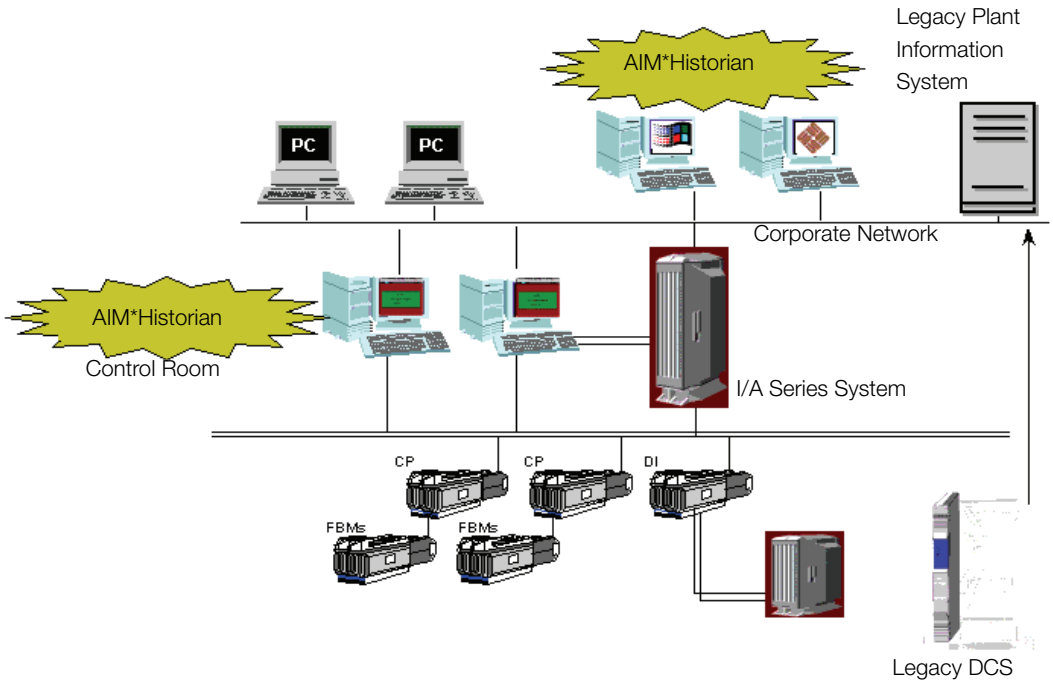
AIM*Historian™ Software



*AIM*Historian provides enterprise-wide capability for collection, storage, and retrieval of historical process information. AIM*Historian can run on both I/A Series systems and network platforms, and can collect information from a wide variety of process control environments including most distributed process control systems (DCSs) such as the I/A Series system. AIM*Historian repositories are easily integrated with Microsoft® personal productivity applications and relational databases.*

AIM*HISTORIAN

Today's manufacturing processes both generate and consume ever larger and more varied amounts of historical information. Manufacturers often need to store this information indefinitely, while making the data both accessible and easy to annotate and augment.

Rapid access to this information is important for graphical and statistical analysis, regulatory and batch reporting, analyzing product quality, and financial reporting. Process history is generated by many different devices and systems.

Originating at different times and locations, process history consists of items such as measurements, alarms, messages, events, and operator actions. It is needed by control system users, network application servers, desktop PCs, and advanced control and business management applications.

Due to this diversity in both source and use, historical process information must be made accessible via the

enterprise intranet using widely accepted, standard client/server technologies. Both Microsoft and Internet standards play increasingly important roles in the distribution and analysis of this information.

In order to meet your needs for process information, AIM*Historian is included in the AIM*AT™ enterprise solution software. This advanced software system enables you to collect, store, and retrieve a wide variety of historical process data using client/server technologies. Information can be stored and accessed over various network environments including the enterprise intranet, the I/A Series system, and other distributed control systems. You can store and access data using industry standard or proprietary access methods. AIM*Historian is capable of supporting today's process systems as well as the increasing needs and requirements of tomorrow's manufacturers. For example, you can migrate I/A Series Historian configurations and data files to AIM*Historian. Applications that used the legacy historian can then access the AIM*Historian data without modifications to applications.

AIM*HISTORIAN CAPABILITIES

The advanced capabilities and benefits of AIM*Historian are outlined below.

Platform Independence

The AIM*Historian server package operates on the following platforms:

- Windows® and Windows Server® systems
- Invensys Foxboro systems running I/A Series software Version 8.5 or later.

AIM*Historian collectors, where events and real-time data are collected for forwarding to an AIM*Historian instance, run on the same platforms. The collectors can run on the instance host or on a remote system that uses the same or a different platform. For example, an I/A Series real-time collector can operate on a Windows workstation providing data for an AIM*Historian running on a non-I/A Series Windows server.

AIM*Historian includes a series of client applications for configuring and managing AIM*Historian instances. These applications are also capable of both local and remote operation, and can be installed on Windows systems, in addition to server platforms listed above.

Applications using AIM*Historian data can reside on any platform supported by AIM*API™. Finally, AIM*Historian instances running on network platforms can utilize both local and network storage resources such as network storage appliances. An assortment of such computing platforms and bulk storage devices is available. These provide computing and storage capacities far greater than required by any control system server platform.

Scalability

With its flexible modular design, AIM*Historian adapts to new requirements as your organization grows and diversifies.

To protect your investment, AIM*Historian:

- Serves a wide range of applications
- Adapts to small tasks as well as plant-wide applications
- Can be configured to collect as few as 200 real-time points or a very large number of real-time points
- Runs on network platforms
- Provides a full range of hardware performance, mass storage size, and price options.

