



FT Historian-ThingWorx Connector

Installation and Configuration Guide

Version 1.0 (Private Release)

Contact Rockwell Automation

As this is a Private Release, support would be provided by identified Point Of Contact for your organization.

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Chapter

1

Overview

In this chapter:

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About FactoryTalk Historian - ThingWorx Connector

ThingWorx Mashup can have seamless access to data from FactoryTalk Historian.

The connector runs as a Windows Service and serves requests of data between both the systems.

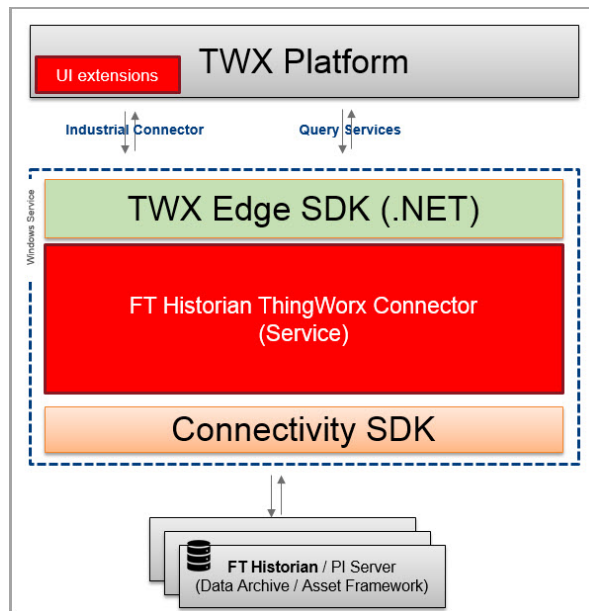
The connector assumes that required licensing is available on both FactoryTalk Historian and ThingWorx server to enable this integration.

The current version allows the following:

- Bind AF Element attribute to ThingWorx property in ThingWorx Composer
- Bind PI Point to ThingWorx property in ThingWorx Composer
- Access to archive value with different aggregation options through services in Industrial Thing

These capabilities bring differentiation of FactoryTalk Historian available seamlessly on ThingWorx Mashups.

Figure 1-1: Component Level Architecture Diagram



The FTH-TWX Connector is a Windows service that uses the Edge SDK to bind to a remote thing in ThingWorx. This remote thing is using the Thing Template “IndustrialGateway”. The template defines properties and services that are used to integrate the Kepware Server into ThingWorx. The FTH-TWX connector implements the behavior of a Kepware Server so that there will be no difference for the user while connecting to a Kepware server or a FT Historian.

The Windows service uses the native PI AF SDK to connect to a FT Historian or the PI AssetFramework and implements:

- Subscription support for PI tag and Asset Framework attribute value change.
- Enhanced query services to query PI System.

About This Guide

This document will guide the user through the Installer that provides step by step prompts through the installation.

This guide is intended to be used with the **FTH_TWX_Connector_Installer-*<Build>*.exe** file.

This is a customized document for Ford and not for general release.

Audience

This book is intended for experienced professionals who understand their company's business needs, the technical terms used, and software dependencies described in this guide. We expect the user to be experienced with administering the following applications and technologies:

- ☐ Windows Operating systems
- ☐ Web Server Environments
- ☐ Third Party Software Installations

This guide fully covers FTH-TWX Connector installation, but it assumes that the supporting network equipment and software are or can be installed. This document does not provide installation instructions for related components, like Internet connections, but it does describe configuration settings required to run this software.

Related Documents

Select the specific guide for the operating system and purpose:

1. FT Historian SE Installation and Configuration Guide
2. FT Historian SE Installation Assistant
3. FT Historian SE Live Data Interface User Guide

Software Requirements

IMPORTANT: Ensure that the user account used for installing FTH-TWX Connector has administrator privileges.

It is recommended to enable long paths so that the directory path can be beyond the normal 255 character limit.

The following are the minimum software third-party requirements for installing FTH-TWX Connector in Windows Environment.

Prerequisites

The FTH-TWX Connector service requires the following:

- Java Development Kit (JDK 1.8.162)
- Microsoft .NET Framework 4.6.2
- PI SDK 2016
- PI AF Client 2017 R2 or PI AF Client 2016 SP2
- ThingWorx .NET SDK 5.8 (FIPS version)
- Preconfigured connections to the involved FT Historian systems and Asset Framework databases using PI SDK and PI System Explorer

Supported Platform

Supported OS
Windows Server 2016

Version Compatibility

ThingWorx	FT Historian
Version 8.4.1	Version 6.0 SE

Third-Party Software

The following Third Party packages are prerequisites for the FTH-TWX Connector installation.

All the required licensing for FactoryTalk Historian and ThingWorx are customers responsibility and is assumed to be available as a prerequisite.

Software Name	Web Link	Comments
JDK 1.8.162	https://www.oracle.com/technetwork/java/javase/downloads/java-archive-javase8-2177648.html	
Microsoft .NET Framework 4.6.2	https://www.microsoft.com/en-us/download/details.aspx?id=53344	
ThingWorx .NET SDK 5.8 (FIPS version)	https://support.ptc.com/appserver/auth/it/esd/product.jsp?prodFamily=TWS#ga=2.125761290.1450898495.1566426751-44338472.1540913975	Valid PTC account ID is required

Minimum Hardware Recommendations

The following are the minimum hardware requirements for installing FTH-TWX Connector in Windows Environment.

Standard Node Deployment

Standard Node Configuration
Windows 2016 Server, 4 Core, 16 GB RAM, 100 GB HD

We recommend installing the connector on same machine as FactoryTalk Historian. More deployment options (installing in standalone machine or on ThingWorx server) would be supported in a future release.

NOTE: The number of servers and their specifications would vary based on the type of deployment approach, data that needs to be processed, stored, accessed etc. This specification is for general guidance only.

Static IP Address

If a dynamic IP address is utilized, it may cause errors during installation. Setting a static IP address is recommended.

A static IP address is highly recommended for production servers.

Security Recommendation

We recommend that you follow your organizational security requirements and policies for setting up and operating the system. Some recommendations are below:

- Configure HTTPS for secured and encrypted communication. Follow respective vendor's latest document for setting up and verification of same.
- TLS must be enabled and setup should disallow any attempts to negotiate down to versions of TLS prior to 1.1.
- Protect the private key for the TLS certificate.
- Follow your organization guidelines on user management, user creation, access control etc.
- Set a complex password as per your company policy.
- Obtain a certificate from an approved CA as per your organization guidance and configure TLS on the platform. The key size of the certificate must be at least 2048 bits and must use the SHA-256, SHA-384, or SHA-512 algorithm for digital signatures.
- Non-administrative users should not be allowed to change the configuration.
- Configure firewalls and harden the infrastructure as recommended by your IT/security team in your environment.

Conventions

The following conventions are followed in this document:

- ❑ Text, labels and icon names that appear in the user interface, appear in square brackets.
For example: Click [Next] to install PostgreSQL.
- ❑ File names and directories appear in bold text.
For example: Open the **config.json** file.
- ❑ Placeholder text for variable values appears in angle brackets.
For example: Installer-<version>.<build>
- ❑ The hypertext appears in blue.

- ❑ The cross-references appear in green text.
For example: Skip to “**Post Installation**” chapter to complete installation.
- ❑ Code and system response examples appear in Courier New font. For example:

```
service uninstall
```

Technical Support

As this is a Private Release, support would be provided by identified Point Of Contact for your organization.

When you call, you should be at your computer and prepared to give the following information:

- The product name and version number, which can be found in the client.
- The type of hardware you are using.
- The exact wording of any errors or messages that appeared on your screen.
- A description of what happened and what you were doing when the problem occurred.
- A description of how you attempted to solve the problem.

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Chapter

2

Getting Started

In this chapter:

- ❑ **Prepare the prerequisites 14**

Prepare the prerequisites

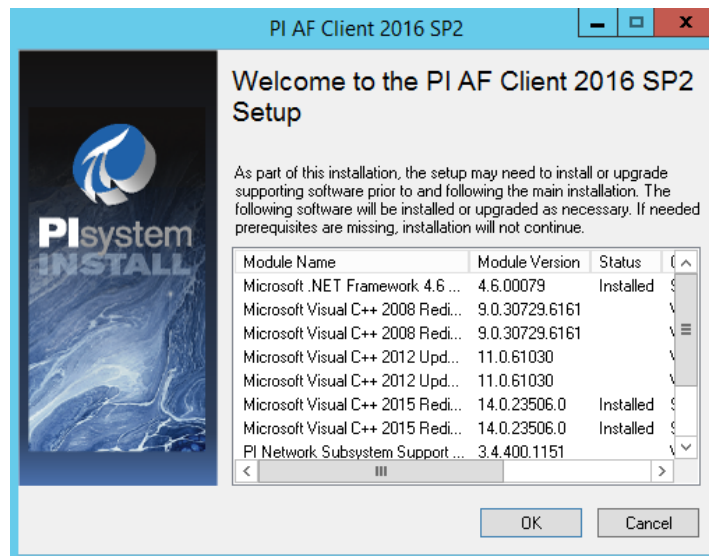
Install and Configure PI AF Client

If the FTH-TWX Connector needs to be installed on the same machine where Historian server is available and the PI-AF Client is already installed, ignore this section and skip to the **Install ThingWorx.NET** section.

1. Install PI AF Client 2017 R2 or PI AF Client 2016 SP2.

NOTE: Before installing PI AF Client 2017 R2, install the Microsoft .NET Framework 4.6.2 first.

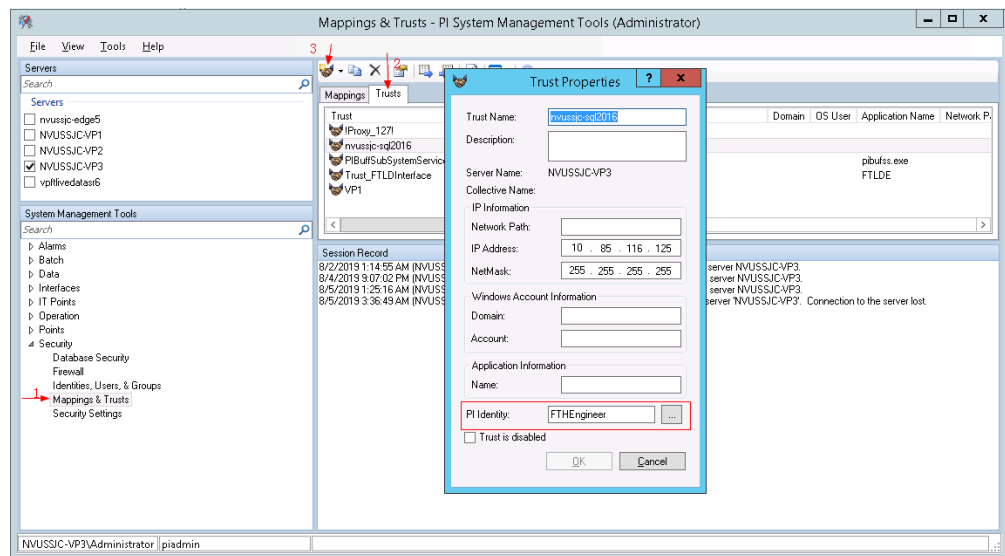
Figure 2-1: PI AF Client



2. Ensure that the preconfigured connections to the involved FT Historian systems and Asset Frameworks databases are available.
3. In Historian server machine, launch PI System Management Tools, navigate to Security > Mappings & Trusts. Add a new trust for the ThingWorx server machine. For PI identity, select PI Users > FTHEngineer.

