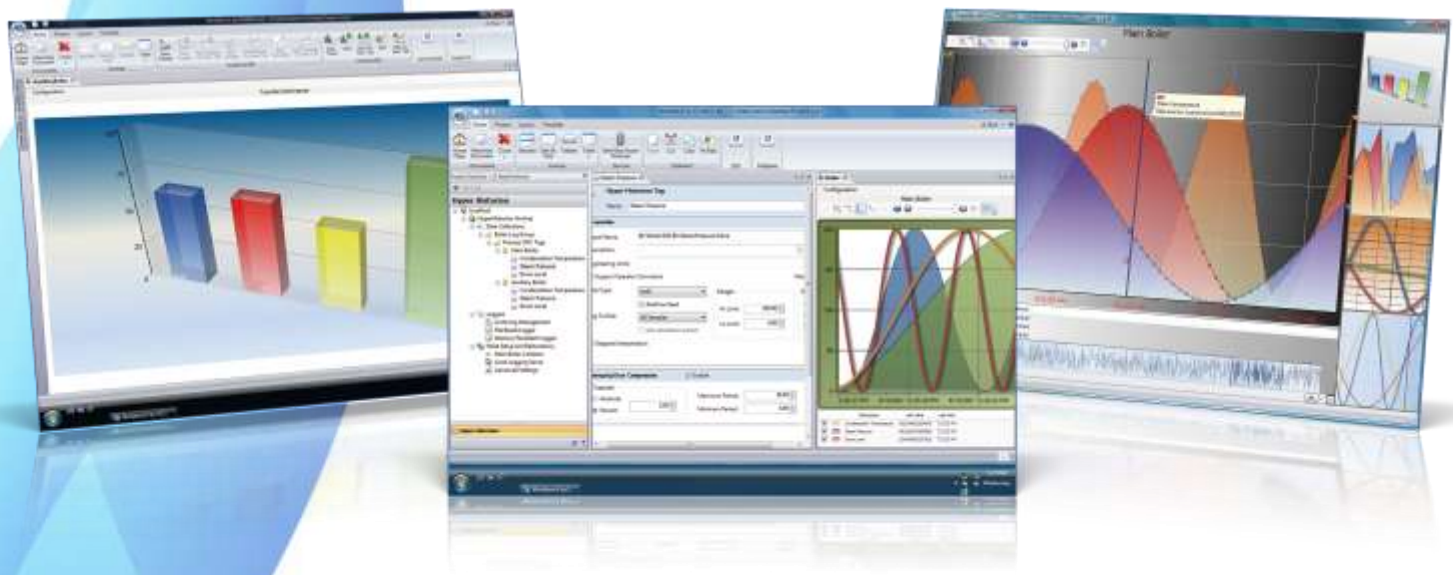
ICONICS

Visualize Your Enterprise™

Hyper Historian™

Product Brief for V10.6

July 2011



Compatible with Windows 7

Certified for Windows Server 2008

Microsoft Gold Certified Partner

OPC Charter Member

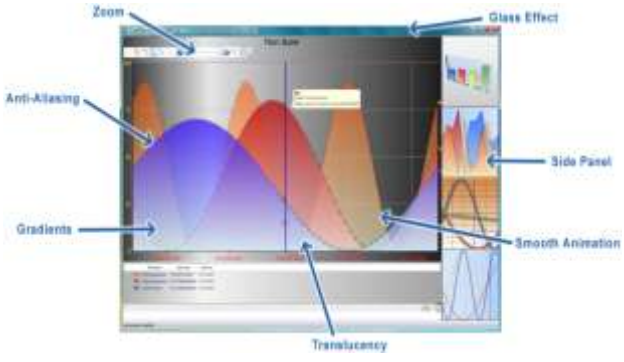
Hyper Historian Introduction

Companies today are faced with the need to perform better and to be more competitive with fewer resources. For plant-level operations, today's systems need to connect to different infrastructures for data gathering and users need to analyze and visualize data in real time. Access to plant data is fundamental to staying competitive and efficient. The demand to produce products faster or streamline operations is increasing across the globe. ICONICS' Hyper Historian™ enterprise-wide plant historian allows you to gain that competitive advantage, by organizing all your real-time information from across the enterprise.

Hyper Historian is ICONICS' high-speed, reliable and robust plant historian. In order to analyze and visualize data in real time, organizations must have access to plant data and reporting. Hyper Historian is designed to log large volumes of data, in excess of 100,000 updates per second, and connects to multiple data sources across the enterprise including OPC UA, OPC DA, OPC XML DA, BACnet, SNMP and many more. ICONICS Hyper Historian also provides full, web-based configuration. Optional redundant configurations are supported using redundant Hyper Historian Collectors and redundant Loggers, and Hyper Historian offers Store and Forward technology as part of its integrated redundancy solution.

Hyper Historian optionally utilizes an advanced Swinging Door algorithm to allow for high compression, and takes full advantage of 64-bit hardware and software architectures, enabling it to access more CPU power and memory than traditional 32-bit-based historians and providing highest performance possible. The Swinging Door algorithm is available with configurable compression, but is based on a space-saving design that intelligently logs data without losing precision.

Key Features Include:



- High Performance
- Integrated Redundancy
- OPC-UA, -DA and -HDA Compliance
- Automatic Data Archiving and Backup
- Real-time and Historical Data Replay
- Multiple Remote Data Collectors
- Store and Forward Technology
- Industry-standard Data Connectivity
- Performance Calculation Engine
- Optimistic Concurrent Multi-user Configuration
- Web-based Configuration and Administration
- Integration with ICONICS BizViz™ and AnalytiX™ Solutions
- Diagnostic and Data Tracing with NT Event Logs

Features and Benefits

Feature	Benefit
Robust, High-Performance & Scalable	Enables faster response for data storage, data-mining and retrieval with high compression algorithm for all your real-time, enterprise-wide information.
Remote Data Collectors	Provides for a distributed architecture using multiple collectors at local and remote locations to colllect data.
Integrated Redundancy with Store-and-Forward Technology	For mission critical applications that need uninterrupted access and data collection. Ensures data integrity in the event of a system upset or communications disruption.
High Compression Swinging Door Algorithm	Intelligently logs data with more precision than standard filtering mechanisms to achieve highly efficient, small footprint data storage.
Performance Calculation Engine	Advanced calculations that are triggered periodically or on data change events, and perform complex mathematical functions and analysis.
Web-enabled Configuration and Administration	The robust, secure, reliable, thin-client Workbench console reduces engineering cost and speeds up project development and deployment time.
2D and 3D Real-time Charts and Trends	Easy to use, rich playback tools for complete visualization of real-time and historical data with 2D and 3D charts.
Powerful SQL Query Engine	Enables tight integration with any open database compliant third party client for advanced data analysis and extended reach in reporting.
MergeWorX Historical Data Integration	Provides for high resolution data merging from devices without taxing their communications capability and provides greatly increased reliability of capturing all data, even when network outages occur.
Designed for 64-bit and .NET	The first true Microsoft Windows 64-bit, high performance, robust, scalable and secure enterprise-wide real-time data historian.

