PI Historian with ControlST* Software Suite System Guide

June 2020
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Revised: June 2020
Issued: Jun 2009


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Document Updates

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Acronyms and Abbreviations

BOP    balance of plant
EGD    Ethernet Global Data
EMT    Ethernet Global Data Management Tool
HMI    Human-machine Interface
OEM    Original Equipment Manufacturer
PDH    plant data highway
SOE    sequence of events
UDH    unit data highway
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1 Overview

The PI Historian is a data archival system, based on OSIsoft™ PI client-server technology. It provides data collection and storage of power distribution and auxiliary process data for display in the WorkstationST® application. It can be configured for turbine-related data and balance of plant (BOP) process data.

The Mark* VLe and Mark VI controllers use the Ethernet Global Data (EGD) unit data highway (UDH) as the communications network between individual turbine unit controllers and system operator components, as well as Human-machine Interfaces (HMI).

The PI Historian system comes with a standard upgradable original equipment manufacturer (OEM) license. The OEM server has limited connections. There are six interface licenses, which can be used to collect and place data in the Historian system. The normal interface is an OLE for Process Control Data Access (OPC® DA) client to the WorkstationST OPC DA server installed on the same computer as the OSI® PI application. The system can be connected to six different OPC DA servers, including six power blocks with independent OPC DA servers.

There is a 10-client connection limit on the OEM software license. A client connection is required any time a PI ProcessBook® or PI DataLink® connects to the PI Historian. If more than 10 client connections are required, there is an upgrade to a 25-client connection.

The OSIsoft OPC DA/HDA server is also supplied with the OEM PI Historian. The license is based on the number of client connections to OPC DA/HDA server of two, 10, or 25 connections. With the OPC DA/HDA server, the ToolboxST® Trender can retrieve historical data from the OSI PI server and the WorkstationST Recorder through the WorkstationST application installed on the Historian computer. The OPC HDA connection only retrieves the data. Two connections can support multiple Trenders. This feature is available in WorkstationST version 3.2 and above.

The PI ProcessBook application displays trends of the historical data, which can be timed-based or cross plots of two tags. Graphic screens can also be created using the Historical tags. The PI DataLink add-in allows the use of historical data in third-party applications such as Microsoft Excel®.
The WorkstationST application allows the local computer to obtain data from all consumed EGD devices through the OPC DA server. The local computer, through the WorkstationST application and the EGD configuration server, automatically receives updates for any configuration change to EGD variables. The OPC DA server provides communication between the HMI and Mark VIe components, as well as the CIMPLICITY® application, ToolboxST Trender, and PI applications. The PI OPC interface receives its data from the WorkstationST OPC DA server, and passes it to the PI server. The PI server compresses the data, based on user-defined compression settings, and stores it in the PI archives.
1.1 Data Collection and Storage

The PI Historian communicates on a plant data highway (PDH) and a unit data highway (UDH). Supervisory data is exchanged between the PI Historian and operator stations, engineering workstations, and printers on the Information Network in redundant or non-redundant configurations. Data is sent from components on the UDH using EGD protocol to the WorkstationST OPC DA server. The PI OPC interface connects the PI Historian to the WorkstationST OPC DA server. The PI OPC interface does not need to be installed on the same computer as the PI Server.

**Note** Further setup is required if the PI OPC interface and PI Server are on separate computers.

The PI Historian samples data from control systems on the control network once per second. Data values and time stamps originate in the controller. For alarms, events, and sequence of events (SOE), data is received on an exception basis. Since time synchronization is essential for determining the root cause of an event, the data can be synchronized to ±1 ms time accuracy between a controller and local time server or ±2 ms time coherence between control systems.

The PI Historian stores data in a series of archives. As each archive fills, the data rolls over to the next archive until all archives are full. The oldest archive is then overwritten. Exception data is stored by the alarm server in files matching the exception data type: alarm, event, SOE, holds, or diagnostics.

The actual amount of data storage available in the archives depends on the data exception and compression settings. Tighter deadbands produce increased data storage and looser deadbands have less data storage.
1.2 **PI Historian Applications**

PI System Management Tools (PI SMT) allow you to administer the PI Server. Here is a subset of the things you can do using PI SMT:

- Create and manage PI archives
- View the details of previous backups performed as well as perform ad-hoc backups
- Display updating snapshot values in real-time
- View, start and stop interfaces
- View PI Server and local PIPC /PI SDK log files
- View current license details
- View PI Services on the selected PI Server and see current state
- View, create, edit and delete PI points

PI ProcessBook is a graphics package that allows you to create dynamic, interactive graphics and trends featuring real-time and historical PI System data. PI ProcessBook can trend any variable stored in the PI Historian. It is fully configurable and can auto-range the scales or set fixed indexes. For accurate readouts, the trend cursor displays the exact value of all variables trended at a given time. PI ProcessBook can be set up to mimic strip chart recorders, analyze the performance of parameters over time, or help troubleshoot root causes of a turbine fault.

PI ProcessBook is licensed to run on the PI Historian. A second license is included to run PI ProcessBook on an HMI. Additional PI ProcessBook licenses can be purchased as needed.

PI DataLink is a Microsoft Excel add-in that enables you to retrieve information from the PI Historian directly into an Excel worksheet. Through Excel, you can gather, monitor, analyze and report PI System data.
2 Installation

The PI Historian applications are typically pre-installed on the PI Historian system.

2.1 PI 2018 SP3 Installation

2.1.1 Prerequisites

The following must be completed on the PI Historian computer prior to starting the installation process:

- Verify that the Computer Name is set to the desired system name
- Install WorkstationST (to get the GE WorkstationST OPC DA Server service)
- Install Excel 2016 (64-bit) (to be able to install PI DataLink)
- Create the directory C:\PI-LICENSE
- Create the directory E:\Backup
- Open Inbound Firewall Port 5450
- Disable the Windows Time Zone (TZ) environment variable

2.1.1.1 Open Inbound Firewall Port 5450

All communication with the PI System is strictly over inbound port 5450.

When a PI Interface or PI Client connects to PI Data Archive server, it initiates a series of connections from an arbitrarily selected ephemeral port (chosen by the operating system) on the machine to port 5450 of the PI Data Archive host computer. The client will always initiate a connection to the PI Data Archive server; the server never initiates a connection.

➢➢➢ To open inbound port 5450

3. In the New Inbound Rule Wizard: Rule Type window, select Port and click Next.
4. In the New Inbound Rule Wizard: Protocol and Ports window:
   a. In the Does this rule apply to TCP or UDP? field, select TCP.
   b. In the Does this rule apply to all local ports or specific local ports? field, select Specific local ports and enter 5450.
   c. Click Next.
5. In the New Inbound Rule Wizard: Action window, select Allow the connection and click Next.
6. In the New Inbound Rule Wizard: Profile window, select (check) the Domain, Private, and Public check boxes and click Next.
7. In the New Inbound Rule Wizard: Name window, enter PI Data Archive in the Name field and click Finish.
2.1.1.2 Disable the Windows Time Zone (TZ) environment variable

Ensure that the Windows TZ environment variable is not set on the PI Data Archive host computer. This is because the variable adversely affects PI Data Archive.

➢➢ To confirm the TZ variable is not set (on Windows Server 2012 R2 or later versions)

1. Press the Windows Key to launch Windows Search.
2. Type Environment.
3. In the search results, select Edit the system environment variables. The System Properties window opens.
4. On the Advanced tab, click Environment Variables.
5. If the TZ variable is present, delete it.
6. If necessary, restart the computer.

2.1.2 Installation Overview

The installation order of PI Server 2018 SP3 is important. The order is outlined below.

1. OSIsoft Prerequisites
2. Microsoft SQL Server
3. PI AF Server
4. PI Data Archive
5. PI Interface for OPC DA
6. PI OPC HDA Server
7. PI ODBC
8. PI OLEDB
9. PI SQL DAS
10. PI DataLink
11. PI ProcessBook

2.1.3 OSIsoft Prerequisites Installation

Installation of an OSIsoft product on Windows relies on the presence of Microsoft operating system components such as the Microsoft .NET Framework and Microsoft run time libraries. OSIsoft Prerequisite Kits verify and install the needed operating system prerequisites.

2.1.3.1 OSIsoft Prerequisite Kit

➢➢ To install OSIsoft Prerequisite Kit 2.0.0.10

1. Go to C:\distrib\files\applications\PI2018-SP3\OSIPreRequisites.
2. Right-click on OSIprerequisites-standalone_2.0.0.10_.exe and select Run as administrator.
3. In the WinZip Self-Extractor dialog, click OK.
4. In the WinZip Self-Extractor – OSIprerequisites ... dialog, click Unzip.
5. In the Welcome to the OSIsoft Prerequisite Kit Setup dialog, click OK.
6. When installation completes, click Close.
2.1.3.2 OSIsoft Prerequisite Kit Patch

The OSIsoft Prerequisite Kit Patch provides an update to the MS Runtimes Redistributables which are provided in the OSIsoft Prerequisite Kit.

➢➢ To install OSIsoft Prerequisite Kit Patch 2.1.1

1. Go to C:\distrib\files\applications\PI2018-SP3\OSIPreRequisites.
2. Right-click on OSIPrequisites-Patch_2.1.1_.exe and select Run as administrator.
3. In the WinZip Self-Extractor dialog, click OK.
5. In the Welcome to the OSIsoft Prerequisite Kit Setup dialog, click OK.
6. When installation completes, click Close.

2.1.4 Microsoft SQL Server Installation

The Microsoft SQL Server is not actually a part of the PI Server but is a dependency. SQL Server Express can be used for systems with few assets (10,000 assets or less) and low-to-moderate workloads (25,000 PI points or fewer).

➢➢ To install Microsoft SQL Server 2017 Express Edition

1. Go to C:\distrib\files\applications\PI2018-SP3\SQLServer.
2. Right-click on SQLEXPR_x64_ENU.exe and select Run as administrator.
3. In the Choose Directory for Extracted Files dialog, accept the default and click OK.
4. In the SQL Server Installation Center window, click New SQL Server stand-alone installation or add features to an existing installation.
5. In the SQL Server 2017 Setup: License Terms window, select (check) the I accept the license terms check box and click **Next**.

6. In the SQL Server 2017 Setup: Microsoft Update window, click **Next**. The PI Historian Server is not connected to the Internet, so no need to check the Use Microsoft Update to check for updates check box.

7. In the SQL Server 2017 Setup: Product Updates window, click **Next**. The PI Historian Server is not connected to the Internet, so it can not search for updates.

8. In the SQL Server 2017 Setup: Feature Selection window, accept the defaults and click **Next**.
9. In the SQL Server 2017 Setup: Instance Configuration window, accept the defaults and click Next.

10. In the SQL Server 2017 Setup: Server Configuration window, accept the defaults and click Next.
11. In the SQL Server 2017 Setup: Database Engine Configuration window:
   a. For Cybersecurity jobs:
      i. On the Server Configuration tab, click **Add**.
      ii. In the Select Users or Groups dialog, type **HMI** and click **Check Names**.
      iii. In the Multiple Names Found dialog, select **HMI Administrators** and click **OK**.
      iv. In the Select Users or Groups dialog, click **OK**.
      v. In the SQL Server 2017 Setup: Database Engine Configuration dialog, **HMI\HMI Administrators** should display. Click **Next**.
   b. For non-Cybersecurity jobs (no domain):
      i. On the Server Configuration tab, click **Add**
      ii. In the Select Users or Groups dialog, type **Admin** and click **Check Names**.
      iii. In the Select Users or Groups dialog, click **OK**.
      iv. In the SQL Server 2017 Setup: Database Engine Configuration dialog, **<Server Name>\Admin** should display. Click **Next**.

