Foxboro Evo™ Process Automation System

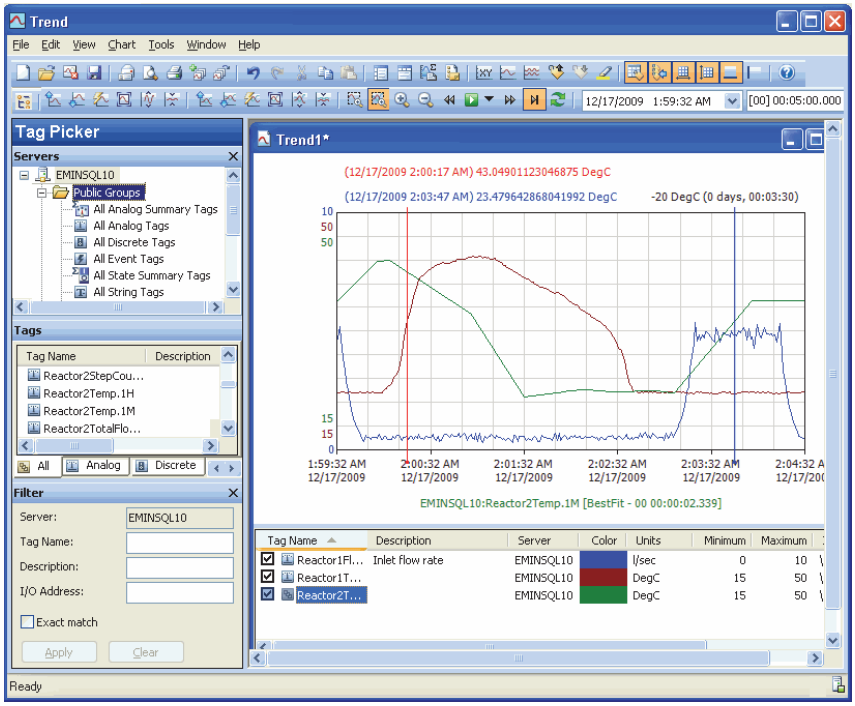
Product Specifications

Foxboro®

by Schneider Electric

PSS 31S-10HISTCL

Wonderware® Historian Client



The Wonderware® Historian Client supports analysis and reporting of historical data from various sources, including the Wonderware Historian. Tools and utilities are provided to match data presentation to the user's specific requirements.

OVERVIEW

The Wonderware Historian Client software is a full-featured suite of applications that maximizes the value of the data in the Wonderware Historian. The Wonderware Historian Client software integrates tightly with the most popular Microsoft® Office tools.

Wonderware Historian Client software provides a number of client tools to address specific data representation and analysis requirements. These tools remove the requirement to be familiar with the SQL and provide intuitive point-and-click interfaces to access, analyze, and graph both current and historically acquired time-series data.

The Wonderware Historian Client software includes the following stand-alone applications:

- Wonderware Historian Client Trend. Enables trending of historical and real time data over time. Powerful features allow data to be compared with other data from different periods. Alarms and limit excursions are readily visible. It is also possible to add and view annotations in your trends.

- Wonderware Historian Client Query. This point-and-click tool enables complex queries to be created and executed against a Wonderware Historian or compatible database. Knowledge of the database structure or SQL is not required.

The Trend and Query client tools are available as both ActiveX® and .NET components, enabling easy extensibility of your existing applications, such as a Wonderware HMI application or Wonderware Information Server portal application.

Wonderware Historian Client also includes Microsoft Office add-ins that give you the ability to easily create documents from your process data.

- Wonderware Historian Client Workbook. This add-in to Microsoft Excel® software allows almost any type of analysis and display of data from a Wonderware Historian using the Excel spreadsheet format.
- Wonderware Historian Client Report. This add-in to Microsoft Word allows sophisticated reporting from a Wonderware Historian using the Word document format.

BENEFITS

In the Wonderware Historian, plant data are stored in special history "extension" tables. The historian provides time domain extensions that allow for more useful retrieval of time-series data from these tables.

The combination of normal SQL Server® tables and the extension tables provides a powerful way to access meaningful data stored in the database. Since the historian is a relational database, queries can join data across multiple tables to retrieve data efficiently.

Wonderware Historian Client understands the nature of data stored within the Wonderware Historian, and simplifies extraction and analysis of that information.