Hyper Historian Data Trends in an HMI Display

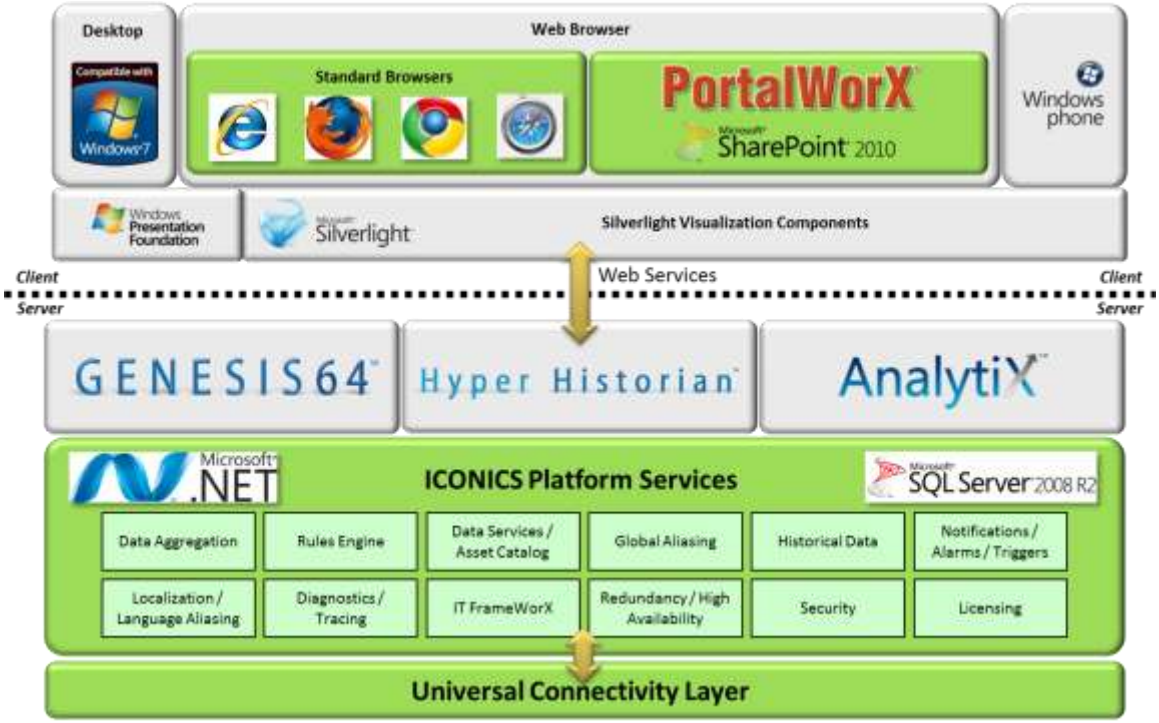
Robust Plant Historian for Any Industry

ICONICS Hyper Historian was designed to be flexible enough to cater to just about any industry. Below are some examples of the types of industries that can benefit from Hyper Historian:

- Building Controls
- Oil and Gas, Petrochemicals
- Pharmaceuticals
- Manufacturing Plants
- Large Industrial Plants
- Food & Beverage
- Water & Wastewater
- Renewable Energy
- Government
- Utilities
- Machine Builders
- Airports

Hyper Historian Solution Architecture

Hyper Historian is a key member of the ICONICS V10 platform, built on top of the powerful Platform Services and fits into the overall system architecture as shown in the diagram below:

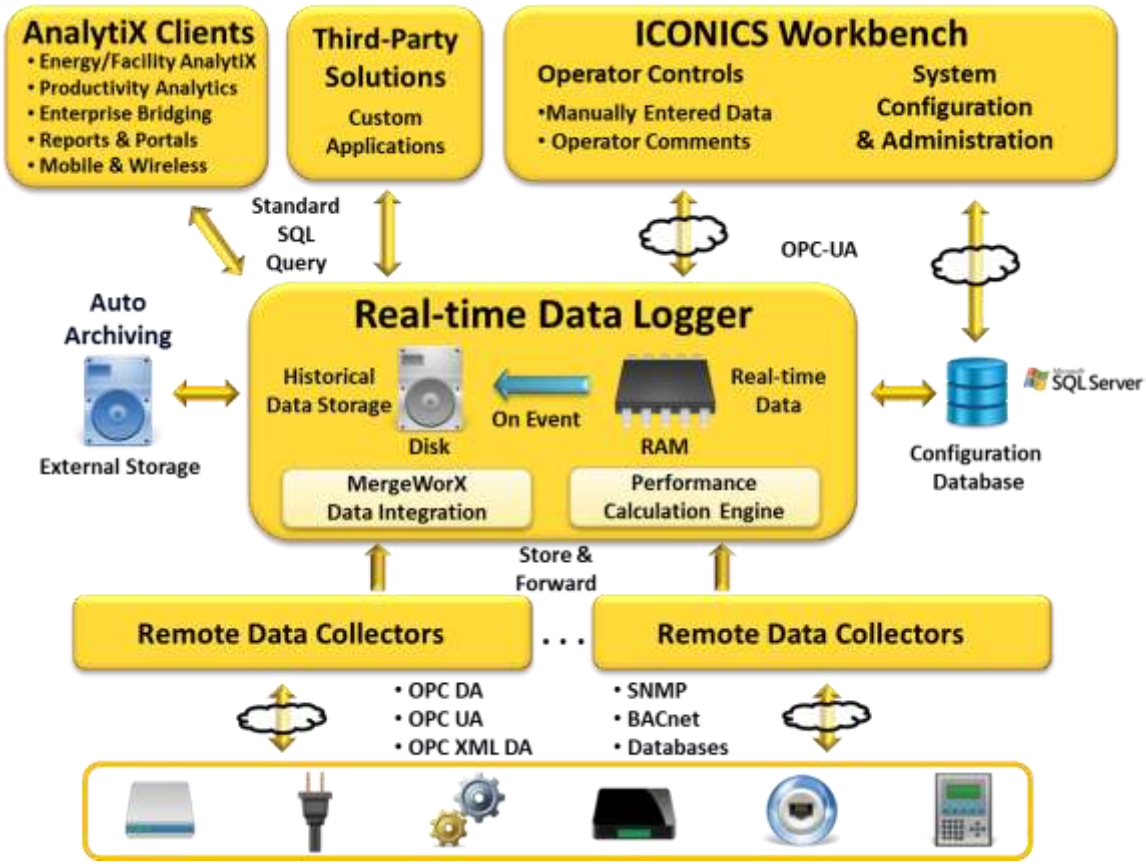


ICONICS V10 System Architecture

Hyper Historian Application Architecture

The Hyper Historian application architecture is broken up into several different key areas: the Real-time Data Logger, Data Collectors (can be distributed), Workbench Classic web-based configuration provider, SQL Query Engine, configuration database, and a comprehensive web services framework that connects it all together.

The diagram below illustrates how those pieces are linked together, and each piece is described in more detail in subsequent sections of this document.