Collection from Proprietary Systems

AIM*Historian provides two collector components, enabling collection from a wide variety of process systems.

- The I/A Series real-time collector operates either on the server host or remotely to collect real-time data from I/A Series systems.
- The I/O Gate data collector acquires real-time values from I/O devices such as distributed control systems (DCSs) and programmable logic controllers (PLCs). The collector is matched with a protocol-specific I/O Gate driver to interface with the target device.

These I/O Gates are available for many common DCSs and plant historian products, allowing AIM*Historian to collect data from them and store the data in a common repository. Data retrieval mechanisms for AIM*Historian work seamlessly with data from a wide group of sources.

Unlimited Data Types

AIM*Historian automatically recognizes and collects all types of data and messages, including:

- I/A Series data types: integer, float, long, Boolean, character, packed integer, and packed long
- Generic data types including arrays of short, unsigned short, integer, unsigned integer, float, and double character.
- Binary large objects (BLOBs), which are arbitrarily large pieces of data with unspecified content such as a video image
- Files, where the content of the file is stored when the file is updated or when an update is requested by an external trigger.

On-Line Configuration

Configuration tools, including the AIM*Historian Configurator, support on-line configuration. AIM*Historian is configured during a session. The creator of the session can save, abort, or commit the session. The AIM*Historian configuration is updated automatically when the session is committed, and newly configured collection points begin operation as soon as the session is committed.

Data Integration

AIM*Historian drivers and interfaces enable quick and efficient integration of historical data with a wide variety of applications for analysis, regulatory compliance, plant management, and decision support. These include a proprietary high-performance API and drivers that support industry-standard interfaces. Refer to Data Integration Tools.

Universal Time

The history collected by AIM*Historian can be stored in universal coordinated time (UTC) or I/A Series system time. UTC time is appropriate if information is accessed from different time zones. Automatic time zone translation is then utilized to transition between local time and UTC.

Compatibility with Legacy Applications

AIM*Historian delivers improved performance and new capabilities while protecting your investment in proven systems and applications. Designed to work with existing Foxboro user tools and applications, AIM*Historian can operate on the same Nodebus as I/A Series Historians, and emulate the older Historian as it serves I/A Series applications such as Display Manager and FoxView. AIM*Historian includes communications servers that allow transparent I/A Series access to data stores even when the AIM*Historian instance resides on a non I/A Series server. For applications using INFORMIX™ ESQL/C, the ODBC interface driver is implemented to facilitate the ESQL query of the AIM*Historian database. The ODBC driver includes all ODBC core functions.

AIM*HISTORIAN ARCHITECTURE

AIM*Historian has a highly modular package architecture (Figure 1) consisting of named instances of the AIM*Historian package. Multiple instances of AIM*Historian can reside on a single server. For example, one small instance can collect recent data for support of local desktop displays while another larger instance provides long-term collection and storage of plantwide data.

Each instance of AIM*Historian consists of one server component and one or more collector components as shown in Figure 1.

The key functions of the instance component are:

- To manage additions to its data repository from a variety of local and remote collectors installed on a mix of I/A Series stations and non I/A Series systems
- To manage its archives
- To provide services to applications such as operator and desktop displays, and remote databases.

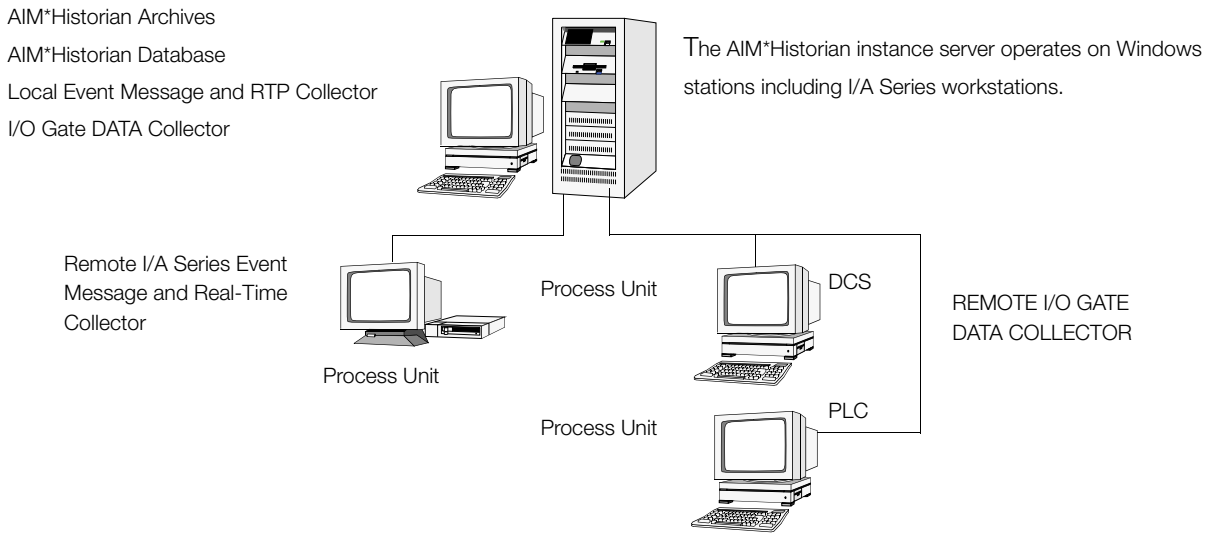


*Figure 1. AIM*Historian Architecture*

AIM*HISTORIAN DATA COLLECTION

Real-Time Data Collection

Real-time information is specified by sets of real-time points (RTPs) and is collected by real-time collectors or generated by customer applications. RTPs are sent to the AIM*Historian server to be stored. The RTP can be any data type including I/A Series data types, generic data types, BLOBs, and files.

