



# **ThingWorx Manufacturing Apps Setup and Configuration Guide**

**8.2**

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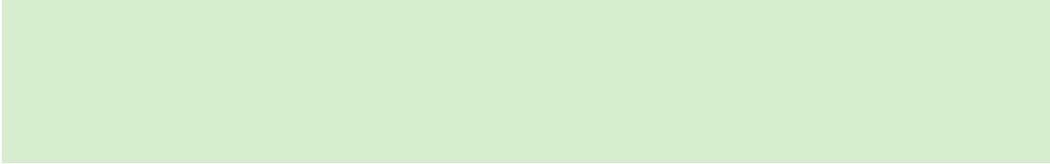
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## About This Guide

This *ThingWorx Manufacturing Apps Setup and Configuration Guide* guide describes the following:

- Installation of ThingWorx Manufacturing Apps as an extension to ThingWorx.
- Initial setup and configuration steps to get started with ThingWorx Manufacturing Apps.

This guide assumes that the [prerequisite products on page 6](#) are installed and configured, including a KEPServerEX with connected devices.

### Related Documentation

It may be useful to refer to the following documents located at the [PTC Reference Documents](#) website under the product categories: ThingWorx Manufacturing Apps Family and ThingWorx Service Apps Family.

- *What's New in ThingWorx Manufacturing Apps*
- *ThingWorx Manufacturing and Service Apps Customization Guide*

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# 1

## Installing ThingWorx Manufacturing Apps

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This chapter describes product requirements and installation for ThingWorx Manufacturing Apps.

# Product Requirements

This product works in connection with ThingWorx servers, data sources such as Kepware servers, and other custom connectors. To use ThingWorx Manufacturing Apps, you must have the support identified below.

## Related Documentation

ThingWorx Manufacturing Apps shares the same core system requirements and compatibility matrix with ThingWorx, as documented in the *ThingWorx 8.2 System Requirements*, available at the following URL:

[https://support.ptc.com/view?im\\_dbkey=174098](https://support.ptc.com/view?im_dbkey=174098)

For more information about ThingWorx, refer to the [ThingWorx Help Center](#).

## Platform and Operating System Support

ThingWorx Manufacturing Apps is compatible with ThingWorx 8.2. For operating system support, please refer to the compatibility matrix located in the *ThingWorx 8.2 System Requirements*.



### Note

Windows Server 2008 R2 SP1, Windows 2012 R2, and Cent OS 7.1 are recommended and fully tested for production.

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## KEPServerEX Support

ThingWorx Manufacturing Apps supports data from KEPServerEX 6.2 and later, which include ThingWorx Native Interface. Non-Kepware servers and earlier versions of KEPServerEX can be connected to either a KEPServerEX 6.2 or KEPServerEX 6.3 server that is used as an aggregator.

KEPServerEX and ThingWorx can be installed on the same machine. However, for a production environment we recommend separate machines.

For more information, see [KEPServerEX Version 6 Install Guide](#).

## Database Support

ThingWorx Manufacturing Apps is compatible with ThingWorx 8.2. For database support, please refer to the compatibility matrix located in the *ThingWorx Core 8.2 System Requirements*.

## Client Browser Support

ThingWorx Manufacturing Apps is compatible with ThingWorx 8.2. For client browser support, please refer to the compatibility matrix located in the *ThingWorx Core 8.2 System Requirements*.

# Import as a ThingWorx Extension

ThingWorx Manufacturing Apps are imported as a ThingWorx extension.

---

## Note

`ThingWorx-Asset-Remoting-<version>-extension.zip` is an optional extension that you can choose to import along with ThingWorx Manufacturing Apps.

This extension enables you to use the remote access and control capability available in Asset Advisor. For more information, see [Remote Access and Control on page 62](#).

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## Prerequisites

Before importing this product as a ThingWorx extension, complete the following prerequisites:

- Review the [Product Requirements on page 6](#).
- Review the ThingWorx 8.2 requirements. For more information, see the *ThingWorx 8.2 System Requirements*, available at the following URL: [https://support.ptc.com/view?im\\_dbkey=174098](https://support.ptc.com/view?im_dbkey=174098).
- Install ThingWorx 8.2. For more information, see *Installing ThingWorx 8.2*, available at the following URL: [https://support.ptc.com/view?im\\_dbkey=174097](https://support.ptc.com/view?im_dbkey=174097).
- Follow the instructions to [Configure Java for Tomcat on page 12](#).

## Import

You import this product as a ThingWorx extension into an existing ThingWorx platform installation (version 8.2). To locate the download, go to the [PTC Software Downloads](#) page and expand the following folders: **ThingWorx Platform** ▶ **Release 8.2** ▶ **ThingWorx Manufacturing Apps Extension** ▶ **<most recent datecode>**.

---

## Note

The extensions for ThingWorx Manufacturing Apps and ThingWorx Service Apps cannot both be imported to the same ThingWorx server.