12. In the SQL Server 2017 Setup: Installation Progress window, wait until installation completes.

13. In the SQL Server 2017 Setup: Complete window, verify that all features succeeded and click **Close**.

14. Click the **X** to close the SQL Server Installation Center window.

15. Reboot the PI Historian Server.
2.1.5 **PI AF Server Installation**

PI Asset Framework (PI AF) is a single repository for asset-centric models, hierarchies, objects, and equipment. It integrates, contextualizes, refines, references, and further analyzes data from multiple sources, including one or more PI Data Archives and non-PI sources such as external relational databases.

➢ To install PI AF Server 2018 SP3

1. Go to `C:\distrib\files\applications\PI2018-SP3\PIServer`.
2. Right-click on **PI-Server_2018-SP3_.exe** and select **Run as administrator**.
3. The Microsoft .NET Framework 4.8 required for PI Server 2018 SP3 Installer setup window opens. Click **Accept and Install**.
4. In the The requested operation is successful. Changes will not be effective until the system is rebooted. dialog, click **OK**. The system reboots.
5. After reboot, go back to `C:\distrib\files\applications\PI2018-SP3\PIServer`.
6. Right-click on **PI-Server_2018-SP3_.exe** and select **Run as administrator**.
7. The **PI Server 2018 SP3 Installer: Welcome** window opens. Uncheck (deselect) **Yes, I would like to participate in the PI System Customer Experience Improvement Program** and click **Next**.
8. In the **PI Server 2018 SP3 Installer: Feature Selection** window (Server Roles tab), select **AF Server**. A list of server roles and features to be installed is displayed in the Summary panel. Click **Next**.

![PI Server 2018 SP3 Installer: Feature Selection](image)

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**Public Information**
9. In the **PI Server 2018 SP3 Installer: SQL Server Connection** window:
   a. In the **SQL Server Connection** field, enter `<Server Name>\SQLEXPRESS` where `<Server Name>` is the name of the PI Historian Server.
   b. In the **AF SQL Database Setup** field, ensure that both **AF SQL database scripts** and **AF SQL script execution** are selected. The installation installs the AF SQL scripts on the local computer, and then executes the scripts locally to create the PI AF SQL Server database.
   c. Click **Next**. A check is performed to see if your user account has the requisite permissions on the SQL Server and whether a PI AF SQL Server database already exists.

10. If the installation detects an existing PI AF SQL Server database, the **SQL Server Rules** window opens. The installation prompts you with an option to back up the existing PI AF SQL Server database and then executes the AF SQL scripts to create the new PI AF SQL Server database. Click **Next**.
11. In the *PI Server 2018 SP3 Installer: RTQP Engine* window, click **Next**.

12. In the *PI Server 2018 SP3 Installer: RTQP Engine Rules* window, check (select) the **Yes, I want to use a self-signed certificate** check box and click **Next**.
13. In the **PI Server 2018 SP3 Installer: Service Accounts** window:
   a. Accept the default account for **PI AF Application Service** (NT SERVICE\AFService).
   b. Accept the default account for **RTQP Engine** (NT SERVICE\PISqlDas.RTQP).
   c. Click **Next**.

14. The **PI Server 2018 SP3 Installer: Summary** window opens, listing the selected features and version numbers scheduled for the installation. Click **Install**.

15. The **PI Server 2018 SP3 Installer: Installation Progress** window opens. PI AF Server installs.

16. The **PI Server 2018 SP3 Installer: Complete** window opens when the installation is complete. Click **Yes** to reboot the system.

### 2.1.6 PI Data Archive Installation

PI Data Archive is a component of the PI Server that provides efficient storage and archiving of time series data. It is the cornerstone of the PI System and your data infrastructure, enabling high-performance data storage and retrieval by client software.

Before beginning the PI Data Archive installation process, obtain a license file for your PI System.

#### 2.1.6.1 Obtain a license file

➢ To obtain a license file

1. [Create a Machine Signature File](#)
2. [Generate a license file](#)
2.1.6.2 Create a Machine Signature File

You must first create a Machine Signature File (MSF) before a license file can be generated for your PI System.

Before you start

• If the PI Historian has multiple Ethernet ports, ensure they are plugged in so that the MAC addresses of each of these ports are registered by the MSF for your machine. The license matching process checks to see if at least one of the MAC addresses are identified when comparing against the list of MAC addresses registered during the creation of the MSF.
• Unplug any non-essential hard drives or thumb drives that will not be present during normal operation of the PI Historian. Because the MSF is an identifying thumb print of the host machine at the time of license generation, any changes to the configuration of the machine may cause a license mismatch to occur.

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4. In the PI Server 2018 SP3 Installer: Data Archive window, click **License information and generation**, as highlighted in the figure below, to autogenerate and locate the MSF.

![PI Server 2018 SP3 Installer: Data Archive window](image)

5. The **License Information and Generation** window opens. Click **here**, as highlighted in the figure below, to locate the autogenerated MSF.

![License Information and Generation window](image)

A *Windows Explorer* window opens with the location of the autogenerated MSF on your host computer.
6. Copy the MSF to an internet-accessible computer and send it to a GE Historian Engineer who has access to the OSIsoft Customer Portal.

2.1.6.3 Generate a license file

In contrast to creating an MSF, which is done directly from a PI Historian host machine, a license file is generated by a GE Historian Engineer on the OSIsoft Customer Portal.

A GE Historian Engineer with access to the OSIsoft Customer Portal will generate the license and send you a pilicense.zip file. It contains the following files:

- pilicense.dat, your license file
- PI Server License Readme.pdf
- Manifest.html, a list of the contents of your license file
- if you have an HA license, it also includes temporarylicense.dat

Copy the pilicense.zip file to the PI Historian Server. Unzip the pilicense.zip file to C:\PI-License.

2.1.6.4 Install PI Data Archive

Proceed with the PI Data Archive installation process now that you have obtained a license file for your PI System.

➢ To install PI Data Archive

1. Go to C:\distrib\files\applications\PI2018-SP3\PIServer.
2. Right-click on PI-Server_2018-SP3_.exe and select Run as administrator.
3. In the PI Server 2018 SP3 Installer: Feature Selection window, select PI Data Archive and click Next.
4. In the PI Server 2018 SP3 Installer: Data Archive window:
   a. In the License directory field, click the ellipsis to browse and select C:\PI-License\pilicense.dat.
   b. Specify directory paths in the Data Directories fields.
      i. In the Historical Archives field, enter D:\PI_ARCH.
      ii. In the Future Archives field, enter D:\PI_ARCH\future.
      iii. In the Event Queues field, enter E:\PI\queue.
   c. Specify values in the Archive Settings fields. Click Modify Archive Settings.
      i. In the Archive Settings window, select Yes to Create historical archives automatically.
      ii. In the Size in MB for historical archives field, enter 512.
      iii. Click OK.
5. The *PI Server 2018 SP3 Installer: Summary* window opens, listing all the PI System components and software to be installed as part of PI Data Archive installation. Click **Install**.

The *PI Server 2018 SP3 Installer: Installation Progress* window opens and shows the progress.

6. In the *PI Server 2018 SP3 Installer: Complete* window, click **Close** to exit the setup.
2.1.6.5 Verify PI Data Archive Installation

After you have completed the installation of PI Data Archive, it is important to verify that the installation was successful.

Use PI System Management Tools (PI SMT) to view, configure, stop and start PI services on the PI Data Archive server. The status of each service is updated every 30 seconds by default.

➢➢ To verify that the corresponding PI Services are running

1. From the Start menu, select PI System, then select PI System Management Tools. PI System Management Tools opens.
2. In the System Management Tools pane, expand Operation and select PI Services.
3. Verify that the following PI services and default interfaces are running:
   • PI Archive Subsystem
   • PI Backup Subsystem
   • PI Base Subsystem
   • PI License Manager
   • PI Network Manager
   • PI Snapshot Subsystem
   • PI SQL Subsystem
   • PI Update Manager

Depending on your license, you might see additional services.

Use the Licensing tool to verify that your PI Data Archive license is activated.

➢➢ To verify PI Data Archive licensing

1. From the Start menu, select PI System, then select PI System Management Tools. PI System Management Tools opens.
2. In the System Management Tools pane, expand Operation and select Licensing. The Licensing manager displays license activation information for the selected PI Data Archive server.
3. Expand General. The Exp Time entry indicates when your license activation expires. This should be Never.
4. Expand Usage. The Current PctMatch shows whether the machine characteristics match what has been coded into the PI Data Archive license file according to the MSF that was loaded to MLA. If this is a standalone PI Data Archive server or a primary PI Data Archive server, the Current PctMatch should be 100%. If this is a secondary machine, the Current PctMatch can be disregarded.
5. Verify the number of points permitted with your license activation.
   a. Click the drop-down box, located between the Refresh and Search icons.
   b. Select Count. Your point count will be the lesser of pibasess.MaxAggregatePointModuleCount or pibasess.MaxPointCount.

In general, older PI Systems will store the permitted point count under pibasess.MaxAggregatePointModuleCount whereas newer systems will store the value under pibasess.MaxPointCount.
6. Click Resources. Expand pibasess.MaxPointCount to verify the number of points permitted with your license activation.
2.1.7  **PI Interface for OPC DA Installation**

PI Interface for OPC DA is designed specifically to transmit data between OPC Servers and the PI System. OPC is a standard established by the OPC Foundation task force to allow applications to access process data from the plant floor in a consistent manner.

2.1.7.1  **PI OPC DA (OPCInt) APS Connector**

PI OPC DA Interface APS Connector allows PI Auto Point Synchronization (PI APS) to synchronize PI OPC DA Interface points with their OPC Server equivalents. The set of attributes which may be synchronized depends on the OPC server being used.

➢➢ To install PI OPC DA (OPCInt) APS Connector 1.2.0.0

1. Go to `C:\distrib\files\applications\PI2018-SP3\OPCInt`.

2. Right-click on `OPCInt_APS_1.2.0.0_.exe` and select Run as administrator.

3. In the This installs PI OPC DA (OPCInt) APS Connector 1.2.0.0 dialog, click OK.

4. In the WinZip Self-Extractor – `OPCInt_APS_1.2.0.0_.exe` dialog, click Unzip.

5. In the Welcome to the PI OPC DA (OPCInt) APS Connector 1.2.0.0 Setup window, click OK.

6. The Welcome to the PI OPC DA (OPCInt) APS Connector Installation Wizard opens, click Next.

7. In the PI OPC DA (OPCInt) APS Connector Setup: User Information window:
   a. In the Full Name field, enter the PI Historian Server Name (for example, HST1).
   b. In the Organization field, enter GE Power.
   c. Select (enable) Anyone who uses this computer.
   d. Click Next.

8. In the PI OPC DA (OPCInt) APS Connector Setup: Destination Folder window, accept the default and click Next.

9. In the PI OPC DA (OPCInt) APS Connector Setup: Ready to Install the Application window, click Next. The installation runs.

10. The PI OPC DA (OPCInt) APS Connector has been successfully installed window opens. Click Finish.

11. The Installation Complete window opens, click Close.
2.1.7.2 PI Interface for OPC DA – Read-Write

The PI OPC interface is an OPC Data Access (DA) client application that communicates with an OPC server and sends data to the PI Server (and, optionally, receives data from the PI Server). The OPC DA standard is designed for real-time data.

➢➢ To install PI Interface for OPC DA – Read-Write 2.7.0.22

1. Go to C:\distrib\files\applications\PI2018-SP3\OPCInt.
2. Right-click on OPCInt_ReadWrite_2.7.0.22_.exe and select Run as administrator.
3. In the PI Interface for OPC DA (OPCInt) Self-Extracting Executable dialog, click OK.
4. In the Welcome to the PI Interface for OPC DA 2.7.0.22 – Read-Write Setup window, click OK.
5. In the Running Services window, click Next. The installation runs.
6. In the Service Status window, click Next.
7. In the Installation Complete window, click Close.

