



thingworx® navigate™

Installing ThingWorx Navigate 9.1

November 2020

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Install and Configure ThingWorx Navigate

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In this section, you'll find the essentials for getting your system up and running for the first time.

Find Your Way Through the Installation

Just before we get started, let's look where we're going:



You are here.

In 3 steps, we'll guide you through the process.

1



ThingWorx Foundation Setup

Start with installing ThingWorx Foundation and obtaining the necessary license.

Now that your ThingWorx is up and running and you have the necessary license, let's begin installing ThingWorx Navigate.

2



ThingWorx Navigate Setup

Now, run the installer to install ThingWorx Navigate.

Straight to the next step. We'll take you there automatically. You can continue with the configuration now, or come back to it later.

3



ThingWorx Navigate Configuration

Connect to Windchill, choose your authentication method, and set up authentication.

Enter credentials in Navigate and PingFederate.

For SSO

Install and configure PingFederate.

4



ThingWorx Navigate installed and ready to use!

Get Ready to Install

ThingWorx Navigate provides quick and easy access to information stored in products such as Windchill and SAP. You, the administrator, can configure ThingWorx Navigate tasks for each user role and even build custom tasks from scratch.

Additional Help

These resources may come in handy during installation and configuration:

- [ThingWorx Help](#)
- [Windchill Help](#)

If you're configuring Single Sign-on, these documents will be helpful:

- [PTC Identity and Access Management Help Center](#)
- [PingFederate documentation, support, and community](#)

Code Examples

The code examples in this guide may have hidden line breaks to fit on the page. Make sure to check any strings that you copy.

Important Legal Information About Data Collection

PTC gathers some user data. Before you download and install ThingWorx Navigate, please read the sections below.

Data Collection

For information about the data we collect and how we use it, see “PTC ThingWorx Data Collection” on PTC’s [Legal Policies, Agreements and Disclaimers](#) page.

User Data Collected by ThingWorx Navigate

- Obfuscated User ID, to analyze the number of unique users
- Name of each task accessed by each user
- Number of times each user accessed each task
- Role of each user

Opt Out of Data Collection

For help with opting out of data collection, see the "ThingWorx Metrics Reporting Services Configuration" table in the [Platform Subsystem](#) topic of the ThingWorx Help Center.

Prerequisites

In this topic, you'll find the prerequisites for ThingWorx Navigate. These include requirements for hardware sizing, the ThingWorx Foundation, and Windchill. Check the [ThingWorx Navigate Product Compatibility Matrix](#) for the supported versions of Windchill, ThingWorx, web browsers, and other required applications.

You can directly navigate to any of the following topics:

- [Hardware Sizing on page 7](#)
- [ThingWorx Requirements and ThingWorx Navigate Licensing on page 7](#)
- [Uninstall ThingWorx Integration Runtime on page 7](#)
- [Windchill Requirements on page 8](#)
- [KeyStore and TrustStore Files on page 8](#)

Hardware Sizing

- Review ThingWorx Sizing Guidelines at [System Requirements](#) in the ThingWorx Help Center.
- The [ThingWorx Navigate Platform Sizing Guide](#) helps determine the hardware configuration required to successfully deploy ThingWorx Navigate.

ThingWorx Requirements and ThingWorx Navigate Licensing

- ThingWorx Foundation must be installed using the installer before installing ThingWorx Navigate. For help with installing ThingWorx Foundation, visit [ThingWorx Foundation Installer](#) in the ThingWorx 9 Help Center.

Note

If you plan to configure ThingWorx Navigate with a Single Sign-on (SSO) authentication, you must configure ThingWorx Foundation using SSL before beginning your ThingWorx Navigate installation.

- After installing ThingWorx Foundation using the installer, run the License Configurator tool to receive a valid licence with entitlement for ThingWorx Navigate.

Uninstall ThingWorx Integration Runtime

If you have an existing installation of ThingWorx Integration Runtime, uninstall it using instructions relevant to your operating system from the following table:

Windows	Linux
<ol style="list-style-type: none"> 1. From the Task Manager, stop the ThingWorx-IntegrationRuntime service. 2. In a command prompt, run the following command: <pre>sc delete Thingworx-IntegrationRuntime</pre> 	<ol style="list-style-type: none"> 1. In a command prompt, run the following commands: <pre>systemctl stop Thingworx-IntegrationRuntime systemctl disable Thingworx-IntegrationRuntime rm -f /etc/systemd/system/Thingworx-IntegrationRuntime.service systemctl daemon-reload</pre>

Windchill Requirements

These are the requirements for Windchill:

- Windchill—Check the [ThingWorx Navigate Product Compatibility Matrix](#) for the supported versions and minimum CPS.
- For enhanced security, we recommend configuring your Windchill server with SSL before you begin a ThingWorx Navigate installation. Refer to the [Windchill Installation and Configuration Guide](#) for instructions on how to do this.

Note

If you plan to configure your ThingWorx Navigate using the Windchill authentication, you must configure your Windchill server with SSL before you begin the installation.

- For Windchill versions prior to Windchill 11.1 M020 CPS 15, an enablement patch must be loaded onto the Windchill server to enable the PTC Windchill Extension for ThingWorx. For details, refer to the topic [Install Windchill Patches on page 9](#).

KeyStore and TrustStore Files

For configuring ThingWorx Navigate, you need to create KeyStore and TrustStore files. You can create these files now or before you begin with the configuration. Refer to the [Create KeyStore and TrustStore Files for ThingWorx Navigate on page 10](#) topic for detailed instructions

The files you need depend on the authentication method you choose. Go to one of these topics to review the files you require:

- [Set Up ThingWorx Navigate with Single Sign-on on page 20](#)

-
- [Set Up ThingWorx Navigate with Windchill Authentication on page 24](#)
 - [Set Up ThingWorx Navigate with Fixed Authentication on page 31](#)

Install Windchill Patches

The [ThingWorx Navigate Product Compatibility Matrix](#) provides detailed information about the supported Windchill versions and patches. Ensure that you are on the minimum supported CPS version for the supported Windchill releases.

For Windchill Versions Prior to 11.1 M020 CPS 15

For Windchill versions prior to 11.1 M020 CPS 15, an enablement patch must also be loaded onto the Windchill server to enable the PTC Windchill Extension for ThingWorx Foundation. The patch must correspond with the Windchill release you have installed.

Note

- You can skip this section if you already installed the Windchill patches.
- Make sure you reapply the patch after every update of Windchill CPS.

The required PTC Windchill patch adds several web service endpoints that allow ThingWorx to interact with Windchill.

The Windchill patches are found in the following location: `$<installdir>\NavigateApp\WindchillPatch`.

Alternatively, you can download the Windchill patches from the following location:

1. From the [PTC Software Download](#) page, select **PTC SMART CONNECTED APPLICATIONS**.
2. Expand **Release APPs, ThingWorx Navigate 9.0**, and then expand **Most Recent Datecode**.
3. Select `Thingworx-Navigate-Supplemental-Files-<version>-bundle`.
4. Next to **Download now**, select your download method. The file is downloaded and you're ready to continue.

The name of the ZIP file identifies the release in which it should be installed. For example, on a 11.1 M020 system, install the patch in `11.1-M020_WCTWXExtension_<version>.zip`. Each patch includes instructions specific to the release. To install the patch, unzip the file and use the instructions found in the Readme file included with the patch.

Create KeyStore and TrustStore Files for ThingWorx Navigate

The information in this topic will help you prepare the KeyStore and TrustStore files you need to install and configure ThingWorx Navigate. Read through the topic before you start installing, and then refer to it as needed during the installation process.

Introduction to Configuring SSL

PTC recommends using the Secure Sockets Layer (SSL) protocol for a production environment. ThingWorx Navigate can use SSL to both mutually authenticate the servers to each other and protect the communication itself.

Configurations for HTTPS require the use of a certificate of authority. ThingWorx Navigate requires that the certificate be trusted by Java. If you elect to use a certificate that is not trusted by Java, then you must configure Java to trust this certificate. Certificates provided by third-party vendors such as Verisign and Thawte, for example, are Java-trusted certificates of authority.

SSL configurations vary considerably, and we won't attempt to describe all options available in an SSL configuration. The instructions provided here should require a minimum of effort to implement self-signed certificates for HTTPS.

ThingWorx Navigate supports various configurations and authentication methods. As a result, you'll need various certificates, KeyStore, and TrustStore files created and handy before you use the **ThingWorx Navigate Setup** installation tool and the **ThingWorx Navigate Configuration** tool.

In the sections below, you'll find generic steps for generating KeyStore and TrustStore files using the `keytool` utility of Java. The installation and configuration procedures have information on exactly which KeyStore or TrustStore files you need at each step of the way. Refer to this topic, as needed, for the general instructions on generating the files.

Caution

- When you set passwords for your TrustStore and KeyStore files, make sure they include only letters and numbers. Special characters are not supported.
 - Research the various options available on the market for generating these files in secure ways. PTC does not take responsibility for the security of the certificates and the KeyStore and TrustStore files you generate.
-

Generate a KeyStore File to Accept SSL-Based Connections Using a Self-Signed Certificate

Before you begin, make sure you have the Java `keytool` utility in your path. Then, follow the steps below to create a new KeyStore file with a public/private Key Pair inside.

Note

For the steps below, make sure to run the command prompt as an Administrator. Otherwise, you are likely to receive this error:

```
keytool error: java.io.FileNotFoundException: tomcat.keystore (Access is denied)
```

1. Choose a directory for the KeyStore and save it in that directory. For example, `D:\Certificates`.
2. Open a command prompt and use this command to navigate to the Java installation folder:

```
cd %JAVA_HOME%/bin
```

3. Run the command below to generate the KeyStore with a private key for the certificate.

```
keytool -genkey -alias testKeyStore -keyalg rsa -dname "CN=<transport cert, application cert, or client authentication>" -keystore KeyStore.jks -storetype JKS
```

You will be prompted to create a password for the KeyStore file and a password for the private key. Use the same password in both places.

Note

Change the value of the `-dname` argument according to your environment.

Provide the value for CN according to the type of certificate you're using:

- Transport Layer—Provide your fully-qualified host name. For example, `<hostname.domain.com>`
 - Application Layer or Client Authentication—Provide any appropriate name. For example, `ThingWorx`
-

-
4. Generate a self-signed certificate for the key using the command below. When you are prompted for the KeyStore password, enter the password you created in Step 3.

```
keytool -selfcert -alias testKeyStore -validity 1825 -keystore  
KeyStore.jks -storetype JKS
```

5. Export the public key for your new certificate using this command:

```
keytool -export -alias testKeyStore -file testKeyStore.cer  
-rfc -keystore KeyStore.jks -storetype JKS
```

The KeyStore file you generated has a private key associated with it.

Generate a TrustStore File

The "SSL Configuration Example: Production Configuration" section in the [Initial Setup of Integration Runtime Service for Integration Connectors](#) topic from the ThingWorx Help Center provides instructions on creating a new TrustStore and importing the server certificate into it.

