

Wonderware Historian Installation Guide

Invensys Systems, Inc.

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Welcome

This guide provides information on installing the Wonderware® Historian, including hardware and software requirements and upgrade instructions.

The Wonderware Historian is tightly integrated with Microsoft products, and a working knowledge of both Microsoft SQL Server and Microsoft Windows operating systems is required.

For more information on Microsoft SQL Server or Windows operating systems, see your Microsoft documentation.

Wonderware Historian Documentation Set

The Wonderware Historian documentation set includes the following guides:

- *Wonderware Historian Installation Guide* (InSQLInstall.pdf). This guide provides information on installing the Wonderware Historian, including hardware and software requirements and migration instructions.
- *Wonderware Historian Concepts Guide* (InSQLConcepts.pdf). This guide provides an overview of the entire Wonderware Historian system and describes each of the subsystems in detail.
- *Wonderware Historian Administration Guide* (InSQLAdmin.pdf). This guide describes how to administer and maintain an installed Wonderware Historian, such as configuring data acquisition and storage, managing security, and monitoring the system.

- *Wonderware Historian Database Reference* (InSQLDatabase.pdf). This guide provides documentation for all of the Wonderware Historian database entities, such as tables, views, and stored procedures.
- *Wonderware Historian Glossary* (InSQLGlossary.pdf). This guide provides definitions for terms used throughout the documentation set.

In addition, the *Wonderware® ArchedrA License Manager Guide* (License.pdf) describes the ArchedrA License Manager and how to use it to install, maintain, and delete licenses and license servers on local and remote computers.

A PDF file for each of these guides is available on the Wonderware Historian installation CD. You can easily print information from the PDF files. The Wonderware Historian documentation is also provided as an online help file, which can be accessed from the System Management Console management tool.

Documentation Conventions

This documentation uses the following conventions:

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

Technical Support

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

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

- The type and version of the operating system you are using; for example, Microsoft Windows 2008 Standard Service Pack 2.
- Details of how to recreate the problem.
- The exact wording of the error messages you saw.
- Any relevant output listing from the Log Viewer or any other diagnostic applications.
- Details of what you did to try to solve the problem(s) and your results.
- If known, the Wonderware Technical Support case number assigned to your problem, if this is an ongoing problem.

Chapter 1

Requirements and Recommendations

For your Wonderware Historian to achieve maximum performance, make sure your hardware and software meets the following requirements. Because the Wonderware Historian is a high-performance relational database, it is also important to size your system to handle the level of input that you expect to store.

Server Requirements

The minimum hardware and software requirements for the Wonderware Historian are based on the tag count and the anticipated data throughput rate. These requirements are divided into four levels, which are outlined in this section.

The recommended memory configuration for SQL Server 2005 is to clamp its memory consumption to 50 percent of the amount of physical memory installed on the server or 512 MB, whichever is larger. The recommended Windows virtual memory setting is twice the amount of physical RAM installed on the server. (Refer to the Microsoft website, www.microsoft.com, for updated installation requirements for SQL Server versions.)

For tag counts less than 30,000, the data throughput rate is assumed to be equal to the tag count. For tag counts greater than or equal to 30,000, the data throughput rate is assumed to be 30,000 values per second. This is the guaranteed throughput that the system can handle, but throughput rates substantially higher are possible, depending on hardware configuration.

You can install the Wonderware Historian on operating systems that have the User Account Control (UAC) turned on.

If you are running the Wonderware Historian on a virtual server, the historian must have an adequate CPU, adequate network memory, and disk I/O resources at all times. Overloading the virtual server leads to unpredictable behavior.

Note If the Wonderware Historian is running on the Windows Server 2003 or later operating system, DDE is not supported.

Operating Systems

The following are the supported operating systems:

- Windows Server 2003 Enterprise R1/R2 SP2
- Windows Server 2003 Standard Edition R1/R2 SP2
- Windows XP Professional SP3
- Windows Server 2008 Standard or Enterprise Editions SP2 (32 or 64-bit)
- Windows Vista Business, Enterprise, or Ultimate Editions SP2 (32 or 64-bit)
- Any of the above running under VMWare ESX, Server version 3.5
- Stratus with Windows Server 2008 SP2

Microsoft SQL Server

The following are the supported SQL Server versions (32-bit versions only):

- Microsoft SQL Server 2008 SP1 Enterprise Edition
- Microsoft SQL Server 2008 SP1 Express
- Microsoft SQL Server 2008 SP1 Standard Edition
- Microsoft SQL Server 2005 SP3 Standard Edition
- Microsoft SQL Server 2005 SP3 Enterprise Edition

Disk Space

- 300 MB of free disk space to install the Wonderware Historian
- Appropriate space for history block storage. For more information, see *Disk Sizing and Data Storage* on page 17.

Level 1 Server - Hardware

A Level 1 server can handle a load of about 5,000 tags. For example, 2,600 analogs, 2,200 discretes, 300 strings, and 20 non-I/O Server (manual) tags. The requirements are:

- Processor:
 - Minimum: P4 3.2 GHz CPU
 - Recommended: dual-core CPU
- RAM:
 - Minimum: 1 GB (Windows Server 2003 and Windows XP)
 - Minimum: 2 GB (Windows Server 2008 and Windows Vista)
 - Recommended: 4 GB
- 100 Mbps network interface card (NIC)

Level 2 Server - Hardware

A Level 2 server can handle a load of about 63,000 tags. For example, 40,000 analogs, 20,000 discretes, 300 strings, and 5,000 non-I/O Server (manual) tags. The requirements are:

- Processor:
 - Minimum: P4 3.0 GHz dual CPU
 - Recommended: quad-core CPU
- RAM:
 - Minimum: 4 GB
 - Recommended: 6 GB
- 1 Gbps network interface card (NIC)

Level 3 Server - Hardware

A Level 3 server can handle a load of 130,000 tags. For example, 70,000 analogs, 50,000 discretetes, 6,000 strings, and 20 non-I/O Server (manual) tags. The requirements are:

- Processor:
 - Minimum: P4 2.7 GHz Xeon quad CPU
 - Recommended: dual processor, quad-core CPUs
- RAM:
 - Minimum: 6 GB
 - Recommended: 10 GB
- 1 Gbps network interface card

A performance report for different historian systems is provided in Appendix A, "System Sizing Examples."

High Availability Support

The Wonderware Historian provides built-in support for Stratus ft3500 fault-tolerant servers.

Requirements for Historian Management Tools

The management tools include the Wonderware Historian System Management Console and the Wonderware Historian Database Export/Import Utility. If you are installing the tools on a remote computer, the following requirements apply:

- Any of the following operating systems:
 - Windows Server 2003 Enterprise R1/R2 SP2
 - Windows Server 2003 Standard Edition R1/R2 SP2
 - Windows XP Professional SP3
 - Windows Server 2008 Standard or Enterprise Editions SP2 (32 or 64-bit)
 - Windows Vista Business, Enterprise, or Ultimate Editions SP2 (32 or 64-bit)
 - Any of the above running under VMWare ESX
 - Stratus with Windows Server 2008 SP2
- Microsoft Management Console 2.0

- MDAC 2.7
- Internet Explorer 6.0 or later
- 20 MB of free disk space

Note The InTouch History Importer is installed as part of a server installation.

Remote IDAS Requirements

A remote IDAS runs on all supported operating systems: domain member, standalone workstation, or server.

To determine the CPU and memory needed for a remote IDAS, use the same guidelines as for the Wonderware Historian computer. For more information, see "Server Requirements" on page 11.

The IDAS computer does not need to be quite as powerful as the server computer, because it will not be performing all of the same functions (for example, processing SQL Server transactions), but it should be powerful enough to handle the tag load that you expect.

The amount of free disk space required depends on whether or not you will have store-and-forward enabled for the IDAS. If store-and-forward is enabled, you need to make sure that the disk space on the remote IDAS computer is sufficient to store cached data if the network connection to the historian fails. Estimate the disk space requirements for a remote IDAS the same as for the historian. For more information, see "Disk Requirements for Historical Data Files" on page 20.

A remote IDAS configured for store-and-forward also has more stringent requirements on memory to ensure that the IDAS local storage engine has sufficient resources to run properly. In general, estimate memory requirements for a remote IDAS configured for store-and-forward the same as you would for a historian having the corresponding tag count.

Security Considerations for a Remote IDAS

If you set up a remote IDAS, you need to configure security settings that allow access permissions between the remote IDAS and the Wonderware Historian. For example, the historian needs to access the remote computer to start and stop the IDAS. Also, the remote IDAS needs to access the historian computer to send data. These are administrative tasks, which require administrative permissions.

When you install the historian, you must specify an administrative user account under which all of the historian services run. Make sure that this same user account is added to the Administrators security group on the remote IDAS computer. The existence of the same administrative user account on both computers allows the historian to access the remote IDAS, and vice versa.

Note A remote IDAS only requires the same administrative account to exist on the local computer and the historian. It is not necessary for you to log in to the remote IDAS computer using the administrator account.

After installing the historian, if you change the Windows login using the System Management Console, make sure that the user account change is reflected on the remote IDAS computer.

If you are running the historian in a domain environment (recommended), you can create the administrative user account on the domain controller and simply add the account to the Administrators group on the historian computer and the remote IDAS computer. Do not create a local user on any computer with the same name and/or password as this administrative user account.

If you are running a remote IDAS in a workgroup environment, there is no centralized management and authentication of user accounts (no domain controller). Create the same administrative user account on each individual computer running a historian component. For example, if you have a computer running the historian and plan to install remote IDASs on two other computers, create the user account (that is, matching usernames and passwords) on all three computers.

For information on workgroups, domains, creating user accounts, and adding accounts to the Administrators security group, see your Microsoft operating system documentation.

Disk Sizing and Data Storage

A number of storage-related questions must be answered when setting up the Wonderware Historian. They include:

- How important is the data? Is it acceptable that four weeks of data is stored online and is then over-written?
- How important is the configuration and event data? This type of information is stored in the Microsoft SQL Server database.
- How often is data in the Microsoft SQL Server database changing?
- Is anyone in the organization going to require operating data that is older than a month? Older than a year?
- How much is the SQL Server component of the historian expected to be used (for example, for the event system)?
- How long can the system be off-line in the event of a component failure?
- What happens if the system stops storing data?
- What happens if stored data is lost as a result of a hard drive failure?
- Can the server equipment be taken off-line to perform repairs?

Ask yourself questions like these to help you determine your disk space requirements and how you should plan to protect your data.

A performance report for different historian systems is provided in Appendix A, "System Sizing Examples."

General Hardware Recommendations for Storage

The following are general recommendations for the hardware used for storage:

- SCSI drives configured using hardware RAID is optimum. The disk space required is a function of data rate and the desired history duration.
- NTFS is the only officially supported file system for a production environment. Although the historian can run using the FAT file system, data corruption can occur if the system crashes while files are still open.
- Enable file compression for the historical data storage locations: Circular, Buffer, and Permanent. File compression on these directories is automatically set during the installation process. However, if you re-assign the storage locations (for example, for the alternate location), you must set the compression manually.

Note File compression is only available for the NTFS file system.

Planning for Disk Space Requirements

There are a number of factors to consider when estimating the amount of disk space required to run the Wonderware Historian:

- Disk space required to install the required software components and files needed to run the historian.
- Disk space required to store the historian database files.
- Disk space required to store the historical data files.
- If a remote IDAS is used, the disk space required on the local IDAS computer to store cached data if the network connection to the historian fails.
- We recommend that you keep sufficient free disk space (around 20%) so that you can run a disk defragmenting utility without negatively affecting the historian performance.

A performance report for different historian systems is provided in Appendix A, "System Sizing Examples."

Disk Requirements for Database Files

The Wonderware Historian installation program adds two databases to the Microsoft SQL Server: Runtime and Holding.

- The Runtime database stores all historian configuration data and event data. The information in the Runtime database is stored to disk as a database file named Run100dat.mdf. Its associated log file is Run100log.ldf.