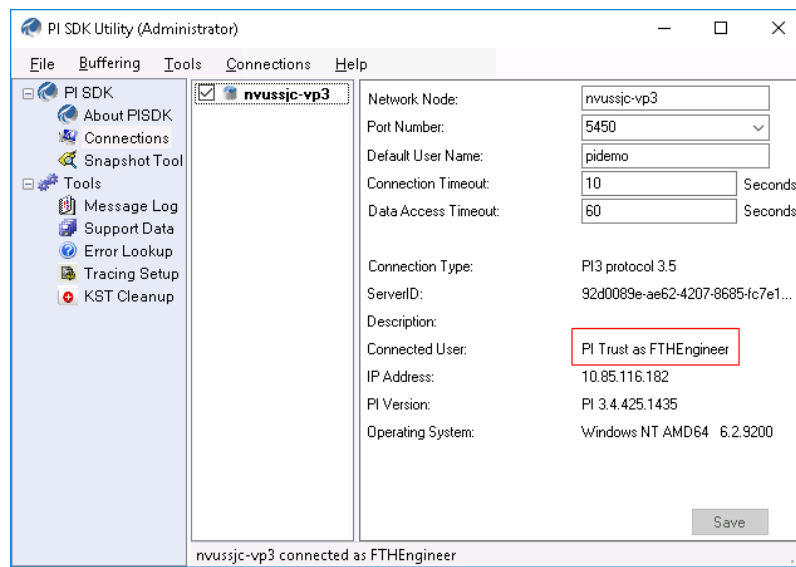
NOTE: OSI PI recommends to use Windows authentication instead of SDK trusts. If a Windows user running an SDK application has access to the PI Data Archive server through Windows authentication (PI mappings and PI identities), then that user will be authenticated through Windows, rather than through the trust. This is because newer versions of the SDK try Windows authentication first. This means that their access permissions will be dictated through the mappings, rather than the trust. It is best to retire SDK trusts wherever possible, and rely on the Windows authentication instead.

Figure 2-2: Add Trust

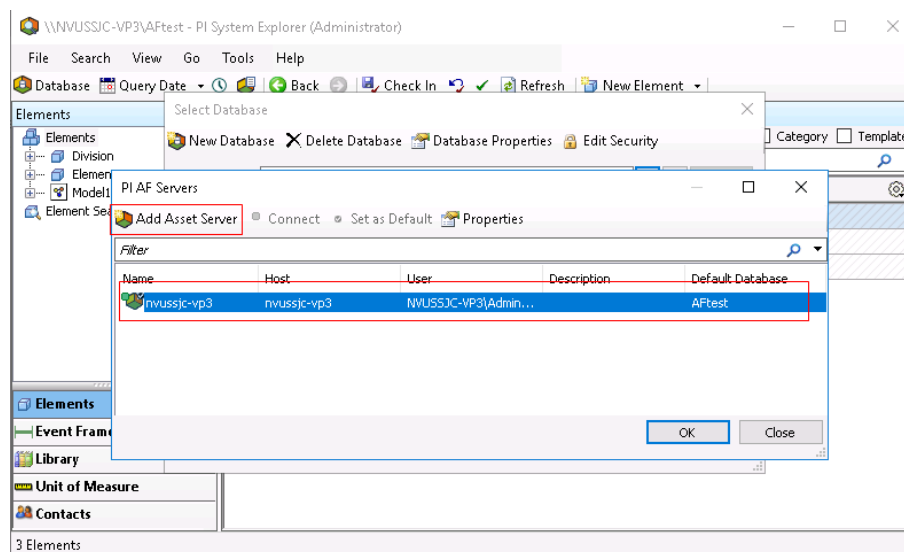


4. In ThingWorx server machine, launch About PI SDK, navigate to Connections > Add Connections. Add the Historian server.

NOTE: While adding the Historian server, use the Hostname, not the IP address.

Figure 2-3: Add Connection

5. Launch PI System Explorer and Add the AF server.

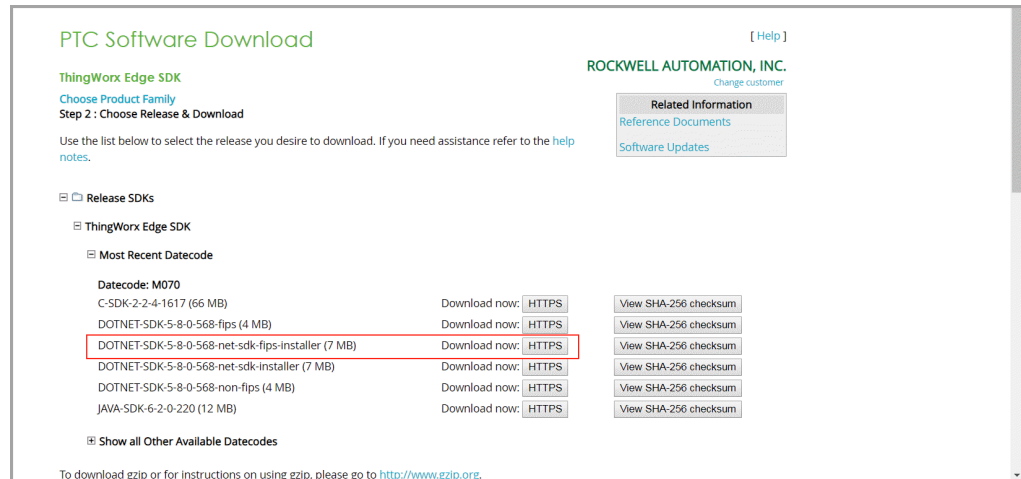
Figure 2-4: Add AF Server

Install ThingWorx.NET

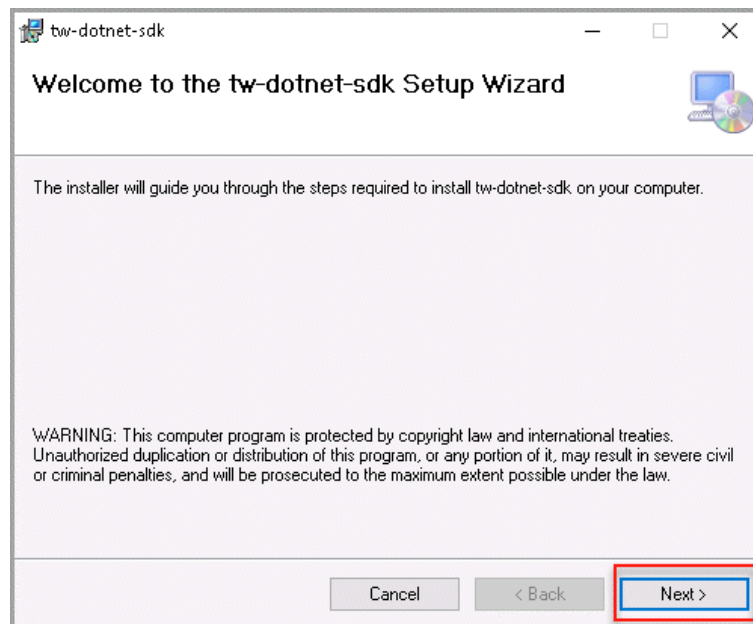
Perform the following steps to install ThingWorx.NET:

1. Download the **DOTNET-SDK-5-8-0-568-net-sdk-fips-installer** file from the following URL:

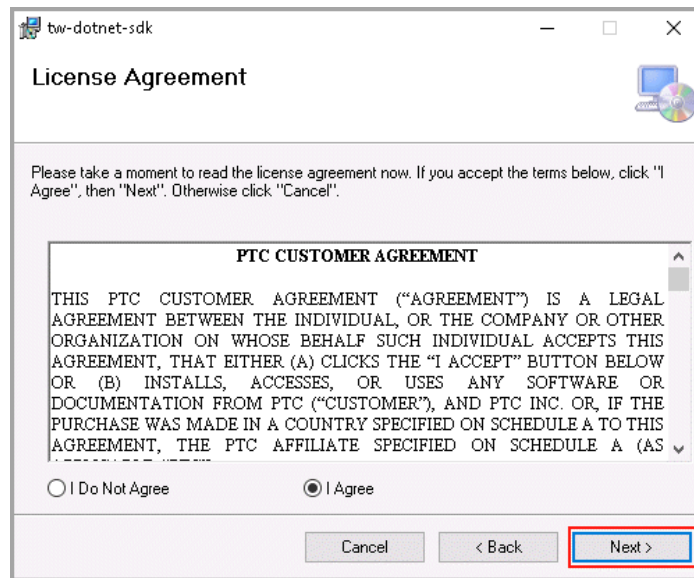
https://support.ptc.com/appserver/auth/it/esd/product.jsp?prodFamily=TWS#_ga=2.125761290.1450898495.1566426751-44338472.1540913975

Figure 2-5: Download ThingWorx .NET

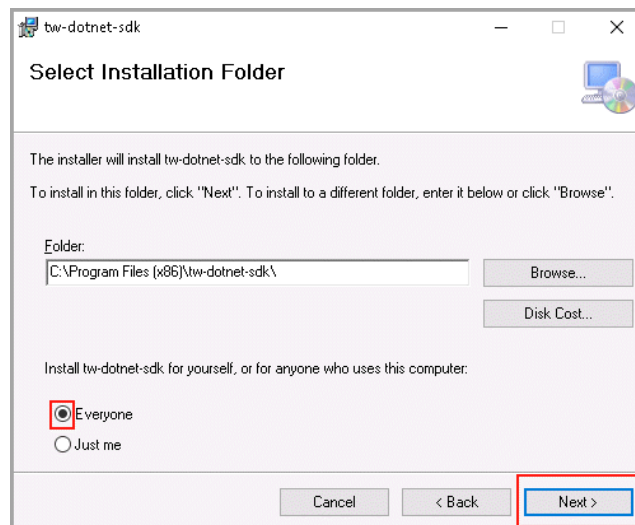
2. Double-click the installer. The setup wizard window displays. Click [Next].