Using simple queries, constructed automatically by the Wonderware Historian Client tools, you can answer questions as diverse as:

- Average vibration of a motor each day over the last month.
- Annotation for a discrete tag that was made six months ago.
- The limit of an analog tag in the context of a normal production mode. The limit of the same analog tag in the context of an accelerated production mode.
- The values for 50 specified analog tags at a point in time when the value of x was greater than 10.
- The path to the storage location for a specific tag.
- 20 evenly distributed data values from the total values stored for an analog tag between 8:00 and 8:30 a.m. on September 12, 2010.
- All data values at 20 minute intervals from the total values stored for an analog tag between 8:00 and 8:30 a.m. on September 12, 2010.
- All values of an analog tag stored on January 8, 2010, where the value of the analog tag changed by 10 engineering units. The data for this analog tag was stored if the value changed by 5 engineering units.
- All values for tags associated with an event boiler trip on January 8, 2010.

As with Wonderware Historian, Wonderware Historian Client is also integrated with the ArchestrA® based System Platform. You can use the ArchestrA IDE to replicate the ArchestrA Model View to a Wonderware Historian. Galaxies and objects are represented as groups, and attributes are represented as tags in the Wonderware Historian.

SERVER CONNECTIVITY

To use the Wonderware Historian Client application, you must first connect to a Wonderware Historian using a valid user account that has the right to retrieve data. You can use either your Windows user account (integrated security) or a valid SQL Server user account, depending on how the Wonderware Historian is configured. You can also use HTTP to connect to a server.

Server connections are shared among the Wonderware Historian Client applications. For example, after you have configured a server connection in the Trend application, you can use it in the Query application as well.

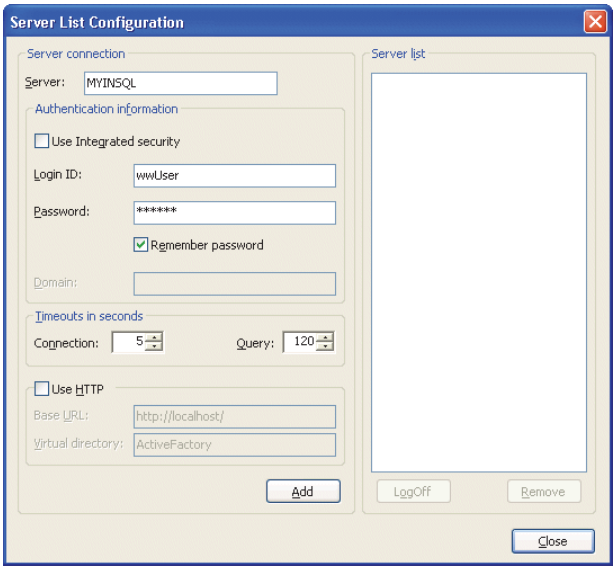


Figure 1. Server Configuration

Server connections are configured from within a Client tool using the Server Configuration dialog box (Figure 1). Depending on the type of security configured, you can either use a Windows (domain) account (integrated security) or SQL Server hosted credentials.

The Wonderware Historian Client software can use HTTP as the transport protocol, instead of other typical network protocols, such as TCP. HTTP (which is layered on top on TCP) usually uses port 80 and is generally open in Internet (or intranet) firewalls, so that communications can take place between the servers and the clients.

If the Wonderware Historian and the Wonderware Historian Client applications (aaTrend.exe, aaQuery.exe, aaHistClientTrend, aaHistClientQuery, and so on) are on two different sides of a firewall and TCP is the protocol, port 1433 must be opened in the firewall software/appliance or else communications cannot take place between the server and clients. Thus, the HTTP feature allows clients to access historians located behind firewalls without requiring additional ports to be opened.

Accessing SQL Server over HTTP is not recommended if you are configuring a client file, such building and saving a trend file. The retrieval of tag information over HTTP can be very slow if there are a large number of tags in the historian database (for example, over 5,000, depending on the system). Note also that in general, equivalent operations can take three to five times longer if you use SQL over HTTP, as compared to native SQL Server access.