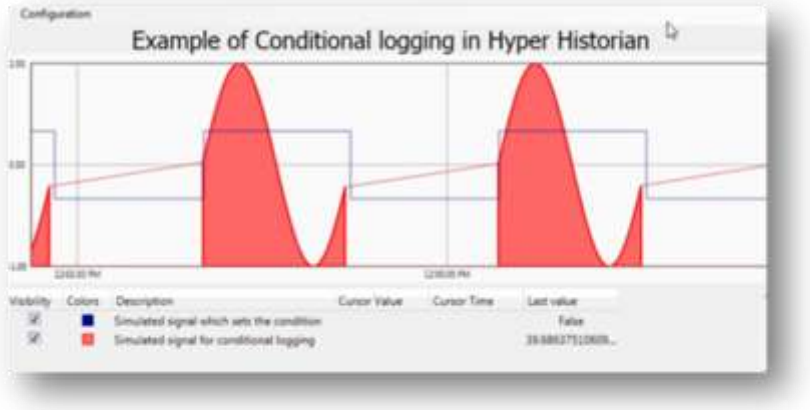


Hyper Historian Application Architecture

High Performance, Robust Real-time Data Logger

The Hyper Historian Logger supports two different logging options: File based or Memory Persistent based. If the logger is File based, all of its collected plant data is committed to the hard disk based on the selected logging rates and applied filters (Swinging Door, deadband or summary aggregates). File based loggers offer the option to automatically create new log files periodically, on an event trigger, or based on the current size of the log file.

The Memory Persistent Logger stores the collected plant data in RAM memory and discards it after a pre-configured amount of time. It also supports the option to "switch" into File-based mode on an event or condition, to store a portion of its collected data to the hard disk in real time. When the condition returns to normal again the data will resume memory-based storage automatically. An example of each type of Logger is included in the default Hyper Historian configuration to help get users up and running more efficiently.



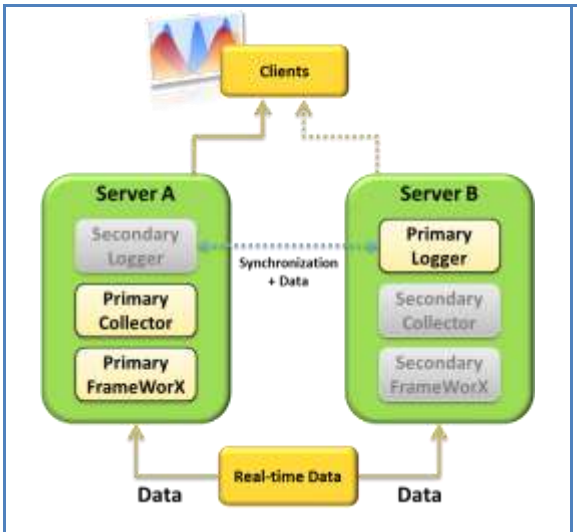
Conditional Logging Example in TrendWorX64 Viewer

Hyper Historian has a unique, automatic archiving feature that allows for routine or triggered scheduling of data archives, freeing up disk space and backing up files for long term storage and subsequent retrieval on demand. This allows users to manage their data files with ease, as they can be backed up to network locations or portable storage drives based on the overall size of log files, age of the data, or even on an event trigger. If the user decides that they need to retrieve data from an archived file, they can simply reattach it to the Logger using an intuitive user interface and the data is immediately available to all clients.

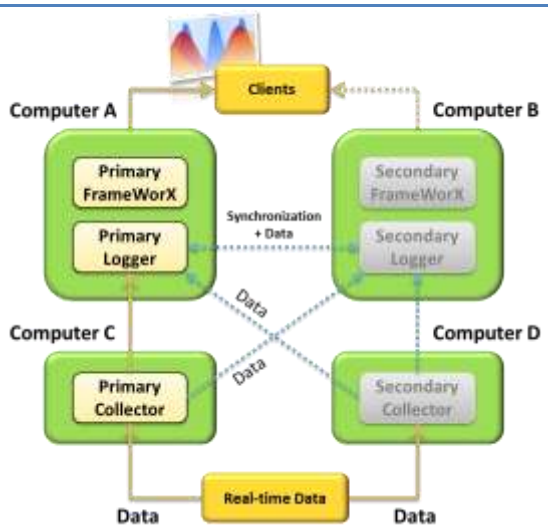
Integrated Redundancy with Store and Forward Technology

Hyper Historian has robust built-in redundancy for mission critical applications that require uninterrupted access and collection of data. Automatic Store and Forward technology ensure data integrity, in the event of system upset or communications disruption.

Redundancy is supported at both the Logger level and the Collector level for increased overall system reliability, with an optional auto-failback feature that enables the system to switch back to the Primary node once it comes back online.



Sample Redundancy Scenario using 2 Computers



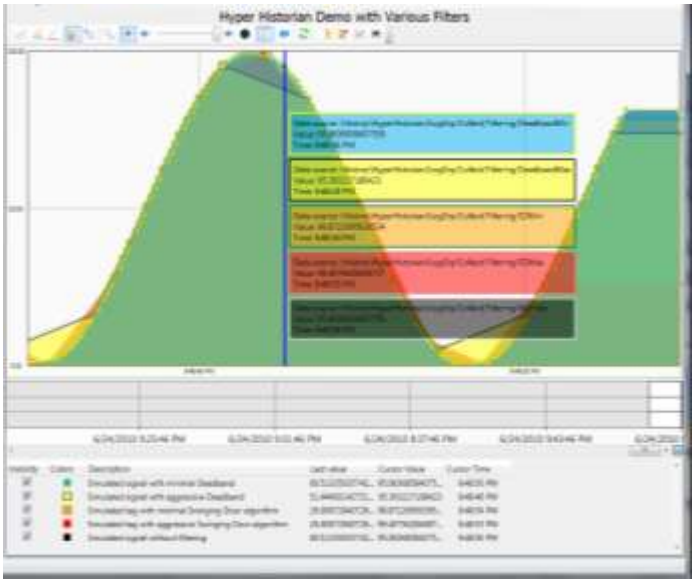
Sample Redundancy Scenario using 4 Computers

Distributed Data Collectors with Advanced Filtering

Hyper Historian Collectors are intended to be portable extensions of the centralized Logger, and they support running on 32-bit platforms in addition to the standard 64-bit operating systems. Hyper Historian tags support a wide variety of different data types including Boolean, Int8, UInt8, Int16, UInt16, Int32, UInt32, Int64, UInt64, Float32, Float64 and String and can come from OPC DA, OPC XML DA, OPC UA, SNMP, BACnet, databases, and more.

There are a range of different filters that can be applied on the Collector side to reduce the overall data storage requirements and optimize the communications between the Collector and Logger. The following filtering options are available on a per tag basis:

- All Samples (no filtering)
- Maximum
- Minimum
- Average
- Standard Deviation
- Totalizer
- Running Maximum
- Running Minimum
- Running Average
- Moving Maximum
- Moving Minimum
- Moving Average
- Most Recent on Time