An RTP value is collected by a real-time collector and stored in the AIM*Historian database. An RTP has both a fast and a slow sampling frequency, both of which are configured by the user. A collector always sends the value at the fast frequency, but the value is stored at the fast or slow rate specified in the RTP. The frequency can be switched programmatically with the use of Control Groups).

A real-time collector gathers and sends a value if one or more of the following user-set criteria are met:

- The value of an RTP changes significantly.
- An RTP is “triggered”. Any event or RTP can be designated as the trigger.
- A maximum time between samples (MTBS) is reached
- The value is an extreme (peak or valley).

The fastest collection frequency for an RTP is one millisecond. (The effective collection rate is also dependent on the scanning frequency of the connected DCS.). New RTPs can be added and removed on-line. An RTP can always be deleted after it has collected data.

Manual Data Entry

In addition to collection from the control system, AIM*Historian RTPs can be configured so that an individual user or an application can write values to the instance database. These RTPs, which are clearly marked as Manual Data Entry (MDE) types, can be displayed and annotated in the MDE window accessible from the AIM*Historian Manager and as a standalone desktop application. MDE points are written to the database as if they had been collected from the control system, but the control system is not affected by the MDE.

Demand Writes

Points can also be configured as write-only RTPs that enable a user or application to write values to the control system itself. The values are actually written to either the I/A Series real-time collector or the I/O Gate data collector, which in turn writes the point to the control system (if that write is enabled in the target system). The value is also recorded in the AIM*Historian database.

Event Collection

Much of the information in a plant cannot be defined as an RTP because it has a variable length or contains a mixture of data types within the information package. AIM*Historian classifies these information packages as events. Events include alarm messages, annotations to MDE points, operator actions, batch messages, and data entered from custom programs using AIM*API. Events in AIM*Historian consist of a user-configured definition and event instances. The definition involves assigning keys to every field in the message.

The keys are used for sending and receiving messages over a network and for querying the resulting data stores. AIM*Historian users specify event definitions, with event types defined as part of an event group. The message types within a group are automatically “joined” when accessed through the ODBC interface.

A message key is defined by a key name, an ODBC key indication, a sequence number, a field type, and the number of elements of the specified type. The key name becomes the ODBC column name. The ODBC specification allows only single-element columns, a restriction which is maintained by AIM*Historian during the key specification. The field type can be any of those allowed for RTPs except BLOBs and files.

DATA INTEGRATION TOOLS

Access to AIM*Historian data is provided via one of four major interfaces: I/A Series Historian API, ODBC Driver for Historian, AIM*API, and the optional AIM*Historian Export to Oracle (Figure 2).

I/A Series Historian API

AIM*Historian serves existing applications on I/A Series systems such as FoxView. AIM*Historian includes modified servers which provide I/A Series Historian services. Applications such as FoxView

communicate transparently with these servers to retrieve data from the AIM*Historian database. Additional servers are available to support communication with AIM*Historian instances operating on network servers.

Open Database Connectivity (ODBC) Access

Applications such as FoxView communicate transparently with the API server to retrieve data from the AIM*Historian. Many applications are already equipped to handle ODBC data sources, reducing the cost of integrating AIM*Historian information with other databases and applications. This capability simplifies integration of AIM*Historian with the many applications including Microsoft Office and all major relational database management system products that support the ODBC interface.

AIM*API

Sometimes very high performance is necessary for access to AIM*Historian information. For these cases, AIM*API provides an extensive, published, and supported proprietary application programming interface. All AIM*API functions can be used locally as well as remotely through the Networked AIM*API product, thus readily integrating process history information into almost any popular computing platform or system.

Oracle® DBMS Integration

AIM*Historian provides an optional component that exports process history to customer-supplied Oracle DBMS applications. AIM*Historian Export to Oracle, a separately licensed product, includes programs that operate in the background on both the AIM*Historian server and the Oracle host. Collected data is exported to the Oracle application at a user-set interval via a TCP/IP connection. You can configure the product to export all collected data or selected process points, reduced data, or event messages.

OLE DB Provider

The AIM*OLE DB Provider enables you to develop OLE DB clients using Visual Basic, Active X Document Object (ADO) code, and similar tools. Using OLE DB, you can make SQL queries of the AIM*Historian to access configuration data, RTP values, and message data. You can also use the interface to insert data into assigned MDE points.

