

Guide to the ArcestrA™ Trend Client

Invensys Systems, Inc.

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Welcome

You use the ArcestrA Trend Client in ArcestrA symbols to show real-time values on a chart. The ArcestrA Trend Client is delivered as part of the ArcestrA Symbol Editor.

You can view this document online or you can print it, in part or whole, by using the print feature in Adobe Acrobat Reader.

This guide assumes you know how to use Microsoft Windows, including navigating menus, moving from application to application, and moving objects on the screen. If you need help with these tasks, see the Microsoft help.

Documentation Conventions

This documentation uses the following conventions:

Convention	Used for
Initial Capitals	Paths and file names.
Bold	Menus, commands, dialog box names, and dialog box options.
Monospace	Code samples and display text.

Technical Support

Wonderware Technical Support offers a variety of support options to answer any questions on Wonderware products and their implementation.

Before you contact Technical Support, refer to the relevant section(s) in this documentation for a possible solution to the problem. If you need to contact technical support for help, have the following information ready:

- The type and version of the operating system you are using.
- Details of how to recreate the problem.

- The exact wording of the error messages you saw.
- Any relevant output listing from the Log Viewer or any other diagnostic applications.
- Details of what you did to try to solve the problem(s) and your results.
- If known, the Wonderware Technical Support case number assigned to your problem, if this is an ongoing problem.

Chapter 1

About the Trend Client

To use the Trend Client, you should already have a basic understanding of the Wonderware Integrated Development Environment (IDE), the ArchedrA Symbol Editor, and the InTouch HMI before continuing. For more information, see the documentation for each of these products.

Understanding the Trend Client

Use the Trend Client to chart attribute current values from Wonderware Application Server and tag current values from the InTouch HMI software. This differs from the trend feature in the InTouch HMI because Trend Client fully supports ArchedrA and can initialize a trend pen with data from a historical source such as InTouch LogHistory/LGH files or the Wonderware Historian.

Note The InTouch trends are still included as part of the InTouch HMI.

Differences between the Trend Client and the ActiveFactory Trend Control

If you use the ActiveFactory Trend control, you need to be aware that there are several differences between the Trend Client and the ActiveFactory Trend control. In contrast to the ActiveFactory Trend control, the Trend Client:

- includes the real-time as well as historical trending functionality.

- uses the data from a historical source such as InTouch LogHistory/LGH files or the Wonderware Historian.
- has fewer pens.
- uses real-time attribute or tag data as well as historized data stored in the Wonderware Historian or InTouch LogHistory/LGH files.
- does not require a separate license from the Wonderware Application Server.
- requires the InTouch HMI.
- only supports the full and cyclic retrieval modes of the Wonderware Historian when retrieving data.
- does not support configuring the default pen colors (although you can change them once you add a pen).
- does not provide scatter plots and target regions.

Data Sources for the Trend Client

The Trend Client can use real-time data from Wonderware Application Server and the InTouch HMI software and historical data from the Wonderware Historian or InTouch LGH files. You identify the historical data source when you configure a pen. For more information, see *Configuring Historical Sources* on page 24.

At run time, the Trend Client initializes the trend with historical data from the data source (if configured) and then appends real-time data for the pens. If the pen is not associated with a historical data source, the trend initially shows no data. It then starts charting information as real-time data becomes available. If you refresh a pen configured with historical data, the chart requeries the historical information, after which it appends the real-time data as it becomes available. Refreshing does not change a pen configured only for real-time data. If you refresh a trend that is charting both historical and real-time data, the historical information is recharted immediately, after which the trend charts real-time data as it becomes available.

The Trend Client supports the same syntax as the ArcestrA symbols. It also supports the built-in functionality of the `OwningObject` property for trends configured with relative naming. For information about ArcestrA symbols data configuration syntax and `OwningObject` functionality, see the *Creating and Managing ArcestrA Graphics User's*

Guide. For more information on relative and absolute references, see the *Wonderware Application Server User's Guide*.

There are primary settings for specifying the time period you want to plot, such as a relative reference (the preceding two hours), or an absolute reference (July 15th at 10am for 2 hours) using scripting.

As an example, suppose you opened two trends created with the Trend Client. Both of them have a duration of 15 minutes, but the first one is only trending real-time data (meaning that the pen is associated with an expression but not with a historical tag) and the second is trending historical data (meaning that the pen is associated with both an expression and a historical tag). If you open both of these trends at the same time, what you see is described in the following table.

Time after starting both trends	What you see
0 minutes	The first trend shows no data. The second trend shows 15 minutes of historical data from the source.
5 minutes	The first trend shows 5 minutes of real-time data. The second trend shows 10 minutes of the historical data and 5 minutes of real-time data.
15 minutes	Both charts show 15 minutes of real-time data. All the historical data will have been pushed off the second trend by the new real-time data.

Chapter 2

Configuring the Trend Client

This section shows you how to place a Trend Client on the canvas and configure it. You can configure it either with the **Edit Animations** dialog box, or by changing individual properties in the Properties Editor

Placing the Trend Client into an ArcestrA Symbol

You can easily place the ArcestrA Trend Client into an ArcestrA Symbol by placing it onto the canvas.

To place the Trend Client into an ArcestrA Symbol

- 1 Open the ArcestrA symbol.
- 2 On the **Tools** panel, click the **Trend Client** icon. The cursor appears in insert mode.
- 3 Click on the canvas where you want to place the upper left corner of the Trend Client.



Removing the Trend Client from an ArcestrA Symbol

You can remove the Trend Client from the canvas.

To remove the Trend Client from an ArcestrA symbol

- 1 Open the symbol you want to remove the Trend Client from.
- 2 Do either of the following:
 - Select the Trend Client and press **DELETE**.
 - Right-click the Trend Client and select **DELETE** from the menu.

Validating the Configuration of the Trend Client

You can validate the configuration of a Trend Client. If the configuration has an error, an exclamation mark appears next to the **Animation** icon.

Examples of errors include:

- Syntax errors in expressions
- Data type mismatches
- Required values not specified
- Specified values out of valid range

To validate the configuration of a Trend Client

- 1 Open the symbol containing the Trend Client.
- 2 Double-click the Trend Client. The **Edit Animations** dialog box appears.
- 3 Click the **Validate** icon on the right side of the **Edit Animations** dialog box. The Trend Client is validated. Possible errors are highlighted in the right side of the dialog box.



Clearing the Configuration from the Trend Client

You can clear all configuration data from the configuration boxes of and reset the settings to the defaults.



To clear all configuration data

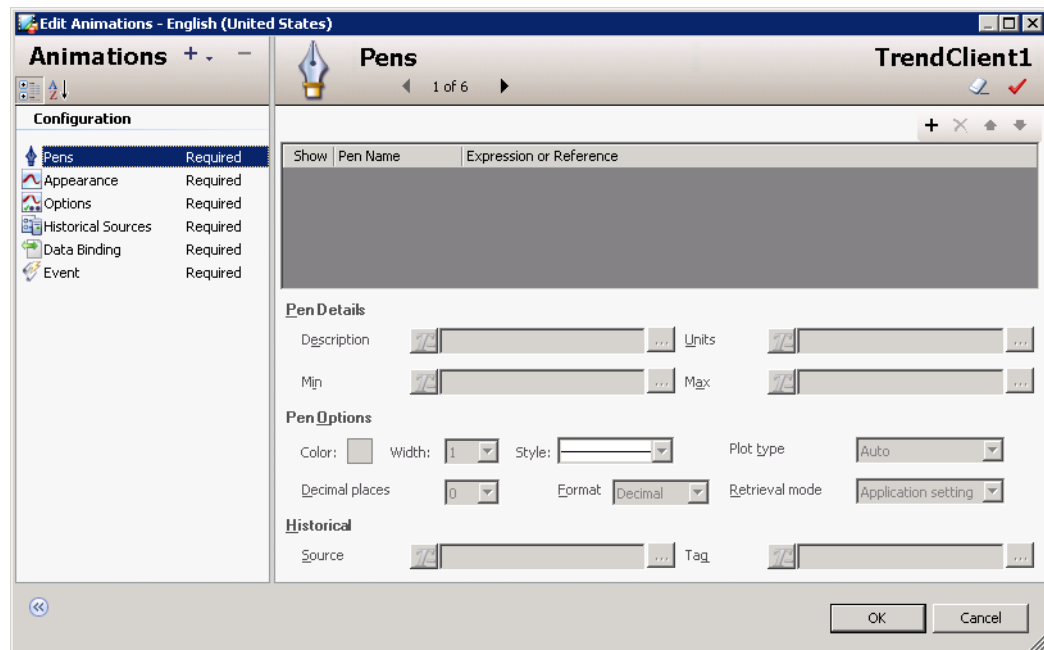
- ◆ In the configuration panel, click the **Clear animation** icon.

Adding a Pen

When you first add a Trend Client to the canvas, no pens are defined. To show a trend, you must add at least one pen and configure it so that the system can identify what trend information to chart. Each pen must have an associated expression or reference.

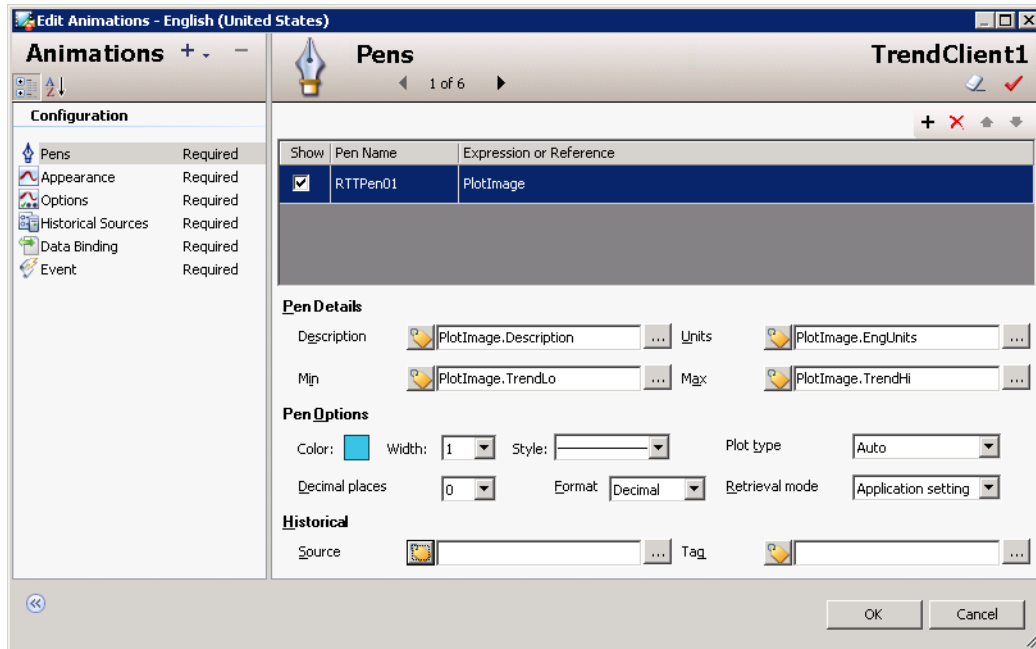
To add a pen

- 1 In the ArcestrA Symbol Editor, double-click the Trend Client. The **Edit Animations** dialog box appears with the pen configuration information in the right pane.





- Click the **Add Row** icon on the right side of the **Edit Animations** dialog box. A new pen appears in the configuration panel.



- In the row for the pen, configure the information for the new pen.

Show	Select the Show box to show the pen in the trend.
Pen Name	Enter the name of the pen. (If you leave this blank, the pen's expression is used as the chart label.)
Expression or Reference	Enter an expression or reference. Click the ellipsis button to show the Galaxy Browser.

Connecting a Pen to an InTouch Tag

You can connect the pen to an InTouch tagname through the **Expression or Reference** box. The InTouch tagname provides values at run time that control the animation and appearance of the pen.

This can be done by:

- Configuring a reference with the **intouch:tagname** syntax.
- Using a custom property and configuring the custom property in the embedded ArchestrA Symbol in InTouch to reference an InTouch tag. For more information, see the *InTouch HMI and ArchestrA Integration Guide*.

- Configuring an ArcestrA attribute reference to the managed InTouchViewApp object that contains the InTouch tagnames as attributes. The InTouchViewApp object uses the functionality of an InTouchProxy object.
- Configuring an ArcestrA attribute reference to an InTouchProxy object that contains the InTouch tagnames as items. This is a special case of configuring an ArcestrA attribute reference.

To be able to browse for InTouch tags, you must first:

- Create a managed InTouch application by deriving an InTouchViewApp template and configuring it in WindowMaker.
- Derive an instance of the InTouchViewApp derived template.

The InTouch tags are represented by attributes of the InTouchViewApp object instance.

You may not always be able to reference the local node if you use this method of connecting to the InTouch HMI software. As a result, you may have problems with some applications. If this is the case, use the **InTouch:tagname** syntax.

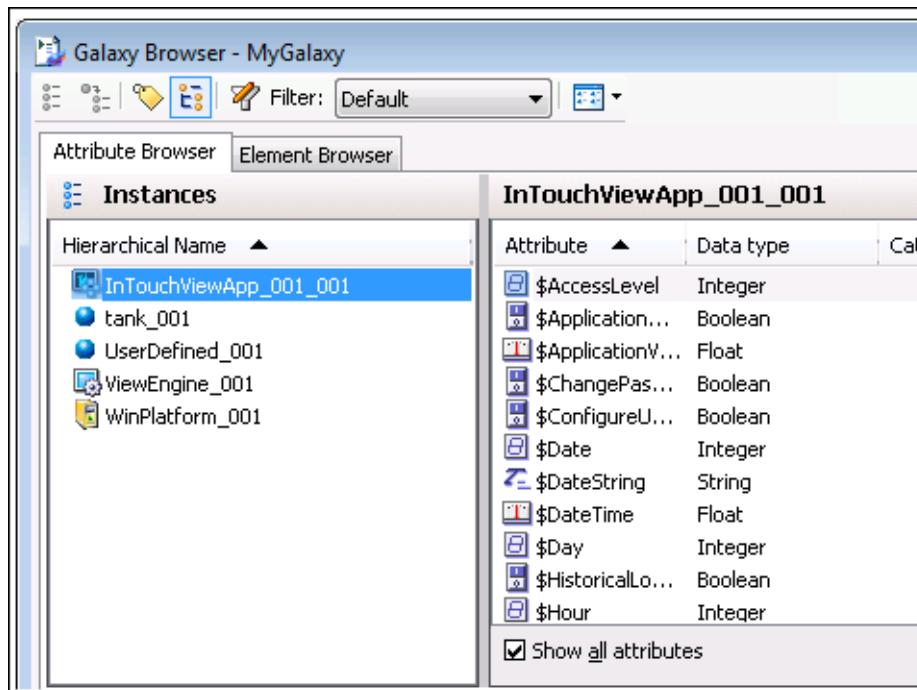
With the **InTouch:tagname** syntax, the pen connects to the InTouch tag on the symbol's node. There are some restrictions on how you can use this syntax:

- Unlike in Application Server, you cannot use TRUE and FALSE as Boolean values. Use 1 and 0 instead.
- If you want to connect to an InTouch SuperTag with this syntax, use the following syntax instead:

```
attribute("intouch:SuperTag\Member")
```

To connect Trend Client to InTouch tags

- 1 In the Galaxy Browser, select the InTouchViewApp object that corresponds to the managed InTouch application. The right panel shows the InTouch tags.



- 2 Select a tag and click **OK**. The selected ArchestrA reference to an InTouch tag appears in **Expression or Reference**.

Configuring Pen Details and Options

After you add a pen and configure the expression or reference for the pen(s), you can set details and options for how the pen shows information on the trend chart. Pen details include the description, units, minimum and maximum for the pen. Pen options include the pen color, width, style, plot type, number of decimal places, format, and retrieval mode.