The configuration data in the database file remains relatively static and usually never causes the file size to go above 20 MB. However, if you set up events, records of event detections and the results of any data summaries or snapshots increase the size of the Runtime database file because the tables are filling up. Also, entries are created in the log file for event-related transactions. If the database files are set to auto-size, the Runtime database file expands to accommodate event-related data until the hard drive is full.

- The Holding database temporarily stores tag definitions being imported from InTouch® HMI software. The information in the Holding database is stored to a database file named Holding100Dat.mdf. Its associated log file is Holding100Log.ldf.

Note Historical plant data is not stored in the database files. This type of data is stored in special files called history blocks.

The Runtime and Holding databases are set to automatically expand at a 10% rate (the default).

You cannot change these defaults during the installation. The databases can be resized later using Microsoft SQL Server utilities. For more information on sizing databases, see your Microsoft SQL Server documentation for guidelines.

Note If you are upgrading version 9.0 of IndustrialSQL Server historian, the installation program needs space to save a copy of the old Runtime database while it creates the new one. To upgrade, the database space required is twice the size of the old database, plus the database size for the new install.

Disk Requirements for Historical Data Files

The Wonderware Historian stores historical plant data to hard disk in special files called history blocks. When you install the historian, you are required to specify a storage location (directory) in which these files will be dynamically created and subsequently filled. You must have at least 200 MB of free disk space for these files to install the historian.

After the historian is up and running, when the free space on the drive containing the storage directory drops below a minimum threshold, the oldest data is overwritten. It is very important that you allocate enough disk space to store your plant data for the desired length of time.

The amount of data that can be stored to disk before running out of space is dependent upon the number of tag values that are stored and how often they are stored. That is, the more tags you have, the fewer values you can store *per tag* before you need to archive off the oldest data. Likewise, the higher the specified storage rate per tag, the faster the system runs out of space.

NTFS file compression can reduce the actual amount of storage space by factors of 2:1 to 10:1. For the estimates, a conservative "worst case" factor of 2:1 is used.

Important You must have sufficient disk space in the circular storage area to hold at least two full history blocks, plus the space specified for the minimum threshold for the circular storage area. Use the System Management Console to view or change the minimum threshold value.

A performance report for different historian systems is provided in Appendix A, "System Sizing Examples."

Analog, Discrete, and Fixed-Length String Storage Requirements

For analog, discrete, and fixed-length string (128 characters or less) tags, each value that is stored uses Storage Size + 3 bytes of disk space, plus approximately 15% overhead. Use the following formula to estimate the disk usage:

$$\text{Estimated disk usage per day} = (1.15 * (\text{Storage Size} + 3) * \text{number of tags}) * (60 / \text{storage rate in seconds}) * 60 \text{ minutes} * 24 \text{ hours} / (\text{NTFS compression ratio})$$

For example, the disk usage per day for 10,000 4-byte analog tags (that is, Storage Size = 4 bytes) that are stored at ten-second intervals would be

$(1.15 * (4+3) * 10000) * (60/10) * 60 * 24 / 2$, which is approximately 332 MB per day.

The disk usage per day for 10,000 discrete tags (that is, Storage Size = 1 byte) that are changing, on average, every 60 seconds would be $(1.15 * (1+3) * 10000) * (60/60) * 60 * 24 / 2$, which is approximately 32 MB per day.

The disk usage per day for 10,000 8-byte string tags (that is, Storage Size = 8 bytes) that are changing, on average, every 60 seconds would be $(1.15 * (8+3) * 10000) * (60/60) * 60 * 24 / 2$, which is approximately 87 MB per day.

Variable-Length String Storage Requirements

For strings of variable length that are 128 characters or more, the number of bytes required for storage will be the actual number of characters being sent from the data source + 5 bytes, plus 15% overhead. Therefore, the average disk usage per day for a variable-length string that is receiving an average of 'N' characters per sample could be calculated using the following formula:

$$\text{Estimated average disk usage per day} = (1.15 * (N+5) * \text{number of tags}) * (60 / \text{average storage rate in seconds}) * 60 \text{ minutes} * 24 \text{ hours} / (\text{NTFS compression ratio})$$

For example, the disk usage per day for 10,000 131-byte string tags that are changing, on average, every 60 seconds and the average incoming value is 60 characters in length would be $(1.15 * (60+5) * 10000) * (60/60) * 60 * 24 / 2$, which is approximately 513 MB per day.

The use of variable-length strings also has an impact on memory. For more information, see "Automatic Resizing of the Active Image" in Chapter 5, "Data Storage Subsystem," in your *Wonderware Historian Concepts Guide*.

Performance Considerations

For a complete Wonderware Historian system, the following components put a demand on memory.

- Internal historian subsystems, such as the Configuration Manager, data acquisition, and data storage
- The associated Microsoft SQL Server
- The operating system
- Client access (data retrieval), which includes caching

When determining the amount of memory to purchase, remember that adding more memory is the cheapest and easiest thing that you can do to improve performance. Increasing the amount of memory reduces the amount the server has to use virtual memory, thus lowering the load on the storage subsystem. Even if you have a large amount of memory, additional memory is used as additional disk cache, speeding up disk access and therefore file service. Also, processes needed by the server become faster because they are memory-resident.

A major factor in system performance is the amount of plant data you anticipate storing in the system, including considerations about how often that data is stored and retrieved. In general, the more you store, the more often you store it, and the more you retrieve it, the slower the system. Major storage factors affecting the performance of the system are:

- Effective analog flow rate (analog updates per second).
- Period of online data storage required.
- Effective discrete variable flow rate.
- Number of concurrent end users required.
- Complexity of end user queries.
- Number and size of string tags, as well as the effective flow rate of string values.
- Number and duration of string tag retrieval queries, as well as the frequency at which these queries are executed.

A performance report for different historian systems is provided in Appendix A, "System Sizing Examples."

Server Loading

When a user connects to the Wonderware Historian with a client, configuration information is immediately requested from the historian. This information includes the tags that the server is storing, their descriptions, engineering units, and other tag data. SQL Server reads this information from the database (stored on disk) and places it in memory.

As the user selects time periods to trend, for example, the historian reads data from files located on the disk and prepares the results of the client's data request to be transmitted back to the client. The ability of the server to quickly handle subsequent requests for data from the same client and others is dependent on the server's ability to keep as much information in memory without having to again access data from the disk.

As a higher load is placed for memory, a higher load is placed on the disk I/O system as the server has to use disk caching and read from the data files.

The following table summarizes the loading for various systems.

System	Load Description
Acquisition and storage	Base load of the historian. This load exists as long as the system is running. However, this load is not affected by client activity.
Retrieval	Variable loading caused by data retrieval from client applications. When the client initially connects, the data requested is configuration data, which is stored in SQL Server. The historian requests data from SQL Server, causing its loading to increase. As the client requests historical data, the disk time increases as information from the data files is transferred to memory. This continues as the client requests additional data. If the client application requests data that has already been transferred to memory, there is no associated disk activity and transfer of data to memory.

The server must be able to adequately handle the variation on loading caused by the client applications. To accomplish this, make sure that your hardware is sized so that it can handle the base load created by the acquisition and storage systems and that there are adequate resources still available for the retrieval system.

IDAS Performance

An IDAS can acquire an unlimited number of real-time data values, from an unlimited number of I/O Servers, each with an unlimited number of topics. However, IDASs are subject to the following limitations.

- The maximum sustained data throughput for any single IDAS is 30,000 items per second for real-time data. For late or old data, the maximum throughput is 9,000 items per second. The total combined throughput (real-time data plus late or old data) cannot exceed 30,000 items per second. For higher-volume applications, you can set up multiple IDASs to serve a single storage subsystem.
- The size of any data value is limited to 64,000 bytes.
- The maximum number of tags supported by any single IDAS is 30,000.

Tiered Historians

If you are installing a tiered historian, tier 1 nodes use the same basic configuration for the number and types of tags and data collection rates.

The tier 1 configuration should be “delta” data collected and stored:

- 12,000 analog tags every 2 seconds
- 2,900 discrete tags every 2 seconds
- 100 32-character string tags every 30 seconds

For the analog and discrete tags, the averages and value state aggregates are:

- 6000 tags with an hourly calculation performed at the top of each hour
- 6000 tags with 1-minute calculations performed at the top of each minute

plus

- 1500 tags replicated (not aggregated) in tier 2
- 1500 tags stored only in tier 1 (no aggregates or replication)

Storage Subsystem Performance

The storage subsystem can support a continuous data acquisition rate of 30,000 updates per second. The storage sub-system also supports a burst rate of 60,000 updates per second for up to 1 second.

The storage subsystem processes all real-time data as a high-priority task that is never interrupted. However, data received from "manual" methods (such as UPDATE/INSERT commands, CSV file imports, or store-and-forward) is handled by a low priority task. If the system is generally busy, then it may take some time for the manual data to be posted.

Networking Recommendations

The Wonderware Historian is a highly configurable package that can be set up in many different ways depending on your needs.

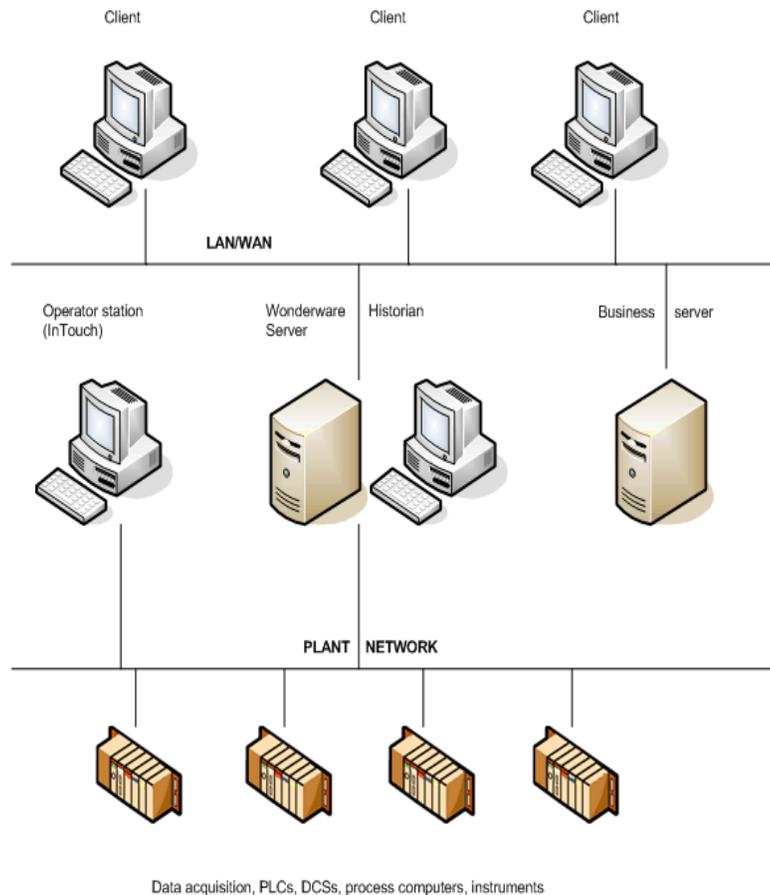
The historian can use any protocol currently supported by Microsoft SQL Server 2008. You can use the default Microsoft SQL Server 2008 protocol (named pipes) with TCP/IP. TCP/IP is required if SuiteLink™ is used.

Note If the historian is running on the Windows Server 2003 or later operating system, DDE is not supported.

It is highly recommended that you run the historian on a dedicated computer. For example:

- Do not use the historian computer as a domain controller, mail server, or an Internet server.
- Do not use the historian computer as a workstation.
- Do not use the historian computer for InTouch HMI software, InControl™, or other Wonderware products.

Generally, it is recommended that you split the process and IS networks to ensure that the process network does not become overloaded. The following illustration shows one possible network architecture where the historian is the link between the process network and the business LAN/WAN:



For this architecture, install two network cards on a server computer and configure them to segment the IS network from the process network.

Note All tags to be stored in historian are on "advise" all of the time. This may cause heavy load conditions on the process network. Before you install the historian, investigate the possible load impact of installing the historian on your network.