Tag Aggregates Enhance Data Analysis Capabilities

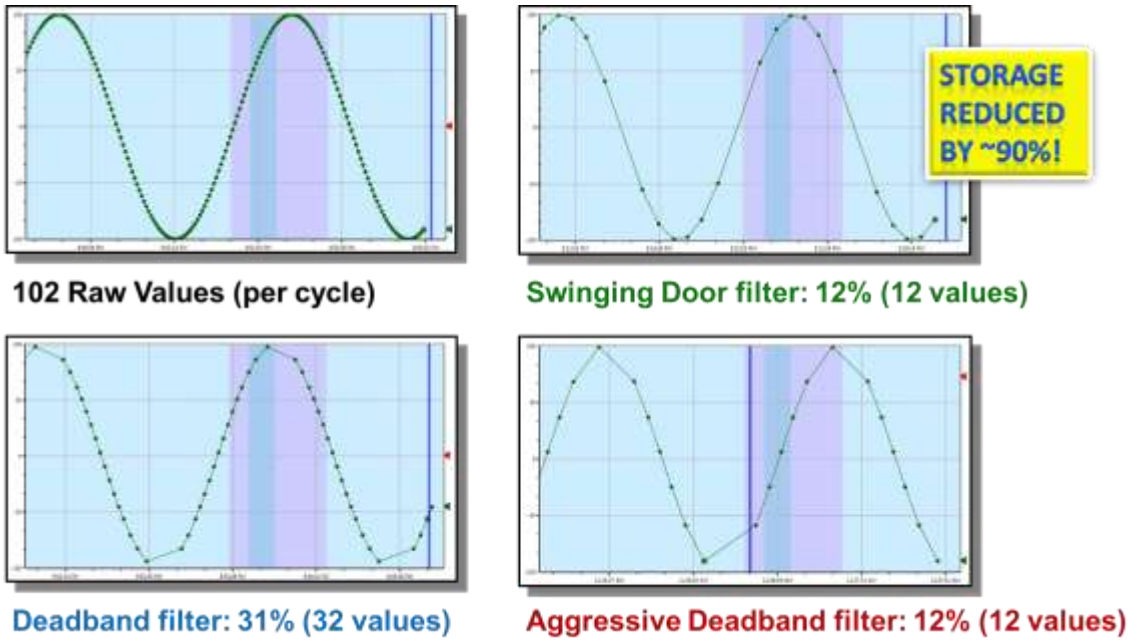
In addition to the above filters, users can elect to log summary aggregates to disk for a given tag. This allows the user to still capture and replay the raw data values, but to also analyze trends from a higher level using any of the below aggregate types:

Aggregate Types	
Interpolative	Logs interpolated values at the defined intervals
Average	Average value over the resampling interval
Time Average	Time-weighted average value over the resampling interval
Total	Sum of the data over the resampling interval
Totalize Average	Totalized value (time integral) of the data over the resampling interval
Minimum	Minimum value over the resampling interval
Maximum	Maximum value over the resampling interval
Minimum Actual Time	Minimum value over the resampling interval and the first timestamp of that minimum value within the resampling interval
Maximum Actual Time	Maximum value over the resampling interval and the first timestamp of that maximum value within the resampling interval
Range	Difference between minimum and maximum values over resampling interval
Annotation Count	Number of annotations made within the resampling interval
Count	Number of samples logged over the resampling interval
Start	Value at the beginning of resampling interval and timestamp of that value
End	Value at the end of resampling interval and timestamp of that value
Delta	Difference between the first and last values in the resampling interval
Duration Good	Duration of time in the interval during which the data is good quality
Duration Bad	Duration of time in the interval during which the data is bad quality
Percent Good	Percent of data (0-100%) within the interval with good quality
Percent Bad	Percent of data (0-100%) within the interval with bad quality
Worst Quality	Worst status code of data in the interval

High Compression Swinging Door Algorithm

Hyper Historian uses advanced data compression technology and the power of the Windows Server 2008 platform to store its data so that even raw, unfiltered values are stored in an extremely efficient manner, but it also offers a high compression, advanced Swinging Door algorithm to provide the most efficient logging possible. The algorithm is available with configurable compression and can be turned on or off on a per group basis. It is based on the space-saving design of the Swinging Door algorithm that intelligently logs data with more precision than standard filtering mechanisms. The Swinging Door filter allows users to capture more data at a higher granularity while still respecting the limits of a typical application's disk space requirements.

To better understand what the Swinging Door algorithm can do, the below example compares the efficiency of various filters applied to a typical Sine wave:



Example of Swinging Door Efficiency

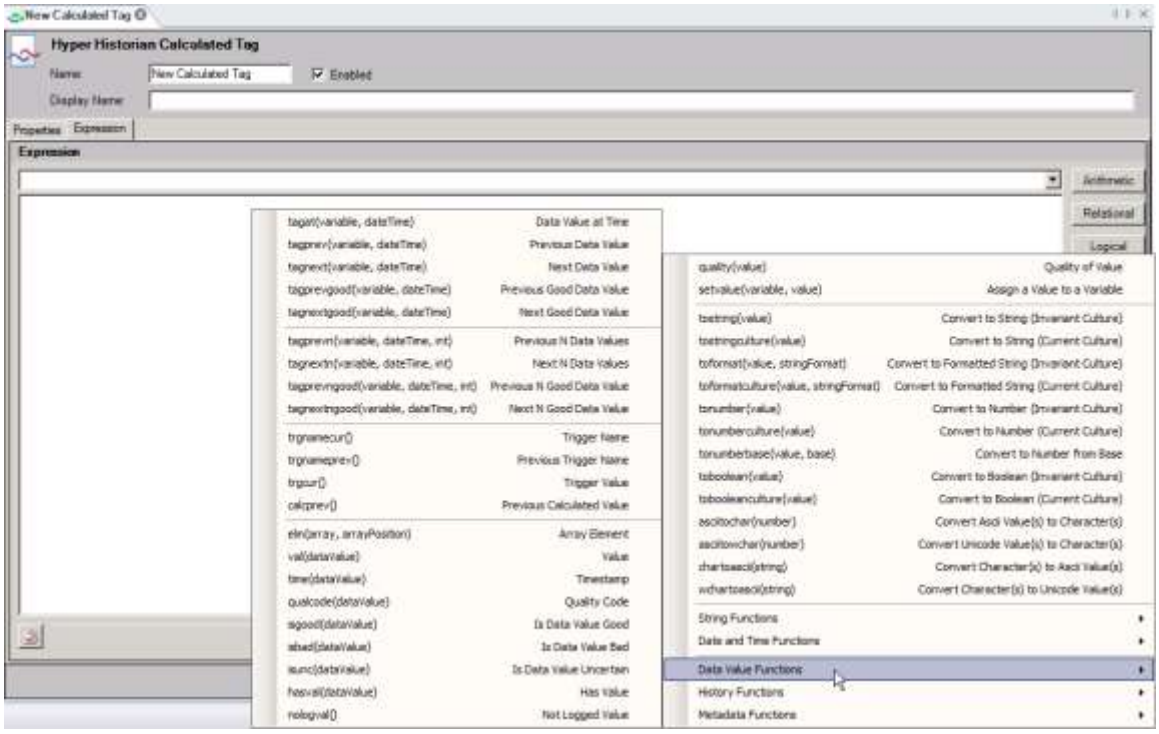
The top left image shows the raw values, while the top right shows the effect of applying the Swinging Door filter at a 12% compression ratio. For the sake of comparison the bottom two images illustrate the effects of applying two different levels of deadband filtering, one more aggressive than the other. It is clear from the example that the Swinging Door filter achieves a high compression ratio and still preserves the shape of the raw data as accurately as possible, making it an ideal choice when disk space is at a premium.

New Performance Calculation Engine

For version 10.6 the Hyper Historian introduces a new Performance Calculation Engine. This powerful new feature allows users to configure complex calculations that can be triggered periodically or on any data change event, using flexible new date/time, mathematical, string and historical data retrieval functions that are part of the ICONICS Expression Editor. Calculations can use scalar values, historical values, or string operations, along with a wide variety of functions within an enhanced version of the ICONICS Expression Engine, and results are calculated automatically on each trigger, or can be recalculated manually on demand.

Configuration of a new Performance Calculation tag is a snap. Simply add a new "Calculated Tag" within the existing hierarchical structure of the Hyper Historian Workbench configurator, with support for folders and subfolders. Each Performance Calculation appears as a new tag in the Hyper Historian browser, and can therefore be accessed, replayed, analyzed, and reported on just like other Hyper Historian data values.