2.1.8 PI OPC HDA Server Installation

PI OPC HDA Server will allow any industry standard HDA client application to read data from PI, insert new data into PI, or delete data from PI. The server allows access both to PI Data Archive tags and to the PI Module Database (PI MDB) modules, aliases, and properties. The OPC HDA standard is designed for the retrieval of historical process data.

➢➢ To install PI OPC HDA Server 2016

1. Go to C:\distrib\files\applications\PI2018-SP3\OPCHDA.
2. Right-click on PI-OPC-HDA-Server-2016.exe and select Run as administrator.
3. In the PI OPC HDA Server 2016 Setup window, check (select) the I agree to the license terms and conditions check box and click Install.
4. In the PI OPC HDA Server 2016 Installation Successfully Completed window, click Close.

2.1.9 PI ODBC Installation

PI ODBC Driver is an ODBC 3.8 API-compliant driver that provides robust data access to the PI System using SQL queries. PI ODBC Driver uses the PI SQL Data Access Server (PI SQL DAS) as a gateway, which provides secure network communication (net.tcp and HTTPS) and executes the queries.

➢➢ To install PI ODBC 2016 R2

1. Go to C:\distrib\files\applications\PI2018-SP3\ODBC.
2. Right-click on PI-ODBC_2016-R2_.exe and select Run as administrator.
3. In the PI ODBC 2016 R2 Self-Extracting Executable dialog, accept the default path and click OK.
4. In the Welcome to the PI ODBC 2016 R2 Setup window, click OK. The installation runs.
5. In the Installation Complete window, click Close.
2.1.10 PI OLEDB Installation

The classic PI OLEDB Provider implements SQL to allow relational queries to be run against the PI Data Archive, the PI Point Database and other configuration data. This product is mostly used in the context of other OLE DB-compliant products such as reporting and analytics.

➢ To install PI OLEDB 2019
1. Go to C:\distrib\files\applications\PI2018-SP3\OLEDB.
2. Right-click on PI-OLEDB_2019_.exe and select Run as administrator.
3. In the PI OLEDB 2019 Setup Self-Extractor dialog, accept the default path and click OK.
4. In the Welcome to the PI OLEDB 2019 Setup window, click OK. The installation runs.
5. In the Installation Complete window, click Close.

2.1.11 PI SQL DAS Installation

PI SQL Data Access Server (PI SQL DAS) is a middleware component used by PI ODBC and PI JDBC. It provides secure network communication (net.tcp and HTTPS) and executes SQL queries.

➢ To install PI SQL Data Access Server (OLE DB) 2018 SP3
1. Go to C:\distrib\files\applications\PI2018-SP3\PISQLDAS.
2. Right-click on PISQLDAS_2018-SP3_.exe and select Run as administrator.
3. In the Welcome to the PI SQL Data Access Server (OLE DB) 2018 SP3 Setup window, click OK.
4. In the PI SQL Data Access Server (OLE DB) 2018 SP3 Setup window, click Install. The installation runs.
5. In the Completed the PI SQL Data Access Server (OLE DB) 2018 SP3 Setup Wizard window, click Finish.
6. In the Installation Complete window, click Close.

2.1.12 PI DataLink Installation

PI DataLink directly integrates PI Server data with Microsoft Excel to easily analyze all operational data using the powerful analytic features of spreadsheets.

Note If Microsoft Excel is not installed, do not install PI DataLink.

➢ To install PI DataLink 2019 SP1
1. Go to C:\distrib\files\applications\PI2018-SP3\DataLink.
2. Right-click on PIDataLink_2019_SP1_.exe and select Run as administrator.
3. In the PI DataLink 2019 SP1 Install Self-Extracting Executable dialog, click OK.
4. In the Welcome to the PI DataLink Setup window, click OK.
5. In the PI DataLink Setup: Customer Experience Improvement window, select No, I would not like to participate at this time and click Finish.
6. In the PI DataLink: Installation Complete window, click Close.
2.1.13 **PI ProcessBook Installation**

PI ProcessBook helps users instantly access and visualize PI Server data through interactive, graphical, displays which can be simultaneously populated with live data, years of historical data, and predictive/forecast data.

![Attention](Image)

You must first uninstall PI AF Client 2018 SP3 in order to install PI ProcessBook 2015 R3. If you proceed without uninstalling PI AF Client 2018 SP3 you will get an error “PI AF Client 2.3.0.4045 or later must be installed before PI ProcessBook 2015 R3” and the installation will fail.

2.1.13.1 **Uninstall PI AF Client 2018 SP3**

*Note* You must have administrator privileges on the computer to uninstall PI AF Client 2018 SP3 using a stand-alone installation program.

➢➢ **To uninstall PI AF Client 2018 SP3**

1. Open the *Windows Control Panel* and select *Programs and Features*.
2. Double-click *PI AF Client 2018 SP3*.
3. A message prompts you to confirm the uninstall. Click *Yes*. The *PI AF Client* program is removed.

If you do not have administrative rights on the computer, perform the following steps to uninstall PI AF Client 2018 SP3.

➢➢ **To uninstall PI AF Client 2018 SP3 without administrative rights**

1. Open an *Administrator Command Prompt* (*Command Prompt > Run as administrator*).
2. In the *Administrator: Command Prompt* window, enter *regedit*. The *Registry Editor* opens.
3. In the *Registry Editor* window, go to `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall`.
4. You will see multiple keys with globally unique IDs. Highlight each one looking at the *DisplayName* until you locate *PI AF Client 2018 SP3*.
5. When you locate the key with *DisplayName PI AF Client 2018 SP3*, double-click on the *UninstallString* and copy the *Value data* contents. Click *Cancel* after copying.
6. Go back to the *Administrator: Command Prompt* window and paste the *UninstallString* value that you copied.
8. Close the *Registry Editor* window.

2.1.13.2 **Install PI ProcessBook**

➢➢ **To install PI ProcessBook 2015 R3**

1. Go to `C:\distrib\files\applications\PI2018-SP3\ProcessBook`.
2. Right-click on `PIProcessBook_2015-R3_.exe` and select *Run as administrator*.
3. In the *PI ProcessBook 2015 R3 Self-Extracting Executable* dialog, click *OK*.
4. In the *Welcome to the PI ProcessBook 2015 R3 Setup* window, click *OK*.
5. In the *Welcome to the PI AF Client 2018 SP2 Installation* window, click *Next*.
6. In the PI AF Client 2018 SP2 Setup: Customer Experience Improvement window, select **No, I would not like to participate at this time** and click **Next**.

7. In the PI AF Client 2018 SP2 Setup: Select Features window, accept the default and click **Next**.

8. In the PI AF Client 2018 SP2 Setup: Ready to Install the Application window, click **Install**. PI AF Client 2018 SP2 installs followed by PI ProcessBook 2015 R3.

9. In the PI ProcessBook 2015 R3 Installation Complete window, click **Close**.

### 2.1.13.3 Re-install PI AF Client 2018 SP3

➢➢ **To re-install PI AF Client 2018 SP3**

1. Go to `C:\distrib\files\applications\PI2018-SP3\PIServer`.

2. Right-click on **PI-Server_2018-SP3_.exe** and select **Run as administrator**.

3. In the PI Server 2018 SP3 Installer: Maintenance window, select **Modify** and click **Next**.

4. In the PI Server 2018 SP3 Installer: Feature Selection window (Server Roles tab), **PI Data Archive** and **AF Server** are checked. The **Summary** panel shows features to be upgraded and features already installed. Click **Next**.

![Feature Selection Window](image-url)
5. In the PI Server 2018 SP3 Installer: Data Archive window, confirm the license directory is \Program Files\PI\Data and click Next.

6. In the PI Server 2018 SP3 Installer: Summary window, click Modify.

7. In the Files In Use dialog, select Automatically close applications and attempt to restart them after setup is complete. (A reboot may be required if interactive applications are running) and click OK.

8. In the PI Server 2018 SP3 Installer: Complete window, click Close.
2.2 **PI 2015 Installation**

2.2.1 **Prerequisites**

The following must be completed on the PI Historian computer prior to starting the installation process:

- Verify that the Computer Name is set to the desired system name
- Install WorkstationST (to get the GE WorkstationST OPC DA Server service)
- Install Excel (to be able to install PI DataLink)
- Create the directory `C:\PI-License`
- Create the directory `E:\Backup`
- Open Inbound Firewall Port 5450
- Disable the Windows Time Zone (TZ) environment variable
- Create a Machine Signature File

2.2.1.1 **Create a Machine Signature File**

You must first create a Machine Signature File (MSF) before a license file can be generated for your PI System.

**Before you start**

- If the PI Historian has multiple Ethernet ports, ensure they are plugged in so that the MAC addresses of each of these ports are registered by the MSF for your machine. The license matching process checks to see if at least one of the MAC addresses are identified when comparing against the list of MAC addresses registered during the creation of the MSF.
- Unplug any non-essential hard drives or thumb drives that will not be present during normal operation of the PI Historian. Because the MSF is an identifying thumb print of the host machine at the time of license generation, any changes to the configuration of the machine may cause a license mismatch to occur.

➢➢ **To generate an MSF**

1. Go to `C:\PI-License`.
2. Right-click on `MSFCmdGen.exe` and select Run as administrator. This generates the MSF.
3. Once the MSF is generated, a Created localhost.msf Press any key to exit. dialog appears.
4. Go to `C:\PI-License` and locate localhost.msf.
5. Copy the MSF to an internet-accessible computer and send it to a GE Historian Engineer who has access to the OSIsoft Customer Portal.

2.2.2 **Installation Overview**

The installation order of PI Server 2015 is important. The order is outlined below.

1. OSIsoft Prerequisites
2. Microsoft SQL Server
3. PI AF Server
4. PI Data Archive
5. PI Interface for OPC DA (OPCInt)
6. PI OPC DA and HDA Server
7. PI DataLink
8. PI ProcessBook
9. PI Licensing
2.2.3 **OSIsoft Prerequisites Installation**

Installation of an OSIsoft product on Windows relies on the presence of Microsoft operating system components such as the Microsoft .NET Framework and Microsoft run time libraries. OSIsoft Prerequisite Kits verify and install the needed operating system prerequisites.

➢ **To install the OSIsoft Prerequisite Kit**

1. Go to `C:\distrib\files\applications\PI2015\OSIPreRequisites`.
2. Right-click on `Setup.exe` and select **Run as administrator**.
3. In the **OSIsoft Prerequisite Kit** dialog, click **OK**.
4. When installation completes, click **Close**.

2.2.4 **Microsoft SQL Server Installation**

The Microsoft SQL Server is not actually a part of the PI Server but is a dependency. SQL Server Express can be used for systems with few assets (10,000 assets or less) and low-to-moderate workloads (25,000 PI points or fewer).

➢ **To install Microsoft SQL Server 2012**

1. Go to `C:\distrib\files\applications\PI2015\SQLServer`.
2. Right-click on `SQLEXPRWTx64ENU_2012_.exe` and select **Run as administrator**.
3. In the **SQL Server Installation Center** window, click **New SQL Server stand-alone installation or add features to an existing installation**.

4. In the **SQL Server 2012 Setup: License Terms** window, select (check) the **I accept the license terms** check box and click **Next**.

5. In the **SQL Server 2012 Setup: Product Updates** window, click **Next**. The PI Historian Server is not connected to the Internet, so no need to check for updates.
6. In the *SQL Server 2012 Setup: Feature Selection* window, accept the defaults and click **Next**.