Client Access

All clients should connect to the Wonderware Historian using the default Microsoft SQL Server connection. Usually, this means using the name of the computer on which the historian is running as the server name when logging on.

Client Connections to the Wonderware Historian

The Wonderware Historian and its clients consume both Windows operating system connections and SQL Server connections in the following ways:

- **Wonderware Historian:** When the historian itself is running without the event subsystem, it uses six database connections and zero Windows connections.
- **System Management Console:** Each open System Management Console consumes one database connection, and each remote System Management Console also consumes a Windows connection.
- **Event System:** Each different time interval for event tags uses a database connection and zero Windows connections. For example, if there are 15 event tags with time interval of 30 minutes, and 10 event tags with an interval of 60 minutes, that consumes two connections. The event subsystem uses zero Windows connections.
- **Local IDAS:** Consumes no connections.
- **Remote IDAS:** Each remote IDAS uses one Windows connection and zero database connections.
- **Wonderware Application Server Platform:** A platform configured to historize data consumes a Windows connection and a database connection.
- **Wonderware Application Server Engine:** Each Engine configured to historize data will consume a database connection.
- **Historian Client applications and controls:** Each Historian Client application or control consumes a database connection for each specified server, and each remote node consumes a Windows connection.

Certain versions of the operating system and SQL Server impose connection limits or workload limits. For more information, see "Client Connection and Workload Limits" on page 28.

Client Connection and Workload Limits

Small historian applications can use an Wonderware Historian that is running on Windows XP Professional. However, only small applications are supported because of the performance limitations imposed by the operating system and by Microsoft SQL Server.

- Operating System Limitations

Microsoft limits the number of concurrent client connections to the "desktop" versions of their operating systems. For Windows, a "connection" is access to any service on the computer (for example, file sharing, print services, Terminal Services, remote access, authentication, and any connection through a named pipe). These connections are specific to the client computer, so if NodeA is accessing print services and a shared directory on NodeB, that counts as a single connection to NodeB.

The Windows XP Professional operating system rejects all connections above the 10-connection limit. More details on this limitation are available in Microsoft Knowledge Base article 314882.

Network Protocols for Clients

To change the default network protocol used by Microsoft SQL Server to something other than named pipes, configure the client network access using the SQL Server Client Network Utility. For more information, see your Microsoft SQL Server documentation.

Licensing

The Wonderware Historian requires a valid license to run. Use the ArchestrA License Utility to manage licenses and associated feature lines.

The historian allows functionality based on the presence of a valid license file and/or feature lines. The historian checks that:

- A valid license file exists at the expected location on disk.
- One or more feature lines relevant to the product is contained in the license file. A feature line defines specific behavior that is allowed for the product. Typically, feature lines are bundled together according to pre-defined licensing schemes.

If a valid license file cannot be found, or if the file does not contain the appropriate feature lines, the historian is considered to be unlicensed. If unlicensed, the historian starts up and runs for an unlimited period of time. However, data is only collected and stored for system tags.

The historian reads the license file and appropriately updates the system behavior when:

- The historian starts.
- You commit changes to the system using the System Management Console.
- You refresh the license information using the System Management Console.

Unless otherwise noted, all aspects of historian licensing are dynamic. That is, you can make licensing changes during runtime, and the system runs interrupted.

The following feature lines are available:

- Historian_Tagcount Feature Line
- Historian_ServerOS Feature Line
- Historian_RemoteIDASCount Feature Line
- Historian_ModifyHistoryData Feature Line
- Historian_HistoryDuration Feature Line
- Historian_Processors Feature Line

Use the System Management Console to view license and feature line information relevant to the historian. For more information, see "Viewing License Information" in Chapter 9, "Viewing or Changing System-Wide Properties," in your *Wonderware Historian Administration Guide*.

Historian_Tagcount Feature Line

The `Historian_Tagcount` feature line specifies the number of tags for which the Wonderware Historian acquires and stores data. The tag count feature line does not restrict the number of tag definitions you can create in the database, just the tags for which data is acquired and stored. System tags and event tags are not included in the tag count.

If this feature line is absent, or if no license file is found, tag count defaults to 0.

For a licensed tag count of n , the historian recognizes only the first n non-system tags it reads from the database, in whatever order the database presents the tags to the Wonderware Historian Configuration service. For example, if you have a licensed tag count of 500, only the first 500 non-system tags are licensed for data collection and storage.

If the tag count feature line in the license file changes, the run-time behavior of the historian does not change until you refresh the license information or a system restart occurs. If the tag count is increased, the historian starts acquiring and storing data for the additional tags, if they exist in the database. If the tag count is decreased, the historian stops acquiring and storing data for all tags except for the system tags and the first n tags in its list, where n denotes the tag count.

Historian_ServerOS Feature Line

The `Historian_ServerOS` feature line controls whether the installed version of the Wonderware Historian is licensed to run on one of the following Microsoft server operating systems:

- Windows Server 2003 Enterprise R1/R2 SP2
- Windows Server 2003 Standard Edition R1/R2 SP2
- Windows XP Professional SP3
- Windows Server 2008 Standard or Enterprise Editions SP2 (32 or 64-bit)
- Windows Vista Business, Enterprise, or Ultimate Editions SP2 (32 or 64-bit)
- Any of the above running under VMWare VSX, Server version 3.5
- Stratus with Windows 2003 Server SP2

If the historian is installed on a server operating system, and this feature line is present in the license file, the historian runs with full functionality as defined by the other feature lines in the license file. If the feature line is not found, the behavior is the same as for the regular version of the historian running as unlicensed.

Historian_RemoteIDASCount Feature Line

The Historian_RemoteIDASCount feature line controls the maximum number of remote IDASs that can be used by the historian. The remote IDAS count feature line does not restrict the number of remote IDAS definitions you can create in the database.

If this feature line is 0, then there is no limit on the number of remote IDASs. If the remote IDAS count feature line does not exist, or if the license file is not found, no remote IDASs are allowed.

If the remote IDAS count is n , the historian uses the local IDAS, plus the first n remote IDASs defined in the historian database. The local IDAS is identified as the IDAS having the same computer name as the historian computer. For example, if the feature line is equal to 2, then the local IDAS and the first two defined remote IDASs are used. Any remaining remote IDASs defined in the database (plus all I/O Servers, topics, and tags associated with these IDASs) are ignored. Information pertaining to an unlicensed remote IDAS (including corresponding I/O Servers and topics) does not appear in the System Management Console.

The tag count feature line is applied after the remote IDAS feature line. If the license file allows all remote IDASs defined in the database to be used, but not all of the tags in the database, the historian uses all IDASs, including their associated I/O Servers and topics, but only acquires and stores data for the allowed number of tags.

If the remote IDAS count feature line in the license file changes, the runtime behavior of the historian does not change until you refresh the license information or a system restart occurs. If the remote IDAS count is increased, the historian starts acquiring and storing data from the additional remote IDASs, if they exist in the database. If the remote IDAS count is decreased, the historian stops acquiring and storing data for all tags assigned to defined remote IDAS $n+1$ and higher, where n denotes the remote IDAS count.

For the IDAS failover feature, the remote IDAS count is applied as follows:

- The local IDAS is counted only once, even if it has a failover node configured. At runtime, the failover IDAS (which must be on a remote node), does NOT run unless a valid license for at least one remote IDAS is present.
- Each remote IDAS configured in the database is counted only once, even if it has a failover node configured.

Historian_ModifyHistoryData Feature Line

The `Historian_ModifyHistoryData` feature line controls whether history data modifications are allowed.

The data modification feature line controls whether you can modify history data via SQL queries (inserts or updates) and CSV file imports (both normal CSV imports and "fast load" CSV imports).

- If the feature line is present, all CSV file import operations, as well as SQL inserts and updates, are permitted.
- If the feature line is not detected, all attempted operations involving SQL inserts and updates and CSV file imports (including `FastLoad`) are not allowed.

If disallowed, SQL insert queries and update queries return an appropriate message to the client stating that the license excludes this functionality. For CSV file imports and fast load file imports, a warning message is logged when a file is first placed in the historian import folder. The warning message states that the license excludes this functionality.

Historian_HistoryDuration Feature Line

The `Historian_HistoryDuration` feature line controls the maximum number of days in history, starting with the current day, for which data can be retrieved from the Wonderware Historian. For example, if the history duration is 50, you can only retrieve data that was stored during the last 50 days.

If this feature line is 0, then there is no limit on retrieving data. If this feature line is missing, the default is seven days.

If you attempt to retrieve data for a period of time starting before the earliest time indicated by this feature line, the start time for the data retrieval is reset to the earliest time allowed by the feature line.

This feature line has no impact on data storage in the Wonderware Historian.

Historian_Processors Feature Line

The Historian_Processors feature line controls the maximum number of processors (CPUs) allowed in the Wonderware Historian computer. This feature line has no impact on the operation of remote IDASs or other remote clients of the historian.

If this feature line is absent, a maximum of one processor is assumed.

If the actual number of processors in the historian computer is less than or equal to the number of processors specified in the feature line, the historian is considered to be licensed.

Hyperthreaded CPUs are not supported and not recommended. If the historian computer is using hyperthreaded CPUs, each hyperthread is included in the processor count and may cause licensing violations. For example, on a system with dual hyperthreaded CPUs, the Historian_Processors feature line must be 4 or more. To disable hyperthreading, use the computer BIOS setup program.

Support for Non-English Operating Systems

The English version of Wonderware Historian, the Wonderware Historian Database Export/Import Utility, and the InTouch History Importer run on the Windows 2003 Server operating system for the following languages. Also, the corresponding version of Microsoft SQL Server for the required language must be used.

- German
- French
- Japanese
- Simplified Chinese

The following entities are not supported in double-byte languages:

- Domain names, user names, and passwords (including SQL Server login names and passwords).
- Names of I/O Server host machines, I/O Server application names, topic names, and item names.
- Any text associated with licensing.

Integration with Other Wonderware Products

The Wonderware Historian is Wonderware's open relational database for plant and process data. Many of the features of the historian allow it to be used with many of Wonderware's other products.

The historian can store data from any application that supports DDE or SuiteLink™. Examples of Wonderware applications that can send data to the historian are Wonderware Application Server, I/O Servers, and InTouch® WindowViewer™.

Note If the historian is running on the Windows Server 2003 or later operating system, DDE is not supported.

Any client application that can retrieve information using SQL can retrieve data from Wonderware Historian. For example, some Wonderware products that can retrieve data by means of SQL queries are the InTouch HMI, Wonderware Information Server, Historian Client applications and controls, SPCPro, Manufacturing Execution Module, and InBatch™ products. The historian further extends SQL to improve the ability to handle time series data.

Also, Wonderware Historian I/O Server (aahIOSvrSvc.exe) is an interface for clients to access current data values a historian by means of the SuiteLink protocol. The Wonderware Historian I/O Server can update items with current values for given topics, providing "real-time" I/O Server functionality.

Finally, you can use InTouch to configure the historian by importing tag definitions and I/O Server definitions from the InTouch Tagname.x file into the Runtime database.

Antivirus Software

After installing the Wonderware Historian, configure your antivirus software to prevent archive files from being scanned. Also, antivirus software should not scan files in the following ArcestrA folders (ensure subfolders of the listed directories are also excluded):

```
c:\Historian\Data\*.*
c:\InSQL\Data\*.*
c:\Program Files\ArcestrA\*.*
c:\Program Files\Wonderware\*.*
c:\Program Files\Common Files\ArcestrA\*.*
c:\Program Files (x86)\ArcestrA\*.*
c:\Program Files (x86)\Wonderware\*.*
c:\Program Files (x86)\Common Files\ArcestrA\*.*
c:\Documents and settings\all users\application
data\ArcestrA\*.*
```

<SMC Logger Storage file path>. The default is:

```
C:\Documents and Settings\All Users\Application
Data\ArcestrA\LogFiles\
```

SQL Server database files of type:

```
.mdf
.ldf
```


Chapter 2

Installation

A complete Wonderware Historian system consists of the following software components:

- Microsoft SQL Server
- Historian program files, database files, and history data files
- System Management Console, the configuration and control tool
- One or more local or remote IDASs (at least one must be defined)
- Wonderware Historian documentation.

