceeds 50,000. This threshold is configurable in the system.properties file.
Data Points	Read only	Displays the maximum number of points in the data set that are available to sample.
Sampling Period	Read only	Visible only once sampling has begun, displays the calculated average of the amount of time between each of the points that have been sampled.

About sampling

Sampling uses a simple roll-up technique to get large data sets down to a manageable number of points. This improves chart rendering performance and it smooths out the chart data somewhat which can make it easier to interpret.

Rollup (or Rollup Interval) is an interval of time that is used to determine what (and how) data is presented in your chart. The effect is that rollup groups the data into auto-configured intervals. Each point displayed, using the rollup, represents a designated time interval before the specified plot time. This interval is a stat that can be seen in the Settings window **Sampling Period** property (only visible once sampling has begun).

When the focused point array is larger than 2500, roll-up buckets are created and calculated based on the available time based on total duration/2500. The roll-up amount is rounded up to the next highest time increment. For example, if the calculated roll-up bucket is 2.5 hours, a roll-up bucket of 3 hours is used and the roll up will start at an even increment. So if the first entry is 2:35 am, then the first rollover bucket will be 2:00 and the next bucket will start at 3:00.

Auto-Sampling turns on automatically if the focused data set exceeds 2500 and turns off automatically once the focused data set is below the 2500 threshold.

Sampling is on if the **Chart** view **Sampling** command is selected. Alternately, in the settings **Sampling** tab, you can turn on sampling by disabling Auto Sampling and setting **`Sampling`** to `true`. Additional settings allow you to configure the Facets Limit Mode, Show Start Trend Gaps or hide them, and Show Data Gaps.

Sampling enhancements

In Niagara 4.1 and later, enhancements in sampling protect against an unlimited number of points in a web chart consuming all available memory on the PC. The number of points are configurable with a system.property, as are the limits for when to start auto sampling and when to force auto sampling on.

Data chunking, which is used for all data, accommodates large histories (those exceeding configured size limits) resulting in improved performance. Chunking limits the amount of memory consumed while data is loading. The chart displays once information about the series is received and data displays in the chart as it comes in from a chunked response.

Note too, that an added chart command (in Niagara 4.1 and later) functions as described here:

- The **Stop** command (■), becomes visible only while data is loading. At any point during data loading, you can press the button to stop the chunking process. Press **Stop** once to halt data coming from the server. While stopped, the button displays a red border. Press **Stop** a second time to reload the data.
- Changing the **Time Range** while the page is loading also triggers the **Stop** command followed by a page reload.
- For performance reasons, you cannot turn off sampling once the number of points in the focused data set exceeds 50,000 (or the configured default maxSamplingSize). If you attempt to turn off sampling a popup alerts you that "The chart has too many points (>50,000). Sampling cannot be turned off until the page is focused on fewer points." You can change the **Time Range** to focus on fewer points.

The following configurable system.properties (`!defaults/system.properties`) allow you to fine tune sampling defaults:

- `#niagara.webChart.autoSamplingSize=2500`

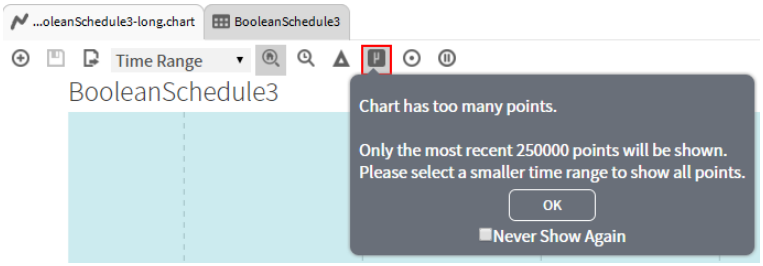
  This property sets the default auto sampling size. This applies when sampling is turned on to improve web browser interaction.

- `#niagara.webChart.maxSamplingSize=50000`

  This sets the default maximum sampling size. When exceeded, sampling cannot be turned off.

- `#niagara.webChart.maxSeriesCapacity=250000`

  This sets the maximum capacity for a data series. When the indicated **Time Range** loads more points than the configured maximum capacity (default=250,000), the **Sampling** command displays a red border and a popup (shown) alerts you that only the most recent 250,000 points will be shown in the chart.