7. In the *SQL Server 2012 Setup: Instance Configuration* window, accept the defaults and click **Next**.
8. In the SQL Server 2012 Setup: Server Configuration window, accept the defaults and click Next.

9. In the SQL Server 2012 Setup: Database Engine Configuration window:
   a. For Cybersecurity jobs:
      i. On the Server Configuration tab, click Add.
      ii. In the Select Users, Computers, Service Accounts, or Groups dialog, type HMI and click Check Names.
      iii. In the Multiple Names Found dialog, select HMI Administrators and click OK.
      iv. In the Select Users, Computers, Service Accounts, or Groups dialog, click OK.
      v. In the SQL Server 2012 Setup: Database Engine Configuration dialog, HMI\HMI Administrators should display. Click Next.
   b. For non-Cybersecurity jobs (no domain):
      i. On the Server Configuration tab, click Add.
      ii. In the Select Users, Computers, Service Accounts, or Groups dialog, type Admin and click Check Names.
      iii. In the Select Users, Computers, Service Accounts, or Groups dialog, click OK.
      iv. In the SQL Server 2012 Setup: Database Engine Configuration dialog, \Server Name\Admin should display. Click Next.

10. In the SQL Server 2012 Setup: Error Reporting window, leave the check box unchecked, click Next.

11. In the SQL Server 2012 Setup: Installation Progress window, wait until installation completes.

12. In the SQL Server 2012 Setup: Complete window, verify that all features succeeded and click Close.

13. Click the X to close the SQL Server Installation Center window.
2.2.5 **PI AF Server Installation**

PI Asset Framework (PI AF) is a single repository for asset-centric models, hierarchies, objects, and equipment. It integrates, contextualizes, refines, references, and further analyzes data from multiple sources, including one or more PI Data Archives and non-PI sources such as external relational databases.

➢ **To install PI AF Server 2015 R2**

1. Go to `C:\distrib\files\applications\PI2015\AFServer`.
2. Right-click on `PI-AF-Server_2015-R2_.exe` and select **Run as administrator**.
3. In the **PI AF Server 2015 R2 Self-Extracting Executable** dialog, click **OK**.
4. In the **PI AF Server 2015 R2: Welcome to the PI AF Server 2015 R2 Setup** window, click **OK**.
5. In the **PI AF Server 2015 R2 Setup: Welcome to the PI AF Server 2015 R2 Installation** window, click **Next**.
6. In the **PI AF Server 2015 R2 Setup: Destination Folder** window, accept the default and click **Next**.
7. In the *PI AF Server 2015 R2 Setup: Select Features* window, click **Next**.

8. In the *PI AF Server 2015 R2 Setup: Logon Information* window, accept the default and click **Next**.
9. In the PI AF Server 2015 R2 Setup: SQL Server Connection window, enter `<Server Name>\SQLEXPRESS` where `<Server Name>` is the name of the PI Historian Server. Click Next.

![SQL Server Connection Window](image)

10. In the PI AF Server 2015 R2 Setup: Ready to Install the Application window, click Install.

![Ready to Install the Application Window](image)

11. In the PI AF Server 2015 R2: Reboot Your Computer to Finish dialog, click Yes. The computer reboots.

12. In the PI AF Server 2015 R2: Installation Complete window, verify that all modules installed and click Close.
2.2.6 PI Data Archive Installation

PI Data Archive is a component of the PI Server that provides efficient storage and archiving of time series data. It is the cornerstone of the PI System and your data infrastructure, enabling high-performance data storage and retrieval by client software.

➢ To install PI Data Archive 2015 R2 SP1

1. Go to C:\distrib\files\applications\PI2015\PIServer.

2. Right-click on PIDataArchive_2015_R2_SP1.exe and select Run as administrator.

3. In the PI Data Archive 2015 R2 SP1 setup self-extractor dialog, click OK.

4. In the PI Data Archive 2015 R2 SP1: Welcome to the PI Data Archive 2015 R2 SP1 Setup window, click OK.

5. In the PI Data Archive 2015 R2 SP1: License File window, click the ellipsis to browse and select C:\PI-License \pilicense.dat, then click Next.

6. In the PI Data Archive 2015 R2 SP1: Default Server window, enter the PI Historian Server name (in this example, HIST1_SVR) and click Next.
7. In the *PI Data Archive 2015 R2 SP1: Installation Directories* window, accept the defaults and click **Next**.

![Image of Installation Directories window]

8. In the *PI Data Archive 2015 R2 SP1: Data Directories* window:
   a. In the **Historical Archives** field, enter `D:\PI_ARCH`.
   b. In the **Future Archives** field, enter `D:\PI_ARCH\future`.
   c. In the **Event Queues** field, enter `E:\PI\queue`.
   d. Click **Modify Archive Settings…**
   e. In the **Archive Settings** dialog:
      i. For **Create historical archives automatically?**, select **No**.
      ii. In the **Empty historical archives to create at installation time** field, enter **700**.
      iii. In the **Size in MB for historical archives** field, enter **512**.
      iv. Click **OK**.

![Image of Archive Settings dialog]
f. Verify that the PI Data Archive 2015 R2 SP1: Data Directories window matches the figure below and click Next.

![Data Directories Window](image)

9. In the PI Data Archive 2015 R2 SP1: Service Status window, verify that all services start successfully and click Next.

10. In the PI Data Archive 2015 R2 SP1: Installation Complete window, verify that all modules installed and click Close.

### 2.2.7 PI Interface for OPC DA (OPCInt) Installation

PI Interface for OPC DA is designed specifically to transmit data between OPC Servers and the PI System. OPC is a standard established by the OPC Foundation task force to allow applications to access process data from the plant floor in a consistent manner.

PI OPC DA Interface APS Connector allows PI Auto Point Synchronization (PI APS) to synchronize PI OPC DA Interface points with their OPC Server equivalents. The set of attributes which may be synchronized depends on the OPC server being used.

➢➢➢ To install PI OPC DA (OPCInt) APS Connector 1.2.0.0

1. Go to C:\distrib\files\applications\PI2015\OPCInt.
2. Right-click on OPCInt_APS_1.2.0.0.exe and select Run as administrator.
3. In the WinZip Self-Extractor – OPCInt_APS_1.2.0.0.exe dialog, click Unzip.
4. In the PI OPC DA (OPCInt) APS Connector 1.2.0.0: Welcome to the PI OPC DA (OPCInt) APS Connector 1.2.0.0 Setup window, click OK.
5. In the PI OPC DA (OPCInt) APS Connector Setup: Welcome to the PI OPC DA (OPCInt) APS Connector Installation Wizard window, click Next.
6. In the PI OPC DA (OPCInt) APS Connector Setup: User Information window:
   a. In the Full Name field, enter the PI Historian Server name (for example, HIST1_SVR).
   b. In the Organization field, enter GE Energy.
   c. Select (enable) Anyone who uses this computer.
   d. Click Next.
7. In the **PI OPC DA (OPCInt) APS Connector Setup: Destination Folder** window, accept the default and click **Next**. The installation runs.

![Destination Folder](image1.png)

8. The **PI OPC DA (OPCInt) APS Connector Setup: PI OPC DA (OPCInt) APS Connector** has been successfully installed window opens. Click **Finish**.

9. The **PI OPC DA (OPCInt) APS Connector 1.2.0.0: Installation Complete** window opens, verify that all modules installed and click **Close**.

### 2.2.8 PI OPC DA and HDA Server Installation

PI OPC HDA Server allows any industry standard HDA client application to read data from PI, insert new data into PI, or delete data from PI. The server allows access both to PI Data Archive tags and to the PI Module Database (PI MDB) modules, aliases, and properties. The OPC HDA standard is designed for the retrieval of historical process data.

➢➢➢➢➢

To install PI OPC DA and HDA Server 2010

1. Go to `C:\distrib\files\applications\PI2015\OPCDAHDAServer`.
2. Right-click on **PIOPCServer_2010_.exe** and select **Run as administrator**.
3. In the **WInZip Self-Extractor** dialog, click **OK**.
4. In the **WInZip Self-Extractor – PIOPCServer_2010_.exe** dialog, click **Unzip**.
5. In the **PI OPC DA/HDA Server 2010: Welcome to the PI OPC DA/HDA Server 2010 Setup** window, click **OK**.
6. In the **PI OPC DA/HDA Server 2010 Setup: Welcome to the PI OPC DA/HDA Server 2010 Installation Wizard** window, click **Next**.
7. In the **PI OPC DA/HDA Server 2010 Setup: User Information** window:
   a. In the **Full Name** field, enter the PI Historian Server name (for example, HIST1_SVR).
   b. In the **Organization** field, enter **GE Energy**.
   c. Select (enable) **Anyone who uses this computer**.
   d. Click **Next**.
8. In the PI OPC DA/HDA Server 2010 Setup: Destination Folder window, accept the default and click Next.

9. In the PI OPC DA/HDA Server 2010 Setup: Ready to Install the Application window, click Next.


11. The PI OPC DA/HDA Server 2010: Installation Complete window opens, verify that all modules installed and click Close.

2.2.9 PI DataLink Installation

Note If Microsoft Excel is not installed, do not install PI DataLink.

➢ To install PI DataLink 2015

1. Go to C:\distrib\files\applications\PI2015\DataLink.

2. Right-click on PIDataLink_2015A_.exe and select Run as administrator.

3. In the PI DataLink: Welcome to the PI DataLink Setup window, click OK.

4. In the PI DataLink Setup: Welcome to the PI DataLink Setup Wizard window, click Next.

5. In the PI DataLink Setup: User Information window:
   a. In the Full Name field, enter the PI Historian Server name (for example, HIST1_SVR).
   b. In the Organization field, enter GE Energy.
   c. Click Next.
6. In the PI DataLink Setup: Ready to install PI DataLink window, click **Install**.

7. In the PI AF Client 2015 Setup: Welcome to the PI AF Client 2015 Installation window, click **Next**.

8. In the PI AF Client 2015 Setup: Customer Experience Improvement window, select (enable) **No, I would not like to participate at this time** and click **Next**.

9. In the PI AF Client 2015 Setup: Select Features window, click **Next**.
10. In the PI AF Client 2015 Setup: Ready to Install the Application window, click Install.

![PI AF Client 2015 Setup](image)

11. In the PI DataLink 2015 x86 Setup: Customer Experience Improvement window, select (enable) **No, I would not like to participate at this time** and click Finish.

12. In the PI DataLink: Installation Complete window, verify that all modules installed and click Close.

### 2.2.10 PI ProcessBook Installation

➢➢ To install PI ProcessBook 2015

1. Go to `C:\distrib\files\applications\PI2015\ProcessBook`.
2. Right-click on `PIProcessBook_2015_.exe` and select **Run as administrator**.
3. In the **PI ProcessBook 2015: This will install PI ProcessBook 2015 on your system** dialog, click OK.
5. In the **PI ProcessBook 2015: Welcome to the PI ProcessBook 2015 Setup** window, click OK.
6. In the **PI ProcessBook 2015: Running Services** window, click Next.
7. In the *PI ProcessBook 2015: Services Status* window, click **Next**.

8. In the *PI ProcessBook 2015: Installation Complete* window, verify that all modules installed and click **Close**.
2.2.11  **PI Licensing**

In contrast to creating an MSF, which is done directly from a PI Historian host machine, a license file is generated by a GE Historian Engineer on the OSIsoft Customer Portal.