You should have a definite plan for implementing the historian in your plant environment before you start the installation process. This plan should include the type of network architecture for the historian system, considerations for how much disk space is required for data storage, and the amount of space required for the historian database files and log files.

Also, any administrative security accounts that you specify for either the Microsoft SQL Server or the historian should be accounts that do not change often, if ever. In particular, do not change an administrative password during any part of the installation process.

Note You must have administrative rights on the local computer to install the historian. The account you log on to the computer with must also be a sysadmin for the SQL Server or else you must be able to provide a sysadmin account for the SQL Server when prompted for it during the installation. For SQL Server 2008, computer administrators are not automatically added as SQL Server sysadmins by default.

The installation program detects any previous versions of the historian and notifies you of your migration options.

Microsoft SQL Server Installation

The required version of Microsoft SQL Server must be installed and running before you can install the Wonderware Historian. A Microsoft SQL Server installation CD is included in your historian package.

Configure the following Microsoft SQL Server options before installing the historian. If you already have Microsoft SQL Server installed, you can run the Microsoft SQL Server setup program to change these options. Microsoft SQL Server options should only be configured by a qualified Windows or SQL Server administrator. For more information, see your Microsoft SQL Server documentation.

- Microsoft SQL Server 2005 or 2008 is required.
- Microsoft Client Utilities must be installed.
- The historian must run with the Microsoft SQL Server default instance name (that is, the computer name).
- Make sure that the x86 option is selected from the Options panel before installing SQL Server. If SQL Server is installed as a native 64-bit application, it won't work with Wonderware Historian.
- During the Database Engine Configuration step of the SQL Server 2008 installation, be sure to add the ArcestrA user account and/or the local Administrators group as authorized users.
- Remote Microsoft SQL Servers are not supported by the historian.

- For networking support, use named pipes and any other support required at your site. However, you must select at least named pipes and TCP/IP sockets (the defaults). It is highly recommended that you do not modify the default configuration for named pipes and TCP/IP sockets.
- As you select the path to the data files, keep in mind that the historian Runtime database will grow, especially if you will be using the event subsystem (including summaries) or storing data in the ManualAnalog, ManualDiscrete, or ManualString tables.
- The Microsoft SQL Server services should be installed using the local system account. The account you specify should be an account that does not change often, if ever.
- For obvious security reasons, you should **not** use a blank **sa** password for Microsoft SQL Server.
- Both case-sensitive and case-insensitive SQL Servers are supported. However, you should avoid mixing case-sensitive collations in tiered historian topologies.
- The SQL Server e-mail functionality requires a Windows domain user account. You can change the service account after SQL Server is installed. However, it is highly recommended that you use an account for which the password does not change often. For more information on SQL Server e-mail, see your Microsoft SQL Server documentation.

About the Wonderware Historian Installation

The Wonderware Historian installation is performed in two phases. In the first phase, the installation program performs the following operations:

- Deploys the common components, such as SuiteLink and the License Viewer, unless they are already installed and validated.
- Locates a running Microsoft SQL Server 2005 or 2008 on the local computer.
- Logs on to the installed Microsoft SQL Server using the account of the person who is currently logged on. This account must be an administrative account on the local computer.
- Checks for required disk space based on the features that you select.
- Creates the historian directories on the hard disk, installs program files for the selected features, and registers components. For more information, see "Wonderware Historian Installation Features" on page 41.
- Populates the historian program or startup group with icons.

The Database Configuration Utility automatically runs after the historian program file installation is complete. This utility:

- Creates and/or configures the required databases.
- Creates the directory for the history data files (history blocks).

To install the Wonderware Historian for use in a tiered historian environment, install the Wonderware Historian on each of the individual computers, then implement them as described Chapter 7, "Managing and Configuring Replication," in your *Wonderware Historian Administration Guide*.

Wonderware Historian Installation Features

The Wonderware Historian installation program allows you to install some of the system features separately. The following table describes the various historian features that can be installed. The online help is installed with all of the features.

For information on hardware and software requirements for installing any of these features, see Chapter 1, "Requirements and Recommendations."

Feature	Description
Wonderware Historian	Installs or re-installs the historian, configuration tools and utilities, a local IDAS, and ActiveEvent.
IDAS	An IDAS, which can be used remotely. The IDAS is always installed if you select to install a complete historian.
Configuration Tools	The server management tools include Wonderware Historian Configuration Editor and Wonderware Historian Management Console. Both of these applications are MMC snap-ins that are contained in the System Management Console. These tools are always installed on the same computer as the historian and can also be installed on a different computer on the network. The Wonderware Historian Database Export/Import Utility is also an installed configuration tool.
ActiveEvent	ActiveEvent is an ActiveX control that allows you to notify the historian event system when an event has occurred in another application, such as InTouch HMI software.

Installing the Wonderware Historian Program Files

Use the Wonderware Historian installation program to install the entire system or any of the features. It is assumed that you are familiar with the installation options.

Note You must have administrative rights on the local computer to install the historian. The account you log on to the computer with must also be a sysadmin for the SQL Server or else you must be able to provide a sysadmin account for the SQL Server when prompted for it during the installation. For SQL Server 2008, computer administrators are not automatically added as SQL Server sysadmins by default.

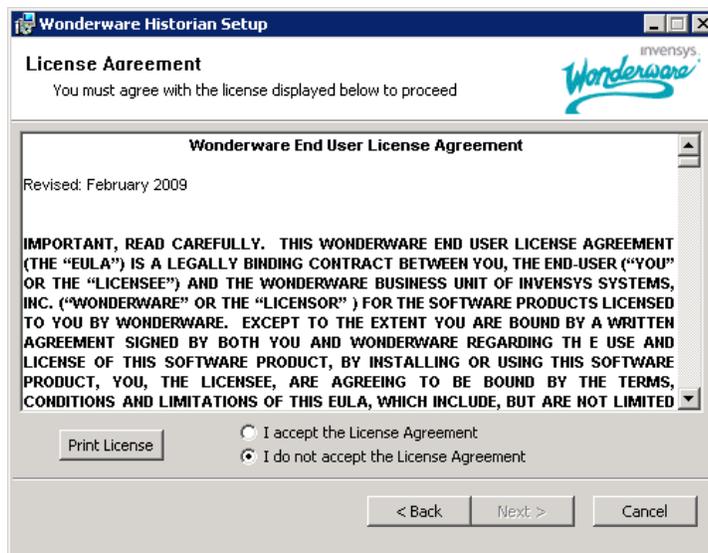
To install the historian program files

- 1 Be sure that the Microsoft SQL Server is working properly before you start the installation.
- 2 Insert the Wonderware Historian CD into your CD-ROM drive. If the setup program does not automatically run, double-click Setup.exe in the root directory of the CD.

Important You must run the installation procedure using setup.exe rather than the .msi file. This avoids some versions of Windows from failing by being unable to start Microsoft SQL Server.

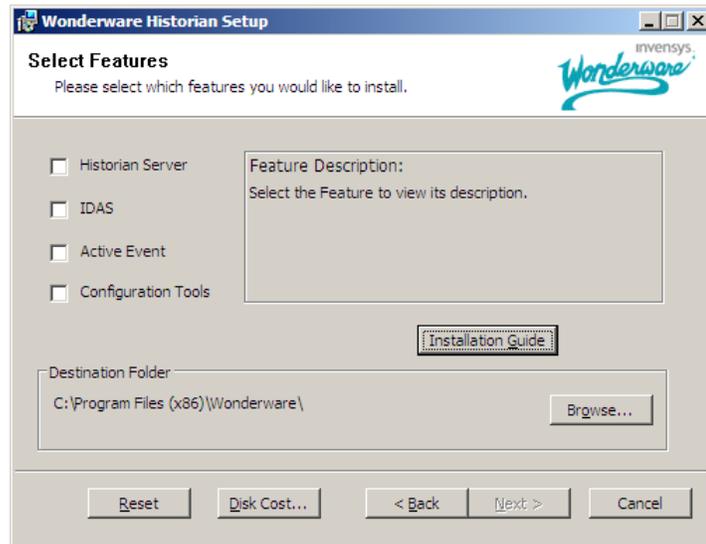
The **Welcome** dialog box appears.

- 3 Click **Next**. The **License Agreement** dialog box appears.



Be sure that you understand the license agreement before installing. You cannot continue with the installation without consenting to the agreement.

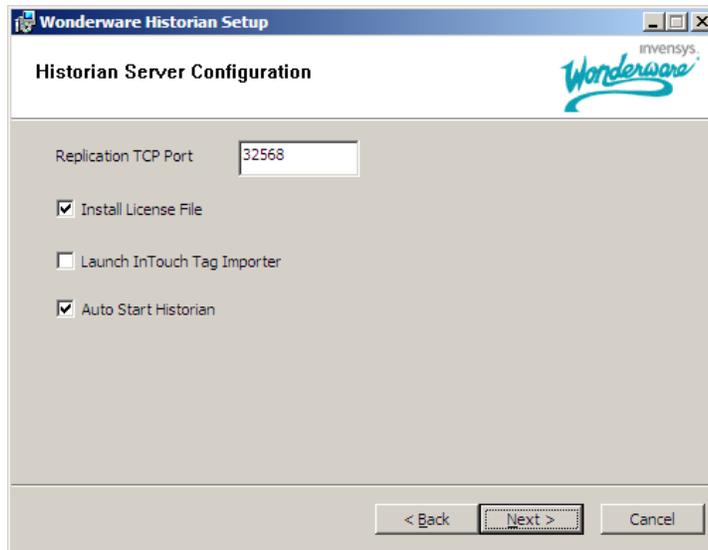
- 4 To print the license agreement, click **Print License**.
- 5 If you accept the terms of the license agreement, click **Yes**. The **Select Features** dialog box appears.



- 6 Select the features to install. For more information, see "Wonderware Historian Installation Features" on page 41.
- 7 Click **Browse** to specify a different directory for the historian program files.
- 8 To check the amount of disk space required for the installation, click **Disk Cost**.

Note If you do not have the required prerequisites for the feature(s) that you want to install, the **Prerequisite Software** dialog box appears. Click **Exit Install** to cancel the Wonderware Historian installation, install the prerequisite(s), and then start the Wonderware Historian installation again.

If you have the required prerequisites installed, or if you click **Next** on the **Prerequisite Software** dialog box, the **Historian Server Configuration** dialog box appears.



9 Enter server configuration information.

Replication TCP Port

If you are configuring a tiered historian server, enter the port number for tag replication between the tier 1 and tier 2 servers. You must enter the same port for all the tier 1 and tier 2 systems working together in the tiered configuration. The port you specify is added to the exclusions list of Windows Firewall.

Install License File

Install the new license file for Wonderware Historian.

Launch InTouch Tag Import

Launch the InTouch tag importer when the installation is complete.

Auto Start Historian

Automatically starts Wonderware Historian.

- 10 Click **Next**. If the Wonderware Historian is the first ArcestrA application to be installed on the computer, the **User Name and Password** dialog box appears. If not, skip to Step 12.

Wonderware Historian Setup

User Name and Password
 Setup the user name and password needed for off node communications.

Please enter a user name and password needed for off node communications. The install can optionally create a local Admin user with these credentials. Remember to use the same user name and password while setting up machines that will communicate with each other.

Domain/Local Machine: SATURN

User Name:

Password:

Confirm Password:

Create Local Account

< Back Next > Cancel

- 11 Enter logon parameters for the ArcestrA user account. This account must have administrative rights on the computer. This account must also have security privileges to start and stop services and to access the network.

Domain/Machine

Name of the domain in which the user account will be validated. If you are not using a domain configuration, enter the computer name.

Important Do not install Wonderware Historian on a computer named INSQL, as this conflicts with the name of the Wonderware Historian OLE DB provider and will cause the installation to fail.