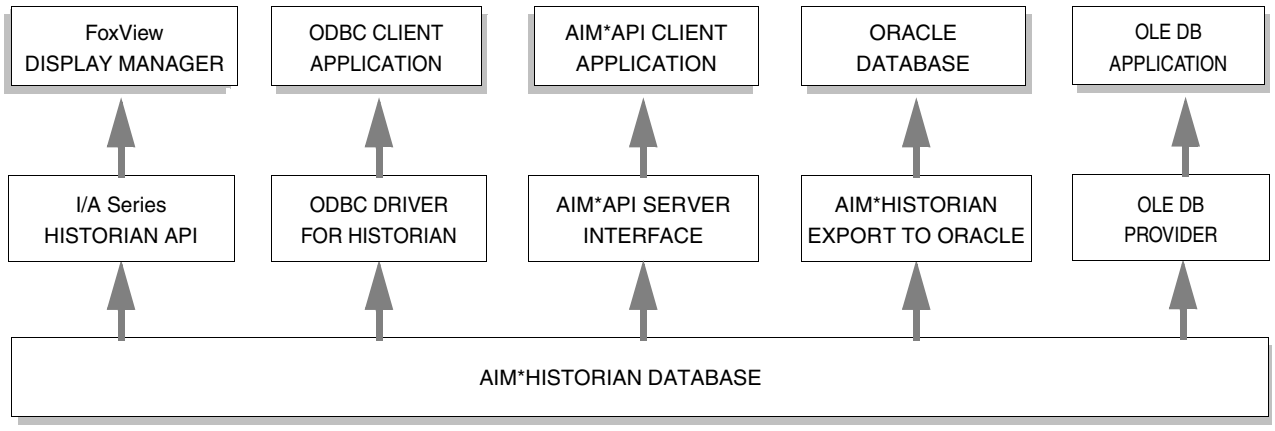


*Figure 2. AIM*Historian Data Retrieval*

AIM*HISTORIAN CONFIGURATOR

AIM*Historian Configurator is a graphical configuration tool that operates as a client program either locally on the server host or remotely on another Windows desktop. AIM*Historian Configurator can be used to configure instances on any connected server. The tree view on the left side of the AIM*Historian Configurator window provides a 3-level display of servers, instances, and configuration files.

Figure 3 is an AIM*Historian Configurator window that provides access to AIM*Historian software on seven servers. The display for server P7AW05 has been expanded to show the two individual instances configured on that server: hist05 and histc2. The instance listing can be expanded to show its six configuration files. When you select a configuration file, the window on the right provides an editable display of the configuration parameters. Figure 3 shows the instance configuration parameters for hist05.

AIM*Historian Configurator includes a series of wizards and pull-down menus that support rapid configuration of new instances and easy updating of existing ones. Figure 5 shows a wizard in which a series of filters assists your selection of process objects to configure RTPs.

AIM*Historian instances can also be maintained by editing saved configuration files. The Save and Batch Configuration functions are initiated from the AIM*Historian Manager or a command line entry.