Known Issues for Installation Tools

The installation and configuration tools have the following known issues:

- You cannot install ThingWorx Navigate multiple times on the same machine.
- For Linux, the progress bar looks complete even while the installation is in progress.
- For all configuration types, no validation is performed on your Windchill connection. Enter the connection information carefully.
- You cannot uninstall ThingWorx Navigate separately. ThingWorx Foundation must be uninstalled to uninstall ThingWorx Navigate.
- Uninstalling ThingWorx Foundation does not uninstall ThingWorx Integration Runtime. If you have an existing installation of ThingWorx Integration Runtime, uninstall it using instructions from the "Uninstall ThingWorx Integration Runtime" section in the [Prerequisites on page 7](#).

Download ThingWorx Navigate

Download your release of ThingWorx Navigate from the PTC site:

1. From the [PTC Software Download](#) page, select **PTC SMART CONNECTED APPLICATIONS**.
2. Expand **Release APPs** and select the desired version of **ThingWorx Navigate**.
3. Now, expand **Most Recent Datecode** and select the suitable bundle:
 - ThingWorx-Navigate-<version>-Windows
 - ThingWorx-Navigate-<version>-Linux

 **Note**

Do not select `Thingworx-Navigate-Supplemental-Files-<version>-bundle`. If you want to upgrade an existing installation of ThingWorx Navigate, see instructions in [Upgrading to ThingWorx Navigate 9.1](#).

4. Next to **Download now**, select your download method. The file is downloaded and you're ready to continue.

Install ThingWorx Navigate



Let's dive right in. Using the **ThingWorx Navigate Setup** installation tool, we'll install ThingWorx Navigate and the other required software. In the sections below, you'll find more information to help you set up your system.

 **Note**

Before you begin the installation, ensure that you have installed the compatible ThingWorx Foundation version using the installer. Determine the compatible ThingWorx Foundation version using the [ThingWorx Navigate Product Compatibility Matrix](#). For help with installing ThingWorx Foundation, visit the [ThingWorx 9 Help Center](#).

Open the Installation Tool

According to the installation package that you downloaded, unzip the download and then open the installer file:

- Windows—`ThingWorx-Navigate-<version>-Windows-installer.exe`
- Linux—`ThingWorx-Navigate-<version>-Linux-x64-installer.run`

For Windows, double-click the file to open the **ThingWorx Navigate Setup** tool.

For Linux, make sure you run **ThingWorx Navigate Setup** with the root user.

Welcome

Let's begin with the installation for ThingWorx Navigate. Click **Next** or **Forward** to begin.

Getting Ready to Install

Now, a reminder to make sure that you meet all the [prerequisites on page 7](#) for installing ThingWorx Navigate.

Click **Next** or **Forward**.

Applications in This Installer

This installation tool helps you install the following applications:

- ThingWorx Navigate
- ThingWorx Integration Runtime

Click **Next** or **Forward**.

License Agreement

1. Read the license agreement, and then select **I accept the agreement**. You can print a copy of the agreement.
2. Click **Next** or **Forward**.

Authentication/ThingWorx Connection

This step validates your ThingWorx Navigate license and ThingWorx connection.

Based on your ThingWorx Foundation authentication type, the **ThingWorx Navigate Setup** tool leads you to one of the following:

- Creating and validating your ThingWorx administrator application key
- Entering your ThingWorx administrator password

For Single Sign-on (SSO)	For Fixed Authentication
<ol style="list-style-type: none"> 1. Create a ThingWorx application key. For help with creating an app key, refer to the "Creating an Application Key" section in the Application Keys topic of the ThingWorx Help Center. 2. Copy the value under Key ID. 3. Back in the ThingWorx Navigate Setup tool, paste the value in the box next to Application Key and click Next or Forward. <p>Your application key is validated.</p>	<ol style="list-style-type: none"> 1. Enter the password for your ThingWorx Administrator account. 2. Click Next or Forward.

Begin Your Installation

Now's the time to review your settings. If you need to change anything, click **Back**. When you're ready, click **Install**.

The installation process can take several minutes.

Note

ThingWorx Navigate is installed in the same location as your existing ThingWorx Foundation installation.

Success!

ThingWorx Navigate is installed.

The next step is [configuring ThingWorx Navigate on page 18](#). The **ThingWorx Navigate Configuration** tool guides you through configuration. This tool will start automatically after you click **Finish** on the **Success!** page.

You can continue with the configuration now, or come back to it later. If you wish to configure ThingWorx Navigate later, clear the **Launch ThingWorx Navigate Configurator** check box and click **Finish**.

Note

Before you begin with the configuration, ensure you are on a compatible Windchill version, as mentioned in the [prerequisites on page 7](#).

Troubleshoot Installation

Note

If you run into any errors during installation, do not continue with configuration. Resolve these errors and then reinstall ThingWorx Navigate.

Installer and Configurator Log Files

If there is a problem with the installation or configuration, the following log files may provide useful information on error handling:

- Installation logs:
 - For ThingWorx Foundation: `$<installdir>\installer\logs\ThingWorxFoundation_install.log`
For example: `C:\Program Files (x86)\ThingWorxFoundation\installer\logs\ThingWorxFoundation_install.log.`
 - For ThingWorx Navigate: `$<installdir>\installer\logs\ThingWorxNavigate_install.log`
For example: `C:\Program Files (x86)\ThingWorxNavigate\installer\logs\ThingWorxNavigate_install.log.`
- License Configuration and Authentication Configuration logs:
`$<installdir>\installer\logs`
For example: `C:\Program Files (x86)\ThingWorxFoundation\installer\logs\.`
- Running logs:
 - `$<installdir>\ThingworxStorage\logs\`
For example: `C:\Program Files (x86)\ThingWorxFoundation\ThingworxStorage\logs\.`
- For abort or failure:
 - `$<system_temp_directory>\ThingWorxFoundation_Failed_installs\`
For example: `C:\Users\vagrant\AppData\Local\Temp\ThingWorxFoundation_Failed_installs\.`
- Uninstall logs:

- `$<system_temp_directory>\bitrock_installer_(pid).log`

The log file name has the prefix `bitrock`. For example: `C:\Users\vagrant\AppData\Local\Temp\bitrock_installer_3008.log`.

License Troubleshooting

- If there is a problem with licensing, check the `ThingworxLicensingConfigurator-install` logs at this location:
`$<installdir>\installer\logs`
- If you have a slow internet connection, increase the timeout on the **Connect to the license server** page of your License Configurator.
- If you are unsure about the status of your license, follow these steps to check whether you have the full, paid license or a limited, trial license.
 - Access ThingWorx Composer via `[http or https]://[host]:[port]/Thingworx`.
 - Under **Monitoring**, click **Subsystem ► Licensing Subsystem Settings**.
 - Check your licensed entities:
 - ◆ A list of licensed entities appears—You have a full license deployed.
 - ◆ No entities appear—You are running a trial license.
- If you have set a web proxy between your ThingWorx server and the internet, add the proxy server details in the `platform-settings.json` file. Refer to the “Licensing Connection Settings” section in the [platform-settings.json Configuration Details](#) topic from the ThingWorx Help Center.

Restart Apache Tomcat after adding these details.

Issues with PostgreSQL Setups

For setups with PostgreSQL, you may encounter issues connecting to the database using the fully qualified host name. To solve the issue, confirm that you meet the prerequisites mentioned in the [ThingWorx Foundation Installer](#) section in the ThingWorx Help Center.

Issues with Windchill Connection

With the 9.1 version, ThingWorx Navigate has extended support to JDK 11 and open JDK 11. For the Windchill connection to work as expected, especially while configuring ThingWorx Navigate with Windchill authentication, make sure you configure the Windchill HTTP server as per instructions provided in [this](#) technical support article.

Configure ThingWorx Navigate



Welcome back. We're almost there—configuration is the last step in setting up ThingWorx Navigate. In the sections below, you'll find more information to help you configure your system.

Note

If you run into any errors during installation, do not continue with configuration. Resolve these errors and then reinstall ThingWorx Navigate.

Before You Begin

Make sure you meet the following prerequisites for configuration:

- You used the installation tool to install ThingWorx Navigate and the supporting applications.

Caution

This tool does not support configuration for manual installations.

- The installation completed successfully, with no errors.
- You meet the Windchill server requirements and the server information is handy. Refer to the "Windchill Requirements" section of the [Prerequisites on page 7](#).
- You decided on an authentication method—Single Sign-on, Windchill authentication, or Fixed authentication.

Let's Get Started

Note

If you want to manually start the configuration tool, navigate to `${installdir}\NavigateConfigurator` and run the configuration tool specific to your operating system.

Step through the welcome page, verify the prerequisites in the **Getting ready to configure** page, and click **Next** or **Forward**.

Authentication

Now, we need the ThingWorx application key. Follow these steps to create and validate the application key:

1. Create a ThingWorx application key. For help, refer to the instructions provided on the installer screen or the "Creating an Application Key" section in the [Application Keys](#) topic of the ThingWorx Help Center.
2. Copy the value under **Key ID**.
3. Back in the **ThingWorx Navigate Setup** tool, paste the value in the box next to **Application Key**.
4. Click **Next** or **Forward**.

Your application key is validated.

Select Authentication Method

1. Now, select the authentication method for your system:
 - **Single Sign-on (SSO)**—We recommend using Single Sign-on authentication. Your users can use a single login to access multiple enterprise applications. PTC supports industry SSO standards and has incorporated PingFederate as an SSO solution.
 - **Windchill Authentication**—This configuration uses Windchill authentication for ThingWorx.
 - **Fixed**—You can use this configuration as a fast, alternative system setup for testing. Or, you can use it to demonstrate ThingWorx Navigate functionality. It is not secure, and fixed authentication should never be used in production.
2. Click **Next** or **Forward**.

Set Up Your Authentication

Go to one of these topics to configure your authentication:

- [Set Up ThingWorx Navigate with Single Sign-on on page 20](#)
- [Set Up ThingWorx Navigate with Windchill Authentication on page 24](#)
- [Set Up ThingWorx Navigate with Fixed Authentication on page 31](#)

Set Up ThingWorx Navigate with Single Sign-on



On the screens for Single Sign-on (SSO), we'll enter the information for the Windchill server and for connecting to PingFederate.

Before You Begin

Make sure your system meets the following prerequisites before you set up SSO authentication:

- You have configured ThingWorx Foundation using SSL.
- You have imported the Windchill SSL certificate (Certificate Chain) and the PingFederate SSL certificate into the Java TrustStore (`cacerts/`
`jssecacerts`) file of Apache Tomcat.
- You have created TrustStore and KeyStore files. The topic [Create KeyStore and TrustStore Files for ThingWorx Navigate on page 10](#) has instructions for generating these files.

Take a moment to go over some background on PingFederate. We also recommend reading the [PTC Identity and Access Management Help Center](#) before you begin.

Enter Windchill Server Information

First, let's connect to Windchill. We recommend configuring Windchill for SSL.