A GE Historian Engineer with access to the OSIsoft Customer Portal will generate the license and send you a `pilicense.zip` file. It contains the following files:

- `pilicense.dat`, your license file
- `PI Server License Readme.pdf`
- `Manifest.html`, a list of the contents of your license file
- if you have an HA license, it also includes `temporarylicense.dat`

### 2.2.11.1  **PI License Installation**

➢➢➢  **To install the PI License**

1. Copy the `pilicense.zip` file to the `C:\PI-License` directory on the PI Historian Server.
2. Go to `%PISERVER%\adm`, right-click on `pisvrstop.bat` and select **Run as administrator**. The batch file runs.
3. Go to `%PISERVER%\dat` and rename `pilicense.dat` to `pilicense.dat.old`.
4. Go to `C:\PI-License`, unzip the zip file and copy `pilicense.dat` to `%PISERVER%\dat`.
5. Go to `%PISERVER%\adm`, right-click on `pisvrstart.bat` and select **Run as administrator**. The batch file runs.

The PI License should now be installed.

### 2.2.11.2  **PI License Verification**

➢➢➢  **To verify that the installed license is active and permanent**

1. From the **Start** menu, select **PI System**, then select **PI System Management Tools**. **PI System Management Tools** opens.
2. In the **System Management Tools** pane, expand **Operation** and select **Licensing**. The Licensing manager displays license activation information for the selected PI Data Archive server.
3. Expand **General**. The **Exp Time** entry indicates when your license activation expires. This should be **Never**. If there is a date in the **Exp Time**: field, then the license is temporary.
2.3 Historian Reports Installation

Note PI 2018 SP3 requires Historian Reports – V07.07.01C or later.

Historian Reports allows you to generate periodic and real-time reports using the historical data.

➢➢➢ To install Historian Reports

1. Place the ControlST Software Suite DVD in the CD-ROM drive.
2. From the Setup – GE ControlST Software Suite - Vnn.nn.nnC dialog box select Historian Reports — Vnn.nn.nnC.
3. In the Setup dialog box, click Yes.

4. From the Setup - ControlST Software Suite - Vnn.nn.nnC dialog box, click Install.
5. When the installation is complete, click Yes to exit setup.

Attention After installation, the post-installation procedures must be performed. For these instructions, refer to the Historian Report Post-installation Instruction Guide (GEI-100753).
2.4  **PI Combo Installation**

Additional licenses for PI DataLink and PI ProcessBook may have been purchased allowing these programs to be installed on select HMIs.

2.4.1  **PI 2018 SP3 Systems**

If PI Combo was purchased, go to *C:\distrib\files\applications\PI2018-SP3* on the PI Historian and copy the *DataLink* and *ProcessBook* folders to *C:\distrib\files\applications\PICombo* on the select HMI(s).

2.4.1.1  **PI DataLink Installation**

*Note*  If Microsoft Excel is not installed, do not install PI DataLink.

➢➢  **To install PI DataLink 2019 SP1 on the HMI**

1. Go to *C:\distrib\files\applications\PICombo\DataLink*.
2. Right-click on *PIDataLink_2019_SP1_.exe* and select **Run as administrator**.
3. In the *PI DataLink 2019 SP1 Install Self-Extracting Executable* dialog, click **OK**.
4. In the *Welcome to the PI DataLink Setup* window, click **OK**.
5. In the *PI DataLink Setup: Customer Experience Improvement* window, select **No, I would not like to participate at this time** and click **Finish**.
6. In the *PI DataLink: Installation Complete* window, click **Close**.

2.4.1.2  **PI ProcessBook Installation**

*Attention*  You must first uninstall PI AF Client 2018 SP3 in order to install PI ProcessBook 2015 R3. If you proceed without uninstalling PI AF Client 2018 SP3 you will get an error “PI AF Client 2.3.0.4045 or later must be installed before PI ProcessBook 2015 R3” and the installation will fail.

*Note*  You must have administrator privileges on the computer to uninstall PI AF Client 2018 SP3 using a stand-alone installation program.

➢➢  **To uninstall PI AF Client 2018 SP3 on the HMI**

1. Open the *Windows Control Panel* and select **Programs and Features**.
2. Double-click *PI AF Client 2018 SP3*.
3. A message prompts you to confirm the uninstall. Click **Yes**. The *PI AF Client* program is removed.

If you do not have administrative rights on the computer, perform the following steps on the HMI to uninstall PI AF Client 2018 SP3.

➢➢  **To uninstall PI AF Client 2018 SP3 on the HMI without administrative rights**

1. Open an **Administrator Command Prompt** (Command Prompt > Run as administrator).
2. In the **Administrator: Command Prompt** window, enter `regedit`. The Registry Editor opens.

3. In the **Registry Editor** window, go to `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall`.

4. You will see multiple keys with globally unique IDs. Highlight each one looking at the **DisplayName** until you locate **PI AF Client 2018 SP3**.

5. When you locate the key with **DisplayName PI AF Client 2018 SP3**, double-click on the **UninstallString** and copy the **Value data** contents. Click **Cancel** after copying.

6. Go back to the **Administrator: Command Prompt** window and paste the **UninstallString** value that you copied.


8. Close the **Registry Editor** window.

➢➢

**To install PI ProcessBook 2015 R3 on the HMI**

1. Go to `C:\distrib\files\applications\PICombo\ProcessBook`.

2. Right-click on `PIProcessBook_2015-R3_.exe` and select **Run as administrator**.

3. In the **PI ProcessBook 2015 R3 Self-Extracting Executable** dialog, click **OK**.

4. In the **Welcome to the PI ProcessBook 2015 R3 Setup** window, click **OK**.

5. You may get a **PI ProcessBook 2015 R3: Running Services** window, click **Next**.

6. In the **Welcome to the PI AF Client 2018 SP2 Installation** window, click **Next**.

7. In the **PI AF Client 2018 SP2 Setup: Customer Experience Improvement** window, select **No, I would not like to participate at this time** and click **Next**.

8. In the **PI AF Client 2018 SP2 Setup: Select Features** window, accept the default and click **Next**.

9. In the **PI AF Client 2018 SP2 Setup: Ready to Install the Application** window, click **Install**. PI AF Client 2018 SP2 installs followed by PI ProcessBook 2015 R3.

10. You may get a **PI ProcessBook 2015 R3: Service Status** window, click **Next**.

11. In the **PI ProcessBook 2015 R3 Installation Complete** window, click **Close**.

➢➢

**To re-install PI AF Client 2018 SP3 on the HMI**

1. Go to `C:\distrib\files\applications\PICombo\DataLink`.

2. Right-click on `PIDataLink_2019-SP1_.exe` and select **Run as administrator**.

3. In the **PI DataLink 2019 SP1 Install Self-Extracting Executable** dialog, click **OK**.

4. In the **Welcome to the PI DataLink Setup** window, click **OK**.

5. In the **Welcome to the PI AF Client 2018 SP3 Installation** window, click **Next**.

6. In the **PI AF Client 2018 SP3 Setup: Customer Experience Improvement** window, select **No, I would not like to participate at this time** and click **Next**.

7. In the **PI AF Client 2018 SP3 Setup: Select Features** window, accept the default and click **Next**.

8. In the **PI AF Client 2018 SP3 Setup: Ready to Install the Application** window, click **Install**.

9. In the **PI DataLink: Installation Complete** window, click **Close**.
2.4.2 PI 2015 Systems

If PI Combo was purchased, go to C:\distrib\files\applications\PI2015 on the PI Historian and copy the DataLink and ProcessBook folders to C:\distrib\files\applications\PICombo on the select HMI(s).

2.4.2.1 PI DataLink Installation

**Note** If Microsoft Excel is not installed, do not install PI DataLink.

➢➢ To install PI DataLink 2015 on the HMI

1. Go to C:\distrib\files\applications\PICombo\DataLink.
2. Right-click on PIDataLink_2015A_.exe and select Run as administrator.
3. In the PI DataLink: Welcome to the PI DataLink Setup window, click OK.
4. In the PI DataLink Setup: Welcome to the PI DataLink Setup Wizard window, click Next.
5. In the PI DataLink Setup: User Information window:
   a. In the Full Name field, enter the PI Historian Server name (for example, HIST1_SVR).
   b. In the Organization field, enter GE Energy.
   c. Click Next.
6. In the PI DataLink Setup: Ready to install PI DataLink window, click Install.
7. In the PI AF Client 2015 Setup: Welcome to the PI AF Client 2015 Installation window, click Next.
8. In the PI AF Client 2015 Setup: Customer Experience Improvement window, select No, I would not like to participate at this time and click Finish.
9. In the PI AF Client 2015 Setup: Select Features window, click Next.
10. In the PI AF Client 2015 Setup: Ready to Install the Application window, click Install.
11. In the PI DataLink 2015 x86 Setup: Customer Experience Improvement window, select (enable) No, I would not like to participate at this time and click Finish.
12. In the PI DataLink: Installation Complete window, verify that all modules installed and click Close.

2.4.2.2 PI ProcessBook Installation

➢➢ To install PI ProcessBook 2015 on the HMI

1. Go to C:\distrib\files\applications\PICombo\ProcessBook.
2. Right-click on PIProcessBook_2015_.exe and select Run as administrator.
3. In the PI ProcessBook 2015: This will install PI ProcessBook 2015 on your system dialog, click OK.
5. In the PI ProcessBook 2015: Welcome to the PI ProcessBook 2015 Setup window, click OK.
8. In the PI ProcessBook 2015: Installation Complete window, verify that all modules installed and click Close.
3 Configuration

3.1 PI OPC HDA Server Configuration

3.1.1 Configure PI OPC HDA Server Service

Configure the PI OPC HDA Server Service to run under the local Admin account.

➢ To configure the PI OPC HDA Server Service to run as local Admin

1. From the Control Panel, select Administrative Tools, then select Services.
2. Right-click on PI OPC HDA Server and select Properties.
3. In the PI OPC HDA Server Properties (Local Computer) dialog, select the Log On tab.
4. On the Log On tab:
   a. Select This account:
   b. In the This account: field, enter the local Admin account (in this example, \Admin).
   c. In the Password field, enter the local Admin password.
   d. In the Confirm password field, enter the local Admin password.
   e. Click OK.
3.1.2 Configure PI OPC HDA Server DCOM

Configure the PI OPC HDA Server in DCOM to run under the PI Historian Admin account.

➢➢

To configure the PI OPC HDA Server in DCOM to run as PI Historian Admin

1. Open an Administrator Command Prompt (Command Prompt > Run as administrator).
2. In the Administrator: Command Prompt window, enter the following command and press [Enter].

   MMC /32 %windir%\syswow64\comexp.msc

The 32-bit version of Component Services opens.

3. In the Component Services window, expand the tree down to and including DCOM Config.

![Component Services Window]

4. Under DCOM Config, locate PI_OSIHDA.

![Component Services Window]

5. Right-click on PI_OSIHDA and select Properties.
6. In the PI_OSIHDA Properties dialog:
   a. Select the General tab.
      i. In the Authentication Level field, select Default.
   b. Select the Security tab.
      i. In the Launch and Activation Permissions field, select Use Default.
      ii. In the Access Permissions field, select Use Default.
   c. Select the Identity tab.
      i. Select (enable) This user.
      ii. In the User field, click Browse and select the historian Admin account.
iii. In the **Password** field, enter the historian Admin password.

iv. In the **Confirm Password** field, re-enter the historian Admin password.

v. Click **Apply**, then click **OK**.

7. Close the *Component Services* window.

8. Restart the **PI OPC HDA Server** service.
3.2 **PI Historian Excel Add-ins**

The PI Historian Excel Add-ins are automatically enabled during some PI installations. If the Microsoft Excel toolbar does not show PI DataLink and PI Builder, perform the following steps to enable them.