Figure 2-6: Setup Wizard

3. The License Agreement windows displays. Select [I Agree] and click [Next].

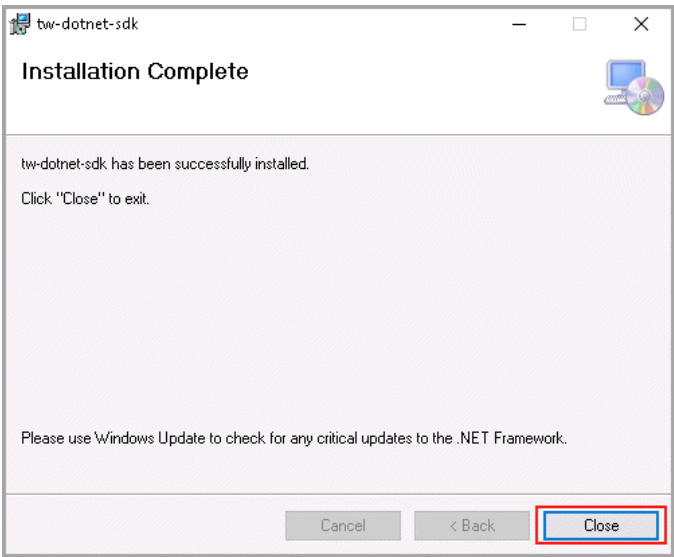
Figure 2-7: License Agreement

4. The Select Installation Folder window displays. Browse the installation location, select the [Everyone] option, and then click [Next].

Figure 2-8: Select the Installation Folder

5. The installation progress window displays. Wait until the installation completes.
6. After completion, the Installation Complete window displays. Click [Close] to close the wizard.

Figure 2-9: Installation Complete



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Chapter

3

Run the Installer

In this chapter:

- ❑ FTH-TWX Connector Installation 22

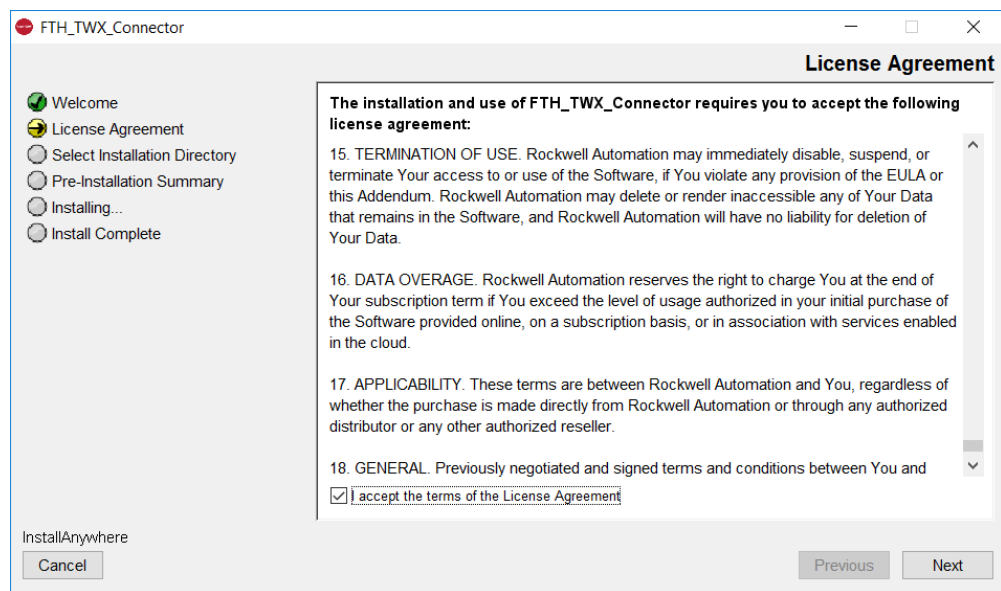
FTH-TWX Connector Installation

The FTH-TWX Connector Installer will extract the Connector files. Follow the steps below to execute the installer and accept the license agreement.

1. Right click the **FTH_TWX_Connector_Installer-<version>.<build>.exe** file and select [Run as administrator] to begin the installation.
2. After the wizard initializes the setup, the 'License Agreement' screen displays. Scroll down, accept the license agreement, and then click [Next].

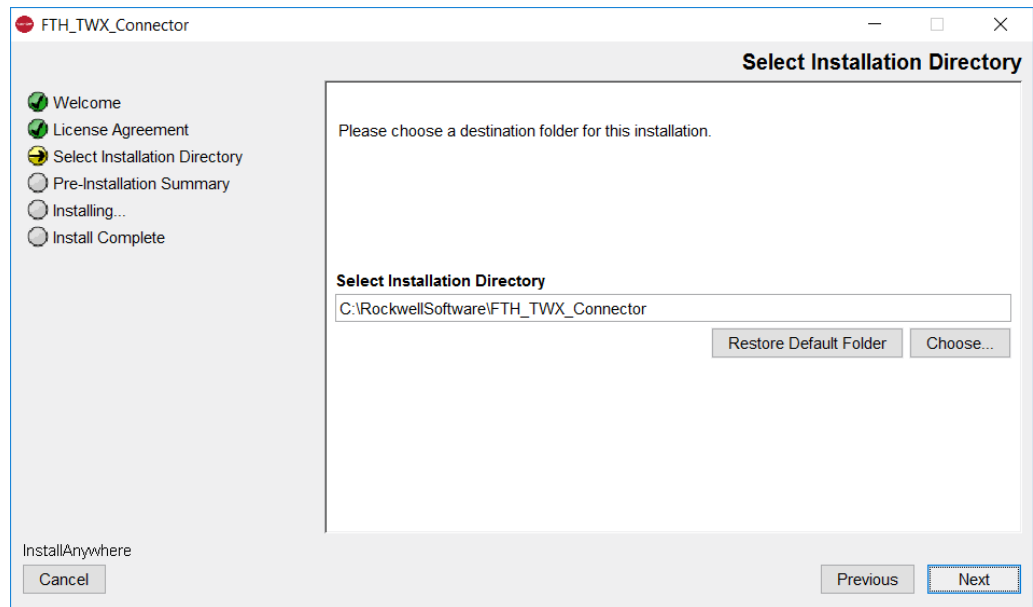
NOTE: The License Agreement can be accepted after the entire text is read.

Figure 3-1: License Agreement



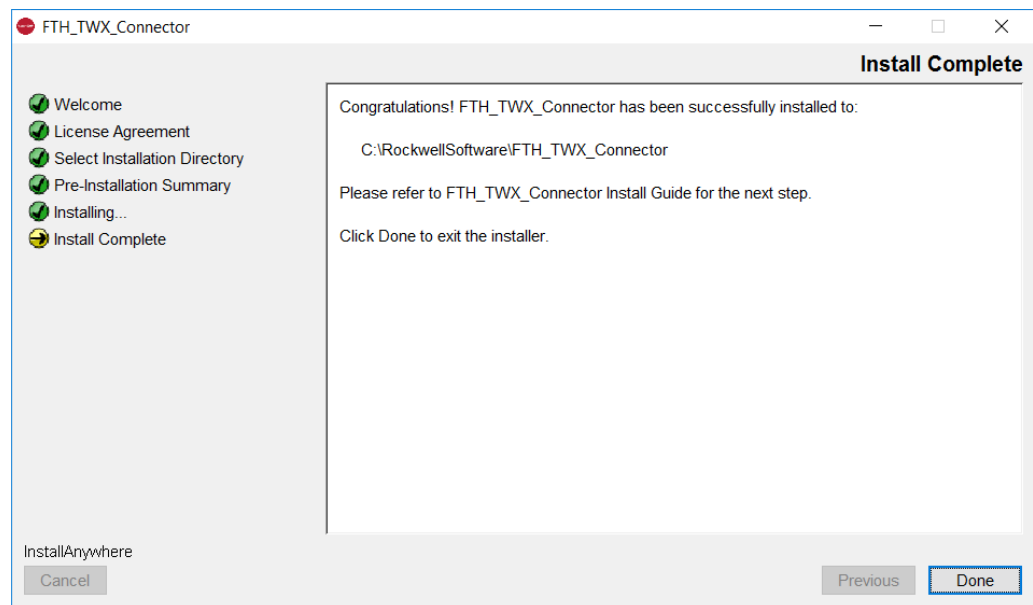
3. The 'Select Installation Directory' screen displays. Specify where to extract the Connector files and click [Next]. The default directory is:
C:\RockwellSoftware\FTH_TWX_Connector

Figure 3-2: Select Installation Directory



4. Click [Next] through the next installation screens to complete the Installer steps.
5. The 'Install Complete' screen displays. Click [Done] to close the installer.

Figure 3-3: Installation Complete



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Chapter

4

Post Installation

In this chapter:

- ❑ **Configure HTTPS on Tomcat 26**
- ❑ **Configure FTH-TWX Connector 26**

Configure HTTPS on Tomcat

Refer to ThingWorx documentation to configure https on Tomcat:

- Installing ThingWorx 8:
https://www.ptc.com/support/-/media/52CCDE621448456ABB31E6C727E0C1B8.pdf?sc_lang=en
- Configuring SSL/HTTPS with Self-Signed Certificate for the ThingWorx Platform:
<https://www.ptc.com/en/support/article/CS193947>
- Configuring ThingWorx/Tomcat for SSL using a Signed Certificate from a Certificate Authority (CA):
<https://www.ptc.com/en/support/article/CS231610>
- Online Help: Set Up ThingWorx Navigate with SSL:
https://support.ptc.com/help/navigate/r1.9/en/index.html#page/ThingWorx_Navigate/Using_SSL_with_ThingWorx_Navigate.html

Configure FTH-TWX Connector

Follow the steps to configure the FTH-TWX Connector:

Edit AssetFramework-Plugin.config File

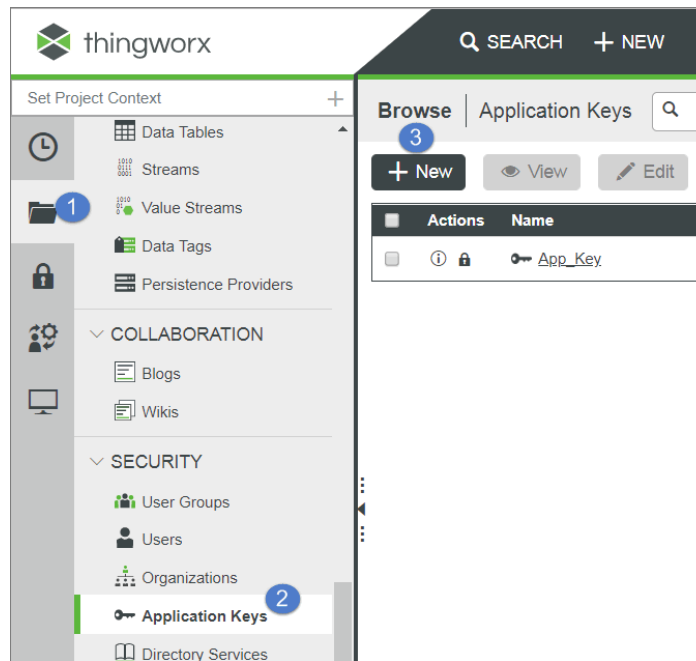
1. Open the **AssetFramework-Plugin.config** file from the install location and add the AF server that the user wants to use.

```
[
{
  "InstanceName": "AFServerHostname",
  "Server": "AFServerHostname"
}
```

NOTE: Ensure that the Server Hostname is used for InstanceName and Server above.