Hyper Historian offers several preconfigured calculations out-of-the-box such as standard deviation and variance, and users can customize their own Performance Calculations using the powerful ICONICS Expression Editor, with full equation parsing and syntax checking.



Data Value Functions Available Within Performance Calculations

Below is a table detailing the wide variety of functions that are available for use within Hyper Historian Performance Calculations:

Performance Calculations Supported Functions

Data Value Functions	
tagat	Returns the data value at a given time
tagprev	Returns the first data value preceding the given timestamp
tagnext	Returns the next data value following the given timestamp
tagprevgood	Returns the first good quality data value preceding the given timestamp
tagnextgood	Returns the next good quality data value following the given timestamp
tagprevn	Returns an array of previous 'n' data values
tagnextn	Returns an array of next 'n' data values
tagprevngood	Returns an array of previous 'n' good quality data values
tagnextngood	Returns an array of next 'n' good quality data values
elm	Returns a specified array element
trgnamecur	Returns the name of the trigger that invoked this calculation
trgnameprev	Returns the name of the trigger that invoked the previous calculation
trgcur	Returns the data value of the trigger that invoked this calculation
calcprev	Returns the last known calculated value
val	Returns the value part of a given data variable
time	Returns the timestamp part of a given data variable
qualcode	Returns the quality code part of a given data variable
isgood	Returns true when the given data value has good quality
isbad	Returns true when the given data value has bad quality
isunc	Returns true when the given data value has uncertain quality
hasval	Returns true when the given data value contains a valid value
nologval	Returns this value as the result and nothing will be logged
Historical Functions	
tagfind	Returns the first timestamp of the value that matches the given filtering criteria within the specified time interval
tagfindstate	Returns the first timestamp of the value that matches the given state value within the specified time interval
tagavg	Average
tagtavg	Time Weighted Average
tagtotalize	Totalize
tagtotal	Total
tagmin	Minimum
tagmax	Maximum
tagdelta	Difference between the first and last good raw values for the given data variable and time range
tagrange	Difference between the maximum and minimum good raw values for the given data variable and time range
tagcount	Number of samples for the given data variable and time range
tagtimestate0	Duration in State 0 for the given data variable and time range
tagtimestate1	Duration in State 1 for the given data variable and time range
tagntrans	Number of Transitions between zero and non-zero state for the given data variable and time range
tagpctgood	Percent of the time for which data value had good quality in the given time interval
tagpctbad	Percent of the time for which data value had bad quality in the

	given time interval
tagtimegood	Duration of time for which the data value had good quality in the given time interval
tagtimebad	Duration of time for which the data value had bad quality in the given time interval
tagworstqual	Returns the worst value quality for the given data variable and time range
tagtime	Returns the time for which data values matched the given filter criteria, within the specified time interval
Statistical Functions	
tagstddev	Standard deviation using 1/(N-1) calculation
tagstddev2	Standard deviation using 1/N calculation
tagvariance	Variance using 1/(N-1) calculation
tagvariance2	Variance using 1/N calculation
Metadata Functions	
tagname	Name of the given data variable
tagdname	Display name of the given data variable
tagdesc	Description of the given data variable
tagvaltype	Value type for the given data variable. The returned values are: 0=Native, 1=Double, 2=Single, 3=SByte, 4=Int16, 5=Int32, 6=Int64, 7=Byte, 8=UInt16, 9=UInt32, 10=UInt64, 11=String, 13=Bool, 16=Duration
tagtype	Variable type for the given data variable. The returned values are: 0=Base, 1=Analog, 2=Decimal Analog, 3=Digital
tagunits	Engineering units for the given data variable
taghighval	High value from value range for the given data variable
taglowval	Low value from value range for the given data variable
tagsource	Source data point name for the given data variable
now	Trigger time (Local time) of the trigger that invoked this calculation
utcnow	Trigger time (UTC time) of the trigger that invoked this calculation
yday	Returns timestamp based on current trigger time with time portion rounded to 12:00:00 AM and date moved to preceding day
today	Returns timestamp based on current trigger time with time portion rounded to 12:00:00 AM
mintime	Returns the smallest possible value of DateTime type
maxtime	Returns the largest possible value of DateTime type
tolocal	Convert to Local time
toutc	Convert to UTC time
isdst	Returns true when given timestamp is within the Daylight Savings Time range for the current time zone, returns false when given timestamp is in UTC
noon	Returns timestamp with date portion taken from given time and time portion rounded to 12:00:00 PM
bday	Returns timestamp with date portion taken from given time and time portion rounded to 12:00:00 AM
bmonth	Returns timestamp with month and year taken from given time and time portion rounded to 12:00:00 AM
byear	Returns timestamp with year taken from given time and time portion rounded to 12:00:00 AM
second	Seconds part of a given timestamp (0-59)
minute	Minutes part of a given timestamp (0-59)

hour	Hour part of a given timestamp (0-23)
day	Day part of a given timestamp (1-31)
month	Month part of a given timestamp (1-12)
year	Year part of a given timestamp (4-digit year)
yearday	Returns an Integer between 1 and 366 representing the day of the year for a given timestamp
weekday	Returns an Integer between 0 and 6 representing the day of the week for a given timestamp (0=Sunday, 6=Saturday)
dayseconds	Returns an Integer between 0 and 86399 representing the seconds of the day for a given timestamp

Web-based Workbench Configuration for Rapid Deployment

Workbench is the centralized Web-based environment for all GENESIS64 components and configuration including Hyper Historian. The Workbench can also act as a simple operator interface for service management and has built-in project management functionality such as project Pack and Go, layout tools and a file browser interface.

The Workbench for Hyper Historian features a thin client and optimistic concurrency design, acting as the central configuration environment and operator interface. The runtime operational interface allows for complete visualization of real-time and historical data with 2D and 3D charts. The Workbench's advanced configuration console performs complete service management and has integrated layout/project management and remote pack-and-go deployment capabilities.

Configuration and Project Management
The Workbench is the centralized configuration environment of GENESIS64 and offers an intuitive user interface. With mass import and export tools for moving or editing application data the Workbench allows configurations to be exported into Microsoft Excel, .CSV and .XML formats. Whole or partial configurations can be exported for easily making mass edits or batch changes.

Web-Based Configuration from Anywhere
All GENESIS64 configurations can be created from the Workbench, allowing for faster development and cost savings in building any application. Workbench offers remote configuration in Internet Explorer, the ability for concurrent configurations and support for online changes.

Project Deployment
With the Pack and Go Wizard in the GENESIS64 Workbench users can use the simple step-by-step process to move configurations into a package for deployment. With features like Find and Replace node names or asset names can be changed beforehand to guarantee a working application.

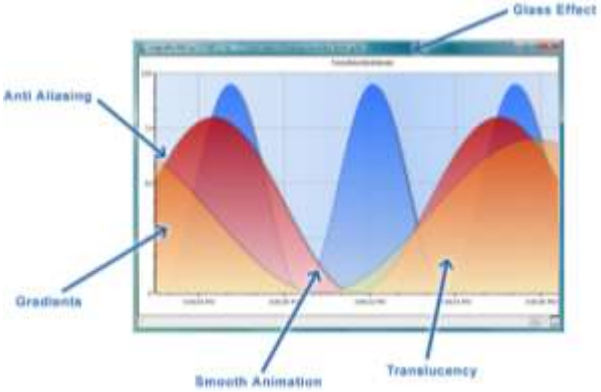
Incremental Pack and Go also allows for versioning support and delta roll-out where developers need only move what has changed and the software does the rest. Other options like project statistics, packing log and security through encryption are available.