About adding data from a supervisor

In Niagara 4.2, you can add virtual points and proxy points on a supervisor to a web chart which uses the local enabled history on the supervisor to initialize the chart. If a local history is not found, the chart displays live data (for numeric, boolean, and enum points).

About adding Proxy Points to web charts

In Niagara 4.2 and later, when adding the Niagara proxy point to a web chart on a Supervisor, if the remote point on the controller has a history, the chart attempts to resolve the history on the Supervisor and use it to initialize the web chart.

NOTE: In order to detect the matching history for the proxy point, the history must already be imported or exported to the Supervisor.

Web Charts plot histories referenced by the **`historyConfig`** property and `n:history` tags. This is especially important with proxy points (history extensions on proxy points). When a proxy point is added to a web chart, it first checks to see if there is a local enabled history extension as a child on the proxy point (which is uncommon). If found, it uses the local history extension's **`historyConfig`** property to determine the history to plot in the chart. If a history extension is not found, it uses a computed `n:history` tag value if the history exists on the Supervisor (either through a history import or export). If the **`Persist Fetched Tags`** property is not enabled on the NiagaraNetwork, then only charting an individual proxy point will force a lookup of the supervisor's history to chart. However, this will not work for a point folder containing that proxy point.

When Supervisor station is subscribing to points on a subordinate station and if a point has a history extension and the history has been imported onto the Supervisor, then an `n:history` tag is added to the point.

NOTE: In order for the tag to be added to the point, you must first set the **`Persist Fetched Tags`** property on the NiagaraNetwork to `true`.

For a point folder (containing proxy points) which you drag and drop on a web chart, the `n:history` tag is used to plot the history. The web chart searches for `n:history` tags only on Numeric, Boolean, and Enum writable points. String points and string writable points are excluded even if they have the `n:history` tag because string points are not typically plotted in a chart.

NOTE: If an individual proxy point's history is not imported to the Supervisor then the web chart plots only live data for that point. Or, if an `n:history` tag is on a proxy point but the associated history has since been deleted from the Supervisor, then that point will not plot. Also, if you add a separate history extension to a proxy point with an existing history extension on the Supervisor then both of those extensions for that point will plot in the web chart.

In addition to adding individual proxy points to a web chart, you can also drag a point folder of proxy points onto a web chart and have it automatically find and chart the local histories (limited to the first 10 histories) for those points.

The following caveats apply in order for the proxy points in the points folder to plot on the chart:

- First, the **`Persist Fetched Tags`** property on the NiagaraNetwork must be enabled.
- The second caveat depends on the version of the JACE station connected to the supervisor via the NiagaraNetwork
  - If the proxy points are for a N4.2 or later station in the Supervisor's NiagaraNetwork, then the proxy points must be subscribed (or re-subscribed, i.e. the "Add" function) after all relevant histories have imported at least once. This ensures that the `n:history` tag information is fetched for all applicable proxy points.
  - If the proxy points are for a N4.1 or earlier (including AX) station in the Supervisor's NiagaraNetwork, then the proxy points must be charted individually at least once after all relevant histories are imported at least once. This ensures that the `n:history` tag information is fetched for all applicable proxy points (it is not enough to re-subscribe the points as you would do for N4.2 or later stations).

NOTE: In N4.2, an action is available to force a re-fetch of `n:history` tag information. The action, **Force Update Niagara Proxy Points**, is on the following components: NiagaraNetwork, NiagaraStation, NiagaraStationFolder, NiagaraPointDeviceExt, and NiagaraPointFolder. This lets the you pick the level for which to force update of any descendant proxy points. When this action is invoked, it creates a job (ForceUpdateNiagaraPointsJob) and submits it to the JobService for processing. You can go to the JobService to see the progress of the job and retrieve a log of the results.