Generate Application Key

1. Open ThingWorx composer and go to Browse > SECURITY > Application Keys. Click the [New] button.

Figure 4-1: Browse Application Key

2. Enter a Name, select a User Name Reference, set the Expiration Date, and click [Save].

Figure 4-2: Save Application Key

Application Key: New Application Key - 1 To Do Save Cancel

General Information

Name (required) 1
 ApplicationKey_IndustrialGateWay

Description

Project
 Search Projects

Tags
 Search Model Tags

User Name Reference (required) 2
 ! A User in the Administrators Group is assigned to this Application Key [more](#)
 Administrator

IP Whitelist

Client Name

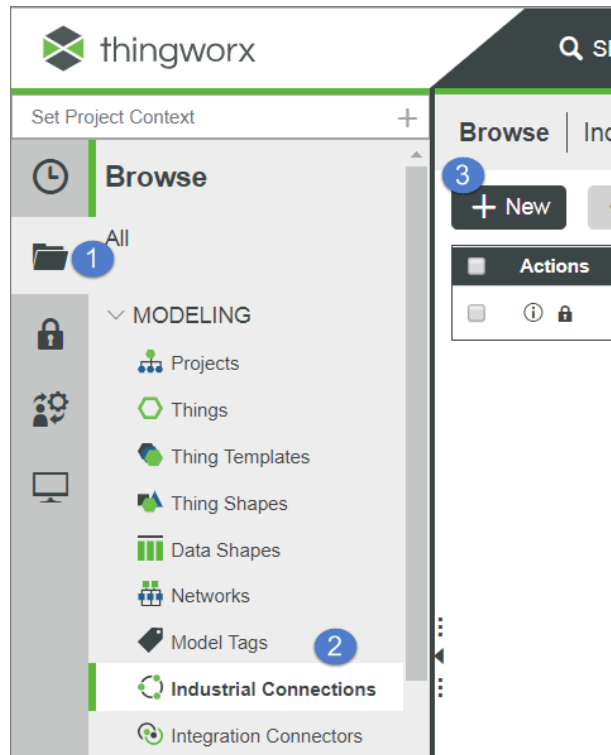
Expiration Date 3
 09/30/2019 12:00 am

4 Save Cancel

Create an Industrial Connection

1. Open ThingWorx composer and go to Browse > MODELING > Industrial Connections. Click the [New] button.

Figure 4-3: Browse Industrial Connections



2. The Choose Template dialog displays. Select the 'IndustrialGateway' template and click [OK].

Figure 4-4: Select Template



3. Enter a name for the Industrial Connection and click [Save].

Figure 4-5: Save Connection

Industrial Connection: New Industrial Connection - 3 * ?

To Do Save Cancel

General Information

General Information

No image available

Name ? (required) 1

FTHistorian

Change

Description ?

Project ?

Search Projects +

Tags ?

Search Model Tags +

Base Thing Template ? (required)

IndustrialGateway

Edit RA.PTC.Integration.Service.exe.config File

1. Open the **RA.PTC.Integration.Service.exe.config** file from the install location and add the Application Key and the URL for ThingWorx.

Field Name	Value
IndustrialGatewayThingName	Industrial Connection created above
AppKey	Application key created above
ThingworxUrl	ThingWorx server. ThingWorxUrl begins with "ws:" for an unsecured connection and with "wss:" for a secured connection. Typically port in the Url for the unsecured connection is 8080 and for the secured connection is 8443.
ServerCertificateFile	Provide the full path and file name of the .cer or .pem certificate chain file that will be used to validate the server certificate
AllowSelfSignedCertificates	Set the value to “true”, when a self signed certificate is used

Field Name	Value
DisableCertValidation	<p>Set the value to "false" when using a secured connection (with either a self-signed server certificate or a CA server certificate).</p> <p>Set the value to "true" to disable encryption and use an unsecured connection. If set to "true" then ensure that the ThingWorxUrl begins with "ws:" and not "wss:", and the port in the ThingWorxUrl is the unsecured port (typically 8080) rather than the secured port (typically 8443).</p>

Configuration example - HTTP

```
<appSettings>
  <add key="IndustrialGatewayThingName" value="FTHistorian" />
  <add key="AppKey" value="04calfa3-ec37-4856-a803-fd513a62a564" />
  <add key="ThingworxUrl" value="ws://192.168.1.99:8080/Thingworx/WS" />
  <add key="ServerCertificateFile" value="" />
  <add key="AllowSelfSignedCertificates" value="false" />
  <add key="DisableCertValidation" value="true" />
  <add key="LoggingLevel" value="Information" />
</appSettings>
```

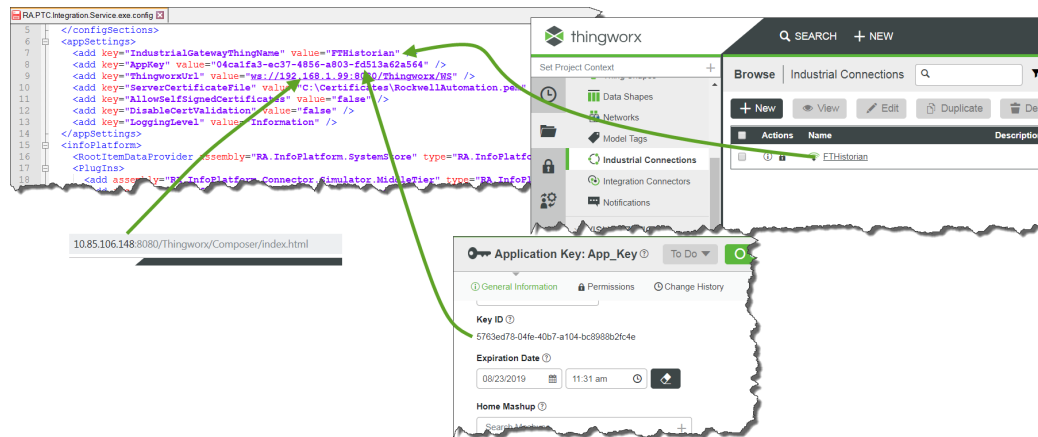
Configuration example - HTTPS (with self-signed certificate)

```
<appSettings>
  <add key="IndustrialGatewayThingName" value="FTHistorian" />
  <add key="AppKey" value="04calfa3-ec37-4856-a803-fd513a62a564" />
  <add key="ThingworxUrl" value="wss://192.168.1.99:8443/Thingworx/WS" />
  <add key="ServerCertificateFile" value="" />
  <add key="AllowSelfSignedCertificates" value="true" />
  <add key="DisableCertValidation" value="false" />
  <add key="LoggingLevel" value="Information" />
</appSettings>
```


Configuration example - HTTPS (with CA-signed certificate)

```
<appSettings>
  <add key="IndustrialGatewayThingName" value="FTHistorian" />
  <add key="AppKey" value="04ca1fa3-ec37-4856-a803-fd513a62a564" />
  <add key="ThingworxUrl" value="wss://192.168.1.99:8443/Thingworx/WS" />
  <add key="ServerCertificateFile"
value="C:\Certificates\RockwellAutomation.pem" />
  <add key="AllowSelfSignedCertificates" value="false" />
  <add key="DisableCertValidation" value="false" />
  <add key="LoggingLevel" value="Information" />
</appSettings>
```

Figure 4-6: Edit Service Configuration



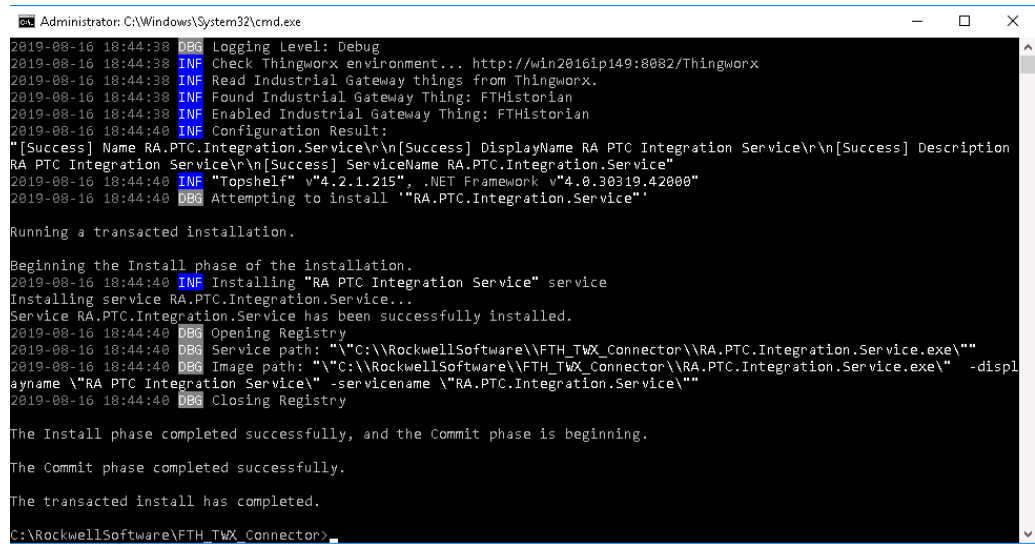
Install Integration Service

The FTH-TWX Connector service can be started as a service or a process. Perform one of the following listed options to start:

1. Install as a Windows service:
 - a. Open a command prompt window and change the working directory to the FTH_TWX_Connector installation directory. Execute the following command:

```
RA.PTC.Integration.Service install
```

Figure 4-7: Install Service



```
Administrator: C:\Windows\System32\cmd.exe
2019-08-16 18:44:38 DBG Logging Level: Debug
2019-08-16 18:44:38 INF Check Thingworx environment... http://win2016ip149:8082/Thingworx
2019-08-16 18:44:38 INF Read Industrial Gateway things from Thingworx.
2019-08-16 18:44:38 INF Found Industrial Gateway Thing: FTHistorian
2019-08-16 18:44:38 INF Enabled Industrial Gateway Thing: FTHistorian
2019-08-16 18:44:40 INF Configuration Result:
"[Success] Name RA.PTC.Integration.Service\r\n[Success] DisplayName RA PTC Integration Service\r\n[Success] Description
RA PTC Integration Service\r\n[Success] ServiceName RA.PTC.Integration.Service"
2019-08-16 18:44:40 INF "Topshelf" v"4.2.1.215", .NET Framework v"4.0.30319.42000"
2019-08-16 18:44:40 DBG Attempting to install "RA.PTC.Integration.Service"

Running a transacted installation.

Beginning the Install phase of the installation.
2019-08-16 18:44:40 INF Installing "RA PTC Integration Service" service
Installing service RA.PTC.Integration.Service...
Service RA.PTC.Integration.Service has been successfully installed.
2019-08-16 18:44:40 DBG Opening Registry
2019-08-16 18:44:40 DBG Service path: "\"C:\RockwellSoftware\FTH_TWX_Connector\RA.PTC.Integration.Service.exe\""
2019-08-16 18:44:40 DBG Image path: "\"C:\RockwellSoftware\FTH_TWX_Connector\RA.PTC.Integration.Service.exe\"" -displ
ayname "\"RA PTC Integration Service\"" -servicename "\"RA.PTC.Integration.Service\""
2019-08-16 18:44:40 DBG Closing Registry

The Install phase completed successfully, and the Commit phase is beginning.

The Commit phase completed successfully.

The transacted install has completed.

C:\RockwellSoftware\FTH_TWX_Connector>
```

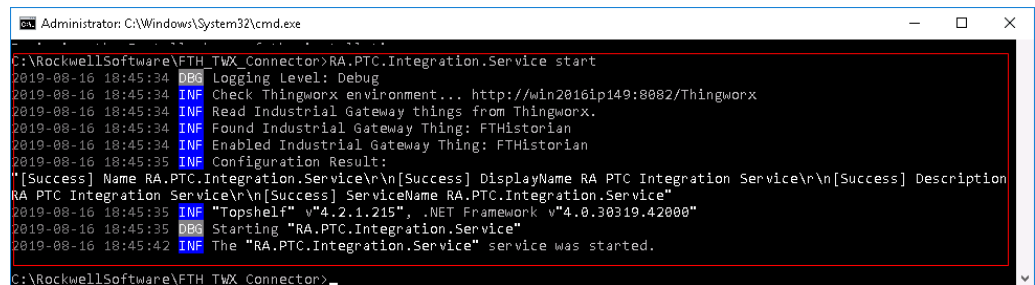
2. To start the service:

- Start the “RA PTC Integration Service” from Windows service management console (or)
- Open the command prompt and execute the following command to start the service:

```
RA.PTC.Integration.Service start
```

- To run as a process, double-click the **RA.PTC.Integration.Service.exe** file from the install location.