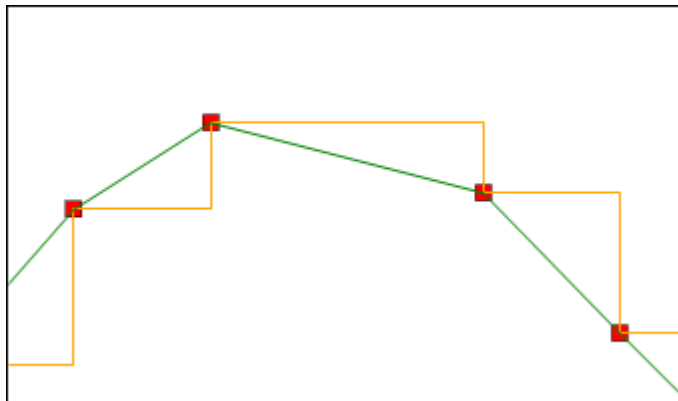
The default values for the pen details are formed by appending `.Description`, `.EngUnits`, `.TrendLo`, and `.TrendHi` to the pen expression. For example, if the pen expression is `Me.PV` for a field attribute named `PV` created on the user defined object, the default pen details are `Me.PV.Description`, `Me.PV.EngUnits`, `Me.PV.TrendLo`, and `Me.PV.TrendHi`. These are generally the best expressions to use for historized attributes. (If the expression is empty or invalid, the Trend Client uses default values of 0 and 100 for the minimum and maximum at run time.)

Note For some input boxes on the configuration screens, you can specify if the configuration is a static value or a reference by setting the input mode. An input mode icon appears to the left of these boxes. Use static mode input to specify a literal static value such as “Temperature” or 3.141. Use reference mode to specify a reference to an attribute or symbol property such as Tank_001.PV. You can enclose static string values with double-quotes (such as “Description:” or “+Tank_001.Desc”) with or without references in Reference mode. When you are in reference mode, you can also click the ellipsis button to the right of the box to show a selection tool such as the Galaxy Browser or the Tag Picker.

A line curve (plot type **Line**) is best suited for charting continuously-changing analog data. A step-line curve (plot type **Step**) is best suited for discrete data and box for analog data that is not continuous. When you select a plot type of **Auto**, the curve type is determined as follows:

- For tags retrieved from Wonderware Historian 9.0 (or higher), the type is based on the tag’s effective interpolation setting. Tags that use stair-step interpolation are trended as a step line, and tags that use linear interpolation are trended as a line.
- For all other tags, the curve type is based on the tag type: step line for integer tags, and line for real tags.

The following illustration shows the same data drawn using each type of curve. The line curve is shown in green, the step line curve is shown in orange, and the point curve is shown in red.



To configure the options for a pen

- 1 Select the pen you want to configure.
- 2 In the **Pen Details** area, configure what the pen shows.

Description	The pen's description. The expression is evaluated and the result is used for the pen's description in the pen list (the legend) below the chart itself.
Units	The unit to chart in. This is the plot scale, rather than an instrument scaled from a percentage to engineering units.
Min	Enter the minimum for the pen's range.
Max	Enter the maximum for the pen's range.
- 3 In the **Pen Options** area, configure how the curve looks in the chart for the selected pen.

Color	The line color of the pen. Click the colored square to select the color from a palette or define a custom color.
Width	The thickness of the trend curve. Valid values are 0 through 10.
Style	The style of the trend curve; for example, a solid or dashed line.
Plot type	The type of trend curve to draw. Options are Line , Step line , Point , and Auto .
Decimal Places	The number of decimal places to show for the data value. This applies only to analog tags. Valid values are 0 through 15.
Format	The way the values for the pen appear, either in decimal format or scientific format.
Retrieval Mode	The data retrieval mode, either Cyclic , Full , or Application Setting .

Configuring Pens for Historical Sources and Tags

If you are initializing with historic data and then plotting real-time data, you can configure a pen to initialize with a specific historic source and tag. For example, `MyEngine.Engine.Historian.Connection` is a common relative reference expression for the historical source on a template and, for a pen expression of `Me.PV`, `Me.TagName.PV` is a comment relative reference expression for the historical tag.

If the historical tagname needs to be relative references, construct the string expression for the historical tagname that evaluates the relative part of the name and appends in a static part. For example, to reference a UDA named PV, use `Me.Tagname+".PV"` or a similar expression. You can define this expression on a symbol in a `$Reactor` template. There are instances of Historian tagnames are `Reactor1.PV` and `Reactor2.PV`. If you use the expression in the form `Me.PV`, it resolves to the current value rather than the tagname. For example, if PV was associated with a temperature, `Me.PV` would return a temperature rather than the string for the tagname.

You can also use valid relative references such as `Me`, `MyArea`, `MyEngine`, and `MyPlatform` when configuring the historical tag-names as relative references. For example, to reference the UDA named "Level" in a user-defined object named `$Reactor`, you can configure the historical tagname as an expression: `Me.TagName+".Level"`. At runtime, when the object "Reactor_001" is viewed, this will use "Reactor_001.Level" as the historical tag name.

To configure a pen for a historical source and tag

- 1 Select the pen you want to configure.
- 2 In the **Historical** area, configure the source and tag for the pen.

Source The historical source to use for the pen. This history source must already be configured in the **Historical Sources** pane. For more information, see [Configuring Historical Sources](#) on page 24.

If this is set to reference mode, click the ellipsis button to show the Galaxy Browser and use that to find the expression or reference.

Tag The historical tag to use for the pen. If this is set to reference mode, click the ellipsis button to show the Tag Picker. For more information on using the Tag Picker, see [Using the Tag Picker](#) on page 28.

Note To use the reference mode, you must have already configured a historic data source for the Trend Client. For more information, see [Configuring Historical Sources](#) on page 24.

Configuring Historical Sources

To use a Trend Client to chart historical data, you must connect to a data source. You can connect to a Wonderware Historian or an InTouch LGH file.

You can use one of the following authentication modes when connecting to Wonderware Historian:

- Windows Integrated Security (uses the running process credentials)
- Alternate Windows account (specifying the domain name, username, and password).

The alternate credentials are used to do a Windows impersonation before connecting to the database using Windows Integrated Security.

- SQL Server Authentication

You specify the username and password of a SQL Server account. These credentials are used to log in to the database.

Note Ask your administrator what type of user account you must use to access the server.

Server connections are specific to the instance of the client and must be re-defined for each instance.

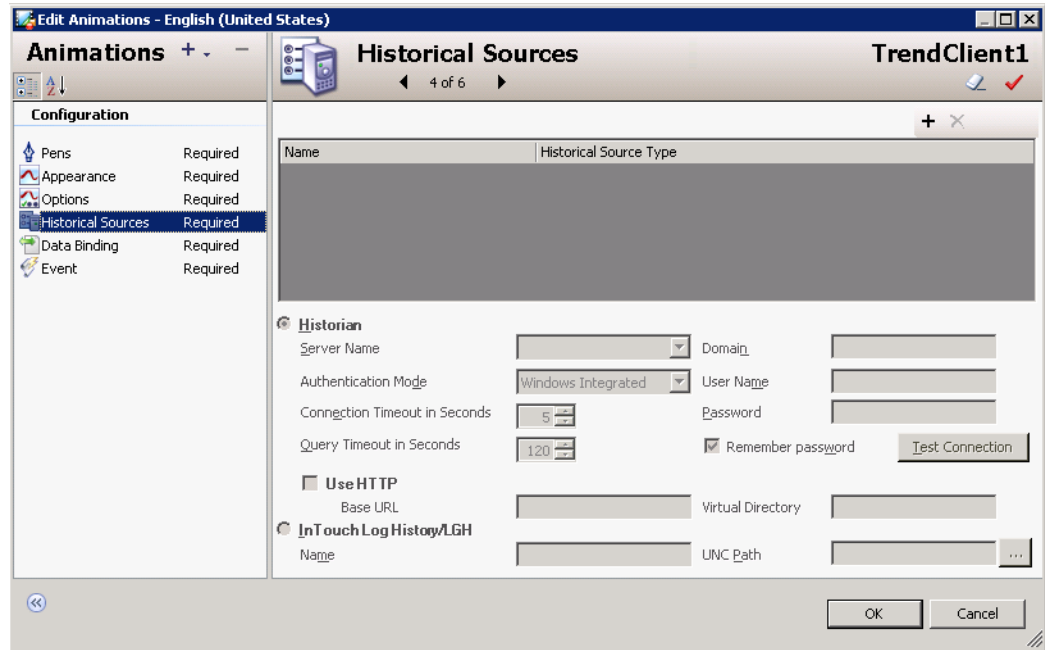
When you start a Wonderware Application Server application, you are not automatically logged on to every server that you configured before. You are only logged on to a server when a pen is configured to use that server.

Creating a Wonderware Historian Connection

To create a Wonderware Historian connection, you need your assigned Wonderware Historian username and password.

To create a Wonderware Historian connection

- 1 In the ArcestrA Symbol Editor, double-click the Trend Client. The **Edit Animations** dialog box appears
- 2 Click **Historical Sources**. The **Historical Sources** screen appears in the right pane.



- 3 Click the **Add Row** icon on the right side of the **Edit Animations** dialog box. A new server row appears in the configuration panel.
- 4 In **Server Name**, enter the name of the server to which you want to connect. You can select from a list of the servers by clicking the arrow to the right of the box.

- In **Authentication Mode**, select the authentication mode: Windows Integrated, Windows Account, or SQL Server. If you are logging on to the server using Windows Account credentials, configure the following login detail:

Domain The domain name in which your Windows account is validated.

If you are logging on to the server using Windows Account or SQL Server credentials, configure the following login details:

User Name Your assigned Wonderware Historian username. If your system administrator has not assigned you a username and password, you may use one of the default user accounts, which are automatically configured during a typical Wonderware Historian installation.

Password The password that is associated with the username. Select **Remember password** to have the system to remember your password.

- In **Connection Timeouts in Seconds**, enter the connection timeout in seconds. Valid values are 1 to 600.
- In **Query Timeout in Seconds**, enter the query timeout in seconds. Valid values are 1 to 600.

Note You can test the connection to the server with the information you've entered by clicking **Test Connection**. If necessary, you can edit the information before adding the server to the list.

- Click **OK**. No error message appears if a connection cannot be made to a server.

Creating an InTouch LGH Connection

You can also link to InTouch LGH files.

To create an InTouch LGH connection

- In the ArcestrA Symbol Editor, double-click the Trend Client. The **Edit Animations** dialog box appears
- Click **Historical Sources**. The **Historical Sources** screen appears in the right pane.
- Click the **Add Row** icon on the right side of the **Edit Animations** dialog box. A new server row appears in the configuration panel.
- Select **InTouch Log History/LGH**.



- 5 In **Name**, enter the InTouch HMI software server.
- 6 In **UNC Path**, enter the location of the InTouch LGH file using a UNC path name or a mapped drive path.
- 7 Click **OK**. No error message appears if a connection cannot be made to the InTouch LGH files.

Editing a Server Connection

You can edit an existing server connection.

To edit a server connection

- 1 On the **Historical Sources** screen, select the server you want to edit.
- 2 Edit the details for the server.
- 3 Click **OK**.

Removing a Server Connection

You can remove a server connection you no longer need. Make sure you select the server you want to delete. After you delete a server, you cannot undelete it.

To remove a server connection

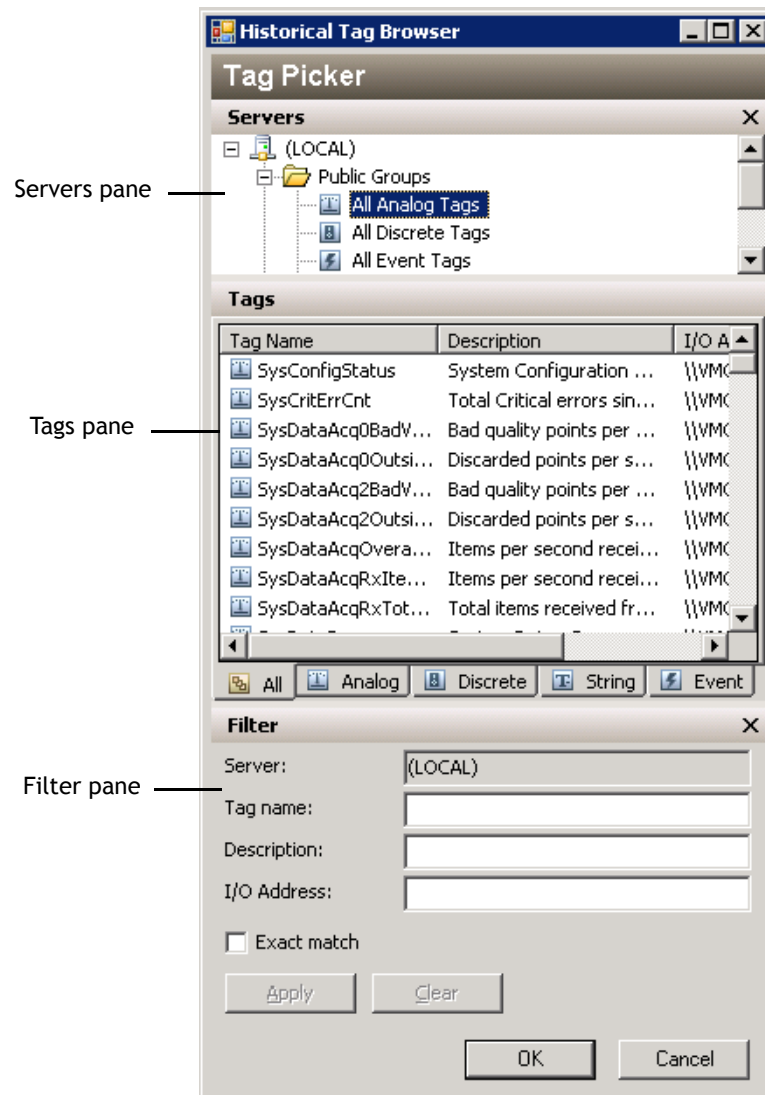
- 1 On the **Historical Sources** screen, select the server you want to delete.
- 2 Click the **Delete Row** icon on the right side of the **Edit Animations** dialog box. The server is deleted.



Using the Tag Picker

The Tag Picker shows which tag groups and tags exist in the Wonderware Historian database. It shows all of the tags that are visible to the currently logged on user based on his or her permissions.

Using the Tag Picker, you can quickly search the database for tags of a certain type and/or for tags that match a particular search pattern. You can then select the ones you want to include for the Trend Client. You cannot select a tag from an LGH file.

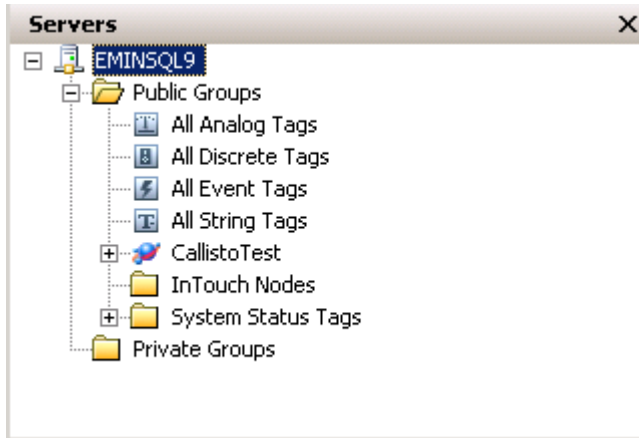


The Tag Picker includes the following panes:

- Servers pane
- Tags pane
- Filter pane

Using the Servers Pane

The **Servers** pane shows a list of Wonderware Historian folders. The **Servers** pane allows you to navigate through the folder structure (namespace) of one or more Wonderware Historians and select a group (folder) of tags.