➢➢ **To enable the PI Historian Excel Add-ins**

1. Open **Microsoft Excel** and select **Blank workbook**.
2. From the Excel **File** menu, select **Options**.
3. In the Excel **Options** dialog box, click **Add-Ins**.
4. In the **Manage** drop-down list, select **Excel Add-ins**, then click **Go**.
5. In the **Add-Ins** dialog box, select **PI DataLink** and **PIAFBuilder**, then click **OK**.

The **PI DataLink** and **PI Builder** tabs are now available in the Microsoft Excel toolbar.

3.3 **Time Synchronization Configuration**

*Note* This is only required when the time zone of the PI Historian is changed.

➢➢ **To synchronize time between the HMI and the PI Historian**

1. From the **Start** menu, select **Control Panel**, then select **Date and Time**.
2. Verify that all system computers are set to the correct time zone and local time.
3. Verify that all configured HMI times are set in the *.tcw* file. Refer to the **ControlST Software Suite How-to Guides** (GEH-6808), the chapter **How to Configure Time Synchronization in the ToolboxST Application**.
4. On the PI Historian, locate `%PISERVER%\dat` and rename **localhost.tz** to **localhost.tzold**. Changing the file name and restarting the PI server recreates the PI time zone file.
3.4 **WorkstationST Historian**

The WorkstationST Historian is a feature of the WorkstationST application that allows users to configure PI Historians to collect long-term data from the system components. The PI Historian’s OPC® client is configured to read the data from the WorkstationST OPC Data Access (DA) server. The collected data is accessible through the ToolboxST Trender, as well as the PI Historian’s data access applications.

The WorkstationST Historian feature allows users to:

- Configure storage of all data available through the WorkstationST OPC DA server
- Automatically configure variables with a defined Historian Deadband
- Override pre-configured variables
- Add non-configured variables
- Configure Historian reports
- Configure Archive Backup Management

**Note** For WorkstationST Historian configuration procedures and more information, refer to the *WorkstationST Historian Instruction Guide* (GEI-100628).
3.5 **PI Historian Archives**

PI Archives are the files that the PI Server uses to store PI data. They are located on the history disk in the `PI_ARCH` directory (typically `D:\PI_ARCH` on the PI Historian). The typical archive size is 512 MB. PI Historian archives use roughly 75% of the history disk. Each archive file contains events for a time period specified by the archive start time and end time.

The PI system shifts from the current primary archive to the next available archive (making it the new primary archive) when an archive reaches its size limit. This next available archive is either an empty archive or the oldest used archive (if an empty one is not available). The PI system uses these archives in a circular queue.

For PI 2018 SP3, automatic archive creation is enabled. During installation, a single archive is created with the name of the form `COMPUTERNAME_YYYY-MM-DD_HH-MM-SS.arc`. The start time of this archive will be the midnight corresponding to the day that the PI Data Archive server was first started.

If you do not want to enable auto-archive creation for an installation, specify a certain number of archives to be created as part of the install. The archive file names in this case will be `piarch.001`, `piarch.002`, `piarch.003`, and so on, by default. Piarch.001 will have a start time of midnight and the remaining archive files will be empty.

PI Snapshot Subsystem receives all the new data events for all PI points, regardless of the sending application. The event queue is a buffer that consists of one or more files that store events that are destined for storage in a PI archive file. PI Snapshot Subsystem writes events into the event queue, and PI Archive Subsystem reads events out of the event queue. The event queue protects against data loss due to disruptions in communication between the Snapshot Subsystem and the PI archive, such as an archive backup or a failure of the disk drive on which the archives are located.

By default, event queues are written to the drive with the second-most available free space, provided at least 5 GB is available. For new installations, you can override this default value and choose the event queue location (typically `E:\PI\queue` on the PI Historian).

OSIsoft recommends you store the event queue on a separate physical drive from the PI archive files. Using separate drives allows data to be read from the even queue and written to the archive simultaneously, thereby optimizing data throughput.

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**Note** When the PI Historian system is initially installed, all available archives are registered by default. To view a list of archives, run the `piartool` program.

➢➢ To view a list of registered archives

1. From the **Command Prompt**, enter `cd /d %PISERVER%\adm` and press **Enter**.
2. Enter `piartool –al >c:\temp\piarclist.txt` and press **Enter**.
3. Enter `notepad c:\temp\piarclist.txt` and press **Enter**.

The list of registered archives displays in Notepad in reverse chronological order with the primary archive listed first. Each archive listed has the associated Start Time and End Time. The archive with a valid Start Time (such as 15-Jan-20 05:37:48) and the value *Current Time* for the End Time, is the primary archive and should be the first archive listed. An archive with a valid Start Time and a valid End Time was previously the primary archive. Archives with the value *Current Time* for the Start and End Times have not had data written to them and are therefore currently empty.
3.5.1 Data Compression

The PI Historian has a real-time database controlled by the PI Snapshot subsystem, and Historian archives controlled by the PI Data Archive subsystem. The application programs that write data to the PI system are configured to read controller variables from the OPC DA server once per second. Each variable value is compared to the previous value written to the PI system for that variable. If the value has changed by the variable’s exception deviation, that variable’s value is written to the PI Snapshot database. The PI Snapshot database saves every variable that is passed to it in the Snapshot.

Whenever a variable is passed into the PI Snapshot, the PI Data Archive subsystem determines if that value should be saved in the archive or discarded. The filter between the application and the PI Snapshot is based on the exception deviation value, which is used as a deadband.

Note: Historical filtering determines whether a variable value is archived or discarded.

The filter between the PI Snapshot and the PI Data Archive is based on the slope of the value, or the first-time derivative of the value. PI uses the compression deviation in a swinging door compression algorithm to determine the current slope of the value. If the previous value written falls outside that slope, it is saved in the PI Data Archive subsystem. This greatly reduces the number of samples saved because it filters on the derivative of the value, not on the value itself.

The exception deviation is a deadband on the value, but the compression deviation is a deadband on the slope. More precisely, the value of compression deviation equals the furthest distance away from the projected slope available without saving another value (thereby projecting a new slope).

3.5.2 PI Point Database

The PI Point Database defines and configures the variables that it maintains. This database can be created either by running an interactive tool or by using a batch processor. The batch processor, piconfig.exe, is distributed as part of the normal PI distribution in %PISERVER%adm.

3.5.2.1 Naming Conventions

In the PI Historian, a unit name and a variable uniquely identify values. This scheme allows unit definitions to be duplicated easily by only changing the unit name. The design of the database requires that each tag name be unique. In the old standard for the PI application, two- or four-letter unit names were recommended, with a colon separating the unit name from the point name. The variable is a simple string. Today, the PI Historian uses the unit’s controller name concatenated with a period and the variable name to uniquely identify each tag, for example G1.TNH is the tag name for unit G1 speed point.

Note: The PI Server does not accept a backslash in the variable name. A backslash is replaced with an underscore when the variable is configured in the PI application.

3.5.2.2 ASCII Variable Definition File – piconfig.dif

The piconfig.dif file, which is used as the input to the PICONFIG program, is an instance of a generic table modification data file and contains instructions for the PICONFIG program. It lists the current table and the format of input data being used. When building a PI Historian in the WorkstationST application, your piconfig.dif file is automatically updated and imported to the system.

3.5.2.3 Data File Import

The WorkstationST Historian automatically creates this file and imports it into the PI configuration utility whenever a change is made to the PI Historian configuration. The PI Server must be running to import the PI configuration input file. The file is treated as input to the PICONFIG program.
3.5.3 Add Archives

➢ To add an archive

1. From the Start menu, select PI System, then select PI System Management Tools. PI System Management Tools opens.

2. In the System Management Tools pane, expand Operation and select Archives.

3. Click Create a new archive.

4. In the Create New Historic Archive dialog:
   a. Select Single archive.
   b. In the Archive path field, enter the desired path (for example, D:\PI_ARCH).
   c. In the Archive name field, enter a name for the new archive.
   d. Select a source option to create the archive.
   e. Click OK. The archive is created and registered.
3.6 Archive Backup Management

The PI Historian uses fixed-length archives to store data. When these archives are filled, the PI Historian reuses the oldest, writeable archive.

**Note** PI backup procedures may be changed by OSIsoft without notice, but are accurate at time of this publication. Refer to the OSIsoft® PI Data Archive System Management Guide for detailed information regarding the backup procedures.

3.6.1 PI Backup Procedure

The `pibackup.bat` file is supplied with the PI Server for backing up archives and archive configuration information. It is in the `%PISERVER%\adm` directory. The `pibackup.bat` file backs up the current archive, additional archives (if specified), site-specific configuration files, as well as log files to the specified backup directory.

On Mondays, it performs a full backup of these files. On all other days, it performs an incremental backup; only files that have changed are backed up. The backup procedure does not delete any previously backed-up files. As data is accumulated and the current archive shifts to the next archive, the older archive remains in the backup directory.

The `pibackup.bat` file can be run interactively from a Command Prompt or can be scheduled to run at regular intervals using the Task Scheduler.

**Note** Do not schedule `pibackup.bat` to run if the Historian Archive Backup Manager is scheduled to run.

➢➢ To enable backups at regular intervals

1. Create a backup directory (such as E:\Backup).
2. Open a Command Prompt, enter the following command and press [Enter].
   ```
   cd /d %PISERVER%\adm
   ```
3. Enter the following command and press [Enter].
   ```
   pibackup.bat X:\Backup –install
   ```

**Note** X in the target directory indicates a user-selected location.

The Task Scheduler is now configured to run `pibackup.bat` every day at 03:15 AM, backing up the current archive and the two previous archives, as well as configuration information, to X:\Backup.

**Note** To view the PiBackup Help, which includes the default parameter values for `pibackup.bat`, enter the following command at the Command Prompt: `pibackup.bat ?`

➢➢ To view or edit the task in the Task Scheduler

1. Open Task Scheduler.
2. Right-click on the name (PI Server Backup or at#) and select Properties.

**Note** If the task name is at#, right-click the name and select Rename. Rename the task to PI Server Backup.
### 3.6.2 Store PI Archives

Store archives and configuration information that are backed up nightly to removable media.

If the backup directory used by pibackup.bat is not on a separate disk that is sized to hold all archives and configuration information, move the older archives to an offline storage medium.

### 3.6.3 Restore Offline PI Archives

When required data is no longer available online, restore the necessary archives to a temporary directory, such as C:\TempRestoreDir. Refer to the PI Data Archive System Management Guide for instructions on how to restore PI Data Archives from a backup.

After restoration, use PI System Management Tools to register the archive.

➢➢ To register an archive using PI System Management Tools

1. From the Start menu, select PI System, then select PI System Management Tools. PI System Management Tools opens.
2. In the Servers pane, verify that the local PI Server is selected.
3. In the System Management Tools pane, expand Operation and select Archives.
4. In the Summary View pane, right-click and select Display unregistered archive.
5. Browse and select the archive you want to register and click Open.
6. In the Summary View pane:
   a. right-click the archive and select Register archive
   b. right-click the archive and select Make non-shiftable

To prevent temporarily restored archives from becoming the primary archive, make temporarily restored archives non-shiftable.

The data from the archive is now available for querying.

**Note** You can register any archive if the time range of the data in the archive does not overlap the time range of an archive already registered. The archive names do not have to be different since PI uses the full path of the archive when it registers the archive.
3.7 **PI ProcessBook Connection**

➢ **To configure the PI ProcessBook connection**

1. From the **Start** menu, select **PI System**, then select **PI ProcessBook**. **PI ProcessBook** opens.

2. From the PI ProcessBook **File** menu, select **Connections**.

3. The **PI Connection Manager** dialog displays. Verify that the **Default User Name** is **piadmin**.

![PI Connection Manager](image)

4. From the **PI Connection Manager** **Server** menu, select **Server Aliases**. The **Server Aliases** dialog displays.