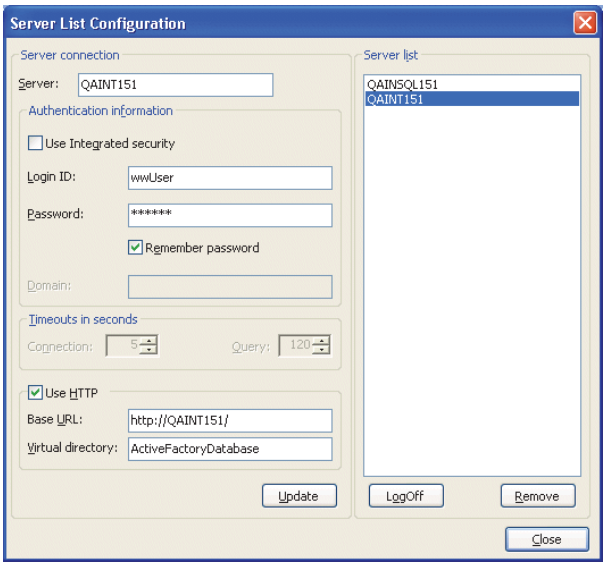


Figure 2. Server Configuration with HTTP

Figure 2 shows how to configure a server to use HTTP for the database access protocol. For this example, the "ActiveFactoryDatabase" virtual directory was created during the installation of the SQLXML software. The local host is a computer named QAINT151.

COMMON CLIENT ELEMENTS

There are a number of application elements common to all of the Client tools. These are:

- Tag Picker
- Servers Pane
- Tags Pane
- Filters Pane
- Time Picker
- Status Bar
- License Status.

The Tag Picker (Figure 3) shows which tag groups and tags exist in the 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 client application or control.

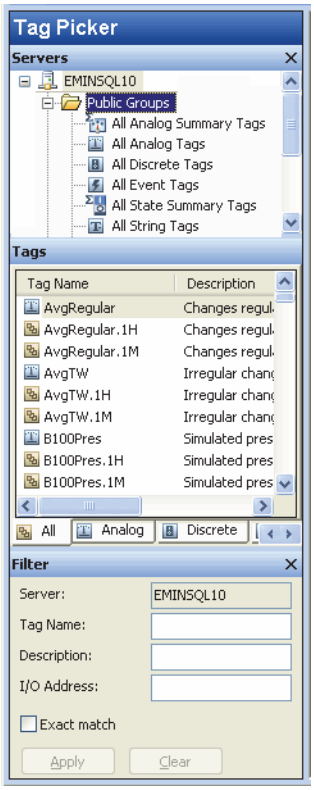


Figure 3. Tag Picker

The Servers pane (Figure 4) shows a list of Wonderware Historian folders. The Servers pane allows you to navigate through the folder structure (namespace) of one or more Wonderware Historian servers and select a group (folder) of tags.

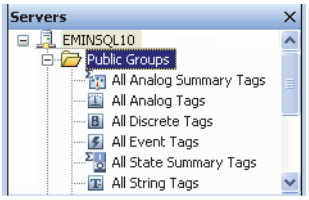


Figure 4. Servers Pane

Groups are groups of objects visible to the currently logged in user, and are separated into Private and Public sections.

The Tags pane (Figure 5) shows all the tags for the currently selected group in the Servers pane.

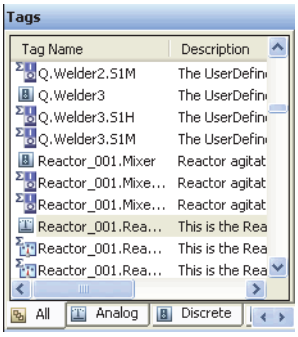


Figure 5. Tags Pane

You can select tags from the Tags pane by clicking. Multiple tags can be selected by holding down combinations of Ctrl- and Shift- keys while clicking, in the same way as the Windows Explorer.

If the number of tags displayed in the Tags pane is too large to easily manipulate, then you can use the Filter pane to reduce the number of tags listed according to criteria that you specify. You can filter tags according to name, description, and I/O address.

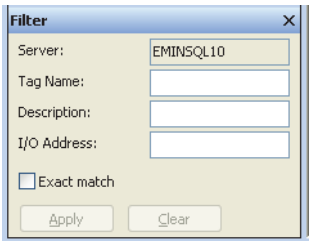


Figure 6. Filter Pane

The Filter pane (Figure 6) allows the use of wildcard characters.

The Time Picker (Figure 7) allows you to specifying a start time, end time, and/or duration.