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1. Do the following:
  - a. Download and unzip the contents of the following file:

- ThingWorx-Manufacturing-Apps-<version>-extension-bundle.zip
- b. Optional: Download, but do not unzip the file ThingWorx-Asset-Remoting-<version>-extension.zip.
2. From ThingWorx, navigate to **Import/Export ► Extensions ► Import**.

---

 **Note**

The extension files must be imported in the correct order as described in the following steps.

---

3. From the **Import Extensions** window, click **Choose File**. Navigate to and select the following file:  
ThingWorx-Manufacturing-Apps-<version>-extension-dependencies.zip
4. Click **Import** and refresh the window if prompted.
5. Again, select **Import/Export ► Extensions ► Import**.
6. From the **Import Extensions** window, click **Choose File**. Navigate to and select the following file:  
ThingWorx-Manufacturing-Apps-<version>-extension.zip
7. Click **Import** and refresh ThingWorx Composer if prompted.

---

 **Note**

Complete the next three steps only if you have downloaded the optional ThingWorx-Asset-Remoting-<version>-extension.zip extension.

Otherwise, proceed to the last step.

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8. Again, select **Import/Export ► Extensions ► Import**.
9. In the **Import Extensions** window, click **Choose File**. Navigate to and select the following file:  
ThingWorx-Asset-Remoting-<version>-extension.zip
10. Click **Import** and refresh ThingWorx Composer if prompted.
11. View the extensions after the import by selecting **Import/Export ► Extensions ► Manage**.

## Verify

To verify that you can access the apps, go to the following URL on your ThingWorx server. Replace the `<port>` with your port number.

```
https://localhost:<port>/Thingworx/FormLogin/Welcome
```

The default user name is Administrator. The password is the one you specified during the installation and configuration of ThingWorx.

## Upgrading ThingWorx Manufacturing Apps

To upgrade ThingWorx Manufacturing Apps:

1. Upgrade your ThingWorx installation as described in *Upgrading to ThingWorx 8.2*, available from the following URL:  
[https://support.ptc.com/view?im\\_dbkey=174100](https://support.ptc.com/view?im_dbkey=174100).
2. Restart your ThingWorx server.
3. Import your ThingWorx Manufacturing Apps extensions as described in the previous [Import section on page 7](#). Your data and connections are automatically preserved.
4. Restart your ThingWorx server.
5. Clear your browser cache. Instruct all users to clear their browser caches as well.
6. If you have customized your ThingWorx Manufacturing Apps, refer to the *ThingWorx Manufacturing and Service Apps Customization Guide* to address any upgrade impacts to your customizations.

## Configure Communication with KEPServerEX

The connection with KEPServerEX provides the data needed by ThingWorx Manufacturing Apps. One or more KEPServerEX servers can be connected. KEPServerEX can be on the same server or a different server than ThingWorx.

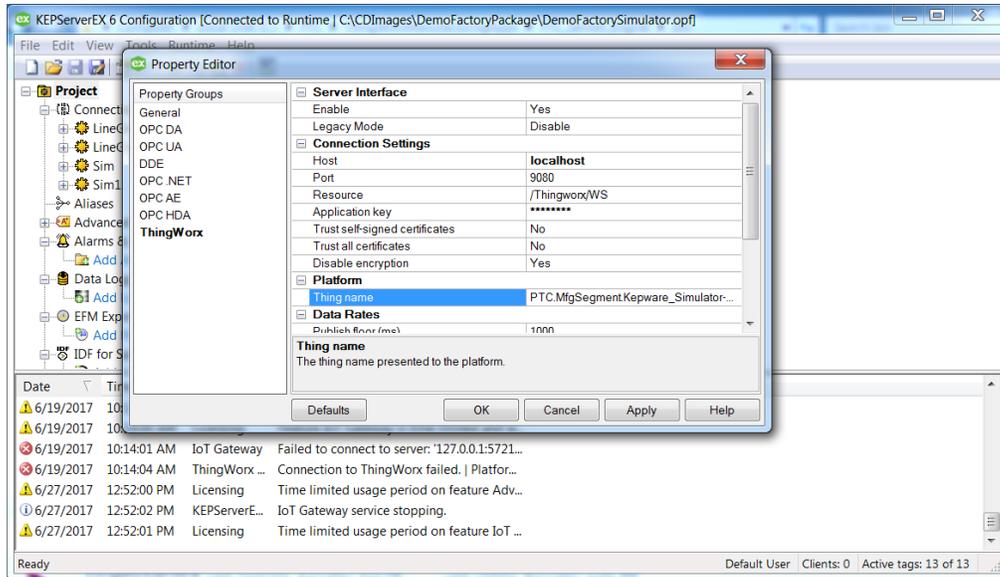
### To configure communication with KEPServerEX:

1. When you open ThingWorx Manufacturing Apps for the first time, you are guided to create your first connection to your KEPServerEX server. You are prompted to enter a server or thing name. Ensure that the name is one you can use to identify this KEPServerEX instance. A list of configuration parameters