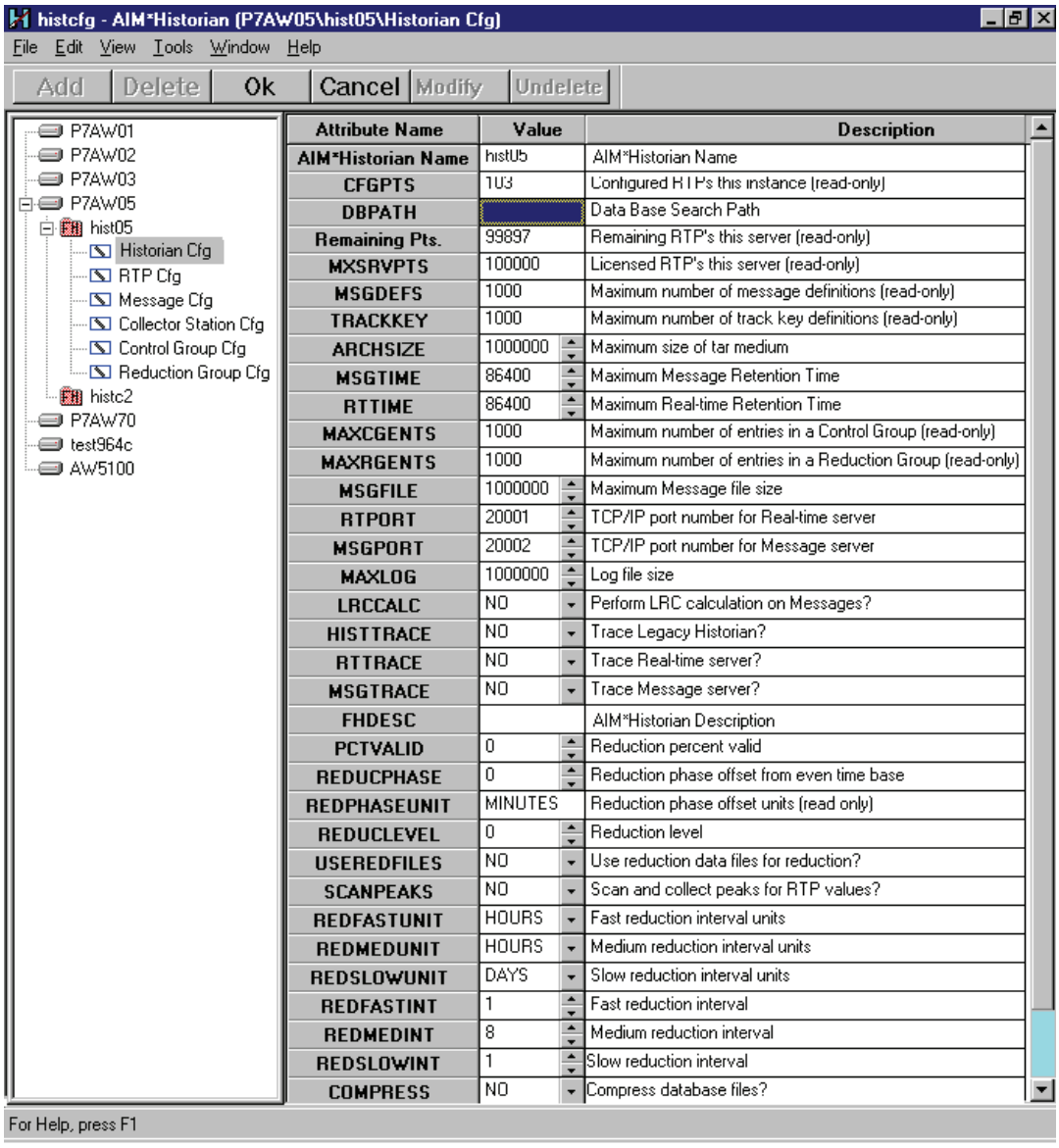


*Figure 3. AIM*Historian Configurator Window*

AIM*Historian Manager

The AIM*Historian Manager is a graphical interface for monitoring and controlling instances across the network. AIM*Historian Manager enables you to check server status, stop and start instances and collectors, monitor communications between remote collectors and the instance hosts, and examine the operational details maintained in log files for each instance. The application window includes a tree view of servers, instances and collectors on the left and five tabbed pages on the right. Figure 5 shows the AIM*Historian Manager Collector page with information about the I/O Gate Data Collector selected in the tree view.

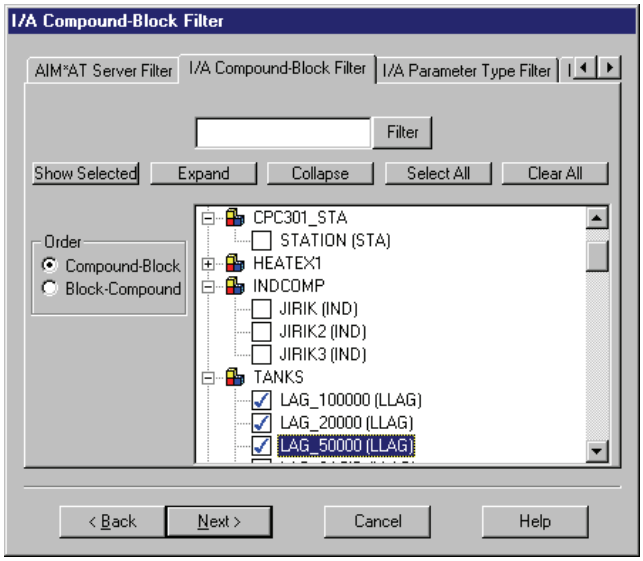


Figure 4. RTP Wizard

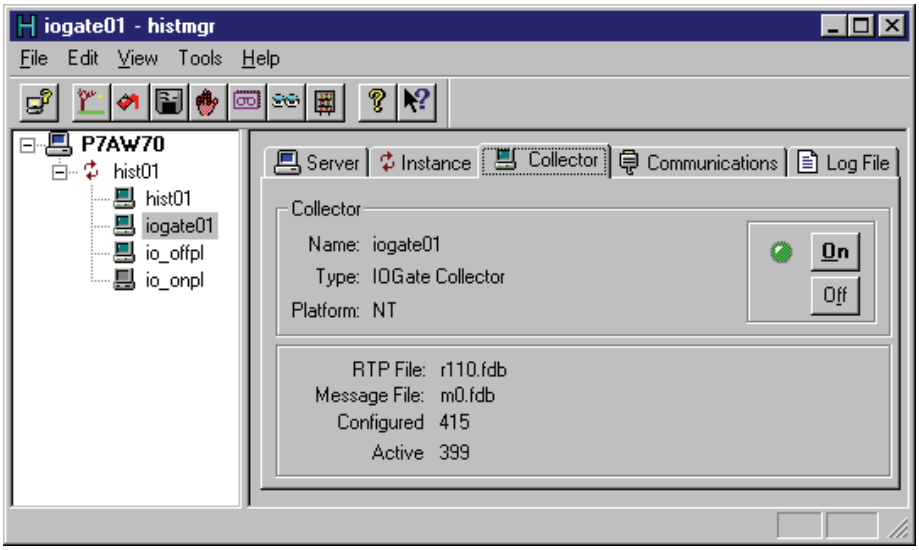


*Figure 5. AIM*Historian Manger Collector Page*

AIM*Historian Data Display

The AIM*Historian Data Display provides process operators with a quick way to check recent history on selected process points. As such, the display is available as both a stand-alone application and as a selection from the I/A Series Display Manager and FoxView. This client application includes a configuration window (Figure 6) for defining multiple reports that can be retrieved by the operator to view values from eight different real-time points.

The report parameters include the time frame for the data, a scanning interval, and presentation of either linearized or averaged data. The RTPs can be selected from multiple servers.

When the operator selects a report definition, the collected data is presented as a tabular display in a separate window. On I/A Series stations, the report can also be displayed as a Trend, with traces updated as the values are collected from the RTPs (Figure 7).