User Name

User name for the logon account.

Password

Password for the logon account.

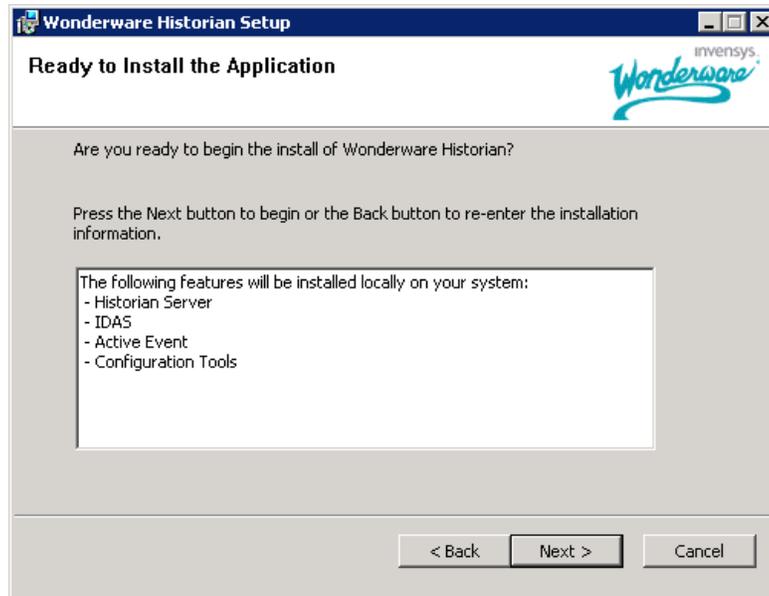
Confirm Password

(same as password)

Note To change the ArcestrA user account after installation, use the **Change Network Account** utility.

Click **Create Local Account** to have a new account created that uses the credentials you have provided.

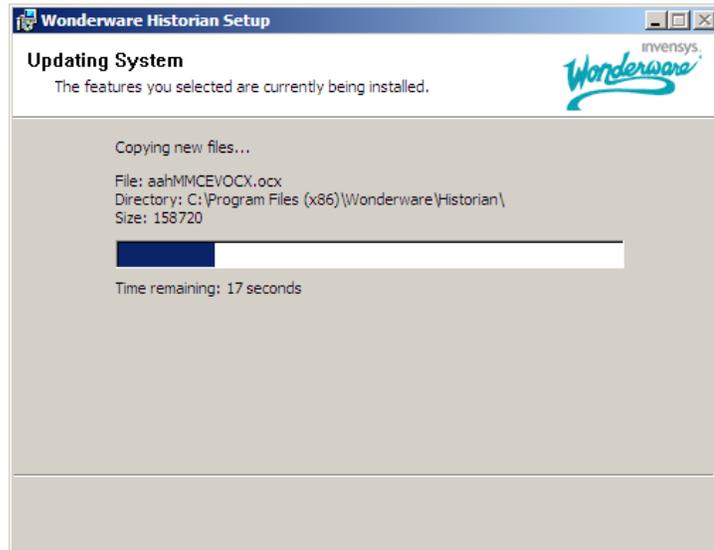
- 12 If the Wonderware Historian was not the first Archestra application to be installed on this computer, or if you clicked **Next** on the **User Name and Password** dialog box, the **Ready to Install the Application** dialog box appears.



Note If you click **Next**, you cannot go back and change any of the installation settings during this instance of setup.

- 13 If you are installing the historian on the Windows XP Professional SP3 or Windows 2003 SP2 operating system, select the **Launch OSConfiguration Utility** check box. The OS Configuration Utility modifies the security settings of the all supported operating systems to allow Wonderware products to operate. This utility does not have a user interface.

- 14 Click **Next** to start the installation. The **Updating System** dialog box appears.



When all of the files are copied, the final dialog box appears.

- 15 Click **Finish**.

After the historian installation program completes, the database Configuration Utility is automatically launched. For information on using this utility, see "Configuring Databases and Data File Locations" on page 47.

The installation program does not log any errors that may occur.

Configuring Databases and Data File Locations

Use the database Configuration Utility to configure locations for the Wonderware Historian database and data files. This utility also creates the required historian databases and makes any needed changes to the Microsoft SQL Server databases.

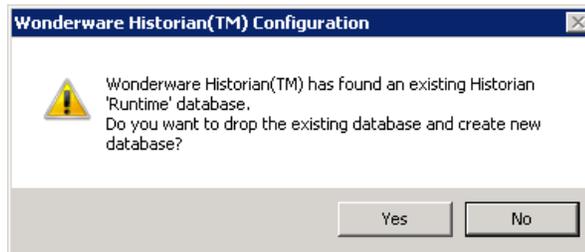
The utility automatically starts at the end of the historian program file installation. You can also start the utility at any time by running the aaHistorianCfg.exe file located in the *<installation path>*\Wonderware\Historian folder.

Any of the supported versions of Microsoft SQL Server must be installed and running on the local computer. The Configuration Utility connects to the SQL Server using Windows authentication.

Note You must have administrative rights on the local computer to install the historian. The account you log on to the computer with must also be a sysadmin for the SQL Server or else you must be able to provide a sysadmin account for the SQL Server when prompted for it during the installation. For SQL Server 2008, computer administrators are not automatically added as SQL Server sysadmins by default.

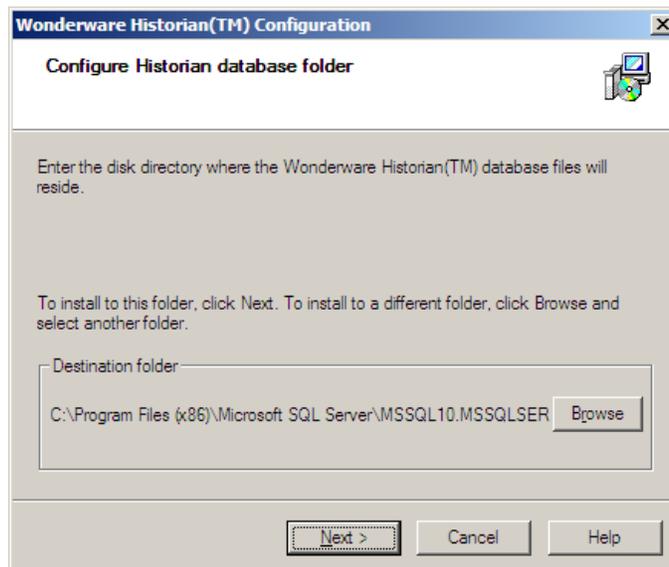
To configure the databases and data file folders

- 1 Run the Configuration Utility. The utility checks for an existing Runtime database. If found, a confirmation dialog box appears.



- 2 If you click **No**, the existing Runtime database is used, as well as the existing folder location for the history files. Skip to Step 6.

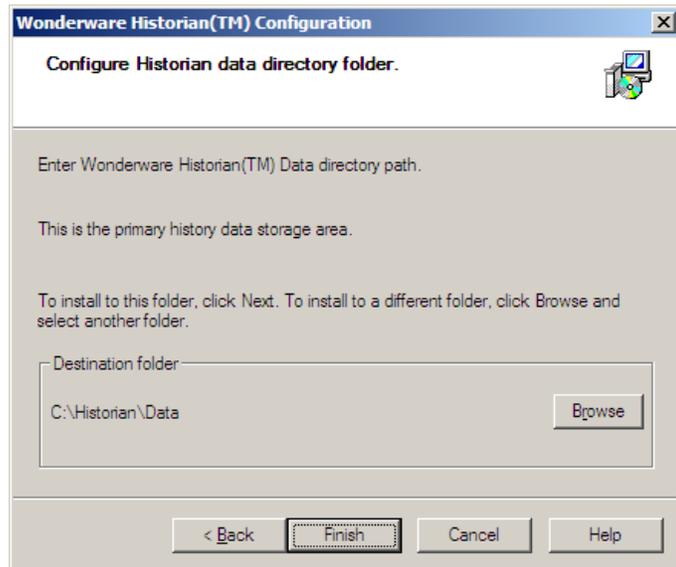
Click **Yes** to delete the existing Runtime database and create a new Runtime database. The **Configure Historian database folder** dialog box appears.



- 3 Click **Browse** to specify a different directory to which to install the historian database files.

Unless you have specific requirements, keep the default SQL Server database path. This is the path where the configuration database are deployed.

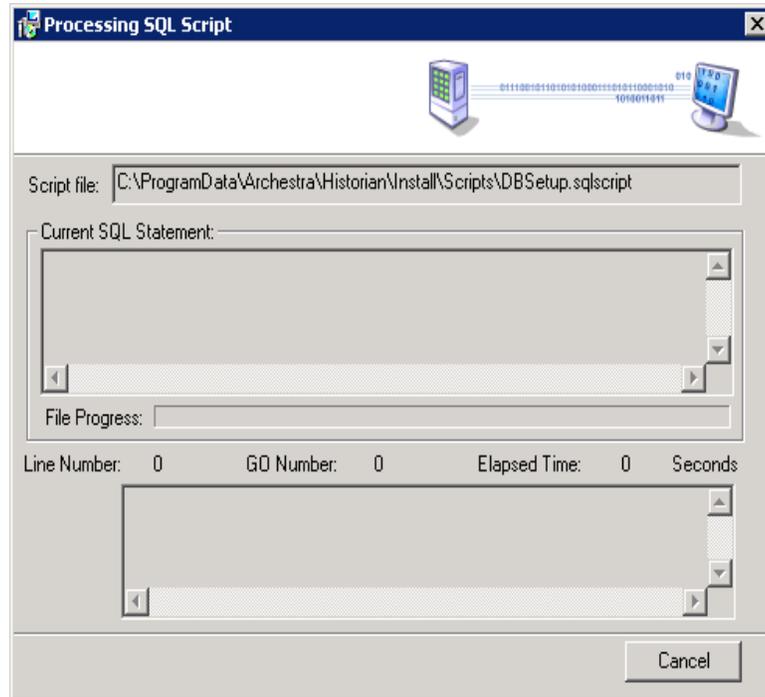
- 4 Click **Next**. The **Configure Historian data directory folder** dialog box appears.



- 5 Click **Browse** to specify a different directory for the historian history data files.

Be sure that you have a sufficient amount of available space on the drive you specify, as this is where the plant data will be stored.

- 6 Click **Finish**. The **Processing SQL Script** dialog box appears, in which you can see the historian database configuration scripts running. Multiple scripts run during the configuration.



- 7 Click **Finish**. You may be required to restart the computer.
- 8 Read the ReadMe file before using the historian.
The Database Configuration utility logs selected options and outputs messages to the following location:

```
..\Documents and Settings\All Users\Application
Data\Archestra\Historian\Install\HistorianCfg.txt
```

Testing the Installation

Test the Wonderware Historian installation to make sure that everything is installed correctly and is working properly.

To test the installation

- 1 Start the historian.
- 2 Start the storage system and check to see that the system is receiving data from the system tags.

After the historian is installed, no additional configuration is required to run client tools against the server using named pipes. However, you may want to change the system or server configuration using the System Management Console.

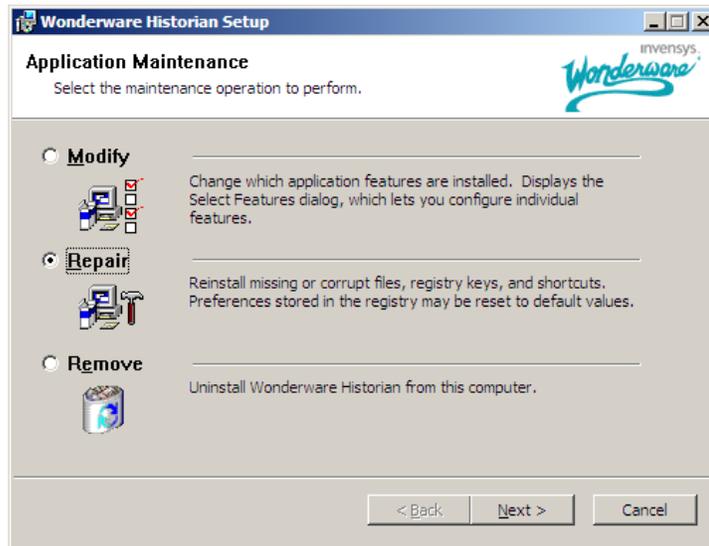
Repairing the Wonderware Historian

For a repair, the installation program automatically detects if you have an existing copy of the Wonderware Historian on your computer and then reinstalls missing or corrupt program files, registry keys, and shortcuts.