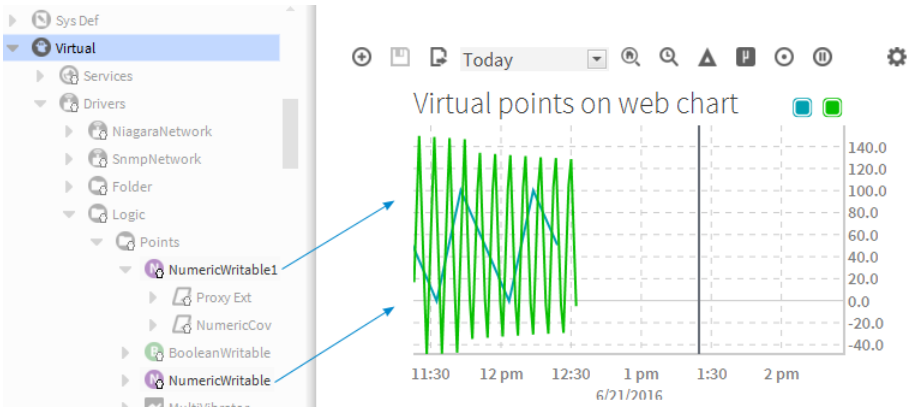
About adding Virtual Points

For any virtual point with a history in a remote station that is displayed in a Web Chart on the local Supervisor station, the history data is included in the chart.

In Niagara 4.2 and later, you can add individual virtual points (via dragging from the Virtual space or some other means) to a web chart on the Supervisor. If the remote point on the controller has a history, then the chart attempts to resolve the history on the Supervisor and use it to initialize the web chart.

NOTE: In order to detect the matching history, the history must be already imported or exported from the controller to the Supervisor.

Figure 10 Adding virtual points to a web chart on Supervisor



By default, the Supervisor pulls across only the `n:history` tag information. However, you can enable **`Persist Virtual Fetched Tags`** property (used in conjunction with the existing **`Tags To Fetch`** property) on the NiagaraNetwork component in order to add tags as slots on the virtual components.

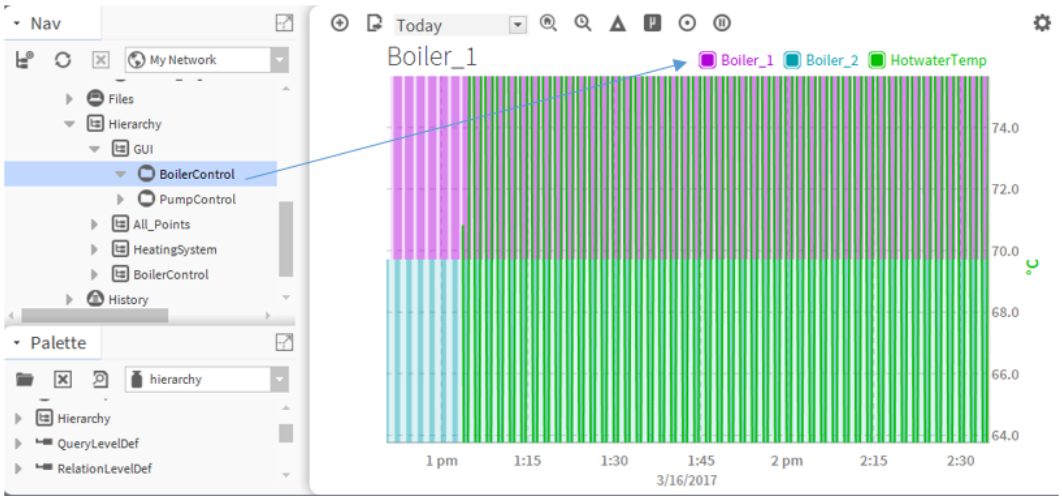
About adding a Hierarchy

The hierarchy children are added to the **Hierarchy** node based on the relations of that object with the other objects in the station logic. Due to the LevelDef's in a hierarchy definition, the children of an object shown in the hierarchy may differ from the actual children of that object as set up in the station logic. So adding a Hierarchy node to the web chart enables you to plot a different set of points based on the navigation as specified by the hierarchy definition.

In Niagara 4.3, when adding a **Hierarchy** node to a webChart, the chart looks for the furthest point of that object and if the hierarchy child objects (the furthest descendants) on the controller have histories, the chart attempts to resolve the history and use it to initialize the webChart.

NOTE: In order to detect the matching history, the history must be already imported or exported from the controller to the Supervisor.

Figure 11 Adding Hierarchies to a webChart



By default, if there is no point to plot under the hierarchy child, the chart pulls across the `n:history` tag information of that hierarchy child.

webChart-CircularGaugeWidget

Located in the **`webChart`** palette, this bajaux HTML5–based component allows you to add a **`CircularGauge`** widget to a Px or Hx page. You can add the gauge to a Dashboard, pane as well. Drag and drop a point component onto the widget to see its current value presented graphically and update showing live data. Also, if the status of the added point changes, the gauge color changes to reflect current status.