1. Enter your **Windchill server URL**:

- To connect to a single Windchill server—Make sure the URL follows the format `[http or https]://[windchill-host]:[windchill-port]/[windchill-web-app]`
- For cluster Windchill environments—Enter the URL of the load balancing router. For example, `[https]://[LB-host]:[port]/[windchill-web-app]`

In [Configure ThingWorx Navigate with a Clustered Windchill Environment on page 46](#), see the sections on Single Sign-on environments.

- To connect to multiple Windchill systems—For now, connect to a single server. Then, after you complete the initial configuration, follow the manual steps in [Configure ThingWorx Navigate to Connect to Multiple Windchill Systems on page 52](#).
- #### 2. Provide the settings for your **Authorization Server Scope**—The name of the scope that is registered in PingFederate. For example, `SCOPE NAME = WINDCHILL`.

-
3. Click **Next** or **Forward**.


If you entered a `http` URL in **Windchill server URL**, skip to the “ThingWorx Foundation Information” section.

Provide Your TrustStore Information for ThingWorx

Before you provide the information on this screen, create a ThingWorx TrustStore file using the Java `keytool` utility, and then import the Windchill SSL certificate into the TrustStore file.

The topic [Create KeyStore and TrustStore Files for ThingWorx](#) Navigate on page 10 has instructions for generating TrustStore files using the `keytool`.

Now that you have the TrustStore file prepared, provide the information on the **SSO: TrustStore information for ThingWorx** screen:

1. Next to **TrustStore file**, click , and then browse to your TrustStore file. Make sure the file is in JKS (`*.jks`) format.
2. Click **Open**.
3. Next to **Password**, enter the password for the TrustStore file.
4. Click **Next** or **Forward**.

Enter Your ThingWorx Foundation Information

Note

This step is only applicable if you are installing ThingWorx Navigate 9.0.0.

Enter your ThingWorx Foundation installation location and then provide the following ThingWorx Foundation Administrator credentials:

- **Username**
- **Password**

Provide Your Access Token Database Information

On this screen, enter the access token information for your database. The location, port, user name, and database name appear automatically according to your installation settings.

- **IP Address or Host Name**
- **Port**
- **Database Name**
- **Username**


- **Password**

Enter the PingFederate Server Information

1. Enter this information for PingFederate:
 - **Host name**—Enter the fully qualified host name for the PingFederate server, such as `<hostname.domain.com>`.
 - **Runtime Port**—Provide the PingFederate runtime port. The default is 9031.
2. Click **Next** or **Forward**.

Provide Identity Provider (IDP) and Service Provider (SP) Information

On this screen, provide information from PingFederate. Check your input carefully. These values are not validated and you won't get an error if the information is incorrect.

1. Provide the IDP metadata information for PingFederate:
 - **IDP metadata file (*.xml file)**—Click , and then browse to the IDP metadata file from PingFederate. For example, `sso-idp-metadata.xml`.
 - **SAML Assertion UserName AttributeName**—Accept the default, `uid`, or enter a new attribute name.
2. Enter the information for the ThingWorx Service Provider connection:
 - **Metadata Entity ID**—Enter the value for `metadataEntityId`. This is the ThingWorx Service Provider connection ID that you provided when you configured the Service Provider connection in PingFederate.
3. Click **Next** or **Forward**.

SSO Key Manager Settings

Before you enter the information on this screen, prepare the correct Keystore file and Key Pair:

1. Create an SSO Keystore file using the Java `keytool` utility. Create a Key Pair using the `keytool` commands mentioned in [Create KeyStore and TrustStore Files for ThingWorx Navigate on page 10](#).

 **Note**


This is the ThingWorx signing certificate. It is an application layer certificate, and it does not have to be the same as your ThingWorx host name. For example, ThingWorx.

2. Import the PingFederate signing certificate into the SSO Keystore file you created in Step 1.

These resources may be helpful:

- [PTC Identity and Access Management Help Center](#)
- The topic [Import Certificates to Keystore File](#) in the ThingWorx Help Center

Now that you have the correct files and certificates, you can enter the information on the **SSO Key Manager Settings** screen:

1. Provide your SSO Keystore information:
 - **SSO Keystore file (.jks file)**—Click , and then browse to the JKS (*.jks) file.
 - **SSO Keystore password**—Enter the password you defined above, when you created the Keystore file.
2. Enter the ThingWorx Key Pair information that you defined above.
 - **SSO Key Pair Alias Name**
 - **SSO Key Pair password**
3. Click **Next** or **Forward**.

Authorization Server Settings

PingFederate serves as your Authorization server.

1. Provide the settings for your PingFederate server:
 - **Authorization Server ID**—Choose a value to provide for the *AuthorizationServerId1* variable, such as PingFed1. This value is used to configure the connection settings for an Integration Connector or media entity.
 - **ThingWorx OAuth Client ID**—The OAuth client ID to identify the ThingWorx application to PingFederate.
 - **ThingWorx OAuth Client Secret**—The client secret mentioned in PingFederate.
 - **Client Authentication Scheme**—The default is form.

-
2. Accept the default, **Encrypt OAuth refresh tokens before they are persisted to the database**, to secure the tokens before they are persisted to the database. We recommend this setting.
 3. Click **Next** or **Forward**.

Summary: Configuration Settings

Review the configuration settings. When you're ready, click **Configure**.

Success!

ThingWorx Navigate is configured with Single Sign-on. Select the programs to open:

- **Open ThingWorx Navigate**
- **Open ThingWorx Composer**

Then, click **Close**. You are redirected to the Identity Provider login page. Use your IdP credentials to log in.

Note

If configuration fails, select the **Open the log file** check box and review the log file for details on what went wrong.

Next Steps

Your ThingWorx Navigate is installed and licensed, and the basic configuration is complete. The next required step is to grant permission to non-administrative users. Follow the steps in [Modify ThingWorx Permissions: Users and Groups on page 34](#).

You can also move on to the optional configurations, such as these:

- [Connect to SAP on page 56](#)
- [Configure with multiple Windchill systems on page 52](#)

Set Up ThingWorx Navigate with Windchill Authentication



On the screens for Windchill authentication, we'll enter the information for the Windchill server and for ThingWorx KeyStore and TrustStore files.

Before You Begin

Make sure your system meets the following prerequisites before you set up Windchill authentication.

- You have Windchill configured with SSL.
- ThingWorx—We recommend configuring ThingWorx with SSL.
- Your Windchill administrator has configured the `allowList` property for URL redirects. If this property is not configured, you will not be able to access ThingWorx Navigate.

To set `wt.idp.allowlisturls` in the `wt.properties` file, run the following command from the Windchill shell:

```
xconfmanager -s wt.idp.allowlisturls="url1 url2 url3" -t codebase/wt.properties -p
```

The name of the webapp should be included in the URL. For instance, `https://hostxyz:8443/Thingworx`.

Example of command:

```
xconfmanager -s wt.idp.allowlisturls="https://hostxyz:8443/Thingworx https://hostxyz:8449/Thingworx http://hostxyz:8080/Thingworx" -t codebase/wt.properties -p
```

This Windchill Help topic provides detailed information on Windchill configuration properties.

- You have created TrustStore and KeyStore files. The topic [Create KeyStore and TrustStore Files for ThingWorx Navigate on page 10](#) has instructions for generating these files.
- You have imported the Windchill SSL certificate to the ThingWorx TrustStore file. For more information on configuring SSL, see the topic [Using SSL for Secure Communication on page 29](#).

Establish the Windchill Connection

On this page, provide the details for your Windchill connection.

1. Enter the **Windchill Server URL**:
 - To connect to a single Windchill server—Make sure the URL follows the format `[http or https]://[windchill-host]:[windchill-port]/[windchill-web-app]`
 - For cluster Windchill environments—Enter the URL of the load balancing router. For example, `[https]://[LB-host]:[port]/[windchill-web-app]`.

The URL format depends on your system's configuration. In [Configure ThingWorx Navigate with a Clustered Windchill Environment](#) on page 46, see the sections for Windchill Authentication.

- To connect to multiple Windchill systems—For now, connect to a single server. Then, after you complete the initial configuration, follow the manual steps in [Configure ThingWorx Navigate to Connect to Multiple Windchill Systems](#) on page 52.

2. Click **Next** or **Forward**.

Windchill Authentication Settings

Before you provide the information on this screen, prepare the correct KeyStore and TrustStore files for ThingWorx:

- **KeyStore file**—Create a new ThingWorx KeyStore file using the Java `keytool` utility. Make sure to include the ThingWorx Key Pair. This is a client certificate used for accessing data from Windchill using the 2-way SSL configuration on the ThingWorx Navigate and Windchill sides.


Note

This ThingWorx KeyStore file is different than the Apache Tomcat KeyStore file that you may have created during the installation of ThingWorx Navigate. These separate KeyStore files serve different purposes, and it is important to provide the correct file in the correct location.

- **TrustStore file**—Create a ThingWorx TrustStore file using the Java `keytool` utility, and then import the Windchill SSL certificate into the TrustStore file.


For details, see the topics [Create KeyStore and TrustStore Files for ThingWorx Navigate](#) on page 10 and [Using SSL for a Secure Connection](#) on page 29.

Now that you have the correct files prepared, you can provide the information on the **Windchill Authentication settings** screen:

1. Next to **KeyStore file**, click , and then browse to the ThingWorx KeyStore file you created above.

Note

Remember, the ThingWorx KeyStore file is different than the Apache Tomcat KeyStore file.

-
2. Enter the **Password** you defined when you created the KeyStore file.
 3. Next to **TrustStore File**, click , and then browse to your ThingWorx TrustStore file.
 4. Enter the **Password**.
 5. Next to **Session User Query Parameter**, accept the default value.

 **Note**

In most cases, you should accept the default value for this parameter. Change the value only if the Windchill administrator changed this default setting in Windchill.

6. Click **Next** or **Forward**. The **Summary: Configuration settings** page opens.

Summary: Configuration Settings

1. Review the settings, and then click **Configure**. ThingWorx Navigate is configured.
2. Select the check boxes to open one or both programs:
 - **Open ThingWorx Navigate**
 - **Open ThingWorx Composer**

Then, click **Close**.

Success!

ThingWorx Navigate is configured with Windchill Authentication. Select the programs to open:

- **Open ThingWorx Navigate**
- **Open ThingWorx Composer**

Then, click **Close**.

 **Note**

If configuration fails, select the **Open the log file** check box and review the log file for details on what went wrong.

Verify Configuration

The administrator must have the same user name in Windchill and ThingWorx.

-
- If you have not made changes in Windchill, the administrator user, “Administrator”, was created when Windchill was installed. Using a configured ThingWorx system, you can authenticate as that user and have full access rights as the administrator user in ThingWorx.
 - If you changed the administrator’s user name, then select a user name that is common to Windchill and ThingWorx, and then add that user to ThingWorx and the Administrators user group.

To verify the Windchill Authentication configuration:

1. Open the ThingWorx URL. You are routed to Windchill for authentication.
2. Provide the Windchill administrator credentials (or another user configured to be the ThingWorx administrator). The browser is routed back to ThingWorx, and ThingWorx Composer opens.
3. Verify that you are now running ThingWorx as the administrator.
Success! ThingWorx is properly configured with Windchill Authentication.