To repair a database, use the Database Configuration Utility. For more information, see "Configuring Databases and Data File Locations" on page 47.

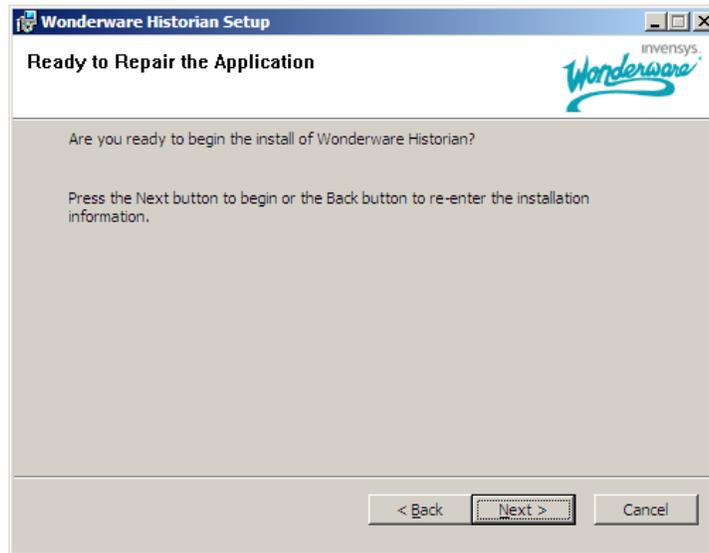
To repair the Wonderware Historian

- 1 Insert the Wonderware Historian CD into your CD-ROM drive. If the setup program does not automatically run, double-click Setup.exe in the root directory of the CD. The **Welcome** dialog box appears.
- 2 Click **Next**. The **Application Maintenance** dialog box appears.



- 3 Click **Repair**.

- 4 Click **Next**. The **Ready to Repair the Application** dialog box appears.



- 5 Click **Next**. The **Updating System** dialog box appears, indicating the progress of the repair operations.
When the repair is complete, the final dialog box appears.
- 6 Click **Finish**.

Modifying the Wonderware Historian Installation

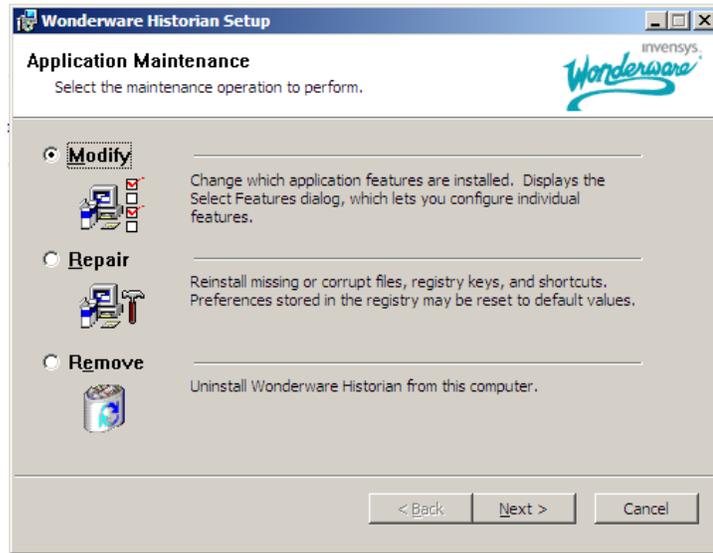
You can modify which Wonderware Historian features are installed.

To modify the disk directories for the database files and/or the history data files (history blocks), use the Database Configuration Utility. For more information, see "Configuring Databases and Data File Locations" on page 47.

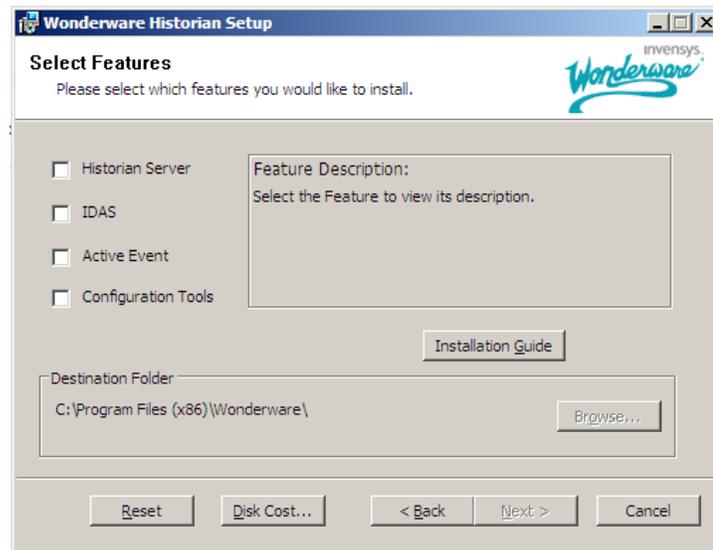
To modify the Wonderware Historian installation

- 1 Insert the Wonderware Historian CD into your CD-ROM drive. If the setup program does not automatically run, double-click Setup.exe in the root directory of the CD.
The **Welcome** dialog box appears.

- 2 Click **Next**. The **Application Maintenance** dialog box appears.

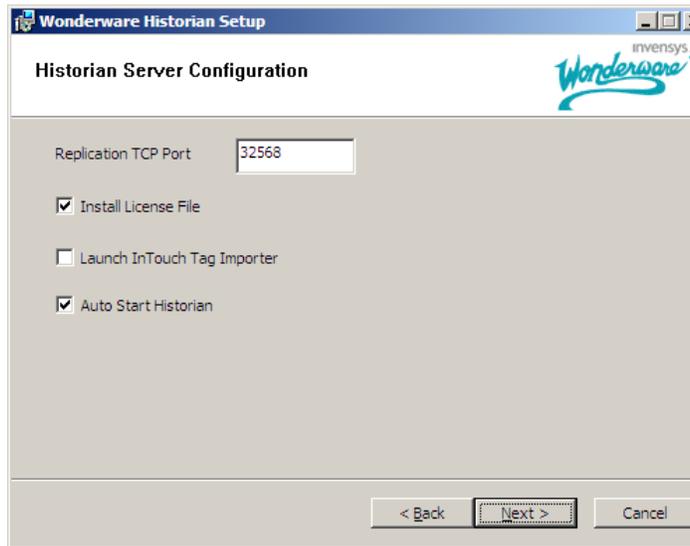


- 3 Click **Modify**.
- 4 Click **Next**. The **Select Features** dialog box appears.



- 5 Click to select or clear the features that you want installed/uninstalled. For information on the features, see "Wonderware Historian Installation Features" on page 41.

- 6 Click **Next**. The **Historian Server Configuration** dialog box appears.



- 7 Enter server configuration information.

Replication TCP Port

The port number for tag replication.

Install License File

Install the new license file for Wonderware Historian.

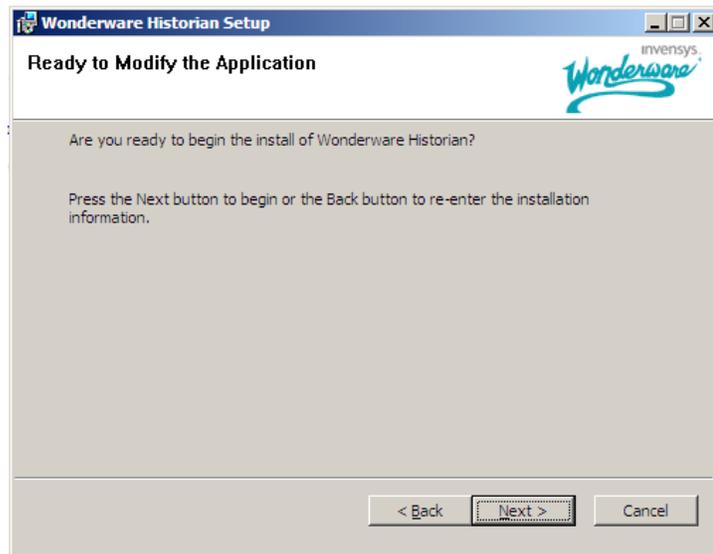
Launch InTouch Tag Import

Launch the InTouch tag importer when the installation is complete.

Auto Start Historian

Automatically starts Wonderware Historian.

- 8 Click **Next**. The **Ready to Modify the Application** dialog box appears.



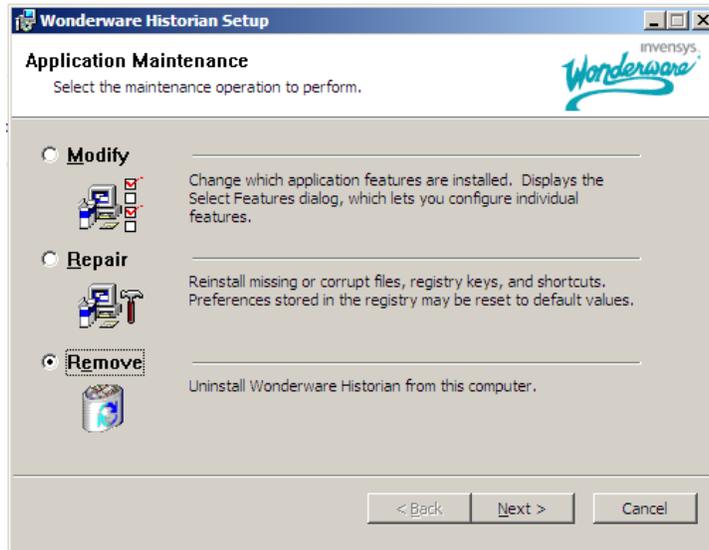
- 9 Read the warnings and then click **Next**. The **Updating System** dialog box appears, indicating the progress of the modification operations. At the end of the modification, the final dialog box appears.
- 10 Click **Finish**.

Removing the Wonderware Historian

The Wonderware Historian uninstall program allows you to remove all of the historian program files. The Runtime and Holding databases and the history blocks are not deleted.

To remove the Wonderware Historian

- 1 Insert the Wonderware Historian installation CD into your CD-ROM drive. If the setup program does not automatically run, double-click Setup.exe in the root directory of the CD. The **Welcome** dialog box appears.
- 2 Click **Next**. The **Application Maintenance** dialog box appears.



- 3 Click **Remove** and then click **Next**. The **Wonderware Historian Uninstall** dialog box appears.
- 4 To delete the configuration files (idatacfg_*.dat) created by IDAS and the Configuration Service, select the **Delete historian configuration files** check box.

By default, these configuration files are located in
 \Documents and Settings\All Users\Application
 Data\ArchestrA\Historian\ ...

- 5 Click **Next**. The **Updating System** dialog box appears, indicating the progress of the removal operations. When the historian is removed, the final dialog box appears.
- 6 Click **Finish**.

Wonderware Historian Menu Shortcuts

The following **Start** menu shortcuts are created in the Start\Programs\Wonderware\Wonderware Historian folder.

- Database Configuration Export and Import
- Import InTouch Historical Data
- Wonderware Historian
- Wonderware Historian Books Online

In addition, the shortcut to the System Management Console appears in the Start\Programs\Wonderware folder.

Note If you performed a complete historian installation, the System Management Console is configured so that the local SQL Server is already registered. However, if you only installed the client tools, the console is empty.

Chapter 3

Upgrading from a Previous Version

You can upgrade to Wonderware Historian 10.0 from IndustrialSQL Server 9.0, IndustrialSQL Server 9.0 Patch01, and IndustrialSQL Server 9.0 Patch02. No other versions are supported for direct upgrades.