Additionally, the **`CircularGauge`** widget observes minimum and maximum facets for points, and has an override in the PxEditor to redefine min and max properties if needed.

Configurable properties for the `CircularGauge` widget

Property	Value	Description
Visible	true (default), false	Enables/disables display of the widget.
Enabled	true (default), false	Enables and disables use of the component.
Layout	Default values: X=0.00, Y=0.00, Width=300.00, Height=2600.00, Fill=on, off (default)	Provides X and Y positioning coordinates for the widget as well as, Width, Height, and Fill. X and Y units can be specified as Absolute or Percent. While Width and Height dimensions can be specified as Absolute, Percent, or Preferred units. The Fill checkbox turns fill on or off.
Js	view:webChart:CircularGaugeWidget	Provides Ord for the Javascript widget. You can browse to select another widget.
Dashboard	true (default), false	Enables/disables usage in dashboards
wbViewBinding	Binding null —>WebWidget (default)	Provides ord for bound label. You can browse to select the Ord. Also provides selectable options for Degrade Behavior (None, Disable, and Hide).

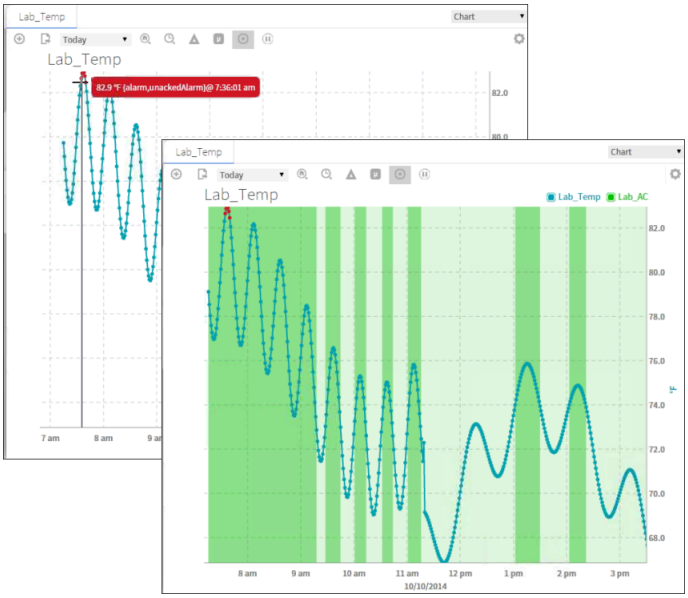
workbench-WebWidget

This is a bajaux, HTML5-based application that incorporates a view with interactive functionality which allows you to edit properties and invoke commands from the view. You can easily add data to a WebWidget, such as the WebChart or Dashboard, simply by dragging one or more components onto the widget. The widget renders in both Workbench and HTML5 Hx interfaces. The widget also integrates into the environment. For example, commands defined for a WebWidget render as added tool bar icons in Workbench, as well as in the HTML5 Hx profile in a web browser.

Examples of the bajaux WebWidget include the following:

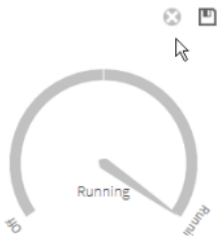
- The WebChart displays the **Chart** view which can display historical data and update with live data. Also, in a the view you can easily add data and invoke numerous commands and settings to modify data presentation.

Figure 12 Chart WebWidget



- The CircularGauge displays the graphical gauge view which updates with live data and provides contextual information for the current value. At any time you can dynamically switch the display to another component simply by dragging and dropping a different component onto this widget.