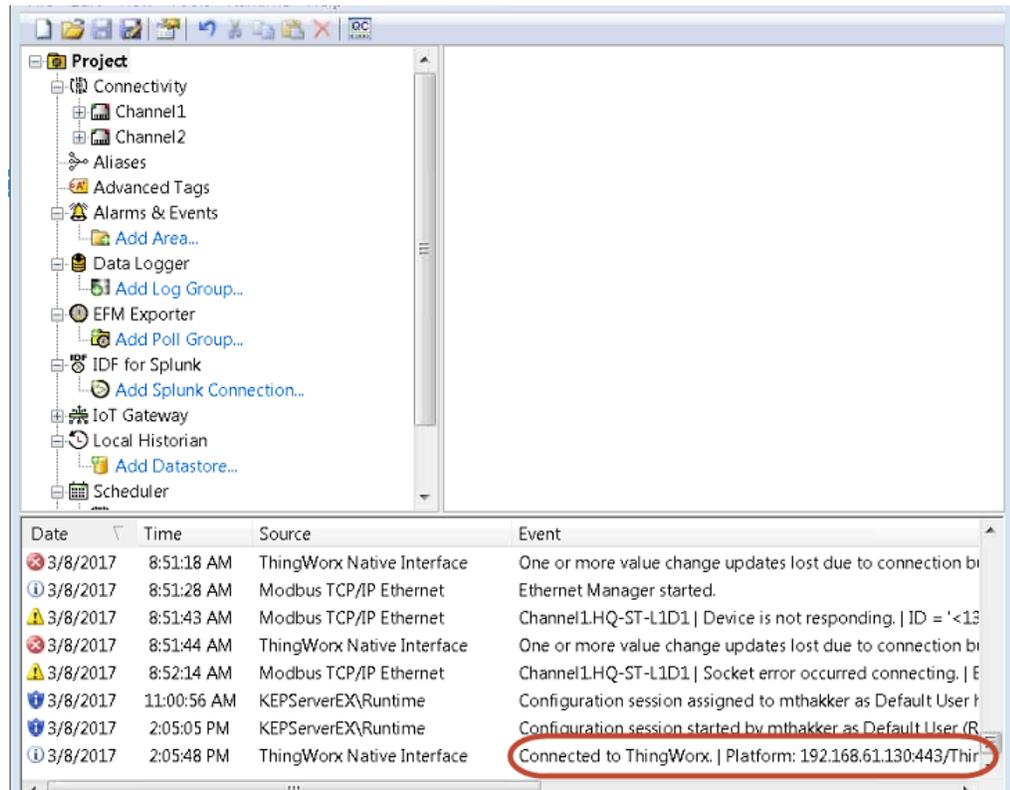
is generated automatically. Print or copy that information before launching ThingWorx Manufacturing Apps.

2. Input the configuration parameters under the ThingWorx tab of your instance of KEPServerEX. Right-click **Project**, select **Properties**, and then click the ThingWorx tab.

KEPServerEX then solicits the connection with your product.



3. In the KEPServerEX configuration, a confirmation regarding a connection to ThingWorx displays in the **Event** column, as shown in the following figure.



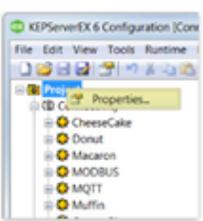
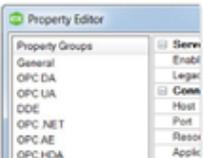
If you receive an error message indicating that the connection to the ThingWorx platform failed and could not initialize a secure socket connection, follow these steps:

- Verify that the host, port, resource, application key, and thing name are valid and correct.
  - Verify that the host of KEPServerEX can reach the machine on which your product is installed. To do so, ping the hostname or IP address of the ThingWorx Manufacturing Apps host.
  - Verify that the proper certificate settings are enabled.
4. Launch ThingWorx Manufacturing Apps.

**thingworx** controls advisor

Print these instructions before you launch ThingWorx Apps. Print Launch ThingWorx Apps

**YOUR KEPServerEX HAS BEEN CREATED:** follow these instructions to connect your KEPServerEX.

1. Open **KEPServerEX** Application.
 
2. Right-click on the **Project** folder and select **Properties**.
 
3. Select **ThingWorx**.
 
4. In **Connection Settings**, enter the following:
 

Server Interface	Enabled: Yes
Enable	Legacy Mode: Disable
Legacy Mode	Host: win-rahsnl4c84g
Connection Settings	Port: 9080
Host	Application Key: 04027fa0-3289-4666-beb3-86c80db510d3
Port	Trust self-signed certificates: No
Resource	Trust all certificates: No
Application key	Disable Encryption: Yes
Trust self-signed certificates	
Trust all certificates	
Disable encryption	
Platform	
5. In **Platform**, enter the following:
 

Connection Settings	
Host	
Port	
Resource	
Application key	
Trust self-signed certificates	
Trust all certificates	
Disable encryption	
Platform	Thing Name: test-GW
Thing name	
Data Rates	
Publish floor (ms)	
Logging	
Enable	
6. Click **OK**.

5. Later, you can click **Controls Advisor** from the main console to create and manage additional server connections.

For more information, see [Controls Advisor on page 42](#).