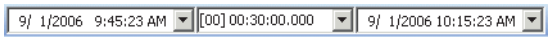


Figure 7. Time Picker

The Time Picker has three sections, for Start, Duration, and End respectively. Selecting or changing one of the sections causes recalculation of one of the other options.

- Changing the Start time causes the end time to be recalculated based on the Duration.
- Changing the End time causes the Start time to be recalculated based on the Duration.
- Changing the Duration causes the Start time to be recalculated based on the End time.

The status bar (Figure 8) allows you to view the status of the connection to the Wonderware Historian and any other status messages that may be sent by the client.

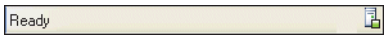


Figure 8. Status Bar

For each Wonderware Historian Client application, you can view program information, such as the version of the program, copyright information, and licensing information. These functions are accessed from the Help menu item.

WONDERWARE HISTORIAN CLIENT TREND

Wonderware Historian Client Trend is a client application that allows you to query tags from a Wonderware Historian database and plot them on a graphical display. Trend supports two different chart types: a regular trend curve and an XY scatter plot.

For more details on the Trend application, review the relevant section of the *Wonderware Historian Client User Guide*.

After you add tags to a trend chart, you can manipulate the display in a variety of ways, including panning, zooming, and scaling. You can customize any trend by configuring display options and set general options for use with all trends.

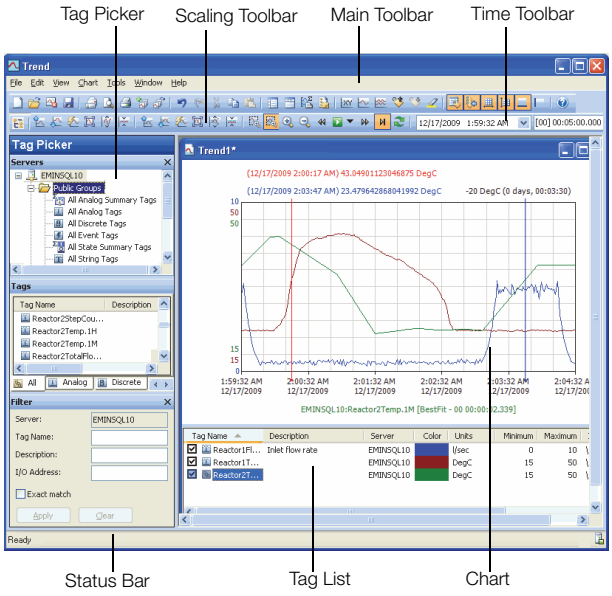


Figure 9. Trend Window Components

The Trend application uses several of the common components as previously described as a part of the interface.

When you configure a trend, you must select the tag(s) for which you want to query the trend data. This data is queried from the Wonderware Historian database(s) to which you are currently logged on, and you can add as many tags as your system resources allow. After you select tags for the trend, you can set the start date and end date for the trend.

After the tags have been added, you can configure the pen style, value axis scale, value display options, and time offset individually for each tag in the chart. You can also select how each line is drawn. Options are: Auto, Line, Step line, and Point. A line curve is best suited for continuously-changing analog data. A step-line curve is best suited for discrete data and for analog data that is not continuous. By default, the line curve trend is selected for the summary tags. Figure 10 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.

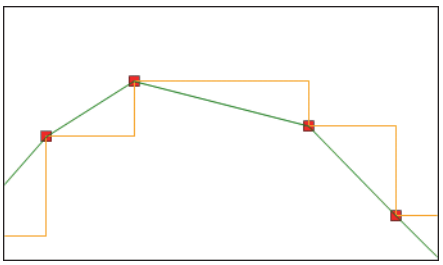


Figure 10. Line Styles

For each analog, discrete, or summary tag in a trend, you can define a “target region.” The target region is a highlighted area of the chart into which tag values should fall during normal operation. Values that fall outside these normal limits can be highlighted in a special color, making it easy to detect them. Target regions are set on a per-tag basis.

Figure 11 shows an example of a target region (the area tinted in blue). The red spikes indicate limit excursions:

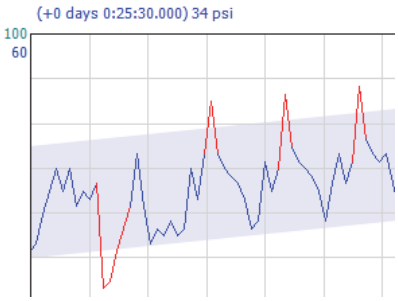


Figure 11. Target Regions

A trend can be configured to show live data. Live data is data that is retrieved continuously in real time for a fixed duration that is relative to the current time (for example, the last hour).