If you set authenticator to automatically create users, test that next:

1. Open the browser to ThingWorx URL. You are routed to Windchill for authentication.
2. Provide the Windchill credentials for a user that does not exist in ThingWorx.
3. Your browser is routed back to the ThingWorx home mashup page.
4. Verify that you are now running ThingWorx as the correct user. The user was automatically created.

 **Note**

If the tailoring options and the search results are not working as expected, restart Apache Tomcat and ThingWorx Integration Runtime.

Next Steps

Your ThingWorx Navigate is installed and licensed, and the basic configuration is complete. The ThingWorx Navigate tasks are now ready to use. To sign in, users should use their Windchill user name and password.

The next required step is to grant permission to non-administrative users. Follow the steps in [Modify ThingWorx Permissions: Users and Groups on page 34](#).

You can also move on to the optional configurations, such as these:

- [Connect to SAP on page 56](#)
- [Configure with multiple Windchill systems on page 52](#)

Using SSL for Secure Communication

Note

This topic applies to systems with Windchill authentication configured.

Introduction

Your site can use 2-way SSL to secure the communication between the ThingWorx server and the Windchill application. PTC recommends using SSL when working in a production environment. The extension can use SSL to both mutually authenticate the servers to each other and protect the communication itself.

An SSL connection requires that both systems trust each other; to do this, `SwaggerConnector` and `ptc-windchill-Odata-connector` must be configured to reference Java keystore and truststores held on the ThingWorx server which provide keys for the transaction. The HTTP Server on the Windchill server must be configured to trust those keys.

SSL configurations vary considerably, and this topic does not attempt to describe all options available in an SSL configuration. Instead, the following steps give an overview of the process for configuring SSL.

This procedure assumes that both ThingWorx and Windchill are configured to use SSL for their standard communications. It also relies on configuration scripts that come with the most recent version of the PTC HTTP Server. The most recent PTC HTTP Server is included with Windchill 11.0 M030 and later.

Note

- You can use a commercial trusted wildcard certificate for Windchill.
 - You can use a self-signed certificate or a commercial trusted wildcard certificate between ThingWorx and Windchill.
-

Configure ThingWorx with KeyStore and TrustStore

ThingWorx requires Java key stores and trust stores. Instructions for creating these files are in the [Create KeyStore and TrustStore Files for ThingWorx](#) [Navigate on page 10](#) topic.

1. Create a TrustStore for ThingWorx and import the Windchill SSL certificate.
2. Create a KeyStore for ThingWorx, and generate KeyPair in the KeyStore.
3. Configure Windchill to trust ThingWorx.

-
4. Reference them in the configuration of the `WindchillConnector` Thing Template used to connect ThingWorx to the Windchill system being secured.

Configure Windchill for Client Authentication

On the Windchill server, configure SSL authentication in the PTC HTTP Server to trust the ThingWorx key and certificate.

Note

Code examples have been reformatted to fit the page and may contain line numbers, hidden editing characters (such as tabs and end-of-line characters) and extraneous spaces. If you cut and paste code, check for these characters and remove them before attempting to use the example in your application.

1. Update PTC HTTP Server configuration to reference the CA certificates file.
 - a. Create a file in `<HTTPSERVER_HOME>\conf\ca-bundle.crt`. This location is recommended but not required.
 - b. Save `ca-bundle.crt`.
 - c. Create a `sslclientauth.conf` file at `<HTTPSERVER_HOME>\conf\sslvhostconf.d`.
 - d. Add `SSLCACertificateFile` to `<PATH_TO>\ca-bundle.crt` so that it refers to the `ca-bundle.crt` file. For example:

```
SSLCACertificateFile
<HTTP_Server>\conf\ca-bundle.crt
```
 - e. Save changes.
2. Add the ThingWorx client certificate to PTC HTTP Server's list of trusted CA certificates.
 - a. Edit the `ca-bundle.crt` file you pointed to previously in the `SSLCACertificateFile` entry.

Note

If the file does not yet exist, create the file and any required directories.

- b. Edit `ca-bundle.crt` and paste the PEM file content of ThingWorx client certificate.
 - c. Save changes.
3. Configure PTC HTTP Server for the `sslClientAuth` URL.

- a. Find the Windchill web app name in `<windchill-home>/codebase/wt.properties` in the entry `wt.webapp.name`.
- b. Open a shell or command prompt and enter the following:


```
cd <HTTPSERVER_HOME>ant -f webAppConfig.xml
-DappName=[windchill-web-app] -Dresource=sslClientAuth
-DresourceAuthType=sslClientAuth addAuthResource
```
- c. Configure Windchill to trust the ThingWorx certificate.
 - i. Edit `<windchill-home>/codebase/WEB-INF/web.xml`.
 - ii. Find `<filter-name>TrustedSSLAuthFilter</filter-name>`.
 - iii. Add an additional `<init-param>` element after the existing one, where `[cert-name]` is the name of your certificate.

You can use the following examples for reference:

Example 1	Example 2
<pre><init-param> <param- name>trustedSubjectPat tern.1</param-name> <param-value>[cert- name]</param-value> </init-param></pre> <p>In the above example, replace <code>[cert-name]</code> with the certificate name that is present in the Subject of your certificate. For instance, if the Subject of your certificate is <code>CN=navigate.domain.com</code>, replace <code>[cert-name]</code> with <code>navigate.domain.com</code>.</p>	<pre><init-param> <param- name>trustedSubjectPat tern.1</param-name> <param-value>.*[cert- name].*</param-value> </init-param></pre> <p>In the above example, replace <code>[cert-name]</code> with the certificate name that is present in the Subject of your certificate. For instance, if the Subject of your certificate is <code>CN=navigate.domain.com</code>, replace <code>[cert-name]</code> with <code>navigate</code>.</p>

- d. Save changes.
- e. Restart Windchill and PTC HTTP Server.

Set Up ThingWorx Navigate with Fixed Authentication



If you need a quick setup for testing, or to demonstrate ThingWorx Navigate functionality, you can use fixed authentication.

Caution

Do not use fixed authentication for a production environment. It is not secure.

Before You Begin

We recommend configuring Windchill with SSL, but it is not required.

Make sure your system meets the following prerequisites before you set up fixed authentication:

- You have created TrustStore file. The topic [Create KeyStore and TrustStore Files for ThingWorx Navigate on page 10](#) has instructions for generating this file.
- You have imported the Windchill SSL certificate (Certificate Chain) into the Java TrustStore (`cacerts/jssecacerts`) file of Apache Tomcat.
- Your Windchill connection information is ready.

Fixed Authentication Settings

On this screen, first provide the location of your Windchill server and Windchill credentials.

1. Next to **Windchill server URL**, enter the information for your Windchill server:
 - To connect to a single Windchill server—Make sure the URL follows the format `[http or https]://[windchill-host]:[windchill-port]/[windchill-web-app]`
 - Connecting to a cluster Windchill environment is not supported for fixed authentication.
 - Connecting to multiple Windchill systems is not supported for fixed authentication.
2. Enter your **Windchill user name** and **Password**.
3. Click **Next** or **Forward**:
 - If Windchill is configured for SSL, proceed to the next steps.
 - If you're using HTTP protocol for Windchill, you are ready to complete the configuration. See the section “Summary: Configuration Settings.”

Before you provide the information on this screen, create a ThingWorx TrustStore file using the Java `keytool` utility, and then import the Windchill SSL certificate into the TrustStore file.

Now that you have the correct TrustStore file, provide the information on the **Fixed authentication settings** screen:

-
1. Next to **TrustStore file**, click , and then browse to the location of your ThingWorx TrustStore file.

Make sure that you have already imported the Windchill SSL certificate into the TrustStore file.

2. Next to **Password**, enter the password for the TrustStore file.
3. Click **Next** or **Forward**. The **Summary: Configuration settings** page opens.

Summary: Configuration Settings

On this screen, review the settings, and then click **Configure**. ThingWorx Navigate is configured.

Success!

Your fixed authentication is set up. The ThingWorx Navigate tasks are ready to use:

1. Select the check boxes to open one or both programs:
 - **Open ThingWorx Navigate**
 - **Open ThingWorx Composer**
2. Click **Close**.

Note

If configuration fails, select the **Open the log file** check box and review the log file for details on what went wrong.

Next Steps

Your ThingWorx Navigate is installed and licensed, and the basic configuration is complete. To access ThingWorx Navigate, use the ThingWorx administrator user name and password that you created during the installation.

The next required step is to grant permission to non-administrative users. Follow the steps in [Modify ThingWorx Permissions: Users and Groups on page 34](#).

You can also move on to the optional configurations, such as these:

- [Connect to SAP on page 56](#)
- [Configure with multiple Windchill systems on page 52](#)

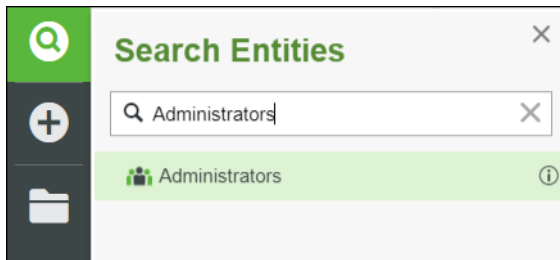
Modify ThingWorx Permissions

After you have completed configuration using the **ThingWorx Navigate Configuration** tool, modify ThingWorx permissions, as required, using ThingWorx Composer.

- [Modify ThingWorx Permissions: Administrators on page 34](#)
- [Modify ThingWorx Permissions: Users and Groups on page 34](#)
- [Modify ThingWorx Permissions: Training Menu on page 38](#)

Modify ThingWorx Permissions: Administrators

To be a ThingWorx Navigate administrator, you must be added to the ThingWorx Administrators group. This group is a systems object, not visible in the **Groups** menu by default. To access the group, click **Search Entities** and enter `Administrators` in the spotlight search on the top-left navigation menu of the ThingWorx Composer screen.



Note

Every administrator and user must be assigned to a license group to access ThingWorx Navigate.

Modify ThingWorx Permissions: Users and Groups


Non-administrator users must be granted permission to access ThingWorx Navigate tasks. A lack of permission may be the problem if your users receive the following error message:

```
Reason: 403 - You don't have a valid license. Ask your administrator for access to the following license feature: ptc_navigate_view
```

To grant permission, perform the following steps:

- Add the non-administrator user to one ThingWorx Navigate License group as per your licenses: `navigate_view_named_group`, `navigate_view_`

`concurrent_group`, `navigate_contribute_named_group`, or `navigate_contribute_concurrent_group`. For more information, see the following section, [License Groups on page 35](#).

- Add a non-administrator user to respective ThingWorx Navigate role groups for which the user wants to access to ThingWorx Navigate tasks. For more information on creating role groups, see the section below, [Create a New Role Group on page 36](#).
- Set the access and visibility of the role groups using common tailoring page. For more information on tailoring permissions, see the section below, [Tailor Roles and Custom User Groups on page 36](#).
- When ThingWorx Navigate is configured with Single Sign-on, disable user modification. This is necessary to prevent PingFederate from removing users from groups after login:
 1. In ThingWorx Composer, click  **Browse**. Under **Security**, click **Authenticators**, and then select `ThingworxSSOAuthenticator`.
 2. Click **Configuration**, and then clear the **User Modification Enabled** check box.
 3. Click **Save**.