## Configure Java for Tomcat

To ensure that ThingWorx Manufacturing Apps runs properly, you must make the following changes to your Java for Tomcat configuration. Complete these steps before importing ThingWorx Manufacturing Apps as an extension.

### To change your Tomcat configuration:

1. From the **Start** menu, launch the **Configure Tomcat** program.
2. On the **Java** tab, enter values in the **Initial memory pool** and **Maximum memory pool** fields.

The recommended value is 5120.

3. Increase the default cache settings that affect static file caching. To do so, add the following line within the tags in the `$TOMCAT_HOME\conf\context.xml` file:

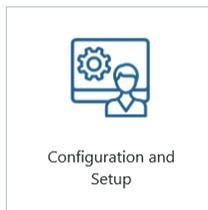
```
<Resources cacheMaxSize="501200" cacheObjectMaxSize=  
"2048" cacheTtl="60000"/>
```

# 2

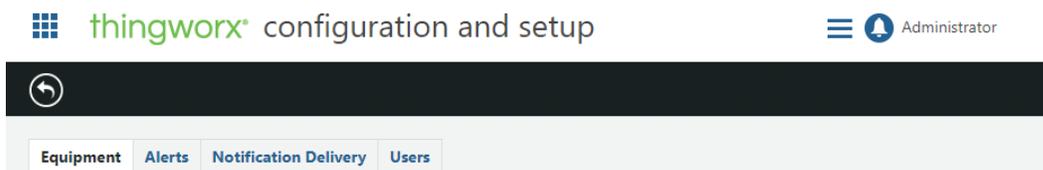
## Configuration and Setup

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This chapter describes the tasks required for the initial configuration and setup of ThingWorx Manufacturing Apps. These tasks are completed from **Configuration and Setup**.



These tasks include setting up your equipment, alerts, email and text notification delivery, and users.



# Setting Up Your Equipment

On the **Equipment** tab, you can create new equipment (+), configure equipment (🔧), delete equipment (🗑️), and clear the data history (🕒).

The equipment configured here includes sites, lines and assets, and their relationship structure relationships. Sites allow you to group your lines and assets by location. Sites and lines are used in Production Advisor. Assets are used in Asset Advisor.

Your equipment is displayed in a tree structure, showing the relationships between your pieces of equipment. Lines and assets related to a site are grouped under that site. Assets related to a line are grouped under that line. Assets related to another asset are grouped under that asset. Any assets not related to a site, line, or other asset are displayed at the first level of the structure. Assets can be related to multiple sites, lines, and assets.

Name	Type	Status Defined?	Defined Alerts	Defined KPIs	Description	Last Modified
<a href="#">Needham Factory</a>	Site					---
▼ <a href="#">1-1_Line</a>	Line	✓	0	4		2018-02-08 03:33:12
<a href="#">1-1_SinkingEDM</a>	Asset	✓	1	4		2018-02-08 03:33:12
<a href="#">1-1_WireEDM</a>	Asset	✓	0	4		2018-02-08 03:33:12
▼ <a href="#">1-2_Line</a>	Line	✓	0	4		2018-02-08 03:33:12
<a href="#">1-2_GantryRobot</a>	Asset	✓	0	4		2018-02-08 03:33:12
<a href="#">1-2_WeldingRobot</a>	Asset	✓	0	4		2018-02-08 03:33:12
▼ <a href="#">1-3_Line</a>	Line	✓	0	4		2018-02-08 03:33:12
<a href="#">1-3_CNCMill</a>	Asset	✓	0	4		2018-02-08 03:33:12
<a href="#">1-3_CNCTurning</a>	Asset	✓	0	4		2018-02-08 03:33:12
▼ <a href="#">2-1_Line</a>	Line	✓	0	4		2018-02-08 03:33:12

The **Equipment** tab also provides a quick view of the completeness of the configuration for each piece of equipment. An indicator displays whether statuses have yet been defined for the piece of equipment. The number of alerts and KPI's defined for that piece of equipment are also displayed.

## Create New Equipment

To create a new piece of equipment:

1. From the **Equipment** tab, click . If you select an existing piece of equipment in the table before clicking , the new piece of equipment is automatically created as a child of the selected equipment.

---

### Tip

Use CTRL + click to deselect a selected row.

---

2. Select a type, either **Asset**, **Line**, or **Site**. If you are creating a child of an existing piece of equipment, only allowable child types are displayed. For example, if you are creating a child of a line, only assets can be selected. If custom subtypes have been defined for your system, they are also available for selection.
3. Enter a name and optional description. Once the equipment has been created, **Name** is not editable.

The configuration page for the new piece of equipment displays.

## Configure Equipment

The configuration page displays automatically after a new piece of equipment is created. You can also view this page by selecting a piece of equipment on the

**Equipment** tab, and clicking .

From the configuration page, you can add general information about the piece of equipment, and establish its relationships within the equipment structure. For lines and assets, you can also define their available statuses, additional properties, performance metrics, and alerts. You can delete the piece of equipment you are

viewing by clicking .