When retrieving live data, the Trend application retrieves data incrementally with every update. For example, if you set the update rate to ten seconds, then every ten seconds, the Trend application retrieves data for the last ten seconds and updates the chart with that data. Additionally, it periodically retrieves data for the entire chart time span to refresh the entire chart. You can specify both the update rate and the refresh interval for the entire chart.

You can also “replay” historical data in the chart. When you replay historical data, the data is continuously plotted on the chart, starting with the start date. By default, the “replay” mode uses real-time speed. For example, if you set the chart to update every second, the start time advances one second with each update. You can accelerate or slow down this replay by selecting a different replay speed.

In addition to regular time based trends, you can display data in XY scatter plots. While a regular trend shows the variation of a tag's value over time, a scatter plot shows the variation of a tag's value over the variation of another tag's value. This allows you to see correlations between the two tags. For example, you could show how product yield varies depending on the reactor temperature in a manufacturing process, and use this information to determine the optimum temperature.

INTEGRATION WITH WONDERWARE INFORMATION SERVER

In addition to viewing trends online within the Trend application, you can also publish them to the Wonderware Information Server, to enable viewing in a browser over your intranet or even over the Internet. When you publish a trend, the trend report information is stored in special tables in the Wonderware Historian, and the file is copied to a folder on the Wonderware Information Server. When you publish a trend, Wonderware Information Server users can view the trend you published with only an Internet browser. Published trends are of two types:

- Static. For a static trend report, Wonderware Information Server users see the same trend, but cannot alter the trend configuration in any way. They can, however, perform some basic navigation functions, like panning and zooming.
- On Demand. For an “on demand” report, Wonderware Information Server users see the same trend, but can fully manipulate the trend, including changing the configuration. However, any changes made to the original trend are not saved.

WONDERWARE HISTORIAN CLIENT QUERY

The Wonderware Historian Client Query application allows you to retrieve data from a Wonderware Historian database or any SQL Server database and return the results in a table format. If you are querying a Wonderware Historian, you can choose from a

number of predefined query types and easily select the options for each type, eliminating the need to know SQL syntax. The SQL query is created for you.

You can also write custom queries if you know SQL syntax and the schema of database you are using.

As with the Trend application, the Query application also uses several common interface elements.

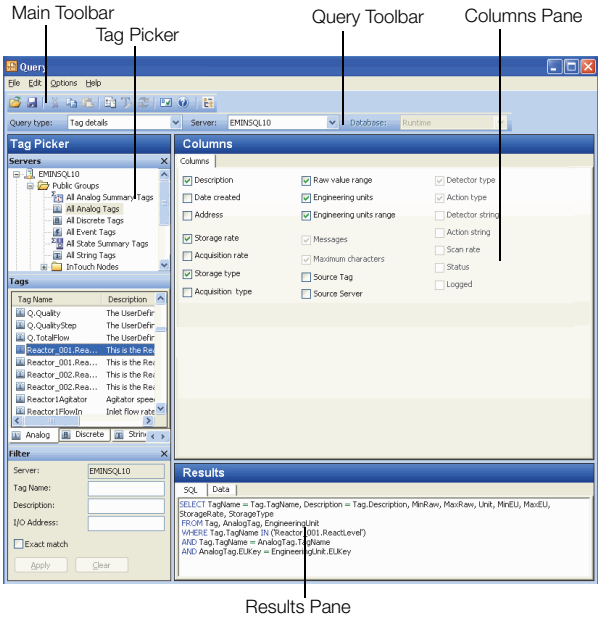


Figure 12. Query Application

A Query Toolbar is used to select the query type, server, and database for the query.

The Columns pane is used to select details for the query. When a query is executed, the results are displayed in the tabbed Results pane. This also enables you to see the SQL that has been generated for you based on the parameters you selected.

Queries and results can be saved and queries reused as needed in. Query files can be saved with a ".txt" or ".sql" file extension. Data can be saved as ".txt" or ".csv" - the latter ("comma separated values") conforms to the locale of the system in use, enabling delimiters and date formats to be set appropriately.