 **Note**

If the **User Modification Enabled** check box is selected, then user accounts in ThingWorx can be modified. This is important to allow future updates to accounts during subsequent login events after the initial login when the user is created to synchronize the ThingWorx user data with the user account data in the identity provider. For more information see, [Single Sign-on Authenticator](#).

- Log in with the non-administrator credentials to verify that the user gets access and visibility only to the tasks his specific role group provides.

Modify Permissions to Two Sets of Groups:

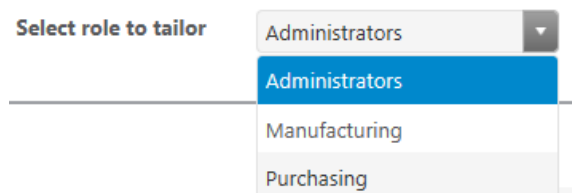
License Groups

In licensing, there are four available groups in ThingWorx Navigate: `navigate_view_named_group`, `navigate_view_concurrent_group`, `navigate_contribute_named_group`, and `navigate_contribute_concurrent_group`.

In `navigate_view_named_group` and `navigate_contribute_named_group`, the number of the users is defined in the license. While in `navigate_view_concurrent_group` and `navigate_contribute_concurrent_group`, the limitation of the license is limited by a time frame. An active user holds a license for a 24-hour period.

Tailor Roles and Custom User Groups

The user groups in ThingWorx Navigate let you expose different tasks to users of different roles. The groups also make it possible for you to tailor ThingWorx Navigate by role. User groups appear in the **Select role to tailor** list on the collection tailoring pages and the task-specific tailoring pages.




Each user must be assigned to only one tailoring role to see any ThingWorx Navigate tasks on the landing page. This can be one of the two default tailoring roles that come with ThingWorx Navigate, **Manufacturing** and **Purchasing**, or one of the custom user groups that your site provides.

Note

If you delete a group without reassigning the users in that group, they can no longer see any tasks on the landing page.


Create a New Role Group

For new groups to appear as roles on tailoring pages, edit each group to add the following tag: `PLMAppsRolesTag` under `AccessAppTags`.

 **User Group: New User Group - 1** * ? To Do ▾ Save Cancel

[General Information](#) [Manage Members](#)

General Information



Name ? (required)

[Change](#)




Description ?

Project ?

 +

Tags ?

 +

 AccessAppTags  PLMAppsRolesTag 

Note

If the `PLMAppsRolesTag` tag is removed from any group, the role does not appear on the collection tailoring pages and the task-specific tailoring pages.

Remove a Group

If a group is no longer relevant as a ThingWorx Navigate role, complete the following steps:


1. Remove the group from the members of the ThingWorx Navigate Organization.
2. In ThingWorx Navigate, use the options on the collection tailoring pages to hide all tasks from the group.
3. In ThingWorx Composer, remove the `PLMAppsRolesTag` tag from the group.

 **Note**

If the `PLMAppsRolesTag` tag is removed from any group before you hide the tasks on the collection tailoring pages, the tasks remain visible to the users of the group.

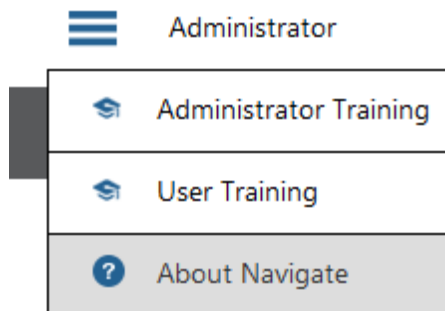
Populate User Groups

You can change or add users in the user groups.

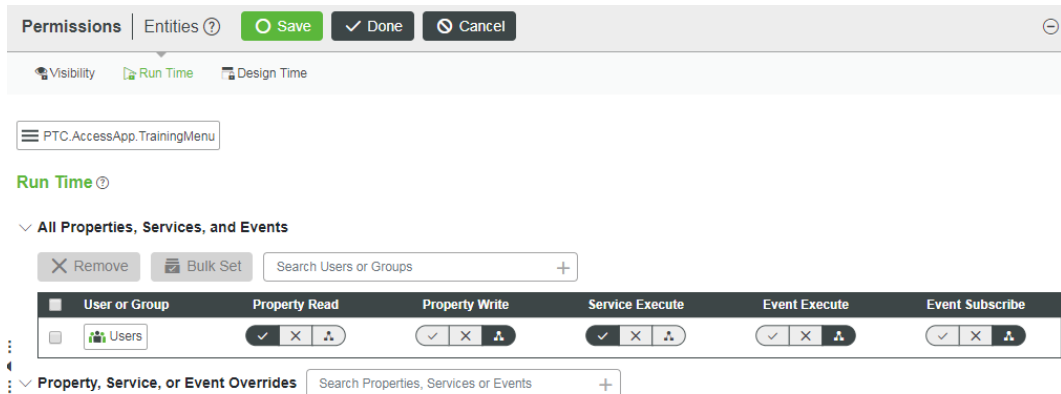
1. In ThingWorx Composer, click  **Browse**. Under **Security**, click **User Groups**, and then select the user group you want to edit.
2. Click **Edit** and modify the groups in these ways:
 - Drag users from the **Available Members** list to the **Members** list.
 - Remove users.
3. Click **Save**.

Modify ThingWorx Permissions: Training Menu

The training menu options are managed by permissions on the following entities:
`PTC.AccessApp.TrainingMenu` and
`PTC.ContributeApps.TrainingMenu`.



By default, the ThingWorx Users group has runtime Read and Execute permissions for both `PTC.AccessApp.TrainingMenu` and `PTC.ContributeApps.TrainingMenu` entities. If the permissions are removed, the training menu does not appear for nonadministrative users.



Update ThingWorx Services to Use Java 11

If you are planning to upgrade to Java 11 after installing or upgrading to ThingWorx Navigate 9.1.0, perform the steps below.

Step 1: Update the ThingWorx-Foundation Service

The topic [Using the ThingWorx Foundation Installer with Java 11](#) from the ThingWorx Help Center provides instructions for updating the ThingWorx-Foundation service.

Step 2: Update the ThingWorx-IntegrationRuntime Service

For updating the ThingWorx-IntegrationRuntime service, follow the steps below based on your operating system:

Windows

Before You Begin

Before you begin, make sure the following is in place:

- Java 11 is installed.
- The `/bin` directory is set in the `PATH` system variable,
- The `JAVA_HOME` environment variable is set to use the Java 11 installation directory.
- The `java.exe` file is located under the Java 11 installation directory. For instance, `C:\Program Files\Java\jdk-11.0.8\bin\java.exe`.
- The ThingWorx-Foundation service is updated to use Java 11. Refer to [this](#) topic for instructions.

Step 1: Determine the Java Version Used

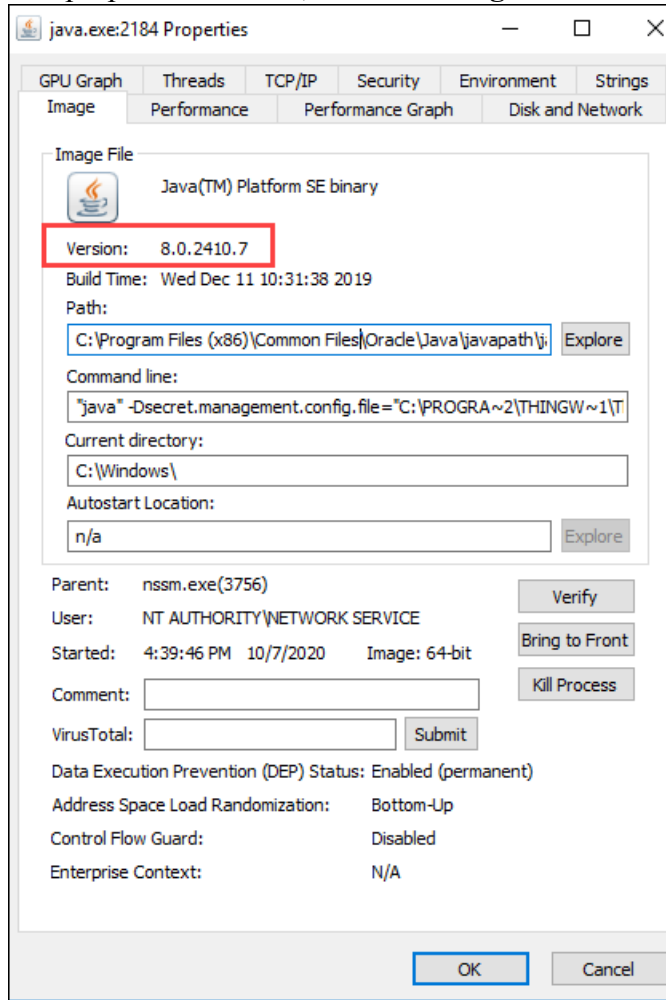
Use the Process Explorer on your environment to determine which Java version is used by the `nssm.exe` process. You can download the Process Explorer from [here](#).

1. Open a command prompt as administrator.
2. Open the Process Explorer from the command prompt. For example,
`> C:\Users\Vagrant\Desktop\procexp64.exe`
3. On the Process Explorer window, locate the `nssm.exe` process and double-click `java.exe`.

Process	CPU	Private Bytes	Working Set	PID	Description	Company Name
svchost.exe		1,728 K	6,716 K	1992	Host Process for Windows S...	Microsoft Corporation
svchost.exe	< 0.01	4,036 K	11,288 K	2504	Host Process for Windows S...	Microsoft Corporation
msdtc.exe		2,488 K	9,212 K	3416	Microsoft Distributed Transa...	Microsoft Corporation
pg_ctl.exe		1,660 K	6,060 K	3616	pg_ctl - starts/stops/restarts ...	PostgreSQL Global Develo...
postgres.exe		3,444 K	18,372 K	540	PostgreSQL Server	PostgreSQL Global Develo...
conhost.exe	0.04	4,968 K	9,068 K	3040	Console Window Host	Microsoft Corporation
postgres.exe		2,808 K	5,924 K	2268	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		3,260 K	19,316 K	3752	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		3,092 K	8,564 K	1680	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe	< 0.01	3,056 K	10,724 K	4008	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		3,560 K	7,616 K	2492	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		2,936 K	6,104 K	1616	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		3,380 K	7,272 K	1620	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		6,920 K	23,152 K	3972	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		4,188 K	10,788 K	2976	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		5,112 K	15,640 K	3684	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		5,136 K	15,084 K	4760	PostgreSQL Server	PostgreSQL Global Develo...
postgres.exe		5,532 K	15,236 K	2988	PostgreSQL Server	PostgreSQL Global Develo...
svchost.exe		4,428 K	19,240 K	3476	Host Process for Windows S...	Microsoft Corporation
svchost.exe		1,816 K	7,216 K	3740	Host Process for Windows S...	Microsoft Corporation
nssm.exe		1,664 K	6,144 K	3756	The non-sucking service ma...	
conhost.exe	0.03	5,012 K	9,392 K	4968	Console Window Host	Microsoft Corporation
java.exe	0.01	241,196 K	149,632 K	2184	Java(TM) Platform SE binary	Oracle Corporation

This opens a new properties window, which lists details about the `java.exe` used to run the `nssm.exe` process.