## General Information

On the **General Information** screen, you can do the following:

- Upload an image to depict the piece of equipment.
  1. Click **Choose File**, then select an image file.
  2. Click **Upload** to display the image, then click **Save**.

---

### Note

The uploaded image is used in the Asset Advisor, where the image size shown is 180 x 180 pixels, and in the Production Advisor, where the image size shown is 330 x 330 pixels. If the image uploaded is larger than the image size shown, it is scaled down in locked aspect ratio based on the larger dimension, resulting in a margin on the lesser dimension. If the image uploaded is smaller than the image size shown, it is not scaled up, resulting in margins on the appropriate dimensions.

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- Enter a description, the equipment's model and serial number, and location. The **Name** field is not editable.
- Enter the **Planned Operation Time** for the equipment by providing values for the **Start Time** and **Duration**. These values are used to calculate the planned time when the equipment is available for use. Enter time as HH:MM.
- Enter the **KPI Calculation Period**. This is the time range over which a key performance indicator is calculated to display to others. It is defined in minutes and cannot be set to less than one minute.

Click **Save** to save your information before navigating to another page. If you navigate away from the page without saving, the data is lost.

The screenshot shows the 'thingworx configuration and setup' interface. At the top right, there is a user profile for 'Administrator'. The main content area is titled 'CONFIGURE 1-1\_SINKINGEDM'. On the left, a sidebar menu includes 'General Information' (selected), 'Equipment Structure', 'Status', 'Additional Properties', 'Performance Metrics', and 'Alerts'. The main form contains a file upload section with a 'Choose File' button and an 'Upload' button. Below this is an image of a blue industrial machine. To the right of the image are several input fields: 'Name' (1-1\_SinkingEDM), 'Description', 'Model Number' (ws10u), 'Serial Number' (4Xr8Py5y), and 'Location'. Below these are 'Planned Operation Time' fields for 'Start Time' (00:00) and 'Duration' (23:59), and 'KPI Calculation Period' (60 Minutes). A 'Save' button is located at the bottom right of the form.

## Equipment Structure

On the **Equipment Structure** tab, you can add related child equipment to the current piece of equipment, remove related child equipment, and view the current equipment's position in the equipment structure.

By default, the following relationships can be created:

- For sites, you can add related lines and assets.
- For lines, you can add related assets.
- For assets, you can add other related assets.

Sites always reside at the top level of the hierarchy. Each line or asset can be child of only one parent piece of equipment. Both assets and lines can reside at the top level of the hierarchy and not be child of any parent.

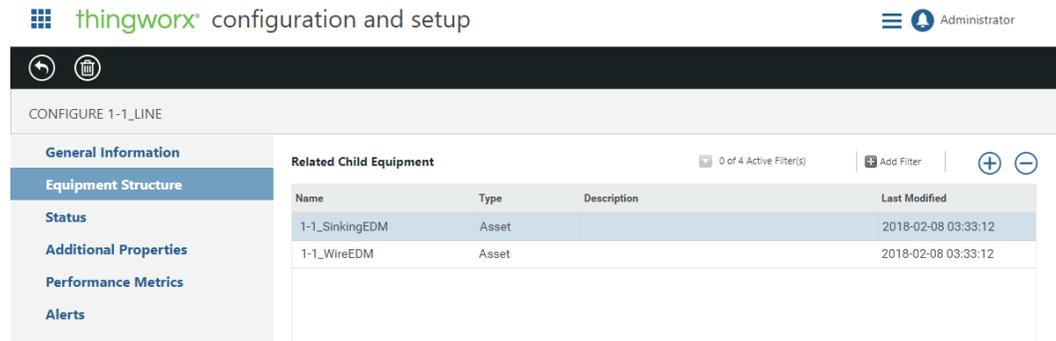
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### Note

The default equipment structure relationship rules can be customized. For more information, see *ThingWorx Manufacturing and Service Apps Customization Guide*.

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If the current piece of equipment is already related to other equipment in the equipment structure, the **Equipment Structure Position** displays the related parent equipment.



The screenshot shows the Thingworx configuration and setup interface. The top navigation bar includes the Thingworx logo, the text 'configuration and setup', and a user profile icon labeled 'Administrator'. Below the navigation bar, there is a breadcrumb trail 'CONFIGURE 1-1\_LINE'. A sidebar on the left contains several menu items: 'General Information', 'Equipment Structure' (which is highlighted), 'Status', 'Additional Properties', 'Performance Metrics', and 'Alerts'. The main content area is titled 'Related Child Equipment' and features a table with the following data:

Name	Type	Description	Last Modified
1-1_SinkingEDM	Asset		2018-02-08 03:33:12
1-1_WireEDM	Asset		2018-02-08 03:33:12

At the top right of the table, there are controls for filters: '0 of 4 Active Filter(s)', 'Add Filter', and expand/collapse icons (+ and -).

To add related child equipment:

1. From the **Related Child Equipment** table, click .
2. The **Add Related Child Equipment** table lists all available equipment based on the relationships allowed. Select one or more pieces of equipment.
3. Click **Add**.