The **Servers** pane shows the following items:

Category	Description
Servers	All objects that make up the basic Wonderware Historian system, such as tags, I/O Servers, defined engineering units, storage locations, and so on.
Public Groups	All objects that are visible to all clients. If you have administrative permissions, you can create, rename, and delete groups in the public groups folder.
Private Groups	All objects that are visible to the user that is currently logged on. Users can create, rename, and delete groups in the private groups folder.

Showing/Hiding the Servers Pane

To show the Servers pane

- Right-click in the **Servers** pane and then click **Servers pane** so that a check mark appears.

To hide the Servers pane

- Perform one of the following:
 - Right-click in the **Servers** pane and then click **Servers pane** so that no check mark appears.
 - Click **Close**.

Adding a Group

You can add groups just as you would add a new folder in the Windows Explorer. For example, you can create the BoilerTags group under in the existing Private Groups group. You can also delete, cut, copy, paste, and drag objects from one folder to another.

To add a group

- 1 Right-click on the folder under which you want to create a group and then click **New Group**.

A new folder appears in the Tag Picker.

- 2 Type a name for the folder and press **ENTER**.

Adding a Tag to a Group

When you add tags to a new group, the original reference still appears in the default system group. Any tag can belong to any number of groups, and any group can contain any number of tags.

To add a tag to a group

- 1 Select the system group folder that contains the tag that you want to add to your new group.
- 2 In the **Tags** pane, select the tag to add.
- 3 Perform any of the following:
 - Drag the desired tag from the **Tags** pane into the folder.
 - Use the **Copy** and **Paste** commands on the **Edit** menu to copy the tag to the target folder.
 - Right-click on the desired tag in the **Tags** pane. Use the **Copy** and **Paste** commands in the shortcut menu to copy the tag to the target folder.

Deleting a Group or Tag Reference

When you delete a private group or tag reference in a private group, the group folder, any subfolders that the group folder may contain, and all references to tags are deleted. The tags themselves are not deleted, and the original references still appear in the default system group. You cannot delete public folders or the tag references contained in them.

To delete a group or tag

- 1 Select the group or tag in the pane.
- 2 Perform one of the following:
 - Right-click on the group or tag and then click **DELETE**.
 - Press **DELETE**.

Renaming a Group

You can rename a group that you have created in the Tag Picker. However, you cannot rename a public folder.

To rename a group

- 1 Select the group in the pane.
- 2 Perform one of the following:
 - Right-click on the group and then click **RENAME**.
 - Press **F2**.
- 3 Type a new name for the group and press **ENTER**.

Viewing Server Details

You can view information such as the version number, time zone, and security mode for any Historian server in the **Servers** pane.

To view server details

- 1 In the **Servers** pane, right-click on a Historian server and then click **Server details**. The **Server Details** dialog box appears.



- 2 Click **OK**.

Using the Filter Pane

Use the **Filter** pane to reduce the tags listed in the **Tags** pane according to criteria that you specify. You can filter the tags according to name, description, and I/O address.

The filter mechanism allows for the following wildcard characters as part of the filter criteria:

Wildcard Character	Filter Function
%	Any string of zero or more characters.
_	Any single character.
[]	Any single character within the specified range or set. For example: <ul style="list-style-type: none"> • [a-f] • [abcdef]
[^]	Any single character not within the specified range or set. For example: <ul style="list-style-type: none"> • [^a - f] • [^abcdef]

For example, to find all tagnames ending with “level,” type **%level**. Filter criteria are not case-sensitive.

When the **Servers** pane and the **Filter** pane are both visible, the filter conditions apply to the selected group in the **Servers** pane. When the **Servers** pane is hidden, the filter applies to all of the tags for the selected Wonderware Historian.

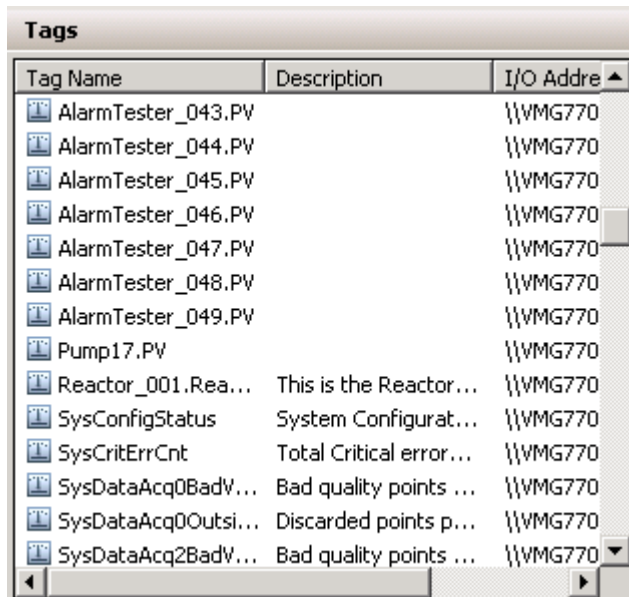
To apply a filter

- 1 In the **Server** box, specify or verify the server.
This box is not available if the **Servers** pane is visible.

- 2 In the **Tag name** box, enter the string to match for the tagname.
- 3 In the **Description** box, enter the string to match for the description.
- 4 In the **I/O Address** box, enter the string to match for the I/O address.
- 5 Select the **Exact match** check box to search for tags that exactly match the entire string that you provided for the tagname and/or description options.
- 6 For example, if you specify level as the tagname and do not select **Exact match**, any tagname that contains the string “level“ appears. For example, “ReactLevel,” “ProdLevel,” and “\$AccessLevel.”
- 7 The **Exact match** option does not apply to the I/O address.
- 8 Click **Apply** to apply the filter criteria.
- 9 Click **Clear** to clear the **Filter** pane.

Using the Tags Pane

The **Tags** pane shows all the tags for the currently selected group in the **Servers** pane.



The screenshot shows a window titled "Tags" containing a table with three columns: "Tag Name", "Description", and "I/O Address". The table lists various tags such as AlarmTester_043.PV, AlarmTester_044.PV, AlarmTester_045.PV, AlarmTester_046.PV, AlarmTester_047.PV, AlarmTester_048.PV, AlarmTester_049.PV, Pump17.PV, Reactor_001.Rea..., SysConfigStatus, SysCritErrCnt, SysDataAcq0BadV..., SysDataAcq0Outsi..., and SysDataAcq2BadV... Each tag has a small icon to its left and an I/O address of \\VMG770. The description column is partially visible for some tags.

Tag Name	Description	I/O Address
AlarmTester_043.PV		\\VMG770
AlarmTester_044.PV		\\VMG770
AlarmTester_045.PV		\\VMG770
AlarmTester_046.PV		\\VMG770
AlarmTester_047.PV		\\VMG770
AlarmTester_048.PV		\\VMG770
AlarmTester_049.PV		\\VMG770
Pump17.PV		\\VMG770
Reactor_001.Rea...	This is the Reactor...	\\VMG770
SysConfigStatus	System Configurat...	\\VMG770
SysCritErrCnt	Total Critical error...	\\VMG770
SysDataAcq0BadV...	Bad quality points ...	\\VMG770
SysDataAcq0Outsi...	Discarded points p...	\\VMG770
SysDataAcq2BadV...	Bad quality points ...	\\VMG770

To select multiple tags in the list, hold **Ctrl** and/or **Shift** while clicking.

To view only tags of a certain type, click the appropriate tab at the bottom of the pane.

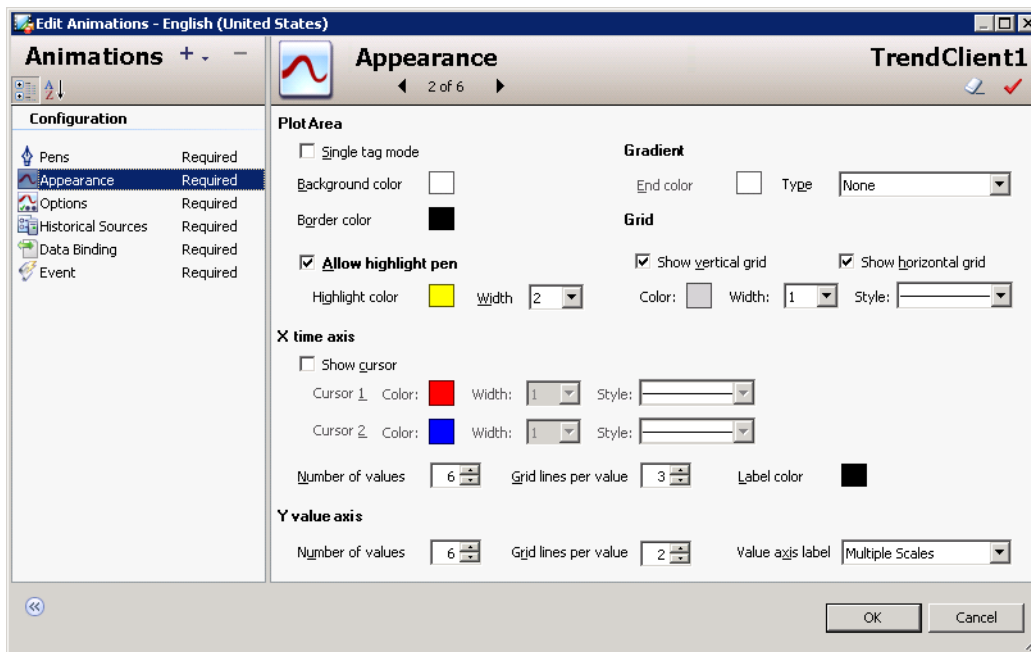
To sort the table by a particular column, click the column heading.

Configuring the Trend Appearance

You can set a number of general options for the trend appearance, including gradients, border and plot area background color, highlights, and colors for the X and Y axes.

To configure the trend appearance

- 1 In the ArchestrA Symbol Editor, double-click the Trend Client. The **Edit Animations** dialog box appears
- 2 Click **Appearance**. The trend appearance information appears in the right pane.



- 3 Select **Single tag mode** to set the trend to single tag mode. When you initially create a tag list for a trend, all the tags are included in the display. Setting the trend to single tag mode allows you to exclude all tags but one from appearing in the trend chart, without removing them from the tag list. Clear **Single tag mode** to view multiple tags again in the chart.
- 4 Click **Background Color** to configure the main color of the background of the plot area. If you are using a gradient fill, this is the starting color for the gradient.
- 5 Click **End color** to select the ending color for the gradient. The gradient starts with the main color and fades to the gradient end color.

- 6 Click **Type** to specify the starting point for the flow of the gradient. Valid values are **LeftRight**, **TopBottom**, **Center**, **DiagonalLeft**, **DiagonalRight**, **HorizontalCenter**, and **VerticalCenter**. For example, if you select green as main color, white as the gradient end color, and center as the gradient type, the center of the chart is green and fades to white towards the surrounding edges.
- 7 Click **Border Color** to configure the color of the border for the entire chart area.
- 8 Select **Allow highlight pen** to highlight the pen. Configure the color and width to be used for pen highlighting.

Highlight color	Click to select or configure a color for highlighting the pen curve.
Width	Specify how wide (in pixels) a highlighted curve should be.
- 9 In the **Grid** area, configure the grid options.

Show horizontal grid	Check to show the horizontal grid.
Show vertical grid	Check to show the vertical grid.
Color	Click to select or configure a color.
Width	The width, in pixels, of the border line.
Type	The style of the border line.
- 10 In the **X time axis** area, configure the properties for the horizontal axis.

Show horizontal cursor	Check to show the horizontal cursor.
Cursor 1 color	Click to select or configure the color for time axis cursor 1.
Width	The width of time axis cursor 1.
Style	The line style of time axis cursor 1.
Cursor 2 color	Click to select or configure the color for time axis cursor 2.
Width	The width of time axis cursor 2.
Style	The line style of time axis cursor 2.
Number of values	The number of values that are shown along the time axis. The values are shown at evenly-spaced points along the axis. The number of values remain the same even if you zoom in and out. The valid range is from 2 to 15, with a default of 6.

Grid lines per value	The number of grid lines that appear between each pen value plotted on the chart. The valid range is from 1 to 20, with a default of 3.
----------------------	---

Label color	The color of the X axis label.
-------------	--------------------------------

- 11** In the **Y axis** area, configure the properties for the vertical axis.

Number of values	The number of values that are shown along the value axis. The timestamps are shown at evenly-spaced points along the axis. The number of values remain the same even if you zoom in and out. The valid range is from 2 to 15, with a default of 6.
------------------	--

Grid lines per value	The number of grid lines appearing between each pen value that is plotted on the chart. The valid range is from 1 to 20, with a default of 2.
----------------------	---

Value axis label	The label of the value axis.
------------------	------------------------------

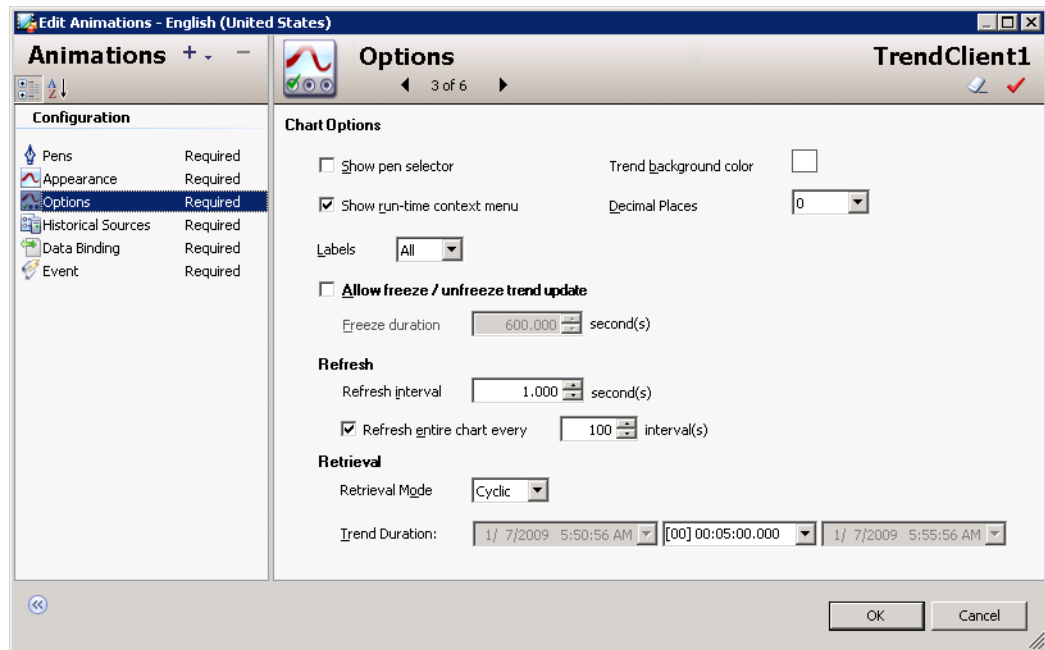
- 12** Click **OK**.

Setting Chart Options

You can set a number of general chart options, including the trend background color, freeze options, refresh interval, and retrieval options.

To set the chart options

- 1 In the ArcestrA Symbol Editor, double-click the Trend Client. The **Edit Animations** dialog box appears.
- 2 Click **Options**. The options information appears in the right pane.



- 3 Select the **Show pen selector** check box to show the legend or list of pens at the bottom the trend.
- 4 Click **Trend background color** to configure the main color of the background of the entire chart area.
- 5 Select **Show run-time context menu** to show the context menu when you right-click the trend at run time.
- 6 Set **Decimal Places** to the number of decimal places to use in the trend.
- 7 Set **Labels** to All to display the chart label, X and Y axis scales, and cursor information. or None to suppress the labels in the plot area

- 8 Select **Allow freeze/unfreeze trend update** to enable Freeze on the run-time context menu so you can freeze the trend chart from live updates. When this option is selected (the default), you can also set the freeze duration. The freeze duration determines how long the chart remains frozen when you freeze the chart at run time. After the freeze time has elapsed, the chart resumes the live updates. If the freeze duration is set to 0, you must manually unfreeze the chart.
- 9 Set **Refresh interval** to the number of seconds between chart updates. You can optionally select **Refresh entire chart** to refresh the entire chart after the number of refresh intervals you specify.
- 10 Set **Retrieval Mode** to **Full** or **Cyclic**. Full retrieval mode returns all the stored data points for a tag. Cyclic retrieval mode returns stored data for the given time period based on a specified cyclic retrieval resolution. For more information, see Appendix A, Understanding Data Retrieval.