Figure 13 CircularGauge WebWidget

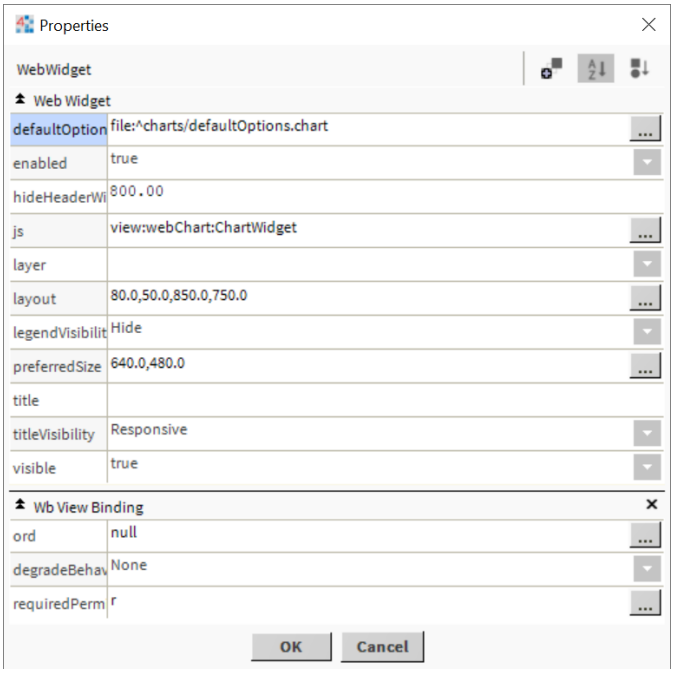


- A Dashboard may be added to any PxPage and displayed in the PxViewer. Additional WebWidgets may be added to the **Dashboard** pane to customize the presentation of data. The dashboard is used to write dashboard-specific data to and from a station for a specific user.

Figure 14 Dashboard WebWidget

Configurable properties for the Chart widget

Figure 15 Chart widget properties



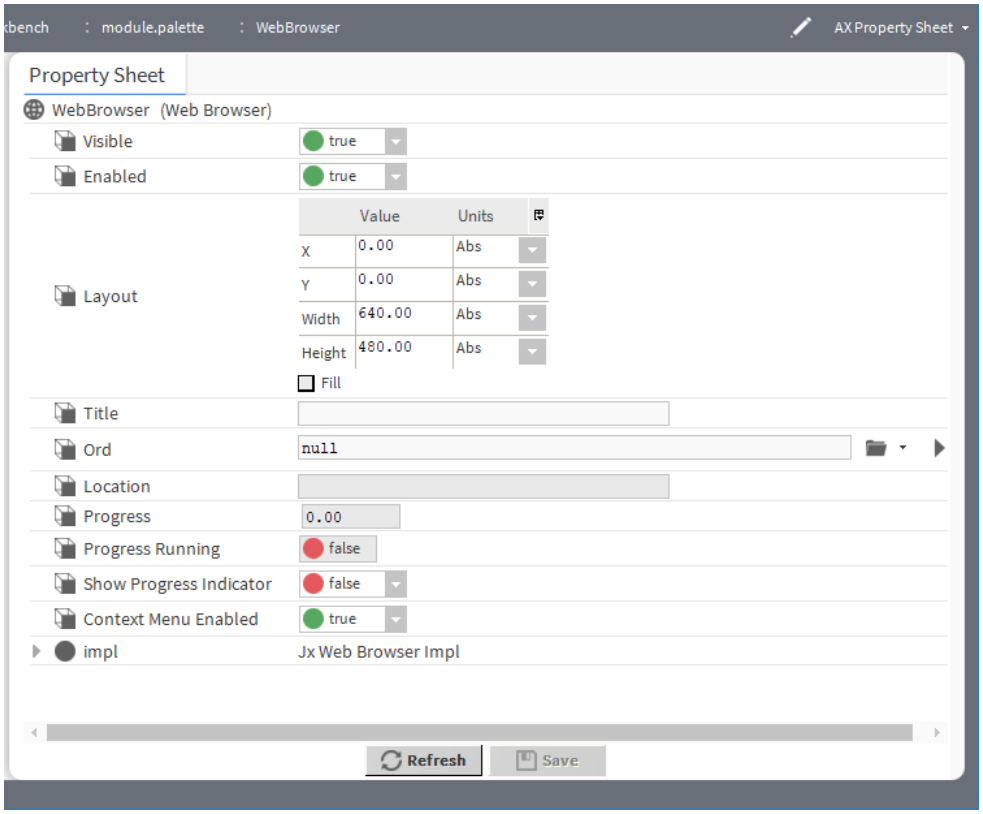
Property	Value	Description
defaultOption	file:^charts/defaul-tOptions.chart	Provides ord for the defaultOption widget. You can browse to select another widget.
hideHeaderWidth	number	All headers are visible when you set the value 800 pixel and above.
Visible	true (default), false	Enables/disables display of the widget.
Enabled	true (default), false	Enables and disables use of the component.