To remove a relationship:

1. Select the related child equipment to be removed.
2. Click .
3. On the confirmation window, click **OK**.

## Status

On the **Status** screen, the possible states are defined. There are 6 states provided by default: **Not Configured**, **Warning**, **Running**, **Unplanned Downtime**, **Planned Downtime**, **Unavailable**. Of these states, **Warning**, **Running**, **Unplanned Downtime**, and **Planned Downtime** can be defined.

The screenshot shows the ThingWorx configuration interface for 'CONFIGURE 1-1\_SINKINGEDM'. The left sidebar contains navigation options: General Information, Equipment Structure, Status (selected), Additional Properties, Performance Metrics, and Alerts. The main content area is titled 'Define Status' and contains a table with the following data:

Icon	State	Expression
!	Warning (1)	"HAS_ALERTS:Asset_1-1_SinkingEDM" OR ("PTC.MfgSegment.Kepware_Simulator:LineGroup1.1-1_SinkingEDM.Machines Online" = false AND "PTC.MfgSegment.Kepware_Simulator:LineGroup1.1-1_SinkingEDM.Running" = true)
✓	Running (2)	"PTC.MfgSegment.Kepware_Simulator:LineGroup1.1-1_SinkingEDM.Running" = true
✓	Planned Downtime (3)	"PTC.MfgSegment.Kepware_Simulator:LineGroup1.1-1_SinkingEDM.Machines Online" = false
✗	Unplanned Downtime (4)	"PTC.MfgSegment.Kepware_Simulator:LineGroup1.1-1_SinkingEDM.Machines Online" = true AND "PTC.MfgSegment.Kepware_Simulator:LineGroup1.1-1_SinkingEDM.Running" = false
⊘	Unavailable (5)	Default value if no other expressions are true.

Below the table is an 'Edit Expression' section with a text area containing the message: 'The expression for this state is not editable. Select a different table row to edit the expression.' Below the text area, there are instructions: 'Valid operators: AND, OR, <, >, <=, >=, !=, ()' and 'Valid operands: true, false, numbers and tags. Strings between single quotes ('). KEPServerEX tags between double quotes ("). A 'Save' button is located at the bottom right of the 'Edit Expression' section.

To define the state values:

1. Select a state from the **Define Status** table.
2. Under **Edit Expression**, enter an expression manually, or click  to browse for a tag or property.

Valid operators and operands for manually entering an expression are provided below the **Edit Expression** field. For lines, the expressions can relate to the assets of the line. For example, a line could be in planned downtime if either

of the two assets in the line are in planned downtime. Copy the planned downtime expressions for each appropriate asset, and paste them into the planned downtime expression for the line.

 **Note**

By default, **Warning** is defined to appear when an asset or line has active alerts. A line is set to **Running** if all of its children are running. These defaults can be changed.

3. Click **Save**.

To clear the expression defined for a state, select that state, and click .

The expressions appear in the table in the order that they are evaluated. After you define the states, ensure that they are in the table in the correct order. You can

change that order using the  and  actions. (The **Not Configured** and **Unavailable** states cannot be moved.)

If none of the expressions can be evaluated, then the status of the piece of equipment is **Unavailable**. If the status does not have an expression defined, it is ignored.

## Additional Properties

On the **Additional Properties** screen, you can add static properties or properties that pull their value from connected servers or external data sources, such as a KEPServerEX tag. These properties can be used in creating alerts, expressions, and trends. They also display on the **Additional Properties** page of an asset detail in **Asset Advisor**.

For each property you can view the property’s name, current value, and property type (whether it is static or tag based). You can also see if the property is currently used in any expressions, trends, or alerts. For tag based properties, the name of the associated KEPServerEX tag is displayed.

thingworx configuration and setup Administrator

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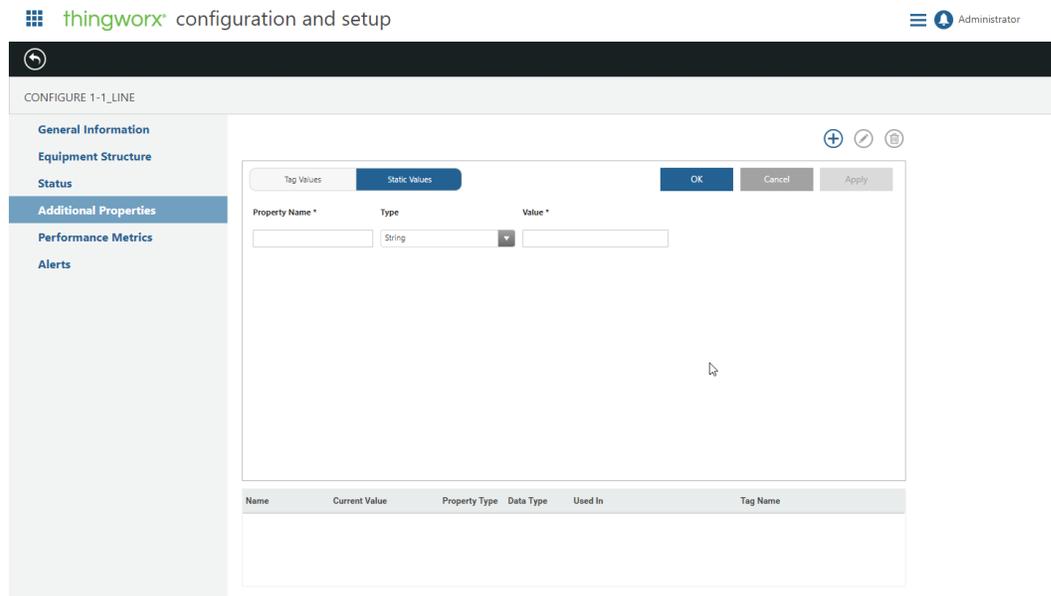
CONFIGURE 1-1\_SINKINGEDM