Note Retrieval mode is applicable for tags from Wonderware Historian. The value set here is the default setting for a pen; however, you can override it by setting the pen retrieval mode to any value other than application setting.

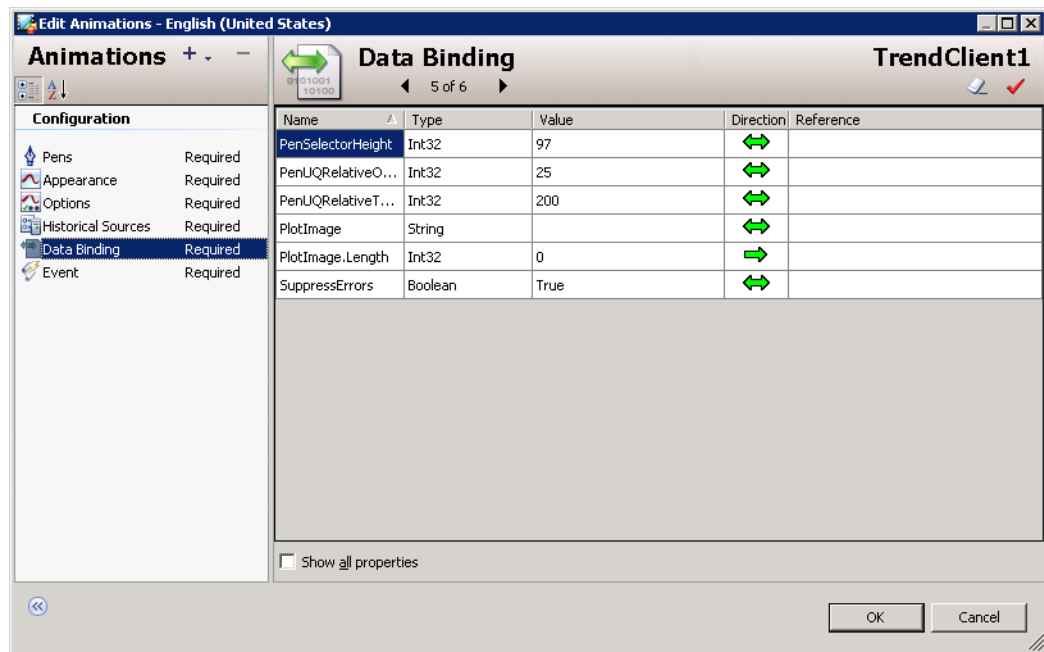
- 11 Set **Trend Duration**. You can set the trend duration for a maximum period of 2 years. All time durations are calculated backward from an end date of the current time (except for the options “Yesterday” and “Previous Hour”). You can pick a duration from the list or type a specific duration in the list box. The time notation is [DD] HH:MM:SS:fff, where DD=days, HH=hours, MM=minutes, SS=seconds, and fff=milliseconds. To edit a value in the duration list box, use the arrow keys on your keyboard to position the mouse cursor to the left of the number you want to change, then type the new number. You can only change the duration and not the start and end time.
- 12 Click **OK**.

Setting Data Bindings

You can associate a reference to an attribute with the Data Binding pane instead of with scripting. Information can be passed in either direction or both directions as desired. Changes to the status of one can affect the other.

To set data bindings

- 1 In the ArcestrA Symbol Editor, double-click the Trend Client. The **Edit Animations** dialog box appears.
- 2 Click **Data Binding**. The data binding information appears in the right pane.



The Data Binding table contains the following read-only information:

Name	The name of the property.
Type	The .NET data type of the property.
Value	The value of the property.

- 3 Click the **Direction** icon to disable the link entirely or change the direction of the data flow. If the arrow points to the right (away from the name of the property), the status of the Trend Client property affects the attribute you're binding to. If the arrow points to the left (toward the name of the event), the status of the Trend Client property is affected by the attribute you're binding to. If the arrow points both ways, a change in the status of one affects the other.

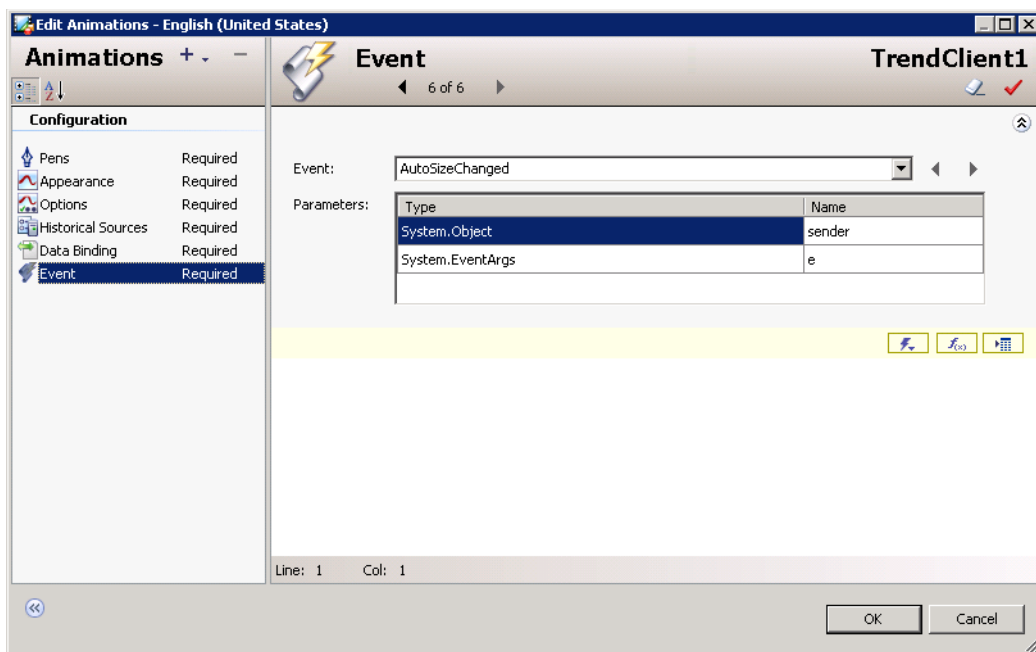
- 4 Double-click **Reference** to enter reference information. Click the ellipsis button to open the Galaxy Browser and use the Element Browser. For more information, see Chapter 3, Working with Objects, in the *Wonderware Application Server User's Guide*.
- 5 Select **Show all properties** to show all properties for which there is data binding information.
- 6 Click **OK**.

Handling Trend Events

You can use the custom event editor to build scripts to handle trend events.


To modify a trend event


- 1 In the ArchestrA Symbol Editor, double-click the Trend Client. The **Edit Animations** dialog box appears
- 2 Click **Events**. The events information appears in the right pane. For information on the different types of events, see Trend Client Events on page 95.



- 3 Select an event in the **Event** list. The parameters information appears in the lower portion of the pane.

- 4 Enter a script for this event in the window. You can use the editor buttons to gather information and parameters.

 Browse Event Parameters inserts the event parameters and any associated event parameter information at the current insertion point in the script.

 Display Script Function Browser shows the available script functions. Select a function and click **OK** to insert the function and parameters at the current insertion point in the script.

 Display Attribute Browser opens the Galaxy Browser.

- 5 Click **OK**. The script information is saved for the event.

Chapter 3

Scripting the Trend Client

This section describes the properties, methods, and events for the Trend Client.

Trend Client Properties

The following are the properties of the Trend Client:

- Chart.AddMultiplePens
- Chart.BackgroundColor
- Chart.Freeze
- Chart.FreezeDurationMS
- Chart.HidePenList
- Chart.Labels
- Chart.PenPrecision
- Chart.RefreshEntireChartIntervals
- Chart.RetrievalMode
- Chart.UpdateRateMS
- HistorySources
- Pen.Color
- Pen.Count
- Pen.Description
- Pen.Expression

- Pen.Format
- Pen.HistorySource
- Pen.HistoryTagName
- Pen.Index
- Pen.Name
- Pen.Precision
- Pen.RetrievalMode
- Pen.Style
- Pen.TrendHi
- Pen.TrendLo
- Pen.TrendType
- Pen.Units
- Pen.Visible
- Pen.Width
- PenSelectorHeight
- PenUQRelativeOpacity
- PenUQRelativeThickness
- PlotArea.BackgroundColor
- PlotArea.BorderColor
- PlotArea.GradientEndColor
- PlotArea.GradientType
- PlotArea.GridColor
- PlotArea.GridHorizontal
- PlotArea.GridStyle
- PlotArea.GridVertical
- PlotArea.GridWidth
- PlotArea.HighlightCurrentPen
- PlotArea.PenHighlightColor
- PlotArea.PenHighlightWidth
- PlotArea.SingleTagMode
- PlotImage

- ShowContextMenu
- SuppressErrors
- TimeAxis.Cursor1.Color
- TimeAxis.Cursor1.Pos
- TimeAxis.Cursor1.Style
- TimeAxis.Cursor1.Width
- TimeAxis.Cursor2.Color
- TimeAxis.Cursor2.Pos
- TimeAxis.Cursor2.Style
- TimeAxis.Cursor2.Width
- TimeAxis.LabelColor
- TimeAxis.NumGridPerValue
- TimeAxis.NumValues
- TimeAxis.ShowCursors
- TimeSelector
- TimeSelector.DurationMS
- TimeSelector.EndDate
- TimeSelector.StartDate
- TimeSelector.TimeDuration
- ToolTipText
- TrendVersion
- ValueAxis.Label
- ValueAxis.NumGridPerValue
- ValueAxis.NumValues
- Visible

This section describes all the scriptable properties available in the Trend Client.

You can access the properties of an individual pen by setting it as the current pen and then applying the pen properties.

Chart.AddMultiplePens

The Chart.AddMultiplePens property is a read-write Boolean property that suspends or allows the chart refresh while multiple pens are added to the chart.

Syntax

```
Chart.AddMultiplePens = bool;  
Result = Chart.AddMultiplePens;
```

Remarks

The default is FALSE (allows the chart refresh while multiple pens are added to the chart).

You can set this property to TRUE, then add multiple properties using a script without refreshing the graph. After adding the final tag, set this property back to FALSE. The graph is automatically refreshed and shows all the pens you have added.

Chart.BackgroundColor

The Chart.BackgroundColor property is a read-write property that gets or sets the background color of the chart.

Syntax

```
Chart.BackgroundColor = color;  
Result = Chart.BackgroundColor;
```

Remarks

The default is white.

Color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, FromARGB(), FromKnownColor(), and FromName(). For a list of the .NET color names and the corresponding hexadecimal codes, see .NET Colors on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

Chart.Freeze

The Chart.Freeze property is a read-write Boolean property that stops (TRUE) or starts (FALSE) the trend display from updating.

Syntax

```
Chart.Freeze = bool;  
Result = Chart.Freeze;
```

Remarks

The default is FALSE, which continues (or resumes) the trend display updates. Setting the property to TRUE stops the trend display updates.

Chart.FreezeDurationMS

The Chart.FreezeDurationMS property is a read-write integer property that freezes the chart from live updates for the specified duration in milliseconds.

Note When freeze duration is set to a value other than 0, in run time after a freeze has been initiated, live updates appear on the Trend Client automatically after the configured time has elapsed. If Freeze Duration for chart is set to 0, the auto resume feature is disabled.

Syntax

```
Chart.FreezeDurationMS = int;  
Result = Chart.FreezeDurationMS;
```

Remarks

The default is 600000 (10 minutes).

Chart.HidePenList

The Chart.HidePenList property is a read-write Boolean property that shows or hides the pen list in the chart.

Syntax

```
Chart.HidePenList = bool;  
Result = Chart.HidePenList;
```

Remarks

The default is TRUE.

Chart.Labels

The Chart.Labels property is a read-write integer property that sets the visibility of labels (chart label, X and Y axes scales, and cursor information) in the chart. Supported options are All and None (where 0 = All and 1 = None).

Syntax

```
Chart.Labels = int;  
Result = Chart.Labels;
```

Remarks

The default is 0 (All).

Chart.PenPrecision

The Chart.PenPrecision property is a read-write integer property that gets or sets the number of decimal places to show by default for the data value.

Syntax

```
Chart.PenPrecision = int;  
Result = Chart.PenPrecision;
```

Remarks

The default is 0.

Chart.RefreshEntireChartIntervals

The Chart.RefreshEntireChartIntervals property is a read-write integer property that refreshes the entire chart at every specified number of intervals. (The interval is specified with the Chart.UpdateRateMS property.) If the value is '0' the chart only adds new data to the chart; however, it does not refresh the data already present on the chart.

Syntax

```
Chart.RefreshEntireChartInterval = int;  
Result = Chart.RefreshEntireChartIntervals;
```

Remarks

The default is 100 intervals.

Chart.RetrievalMode

The Chart.RetrievalMode property is a read-write integer property that gets or sets the data retrieval mode for retrieving the data from Wonderware Historian at the chart level. Supported options are cyclic and full (where 0 = cyclic and 2 = full).

Syntax

```
Chart.RetrievalMode = int;  
Result = Chart.RetrievalMode;
```

Remarks

The default is 0 (cyclic).

Chart.UpdateRateMS

The Chart.UpdateRateMS property is a read-write integer property that gets or sets the chart refresh interval in milliseconds.

Syntax

```
Chart.UpdateRateMS = int;  
Result = Chart.UpdateRateMS;
```

Remarks

The default is 1000.

HistorySources

The HistorySources property is a read-only object property that gets a list of history sources. For more information about the HistorySources properties, see Trend Client History Sources on page 70.

Syntax

```
Result = HistorySources;
```

Remarks

No default.

Pen.Color

The Pen.Color property is a read-write property that gets or sets the color of the currently selected pen.

Syntax

```
Pen.Color = color;  
Result = Pen.Color;
```

Remarks

The default is color.

Color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, FromARGB(), FromKnownColor(), and FromName(). For a list of the .NET color names and the corresponding hexadecimal codes, see .NET Colors on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

Pen.Count

The Pen.Count property is a read-only integer property that gets the number of the pens in the pen list.

Syntax

```
Result = Pen.Count;
```

Remarks

The default is 0.

Pen.Description

The Pen.Description property is a read-write string property that gets or sets the description of the currently selected pen.

Syntax

```
Pen.Description = string;  
Result = Pen.Description;
```

Remarks

If the pen expression was configured by browsing to the attribute in the Attribute Browser, the default value is obtained from the corresponding description property of the associated ArchestrA attribute. Otherwise, the default value is blank if the pen expression is manually configured.

Pen.Expression

The Pen.Expression property is a read-write string property that gets or sets the expression of the currently selected pen. The expression can be a Galaxy attribute, InTouch tag reference, or an expression.

Syntax

```
Pen.Expression = string;  
Result = Pen.Expression;
```

Remarks

The default is blank.

Pen.Format

The Pen.Format property is a read-write integer property that gets or sets the format of the current pen (where 0 is decimal and 1 is scientific).

Syntax

```
Pen.Format = int;  
Result = Pen.Format;
```

Remarks

The default is 0 (decimal).

Pen.HistorySource

The Pen.HistorySource property is a read-only string property that gets the history source of the currently selected pen. For more information about the HistorySources properties, see Trend Client History Sources on page 70.

Note This value is empty when no historical source is configured, if an expression is configured, or if no historical tag is configured.

Syntax

```
Result = Pen.HistorySource;
```

Remarks

The default is blank.