Runtime Operation

Using the Workbench as a runtime environment is also supported allowing users to open up GraphWorX64 displays, TrendWorX64 trends, AlarmWorX64 alarm grids at once to visually compare and relate the information provided at any one moment by the SCADA system. With customizable runtime layouts, multi-monitor support and the card flow visual navigation file browser the Workbench is an invaluable tool for any enterprise SCADA application.

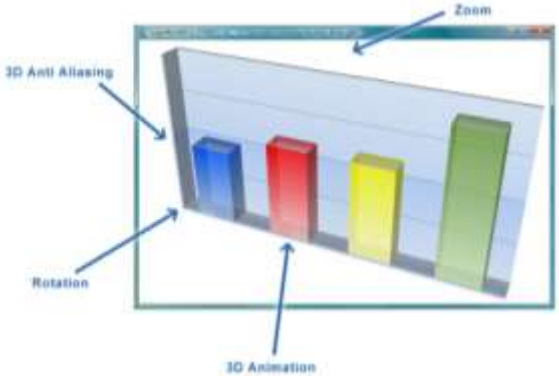
TrendWorX64 Viewer Provides Rich Charting and Visualization

From the Workbench, operators can add fully customizable 2D and 3D trends and charts that bring applications to life. Trend and chart data in the standard Time Based Chart or quickly choose any of the following from the styling gallery: X vs. Y, Logarithmic, Bar Graph, the popular Strip Chart Recorder, Circular Charts and more to build clear and accurate representations of real-time and historical data. The TrendWorX64 Viewer toolbar allows operators to change time periods, show or hide the legend, freeze time and look back at trends during runtime.



Use the intuitive ribbons and galleries to customize your trend or chart by adding color, gradients, smooth animation, translucency, glass effect, anti-aliasing and more. Drag and drop data sources during runtime, view multiple trends simultaneously, or create different plot types on the same trend.

Plotting both real-time and historical data in the same trend plot allows you to compare last week's data, for instance, to current information. Trend production numbers against a target. Plot batch data against a known recipe curve and more. Utilizing an “ideal” pen can also give further information on current versus normal operation.



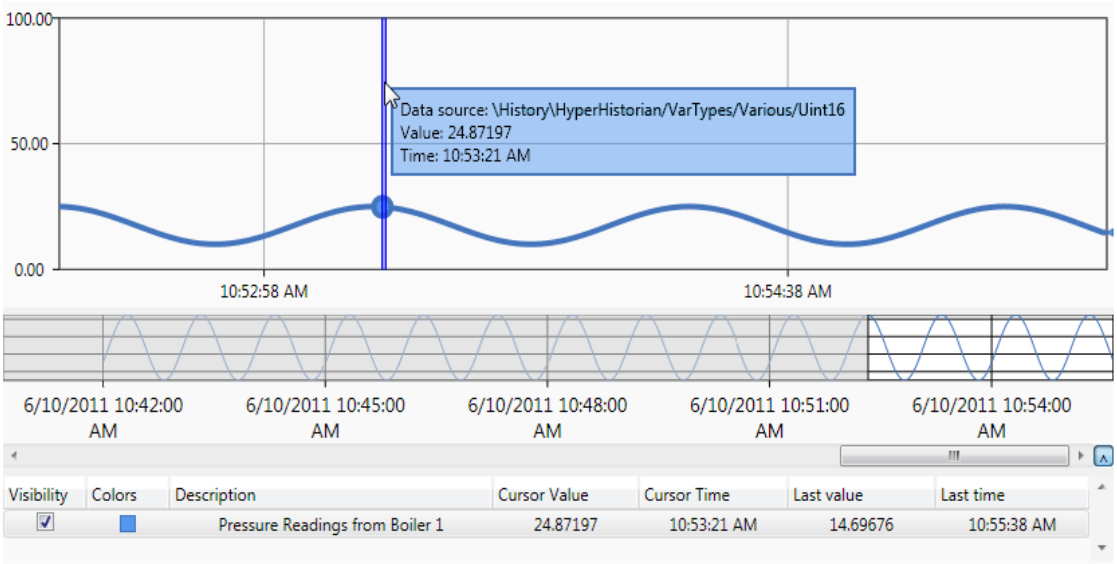
TrendWorX64 Viewer Specifications

OPC Connectivity	
OPC UA	Client [DA, HDA]
OPC .NET	Client [DA, HDA]
OPC Classic	Client [DA, HDA]
Appearance and Properties	
Extension	**TWXX (WPF format), TWXXS (Silverlight format)**
Data Type	Real-Time, Historical (DA, HDA)
Embeddable	Yes [GraphWorX64]
Number of Trends	Over 250 per Chart
Time & Rate	Trend Period, Summary Period, Data Collection Rate, Display Refresh Rate, History Refresh Rate,
Time & Date	UTC, Local
Time Format	None, Long, Short, Custom (h, H, m, s, t)
Date Format	None, Long, Short, Custom (M, d, y)
Plot Types	
Line	Time, Time Spline, Step Time, XY
Area	Time Area, Time Spline Area, Time Step Area
Other	Bar, Histogram, Circular, Pie
Pen Types	
Stroke	Solid, Dashed, Dotted, Dotted-Dash, Custom
Markers	None, Circle, Square, Triangle
Numeric Format	Currency, Decimal, Exponential, Fixed-Point, General, Number, Percent, Hexadecimal
Range	Auto, Auto Scale, Fixed (Minimum, Maximum)
Support	
Bad Quality Markers	Yes
Multi-Grid	Yes
Multi-Tab	Yes
Multi-Chart	Yes
Custom Styles	Yes
Freeze Trends	Yes
Alarm Lines	Yes
Ideal Pen	Yes

Sample Trend Viewer Display

New MergeWorX Data Merging Technology

MergeWorX is a tool for automatic or manual insertion of data into the Hyper Historian, typically used for importing historical or log data from databases, other historians, intermittently connected field devices and other equipment such as PLC's. This provides for high resolution recording from these devices and greatly increased reliability of capturing all data, even when network outages occur.