Property	Value	Description
Layout	Default values: X= 0.00, Y=0.00, Width=000.00, Height=000.00 Fill=on, off (default)	Provides X and Y positioning coordinates for the widget as well as, Width, Height, and Fill. X and Y units can be specified as Absolute or Percent. While Width and Height dimensions can be specified as Absolute, Percent, or Preferred units. The Fill checkbox turns fill on or off.
Js	view:webChart: ChartWidget (default)	Provides ord for the Javascript widget. You can browse to select another widget.
layer	drop-down	null
legendVisibility	drop-down	Provides legendVisibility as per set value. (for example `Responsive`, `Show`, `Hide`)
preferredSize	Default values: Width=000.00, Height=000.00	preferredSize can use to set the values of height and width of widgetbar.
title	text	You can add the title.
titlevisibility	drop-down	Provides titleVisibility as per set value. (for example `Responsive`, `Show`, `Hide`)
wbViewBinding	Binding null —>WebWidget (default)	Provides ord for bound label. You can browse to select the Ord. Also provides selectable options for Degrade Behavior (None, Disable, and Hide).

workbench-WebBrowser

This component can be added to a Px page to expose an external website (e.g. www.google.com) inside Workbench in a **Web Browser View**. The component properties allow you to configure browser display details for the referenced site.

Figure 16 Web Browser properties



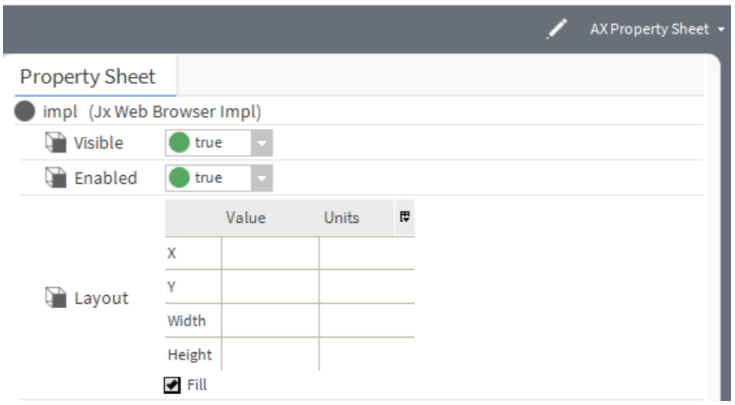
This component is located in the **workbench** palette. Double-click the **WebBrowser** component to open the Property Sheet view.

In addition to the standard properties (Enabled and Layout) the following properties are present for this component:

Property	Value	Description
Visible	`true` (default) or `false`	Determines if this object is visible or hidden.
Title	text	Creates a name for the view.
Ord	ORD	Identifies the location of the content to display in this view.
Location	read-only	
Progress	read-only	
Progress Running	read-only	
Show Progress Indicator	`true` or `false (default)`	Turns the progress indicator on and off.
Context Menu Enabled	`true` (default) or `false`	Turns the context menu on and off.
impl	additional properties	See the section on jxBrowser-JxWebBroswerImpl.

jxBrowser-JxWebBrowserImpl

Figure 17 Property sheet Jx Web Browser Impl



The Impl (jxBrowser-JxWebBrowserImpl) component is found in the **`Workbench`** palette, under the **`Web-Browser`** folder.

In addition to the standard properties (Enabled), these properties are unique to this component.

Type	Value	Description
Visible	`true` or `false`	Display of the widget Enables if set `true` and disables when set `false`.
Layout	Default values: X= 0.00, Y=0.00, Width=000.00, Height=000.00 Fill=on, off (default)	Provides X and Y positioning coordinates for the widget as well as, Width, Height, and Fill. X and Y units can be specified as Absolute or Percent. While Width and Height dimensions can be specified as Value, Unit, or Preferred units. The Fill check-box turns fill on or off.

workbench-WebBrowserView

The **Web Browser View** is an instance of the BWebBrowser class. It provides a browser view within the Workbench interface.

NOTE: The **Web Browser View** often acts as a "wrapper" for other views that provide specific functionality. In cases such as this, when you click **Help→On View**, help details will pertain only to **Web Browser View** not to the contents of the view.

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