Pen.HistoryTagName

The Pen.HistoryTagName property is a read-write string property that gets or sets the historical tag name for the currently selected pen.

Syntax

```
Pen.HistoryTagName = string;  
Result = Pen.HistoryTagName;
```

Remarks

The default is blank.

Pen.Index

The Pen.Index property is a read-only integer property that gets the index of the currently selected pen, or -1 if no pen is selected. The array is zero-based.

Syntax

```
Result = Pen.Index;
```

Remarks

The default is -1.

Pen.Name

The Pen.Name property is a read-write string property that gets or sets the name of the currently selected pen.

Syntax

```
Pen.Name = string;  
Result = Pen.Name;
```

Remarks

The default is blank.

Pen.Precision

The Pen.Precision property is a read-write integer property that gets or sets the decimal precision of the currently selected pen.

Syntax

```
Pen.Precision = int;  
Result = Pen.Precision;
```

Remarks

The default is the trend chart's pen precision property.

Pen.RetrievalMode

The Pen.RetrievalMode property is a read-write enumerated property that gets or sets the mode for retrieving the data from Wonderware Historian of the currently selected pen. Supported options are:

0 = Cyclic
2 = Full
12 = ApplicationSetting

Syntax

```
Pen.RetrievalMode = enum;  
Result = Pen.RetrievalMode;
```

Remarks

The default is the trend chart's retrieval mode property (12).

Pen.Style

The Pen.Style property is a read-write integer property that gets or sets the line style of the currently selected pen.

Valid values are:

0 = Solid
1 = Dash
2 = DashDot
3 = DashDotDot
4 = Dot

Syntax

```
Pen.Style = int;  
Result = Pen.Style;
```

Remarks

The default is 0.

Pen.TrendHi

The Pen.TrendHi property is a read-write double property that gets or sets the high value of the value range to be used for the currently selected pen.

Syntax

```
Pen.TrendHi = double;  
Result = Pen.TrendHi;
```

Remarks

If the pen expression was configured by browsing to the attribute in the Attribute Browser, the default value is set to the corresponding TrendHi property of the associated ArchestrA attribute. Otherwise, the default value is 100 if the pen expression is manually configured.

Pen.TrendLo

The Pen.TrendLo property is a read-write double property that gets or sets the low value of the value range to be used for the currently selected pen.

Syntax

```
Pen.TrendLo = double;  
Result = Pen.TrendLo;
```

Remarks

If the pen expression was configured by browsing to the attribute in the Attribute Browser, the default value is set to the corresponding TrendLo property of the associated ArchestrA attribute. Otherwise, the default value is 0 if the pen expression is manually configured.

Pen.TrendType

The Pen.TrendType property is a read-write integer property that gets or sets the plot type of the currently selected pen.

0 = Point

1 = Line

2 = StepLine

3 = Auto

When Pen.TrendType is set to Auto and there is no Historian default available, the Trend Client uses a plot type of **Line** for real tags and **StepLine** for integer tags.

Syntax

```
Pen.TrendType = int;  
Result = Pen.TrendType;
```

Remarks

The default is 3.

Pen.Units

The Pen.Units property is a read-write string property that gets or sets the units of the currently selected pen.

Syntax

```
Pen.Units = string;  
Result = Pen.Units;
```

Remarks

If the pen expression was configured by browsing to the attribute in the Attribute Browser, the default value is set to the corresponding EngUnits property of the associated ArcestrA attribute. Otherwise, the default value is blank if the pen expression is manually configured.

Pen.Visible

The Pen.Visible property is a read-write Boolean property that gets or sets the visible property for the currently selected pen.

Syntax

```
Pen.Visible = bool;  
Result = Pen.Visible;
```

Remarks

The default is TRUE (the pen is visible on the chart). When this property is set to FALSE, the pen is hidden from the chart display.

Pen.Width

The Pen.Width property is a read-write integer property that gets or sets the line width (from 1 to 10) of the currently selected pen.

Syntax

```
Pen.Width = int;  
Result = Pen.Width;
```

Remarks

The default is 1, when a pen is added to the pen list. If there is no pen in the pen list, the default is 0.

PenSelectorHeight

The PenSelectorHeight property is a read-write integer property that gets or sets the height of the pen selector in pixels.

Syntax

```
PenSelectorHeight = int;  
Result = PenSelectorHeight;
```

Remarks

The default is 97.

PenUQRelativeOpacity

The PenUQRelativeOpacity property is a read-write integer property that gets or sets the line's relative opacity when the data quality is uncertain.

The two properties, relative opacity and relative thickness, create a visual distinction for values with uncertain quality. When the pen type is point, no visual change is shown on the trend.

Syntax

```
PenUQRelativeOpacity = int;  
Result = PenUQRelativeOpacity;
```

Remarks

The default is 25%.

For example, if the pen has an opacity of 80% and the data quality is "uncertain," then the Trend Client calculates the opacity of the pen as $80\% \times 25\% = 20\%$ opaque.

PenUQRelativeThickness

The PenUQRelativeThickness property is a read-write integer property that gets or sets the line's relative thickness when data quality is uncertain.

The two properties, relative opacity, and relative thickness, create a visual distinction for values with uncertain quality. When the pen type is point, no visual change is shown on the trend.

Syntax

```
PenUQRelativeThickness = int;  
Result = PenUQRelativeThickness;
```

Remarks

The default is 200%.

For example, if a line is 1 pixel wide and 200% thick, then the Trend Client calculates the thickness of the line with a data quality of "uncertain" as $1 \text{ pixel} \times 200\% = 2 \text{ pixels wide}$.

PlotArea.BackgroundColor

The `PlotArea.BackgroundColor` property is a read-write property that gets or sets the color of the plot area of the graph.

Syntax

```
PlotArea.BackgroundColor = color;  
Result = PlotArea.BackgroundColor;
```

Remarks

The default is white.

Color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, `FromARGB()`, `FromKnownColor()`, and `FromName()`. For a list of the .NET color names and the corresponding hexadecimal codes, see [.NET Colors](#) on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

PlotArea.BorderColor

The `PlotArea.BorderColor` property is a read-write property that gets or sets the color of the plot area's border.

Syntax

```
PlotArea.BorderColor = color;  
Result = PlotArea.BorderColor;
```

Remarks

The default is black.

Color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, `FromARGB()`, `FromKnownColor()`, and `FromName()`. For a list of the .NET color names and the corresponding hexadecimal codes, see [.NET Colors](#) on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

PlotArea.GradientEndColor

The `PlotArea.GradientEndColor` property is a read-write property that gets or sets the gradient end color of the plot area of the graph.

Syntax

```
PlotArea.GradientEndColor = color;  
Result = PlotArea.GradientEndColor;
```

Remarks

The default is white.

Color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, `FromARGB()`, `FromKnownColor()`, and `FromName()`. For a list of the .NET color names and the corresponding hexadecimal codes, see [.NET Colors](#) on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

PlotArea.GradientType

The `PlotArea.GradientType` property is a read-write integer property that gets or sets the gradient type of the plot area of the graph.

0 = None (no gradient)

1 = LeftRight

2 = TopBottom

3 = Center

4 = DiagonalLeft

5 = DiagonalRight

6 = HorizontalCenter

7 = VerticalCenter

Syntax

```
PlotArea.GradientEndType = int;  
Result = PlotArea.GradientEndType;
```

Remarks

The default is 0.

PlotArea.GridColor

The `PlotArea.GridColor` property is a read-write property that gets or sets the color of grid.

Syntax

```
PlotArea.GridColor = color;  
Result = PlotArea.GridColor;
```

Remarks

The default is grey.

Color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, `FromARGB()`, `FromKnownColor()`, and `FromName()`. For a list of the .NET color names and the corresponding hexadecimal codes, see [.NET Colors](#) on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

PlotArea.GridHorizontal

The `PlotArea.GridHorizontal` property is a read-write Boolean property that shows or hides the horizontal grid.

Syntax

```
PlotArea.GridHorizontal = bool;  
Result = PlotArea.GridHorizontal;
```

Remarks

The default is `TRUE`.

PlotArea.GridStyle

The `PlotArea.GridStyle` property is a read-write integer property that gets or sets the grid line style.

0 = Solid

1 = Dash

2 = DashDot

3 = DashDotDot

4 = Dot

Syntax

```
PlotArea.GridStyle = int;  
Result = PlotArea.GridStyle;
```

Remarks

The default is 0.

PlotArea.GridVertical

The `PlotArea.GridVertical` property is a read-write Boolean property that shows or hides the vertical grid.

Syntax

```
PlotArea.GridVertical = bool;  
Result = PlotArea.GridVertical;
```

Remarks

The default is `TRUE`.

PlotArea.GridWidth

The `PlotArea.GridWidth` property is a read-write integer property that gets or sets the width of the grid. Allowed values are 1 to 10.

Syntax

```
PlotArea.GridWidth = int;  
Result = PlotArea.GridWidth;
```

Remarks

The default is 1.

PlotArea.HighlightCurrentPen

The `PlotArea.HighlightCurrentPen` property is a read-write Boolean property that highlights the currently selected pen.

Syntax

```
PlotArea.HighlightCurrentPen = bool;  
Result = PlotArea.HighlightCurrentPen;
```

Remarks

The default is `TRUE`.

PlotArea.PenHighlightColor

The `PlotArea.PenHighlightColor` property is a read-write property that gets or sets the pen's highlight color.

Syntax

```
PlotArea.PenHighlightColor = color;  
Result = PlotArea.PenHighlightColor;
```

Remarks

The default is yellow.

`Color` is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, `FromARGB()`, `FromKnownColor()`, and `FromName()`. For a list of the .NET color names and the corresponding hexadecimal codes, see [.NET Colors](#) on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

PlotArea.PenHighlightWidth

The PlotArea.PenHighlightWidth property is a read-write integer property that gets or sets the width of the pen's highlight color. Allowed values are 1 to 5.

Syntax

```
PlotArea.PenHighlightWidth = int;  
Result = PlotArea.PenHighlightWidth;
```

Remarks

The default is 2.

PlotArea.SingleTagMode

The PlotArea.SingleTagMode property is a read-write Boolean property that sets whether to show only the currently selected pen or all pens.

Syntax

```
PlotArea.SingleTagMode = bool;  
Result = PlotArea.SingleTagMode;
```

Remarks

The default is FALSE.

PlotImage

The PlotImage property is a read-write string property that gets or sets the plot background image for the chart.

Syntax

```
PlotImage = string;  
Result = PlotImage;
```

Remarks

The value of this property is the folder path and filename for the image. Supported image types are .jpeg, .gif, .bmp, and .png.

The default is blank.

ShowContextMenu

The ShowContextMenu property is a Boolean property that shows the context menu in run time.

Syntax

```
ShowContextMenu = bool;  
Result = ShowContextMenu;
```

Remarks

The default is TRUE.

SuppressErrors

The SuppressErrors property is a read-write Boolean property that suppresses or allows error messages.

Note All errors are logged to ArcestrA Logger regardless of this setting.

Syntax

```
SuppressErrors = bool;  
Result = SuppressErrors;
```

Remarks

The default is TRUE.

TimeAxis.Cursor1.Color

The TimeAxis.Cursor1.Color property is a read-write property that gets or sets the color of the left time axis cursor.

Syntax

```
TimeAxis.Cursor1.Color = color;  
Result = TimeAxis.Cursor1.Color;
```

Remarks

The default is red.

Color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, FromARGB(), FromKnownColor(), and FromName(). For a list of the .NET color names and the corresponding hexadecimal codes, see .NET Colors on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

TimeAxis.Cursor1.Pos

The TimeAxis.Cursor1.Pos property is a read-write property that gets or sets the time position of the left time axis cursor.

Syntax

```
TimeAxis.Cursor1.Pos = datetime;  
Result = TimeAxis.Cursor1.Pos;
```

Remarks

No default.

TimeAxis.Cursor1.Style

The `TimeAxis.Cursor1.Style` property is a read-write integer property that gets or sets the style of the left time axis cursor. Valid values are:

- 0 = Solid
- 1 = Dash
- 2 = DashDot
- 3 = DashDotDot
- 4 = Dot

Syntax

```
TimeAxis.Cursor1Style = int;  
Result = TimeAxis.Cursor1Style;
```

Remarks

The default is 0.

TimeAxis.Cursor1.Width

The `TimeAxis.Cursor1.Width` property is a read-write integer property that gets or sets the width of the left time axis cursor. Allowed values are 1 to 10.

Syntax

```
TimeAxis.Cursor1.Width = int;  
Result = TimeAxis.Cursor1.Width;
```

Remarks

The default is 1.

TimeAxis.Cursor2.Color

The `TimeAxis.Cursor2.Color` property is a read-write property that gets or sets the color of the right time axis cursor.

Syntax

```
TimeAxis.Cursor2.Color = color;  
Result = TimeAxis.Cursor2.Color;
```

Remarks

The default is blue.

Color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, `FromARGB()`, `FromKnownColor()`, and `FromName()`. For a list of the .NET color names and the corresponding hexadecimal codes, see .NET Colors on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

TimeAxis.Cursor2.Pos

The `TimeAxis.Cursor2.Pos` property is a read-write property that gets or sets the time position of the right time axis cursor.

Syntax

```
TimeAxis.Cursor2.Pos = datetime;  
Result = TimeAxis.Cursor2.Pos;
```

Remarks

No default.

TimeAxis.Cursor2.Style

The `TimeAxis.Cursor2.Style` property is a read-write integer property that gets or sets the style of the right time axis cursor. Valid values are:

0 = Solid

1 = Dash

2 = DashDot

3 = DashDotDot

4 = Dot

Syntax

```
TimeAxis.Cursor2.Style = int;  
Result = TimeAxis.Cursor2.Style;
```

Remarks

The default is 0.

TimeAxis.Cursor2.Width

The `TimeAxis.Cursor2.Width` property is a read-write integer property that gets or sets the width of the right time axis cursor. Allowed values are 1 to 10.

Syntax

```
TimeAxis.Cursor2.Width = int;  
Result = TimeAxis.Cursor2.Width;
```

Remarks

The default is 1.

TimeAxis.LabelColor

The `TimeAxis.LabelColor` property is a read-write property that gets or sets the color of the time axis labels.

Syntax

```
TimeAxis.LabelColor = color;  
Result = TimeAxis.LabelColor;
```

Remarks

The default is black.

Color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, `FromARGB()`, `FromKnownColor()`, and `FromName()`. For a list of the .NET color names and the corresponding hexadecimal codes, see [.NET Colors](#) on page 98. For more information on the color methods, see the Microsoft documentation for .NET Framework development.

TimeAxis.NumGridPerValue

The `TimeAxis.NumGridPerValue` property is a read-write integer property that gets or sets the number of grid lines that appear between each value shown on time axis. The valid range is 1 to 20.

Syntax

```
TimeAxis.NumGridPerValue = int;  
Result = TimeAxis.NumGridPerValue;
```

Remarks

The default is 3.

TimeAxis.NumValues

The `TimeAxis.NumValues` property is a read-write integer property that gets or sets the number of time labels that are shown along the time axis. The valid range is 2 to 15.

Syntax

```
TimeAxis.NumValues = int;  
Result = TimeAxis.NumValues;
```

Remarks

The default is 6.

TimeAxis.ShowCursors

The `TimeAxis.ShowCursors` property is a read-write Boolean property that shows or hides the time axis cursors.

Syntax

```
TimeAxis.ShowCursors = bool;  
Result = TimeAxis.ShowCursors;
```

Remarks

The default is `FALSE`.

TimeSelector

The `TimeSelector` property is a read-only property that gets the Time Range Picker object used in the Trend Client. You can use it in scripting to shorten the code using its properties and methods.

For the individual properties and methods, see the following properties, or the methods starting at `TimeSelector.GetStartAndEndTimes` on page 89.