5. In the **Server Aliases** dialog, click **Add**.
   a. Add **localhost**, if not already there.
   b. Add `<Historian Server>` (in this example, HST2).
   c. Click **Close** when done adding.

![Server Aliases](image)
3.8 Historian Report Configuration

Refer to the Historian Report Configuration Instruction Guide (GEI-100752).

3.9 Variable Aliasing

The Variable Aliasing option allows you to specify an alternate name for a variable (for example, the alias for the gas turbine speed variable, TNH, is specified as SPEED). Aliases are defined where the variable is defined, and must be unique throughout the system.

*Note* Aliases cannot be overridden on the Historian Feature tab.

*Note* Existing variables in the Historian cannot be renamed.

➢➢➢

To enable variable aliasing

1. From the System Editor Tree View, double-click a component, such as G1. The Component Editor displays.

2. From the Component Editor General tab Property Editor, set Enable Alias Prefix to True.

*Note* Each system component can enable alias prefixes. This adds the component name to the beginning of each alias name (for example, G1.Speed).
➢ To create a variable alias
1. From the Component Editor Software tab Tree View, select Variables. The variables display in the Data Grid.
2. In the Data Grid Alias column, add the variable alias names.

To use defined aliases instead of the variable name in the Historian system, the Use Alias Name property must be enabled in the Historian WorkstationST component. If a variable alias is not defined, the variable name creates the variable in the Historian system.

➢ To use defined aliases
1. From the System Editor Tree View, double-click the Historian WorkstationST component. The Component Editor displays.
2. From the Property Editor, set Use Alias Name to True.
Note  Setting the Enable Alias Prefix property to True on the Historian WorkstationST only applies the component name prefix to variables defined in the Historian WorkstationST (for example, client-driven variables defined on the OPC DA Server tab).

3.9.1 Upgrade Existing PI Historian Variable to Use Alias

To maintain continuity of data history when upgrading an existing variable to use an alias, use the PI System Management Tool to rename the original variable (refer to the section Delete or Rename Tags from PI Historian). This must be done before setting the Enable Alias Prefix property to True and performing a Build and Download to the Historian WorkstationST component. If the original variable is not renamed, a new variable with the alias is created.

Attention  Permanently deleting a variable from the Historian system removes all access to the data for that variable.
4 User Operations

4.1 View PI Tags in Excel

Note PI tags and their parameters can be viewed in Microsoft Excel.

Tags are the PI equivalent of ToolboxST variables. Whenever a Historian WorkstationST is built and downloaded, the tag configuration in the PI server is updated. The ToolboxST applications converts its variable names that are configured for archiving in PI and updates the PI system. Once these tag names are created, PI uses the PI OPC DA client to connect to the WorkstationST OPC DA server to obtain the variable values. The variable names in the ToolboxST application and the tag names in PI should be identical except for backslashes replaced by underscores.

➢➢ To view PI tags in Excel

1. Open Microsoft Excel and select Blank workbook.
2. Select the PI Builder tab.
3. Click the PI Points drop-down and select All PI Points.
4. In the Select Object Type and Column Headers dialog, select the desired columns and click OK.
5. In the Retrieve Selected Objects dialog, click Close.

All PI tags display with data in the columns that were selected.
4.2 **Delete or Rename Tags from PI Historian**

➢ To delete or rename a tag from the PI Historian

1. From the **Start** menu, select **PI System**, then select **PI System Management Tools**. **PI System Management Tools** opens.

2. In the **System Management Tools** pane, expand **Points** and select **Point Builder**.

3. From the **Tools** menu, select **Tag search**. The **Tag Search** dialog displays.

4. In the **Tag Search** dialog, enter the search criteria and click **Search**.

5. Select the variable(s) and click **OK**. The selected variables display in the **Point Builder — PI System Management Tools** window.

6. In the **Point Builder — PI System Management Tools** window, right-click on the variable(s). From the drop-down list, select either **Delete PI Point** or **Rename PI Point**.

7. If you selected **Delete PI Point**, the **Delete PI Point Confirmation** dialog displays. Click **Yes** to delete the point.

   **Note** If multiple variables were selected for deletion, select the **Apply To All** check box and click **Yes**.

8. If you selected **Rename PI Point**, the **Rename PI Point** dialog displays. In the **New Name** field, enter the new name and click **OK**.
4.3 **PI ProcessBook**

PI ProcessBook is a graphical interface used to display analog and digital data stored in the PI Server. It can be accessed from the *Administrator*, *Maintenance*, and *Operator* user accounts.

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**Note**  PI ProcessBook is licensed to run on the Historian and one HMI.

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PI ProcessBook opens a list of ProcessBook entries (predefined displays) on the default PI ProcessBook screen. Each ProcessBook entry is configured for retrieval and display of variables from the PI Historian archives. Multiple trends may be defined for a single ProcessBook entry. Each trend can display up to eight variables. The time range for each trend can be modified. Trends can simultaneously display historical and real-time data. Additional trends can be added to a ProcessBook entry, or new ProcessBook entries can be added to the PI ProcessBook.

### 4.3.1 Configure ProcessBook Preferences

Preference settings determine how the ProcessBook entries look, what colors are available when you draw, and whether your ProcessBook opens in Book View or Outline View.

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**Note**  Preference settings are stored in the `procbook.ini` file in the `%PIHOME%\dat` directory. Before you change the Preference settings, consider creating a back-up copy of `procbook.ini` so that you can restore PI ProcessBook to the original settings.

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➢➢ **To configure ProcessBook preferences**: From the PI ProcessBook *Tools* menu, select *Preferences*. The *ProcessBook Preferences* window opens.

### 4.3.1.1 General Preferences

These settings are stored in and retrieved from the [STARTUP] section of the `procbook.ini` file.

➢➢ **To configure application-wide settings**: From the PI ProcessBook *Tools* menu, select *Preferences*., then select the *General* tab.

- **Author** Determines the name used as the creator of new files and the person who last edited the file.
- **Startup File** The file name and path in this field determine which, if any, file is automatically opened when the application is launched. The default value when PI ProcessBook is first installed is `%PIHOME%\Procbook\en\Pidemo.piw`.
- **Library File** The file name and path in this field determine which, if any, file is opened when the original symbol library command is used. The default value when PI ProcessBook is first installed is `%PIHOME%\Procbook\Symlibry.piw`.
- **Prefer Run Mode** Determines whether ProcessBook starts up in Run mode or Build mode by default. By default, this option is enabled when PI ProcessBook is first installed.
- **Create Backup Files** Determines whether backup files (with a `.bak` extension) are automatically created when a PI ProcessBook file is saved after a modification. By default, this option is turned off when PI ProcessBook is first installed.
- **Keep snapshot values on updating plots** Determines whether the archive event pipe is used for updating trends, discarding any snapshot values between stored, archive values. This setting is stored as `PB2TraceCompatibility` in the [STARTUP] section of the `procbook.ini`. By default, this option is turned off when PI ProcessBook is first installed.
- **Future Data Refresh Interval** The number of seconds between retrieving future data from the PI Data Archive server.
- **Date and Time Format** Settings in this area determine how time is displayed in PI ProcessBook. Previews of each format are shown to help you select the desired option.
  - **Use local Windows format** uses the current Regional Options settings in the Windows Control Panel on the client machine to determine how dates and times are displayed. Dates are shown using the currently configured Short Date format and Times are shown using the current time format settings.
Use PI Time format displays time stamps in the default PI format of \textit{dd-mmm-yy HH:mm:ss.sss}, where \textit{dd} is the day of the month, \textit{mmm} is the short text abbreviation of the month name, \textit{yy} is the two digit year, \textit{HH} is the hour in 24-hour format, \textit{mm} is the minute and \textit{ss.sss} is the second, including sub-seconds, if present.

- **Default Time Zone** Determines whether time stamps reflect the time zone of the PI Data Archive server used to retrieve data (PI Server time zone), or the time zone of the local computer (Client machine time zone), when a new display is created. By default, the PI Data Archive server option is selected when PI ProcessBook is first installed.

4.3.1.2 Table of Contents Preferences

These settings are stored in and retrieved from the \textit{procbook.ini} file.

- **Future Data Refresh Interval:** 60 seconds

- **Date and Time Format:**
  - Use local Windows format: 1/21/2020 8:31:37 AM
  - Use PI Time format: 21-Jan-20 08:31:37

- **Default Time Zone:**
  - Client machine time zone
  - PI Server time zone

4.3.1.2 Table of Contents Preferences

These settings are stored in and retrieved from the \textit{procbook.ini} file.

- **Default View** Settings in this area determine how ProcessBook entries are displayed by default. The default is Notebook view.

- **Font Settings** The controls in this area determine the font settings applied to each entry level in a ProcessBook. The font settings control the display of entry names in Table of Contents windows.

- **Preview** This read-only field displays font settings for each level in a ProcessBook. Each of the 10 possible entry levels is listed and displayed with its current font name, and style settings.
4.3.1.3 Display Window Preferences

These settings are stored in and retrieved from the procbook.ini file.

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4.3.1.4 Trend Preferences

➢ To set default settings for the new trend symbols: From the PI ProcessBook Tools menu, select Preferences., then select the Trend tab.

• Display Check or uncheck these options to configure what information a trend displays by default.
  - AutoScale Select this check box if you want trends to be scaled as tag values change over time. If you do not select this check box, then trends use the Database scale for each tag.
  - Plot Title Select this check box if you want a title to display.
  - Value Scale Inside Axis Select this check box to display the numeric scale inside the axis. If you do not select this check box, the scale displays outside the axis. Note that the value scale is drawn horizontally when the trend orientation is vertical.
  - Grids Select to display grid lines.
  - Multiple Scales Add a value scale for each data point when selected. When the check box is cleared, only a single value scale appears.
  - Markers Select this check box if you want markers to indicate data points on the trend. If you do not select this check box, three markers display on each line. These markers help you match a line to a tag.
  - Show All When Trend Maximized Select this check box if you want to see all legend options appear when you maximize a trend. Clear this check box if you prefer to only see traces on a maximized trend.

• Legend Check or uncheck these options to configure what information a trend appears in the trend legends. The information that can fit in the legend is determined by the size of the trend. Consequently, not all the information in the legend may be visible:
  - If the width of the legend is more than the width of the trend, the legend does not appear.
  - If the height of the text in the legend is longer than the total height of the trend, items are removed in this order: engineering units, tag name, then value. Options include:
    - Tag Name
    - Server Name (for PI tags)
4.3.1.5 Trend Elements Preferences

➢ To set what colors, line styles, and so on are used in individual traces gridlines, text, or the background: From the PI ProcessBook Tools menu, select Preferences, then select the Trend Elements tab.

• Multi-State on Ad Hoc Select this check box to include data from multi-stated symbols when creating an ad hoc (instant) trend. When this option is cleared, data from multi-state configuration is not included on instant trends.

• Traces per Ad Hoc Trend Select the number of traces to have per plot on an ad hoc (instant) trend. The default is 3, the maximum is 8. Once this number is reached, additional plots are created to show the remaining tags selected for the instant trend.

• Plot Elements Use the drop-down list to select from pens, text, grids, and background. For each plot element, select a Marker Type, Line Style, Line Weight, and Color.

Note You may select one of several line styles for each trace. You can also specify the line thickness. Select none to omit a grid line.

• Sample Use this display area to see a preview of your changes.
4.3.2 Create ProcessBook

➢ To create a ProcessBook

1. From the Start menu, select PI System, then select PI ProcessBook. PI ProcessBook opens.
3. In the Type field, select ProcessBook (.piw) File.
4. In the ProcessBook Name field, type a name for the new book.
5. Click OK. A new ProcessBook opens.
6. From the PI ProcessBook File menu, select Save As to save the new PI ProcessBook.