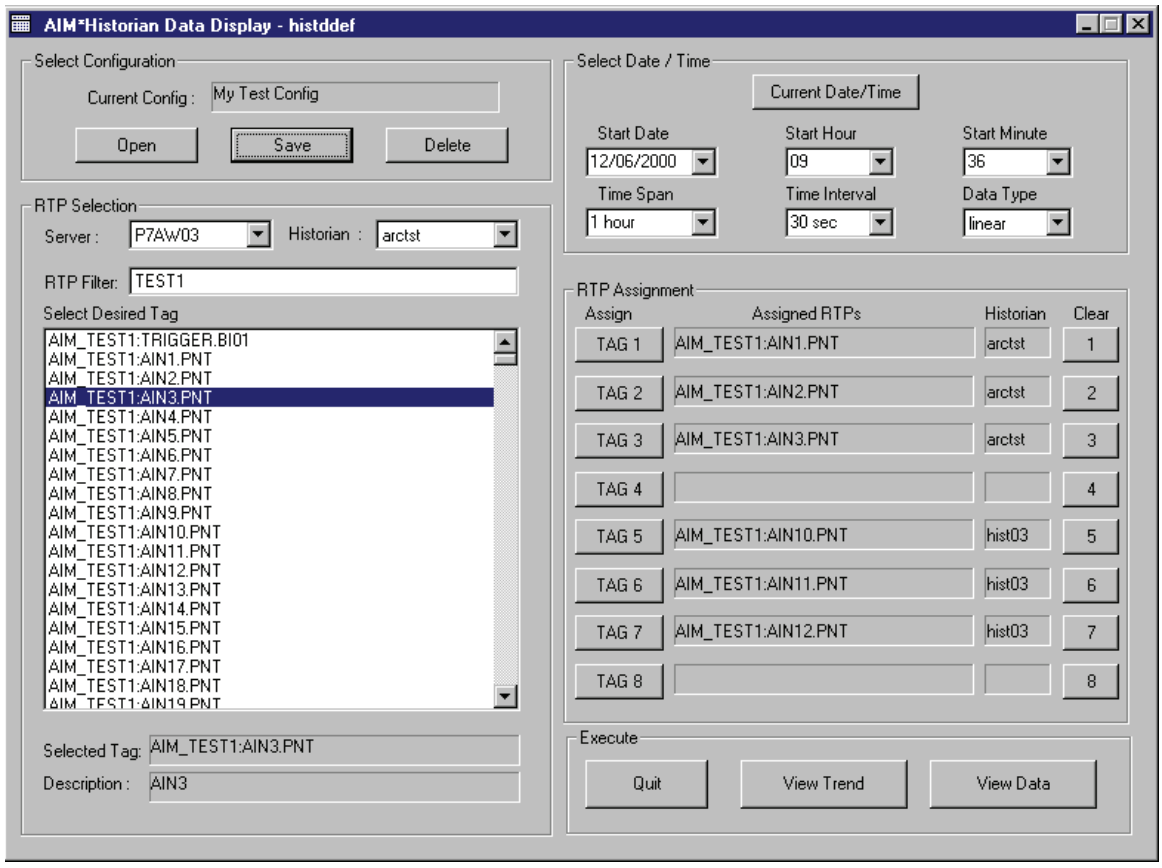


*Figure 6. AIM*Historian Data Display Configuration Window*

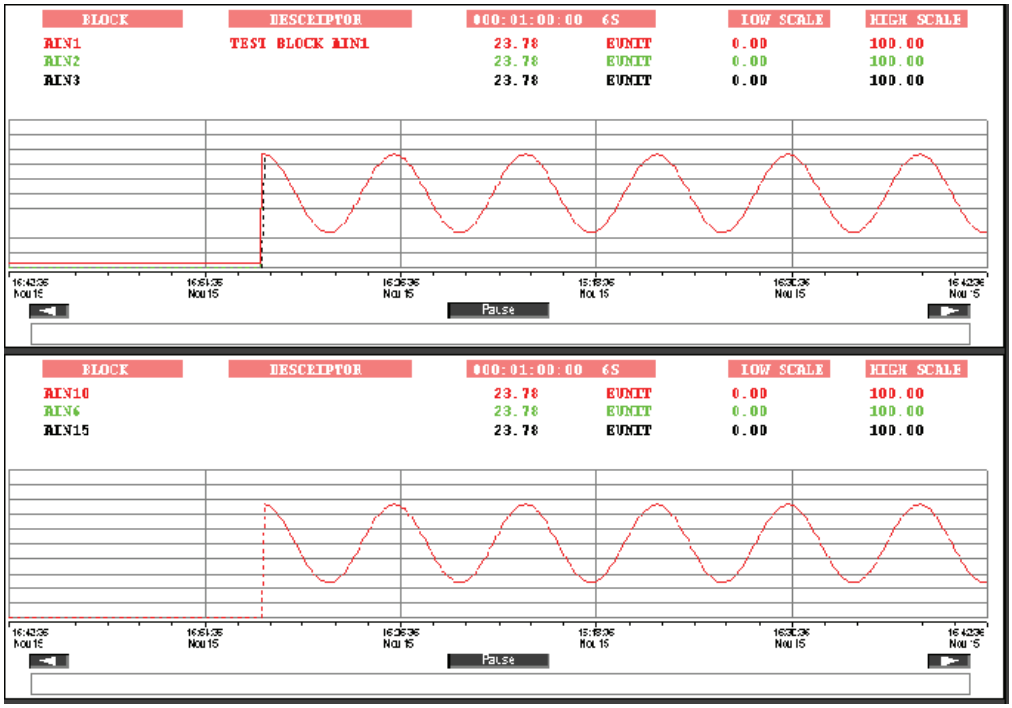


*Figure 7. AIM*Historian Data Display Trend*

AIM*HISTORIAN SPY

AIM*Historian Spy is a series of browsers for viewing instance configurations and collected data without allowing them to be modified (Figure 8).

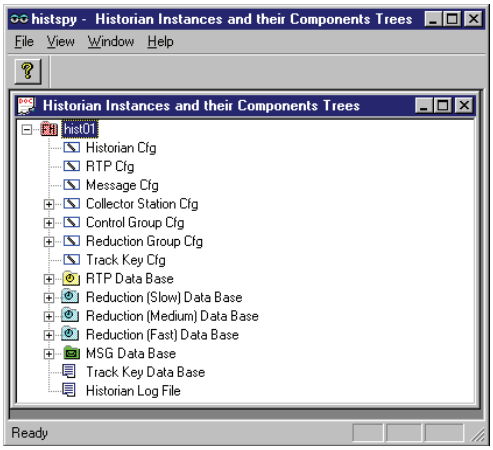


*Figure 8. AIM*Historian Spy Window*

REDUCTION GROUPS

A reduction group is an AIM*Historian component that enables another application, such as I/A Series Report Package, to retrieve reduced data from AIM*Historian.