4. From the properties window, click the **Image** tab to identify the Java version



used.

If Java 11 is used, you are good to go. There is no need to follow any additional steps. If any other version of Java is used, proceed with the next section, "Step 2: Update the ThingWorx-IntegrationRuntime Service".

Step 2: Update the ThingWorx-IntegrationRuntime Service

1. Stop the Thingworx-IntegrationRuntime service.
2. Open a command prompt as administrator.
3. Navigate to the third-party directory under the ThingWorx Integration Runtime installation directory. For example,

```
> cd C:\Program Files (x86)\ThingWorxIntegrationRuntime\third-party
```
4. Execute the following to edit the Thingworx-IntegrationRuntime service configuration:

```
> nssm.exe edit Thingworx-IntegrationRuntime
```

The Apache Tomcat Properties window opens.

5. Open the **Application** tab and edit the **Path** to use the `java.exe` for Java 11. For example, `C:\Program Files\Java\jdk-11.0.8\bin\java.exe`
6. Click **Edit service** to save your changes. A successful edit is notified through a popup window.
7. Start the `Thingworx-IntegrationRuntime` service.
8. Verify that log file created under the `/IRLogs` folder inside the ThingWorx Integration Runtime installation directory lists that the connection was established.

Example of log file location: `C:\Program Files (x86)\ThingWorxIntegrationRuntime\IRLogs\IntegrationRuntime-012144ff23af.log`

Example of log:

```
[vert.x-worker-thread-1] INFO c.t.i.ThingworxEdgeVerticle -
#####
[vert.x-worker-thread-1] INFO c.t.i.ThingworxEdgeVerticle -
Connection Established
[vert.x-worker-thread-1] INFO c.t.i.ThingworxEdgeVerticle -
#####
```

9. Post this update, you can verify the Java version using the Process Explorer. Detailed instructions are available in the section "Step 1: Determine the Java Version Used".

Linux

Before You Begin

Before you begin, make sure the following is in place:

- Java 11 is installed
- You have copied the path of the Java 11 installation directory where the Java executable is located.

You can execute alternatives `--display java | grep 'family java-11' | cut -d' ' -f1`. The output should show the Java executable location, for example: `/usr/lib/jvm/java-11-openjdk-11.0.8.10-0.el8_2.x86_64/bin/java`. Here, you copied `/usr/lib/jvm/java-11-openjdk-11.0.8.10-0.el8_2.x86_64`, which is used to configure the `ThingWorx-IntegrationRuntime` service.

- The `ThingWorx-Foundation` service is updated to use Java 11. Refer to [this](#) topic for instructions.

Update the ThingWorx-IntegrationRuntime Service

1. Stop the Thingworx-IntegrationRuntime service.
`systemctl stop ThingWorx-Foundation.service`
2. Back up the `startup.sh` script located under the `/scripts` folder in the ThingWorx Integration Runtime installation directory. For example:
`/opt/ThingWorxIntegrationRuntime/scripts/startup.sh.backup`
3. Edit the `startup.sh` script to point to the Java 11 installation directory copied in the "Before You Begin" section. In this example, the path was updated to `JAVA_HOME=/usr/lib/jvm/java-11-openjdk-11.0.8.10-0.el8_2.x86_64` from `JAVA_HOME=/usr/lib/jvm/java-1.8.0-openjdk-1.8.0.265.b01-0.el8_2.x86_64/jre`.
4. Execute the following command:
`# systemctl daemon-reload`
5. Start the Thingworx-IntegrationRuntime service:
`systemctl start Thingworx-IntegrationRuntime`
6. Verify that the Thingworx-IntegrationRuntime service is using Java 11:

```
# systemctl status Thingworx-IntegrationRuntime
Thingworx-IntegrationRuntime.service - Thingworx-
IntegrationRuntime
   Loaded: loaded (/etc/systemd/system/Thingworx-
IntegrationRuntime.service; enabled; vendor preset: disabled)
   Active: active (running) since Wed 2020-10-07 16:08:43 UTC;
4s ago
     Process: 11310 ExecStop=/bin/bash /opt/
ThingWorxIntegrationRuntime/scripts/shutdown.sh (code=exited,
status=0/SUCCE>
     Process: 11336 ExecStart=/bin/bash /opt/
ThingWorxIntegrationRuntime/scripts/startup.sh (code=exited,
status=0/SUCCE>
    Main PID: 11337 (java)
      Tasks: 31 (limit: 17467)
     Memory: 166.2M
     CGroup: /system.slice/Thingworx-IntegrationRuntime.service
             └─11337 /usr/lib/jvm/java-11-openjdk-11.0.8.10-0.
el8_2.x86_64/bin/java -Dsecret.management.config.file=/op>
```

```
Oct 07 16:08:41 pg-foundation-rhel8.vagrantup.com systemd[1]:
Starting Thingworx-IntegrationRuntime...
Oct 07 16:08:41 pg-foundation-rhel8.vagrantup.com bash[11336]:
Starting Thingworx-IntegrationRuntime service ...
Oct 07 16:08:43 pg-foundation-rhel8.vagrantup.com bash[11336]:
Thingworx-IntegrationRuntime service started
Oct 07 16:08:43 pg-foundation-rhel8.vagrantup.com systemd[1]:
Started Thingworx-IntegrationRuntime.
```
7. Remove the backed up `startup.sh.backup` script.

-
- Verify that log file created under the `/IRLogs` folder inside the ThingWorx Integration Runtime installation directory lists that the connection was established.

Example of log file location: `/opt/ThingWorxIntegrationRuntime/IRLogs/IntegrationRuntime-a268-012144ff23af.log`

Example of log:

```
[vert.x-worker-thread-1] INFO c.t.i.ThingworxEdgeVerticle -
#####
[vert.x-worker-thread-1] INFO c.t.i.ThingworxEdgeVerticle -
Connection Established
[vert.x-worker-thread-1] INFO c.t.i.ThingworxEdgeVerticle -
#####
```

Uninstall ThingWorx Navigate

Caution

You cannot uninstall ThingWorx Navigate separately. Uninstalling ThingWorx Foundation will also uninstall ThingWorx Navigate.

- First, uninstall your existing ThingWorx Integration Runtime using instructions in the [prerequisites on page 7](#).
- Now, uninstall ThingWorx Navigate.

For instructions, search for "Uninstalling a ThingWorx Foundation Installer-based Installation" in either of the following topics based on your operating system:

- [ThingWorx Foundation Installer for Windows](#)
- [ThingWorx Foundation Installer for Linux](#)

2

Additional Configurations

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After installing ThingWorx Navigate, you can perform one or more of the following configurations manually, as required for your deployment.

- [Configure ThingWorx Navigate with a Clustered Windchill Environment on page 46](#)
- [Configure ThingWorx Navigate to Connect to Multiple Windchill Systems on page 52](#)
- [Configure Windchill to Include URL for Task Details Page in Email Notification on page 56](#)
- [Connect ThingWorx Navigate to SAP on page 56](#)
- [Improve the Performance of ThingView WebGL on page 60](#)
- [Extend Session Timeout on page 61](#)
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Configure ThingWorx Navigate with a Clustered Windchill Environment

You can use ThingWorx Navigate with a clustered Windchill environment. Use the URL of the load balancer to connect ThingWorx Navigate to Windchill. The URL to use depends on these conditions:

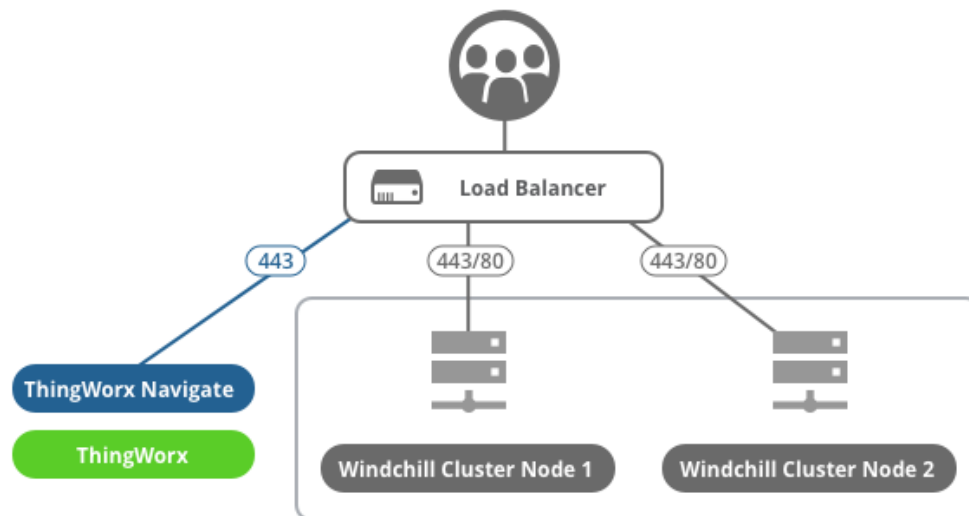
- ThingWorx Navigate configuration—Single sign-on or Windchill authentication
- Windchill basic configuration—HTTP or HTTPS protocol

This topic contains a basic refresher on the clustered environment and examples of configurations with ThingWorx Navigate.

Caution

There are security factors you must consider when you use a Windchill cluster in a ThingWorx Navigate configuration. Make sure to review the details below before you use a cluster configuration in production.

Diagram of ThingWorx Navigate Configured with a Windchill Cluster



Windchill Clusters: Overview

The main advantages of using a cluster are increased performance, scalability, and reliability. A cluster has these components:

-
- Two or more application-tier hosts that are connected to a single database instance and that are fronted by a load-balancing router.
 - Load-balancing router—Takes requests from clients, including Windchill users and ThingWorx Navigate users. The load balancer distributes the requests among one of the Windchill instances. As a result, the users are less affected if a server crashes or traffic is high.

To the rest of the network, this router appears as a single Windchill server. It has its own hostname, and it should always use an HTTPS protocol.

For more information on clusters, see the chapter “Installing and Configuring a Cluster Windchill Environment” in the [Windchill Help Center](#).

In the sections that follow, you’ll find four examples of how to configure a Windchill cluster for each of the authentication configurations for ThingWorx Navigate. We recommend single sign-on for ThingWorx Navigate; it is the most secure configuration. The other configurations require additional setup and security considerations, to ensure an end-to-end solution is configured.

ThingWorx Navigate Single Sign-on with a Windchill Cluster Configured with HTTPS and OAuth (recommended)

This is the most secure setup. Your configuration details follow:

- ThingWorx Navigate authentication type—SSO
- Load balancer protocol—HTTPS
- Windchill servers—HTTPS and OAuth configured. SAML authentication is optional.