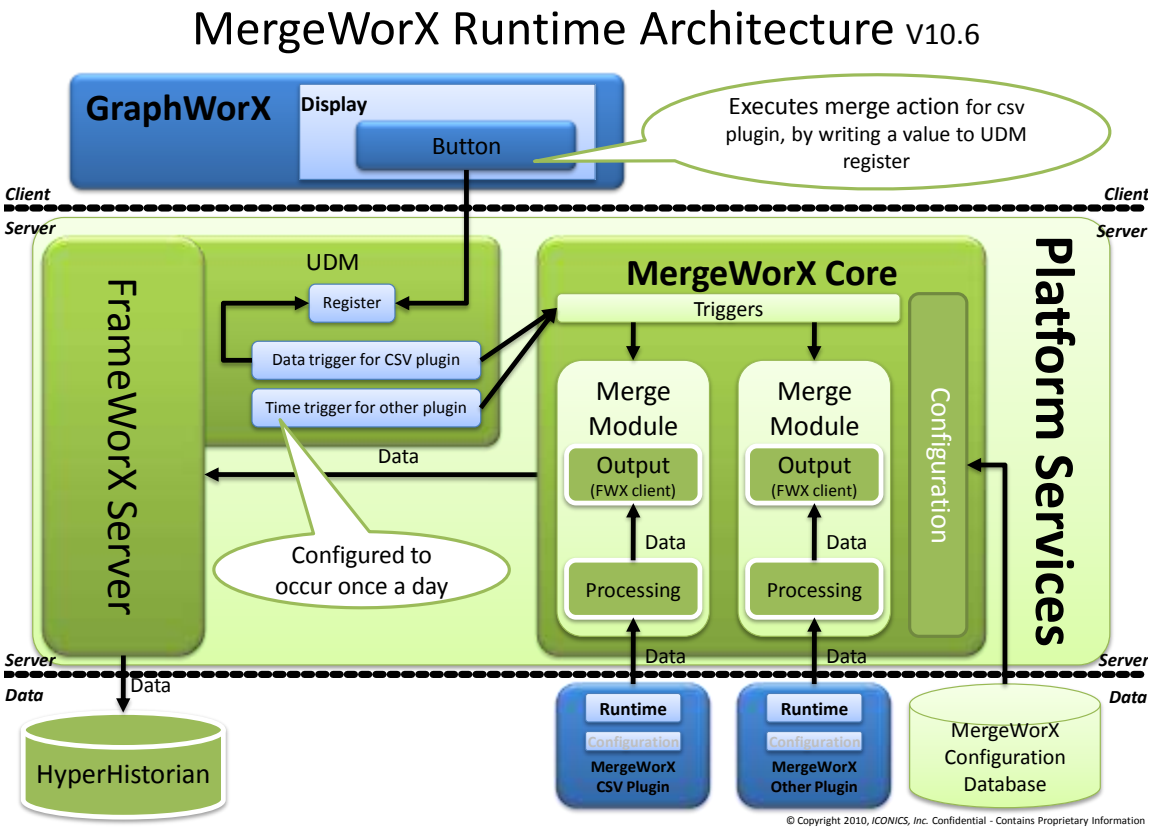
Trend Viewer Showing Merged Data Integrated Seamlessly

MergeWorX uses a plug-in technology to allow users to import from various formats of CSV files. Users can also write their own .NET plug-in module to read data from any desired data source. The plug-in interface is very simple, while at the same time flexible enough to allow users to configure and store their plug-in configuration in the MergeWorX configuration database, using a standard ICONICS configuration tool (Workbench) to configure it.

All MergeWorX communications run through web services via the ICONICS Platform Services and can therefore operate remote from the Hyper Historian. Depending on the plug-in type being utilized, it is possible to be remote from your data source as well.

MergeWorX is an event driven tool and uses ICONICS Unified Data Manager (UDM) Triggers for initiating data merging activities. Currently there are two types of triggers available: periodic (time-based) and data (event-based). This allows you to completely automate data merges for unattended operation, while still allowing for the option to manually initiate data merges simply with the press of a button. Consequently, you can have multiple instances of the same plug-in, each trigged by its own trigger, each processing data from a different PLC, device or source.

Below is an architecture diagram showing a high level overview of the MergeWorX module:



MergeWorX Runtime Architecture

MergeWorX can be configured to process and merge device data in a similar way that OPC servers process data. This includes name mapping, data conversion, scaling and clamping. MergeWorX processes new data as it receives it and if any errors are encountered (for example if the point identified does not match any of MergeWorX's configured input names), it sends appropriate messages to the GenEvent server to report on the status of its activities.

The following examples show three different CSV formats that are supported out-of-the-box with MergeWorX, and can be combined within the same file as well. In the following examples "DataPoint" is a point name used to identify data, either from the MergeWorX configuration or the Hyper Historian configuration.

MergeWorX CSV Format Type 1

Consists of a header definition line and data lines, where the Header defines the order of the columns to be provided.
Header definition line: [***DataPoint***, ***Value***, *ValueType, Quality, Timestamp*]

- ***DataPoint*** and ***Value*** are **required**
- *ValueType*, *Quality* and *Timestamp* are **optional**

Example:

DataPoint	Timestamp	Quality	Value	ValueType
Hall1\PLC1\Temperature	2011-01-01 01:00:00.256 PM	0	10	Int32
Hall1\PLC2\Temperature	2011-01-01 01:00:00	134217728		
Hall1\PLC1\Pressure	2011-01-01 01:00:10 AM	0	1.256	Double

MergeWorX CSV Format Type 2

Consists of a point definition line, header definition line and data lines.
Point definition line: [**@DataPoint, PointName**]
Header definition line: similar to Type 1, but without the DataPoint

Example:

@DataPoint	Hall1\PLC1\Temperature		
Timestamp	Quality	Value	ValueType
2011-01-01 01:00:00	0	10	Int32
2011-01-01 02:00:00	134217728		

MergeWorX CSV Format Type 3

A combination of Types 1 and 2, which can be used for relative tag names or to build a hierarchy.

Example:

@DataPoint	Hall1\PLC1\			
DataPoint	Timestamp	Quality	Value	ValueType
Temperature	2011-01-01 01:00:00	0	10	Int32
Pressure	2011-01-01 02:00:00	0	1.256	Double

Resulting point names:

- Hall1\PLC1\Temperature
- Hall1\PLC1\Pressure

The end result is logged data that looks and behaves like it was logged in real time using the standard Hyper Historian Logger. Users can replay the data within the TrendWorX64 Viewer for example, or report on it using ReportWorX.

Powerful SQL Query Engine

Hyper Historian logs data to a proprietary file-based storage repository. While you can use the TrendWorX64 and TrendWorX32 Viewers to see and edit your logged data in a graphical format, you may wish to create reports for the logged data or edit data in bulk. For this reason, Hyper Historian comes with a SQL Query Engine that allows you to use common SQL Data Manipulation Language (DML) queries to retrieve and edit data. This enables tight integration with any SQL-compatible database such as Microsoft SQL Server, Oracle and any open database compatible client such as Microsoft Excel for example.

TAGNAME	TIMESTAMP	QUALITY	VALUE
Ramp	6/10/2010 14:33	0	77
Random	6/10/2010 14:33	0	1.498458815
Random/RandomMaxActTime	6/10/2010 14:33	2147484672	1.498458815
Sample/Step	6/10/2010 14:33	0	73.68421173
Sine	6/10/2010 14:33	0	99.60573507
Ramp	6/10/2010 14:33	0	78.124
Sine	6/10/2010 14:33	0	99.03987682
Ramp	6/10/2010 14:33	0	79.124
Sine	6/10/2010 14:33	0	98.33081016
Ramp	6/10/2010 14:33	0	80.25
Sine	6/10/2010 14:33	0	97.30426794
Ramp	6/10/2010 14:33	0	81.25
Sine	6/10/2010 14:33	0	96.19397663
Ramp	6/10/2010 14:33	0	82.374
Sine	6/10/2010 14:33	0	94.72863613

Bringing Hyper Historian Data into Excel using the SQL Query Engine

Essentially, the Hyper Historian SQL Query Engine gets installed as a Linked Server in SQL Server, which causes it to appear just like any other database in SQL Server. Once installed, users can execute queries against the SQL Query Engine to retrieve their desired data. Clients that support OLE DB connections such as Excel can also call directly into the OLE DB provider, without going through the Linked Server.