- General Information
- Equipment Structure
- Status
- Additional Properties
- Performance Metrics
- Alerts

Name	Current Value	Property Type	Data Type	Used In	Tag Name
Voltage	16.14609146118164	Tag	Number	Trends	PTC.MfgSegment.Kepware_Simul...
Temperature	43.28825378417969	Tag	Number	Alerts, Trends	PTC.MfgSegment.Kepware_Simul...
Current	1.525931715965271	Tag	Number	Trends	PTC.MfgSegment.Kepware_Simul...

To add a property with a static value:

1. From **Additional Properties**, click .
2. Click **Static Values**.
3. Enter the property name, value, and select the type.
4. Click **OK**.



To add properties based on KEPServerEX tags:

1. From the **Additional Properties** table, click .
2. Click **Tag Values**.

3. Select the **Equipment Type** and **Equipment** to display the available tags for that piece of equipment.
  - To add a single property, select the tag from the **Tags** list. The **Property Name** defaults to the name of the tag. You can accept the default, or edit the name as desired.
  - To add multiple properties, select the tags from the **Tags** list. The tag name is used as the property name by default when adding multiple properties.
  - Tags already in use by other properties on this equipment are removed from the list.
4. Click **OK**.

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---

CONFIGURE 1-1\_SINKINGEDM

**General Information**

Equipment Structure

Status

**Additional Properties**

Performance Metrics

Alerts

Tag Values
Static Values
OK
Cancel
Apply

Equipment Type

KEPServerEX

Equipment

PTC.MfgSegment.Kepware\_Simulator

Property Name \*

Server Structure

- PTC.MfgSegment.Kepware\_Simulator
- > \_AdvancedTags
- \_ConnectionSharing
- \_CustomAlarms
- \_DataLogger
- \_EFMExporter
- \_IDF\_for\_Splunk
- > \_IoT\_Gateway

Tags

Name	Current Value	Property Type	Data Type	Used In	Tag Name
Voltage	16.14609146118164	Tag	Number	Trends	PTC.MfgSegment.Kepware_Simul...
Temperature	43.28825378417969	Tag	Number	Alerts, Trends	PTC.MfgSegment.Kepware_Simul...
Current	1.525931715965271	Tag	Number	Trends	PTC.MfgSegment.Kepware_Simul...

To edit a property:

1. Select the property in the **Additional Properties** table and click . A property that is used in an expression, alert, or trend cannot be edited. To edit the property, those usages must first be removed.
2. Only certain fields can be edited.
  - The **Property Name** can be edited only if the property is not used in an alert, expression, or trend.
  - The **Type** of a static property cannot be edited.
  - To change the **Value** of a tag based property, click  to remove the current tag value. Select the **Equipment Type** and **Equipment**, then select the new tag.
3. Click **OK**. If you select a different property in the table before clicking **OK**, any edits you have made are lost.

To delete properties:

1. From the **Additional Properties** table, select one or more properties.
2. Click , then click **OK** on the confirmation message.

If the properties were used in alerts, those alerts are deleted. If the properties were used in expressions or trends, the expressions and trends are not deleted, but will no longer function.

## Performance Metrics

On the **Performance Metrics** screen, you can define indicator thresholds for key performance indicators (KPIs), and parameters for performance calculations. Production Advisor and Asset Advisor display the performance metrics defined for lines and assets.

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CONFIGURE 1-1\_LINE

**Performance Indicator Thresholds**  
Enter low and high threshold values for each metric.

Metric	Red (%)	Yellow (%)	Green (%)
Availability	30	70	100+
Quality <small>Good Count / Total Count since beginning of the planned operation time</small>	30	70	100+
Performance <small>(Total Count / Run Time) / Ideal Run Rate</small>	30	70	100+
OEE	30	70	100+

**Parameters for Performance Calculations**  
Enter an expression or browse for a tag.  
The following operators are valid: +, -, \*, /  
The following operands are valid: numbers and tags.  
Strings between single quotes ('). KEPServerEX tags between double quotes (").