Example 1

```
dim TRP as object;  
TRP = TrendClient1.TimeSelector;  
Timeselect = TRP;  
StartDate = TRP.StartDate;  
EndDate = TRP.EndDate;  
duration = TRP.TimeDuration;
```

Example 2

```
dim TRP as object;  
TRP = TrendClient1.TimeSelector;  
TRP.SetStartAndEndTimes(StartDate, EndDate, Duration);
```

Remarks

The return value is a `TimeRangePicker`.

TimeSelector.DurationMS

The `TimeSelector.DurationMS` property is a read-write integer property that gets the time duration measured in milliseconds.

The start time of the Trend Client (`TimeSelector.StartDate`) is calculated as the end time (`TimeSelector.EndDate`) minus the new time duration (`TimeSelector.DurationMS`).

When you set the value of the `TimeSelector.DurationMS` property, the `TimeSelector.TimeDuration` property is set to 0.

Syntax

```
result = TimeSelector.DurationMS;  
TimeSelector.DurationMS = Value;
```

Remarks

The default value is 300000.

TimeSelector.EndDate

The `TimeSelector.EndDate` property is a read-only string property that gets the end date and time of the Trend Client.

The default value is the time the Trend Client is placed on the canvas. If the **Update to Current Time** option is enabled, the `TimeSelector.EndDate` property is updated with the current time.

Note To set the end date and time of the Trend Client, use the `TimeSelector.SetStartAndEndTimes` method.

Syntax

```
result = Trend01.TimeSelector.EndDate;
```

TimeSelector.StartDate

The `TimeSelector.StartDate` property is a read-only string property that gets the start date and time of the Trend Client.

The default value is the time the Trend Client is placed on the canvas minus the duration.

Note To set the start date and time of the Trend Client, use the `TimeSelector.SetStartAndEndTimes` method.

Syntax

```
result = TimeSelector.StartDate;
```

TimeSelector.TimeDuration

The `TimeSelector.TimeDuration` property is a read-write enumerated property that gets or sets the enumerated duration of the time axis of the chart.

Syntax

```
TimeSelector.TimeDuration = enum;
Result = TimeSelector.TimeDuration;
```

The `TimeSelector.TimeDuration` property is a read-write integer property that gets or sets the time duration. The start time of the Trend Client (`TimeSelector.StartDate`) is calculated as the end time (`TimeSelector.EndDate`) minus the new time duration.

The `TimeSelector.TimeDuration` can have one of the following values:

Value	Description
0	Custom
1	The last minute.
2	The last five minutes.
3	The last ten minutes.
4	The last 15 minutes.
5	The last 30 minutes.
6	The last hour.
7	The last two hours.
8	The last four hours.
9	The last eight hours.
10	The last 12 hours.
11	The last 24 hours.
12	The last two days.
13	The last week.
14	The last two weeks.
15	The last month.
16	The last three months.
17	One minute.
18	Five minutes.
19	Ten minutes.

Value	Description
20	15 minutes.
21	30 minutes.
22	One hour.
23	Two hours.
24	Four hours.
25	Eight hours.
26	12 hours.
27	24 hours.
28	Two days.
29	One week.
30	Two weeks.
31	One month.
32	Three months.
33	Yesterday: 0:00:00 of the previous day to 0:00:00 of the current day.
34	Current day: 0:00:00 of the current day to the current time.
35	Previous hour: The start of the previous hour to the start of the current hour.
36	Current hour: The start of the current hour to the current time.

Syntax

```
result = TimeSelector.TimeDuration;
TimeSelector.TimeDuration = Value;
```

Example

```
Trend01.TimeSelector.TimeDuration = 5;
// The trend is now set to show the last 30 minutes.
```

Remarks

The default is 18 (5 minutes).

ToolTipText

The ToolTipText property is a read-write string property that gets or sets the pop-up text that appears when the mouse is hovered over the chart at run time.

Syntax

```
ToolTipText = string;  
Result = ToolTipText;
```

Remarks

The default is blank.

TrendVersion

The TrendVersion property is a read-only string property that gets the version of the trend.

Syntax

```
Result = TrendVersion;
```

Remarks

The return value is 1.0.0 for the first release.

ValueAxis.Label

The ValueAxis.Label property is a read-write integer property that gets or sets which labels are shown on the value axis.

0 = MultipleScales

1 = SingleScale

2 = ValuesAtCursor

Syntax

```
ValueAxis.Label = int;  
Result = ValueAxis.Label;
```

Remarks

The default is 0.

ValueAxis.NumGridPerValue

The ValueAxis.NumGridPerValue property is a read-write integer property that gets or sets the number of grid lines that appear between each value shown along the Y-axis. The valid range is 1 to 20.

Syntax

```
ValueAxis.NumGridPerValue = int;  
Result = ValueAxis.NumGridPerValue;
```

Remarks

The default is 2.

ValueAxis.NumValues

The ValueAxis.NumValues property is a read-write integer property that gets or sets the number of value labels that are shown along the Y-axis. The valid range is 2 to 15.

Syntax

```
ValueAxis.NumValues = int;  
Result = ValueAxis.NumValues;
```

Remarks

The default is 6.

Visible

The Visible property is a read-write Boolean property that shows or hides the Trend Client at run time.

Syntax

```
Visible = bool;  
Result = Visible;
```

Remarks

The default is TRUE.

Trend Client History Sources

The Trend Client has the following scriptable properties for the history sources:

- HistorySource.Authentication
- HistorySource.Domain
- HistorySource.Password
- HistorySource.RetainPassword
- HistorySource.ServerName
- HistorySource.Type
- HistorySource.UNCPPath
- HistorySource.UserID
- HistorySources.Count
- HistorySources.Items

HistorySource.Authentication

The HistorySource.Authentication property is a read-write string property that gets or sets the authentication mode for the connection to the server. Available options are SQL Server, Windows Account, and Windows Integrated.

Syntax

```
HistorySource.Authentication = string;  
Result = HistorySource.Authentication;
```

Remarks

The default is Windows Integrated.

HistorySource.Domain

The HistorySource.Domain property is a read-write string property that gets or sets the domain name for the connection to the Wonderware Historian.

Syntax

```
HistorySource.Domain = string;  
Result = HistorySource.Domain;
```

Remarks

The default is an empty message value ("").

This property is not applicable if you are using an InTouch LGH file as the data source.

HistorySource.Password

The HistorySource.Password property is a read-write string property that gets and sets the password for the connection to the server.

Syntax

```
HistorySource.Password = string;  
Result = HistorySource.Password;
```

Remarks

The default is wwUser.

HistorySource.RetainPassword

The `HistorySource.RetainPassword` property is a read-write Boolean property that indicates whether the password is stored in persistent storage.

Syntax

```
HistorySource.RetainPassword = int;  
Result = HistorySource.RetainPassword;
```

Remarks

The default is `TRUE` (the password is stored in persistent storage).

This property is not applicable if you are using an InTouch LGH file as the data source.

HistorySource.ServerName

The `HistorySource.ServerName` property is a read-write string property that gets or sets the name of the history source.

Syntax

```
HistorySource.ServerName = string;  
Result = HistorySource.ServerName;
```

Remarks

The default is an empty message value (`""`).

HistorySource.Type

The `HistorySource.Type` property is a read-write string property that gets or sets the type of the history source. Possible values are “InSQL” (Wonderware Historian Server) and “LGH” (InTouch History Files).

Syntax

```
HistorySource.Type = string;  
Result = HistorySource.Type;
```

Remarks

The default is “InSQL.”

HistorySource.UNCPATH

The `HistorySource.UNCPATH` property is a read-write string property that gets or sets the UNC path of the InTouch Log History/LGH file.

Syntax

```
HistorySource.UNCPATH = string;  
Result = HistorySource.UNCPATH;
```

Remarks

The default is an empty message value (`""`).

HistorySource.UserID

The HistorySource.UserID property is a read-write string property that gets and sets the user ID for the Wonderware Historian.

Syntax

```
HistorySource.UserID = string;  
Result = HistorySource.UserID;
```

Remarks

The default is wwUser.

This property is not applicable if you are using an InTouch LGH file as the data source.

HistorySources.Count

The HistorySources.Count property is a read-only integer property that shows the number of history sources configured.

Syntax

```
Result = HistorySources.Count;
```

Remarks

The default is 0.

HistorySources.Items

The HistorySources.Items property is a read-only array property that shows the array of history source names.

Syntax

```
Result = HistorySources.Items;
```

Remarks

No default.

Trend Client Methods

The following are the methods used by the Trend Client:

- AddHistorianSource
- AddPen
- ClearPens
- DeleteCurrentPen
- GetHistorianSource
- GetPenValAtX1
- GetStartAndEndTimes
- MoveNextPen
- MovePrevPen
- RefreshData
- RefreshTimes
- RemoveHistorianSource
- RemovePen
- ScaleAllPens
- ScaleAutoAllPens
- ScaleAutoPen
- ScaleDownAllPens
- ScaleDownPen
- ScaleMoveAllPensDown
- ScaleMoveAllPensUp
- ScaleMovePenDown
- ScaleMovePenUp
- ScalePen
- ScaleUpAllPens
- ScaleUpPen
- SetCurrentPen
- SetDuration
- SetStartAndEndTimes
- TimeSelector.GetStartAndEndTimes

- TimeSelector.RefreshTimes
- TimeSelector.SetStartAndEndTimes
- UpdateHistorianSource

The following section describes the scriptable methods available in the Trend Client.

AddHistorianSource

AddHistorianSource method adds a new history source.

Example

```
Dim b as object;  
b = Trend1.AddHistorianSource("idc_insql12", "InSQL");
```

Syntax

```
[Result =] Trend1.AddHistorianSource(string  
    HistorySourceName, string Type);
```

Parameters

HistorySourceName

The name of the history source.

Type

The type of history source "InSQL" or "InTouch".

Return Value

If there is already a server with the given name in the list, the object for that server is returned. Otherwise, a new server with the given name is added to the list and the object for the new server is returned.

AddPen

The AddPen method adds a named pen to the trend.

Examples

```
dim b as boolean;
b = Trend1.AddPen("MyPen01","UserDefined_001.Value",
  "InSQL01","UserDefined_001.Value", 1);
b = Trend1.AddPen("MyPen02","InTouch:$Second",
  "InSQL01","$Second", 1);
b = Trend1.AddPen("MyPen03",
  "MyContainer.InletPump1+MyContainer.InletPump2","","",
  ",1);
```

Syntax

```
[Result=] AddPen(string PenName, string TagName, string
  HistorySource, string HistoryTagName, int
  HistoryTagType);
```

Parameters

PenName

The name of the pen to add.

TagName

The name of the tag associated with the pen being added.

HistorySource

The history source for the pen being added.

HistoryTagName

The name of the history tag for the pen being added.

HistoryTagType

The type of history tag for the pen being added: 1 for Wonderware Historian or 3 for LGH.

Return Value

Returns TRUE if the pen was successfully added; otherwise, returns FALSE.

ClearPens

The ClearPens method removes all pens from the trend.

Example

```
dim b as boolean;
b = Trend1.ClearPens();
```

Syntax

```
[Result=] Trend1.ClearPens();
```

Parameters

None.

Return Value

Returns TRUE if the pens were successfully deleted from the trend; otherwise, returns FALSE.

DeleteCurrentPen

The DeleteCurrentPen method removes the currently selected pen from the trend.

Example

```
dim b as boolean;  
b = Trend1.DeleteCurrentPen();
```

Syntax

```
[Result=] Trend1.DeleteCurrentPen();
```

Parameters

None.

Return Value

Returns TRUE if the pen was successfully removed; otherwise, returns FALSE.

GetHistorianSource

GetHistorianSource method gets the named history source object for a server from the server list.

Example

```
Dim b as object;  
b = Trend1.GetHistorianSource("idc_insql15");
```

Syntax

```
[Result =] Trend1.GetHistorianSource(string  
    HistorySourceName);
```

Parameters

HistorySourceName

The name of the history source.

Return Value

If the server exists, the object is returned; otherwise, a NULL is returned.

GetPenValAtX1

The `GetPenValAtX1` method gets the value of the expression associated with the specified pen at the point at which its curve intersects with the first time axis cursor.

Example

```
double val = Trend1.GetPenValAtX1("MyPen01");
```

Syntax

```
[Result=] Trend1.GetPenValAtX1(string PenName);
```

Parameters

PenName

The pen you want to check the value of.

Return Value

Returns a double if the point is analog or discrete; returns the fixed position of the point if the point is message or other type. If the specified pen is shown in the chart multiple times, then the method uses the first instance that was added.

GetStartAndEndTimes

The `GetStartAndEndTimes` method gets the start and end times for the query.

Example

```
Dim SDate as System.DateTime;  
Dim EDate as System.DateTime;  
Dim b as System.Int32  
b = Trend1.GetStartAndEndTimes(SDate, EDate);  
StartTime = SDate.ToString();  
EndTime = EDate.ToString();  
Ret = b;
```

Syntax

```
[Result =] Trend1.GetStartAndEndTimes(DateTime  
    StartTime, DateTime EndTime);
```

Parameters

StartTime

The start time for the query.

EndTime

The end time for the query.

Return Value

Returns the time range enumeration.

MoveNextPen

The MoveNextPen method sets the current pen focus to the next pen in the list of trended attributes or tags. If the current pen is the last pen, calling the MoveNextPen method sets the first pen as the current pen.

Example

```
dim b as boolean;  
b = Trend1.MoveNextPen();
```

Syntax

```
[Result=] Trend1.MoveNextPen();
```

Parameters

None.

Return Value

Returns TRUE if the current pen focus was successfully set to the next pen (or wrapped around to the first pen in the list); otherwise, returns FALSE.

MovePrevPen

The MovePrevPen method sets the current pen focus to the previous pen in the list of trended attributes or tags. If the current pen is the first pen, calling the MovePrevPen method has no effect.

Example

```
dim b as boolean;  
b = Trend1.MovePrevPen();
```

Syntax

```
[Result=] Trend1.MovePrevPen();
```

Parameters

None.

Return Value

Returns TRUE if the current pen focus was successfully set to the previous pen; otherwise, returns FALSE.

RefreshData

The RefreshData method refreshes the trend chart by retrieving new data for all pens.

Example

```
bool b = Trend1.RefreshData();
```

Syntax

```
[Result=] Trend1.RefreshData();
```

Parameters

None.

Return Value

Returns TRUE if the trend was successfully updated; otherwise, FALSE is returned.

RefreshTimes

The RefreshTimes method sets the time period for the query by updating the end time to current time and recalculates the start time based on the new end time and duration.

Example

```
dtag = 1;  
Trend1.RefreshTimes(dtag);
```

Syntax

```
Trend1.RefreshTimes(bool TriggerEvent);
```

Parameters

TriggerEvent

If you set the Boolean parameter to TRUE, the OnChange event is triggered if the time is updated.

RemoveHistorianSource

RemoveHistorianSource method removes the specified history source from the list.

Example

```
Dim b as Boolean;  
b = Trend1.RemoveHistorianSource("IDC_INSQL15");
```

Syntax

```
[Result] = Trend1.RemoveHistorianSource(string  
    HistorySourceName);
```

Parameters

HistorySourceName

The name of the history source.

Return Value

This method returns true if the instance was removed from the list. This method returns false if the exact instance is not in the list, and the list remains unchanged.

RemovePen

The RemovePen method removes the specified pen from the trend chart.

Note If the same pen is available multiple times, then only the first occurrence is removed.

Example

```
dim b as boolean;  
b = Trend1.RemovePen("MyPen01");
```

Syntax

```
[Result=] Trend1.RemovePen(string PenName);
```

Parameters

PenName

The pen name to be removed.

Return Value

Returns TRUE if the pen was successfully removed from the trend chart; otherwise, returns FALSE.

ScaleAllPens

The ScaleAllPens method sets the Y-axis (value axis) scale for all pens.

Example

```
dim b as boolean;  
b = Trend1.ScaleAllPens(-100, 100);
```

Syntax

```
[Result=] Trend1.ScaleAllPens(double Min, double Max);
```

Parameters

Min

Enter the minimum value for the Y-axis.