Figure 4-8: Start Service



```
Administrator: C:\Windows\System32\cmd.exe
C:\RockwellSoftware\FTH_TWX_Connector>RA.PTC.Integration.Service start
2019-08-16 18:45:34 DBG Logging Level: Debug
2019-08-16 18:45:34 INF Check Thingworx environment... http://win2016ip149:8082/Thingworx
2019-08-16 18:45:34 INF Read Industrial Gateway things from Thingworx.
2019-08-16 18:45:34 INF Found Industrial Gateway Thing: FTHistorian
2019-08-16 18:45:34 INF Enabled Industrial Gateway Thing: FTHistorian
2019-08-16 18:45:35 INF Configuration Result:
"[Success] Name RA.PTC.Integration.Service\r\n[Success] DisplayName RA PTC Integration Service\r\n[Success] Description
RA PTC Integration Service\r\n[Success] ServiceName RA.PTC.Integration.Service"
2019-08-16 18:45:35 INF "Topshelf" v"4.2.1.215", .NET Framework v"4.0.30319.42000"
2019-08-16 18:45:35 DBG Starting "RA.PTC.Integration.Service"
2019-08-16 18:45:42 INF The "RA.PTC.Integration.Service" service was started.

C:\RockwellSoftware\FTH_TWX_Connector>
```

TIP: Execute the following command to stop the service:

```
RA.PTC.Integration.Service stop
```

Import Files

Follow the steps to import the DataShapes, ThingShapes, ThingTemplates files to the ThingWorx server:

1. Open ThingWorx composer and click the [Import/Export] dropdown at the right upper corner and select [Import].
2. The Import dialog displays. Click [Browse] and import the files which are available in the
<FTH_TWX_Connector installation directory>\thingworx_exports directory.

Import the files in the following order:

- a. All the files in the **datashapes** folder
- b. All the files in the **thingshapes** folder

NOTE: ThingShape **RA.FTHistorian.SyncServices** contains the services for querying the AF databases, elements. Refer to the [Thing Shape: RA.FTHistorian.SyncServices](#) section.

- c. All the files in the **thingtemplates** folder

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Browse PI Point and Element Attribute

In this chapter:

- ❑ **Getting Started 36**
- ❑ **Bind AF Element Attributes to Thingworx Property 36**
- ❑ **Bind PI Point to Thingworx Property 40**
- ❑ **Archive Historical Value of AF Element Attribute 41**

Getting Started

Perform the following steps to login:

1. In the browser, use the following URL:
<http://<Hostname>:8080/Thingworx>
 (or)
<https://<Hostname>:443/Thingworx>
 - **Hostname:** Server or domain where the application is deployed.
 - **Port:** The port is 8080 (for http) or 443 (for https) by default. The port number may vary based on installation and configuration.
2. Enter the Username and Password and click [Sign in].
3. The ThingWorx home page displays.

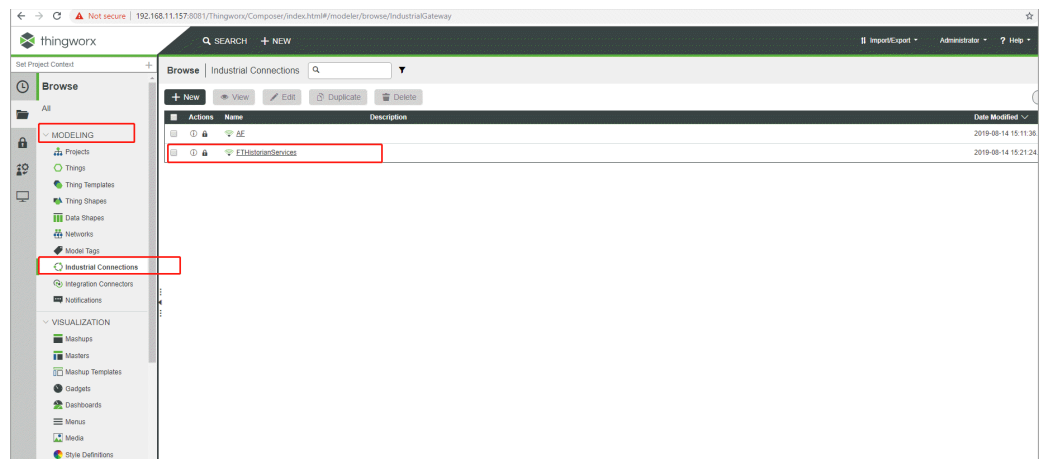
Bind AF Element Attributes to Thingworx Property

This section describes the steps to bind the AF attributes to Thing properties.

1. Click [Browse] and click [Industrial Connections] under the [MODELING] drop-down list.
2. Click the connection that is created while configuring the FTH-TWX Connector.

For example: Click [FTHHistorian].

Figure 5-1: Industrial Connection

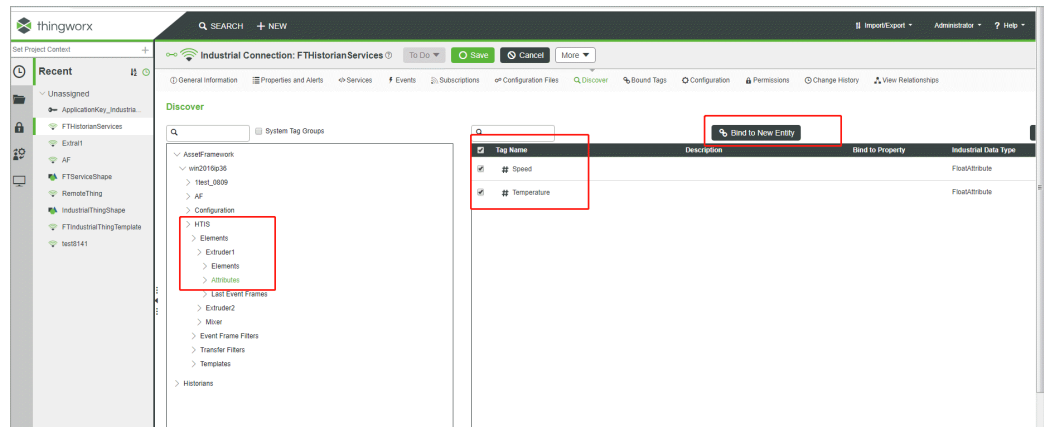


The Industrial Connection page displays.

3. Click [Discover], select the required attributes from the AF Server and then click [Bind to New Entity].

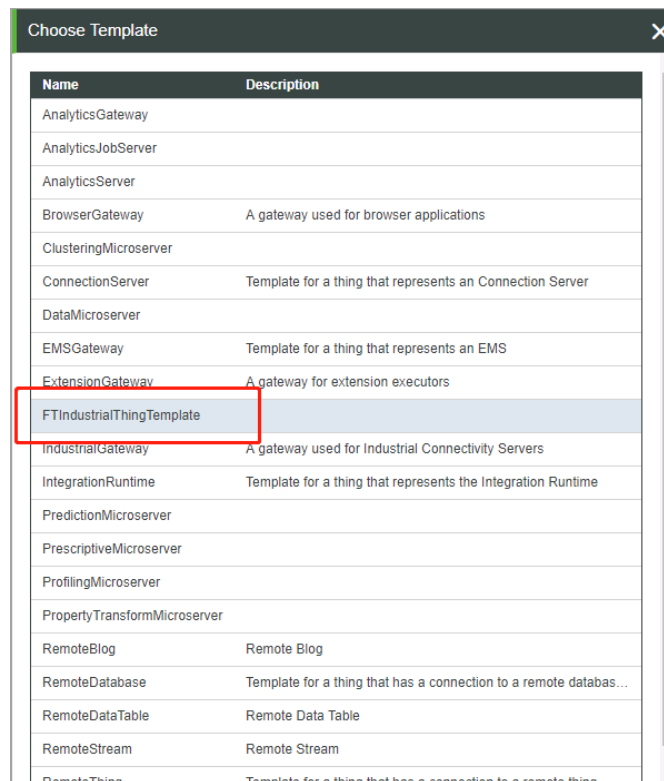
NOTE: FTH PI point with special characters comma (,), period (.), square brackets ([,]) in the names would not bind correctly in ThingWorx. Please follow ThingWorx allowed special characters only in PI Point and Thing property names.

Figure 5-2: Bind to New Entity



4. The Choose Template dialog displays. Select the [FTIndustrialThingTemplate] and click [OK].

Figure 5-3: Choose Template



5. The General Information section displays. Define the [Name] and click [Save]. The “Save Successful” message displays.

NOTE: The Name field in the General Information section is a required property.

Figure 5-4: Save

The screenshot shows the 'Industrial Thing: New Industrial Thing' form. At the top, there is a 'To Do' dropdown and 'Save' and 'Cancel' buttons. The 'Save' button is highlighted with a red box. Below the header, there are tabs for 'General Information', 'Properties and Alerts', 'Services', 'Events', 'Subscriptions', and 'Configuration'. The 'General Information' tab is active. It contains a 'Name' field (required) with the value 'TestPIPointFromAF', a 'Description' field, a 'Project' dropdown, a 'Tags' dropdown, a 'Base Thing Template' dropdown (showing 'FTIndustrialThingTemplate'), an 'Implemented Shapes' dropdown (showing 'IndustrialThingShape'), and a 'Value Stream' dropdown. The 'Active' checkbox is checked at the bottom.


- Click the [] icon in the top left. The defined connection is connected message displays.