4.3.3 Create ProcessBook Entry

After creating a ProcessBook, the next step is to add individual entries.

There are five specific types of entries:

- **Text** Provides headings or static information.
- **Display** Opens a display.
- **Linked displays** Links to an independent display file.
- **Linked ProcessBook** Links to an entry in another ProcessBook.
- **Operating system (OS) command** Opens another application.

When you add entries to a ProcessBook the entries are arranged hierarchically. Subentries are indented under main entries. The name you give each new entry is the name that shows in the ProcessBook.
When you create a new entry, it is placed in the ProcessBook just before the selected entry. If no entries are selected, the new entry appears at the end of the current tab section in Book View or at the end of the Outline View.

The first entry on a book tab is normally a Level 2 item (Level 1 is used as the tab label). All Level 3 through 10 items are listed below a level 2 item and indented the same. In Outline View, all levels are indented according to their level.

➢ To create a new ProcessBook entry

2. Under Type, select ProcessBook Entry.
3. Click OK. The Define ProcessBook Entry window opens.
4. In the Label field, type a name. The label must be 244 characters or less in length.
5. For the Type, select Display or Text.
6. In the Level list, click the level at which you want to position the entry in the ProcessBook hierarchy of entries.

Note: If you are creating the first entry in the ProcessBook, the level is automatically set to 1 and cannot be changed.

7. Click OK. The entry is added to the ProcessBook. If the entry is at Level 1 and you are in Book view, a tab is created using the name of the entry.

8. Click the Save icon on the toolbar or click File, Save.

4.3.4 Tag Search

The Tag Search window is used to locate PI tags.

➢ To open the Tag Search window: From the PI ProcessBook Tools menu, select Tag Search. The Tag Search window opens.

The Tag Search window provides three types of searches:

• **Basic Search** allows you to create a tag mask by specifying PI point attributes. The mask is used to find a list of tags on the server with matching attributes.
• **Advanced Search** provides a query-building interface with access to more point attributes for complex searches.
• **Alias Search** provides a logical tree view of the PI Data Archive server through the PI Module Database, which you can use to select tags by their descriptive aliases.
To search for tags

1. Click a tab to choose a Basic, Advanced or Alias search.

2. Enter the required search criteria and click **Search**. Use * or ? as wildcard characters to search for tag names and attributes. Tags returned from a search appear listed in a search results panel.

3. Select the desired tags in the results panel and click **OK**. Click column headers in the search results panel to sort the results. [Ctrl]-click or [Shift]-click to select multiple tags.

### 4.3.5 Create a Trend

To create a trend

1. Open a display.

2. From the PI ProcessBook **Draw** menu, select **Trend**. The mouse pointer changes to the Trend pointer.

3. Click in the display where you want to add the trend and drag the pointer to form a rectangle into which the trend will be placed. When you release the mouse button, the **Define Trend** window opens.

4. In the **Plot Name** field, type a name.

5. (Optional) Click **New Plot** if you want to build a trend with multiple plots.

6. In the **Tags in Plot** box, click **Tag Search** to locate a tag. Your selections for tags appear under **Tags in Plot**.

7. You can rearrange, add to, or delete the selected tags by clicking one of the buttons above the **Tags in Plot** box.

8. Under **Scale**, select **Single Scale** or, if you have more than one trace, you may select **Multiple Scales**.

9. Consider checking the following check boxes:
   - **Logarithmic** To display the data in a logarithmic scale. If you have multiple scales, you may set this option differently for each trace. This option is disabled for digital tags.
   - **Regression Line** Determines whether a regression line is drawn for a selected trace.
10. In the Max and Min drop-down lists, select Autorange or Database or enter the values to determine the value scale range.

- **Max Settings:**
  - **Autorange** The trend displays with the value scale ending at the closest available major axis. If the maximum is Autorange and the minimum is not, the plot starts on the minimum value and ends on the largest trace value (neither min nor max will be on a major axis).
  - **Database** The tag's Zero + Span attributes are used to specify the maximum plot value.
  - **o (absolute value)** The value you type is used as the value scale maximum.

- **Min Settings:**
  - **Autorange** The trend displays with the value scale starting at the closest available major axis. If the minimum is Autorange and the maximum is not, the scale starts at the lowest data value in the trace (not on a major axis) and ends on the closest major axis.
  - **Database** The tag’s Zero attribute is used to specify the minimum plot value. This value can be negative if the value of the tag is negative.
  - **o (absolute value)** The value you type is used as the first value on the value scale.

11. In the Format drop-down list, select the number format for the scale. Database is the default format. This number format is also applied to legend, cursor, and tooltip numbers.

- **Database** format uses the displaydigits PI Point attribute to determine how many decimal places to show. If the length of the number exceeds the displaydigits value, scientific notation is used. PI ProcessBook trims trailing zeros that follow a decimal point. The Database format option is intended for use with PI Tags only.
- **General** format shows all significant digits for a number except trailing zeros. If the absolute value of the value is greater than 1e+7 or less than 1e-5, the format will switch to use scientific notation.
- **Scientific** format is most useful with very large numbers. The scientific format used for trends displays in the format: 0.00E+00.
- **System** format uses the Regional Settings to determine how the number is shown.
- **Custom (#, ##0.00, 0%)** format allows you to enter your own number format.

12. Under Plot Time, from the Start and End drop-down lists, select a time. An asterisk (*) represents the current time.

13. In the Style drop-down list, select Full time stamp, Partial time stamp, or Relative time stamp to indicate how time is displayed on the time axis.

14. Click OK.
The ToolboxST Trender can interface to the PI Server if the PI OPC HDA Server is installed on the PI Historian.

The ToolboxST Trender graphically displays live and historical data. A Trend can be configured to read values from the PI archives, the Recorder, the OPC DA server, or directly from a component. After installing the PI OPC DA/HDA server, Trender functions as a Historical display. Trender accesses the PI archives through the PI Historian to look at historical data.

**Note**  Refer to Trender Instruction Guide (GEI-100795).

➢➢ To create a Historical Trend

1. From the Start menu, select GE ControlST, then select Trender. Trender opens..
2. From the Trender Edit menu, select Add Traces…. The Trender – Add Trace Wizard opens.
3. In the Trender – Add Trace Wizard Welcome window, click Next.
4. In the Select the type of trend window, select Historical and click Next.
5. In the *Please select the computer...* window:
   a. In the **Computer** field, select the Historian WorkstationST name.
   b. In the **Data Source** field, select **Historian**.
   c. In the **Server** field, select **OSI.HDA.1**.
   d. Click **Next**.

6. In the *Please select the variables you wish to trend* window, click **Add** to display the **Select a Variable** dialog box.
7. In the *Select a Variable* dialog, select the desired variables and click **OK**.

8. The selected variables display in the *Selected Variables* box. Click **Finish** to display these variables in the Trender.
9. The variables display in Trender. From the **Range Property Editor**, specify the **Duration**, **Left Time**, and **Right Time** of the desired data to retrieve it from the PI archives.
5  Troubleshooting

5.1  Data Flow

Data flows from the data source (for example, a controller) to the OPC DA Server and through the PI OPC interface to the PI Data Archive. Data flows from the data source (for example, a controller) to the OPC DA server and through the PI-based OPC interface to the PI-based server.

➢  To verify data flow to the OPC DA server

1.  From the Start menu, select GE ControlST, then select ToolboxST to display the System Editor.

2.  From the Tree View, double-click the Historian WorkstationST to display the Component Editor.

3.  From the Component Editor EGD tab, select the controller (under Referenced Devices).

4.  From the Component Editor toolbar, click the Go On/Offline icon to go online.

5.  From the Configuration tab, verify that each variable value is equal to the value in the controller.

6.  If the live values display green (healthy), verify that the PI OPC interface is running, and that data is being received in the PI Data Archive.

7.  If the live values display red or black (unhealthy), refer to the instructions provided in the ToolboxST User Guide for Mark Controls Platforms (GEH-6703), the chapter WorkstationST — Working Online.
➢ To verify PI OPC interface operation

1. From the Start menu, select PI System, then select PI OPC Client Tool. The PI_OPCClient opens.
2. From the PI_OPCClient File menu, select Connect to Node.
3. From the Tree View, expand Localhost and double-click GeCssOpcServer.
4. Click the Add Group icon to display the Add Group dialog box.

5. In the Add Group dialog box, Group Name field, type a group name and click Create.

6. From the PI_OPCClient, click the Server Browse icon to display the Add Item dialog box.
7. In the Add Item dialog box, click **List**.

8. From the GeCssOpcServer **Tree View**, expand **GeCssOpcServer** and select the controller.

9. Search for variables being sent to the Historian with a Historian Definition. Highlight the tags and click **Add Selected**.

10. Click **OK**.
11. From the **PI_OPCClient**, click the **Refresh on Group** icon to display the current value of each variable.

12. If the correct values display, verify that data is received in PI System Management Tools.

13. If the correct values are not displayed, refer to the *WorkstationST OPC DA Server Instruction Guide* (GEI-100621).
➢ To verify that data is received in PI SMT

1. From the Start menu, select PI System, then select PI System Management Tools. PI System Management Tools opens.

2. From the System Management Tools Tree View, expand Data and select Current Values.

3. Add tags as needed. Verify that the current values display.
   a. Click the Tag Search icon. The Tag Search dialog opens.
   b. In the Tag Search dialog, enter the search criteria and click Search.
   c. Select the variable(s) and click OK.

4. Click the Refresh icon to update the values. If the values display correctly, ControlST is integrated with the PI Historian.
5.2 Report Configuration Errors

Report errors, which display when the report is run from the web browser, are controlled by the file \textit{X:/site/reports/defaultstyle.css}. This file specifies font types, sizes, colors, and the default background colors. Background image files referenced in the \textit{defaultstyle.css} file are located in the \textit{X:/site/reports/images} directory. Correct logos are specified in the \textit{reports.dat} file, with the logo image file located in \textit{X:/site/reports/images}.

Other report configuration errors, such as incorrect start and stop times, report frequency, or event triggers display when the report is run with an incorrect time period. To correct these errors, adjust the report parameters as needed in the \textit{X:/site/reports/reports.dat} file to produce the correct data.

\textbf{Note} \(X\) in the target directory indicates a user-selected location (user can select the target directory during installation).

When incorrect variable names display in the tag file, the following message displays in the report:

\textit{Error executing query: OLE exception from "Microsoft® OLE DB Provider for ODBC Drivers": [OSI][PI-ODBC][PI]Tag < G1.AFP AF > not found Win32::OLE(0.15) error 0x80004005: "Unspecified error" in METHOD/PROPERTYGET "Execute"

SELECT tag, descriptor, engunits, pointtype FROM pipoint WHERE tag = 'G1.DW A TT' or tag = 'G1.AFP AF' or tag = 'G1.MVARHR' or tag = 'G1.MWATTHR'"}

This is typically a copy of the SQL command that the script is trying to run to get the data, as well as the returned error message. Careful examination of the error message indicates the source of the problem (in this case G1.AFP AF was not found – point name should have been G1.AFP AP).

5.2.1 Automatic Report Generation Errors

Automatic report generation errors are usually related to scheduler problems. Verify that the \textit{chain.pl} task is scheduled to run every hour. The tasks currently scheduled can be verified on a Windows NT system by opening a command window, and entering \textit{at}. On a Windows 2000 or later system, the scheduled tasks can be monitored by selecting Start, Programs, Accessories, System Tools, and Scheduled Tasks. Additional information about each task displays in the scheduled task folder. Once the task is scheduled, actions are logged to \textit{X:/site/reports/LOG/rpt.log} each time the task runs. Any problems encountered, as well as successful completion messages, are logged to this file.
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