The parameters for the reduction group are:

- Reduction group name
- Description
- Reduction interval
- Percent of RTPs in the interval that must be valid for the points to be reduced
- Operations list including name and type for each operation (the operation name is used as the column name for ODBC and database export purposes)
- Member RTP name list.

Supported AIM*Historian data reduction operations are:

- Average
- Minimum
- Maximum
- Sum
- Standard deviation
- Kurtosis
- Linearization
- Extremes (Peaks and Valleys).

CONTROL GROUPS

Sometimes groups of real-time points and events need to be associated. A control group makes this association. All RTPs in a control group are switched between On/Off, Bad/OK, and Fast/Slow by one operation. Event collections are switched between On/Off by the same operation. Multiple RTPs can be assigned as the controlling RTP for the control group.

For a control group three RTPs can control:

- On/Off state of the RTPs and Event Messages
- Bad/OK status
- Switching between fast and slow frequency.

ARCHIVING

AIM*Historian provides two archiving tools that enable moving and copying database files within the host or in the network file system to reduce requirements on the server host. Both tools are designed to back up critical process history using the existing file system.

On-Demand Archiving

On-demand archiving is provided by the AIM*Historian Archiver window, which can be started as a stand-alone application or called from the AIM*Historian Manager. With the window, you can select sample, reduction, or message files to be moved, copied, or deleted. File displays indicate which items have already been archived, the size and time span of the files, and their current locations. The window also provides facilities for restoring archived files to the AIM*Historian server.

Scheduled Archiving

The AIM*Historian AutoArchiver performs archiving functions on a scheduled basis, automatically copying or removing files based on user-set criteria for specific file types. Separate archiving schedules can be configured for each instance. Thus, data from a very active instance can be archived every six hours, while archiving for an instance with low storage demand can be scheduled for once every three days.

The specific archiving functions of copying and deleting files are configured for each file type within the instance: sample data, three types of data reduction, messages, and configurations.

Figure 9 is a page in AutoArchiver Configurator where the functions are being specified for sample data files. The selections in Figure 9 indicate that files are to be copied after one day and deleted after two days. Sample files will also be deleted when the entire instance uses more than 5 GB of disk space on the AIM*Historian server host. Archive configurations for the reduced data for these same points can be set so that it is available on the server host for a longer period.

The lower half of the AutoArchiver Configurator window specifies the archive directory, optional commands that are automatically executed after files are copied to the location, and scheduled deletion of the archive files. In Figure 9, the archived files are to be deleted after 30 days.

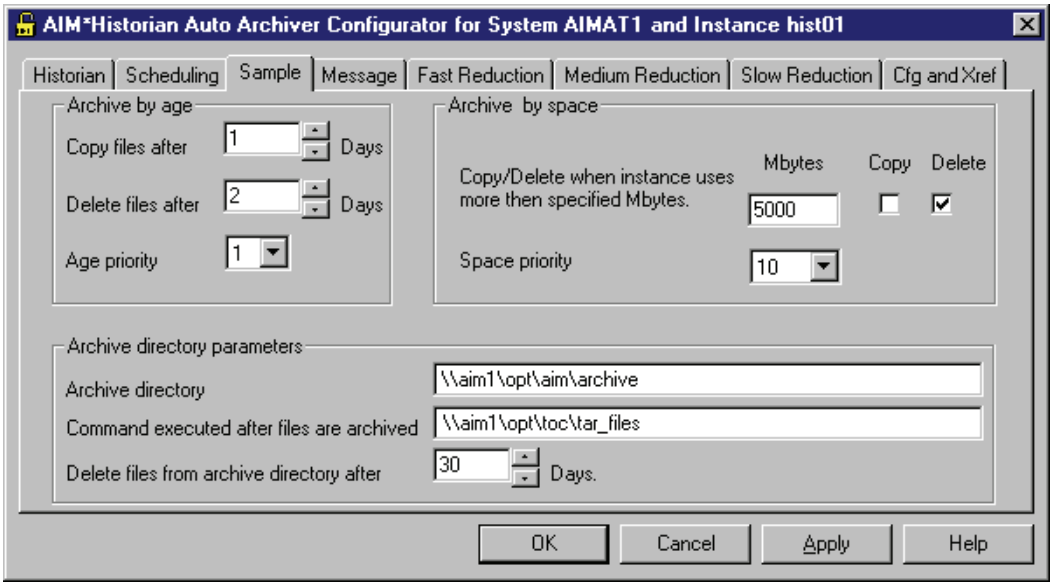


Figure 9. AutoArchiver Configurator Sample Page

OPTIMIZING COLLECTION RATE

The AIM*Historian Deadband (DB) Wizard is a client program for analyzing the effects of various RTP configurations on storage at the AIM*Historian server and on the archiving uses. The DB Wizard identifies the RTPs that create the greatest storage load, and then allows the user to see the effect of adjusting the change deltas (deadbands) configured for some or all of the RTPs (Figure 10). The wizard predicts the storage load for each RTP, estimates the daily storage rates for the instance and the number of days remaining before available disk capacity is spent. When a simulation suggests a change that would better balance the need for data and the storage limits, the user can click an Apply button to commit the configuration change, in which case the wizard updates the instance configuration automatically. There is no need to modify the RTP configuration files. When appropriate, the wizard also suggests changes to the AutoArchiver configuration.