Figure 5-5: Connected Message

The screenshot shows the 'Industrial Thing: TestPIPointFromAF' form. At the top, there is a 'To Do' dropdown and 'Save', 'Cancel', and 'More' buttons. A notification message 'TestPIPointFromAF is connected' is displayed at the top. The 'Save' button is highlighted with a red box. Below the header, there are tabs for 'General Information', 'Properties and Alerts', 'Services', 'Events', 'Subscriptions', 'Configuration', 'Permissions', 'Change History', and 'View Relationships'. The 'General Information' tab is active. It contains a 'Name' field (required) with the value 'TestPIPointFromAF', a 'Description' field, and a 'Value Stream' dropdown. The 'Active' checkbox is checked at the bottom.

- Click [Properties and Alerts]. Under the My Properties section, find the attribute properties that are selected while binding to new entity.

Figure 5-6: Properties and Alerts

Name	Actions	Source	Default Value	Value	Alerts	Category	Additional Info
AssetFramework_wm2016p36_H...	[Icon]	AssetFramework_wm2016p36_HTTPS...		155	0		
AssetFramework_wm2016p36_H...	[Icon]	AssetFramework_wm2016p36_HTTPS...		56384	0		

Name	Actions	Source	Default Value	Value	Alerts	Category	Additional Info
isConnected	[Icon]				0	ConnectionStatus	
isDisconnected	[Icon]				0	ConnectionStatus	
lastConnection	[Icon]		1970-01-01 08:00:00.000	2019-08-15 12:11:25.947	0	ConnectionStatus	
reportLastChange	[Icon]		1970-01-01 08:00:00.000	2019-08-15 12:11:25.951	0	ConnectionStatus	
reportLastEvaluation	[Icon]		1970-01-01 08:00:00.000	2019-08-15 12:11:25.951	0	ConnectionStatus	

- Click the required attribute property. The detailed information about the attribute property displays in the right pane.

NOTE: The detailed information of the attribute property can be edited in the right pane.

Figure 5-7: Detailed Information

Name	Actions	Source	Default Value	Value	Alerts	Category	Additional Info
AssetFramework_wm2016p36_H...	[Icon]	AssetFramework...		155	0		
AssetFramework_wm2016p36_H...	[Icon]	AssetFramework...		56384	0		

Name	Actions	Source	Default Value	Value	Alerts	Category	Additional Info
isConnected	[Icon]				0	ConnectionStatus	
isDisconnected	[Icon]				0	ConnectionStatus	
lastConnection	[Icon]		1970-01-01 08:00:00...	2019-08-15 12:11:25...	0	ConnectionStatus	
reportLastChange	[Icon]		1970-01-01 08:00:00...	2019-08-15 12:11:25...	0	ConnectionStatus	
reportLastEvaluation	[Icon]		1970-01-01 08:00:00...	2019-08-15 12:11:25...	0	ConnectionStatus	

Name	Actions	Source	Default Value	Value	Alerts	Category	Additional Info
IndustrialThing	[Icon]	FTIndustrialServices			0	Properties	IndustrialGatew...

- In the My Properties section, the following options are available:

- Add:** To add a new attribute property
- Duplicate:** To duplicate an existing attribute property
- Delete:** To delete an existing attribute property
- Manage Bindings:** To manage the bindings
- Refresh:** To view the change in the data value

Figure 5-8: Options

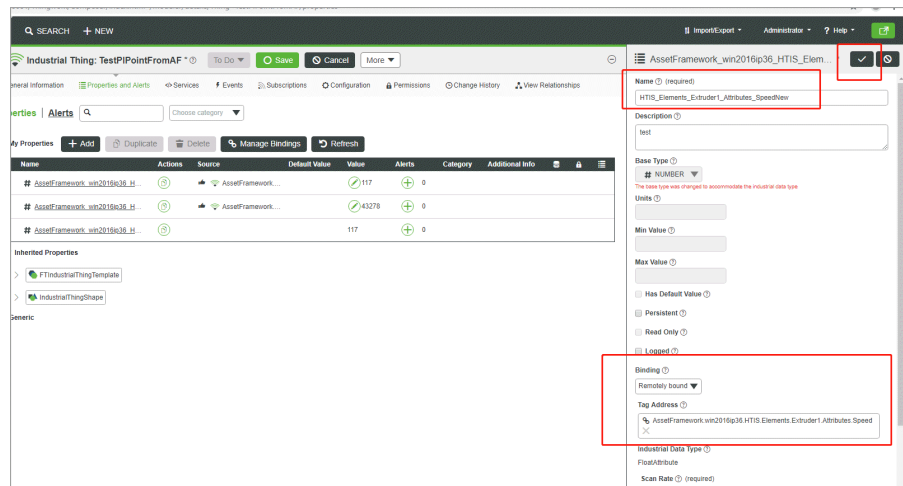


Add a New AF Attribute Property

Perform the following steps to add a new attribute property:

1. In the My Properties section, click [Add].
2. Provide the following details:
 - **Name:** Enter the name of the attribute property
 - **Description:** Enter the description of the attribute property
 - **Binding:** Select the binding from the drop-down list (For example: Select [Remotely bound])
 - **Tag address:** Select the tag address
3. Save the new attribute property.

Figure 5-9: Add New Property



Bind PI Point to Thingworx Property

This section describes the steps to bind the PIPoint to Thing properties.

1. Click [Browse] and click [Industrial Connections] under the [MODELING] drop-down.
2. Click the connection that is created while configuring the FTH-TWX Connector.


For example: Click [FTHistorian].

The Industrial Connection: <FTH-TWX Connector> page displays.

3. Click [Discover], select the required tags that comes from the Historian Server and then click [Bind to New Entity].
4. The Choose Template dialog displays. Select the [FTIndustrialThingTemplate] and click [OK].

5. The General Information section displays. Define the [Name] and click [Save]. The “Save Successful” message displays.

NOTE: The Name field in the General Information section is a required property.

6. Click the [] icon in the top left. The defined connection is connected message displays.
7. Click [Properties and Alerts]. Under the My Properties section, find the tag properties that are selected while binding to new entity.
8. Click the required tag property. The detailed information about that tag property displays in the right pane.

NOTE: The detailed information of the Historian tag can be edited in the right pane.

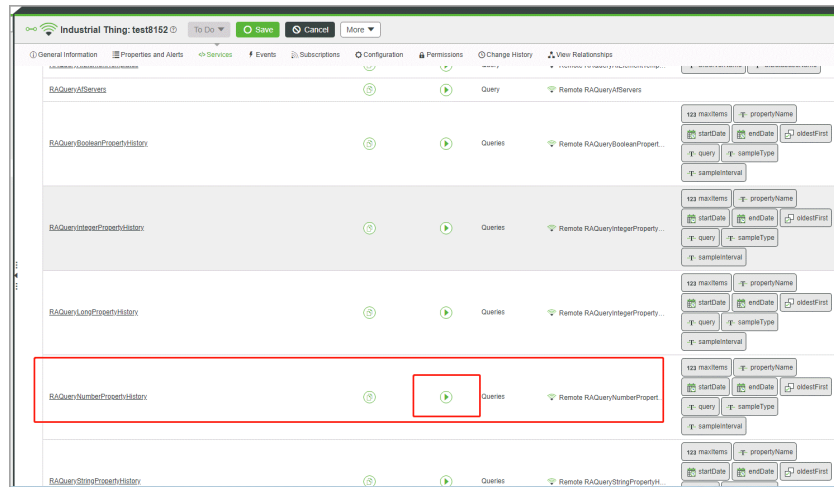
9. In the My Properties section, following options are available:
 - **Add:** To add a new tag property
 - **Duplicate:** To duplicate an existing tag property
 - **Delete:** To delete an existing tag property
 - **Manage Bindings:** To manage the bindings
 - **Refresh:** To view the change in the data value

Archive Historical Value of AF Element Attribute

Perform the following steps to archive the historical value of AF element attribute:

1. Click [Services] in the industrial thing page.
2. Select the required property to do aggregation.
3. Note down the name of the property.
4. Execute the service that corresponds to the property's data type. For example, if the property is String, execute **RAQueryStringPropertyHistory**. Click the [Execute] icon to execute the service.

Figure 5-10: Execute Service

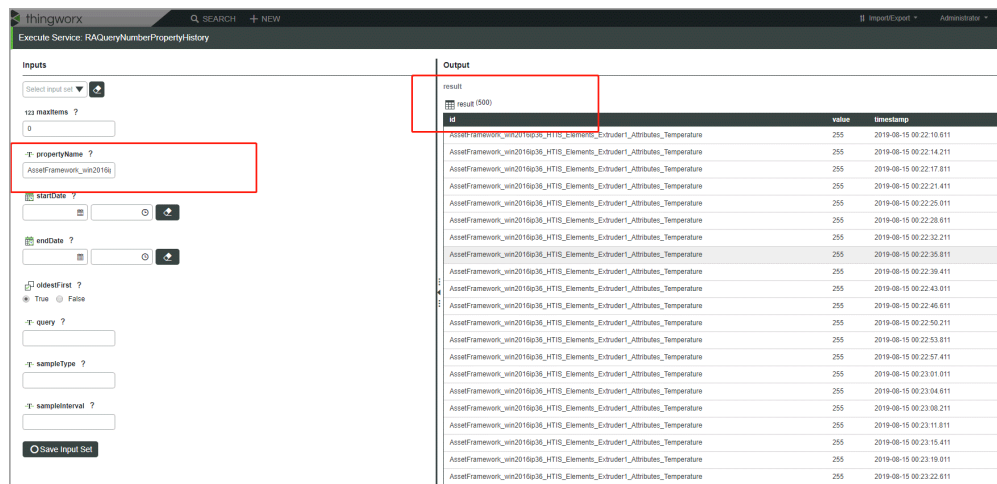


5. The Execute Service dialog displays. Provide the following details and click [Execute]:

- **propertyName:** Enter the name of the property
- **startDate:** Select the start date for data
- **endDate:** Select the end date for data
- **sampleType:** Enter the method that summarize data values. Refer to the [Aggregation/Sample Type](#) section
- **sampleInterval:** Enter the method for determining the number of samples, or buckets. Refer to the [Sample Interval](#) section

6. The output is visible in the right pane.

Figure 5-11: Property Name





Chapter

6

Uninstall FTH-TWX Connector

In this chapter:

- ❑ Uninstall 44

Uninstall

Perform the following steps to uninstall the FTH-TWX Connector:

1. Open a Command Prompt window with administrator privileges. Change the working directory to FTH_TWX_Connector installation directory:
C:\RockwellSoftware\FTH_TWX_Connector
2. Execute the following command to uninstall the Integration service:

```
RA.PTC.Integration.Service uninstall
```
3. Go to the **Uninstall** folder in the **C:\RockwellSoftware\FTH_TWX_Connector** directory and run the **Uninstaller.exe** file. Follow the instructions in the wizard.
4. On the Start menu, enter Control Panel in the search box and select 'Control Panel' from the results. Select 'Programs' and then 'Programs and Features'. Uninstall the following program:
 - a. ThingWorx.NET 5-8-0



Appendix

A

In this chapter:

- ☐ **Aggregation/Sample Type 46**
- ☐ **Sample Interval 52**
- ☐ **Thing Shape: RA.FTHistorian.SyncServices 52**

Aggregation/Sample Type

Aggregations are methods that summarize data values. They are performed during the retrieval of the data. Since FTH-TWX Connector retrieves the data from multiple data sources, aggregations on data are performed as close to the data source as possible. This means that if a historian is capable of performing an aggregation, the connector will push the aggregation request down to the historian. Otherwise, connector will perform the aggregation on the returned data.