This SQL Query Engine is what makes data available to clients such as ReportWorX™, PortalWorX™, GraphWorX64™, TrendWorX64™, MobileHMI™, and other third-party systems. It supports an assortment of SQL constructs and functions, as detailed in the table below.

SQL Query Engine Specifications

SQL Constructs	SELECT, INSERT, UPDATE
SQL Aggregates	MIN, MAX, AVG, SUM, COUNT
Functions	
QualityToStr	Converts quality from DWORD representation (number) to a string (Good, Bad or Uncertain)
DataTypeToStr	Converts data type column from DWORD representation (number) to a string
AccessRightsToStr	Converts access rights column from DWORD representation (number) to a string (None, Read, Write, Read_Write)
IsGood	Selects only data where the quality is good
IsBad	Selects only data where the quality is bad
IsUncertain	Selects only data where the quality is uncertain
DateAdd	Returns a specified date with the specified number interval (signed integer) added to a specified datepart of that date
Now	Returns the current time in Local time
NowUTC	Returns the current time in UTC time
LocalTimeToUTC	Converts the specified timestamp from Local to UTC time
Stored Procedures	
HDA_BOOL	Calculates Duration in State 0, Duration in State 1, Number of Transitions and Count for one tag
HDA_BOOL_5	Same functionality as HDA_BOOL but for up to 5 tags
HDA_ANALOG	Calculates Min, Max, Average, Time Average, Totalize Average, Interpolative, Last, Delta, Range, Total and Count for one tag
HDA_ANALOG_5	Same functionality as HDA_ANALOG but for up to 5 tags
SP_RAW_DATA	Retrieves raw data for the specified tag in the given interval
GET_MOST_RECENT_VALUE	Returns most recent value, timestamp and quality for the specified tag
GET_GOOD_VALUES	Returns specified number of values with good quality within the specified time range
GET_BAD_VALUES	Returns specified number of values with bad quality within the specified time range
GET_VALUES	Returns specified number of values within the specified time range
HDA_QUALITY	Calculates DurationGood, DurationBad, PercentGood, PercentBad and WorstQuality for one tag
HDA_QUALITY_5	Same functionality as HDA_QUALITY but for up to 5 tags

Advanced Analytic Functions with Automated Reporting

Hyper Historian can connect with the ICONICS BizViz Manufacturing Intelligence / Business Visualization suite, to create best-in-class reporting, analysis, portal or data bridging applications. Users can either utilize the SQL Query Engine (described above) or OPC HDA connectivity to extract data from the Hyper Historian into reports.

With ReportWorX it is easy to configure powerful and detailed reports that expose information from the Hyper Historian. Start from one of the preconfigured reports or customize your own report format using the flexibility of Microsoft Excel combined with the power of ICONICS' ReportWorX reporting tool.

Sample Hyper Historian Report

ReportWorX uses award-winning technology to turn data into actionable information in the form of reports. ICONICS brings you the most advanced reporting tool available today, taking maximum advantage of Microsoft's powerful technologies. ReportWorX, based on Microsoft .NET technology, enables you to push data into your reports and to control the report execution frequency and delivery format (Excel, PDF or HTML). Once generated, the reports can be automatically sent to local or remote disk drives, redundant printers, PDF files, Web servers, Fax machines, or multiple users via E-Mail.

ReportWorX allows for the execution of reports containing Hyper Historian data in conjunction with data from other logical areas of your process, based on scheduling triggers within ICONICS' Unified Data Manager. The criteria by which reports can be triggered include:

- Manually based on direct operator commands
- Periodically based on time and/or date
- Based on alarms or events
- Based on real-time OPC tags
- Expressions or calculations
- Based on NT events
- File system and database value changes

Leverage Microsoft Technology for Open Integration

Hyper Historian offers the following Microsoft technology benefits and features to bring you a high performance, reliable, optimized plant historian with efficient data collection algorithms and powerful analysis capabilities:

Feature	Benefit
Windows Server 2008 Platform	Leverage the foundation on which Microsoft has built its latest server-class products
Windows Presentation Foundation (WPF)	Rich, scalable, vector-based graphics for a compelling user experience
Microsoft Silverlight	Rich visualization and charting components for thin-client, IT-friendly deployment
Microsoft .NET Framework	Web services to enhance the computing experience with highly integrated communications and information
Microsoft SQL Server	Comprehensive data management platform with open database technology for 3rd party integration
Windows Communication Foundation (WCF)	Secure, reliable and transacted messaging and interoperability
Transactional NTFS	Feature of Windows Server 2008 that helps to preserve data integrity and handle error conditions reliably
Parallel Processing	Distributes the calculation processing load across all available processors

Hyper Historian was designed from the ground up to take maximum advantage of Windows Server 2008 and Microsoft .NET technology.

According to Microsoft, “Windows Server 2008 builds on the success and strengths of its Windows Server predecessors while delivering valuable new functionality and powerful improvements to the base operating system. New Web tools, virtualization technologies, security enhancements, and management utilities help save time, reduce costs, and provide a solid foundation for your information technology (IT) infrastructure.”

ICONICS software solutions such as Hyper Historian work in unison with these and other Microsoft technologies to provide further industrial automation benefits.

System Requirements

Hyper Historian 10.6 requires the following hardware and software components. System requirements may vary based on application size, system performance requirements, and loading factors.

Operating Systems Supported

Hyper Historian 10.6 presently supports the following systems:

- Microsoft Windows 7 64-bit (Professional or Ultimate Edition)
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008 64-bit
- Microsoft Windows Vista 64-bit
- Microsoft Windows Server 2003 64-bit

Minimum Hardware and System Requirements:

Hyper Historian requires the following hardware and software components. System requirements may vary based on application size, system performance requirements, and loading factors.

Component	Requirement
CPU	Dual core 64-bit processor or better
Memory[1]	4 GB of memory required (6 GB recommended)
Hard disk	At least 20 GB of free hard disk space required (at least 50 GB is recommended to allow space for data storage files)
Drive	8X speed DVD-ROM for installation
SQL Server [2]	Microsoft SQL Server 2005 (Express / Workgroup / Standard or Enterprise Edition) with the latest service packs Microsoft SQL Server 2008 (Express / Workgroup / Standard or Enterprise Edition) with the latest service packs
Excel	Microsoft Office Excel 2003 or above (required for ReportWorX only)
Web Server	Microsoft Internet Information Services (IIS) 7.0 or later
Web Clients[3]	Via Silverlight Web Parts: Internet Explorer 7 or later, Firefox 3 or later, Safari, Chrome

Note 1: It is recommended that the system page file size be a minimum of four (4) times the size of installed (physical) RAM.
Note 2: The user also has the option of designating a remote SQL Server, in which case the user will not be forced to install SQL Server locally.

About ICONICS

Founded in 1986, ICONICS is an independent software developer of award winning real-time visualization, data historians, automation intelligence and suite of analytics software solutions. ICONICS products are installed in 70% of the Fortune 500 companies around the world, helping customers be more profitable, agile, efficient and sustainable.

ICONICS is a long time Microsoft Gold Certified Partner and Winner of the very prestigious Microsoft Partner of the Year Award, providing advanced software for many end users and technology suppliers. ICONICS has over 250,000 applications installed in multiple industries worldwide.

ICONICS cultivates an international culture of innovation, creativity and excellence in product design, development, technical support, sales and service. World headquarters are located in Foxborough, Massachusetts, USA.

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