WONDERWARE HISTORIAN CLIENT WORKBOOK

Wonderware Historian Client Workbook is an add-in to Microsoft Excel software that allows you to query one or more Wonderware Historian or SQL Server databases and return results to a spreadsheet.

When you install the Wonderware Historian Client software after installing Microsoft Excel software, the Workbook add-in is automatically loaded into the Excel software so that the Workbook menu and toolbar appear on the Add-Ins tab in the application.

Using the Wonderware Historian Client Workbook, you can easily create reports using Wonderware Historian data without needing in-depth knowledge of SQL scripting. The reports that you create with the Wonderware Historian Client Workbook can be saved, allowing you to run a report again at any time.

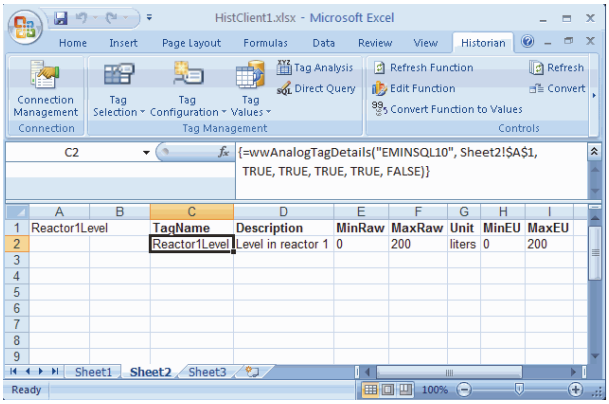


Figure 13. Using Workbook in Excel Software

In addition to creating value reports, you can use the Wonderware Historian Client Workbook to generate statistics, charts, and graphs that are useful for analysis.

- Analog Tag Analysis. Create graphs and trends, calculate statistics, and return information regarding configuration and limits.

- Batch Analysis. Graph single analog tag over two time periods.
- Scatter Analysis. Create a scatter plot of two analog tags.
- Discrete Tag Analysis. Create graphs and trends, calculate statistics, and return information regarding configuration.
- Analog Values at Discrete Transition Analysis. Graph analog tag values at discrete tag transitions.
- Analog/Discrete Pair Analysis. Graph analog vs. discrete tags.

As with Trend, you can publish static or on-demand spreadsheet reports to the Wonderware Information Server. When you publish a report, the report information is stored in special tables in the Wonderware Historian, and the file is copied to a folder on the Wonderware Information Server. When you publish a report, Wonderware Information Server users can view the report you published within their browser.

WONDERWARE HISTORIAN CLIENT REPORT

Wonderware Historian Client Report is an add-in to Microsoft Word that allows you to query one or more Wonderware Historian or SQL Server databases and return results to a Word document.

Wonderware Historian Client Report is an “add-in” to Microsoft Word. An add-in is a supplemental program that runs within the Microsoft Word application and provides custom features and specialized commands.

If the Wonderware Historian Client Report add-in is installed, an additional menu is added to Microsoft Word.

After the add-in is loaded, the Wonderware Historian Client menu contains all of the commands you use to create a report document or report template using data from a Wonderware Historian or a normal SQL Server database. Wonderware Historian Client Report default template, HistClient.dot, is a blank template used as the starting point for any report documents or additional templates that you want to create.

A field code is a special string of text in a Microsoft Word document that includes instructions for data processing.

Field codes can process data from inside the same document or from external sources. For the Wonderware Historian Client Report, field codes are used to contain the instructions for retrieving data from the database and returning the results to the report document.

Field codes are present in report templates and report documents that have not yet been run.

Figure 14 shows a configured report document that will show status information for a Wonderware Historian, as well as the date and time that the report document was run. In this view, the field codes show the Historian queries that will be used to generate the report. Field codes appear between the curly brackets { }. If you do not want to see the field codes, then a Word option can be set to hide them.