Since Windchill is HTTPS, no SSL certificate termination occurs at the load balancer.

Verify the URL of the load balancer in these places in ThingWorx Composer:

For `ptc-windchill-integration-connector`, the **Base URL** is `[https]://[LB-host]:[port]/[windchill-web-app]/oauth`

For `ptc-windchill-integration-connector-proxy`:

- **Base URL**—`[https]://[LB-host]`
- **Test Connection URL**—`[https]://[LB-host]:[port]/[windchill-web-app]/oauth/servlet/WindchillAuthGW/wt.httpgw.HTTPServer/echo`

ThingWorx Navigate Single Sign-on with a Windchill Cluster Configured with HTTP and OAuth

Your configuration details follow:

- ThingWorx Navigate authentication type—SSO

-
- Load balancer protocol—HTTPS
 - Windchill servers—HTTP and OAuth configured. SAML authentication is optional.
Since Windchill is HTTP, the SSL certificate termination occurs at the load balancer.

Verify the URL of the load balancer in ThingWorx Composer.

For `ptc-windchill-integration-connector`, the **Base URL** is `[https]://[LB-host]:[port]/[windchill-web-app]/oauth`.

For `ptc-windchill-integration-connector-proxy`:

- **Base URL**—`[https]://[LB-host]`
- **Test Connection URL**—`[https]://[LB-host]:[port]/[windchill-web-app]/oauth/servlet/WindchillAuthGW/wt.httpgw.HTTPServer/echo`

ThingWorx Navigate with Windchill Authentication, with a Windchill Cluster Configured with HTTPS

Note

Using certificates in a 2-way SSL configuration ensures encryption and secure data transfer. This is enforced with validation on both sides to confirm the connection and communication between ThingWorx/ThingWorx Navigate, and Windchill.

Because we support only Windchill as the Identity Provider, the sharing of credentials is limited to only ThingWorx and Windchill.

Your configuration details follow:

- ThingWorx Navigate authentication type—Windchill Authentication with 2-way SSL
- Load balancer protocol—HTTPS
- Load balancer type—Layer 4
- Windchill servers—HTTPS and 2-way SSL configured
Since Windchill is HTTPS, no SSL certificate termination happens at the load balancer.

Verify the URL of the load balancer in ThingWorx Composer. For `ptc-windchill-connector` and `ptc-windchill-connector-proxy`, this is the correct format:

```
https://<loadbalancer_host>:port>/Windchill/  
sslClientAuth
```

 **Note**

Only a load balancer operating at OSI Layer 4 can support this configuration.

If you are using load balancer operating at OSI Layer 7, you must use Windchill Authentication with the Trusted Host configuration described below.

ThingWorx Navigate with Windchill Authentication, with a Windchill Cluster Configured with HTTP

 **Caution**

This alternative configuration is not recommended, and you should only use it for demo and proof-of-concept purposes. The configuration connects ThingWorx Navigate and Windchill without SSO or SSL. Instead, the Trusted Host property is configured.

Using a Trusted Host opens the connection between the ThingWorx and Windchill to allow all communication from the identified Trusted Host's IP address. This adds a risk of Man in the Middle (MIM) attacks. Sensitive information is exposed over this connection.

In addition, even though your system might be behind a firewall, there is risk from internal attacks and network misconfigurations. If an attacker breaches one of these network boundaries, the attacker has direct visibility to the non-encrypted information being shared. That adds risk to the existing Windchill product and the ThingWorx Navigate configuration.

It is your responsibility to determine if you are willing to accept the risk of using this setup. PTC does not recommend this configuration, and PTC does not take responsibility for any security breaches or attacks on systems configured using the Trusted Host option.

Your configuration details follow:

- ThingWorx Navigate authentication type—Windchill authentication
- Load balancer protocol—HTTPS
- Windchill servers—HTTP and `trustedHost` property configured. Instructions for configuring this property are below.

Since Windchill is HTTP, the SSL certificate termination occurs at the load balancer.

- Additional steps for fetching data from Windchill and establishing a connection between Windchill and ThingWorx Navigate.

In the **ThingWorx Navigate Configuration** tool, provide this URL in the field for Windchill:

```
https://<loadbalancer_host>:port>/Windchill/trustedAuth
```

In addition, there are several manual steps to perform on the Windchill side. We need to establish the IP addresses of the ThingWorx server and the load balancer as trusted hosts. In this way, we safeguard the ThingWorx Navigate connection to Windchill using the load balancer.

This also improves security by preventing untrusted client hosts from reaching the Windchill `/trustedAuth/` URL pattern through the load balancer.

Follow these steps on the Windchill side:

1. Stop the Windchill method server.
2. Go to `WT_HOME/codebase/WEB-INF/web.xml`, and then open it in a text editor.
3. Find the sections `TrustedSSLAuthFilter` and `TrustedAuthFilter`, and then add the parameter `clientHostHeader` as below, in both sections.

For example:

```
<filter>
  <description>Filter allowing a trusted SSL certificate to
  specify the remote user for the request</description>
  <filter-name>TrustedSSLAuthFilter</filter-name>
  <filter-class>wt.httpgw.filter.TrustedAuthFilter</filter-
  class>
  <init-param>
    <param-name>trustTrustedHosts</param-name>
    <param-value>>false</param-value>
  </init-param>
  <init-param>
    <param-name>clientHostHeader</param-name>
    <param-value>X-Forwarded-For</param-value>
  </init-param>
</filter>
<filter>
  <description>Filter allowing a trusted client to specify the
  remote user for the request</description>
  <filter-name>TrustedAuthFilter</filter-name>
  <filter-class>wt.httpgw.filter.TrustedAuthFilter</filter-
  class>
  <init-param>
    <param-name>clientHostHeader</param-name>
    <param-value>X-Forwarded-For</param-value>
```

```
    </init-param>
</filter>
```

4. Add the parameter `TrustedHostFilter` to the same file. For example:

```
<filter>
  <description>Filter allowing a trusted client to specify
the remote user for the request</description>
  <filter-name>TrustedHostFilter</filter-name>
  <filter-class>wt.servlet.TrustedHostFilter</filter-class>
</filter>
<filter-mapping>
  <filter-name>TrustedHostFilter</filter-name>
  <url-pattern>/trustedAuth/*</url-pattern>
</filter-mapping>
```

5. Save and close `web.xml`.
6. Now, open the Windchill shell in a command prompt.
7. If `wt.auth.trustedHosts` is not already added, add the property below to `xconf.properties`:

```
<Property name="wt.auth.trustedHosts" overridable="true"
  targetFile="codebase/wt.properties"
  value="<TWXHost_IP> <LBHost_IP>">
```

`TWXHost` is the ThingWorx host name, and `LBHost` is the load balancer host name.

8. Run `xconfmanager -p`.
9. If `wt.auth.trustedHosts` is not set in the `wt.properties` file, set the property using the following `xconfmanager` command. Or, add it directly in `wtproperties`:

```
xconfmanager --set wt.auth.trustedHosts==<TWXHost_IP> <LBHost_IP>
-t codebase/wt.properties -p
```

`TWXHost` is the ThingWorx host name, and `LBHost` is the load balancer host name.

10. Start the Windchill Method Server.

Windchill is now configured with the `trustedHost` property.

Note

If you need more help using `xconfmanager`, search for the topic “Using the `xconfmanager` Utility” in the [Windchill Help Center](#).

We need to use the `trustedAuth` option in Windchill, and this requires some updates in the connector and the connector proxy settings:

-
1. In ThingWorx Composer, open the `ptc-windchill-connector`.
 2. Click **Configuration**, and then next to **Base URL**, enter the following URL:

```
[https]://[LB-host]:[port]/[windchill-web-app]/trustedAuth
```
 3. Click **Save**.
 4. Open `ptc-windchill-connector-proxy`, and then click **Configuration**.
 5. Next to **Test Connection URL**, enter this URL:

```
[https]://[LB-host]:[port]/[windchill-web-app]/trustedAuth/servlet/WindchillAuthGW/wt.httpgw.HTTPServer/echo
```
 6. Click **Save**.

Your Windchill cluster configuration is now complete.

Configure ThingWorx Navigate to Connect to Multiple Windchill Systems

You can connect ThingWorx Navigate to more than one Windchill system. ThingWorx Navigate then searches systems, and displays search results to the end user on a single page.

This topic describes how to configure ThingWorx Navigate to connect to multiple Windchill instances, each instance executes a service in ThingWorx Navigate that automatically duplicates necessary connectors, entities, and services.

Prerequisites


Before you set up your multiple Windchill configuration, make sure you meet the following prerequisites:

- Your Windchill servers are set up.
- ThingWorx Navigate is configured with Single Sign-on or Windchill Authentication.
- Each user has the same user name on every Windchill system.

Each Windchill system returns data based on the permissions granted to that user on that specific server. If a user logs in with a different user name, ThingWorx Navigate will not work as expected.

Add Windchill Servers

To add another Windchill server, duplicate the existing resource provider and the Windchill connector:

-
1. In ThingWorx Composer, under **System**, click **Resources**.
 2. Search for the resource `NavigateSetupUtils`, and then open it. The **General Information** page opens.
 3. Click **Services**. The **Services** page opens.
 4. Search for `AddWindchillServerForNavigate`, and then click . The **Execute Service: AddWindchillServerForNavigate** window opens.
 5. Under **suffix**, add a suffix to the duplicate server name, and then click **Execute**.
 6. Check the output for the summary of the duplicated things:

```
ptc-windchill-integration-connector-proxy_suffix
ptc-windchill-integration-connector_suffix
WindchillDemoPartResourceProvider_suffix
WindchillDocumentResourceProvider_suffix
WindchillDemoEpmDocumentResourceProvider_suffix
WindchillDemoRepresentationResourceProvider_suffix
```

 **Note**

If you see errors in the output and the service fails, no new connectors are created, and you won't be able to configure your system with multiple Windchill servers.

7. Click **Done**.
8. To check if the duplicated connector, connector-proxy and resource providers are created, search for the names with the given suffix.
9. If ThingWorx Navigate is configured with Single Sign-on, restart Apache Tomcat, otherwise the connectors cannot be configured.

Now that you added the duplicate connectors, the next step is to configure ThingWorx Navigate with your authentication method for Multiple Windchill connection.

Configure the new connectors and connector-proxy (`ptc-windchill-integration-connector_suffix` and `ptc-windchill-integration-connector-proxy_suffix`), based on the configuration of the original connectors and connector-proxy (`ptc-windchill-integration-connector` and `ptc-windchill-integration-connector-proxy`), but add the new Windchill server details to:

- The `ptc-windchill-integration-connector-proxy_suffix` URL and Test Connection URL
- The `ptc-windchill-integration-connector_suffix` Base URL

Continue to the section for Single Sign-on or Windchill Authentication.

Configure the New Server with Single Sign-On

To configure your additional Windchill server with your Single Sign-on, refer to the [PTC Identity and Access Management Help Center](#). This help center provides instructions and several Identity Providers configuration examples.