All aggregations must specify three time parameters; a start time, an end time, and a sample interval. The historian uses these three parameters to generate a sequence of time intervals and then calculates an aggregate - one value, or one "sample" - for each interval.

The start and end times define the boundaries, or time period, of the request. For all requests, a value falling at the exact end of the time period is not included in the result, so that requests made for successive, contiguous time periods will include every value in the archive exactly once.

Various sample types are described below:

Average

Retrieve the average data over the resample interval.

The Average sampling type is an aggregation sampling technique that adds up the values of all good raw data within each defined Sampling Interval, and divides the sum by the number of good values.

If one or more non-good raw values are also found within a Sampling Interval, the quality of the average aggregate for that Sampling Interval will be returned as "Uncertain".

CumulativeTotal

The CumulativeTotal sampling type is an aggregation sampling technique that returns the cumulative total of all good raw values within each defined Sampling interval. This is useful when used with a counter, for when the counter resets to zero, the cumulative total will not be zero'ed out but continue counting up from the point of the reset.

If one or more non-good raw values are also found within a Sampling interval, the quality of the cumulative total aggregate for that Sampling interval will be returned as "Uncertain".

Count

Retrieve the number of raw values over the resample interval.

The Count sampling type is an aggregation sampling technique that returns the number of good raw values within each defined Sampling Interval.

If one or more non-good raw values are also found within a Sampling Interval, the quality of the count aggregate for that Sampling Interval will be returned as "Uncertain".

Delta

Retrieve the difference between the first and last value in the resample interval.

The Delta sampling type is an aggregation sampling technique that retrieves the difference between the earliest and latest good raw values within each defined Sampling Interval. If the last value is less than the first value, the result will be negative. If the last value is the same as the first value, the result will be zero. If the last value is greater than the first value, the result will be positive. If any non-good values exist earlier or later than the earliest and latest good values, respectively, the quality of the aggregate for that Sampling Interval will be returned as "Uncertain".

End

Retrieve the value at the end of the resample interval. The time stamp is the time stamp of the end of the interval.

Interpolative

Retrieve an interpolative value over the resample interval.

The Interpolative sampling type returns an interpolated value for each defined Sampling Interval boundary. The type of interpolation performed will be dependent on the data provider, but will be either SampleAndHold or Linear Interpolation. The default interpolation type for the Incuity server is SampleAndHold, which returns the last raw value prior to each defined Sampling Interval boundary.

Linear

Take all values that came back in the time interval, draw a straight line through the data, and return the data value in the middle of the line.

The Linear sampling type is an interpolative sampling technique that returns the good raw value (if available) at each defined Sampling Interval boundary; or, if no good raw value is available at the boundary, the calculated linear straight-line interpolation between the nearest good raw values preceding and following the boundary.

The formula utilized in this case is: $\text{BoundaryVALUE} = (((\text{BoundaryTIME} - \text{PrecedingTIME}) / (\text{FollowingTIME} - \text{PrecedingTIME})) \times (\text{FollowingVALUE} - \text{PrecedingVALUE})) + \text{PrecedingVALUE}$.

Maximum

Retrieve the maximum value in the resample interval.

The Maximum sampling type is an aggregation sampling technique that retrieves the maximum good raw value within each defined Sampling Interval, and returns that value with the timestamp of the start of the interval. If the same maximum exists at more than one timestamp, the oldest one is retrieved. If a non-good raw value within a Sampling Interval is higher than the good maximum, the quality of the aggregate for that Sampling Interval will be returned as "Uncertain".

MaximumActualTime

Retrieve the maximum value in the resample interval and the timestamp of the maximum value.

The MaximumActualTime sampling type is an aggregation sampling technique that retrieves the maximum good raw value within each defined Sampling Interval, and returns that value with the timestamp at which the value occurs. If the same maximum exists at more than one timestamp, the oldest one is retrieved. If a non-good raw value within a Sampling Interval is higher than the good maximum, the quality of the aggregate for that Sampling Interval will be returned as Uncertain.

MaxSampleAndHold

The MaxSampleAndHold sampling type is an aggregation sampling technique that retrieves the maximum good raw value within each defined Sampling Interval, and returns that value with the timestamp of the start of the interval. If the same maximum exists at more than one timestamp, the oldest one is retrieved. If a non-good raw value within a Sampling Interval is greater than the good maximum, the quality of the aggregate for that Sampling Interval will be returned as Uncertain.

This sampling type differs from the Maximum sampling type in that it utilizes SampleAndHold interpolation to determine the beginning held value at the start of each interval. (This held value is the last good raw value occurring on or before the starting time of that interval). This beginning held value is also considered to be within the interval, and is therefore taken into consideration as a possible maximum. It will in fact be the maximum when no other values are present in the interval.

Minimum

Retrieve the minimum value in the resample interval.

The Minimum sampling type is an aggregation sampling technique that retrieves the minimum good raw value within each defined Sampling Interval, and returns that value with the timestamp of the start of the interval. If the same minimum

exists at more than one timestamp, the oldest one is retrieved. If a non-good raw value within a Sampling Interval is lower than the good minimum, the quality of the aggregate for that Sampling Interval will be returned as "Uncertain".

MinimumActualTime

Retrieve the minimum value in the resample interval and the timestamp of the minimum value.

The MinimumActualTime sampling type is an aggregation sampling technique that retrieves the minimum good raw value within each defined Sampling Interval, and returns that value with the timestamp at which the value occurs. If the same minimum exists at more than one timestamp, the oldest one is retrieved. If a non-good raw value within a Sampling Interval is lower than the good minimum, the quality of the aggregate for that Sampling Interval will be returned as "Uncertain".

MinSampleAndHold

The MinSampleAndHold sampling type is an aggregation sampling technique that retrieves the minimum good raw value within each defined Sampling Interval, and returns that value with the timestamp of the start of the interval. If the same minimum exists at more than one timestamp, the oldest one is retrieved. If a non-good raw value within a Sampling Interval is less than the good minimum, the quality of the aggregate for that Sampling Interval will be returned as Uncertain.

This sampling type differs from the Minimum sampling type in that it utilizes SampleAndHold interpolation to determine the beginning held value at the start of each interval. (This held value is the last good raw value occurring on or before the starting time of that interval). This beginning held value is also considered to be within the interval, and is therefore taken into consideration as a possible minimum. It will in fact be the minimum when no other values are present in the interval.

Range

Retrieve the difference between the minimum and maximum value over the sample interval.

The Range sampling type is an aggregation sampling technique that retrieves the difference between the raw maximum and raw minimum values within each defined Sampling Interval. If only one value exists in the interval, the range is zero. Note that the range is always zero or positive. If any non-good values exist in the interval, they are ignored, and the quality of the aggregate for that interval will be returned as "Uncertain".

SampleAndHold

Retrieve a value and keep it until it changes.

SampleAndHold is an interpolative sampling technique that returns the last raw value prior to each defined Sampling Interval boundary. The quality of the returned value will match that of the raw value.

Because the last raw values are held across intervals, the same raw value may potentially be returned for more than one interval boundary.

StandardDeviation

Retrieve the standard deviation over the resample interval.

The StandardDeviation sampling type is an aggregation sampling technique that returns the standard deviation of good raw values within each defined Sampling Interval, calculated using the formula $\text{SQRT}(\text{SUM}(((X - \text{Avg}(X))^2) / (n - 1)))$ where X is each good raw value in the interval, Avg(X) is the average of the good raw values, and n is the number of good raw values in the interval. For intervals where n=1, then a value of 0 is returned.

Start

Retrieve the value at the beginning of the resample interval. The time stamp is the time stamp of the beginning of the interval.

The Start sampling type is an aggregation sampling technique that retrieves the first raw value within each defined Sampling Interval, and returns it with the timestamp at which that value occurs.

If the value is non-good, the quality of the aggregate for that Sampling Interval will be returned as "Uncertain"

Sum

The Sum sampling type is an aggregation sampling technique that returns the sum of all good raw values within each defined Sampling Interval.

If one or more non-good raw values are also found within a Sampling Interval, the quality of the sum aggregate for that Sampling Interval will be returned as "Uncertain".

TimeAverage

Retrieve the time weighted average data over the resample interval.

The TimeAverage sampling type is an aggregate sampling technique that first utilizes Linear sampling to return a boundary value for each defined Sampling Interval boundary (see Linear description). A straight line is then drawn between the starting and ending boundary values of each interval, and the area under the

line calculated $(1/2 \text{ base} \times \text{height}) + (\text{base} \times \text{height})$). The area under the line is then divided by the length of the interval to yield the time-weighted average for each bounded interval.

TimeAverageSampleAndHold

The TimeAverageSampleAndHold sampling type is an aggregate sampling technique that first utilizes SampleAndHold interpolation to return a boundary value for each defined Sampling Interval boundary (see SampleAndHold description).

This differs from the TimeAverage sampling type, which utilizes Linear interpolation to determine the boundary values, and also differs from TimeAverage in the assumption made as to the value between raw data values. Whereas for TimeAverage the value between each Good raw value is assumed to change continuously (in a straight line) from the first value to the second, for TimeAverageSampleAndHold the value is instead assumed to hold at the first value for the entire length of time prior to receipt of the second value.

The rectangular area between each value is calculated using the formula $((\text{end time} - \text{start time}) \times \text{start value})$. Each of these areas is then added to the total interval area. The total interval area is then divided by the total time of the interval to yield the time-weighted average for that interval.

Total

Retrieve the totalized value (time integral) of the data over the resample interval.

The Total sampling type is an aggregate sampling technique that first utilizes TimeAverage sampling to return a time-weighted average for each defined Sampling Interval (see TimeAverage description). The time-weighted average is multiplied by the length of the interval, in seconds, to give the Total value normalized to seconds.

TotalSampleAndHold

The TotalSampleAndHold sampling type is an aggregate sampling technique that first utilizes TimeAverageSampleAndHold sampling to return a time-weighted average for each defined Sampling Interval (see TimeAverageSampleAndHold description). The time-weighted average is multiplied by the length of the interval, in seconds, to give the TotalSampleAndHold value normalized to seconds.

Variance

Retrieve the variance over the sample interval.

The Variance sampling type is an aggregate sampling technique that first utilizes StandardDeviation sampling to return the standard deviation for each defined

Sampling Interval (see StandardDeviation description). The standard deviation is squared to give the Variance for the interval.