Note The Wonderware Historian was previously known as Wonderware IndustrialSQL Server.

About Upgrading to Wonderware Historian 10.0

You can directly upgrade from IndustrialSQL Server 9.0, IndustrialSQL Server 9.0 Patch01, and IndustrialSQL Server 9.0 Patch02. It is possible to upgrade from earlier versions of IndustrialSQL Server, but you must first upgrade to the 9.0 version. Follow the instructions in the 9.0 documentation to perform the upgrade. After you have upgraded to the 9.0 historian, you can then upgrade to Wonderware Historian 10.

About Database Migration

The data in an existing Runtime database can be migrated to a new Runtime database. The old Runtime database is not deleted. Keep the old database until the Wonderware Historian migration is validated.

There is no migration for the content of the Holding database, because this database is used only to temporarily hold data when importing an InTouch data dictionary.

Not all of the system tags included in previous versions are included in version 10.0. Any configuration data associated with these obsolete system tags is not migrated.

For the event subsystem, all SQL-based detectors and actions are migrated to the OLE DB syntax. If you have any custom SQL-based detectors or actions, you need to rewrite them using the OLE DB syntax.

History data that is stored in SQL Server tables (not history blocks) can be migrated after the general upgrade has been performed.

All of the migration scripts are included on the CD in the following location:

```
\Historian\Scripts
```

The scripts are installed with the historian program files so that you can run them at any time. The default file path is:

```
\Program Files\Wonderware\Historian\Scripts
```

Upgrading from a Previous Version

If the IndustrialSQL Server 9.0 and IDAS 9.0 node are running on Windows 2003 SP2 and SQL Server 2005 SP3, then upgrading to Historian 10.0 occurs smoothly. The Wonderware Historian installation program detects the 9.0 Runtime database and prompts you to migrate or create the database.

To upgrade from IndustrialSQL Server 9.0 on Windows 2003 SP2 and SQL Server 2005 SP3

- 1 Back up the Runtime database.
- 2 Shut down and disable IndustrialSQL Server 9.0 using the Management Console. Any remote IDASs sending data to IndustrialSQL Server 9.0 will go into store-and-forward mode.
- 3 Run the Wonderware Historian 10.0 installation program.

- 4 Migrate the 9.0 Runtime database or create the new database and finish the install.
- 5 Restart the computer.
- 6 Start the Historian. The Historian will start acquiring and storing the store-and-forward data from the existing remote IDASs .
- 7 After the Historian Server node is upgraded, you can upgrade any remote IDAS nodes.

If the IndustrialSQL Server 9.0 is not running on an operating system or SQL Server supported by Wonderware Historian 10.0, you cannot migrate the operating system or SQL Server. You will need to set up another computer.

To upgrade from IndustrialSQL Server 9.0 on a computer NOT running Windows 2003 SP2 and SQL Server 2005 SP3

- 1 Back up the Runtime database.
- 2 Shut down and disable IndustrialSQL Server 9.0 using the Management Console. Any remote IDASs sending data to IndustrialSQL Server 9.0 will go into store-and-forward mode.
- 3 Set up a computer with the desired supported operating system and SQL Server.
 - Be sure that you install all of the necessary requirements. For more information, see "Server Requirements" on page 11.
 - Select the same collation and sort order that was used for your previous SQL Server installation. For more information, see "Microsoft SQL Server Installation" on page 38.
- 4 Restore the Runtime database using SQL Server database management tools.
- 5 Run the Wonderware Historian 10.0 setup. For more information, see Chapter 2, "Installation."
- 6 The installation program detects the Runtime 9.0 database and prompts you to migrate the database or recreate the new database. The existing Runtime database is renamed to Runtime90 and the version 10.0 database is created. If you chose to migrate, the utility runs the migration scripts (Migrate90To100.sql and MigrateSQLHistData90to100.sql) to transfer the historian configuration and history data from the old database.
- 7 Finish the install of Wonderware Historian.

- 8 Copy history blocks from the previous version to the new computer.
- 9 Use the historian System Management Console to update the storage locations and system parameters to configure paths as per your new hardware configuration and the Runtime parameters as per your new implementation.

Migration of History Data Stored in SQL Server

The normal SQL Server tables in the Runtime database contain configuration data and certain types of history data. History data that is stored in the normal SQL Server tables includes:

- Data in the AnalogManualHistory, DiscreteManualHistory, and StringHistory tables.
- Event and summary data, which is stored in the EventHistory, SummaryHistory, SummaryData, AnalogSnapshot, DiscreteSnapshot, and StringSnapshot tables.

These tables can contain hundreds of thousands of rows, if not millions of rows. Depending of the amount of data to be migrated, migrating this data can take a few minutes to many hours, and in some cases, days.

Important You **MUST** perform the database migration before the server goes back into production, because the history table content will be truncated.

Be sure that you have disk space equivalent to two times the size of the Runtime database on the drive to which the history data will be migrated; otherwise, the migration may fail. Back up the Runtime database with the migrated configuration data before migrating the history data.

The scripts used to migrate the SQL Server history data can be found in the Wonderware Historian installation directory. By default, this directory is:

```
\Program Files\Archestra\Historian\Install\Scripts
```

The filename is:

```
MigrateSQLHistData90to100.sql
```

Do not attempt to migrate the data until you complete the upgrade to the Wonderware Historian 10.0. To migrate the data, execute these scripts using SQL Server Management Studio. You may prefer to run the script in blocks (that is, execute the syntax commands between the GO statements).

Appendix A

System Sizing Examples

To help you determine how to size your system, performance reports are provided for different Wonderware Historian configurations.

Important The information presented here is a guideline only. The actual results in your environment may vary.

Process (Non-Tiered) Historian Sizing Examples

Performance reports are provided for various levels of a single process (non-tiered) Historian.

Server 1: 2.4 GHz Single Processor Quad-Core CPU

Wonderware Historian Specifications

- DELL OptiPlex 755 with 2.4 GHz single processor quad-core CPU
- 4 GB RAM
- 512 MB Virtual Memory
- 1 Gbps NIC
- Windows XP Professional SP2
- Microsoft SQL Server 2005 Standard Edition SP3

- SQL memory clamped @ 512 MB
- 12-hour history block duration

Tag Information

Tag count (total) = 5,187

Analog tags = 2,607

Discrete tags = 2,285

String tags = 295

Manual tags = 17

Update rate of +/- 5,000 updates/second

Remote IDAS

None.

Event Information

- 3 snapshot events, each having:
 - 1 analog snapshot
 - 1 discrete snapshot
 - 1 string snapshot
- 2 summary events, each having:
 - 1 AVG calculation (1 tag every 8 hours)
 - 1 MAX calculation (1 tag every 8 hours)
 - 1 MIN calculation (1 tag every 8 hours)
 - 1 SUM calculation (1 tag every 8 hours)
- 1 SQL insert every 4 hours
- 2 SQL multi-point updates every hour

Query Load

For the following seven queries, each are occurring at different times in the hour:

- 1 query (trend):
 - live mode - 1 second update
 - 1-hour duration
 - 10 tags (7 analogs, 3 discretetes)
- 1 query: 1-hour range / hour (1 tag)
- 4 queries: 15-minute range / hour (1 tag)
- 1 query: 24-hour report every 24 hours (25 to 30 tags)

Performance Results

Category	Value
Average CPU load (%)	4.74
Wonderware Historian memory (Private Bytes) consumption (MB)	138
Number of online history blocks	207
Uncompressed hard drive disk space per history block (MB)	925

Server 2: Four Dual-Core 2.7 GHz CPUs**Wonderware Historian Specifications**

- DELL Precision WorkStation T5400 with four dual-core Intel Xeon 2.7 GHz CPUs
- 4 GB RAM
- 3072 MB Virtual Memory
- 1 Gbps NIC
- Windows 2003 Standard Server
- Microsoft SQL Server 2005 Standard Edition SP3
- SQL memory clamped @ 1024 MB
- 4-hour history block duration

Tag Information

Tag count (total) = 63,000

Analog tags = 39,359

Discrete tags = 19,734

String tags = 295

Manual tags = 5,057

Update rate of +/- 30,000 updates/second

Remote IDAS

One remote IDAS:

- P4 1.7 GHz
- 1 GB RAM
- 34,000 tags via the remote IDAS and the rest via the local IDAS

Note Because this configuration was used for performance and stress testing, the remote IDAS tag count is more than the recommended 30,000 maximum.

Event Information

- 3 snapshot events, each having:
 - 1 analog snapshot
 - 1 discrete snapshot
 - 1 string snapshot
- 2 summary events, each having:
 - 1 AVG calculation (1 tag every 8 hours)
 - 1 MAX calculation (1 tag every 8 hours)
 - 1 MIN calculation (1 tag every 8 hours)
 - 1 SUM calculation (1 tag every 8 hours)
- 1 SQL insert every 4 hours
- 2 SQL multi-point updates every hour

Query Load

For the following seven queries, each are occurring at different times in the hour:

- 1 query (trend):
 - live mode - 1 second update
 - 1- hour duration
 - 10 tags (7 analogs, 3 discretetes)
- 1 query: 1-hour range / hour (1 tag)
- 4 queries: 15-minute range / hour (1 tag)
- 1 query: 24-hour report every 24 hours (25 to 30 tags)

Performance Results

Category	Value
Average CPU load (%)	9.89
Wonderware Historian memory (Private Bytes) consumption (MB)	680
Number of online history blocks	104
Uncompressed hard drive disk space per history block (GB)	2.47

Server 3: Four Dual-Core 3.4 GHz CPUs**Wonderware Historian Specifications**

- DELL PowerEdge 6800 with four dual-core Intel Xeon 3.4 GHz CPUs
- 16 GB RAM
- 4096 MB Virtual Memory
- 1 Gbps NIC
- Windows 2003 Enterprise Server
- Microsoft SQL Server 2005 Standard Edition SP3
- SQL memory clamped @ 3967 MB
- 2-hour history block duration

Tag Information

Tag count (total) = 133,941

Analog tags = 73,600

Discrete tags = 53,560

String tags = 6920

Update rate of +/- 50,000 updates/second

MDAS

In the total tag count, 4009 tags originated from Wonderware Application Server.

Remote IDAS

Two remote IDASs:

- Remote IDAS 1: P4 1.9 GHz, 1 GB RAM
- Remote IDAS 2: P4 2.5 GHz, 512 MB RAM

44,370 tags via the remote IDAS 1

45,584 tags via the remote IDAS 2

44,383 tags via the local IDAS

Note Because this configuration was used for performance and stress testing, the remote IDAS tag counts are more than the recommended 30,000 maximum.