Your system is now connected to the new Windchill server. Log into ThingWorx Navigate again to access the data from multiple Windchill systems.

Configure the New Server with Windchill Authentication

If you are using Windchill Authentication, follow these steps:

1. In ThingWorx Composer, under **Security**, click **Authenticators**.
2. Click `ptc-identity-provider-authenticator` to open it.
3. Click **Configuration**. The **Configuration** page opens.
4. Select the check box for `MultipleWindchillServers`—This connects ThingWorx Navigate to two or more Windchill instances.
5. Stop Apache Tomcat and ThingWorx Integration Runtime.
6. Replace the `web.xml` file in the Tomcat installation directory:
 - a. Browse to `<Tomcat installation location>\webapps\Thingworx\WEB-INF`
 - b. Make a copy of `web.xml`, then save it to a different location.
 - c. Browse to `<Navigate installation location>\NavigateApp\idp\tx-9.0.x\multi\`, then copy the `web.xml` file.

Note

If you downloaded `ptc-windchill-extension` separately, you can also copy the `web.xml` file from the `ptc-windchill-extension\idp\tx-9.0.x\multi` folder.

- d. Paste `web.xml` to this location:

```
<Tomcat installation location>\webapps\Thingworx\
WEB-INF
```

7. Start Apache Tomcat and ThingWorx Integration Runtime.

 **Note**

Make sure that the KeyStore and TrustStore files contain the required certificates for all the Windchill servers. If certificates are missing, you will not be able to connect to additional Windchill servers.

Your new server is now configured with Windchill Authentication. Log into ThingWorx Navigate again to access the data from multiple Windchill systems.

 **Note**

For systems with Windchill Authentication configured, a user must log in with the same user role to each Windchill instance.

Continue to the next section to set the refresh rate for new servers.

Configure the Refresh for New Servers

If you are adding Windchill servers to an existing setup of ThingWorx Navigate, decide when your users will see results from the new servers. Choose one of these types of refresh for new servers:

- Look for new servers only during login—This is the default. Your users will see search results from the new servers the next time they log in to ThingWorx Navigate.
- Refresh every n seconds—The system checks for new servers every n seconds. Your users see results from the other servers after the refresh, without having to log out first. Follow the steps below to set an automatic refresh rate:
 1. Stop Apache Tomcat and ThingWorx Integration Runtime.
 2. Open the file `<Tomcat installation location>\webapps\Thingworx\WEB-INF\web.xml` in a text editor.
 3. Find `mwaTimePeriod` and change the parameter value to `+n`, with n to look for new servers every n seconds.

 **Note**

- If you're using Windchill Authentication, and this parameter is set to a positive value and one of the Windchill servers is down, users may have issues when that server comes back up. In this case, the user should refresh the landing page of ThingWorx Navigate to get a Windchill login prompt for that server.
- Optionally, you can choose the Windchill server the user logs into first by changing the `masterIdpServer` parameter value to the Windchill URL.

4. Save and close the file.
5. Start Apache Tomcat and ThingWorx Integration Runtime.

 **Note**

For this configuration note the following points:

- For systems with Windchill Authentication configured, a user must log in with the same user role to each Windchill instance.
- The **Download Drawing Bundle** task is not supported.

Configure Windchill to Include URL for Task Details Page in Email Notification

Windchill sends task notification emails to assignees. For Windchill to include a URL to the workflow task details page of ThingWorx Navigate **My Tasks** in the notification email sent to the assignees, configure the Windchill property, `wt.workflow.task.navigateURL`. For more details, search for `wt.workflow.task.navigateURL` in the [Windchill Help Center](#).

Connect ThingWorx Navigate to SAP

Your users can access data from SAP Netweaver Gateway using these tasks in ThingWorx Navigate:

- **View Parts List**
- **View Part Properties**

- **View Part Structure**

Connect to the server to get information for parts, CAD documents, or both. In the package of PLM files you imported to install the ThingWorx Navigate View PLM App Extension, there is also an extension package, `SAPProviders_ExtensionPackage`. It includes all the components you'll need. The setup requires some connection steps in ThingWorx Composer:

Define the Connection to SAP

First, we'll set up the connector between the SAP server and ThingWorx Navigate.

1. Search for this connector: `ptc-SAP-OData-connector`.
2. Click **Configuration**. The **Configuration** page opens.
3. Under **Generic Connector Connection Settings**, under **Authentication Type**, select **SSO**.
4. **Authorization Server ID** — The ID defined in `sso-settings.json` for SAP.
5. Under **Authorization Server Scopes Settings**, add the SAP scope. For more information about scopes, see the [PTC Identity and Access Management Help Center](#).
6. Under **OData Connector Connection Settings**, click **Add**, and then add the `tw.friendly-names.ServiceRootRelativeURL` for SAP.
7. At the bottom of the page, under **HTTP Connector Connection Settings**, provide this information for your system:
 - **Username and Password**—Leave these boxes blank.
 - **Base URL**—Provide the path to the SAP server.
 - **Relative URL** — Leave this box blank.
 - **Connection URL**—Enter the location that provides REST web services
8. Click **Save**.

Check your Connection, and then Edit the Services

In this step, define the type of information that your users receive from a search.

1. Open `ptc-SAP-OData-connector`, and then click **Services**.

 **Tip**

Before you edit your services, we recommend that you check your **Base URL** and **Connection URL**:

- a. Find the `ValidateConnection` service.
 - b. Click the play button, and then click **Execute**. On the right, under **Output**, the results appear.
-

2. Select the `GetProductSet` service, and then edit it.
3. Under **Route Info** ► **Endpoint**, select your organization endpoint. This ensures that your users get the correct information, such as a material or a product, for the search criteria in SAP.
4. Click **Done**, and then click **Save**.
5. To validate that the `GetProductSet` service is correctly configured and provides the correct information, execute it.

Edit the Data Shape

You use this Data Shape to define which SAP attributes appear on the ThingWorx Navigate tailoring pages.

1. Search for `SAP_DATA_SHAPE`.
2. Click **Field Definitions**. Edit the list to include all the attributes your organization needs, such as `SAPQuantity`, `SAPCurrency`, and `SAPMaterialCost`.

 **Note**

After you define the list of field names, you can also define localization tokens for each field.

3. Click **Save**.

Map the Attributes in the Resource Provider

Now that you have defined the fields to appear in ThingWorx Navigate, we'll make sure that they're mapped to the corresponding attributes from SAP.

1. Search for `SAPPartResourceProvider`, and then open it.
2. Click **Configuration**. The **Configuration** page opens.

-
3. Click **Add** to add each field that you defined in the Data Shape. In our example, these were `SAPQuantity`, `SAPCurrency`, and `SAPMaterialCost`. The field names appear in the **Normalized** column.
 4. Under **Original**, map each field to its corresponding attribute name in SAP. For example, `SAPMaterialCost` may correspond to `MovingPr` in SAP.
 5. In addition to the fields you defined, add these two required fields to the **Normalized** list:
 - `Id`
 - `Number`
 6. Map both the `Id` and `Number` fields to the SAP attribute that your users will query on. For example, `Material` or `ProductID`.
 7. In `Resource Provider Configuration` table, add the connector `ptc-SAP-OData-connector`.
 8. Click **Save**.

Add Tags to the SAP Fields

You're almost finished with the setup. In this step, add SAP tags to the fields using these resource providers:

- `CompositePartResourceProvider`—Supports part information
- `CompositeEPMDocumentResourceProvider`—Supports CAD document information

The tags help you distinguish which attributes come from SAP. Any field without this prefix searches Windchill for the data.

1. Search for `CompositePartResourceProvider`, and then open it.
2. Click **Configuration**. The **Configuration** page opens.
3. Add all the fields you defined and mapped in the previous steps. In our example, these were `SAPQuantity`, `SAPCurrency`, and `SAPMaterialCost`, plus the two required additional fields, `Id` and `Number`. As you add them, the field names appear in the **Normalized** column.
4. In the **Original** column, add this tag as a prefix, including the hyphen, to each field name: `SAPPartResourceProviderTag-`. So, for example, `SAPMaterialCost` in the **Normalized** column should be `SAPPartResourceProviderTag-SAPMaterialCost` in the **Original** column.
5. In `Expand Terms` table, add the tag name `SAPPartResourceProviderTag`.
6. Click **Save**.

-
7. Repeat steps 1–5 for `CompositeEPMDocumentResourceProvider`.
 8. Restart ThingWorx.

Your connection to the SAP server is complete. On the tailoring pages, your business administrator can choose SAP attributes to show your end users.

Improve the Performance of ThingView WebGL

To improve the performance of the ThingView WebGL widget, we recommend optimizing the widget with WebAssembly MIME types.

Configure the Apache Tomcat server to support WebAssembly MIME types as a file, by editing the `web.xml` and `server.xml` files:

1. First, stop Apache Tomcat and ThingWorx Integration Runtime. If you have Single Sign-on, continue to step 2. For Windchill Authentication, skip to step 3.
2. For systems with Single Sign-on—Edit the `web.xml` file:
 - a. Open `<Tomcat installation location>\webapps\Thingworx\WEB-INF\web.xml` in a text editor.
 - b. Scroll down to the end of the file, then add the following lines:

```
<mime-mapping>
<extension>wasm</extension>
<mime-type>application/wasm</mime-type>
</mime-mapping>
```
3. For systems with Windchill Authentication, `web.xml` already has the required MIME settings by default.

Note

If you're using a multiple Windchill connection, copy the `web.xml` file from the folder: `<Navigate installation location>\MultiWindchillConfiguration\idp\`.

Alternatively, if you downloaded `ptc-windchill-extension` separately, you can also copy the `web.xml` file from the `ptc-windchill-extension\idp\twx-8.3.x\multi` folder.

4. To add the compression settings for any authentication type, open `<Tomcat installation location>\conf\server.xml` in a text editor.
5. Add the following compression attributes in the connector port section:

```
compression="on"
```

```
compressionMinSize="1024"  
compressableMimeType="application/wasm,text/html,text/xml,text/  
plain,  
text/css,text/javascript,application/javascript"/>
```

6. Start Apache Tomcat and ThingWorx Integration Runtime.

Extend Session Timeout

By default, a ThingWorx session times out after 30 minutes of inactivity. You can increase this limit using the instructions in [this](#) topic from the ThingWorx Help Center.


Extend Request Timeout

In large datasets, the response time may exceed the default 30-second limit. Follow these steps to extend the timeout:

1. In ThingWorx Composer, search for `WSCommunicationsSubsystem`, and open to edit.
2. Click **Configuration**.
3. Increase the value for the **Amount of time a request will wait for the response message before timing out (secs)**, and click **Save**.

Change the Language Setting

Use the following procedure to change your language setting for ThingWorx Navigate.

1. In ThingWorx Composer, click  **Browse**, and then under **Security**, click **Users**.
2. Select and edit the user, in this case, Administrator.
3. In the **Languages** box, type the two-letter abbreviation for your language. For example, `fr` for French or `ko` for Korean.

Languages 