Sample Interval

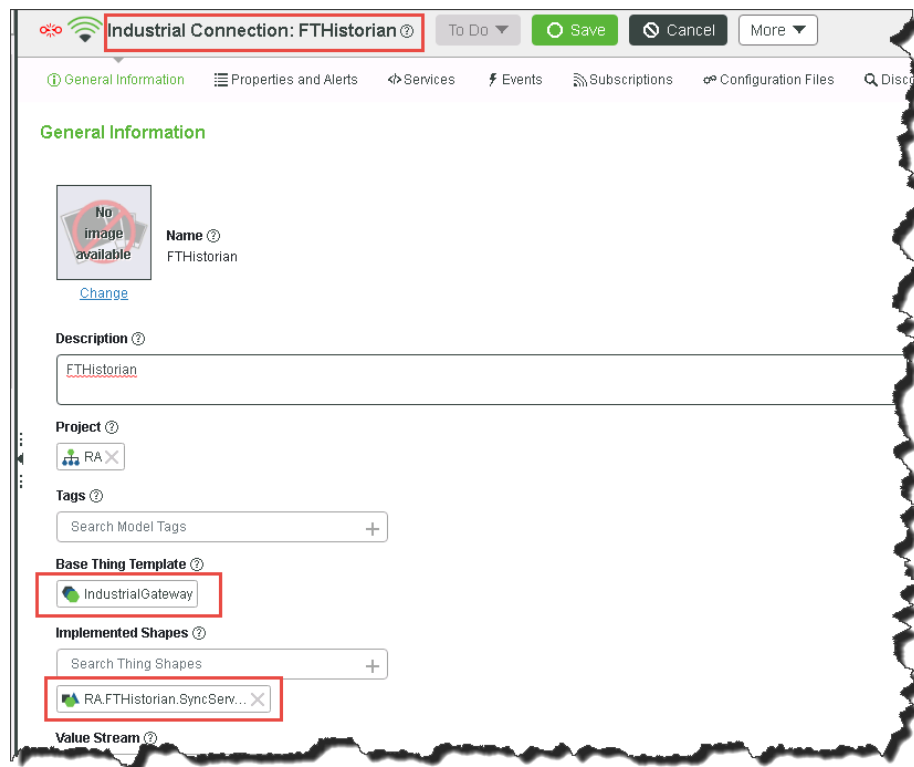
The FTH-TWX Connector provides two methods for determining the number of samples, or buckets, to produce:

- Slice count: a fixed number of intervals where the number is determined by the user.
- Time interval: a variable number of intervals where the user elects [x] number of sampling intervals every [millisecond, second, minute] amount of time. (e.g. 10 samples every second). The interval can be defined with the following format:
d.hh:mm:ss (d=day, hh=hours, mm: minutes, ss=seconds) like 00:10:00 for 10 minutes.

Thing Shape: RA.FTHistorian.SyncServices

The following Thing Shape is added to an Industrial Connection Thing, to support the following synchronization services.

Figure A-1: Thing Shape




The **RA.FTHistorian.SyncServices** thing shape has the following services:

Service: RAQueryAfServers

Returns information about the available Asset Framework (AF) servers back.

- Input Parameter: No input parameter are needed.
- Output: InfoTable: Data Shape: RA.FTHistorian.AfServer

Figure A-2: RAQueryAfServers

 result (2)

uniqueID	name	description	serverVersion	isConnected
6a7f9905-e138-4a47-8a9f-7cd524a9c0d6	APPSEHIST	my APPSEHIST	2.8.0.7444	<input checked="" type="checkbox"/>
f29a3cf6-4805-4a79-963d-25ba90c4f911	VMHIST		2.9.5.8368	<input checked="" type="checkbox"/>

Service: RAQueryAfDatabases

Returns information about the available AF databases of the selected servers back.

- Input Parameter

Name	Type	Description
afServerName	STRING	AF server name

- Output: InfoTable: Data Shape: RA.FTHistorian.AfDatabase

Figure A-3: RAQueryAfDatabases

 result (3)

uniqueID	name	description	elementTemplateCount
dee1a62d-9eac-4945-82e1-4a1e9baa9d8e	Configuration	A store for configuration data.	0
135f4596-4a93-488f-9626-df8ff6002d6	Ford		11
a01c3906-5692-4687-93b2-84c57c0552ed	LTP		6

Service: RAQueryAfElementTemplates

Returns information about the available AF element templates of the selected database back.

- Input Parameter

Name	Type	Description
afServerName	STRING	AF server name
afDataBaseName	STRING	AF database name

- Output: InfoTable: Data Shape: RA.FTHistorian.AfElementTemplate

Figure A-4: RAQueryAfElementTemplates

uniqueID	name	description	categoriesString	baseTemplate	isDeleted	allowElementToExtend
bcc7309e-8a1b-4bf7-8c8e-e0dc9594a690	Area	Test			<input type="checkbox"/>	<input type="checkbox"/>
4ed38d17-2657-4441-92e5-afe367a23c05	Base_Station	Auto Generated by ENTZ Tools 2011-06-30 15:54:55			<input type="checkbox"/>	<input type="checkbox"/>
ab0bcac1-ebbc-407c-905e-8526f3389b44	BaseStationEx		MyCategory2;	Base_Station	<input type="checkbox"/>	<input type="checkbox"/>
64d1e8fa-73be-4f34-8a79-94e2d9cca32c	BatchTemplate				<input type="checkbox"/>	<input type="checkbox"/>
16dd0df-34a4-48cd-822a-d6335aeb4dcc	ExtruderExTemplate		MyCategory1;	ExtruderTemplate	<input type="checkbox"/>	<input type="checkbox"/>
6777f0b6-3755-4f08-a3ab-39b3967a7016	ExtruderTemplate				<input type="checkbox"/>	<input type="checkbox"/>

Service: RAQueryAfElementTemplateAttributes

Returns information about the available AF element template attributes of the selected element template back.

- Input Parameter

Name	Type	Description
afServerName	STRING	AF server name
afDataBaseName	STRING	AF database name
afElementTemplate	STRING	AF element template

- Output: InfoTable: Data Shape:
RA.FTHistorian.AfElementTemplateAttribute

Figure A-5: RAQueryAfElementTemplateAttributes

uniqueID	name	description	elementTemplateName	categoriesString	configString	typeString	isDeleted	isHidden
0dae3419-7397-40d6-a332-8826ea6d75b1	ID		ExtruderExTemplate			System.String	<input type="checkbox"/>	<input type="checkbox"/>
7353ef2f-ce3e-45b0-ade0-04e818feaf12	Temperature		ExtruderTemplate			System.Double	<input type="checkbox"/>	<input type="checkbox"/>
c732a15d-ba9d-484a-99d1-13cc072673fd	Speed		ExtruderTemplate		\\%Server%\%Element%\%Attribute%	System.Double	<input type="checkbox"/>	<input type="checkbox"/>

Service: RAQueryAfElementsByTemplate


Returns information about the available AF elements of the selected element template back.

- Input Parameter

Name	Type	Description
afServerName	STRING	AF server name
afDataBaseName	STRING	AF database name
afElementTemplateName	STRING	AF element template name

- Output: InfoTable: Data Shape:
RA.FTHistorian.AfElementTemplateAttribute

Figure A-6: RAQueryAfElementsByTemplate

 result (3)

uniqueID	name	description	categoriesString	templateName	path	isDeleted	attributeCount
1899305e-9eec-11e9-80e9-000c2947c270	Extruder11	Test		ExtruderTemplate	\\MHIST\Ford\Extruder11	<input type="checkbox"/>	2
18993061-9eec-11e9-80e9-000c2947c270	Extruder2			ExtruderTemplate	\\MHIST\Ford\Extruder2	<input type="checkbox"/>	2
7e097c54-b372-11e9-80ea-000c2947c270	ExtruderEx1		MyCategory1;	ExtruderExTemplate	\\MHIST\Ford\ExtruderEx1	<input type="checkbox"/>	3

Service: RAQueryAfElements


Returns information about the available AF elements based on provided filter criterion.

- Input Parameter

Name	Type	Description
afServerName	STRING	AF server name
afDataBaseName	STRING	AF database name
maxItems	INTEGER	Maximum number of values to be returned.
afElementFilter	STRING	AF Element Filter: e.g. Extruder* or M* or *Mixer*
afCategoryFilter	STRING	Category Filter: e.g. Category* or C* or *Mixer*
afElementTemplateFilter	STRING	AF Element Template Filter: e.g. Extruder* or T* or *Template*

- Output: InfoTable: Data Shape:
RA.FTHistorian.AfElementTemplateAttribute

Figure A-7: RAQueryAfElements

 result (3)

uniqueID	name	description	categoriesString	templateName	path	isDeleted	attributeCount
1899305e-9eec-11e9-80e9-000c2947c270	Extruder11	Test		ExtruderTemplate	\\MHIST\Ford\Extruder11	<input type="checkbox"/>	2
18993061-9eec-11e9-80e9-000c2947c270	Extruder2			ExtruderTemplate	\\MHIST\Ford\Extruder2	<input type="checkbox"/>	2
7e097c54-b372-11e9-80ea-000c2947c270	ExtruderEx1		MyCategory1;	ExtruderExTemplate	\\MHIST\Ford\ExtruderEx1	<input type="checkbox"/>	3

Service: RAQueryAfElementAttributes

Returns information about the AF element attributes of the selected element back.

- Input Parameter

Name	Type	Description
afServerName	STRING	AF server name
afDataBaseName	STRING	AF database name
afElementName	STRING	AF element name

- Output: InfoTable: Data Shape: RA.FTHistorian.AFElementAttribute

Figure A-8: RAQueryAfElementAttributes

result (2)										
elementUniqueId	elementName	name	description	typeString	categoriesString	path	defaultUnit	configString	isDeleted	isDynamic
19993061-9eec-11e9-80e9-000c2947c270	Extruder2	Temperature		System.Double		\\MHIST\FordExtruder2\Temperature		\\MHist?945834cf-1769-4599-8e16-a733bf57e0eb\PI Network Manager(_Total)_Bytes Received\sec?72	<input type="checkbox"/>	<input type="checkbox"/>
19993061-9eec-11e9-80e9-000c2947c270	Extruder2	Speed		System.Double		\\MHIST\FordExtruder2\Speed		\\MHist?945834cf-1769-4599-8e16-a733bf57e0eb\PI Network Manager(_Total)_Bytes Sent\sec?66	<input type="checkbox"/>	<input type="checkbox"/>

Service: RAQueryAfElementAttributesByElementId

Returns information about the AF element attributes of the selected element back.

- Input Parameter

Name	Type	Description
afServerName	STRING	AF server name
afElementId	GUID	AF element Unique ID

- Output: InfoTable: Data Shape: RA.FTHistorian.AFElementAttribute

Figure A-9: RAQueryAfElementAttributesByElementId

result (2)										
elementUniqueId	elementName	name	description	typeString	categoriesString	path	defaultUnit	configString	isDeleted	isDynamic
19993061-9eec-11e9-80e9-000c2947c270	Extruder2	Temperature		System.Double		\\MHIST\FordExtruder2\Temperature		\\MHist?945834cf-1769-4599-8e16-a733bf57e0eb\PI Network Manager(_Total)_Bytes Received\sec?72	<input type="checkbox"/>	<input type="checkbox"/>
19993061-9eec-11e9-80e9-000c2947c270	Extruder2	Speed		System.Double		\\MHIST\FordExtruder2\Speed		\\MHist?945834cf-1769-4599-8e16-a733bf57e0eb\PI Network Manager(_Total)_Bytes Sent\sec?66	<input type="checkbox"/>	<input type="checkbox"/>