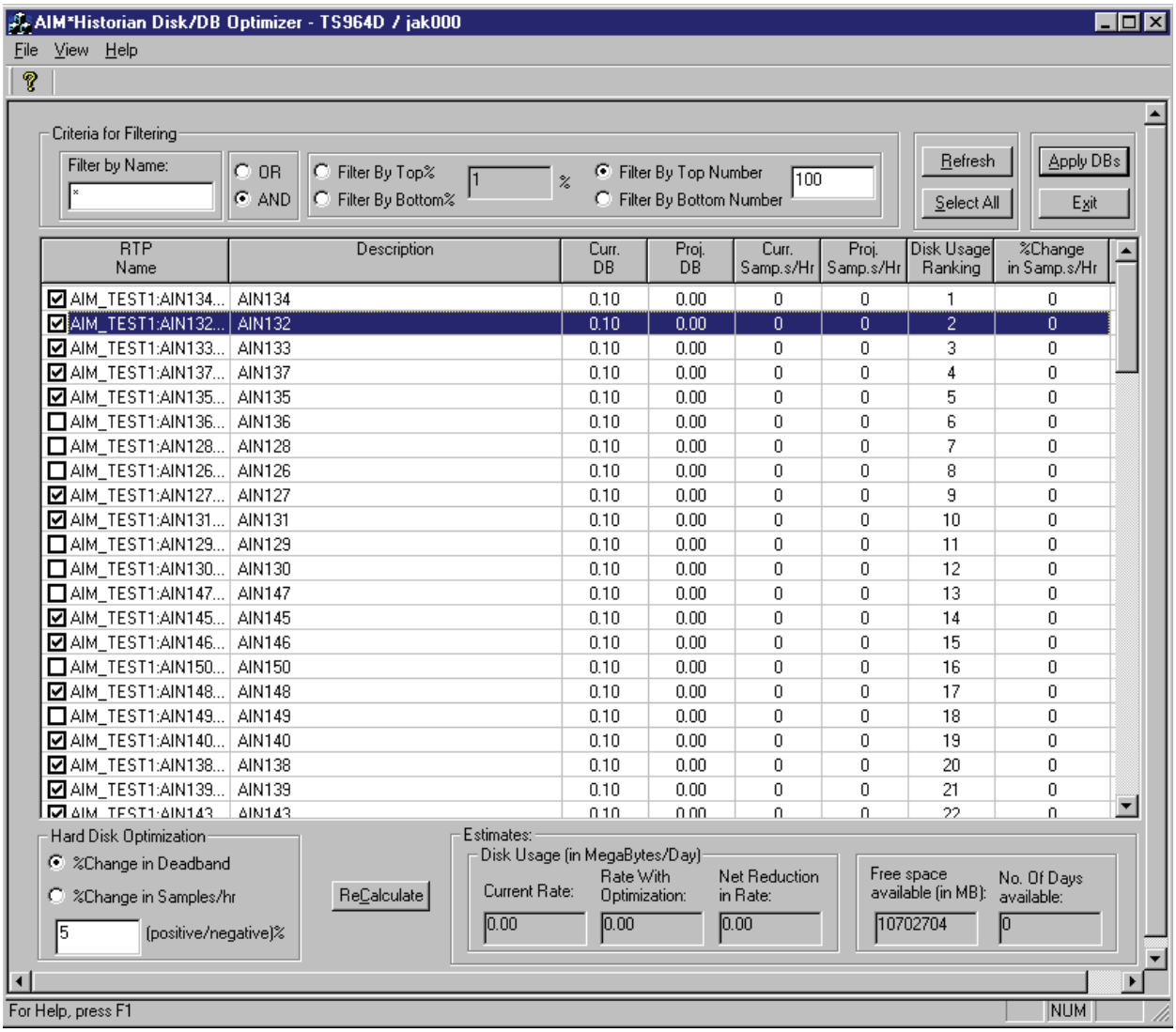


*Figure 10. AIM*Historian DB Wizard Window*

FUNCTIONAL SPECIFICATIONS

Supported Network Platforms

- Windows® 7
- Windows Server® 2008
- Windows® XP
- Windows Server® 2003

Supported I/A Series Platforms

Application Workstations and Servers

Installation

Any number of AIM*Historian instances per system

Data Classes

Real-time points, events, manual data entries, user-defined classes

Minimum Number of Licensed Collection Points

200

Maximum Number of Collection Points

Unlimited (platform sizing required)

Maximum Number of Samples per Collection Point

Any number subject to the amount of available bulk storage capacity

Interfaces

AIM*API, ODBC, I/A Series Historian API, and optional AIM*Historian Export to Oracle

Data Reduction Operations

Average, maximum, minimum, standard deviation, sum, linearization, extremes (peaks and valleys), and kurtosis

Supported AIM*Historian DCS Data Servers

The I/A Series Collector provides both local and remote access to the I/A Series system.
When combined with the appropriate I/O Gate driver, the I/O Gate data collector interfaces with numerous proprietary DCSs and PLCs that support the following protocols:

- OLE for Process Control (OPC)™

Invensys Operations Management
5601 Granite Parkway Suite 1000
Plano, TX 75024
United States of America
http://iom.invensys.com

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424 or contact your local Invensys representative.
Website: http://support.ips.invensys.com

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