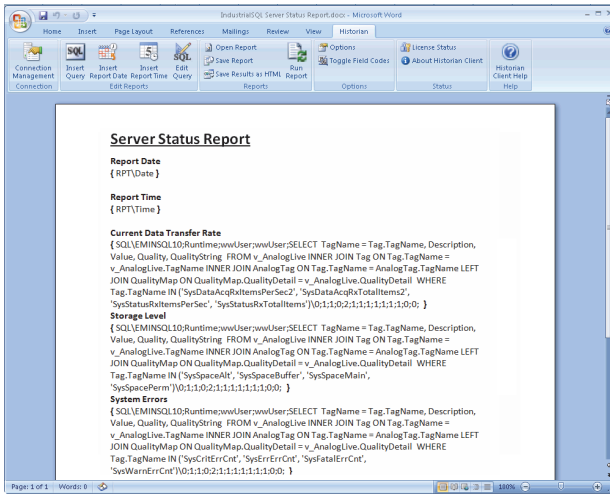
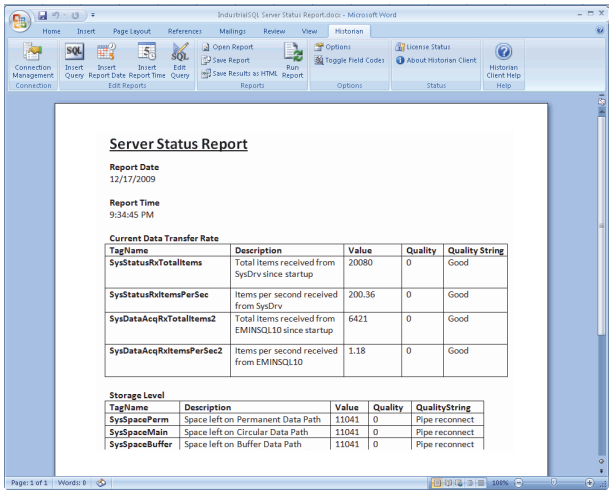


Figure 14. Report Definition in Word

When you run the report, Wonderware Historian Client Report fills in the report document with the data and the resulting report document appears (Figure 15).



Server Status Report

Report Date
12/17/2009

Report Time
9:34:45 PM

Current Data Transfer Rate

TagName	Description	Value	Quality	Quality String
SysStatusRxTotalItems	Total Items received from SysDrv since startup	20080	0	Good
SysStatusRxItemsPerSec	Items per second received from SysDrv	200.36	0	Good
SysDataAcqRxTotalItems2	Total Items received from EMINSQL10 since startup	6421	0	Good
SysDataAcqRxItemsPerSec2	Items per second received from EMINSQL10	1.18	0	Good

Storage Level

TagName	Description	Value	Quality	QualityString
SysSpacePerm	Space left on Permanent Data Path	11041	0	Pipe reconnect
SysSpaceMain	Space left on Circular Data Path	11041	0	Pipe reconnect
SysSpaceBuffer	Space left on Buffer Data Path	11041	0	Pipe reconnect

Figure 15. Resulting Report

You can save a run report document as an HTML file so that it can be viewed in a browser. This type of report document is a “static” report document and can be published to a web site such as the Wonderware Information Server.

EXTENSIBILITY

Wonderware Historian Client controls and objects can be run in any application that can function as a .NET or an ActiveX control container, such as InTouch® HMI software (including ArchestrA symbols), Visual Basic, Visual C#, Visual C++, web pages, and so on.

For InTouch HMI software, you can select these controls from within WindowMaker when you create your runtime graphical user interface.

The Wonderware Historian Client objects and controls must be installed on the computer running the application that you want to use them in. For example, if you want to use the aaHistClientTrend control in InTouch HMI software, you must install the Trend files on the InTouch computer.

Technically, the ActiveX versions of the controls can be used within the Internet Explorer® browser. However, because the Internet Explorer browser is a native .NET control container, you should use the native controls instead of the ActiveX versions.

Wonderware Historian Client controls can be categorized as either “application” controls, “building block” controls, or “core functionality” controls.

An application-level control runs within the container application, but functions as if it were a stand-alone application. This type of control does not require extensive scripting to function. Application-level controls include:

- aaHistClientTrend Control
- aaHistClientQuery Control.

A building block control provides specific functionality for use within an application. Scripting is required to make these controls functional. Building block controls include:

- aaHistClientTimeRangePicker Control
- aaHistClientTagPicker Control
- aaHistClientSingleValueEntry Control
- aaHistClientActiveDataGrid Control.

The following low-level controls and objects are used by either an application or building block control. Core functionality controls include:

- Tag Object
- Server Object
- Servers Object
- HistClientWorkbookRunner Object
- HistClientReportRunner Object.

For details on using any of these components, see the *Wonderware Historian Client User Guide*.

Foxboro®

by Schneider Electric

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