Event Information

- 3 snapshot events, each having:
 - 1 analog snapshot
 - 1 discrete snapshot
 - 1 string snapshot
- 2 summary events, each having:
 - 1 AVG calculation (1 tag every 8 hours)
 - 1 MAX calculation (1 tag every 8 hours)
 - 1 MIN calculation (1 tag every 8 hours)
 - 1 SUM calculation (1 tag every 8 hours)
- 1 SQL insert every 4 hours
- 2 SQL multi-point updates:
 - 1 every 15 minutes
 - 1 every 30 minutes

Query Load

For the following seven queries, each are occurring at different times in the hour:

- 1 query (trend):
 - live mode - 1 second update
 - 15-minute duration
 - 15 tags (10 analogs, 5 discretets)
- 1 query: 1-hour range / hour (1 tag)
- 4 queries: 15-minute range / hour (1 tag)
- 1 query: 24-hour report every 24 hours (25 to 30 tags)

Performance Results

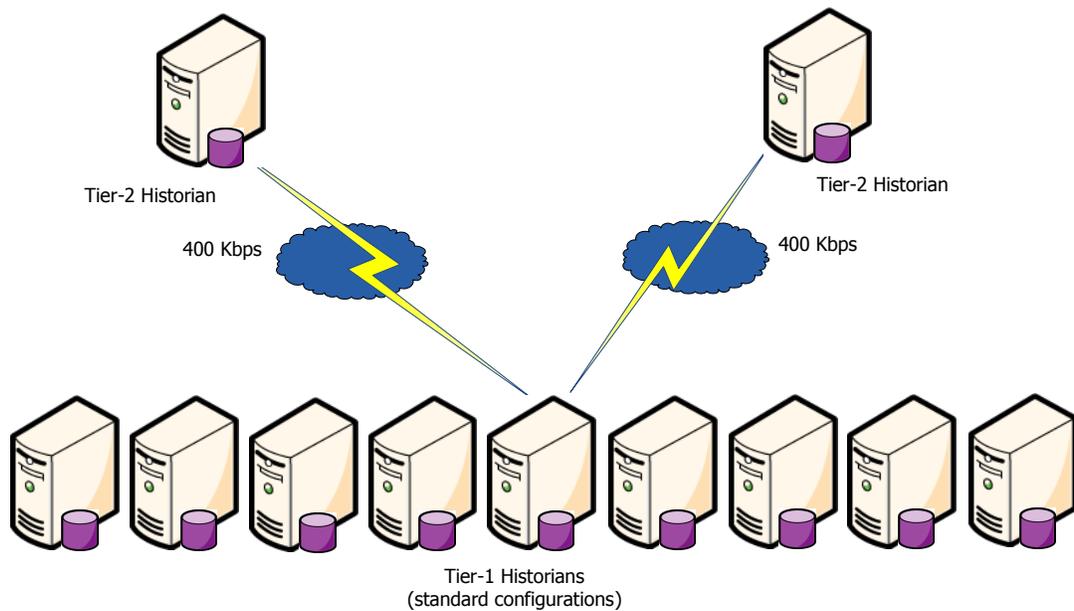
Category	Value
Average CPU load (%)	13.9
Wonderware Historian memory (Private Bytes) consumption (MB)	1,478
Number of online history blocks	470
Uncompressed hard drive disk space per history block (average GB)	1.73

SCADA (Tiered) Historian Sizing Examples

Performance reports are provided for various levels of a multiple Historian SCADA configuration.

Topology 1: Centralized Tiered Historian Topology on a Slow/Intermittent Network

This topology consists of ten tier-1 historians performing simple and summary replication of the same tags independently to two tier-2 historians. This topology is targeted to reflect the requirements of geographically distributed SCADA applications operating on slow and intermittent networks.



The 400 Kbps data transfer limit reflects a typical data transfer speed between remote locations over the Internet. The data transfer from each tier-1 historian to a tier-2 historian is assumed to be through a dedicated 400 Kbps connection; multiple tier-1 historians do not share the same 400 Kbps connection. It is assumed that the 400 Kbps is a bandwidth that can be fully used.

Tier 2 Historian Specifications

- DELL PowerEdge 6800 with four dual-core Intel Xeon 3.4 GHz CPUs
- 16 GB RAM with enabled PAE or 4 GB RAM
- Disk I/O subsystem of a 100MB/s throughput, 6 ms access time.
- 100/1000 Base-T network card
- 400 Kbps network connection (actual usable bandwidth)

Tier 1 Historian Specifications

- DELL Precision WorkStation T5400 with dual processor quad-core Intel Xeon 2.7 GHz CPUs
- 4 GB RAM
- Disk I/O subsystem of a 60MB/s throughput, 16 ms access time.
- 100/1000 Base-T network card

Loading Information

Assume that the total tag count on the tier-1 historian is 15,000.

The tier-1 historian receives 15,000 tags from I/O Servers of the following types and data rates:

- 12,000 4-byte analog delta tags changing every 2 seconds: (10,000 always fitting the real-time window and 2,000 falling outside of the real-time window being 50 minutes late).
- 2,800 1-byte discrete delta tags changing every 2 seconds
- 200 variable-length string delta tags of 32-character length changing every 30-seconds

The tier-2 historian stores the following:

- 6,000 tags with hourly analog summary calculations performed at the top of each hour (using 6,000 4-byte analog tags as tier-1 tags)
- Another 6,000 tags with 1-minute analog summary calculations performed at the top of each minute (using 6,000 4-byte analog tags as tier-1 tags)
- 1,500 tags replicated (as simple replication) to tier-2 (using 1,400 1-byte discrete tags and 100 variable-length string delta tags as tier-1 tags)
- Another 1,500 tags only stored on tier-1 (using 1,400 1-byte discrete tags and 100 variable-length string delta tags as tier-1 tags)

Performance Results for the Tier-2 Historian

Category	Value
Average CPU load (%) (with no queries executing)	1%
Wonderware Historian memory (Virtual Bytes) consumption (GB)	3.05 GB
Number of online history blocks	312
Uncompressed hard drive disk space per history block (average MB)	888 MB

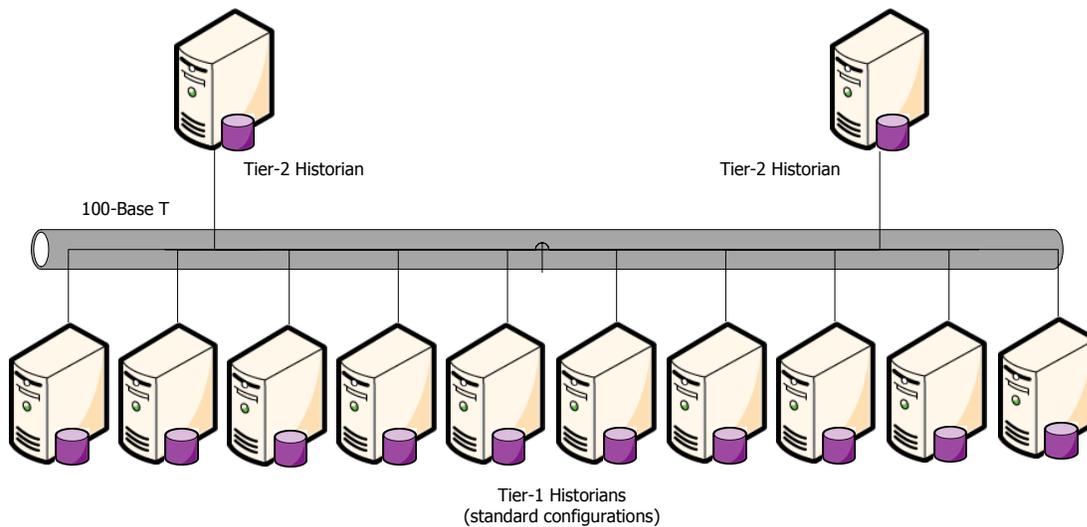
Latency Results

Category	Value
Fastload (1 day fastload)	10.33 hours
Simple replication	4 seconds
Summary replication	4.6 seconds

Latency is the difference in time between when the value is received by the tier-1 historian and when it is received by the tier-2 historian.

Topology 2: Centralized Tiered Historian Topology for a Single Physical Location

A 100 Mbps data transfer limit reflects a typical data transfer speed within one location, but distributed over several buildings. In this case the 100 Mbps bandwidth is a physical characteristic of the connection. It is assumed that up to 33% of that physical bandwidth can be used.



Tier 2 Historian Specifications

- DELL PowerEdge 6800 with four dual-core Intel Xeon 3.4 GHz CPUs
- 16 GB RAM with enabled PAE or 4 GB RAM
- Disk I/O subsystem of a 100MB/s throughput, 6 ms access time.
- 100/1000 Base-T network card
- 100 Kbps network connection (actual usable bandwidth)

Tier 1 Historian Specifications

- DELL Precision WorkStation T5400 with dual processor quad-core Intel Xeon 2.7 GHz CPUs
- 4 GB RAM
- Disk I/O subsystem of a 60MB/s throughput, 16 ms access time.
- 100/1000Base-T network card

Loading Information

Assume that the total tag count on the tier-1 historian is 15,000.

The tier-1 historian receives 15,000 tags from I/O Servers of the following types and data rates:

- 12,000 4-byte analog delta tags changing every 2 seconds: (10,000 always fitting the real-time window and 2,000 falling outside of the real-time window being 50 minutes late).
- 2,800 1-byte discrete delta tags changing every 2 seconds
- 200 variable-length string delta tags of 32-character length changing every 30-seconds

The tier-2 historian stores the following:

- 6,000 tags with hourly analog summary calculations performed at the top of each hour (using 6,000 4-byte analog tags as tier-1 tags)
- Another 6,000 tags with 1-minute analog summary calculations performed at the top of each minute (using 6,000 4-byte analog tags as tier-1 tags)
- 1,500 tags replicated (as simple replication) to tier-2 (using 1,400 1-byte discrete tags and 100 variable-length string delta tags as tier-1 tags)
- Another 1,500 tags only stored on tier-1 (using 1,400 1-byte discrete tags and 100 variable-length string delta tags as tier-1 tags)

Performance Results for the Tier-2 Historian

Category	Value
Average CPU load (%) (with no queries executing)	1.55%
Wonderware Historian memory (Virtual Bytes) consumption (GB)	3.3 GB
Number of online history blocks	312
Uncompressed hard drive disk space per history block (average MB)	888 MB

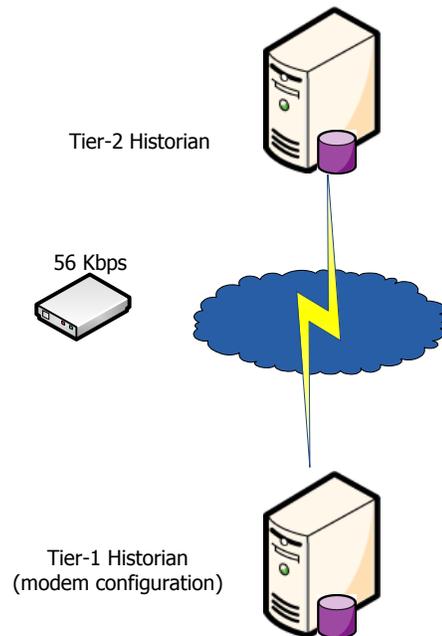
Latency Results

Category	Value
Fastload (1 day fastload)	9.92 hours
Simple replication	1.65 seconds
Summary replication	1.51 seconds

Latency is the difference in time between when the value is received by the tier-1 historian and when it is received by the tier-2 historian.

Topology 3: Simple Tiered Historian Topology for a Modem Configuration

In a modem configuration, the network bandwidth between the tier-1 and the tier-2 historians is limited by 56 Kbps. Because the tag count and the replication data rate of the tier-1 historian should be very limited, it would be sufficient to consider only one tier-1 historian performing simple replication to one tier-2 historian over a modem network.



Tier 2 Historian Specifications

- DELL Precision WorkStation T5400 with dual processor quad-core Intel Xeon 2.7 GHz CPUs
- 4 GB RAM
- Disk I/O subsystem of a 60MB/s throughput, 16 ms access time.
- 100/1000Base-T network card
- 56K modem

Tier 1 Historian Specifications

- OptiPlex 755 with single processor quad-core CPU 2.4 GHz
- 4 GB RAM
- Disk I/O subsystem of a 60MB/s throughput, 16 ms access time.
- 100/1000Base-T network card
- 56K modem

Loading Information

In the tier-1 historian modem configuration, the tier-1 historian receives 3,000 tags from I/O Servers of the following types with average update rate 300 items per second:

- 1,500 4-byte analog delta tags (1,400 always fitting the real-time window and 100 falling outside of the real-time window being 50 minutes late)
- 1,350 1-byte discrete delta tags
- 150 variable-length string delta tags of 32 bytes each

Performance Results for the Tier-2 Historian

Category	Value
Average CPU load (%) (with no queries executing)	1%
Wonderware Historian memory (Virtual Bytes) consumption (GB)	1.86 GB
Number of online history blocks	30
Uncompressed hard drive disk space per history block (average GB)	43 MB

Latency Results

Category	Value
Fastload (1 day fastload)	n/a
Simple replication	5 seconds
Summary replication	n/a

Latency is the difference in time between when the value is received by the tier-1 historian and when it is received by the tier-2 historian.

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