Max

Enter the maximum value for the Y-axis.

Return Value

Returns TRUE if the Y-axis scale is set successfully; otherwise, returns FALSE.

ScaleAutoAllPens

The ScaleAutoAllPens method sets a suitable Y-axis scale for all tags in accordance with the current minimum and maximum values.

Example

```
dim b as boolean;  
b = Trend1.ScaleAutoAllPens();
```

Syntax

```
[Result=] Trend1.ScaleAutoAllPens();
```

Parameters

None.

Return Value

Returns TRUE if the Y-axis is successfully scaled; otherwise, returns FALSE.

ScaleAutoPen

The ScaleAutoPen method sets a suitable Y-axis scale for the currently selected pen in accordance with the current minimum and maximum values.

Example

```
dim b as boolean;  
b = Trend1.ScaleAutoPen();
```

Syntax

```
[Result=] Trend1.ScaleAutoPen();
```

Parameters

None.

Return Value

Returns TRUE if the Y-axis is successfully scaled; otherwise, returns FALSE.

ScaleDownAllPens

The ScaleDownAllPens method increases the value range of all pens by one third.

Example

```
dim b as boolean;  
b = Trend1.ScaleDownAllPens();
```

Syntax

```
[Result=] Trend1.ScaleDownAllPens();
```

Parameters

None.

Return Value

Returns TRUE if the value range is successfully increased by one third; otherwise, returns FALSE.

ScaleDownPen

The ScaleDownPen method increases the value range of the currently selected pen by one third.

Example

```
dim b as boolean;  
b = Trend1.ScaleDownPen();
```

Syntax

```
[Result=] Trend1.ScaleDownPen();
```

Parameters

None.

Return Value

Returns TRUE if the scaling is successful; otherwise, returns FALSE.

ScaleMoveAllPensDown

The ScaleMoveAllPensDown method moves the value scale down for all pens.

Example

```
dim b as boolean;  
b = Trend1.ScaleMoveAllPensDown();
```

Syntax

```
[Result=] Trend1.ScaleMoveAllPensDown();
```

Parameters

None.

Return Value

Returns TRUE if the scaling is successful; otherwise, returns FALSE.

ScaleMoveAllPensUp

The ScaleMovesAllPensUp method moves the value scale up for all pens.

Example

```
dim b as boolean;  
b = Trend1.ScaleMoveAllPensUp();
```

Syntax

```
[Result=] Trend1.ScaleMoveAllPensUp();
```

Parameters

None.

Return Value

Returns TRUE if the scaling is successful; otherwise, returns FALSE.

ScaleMovePenDown

The ScaleMovePenDown method moves the value scale down for the currently selected pen.

Example

```
dim b as boolean;  
b = Trend1.ScaleMovePenDown();
```

Syntax

```
[Result=] Trend1.ScaleMovePenDown();
```

Parameters

None.

Return Value

Returns TRUE if the scaling is successful; otherwise, returns FALSE.

ScaleMovePenUp

The ScaleMovePenUp method moves the value scale up for the currently selected pen.

Example

```
dim b as boolean;
b = Trend1.ScaleMovePenUp();
```

Syntax

```
[Result=] Trend1.ScaleMovePenUp();
```

Parameters

None.

Return Value

Returns TRUE if the scaling is successful; otherwise, returns FALSE.

ScalePen

The ScalePen method sets the Y-axis scale for the currently selected pen.

Example

```
dim b as boolean;
b = Trend1.ScalePen(-100, 100);
```

Syntax

```
[Result=] Trend1.ScalePen(double Min, double Max);
```

Parameters

Min

Enter the minimum value for the Y-axis.

Max

Enter the maximum value for the Y-axis.

Return Value

Returns TRUE if the Y-axis scale is set successfully; otherwise, returns FALSE.

ScaleUpAllPens

The ScaleUpAllPens method decreases the value range of all pens by one fourth.

Example

```
dim b as boolean;  
b = Trend1.ScaleUpAllPens();
```

Syntax

```
[Result=] Trend1.ScaleUpAllPens();
```

Parameters

None.

Return Value

Returns TRUE if the value range is successfully reduced by one fourth; otherwise, returns FALSE.

ScaleUpPen

The ScaleUpPen method decreases the value range of the currently selected pen by one fourth.

Example

```
dim b as boolean;  
b = Trend1.ScaleUpPen();
```

Syntax

```
[Result=] Trend1.ScaleUpPen();
```

Parameters

None.

Return Value

Returns TRUE if the value range is successfully reduced by one fourth; otherwise, returns FALSE.

SetCurrentPen

The SetCurrentPen method sets the specified pen as the currently selected pen. If the pen is available multiple times, then the first occurrence is selected.

Example

```
dim b as boolean;  
b = Trend1.SetCurrentPen("MyPen01");
```

Syntax

```
[Result=] Trend1.SetCurrentPen(string PenName);
```

Parameters

PenName

The name of the pen being set.

Return Value

Returns TRUE if the pen was set successfully; otherwise, returns FALSE.

SetDuration

The SetDuration method sets the duration of the trend. Calling this method first sets the end time to the current time and then the start time to current time minus the specified duration. Default duration is 5 minutes. Maximum duration is 2 years.

Example

```
dim b as boolean;  
b = Trend1.SetDuration("00:05:00");
```

Syntax

```
[Result=] Trend1.SetDuration(string DateTimeDuration);
```

Parameters

DateTimeDuration

The time of the duration in HH:MM:SS format.

Return Value

Returns TRUE if the duration is set successfully; otherwise, returns FALSE.

SetStartAndEndTimes

The `SetStartAndEndTimes` method sets the start and end times for the query.

Example

```
Dim b as Boolean;  
b = Trend1.SetStartAndEndTimes("08/31/2008  
15:33:43", "09/01/2009 15:33:43", 0);
```

Syntax

```
[Result =] Trend1.SetStartAndEndTimes(DateTime  
StartTime, DateTime EndTime, integer Duration);
```

Parameters

StartTime

The start time for the query. Only considered if the duration is set to `Custom`. For other durations, the start time is calculated automatically based on the end time and duration.

EndTime

The end time for the query. Only considered if the duration is set to `Custom` or an option from 17 to 32 (`OneMinute` to `ThreeMonths`). Otherwise, the end time is set based on the duration.

Duration

The time range duration. If the duration is set to `Custom`, the specified start and end times are used. For other duration options, the time indicated by the duration is used, and the start and/or end times are updated as necessary. For more information on valid values for the duration, see `TimeSelector.TimeDuration` on page 67.

TimeSelector.GetStartAndEndTimes

The `TimeSelector.GetStartAndEndTimes` method gets the start and end times for the query.

Syntax

```
Trend01.GetStartAndEndTimes(DateTime StartTime,
    DateTime EndTime);
```

Parameters

StartTime

String attribute, custom property, or element property to retrieve the start time.

EndTime

String attribute, custom property, or element property to retrieve the end time.

Example

```
dim SDate as string;
dim EDate as string;
Trend01.TimeSelector.GetStartAndEndTimes(SDate, EDate);
StartDate = SDate;
EndDate = EDate;
```

TimeSelector.RefreshTimes

The `TimeSelector.RefreshTimes` method sets the time period for the query by updating the end time to current time and recalculates the start time based on the new end time and duration.

If you set the Boolean parameter to `TRUE`, the `OnChange` event is triggered if the time is updated.

Only use this method, if the **Update to Current Time** option is cleared or the **UpdateToCurrentTime** property is `FALSE`.

Note This method does not work if the **UpdatetoCurrentTime** property value is `TRUE`.

Syntax

```
Trend01.TimeSelector.RefreshTimes(TriggerEvent);
```

Example

```
dtag = 1;
Trend01.TimeSelector.RefreshTimes(dtag);
```

TimeSelector.SetStartAndEndTimes

The `TimeSelector.SetStartAndEndTimes` method sets the start and end times for the query.

You must specify one of the following parameter combinations:

- Start time and end time. Set the `Duration` parameter to 0.
- Start time and duration. Set the `EndTime` parameter to "".
- End time and duration. Set the `StartTime` parameter to "".
- Start time, duration, and end time. The Trend Client shows an error message if start time plus duration is not equal to end time.

Syntax

```
Trend01.SetStartAndEndTimes(DateTime StartTime,  
                             DateTime EndTime, integer Duration);
```

Parameters

StartTime

String value or expression indicating the start time.

EndTime

String value or expression indicating the end time.

Duration

Duration enum. For more information on possible values, see `TimeSelector.TimeDuration` on page 67.

Example

```
Trend01.TimeSelector.SetStartAndEndTimes("08/31/2008  
15:33:43", "09/01/2009 15:33:43", 0);
```

UpdateHistorianSource

UpdateHistorianSource method updates the specified history source in the list.

Example

```
Dim a as object;
Dim b as Boolean;
a = Trend1.GetHistorianSource ("IDC_INSQL15");
a.Authentication = "Windows Integrated";
b = Trend1.UpdateHistorianSource("IDC_INSQL15");
```

Syntax

```
[Result =] Trend1.UpdateHistorianSource(string
    HistorySourceName);
```

Parameters

HistorySourceName

The name of the history source.

Return Value

Returns true if the given instance is currently in the server list; otherwise, it returns false.

Trend Client History Sources

The Trend Client has the following scriptable methods for the history sources:

- HistorySource.Connect
- HistorySource.Disconnect
- HistorySources.Add
- HistorySources.GetSource
- HistorySources.Remove
- HistorySources.Update

HistorySource.Connect

HistorySource.Connect method logs on to the current history source.

Example

```
Dim histSources = Trend1.HistorySources;
Dim histSource = histSources.GetSource("idc_insql12");
Dim statusMsg as string;
Dim ret = histSource.Connect(statusMsg);
```

Syntax

```
[Result =] HistorySource.Connect(string
    statusMessage);
```

Parameters

statusMessage

Information of the result of the log on attempt.

Return Value

Returns TRUE if the log on was successful; otherwise, returns FALSE. The server must be configured before calling the Connect method. Changes made to the server configuration after a connect do not take effect until after a disconnect and subsequent connect.

HistorySource.Disconnect

HistorySource.Disconnect method logs off the connection to the current history source.

Example

```
Dim histSources = Trend1.HistorySources;
Dim histSource = histSources.GetSource("idc_insql12");
histSource.Disconnect();
```

Syntax

```
[Result =] HistorySource.Disconnect();
```

Parameters

None.

Return Value

None.

Remarks

Repeated calls to this method are harmless and do not result in further state change events.

HistorySources.Add

HistorySources.Add method adds a new history source.

Example

```
Dim histSources = Trend1.HistorySources;  
Dim ret = histSources.Add("idc_insql12", "InSQL");
```

Syntax

```
[Result =] HistorySources.Add(string HistorySourceName,  
    string Type);
```

Parameters

HistorySourceName

The name of the history source.

Type

The type of history source “InSQL“ or “InTouch“.

Return Value

If there is already a server with the given name in the list, the object for that server is returned. Otherwise, a new server with the given name is added to the list and the object for the new server is returned.

HistorySources.GetSource

HistorySources.GetSource method gets the named history source object for a server from the server list.

Example

```
Dim histSources = Trend1.HistorySources;  
Dim histSource = histSources.GetSource("IDC_INSQL15");
```

Syntax

```
[Result =] HistorySources.GetSource(string  
    HistorySourceName);
```

Parameters

HistorySourceName

The name of the history source.

Return Value

If the server exists, the object is returned; otherwise, a NULL is returned.

HistorySources.Remove

HistorySources.Remove method removes the specified history source from the list.

Example

```
Dim histSources = Trend1.HistorySources;  
Dim ret = histSources.Remove("IDC_INSQL15");
```

Syntax

```
[Result =] HistorySources.Remove(string  
    HistorySourceName);
```

Parameters

HistorySourceName

The name of the history source.

Return Value

This method returns TRUE if the instance was removed from the list. This method returns FALSE if the exact instance is not in the list, and the list remains unchanged.

HistorySources.Update

HistorySources.Update method updates the specified history source in the list.

Example

```
Dim histSources = Trend1.HistorySources;  
Dim ret = histSources.Update("IDC_INSQL15");
```

Syntax

```
[Result =] HistorySources.Update(string  
    HistorySourceName);
```

Parameters

HistorySourceName

The name of the history source.

Return Value

Returns TRUE if the given instance is currently in the server list; otherwise, it returns FALSE.

Trend Client Events

The following events are relevant to the Trend Client.

- CurrentPenChanged
- DatesChanged
- MouseClick
- PenDisplayChanged
- PenlistChanged
- ShutDown
- SizeChanged
- StartUp
- StateChanged

CurrentPenChanged

The CurrentPenChanged event is triggered when a different pen is selected.

Syntax

```
TrendClient.CurrentPenChanged();
```

DatesChanged

The DatesChanged event is triggered when a date/time for the trend chart changes because there is a scripted change to the chart's duration.

Syntax

```
TrendClient.DatesChanged();
```

MouseClick

The MouseClick event is triggered when there is a mouse click in the trend region.

Syntax

```
TrendClient.MouseClick();
```

PenDisplayChanged

The PenDisplayChanged event is triggered when the display options for a pen in the pen list are changed.

Syntax

```
TrendClient.PenDisplayChanged();
```

PenlistChanged

The PenlistChanged event is triggered when a pen is added to or removed from the pen list.

Syntax

```
TrendClient.PenlistChanged();
```

ShutDown

The ShutDown event is triggered when the client is closed.

Syntax

```
TrendClient.ShutDown();
```

SizeChanged

The SizeChanged event is triggered when a resize event is received.

Syntax

```
TrendClient.SizeChanged();
```

StartUp

The StartUp event is triggered when the client is started.

Syntax

```
TrendClient.StartUp();
```

StateChanged

The StateChanged event is triggered when a change has been made to the configuration for a pen in the pen list.

Syntax

```
TrendClient.StateChanged();
```


Colors in Trend Client

Trend Client and ActiveFactory use different color rendering schemes. ActiveFactory uses BGR and ABGR color rendering,

where:

A = Transparency (for ABGR only)

B = Blue

G = Green

R = Red

Information on how colors are rendered in ActiveFactory appears in Chapter 19, Common Properties, Methods, Events, Enums, and Data Types, of the *ActiveFactory Software User's Guide*.

In contrast, in the Trend Client, color is a .NET Framework data type. You can use various color methods to set the color, such as a predefined color name, `FromARGB()`, `FromKnownColor()`, and `FromName()`. For example, to set the pen color on a Trend Client Trend named **RealtimeTrend1** to **DarkGreen**, you use the following script statement:

```
RealtimeTrend1.Pen.Color =  
    System.Drawing.Color.FromName("DarkGreen");
```

For more information on the color methods, see the Microsoft documentation for .NET Framework development.

.NET Colors

The following table is an overview of the color .NET color names with hexadecimal code.

Color with Hex Code	Color with Hex Code	Color with Hex Code
AliceBlue #F0F8FF	AntiqueWhite #FAEBD7	Aqua #00FFFF
Aquamarine #7FFFD4	Azure #F0FFFF	Beige #F5F5DC
Bisque #FFE4C4	Black #000000	BlanchedAlmond #FFEBCD
Blue #0000FF	BlueViolet #8A2BE2	Brown #A52A2A
BurlyWood #DEB887	CadetBlue #5F9EA0	Chartreuse #7FFF00
Chocolate #D2691E	Coral #FF7F50	CornflowerBlue #6495ED
Cornsilk #FFF8DC	Crimson #DC143C	Cyan #00FFFF
DarkBlue #00008B	DarkCyan #008B8B	DarkGoldenrod #B8860B
DarkGray #A9A9A9	DarkGreen #006400	DarkKhaki #BDB76B
DarkMagenta #8B008B	DarkOliveGreen #556B2F	DarkOrange #FF8C00
DarkOrchid #9932CC	DarkRed #8B0000	DarkSalmon #E9967A
DarkSeaGreen #8FBC8B	DarkSlateBlue #483D8B	DarkSlateGray #2F4F4F
DarkTurquoise #00CED1	DarkViolet #9400D3	DeepPink #FF1493
DeepSkyBlue #00BFFF	DimGray #696969	DodgerBlue #1E90FF
Firebrick #B22222	FloralWhite #FFFAF0	ForestGreen #228B22
Fuchsia #FF00FF	Gainsboro #DCDCDC	GhostWhite #F8F8FF
Gold #FFD700	Goldenrod #DAA520	Gray #808080
Green #008000	GreenYellow #ADFF2F	Honeydew #F0FFF0
HotPink #FF69B4	IndianRed #CD5C5C	Indigo #4B0082
Ivory #FFFFFF	Khaki #F0E68C	Lavender #E6E6FA
LavenderBlush #FFF0F5	LawnGreen #7CFC00	LemonChiffon #FFFACD
LightBlue #ADD8E6	LightCoral #F08080	LightCyan #E0FFFF
LightGoldenrodYellow #FAFAD2	LightGray #D3D3D3	LightGreen #90EE90
LightPink #FFB6C1	LightSalmon #FFA07A	LightSeaGreen #20B2AA
LightSkyBlue #87CEFA	LightSlateGray #778899	LightSteelBlue #B0C4DE
LightYellow #FFFFE0	Lime #00FF00	LimeGreen #32CD32

Color with Hex Code	Color with Hex Code	Color with Hex Code
Linen #FAF0E6	Magenta #FF00FF	Maroon #800000
MediumAquamarine #66CDAA	MediumBlue #0000CD	MediumOrchid #BA55D3
MediumPurple #9370DB	MediumSeaGreen #3CB371	MediumSlateBlue #7B68EE
MediumSpringGreen #00FA9A	MediumTurquoise #48D1CC	MediumVioletRed #C71585
MidnightBlue #191970	MintCream #F5FFFA	MistyRose #FFE4E1
Moccasin #FFE4B5	NavajoWhite #FFDEAD	Navy #000080
OldLace #FDF5E6	Olive #808000	OliveDrab #6B8E23
Orange #FFA500	OrangeRed #FF4500	Orchid #DA70D6
PaleGoldenrod #EEE8AA	PaleGreen #98FB98	PaleTurquoise #AFEEEE
PaleVioletRed #DB7093	PapayaWhip #FFEFD5	PeachPuff #FFDAB9
Peru #CD853F	Pink #FFC0CB	Plum #DDA0DD
PowderBlue #B0E0E6	Purple #800080	Red #FF0000
RosyBrown #BC8F8F	RoyalBlue #4169E1	SaddleBrown #8B4513
Salmon #FA8072	SandyBrown #F4A460	SeaGreen #2E8B57
SeaShell #FFF5EE	Sienna #A0522D	Silver #C0C0C0
SkyBlue #87CEEB	SlateBlue #6A5ACD	SlateGray #708090
Snow #FFFAFA	SpringGreen #00FF7F	SteelBlue #4682B4
Tan #D2B48C	Teal #008080	Thistle #D8BFD8
Tomato #FF6347	Transparent #FFFFFF	Turquoise #40E0D0
Violet #EE82EE	Wheat #F5DEB3	White #FFFFFF
WhiteSmoke #F5F5F5	Yellow #FFFF00	YellowGreen #9ACD32

Scripting Differences between Trend Client and ActiveFactory Trend Control

The Trend Client maintains the same support for run-time reference binding as all ArcestraA graphic elements.

The Trend Client properties and methods are very similar to the ActiveFactory Trend control properties and methods, as shown in the following table:

ActiveFactory Trend property or method	Trend Client property or method
(no equivalent)	AddHistorianSource on page 75
AddTag	AddPen on page 76
AddMultipleTags	Chart.AddMultiplePens on page 46
BackColor	Chart.BackgroundColor on page 46
(no equivalent)	Chart.Freeze on page 46
(no equivalent)	Chart.FreezeDurationMS on page 47
(no equivalent)	Chart.HidePenList on page 47
(no equivalent)	Chart.Labels on page 47
DefaultTagPrecision	Chart.PenPrecision on page 48
(no equivalent)	Chart.RefreshEntireChartIntervals on page 48
RetrievalOptionsRetrievalMode	Chart.RetrievalMode on page 48
LiveModeRate	Chart.UpdateRateMS on page 48
ClearTags	ClearPens on page 76
DeleteCurrentTag	DeleteCurrentPen on page 77
(no equivalent)	GetHistorianSource on page 77
CurrentTagValAtX1	GetPenValAtX1 on page 78
(no equivalent)	GetStartAndEndTimes on page 78
(no equivalent)	HistorySource.Authentication on page 71
(no equivalent)	HistorySource.Connect on page 92
(no equivalent)	HistorySource.Disconnect on page 92
(no equivalent)	HistorySource.Domain on page 71
(no equivalent)	HistorySource.Password on page 71
(no equivalent)	HistorySource.RetainPassword on page 72

ActiveFactory Trend property or method	Trend Client property or method
(no equivalent)	HistorySource.ServerName on page 72
(no equivalent)	HistorySource.Type on page 72
(no equivalent)	HistorySource.UNCPATH on page 72
(no equivalent)	HistorySource.UserID on page 73
Servers	HistorySources on page 49
(no equivalent)	HistorySources.Add on page 93
(no equivalent)	HistorySources.Count on page 73
(no equivalent)	HistorySources.GetSource on page 93
(no equivalent)	HistorySources.Items on page 73
(no equivalent)	HistorySources.Remove on page 94
(no equivalent)	HistorySources.Update on page 94
MoveNextTag	MoveNextPen on page 79
MovePrevTag	MovePrevPen on page 79
CurrentTagColor	Pen.Color on page 49
(no equivalent)	Pen.Count on page 49
(no equivalent)	Pen.Description on page 50
(no equivalent)	Pen.Expression on page 50
CurrentTagFormat	Pen.Format on page 50
(no equivalent)	Pen.HistorySource on page 51
(no equivalent)	Pen.HistoryTagName on page 51
CurrentTagIndex	Pen.Index on page 51
(no equivalent)	Pen.Name on page 51
(no equivalent)	Pen.Precision on page 52
CurrentTagPrecision	Pen.RetrievalMode on page 52
CurrentTagRetrievalStyle	Pen.Style on page 52
(no equivalent)	Pen.TrendHi on page 53
(no equivalent)	Pen.TrendLo on page 53
CurrentTagTrendType	Pen.TrendType on page 53
(no equivalent)	Pen.Units on page 54
(no equivalent)	Pen.Visible on page 54

ActiveFactory Trend property or method	Trend Client property or method
CurrentTagPenWidth	Pen.Width on page 54
CurrentTagRetrievalMode	PenSelectorHeight on page 55
(no equivalent)	PenUQRelativeOpacity on page 55
(no equivalent)	PenUQRelativeThickness on page 55
BackColor	PlotArea.BackgroundColor on page 56
BorderColor	PlotArea.BorderColor on page 56
PlotGradientEndColor	PlotArea.GradientEndColor on page 57
PlotGradient	PlotArea.GradientType on page 57
GridColor	PlotArea.GridColor on page 58
GridHorizontal	PlotArea.GridHorizontal on page 58
(no equivalent)	PlotArea.GridStyle on page 58
GridVertical	PlotArea.GridVertical on page 59
(no equivalent)	PlotArea.GridWidth on page 59
HighlightCurrentTag	PlotArea.HighlightCurrentPen on page 59
(no equivalent)	PlotArea.PenHighlightColor on page 59
(no equivalent)	PlotArea.PenHighlightWidth on page 60
SingleTagMode	PlotArea.SingleTagMode on page 60
PlotImage	PlotImage on page 60
RefreshData	RefreshData on page 80
(no equivalent)	RefreshTimes on page 80
(no equivalent)	RemoveHistorianSource on page 81
RemoveTag	RemovePen on page 81
ScaleAllTags	ScaleAllPens on page 82
ScaleAutoAllTags	ScaleAutoAllPens on page 82
ScaleAutoTag	ScaleAutoPen on page 83
ScaleDownAllTags	ScaleDownAllPens on page 83
ScaleDownTag	ScaleDownPen on page 83
ScaleMoveAllTagsDown	ScaleMoveAllPensDown on page 84
ScaleMoveAllTagsUp	ScaleMoveAllPensUp on page 84

ActiveFactory Trend property or method	Trend Client property or method
ScaleMoveTagDown	ScaleMovePenDown on page 84
ScaleMoveTagUp	ScaleMovePenUp on page 85
ScaleTag	ScalePen on page 85
ScaleUpAllTags	ScaleUpAllPens on page 86
ScaleUpTag	ScaleUpPen on page 86
SetCurrentTag	SetCurrentPen on page 87
SetDuration	SetDuration on page 87
(no equivalent)	SetStartAndEndTimes on page 88
AllowContextMenu	ShowContextMenu on page 60
SupressErrors	SuppressErrors on page 61
XCursor1Color	TimeAxis.Cursor1.Color on page 61
XCursor1Pos	TimeAxis.Cursor1.Pos on page 61
(no equivalent)	TimeAxis.Cursor1.Style on page 62
(no equivalent)	TimeAxis.Cursor1.Width on page 62
XCursor2Color	TimeAxis.Cursor2.Color on page 62
XCursor2Pos	TimeAxis.Cursor2.Pos on page 63
(no equivalent)	TimeAxis.Cursor2.Style on page 63
(no equivalent)	TimeAxis.Cursor2.Width on page 63
NumDataPointLabels	TimeAxis.LabelColor on page 64
NumTimeAxisGridPerValue	TimeAxis.NumGridPerValue on page 64
NumTimeAxisValues	TimeAxis.NumValues on page 64
(no equivalent)	TimeAxis.ShowCursors on page 65
(no equivalent)	TimeSelector on page 65
(no equivalent)	TimeSelector.DurationMS on page 66
(no equivalent)	TimeSelector.EndDate on page 66
(no equivalent)	TimeSelector.GetStartAndEndTimes on page 89
(no equivalent)	TimeSelector.RefreshTimes on page 89
(no equivalent)	TimeSelector.SetStartAndEndTimes on page 90
(no equivalent)	TimeSelector.StartDate on page 66

ActiveFactory Trend property or method	Trend Client property or method
TimeSelector.TimeDuration	TimeSelector.TimeDuration on page 67
ToolTipText	ToolTipText on page 69
(no equivalent)	TrendVersion on page 69
(no equivalent)	UpdateHistorianSource on page 91
NumXValueAxisLabels	ValueAxis.Label on page 69
NumYAxisGridPerValue	ValueAxis.NumGridPerValue on page 69
NumYAxisValues	ValueAxis.NumValues on page 70
Visible	Visible on page 70

Appendix A

Understanding Data Retrieval

The Trend Client supports both cycle and full data retrieval modes when retrieving data from Wonderware Historian to suit different reporting needs and applications. This appendix explains how these two retrieval modes work.

Understanding Retrieval Modes

Different retrieval modes allow you to access the data stored on a IndustrialSQL Server in different ways. For example, if you retrieve data for a long time period, you might want to retrieve only a few hundred evenly spaced data points to minimize response time. For a shorter time period, you might want to retrieve all values that are stored on the server to get more accurate results.

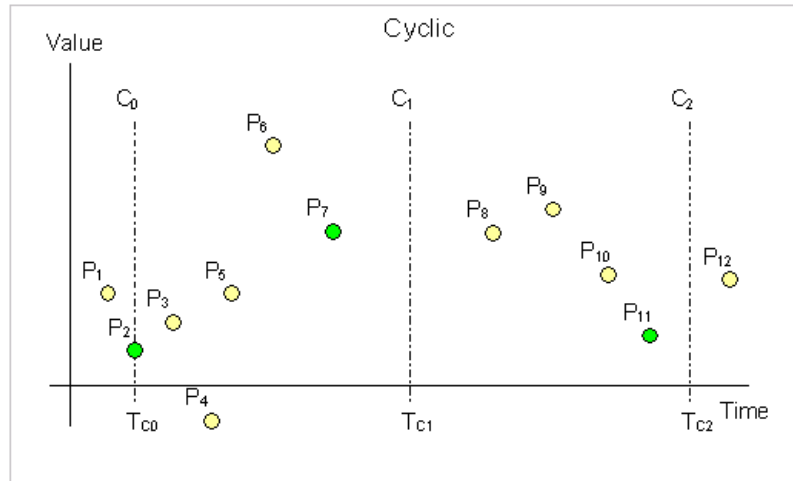
Although IndustrialSQL Server with a version of 9.0 or higher support a variety of retrieval modes, Trend Client only supports Cyclic and Full data retrieval.

Cyclic Retrieval

Cyclic retrieval is the retrieval of stored data for the given time period based on a specified cyclic retrieval resolution, regardless of whether or not the value of the tag(s) has changed. It works with all types of tags. Cyclic retrieval produces a virtual rowset, which may or may not correspond to the actual data rows stored on the IndustrialSQL Server.

In cyclic retrieval, one row is returned for each cycle boundary. If no data row is actually stored at a cycle boundary, the last value before the boundary is returned.

The following illustration shows how values are returned for cyclic retrieval:



Data is retrieved in cyclic mode with a start time of T_{C0} and an end time of T_{C2} . The resolution has been set in such a way that the historian returns data for three cycle boundaries at T_{C0} , T_{C1} , and T_{C2} . Each dot in the graphic represents an actual data point stored on the historian. From these points, the following are returned:

- At T_{C0} : P_2 , because it falls right on the cycle boundary
- At T_{C1} : P_7 , because it is the last point before the cycle boundary
- At T_{C2} : P_{11} , for the same reason

Cyclic retrieval is fast and therefore consumes little server resources. However, it may not correctly reflect the stored data because important process values (gaps, spikes, etc.) might fall between cycle boundaries.

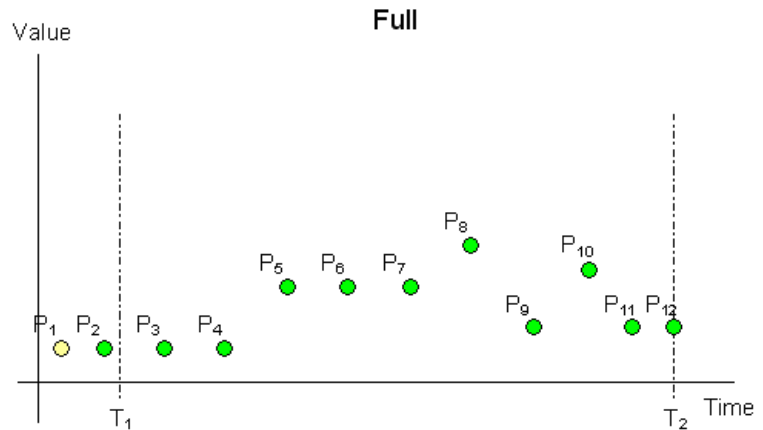
Full Retrieval

In full retrieval mode, all stored data points are returned, regardless of whether a value or quality has changed since the last value. This mode allows the same value and quality pair (or NULL value) to be returned consecutively with their actual timestamps. It works with all types of tags.

By using full retrieval in conjunction with storage without filtering (that is, no delta or cyclic storage mode is applied at the historian), you can retrieve all values that originated from the plant floor data source or from another application.

Full retrieval best represents the process measurements recorded by the IndustrialSQL Server. However, it creates a higher load for the server, the network and the client system because a very large number of records may be returned for longer time periods.

The following illustration shows how values are returned for full retrieval:



Data is retrieved in full mode with a start time of T_1 and an end time of T_2 . Each dot in the graphic represents an actual data point stored on the historian. From these points, the following are returned:

- P_2 , because there is no actual data point at T_1
- P_3 through P_{12} , because they represent stored data points during the time period

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