**Good Count**  
"PTC.MfgSegment.Kepware\_Simulator.LineGroup1.1-1\_SinkingEDM.Good Quantity" + "PTC.MfgSegment.Kepware\_Simulator.LineGroup1.1-1\_WireEDM.Good Quantity"

**Total Count**  
"PTC.MfgSegment.Kepware\_Simulator.LineGroup1.1-1\_SinkingEDM.Good Quantity" + "PTC.MfgSegment.Kepware\_Simulator.LineGroup1.1-1\_SinkingEDM.Bad Quantity" + "PTC.MfgSegment.Kepware\_Simulator.LineGroup1.1-1\_WireEDM.Good Quantity" + "PTC.MfgSegment.Kepware\_Simulator.LineGroup1.1-1\_WireEDM.Bad Quantity"

**Ideal Run Rate**  
12

Save

The default calculation for each metric can be viewed by clicking next to each indicator.

To configure custom performance metrics for your equipment, enter information for your performance thresholds and calculations as described in the example below, and detail the required equations.

### Tip

**Quality** and **Performance** can be overridden by clicking and selecting a KEPServerEX tag directly.

The following example assumes that you have KEPServerEX tags from which you can access the number of good parts and bad parts for the day.

1. **Good Count**—

- For assets, enter or browse for the KEPServerEX tag that identifies the number of good parts for the asset.
- For lines, enter the good counts for each asset in the line.

2. **Total Count**—

For assets, enter or browse for your bad count, then add your good count. You can copy and paste the good count from the previous field.

**Parameters for Performance Calculations**  
Enter an expression or browse for a tag.

The following operators are valid: +, -, \*, /  
The following operands are valid: numbers and tags.  
Strings between single quotes ('). KEPServerEX tags between double quotes (").

---

**Good Count** ⓘ ↕

"PTC.MfgSegment.Keeware\_Simulator.LineGroup1.1-1\_SinkingEDM.Good Quantity"

---

**Total Count** ⓘ ↕

"PTC.MfgSegment.Keeware\_Simulator.LineGroup1.1-1\_SinkingEDM.Good Quantity" + "PTC.MfgSegment.Keeware\_Simulator.LineGroup1.1-1\_SinkingEDM.Bad Quantity"

3. **Ideal Run Rate**—

Identify how quickly your factory would be producing parts for the asset or line in an ideal situation. Properties on the asset or line can be used in this calculation. This value is expressed in parts per minute.

4. Click **Save**.

## Alerts

On the **Alerts** screen, you can add, edit, or delete alerts for this piece of equipment. This screen offers the same functionality as on the **Alerts** tab, limited specifically to the current piece of equipment.

configuration and setup
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CONFIGURE 1-1\_SINKINGEDM

**General Information**

Equipment Structure

Status

Additional Properties

Performance Metrics

Alerts

0 of 6 Active Filter(s)
Add Filter
+
✎
🗑️

Name	Description	Property or Source	Definition	Current Value	Triggered
Overheating		Temperature	Above 40.0	35.2924308...	No

When creating a new alert from this **Alerts** screen, the **Equipment Type** and **Equipment** fields automatically select the current piece of equipment. For more information, see [Configuring Alerts on page 27](#).

## Clear Data History

If a piece of equipment has captured data incorrectly, the incorrect data can be removed from the system by clearing the data history, ensuring that the equipment history does not retain incorrect data. Clearing the data history does not clear any expressions, only the data captured up to that point in time.

To clear the data history, select one or more pieces of equipment in the **Equipment** tab, and click .

## Configuring Alerts

On the **Alerts** tab, you can create and edit alerts using the status expressions set when you [configured status for your equipment on page 20](#).

Alert definitions display on the **Alerts** tab. Actual alerts (active and historical) are displayed in the Alert Monitor and Asset Advisor. For more information, see [Alert Monitoring on page 56](#) and [Asset Advisor on page 35](#).

To create an alert:

1. From the **Alerts** tab, click .
2. Select the **Equipment Type** and individual **Equipment** for which you are creating the alert.

3. Select the tag or property used to trigger the alert.

SELECT PROPERTY

Equipment Type: Asset

Equipment: 1-1\_SinkingEDM

Search:

**Properties**

- Current
- Temperature
- Voltage
- availability
- goodCount
- idealRunRate
- oee

OK Cancel

4. Click **OK**.
5. Create the alert. Enter a name and value for the alert, and select the alert type.

CREATE NEW ALERT

Tag or Property: Temperature  
Description:

**Alert Definition**

<b>Alert Name *</b>	<b>Alert Type</b>	<b>Value *</b>
<input type="text" value="Overheating"/>	<input style="border-bottom: 1px solid #ccc;" type="text" value="Above"/>	<input type="text" value="40"/>

**Alert Description**

**Alert Delivery**

**Find Recipient**

 Add Recipient

**Alert Recipients**

Type	Name	Email	Mobile Phone

Save
Cancel

6. Search for and add recipients for the alert.

**Tip**

For users to show in the **Alert Recipients** search results, one or both delivery methods (email or text delivery) must be enabled in **Configuration and Setup ► Notification Delivery**. Only those users that have an alert delivery notification method specified (email or SMS) show up in the search results.

You can create a custom notification handler to allow other users who do not meet those requirements to be added as alert recipients, or to use different notification delivery methods. For more information, see *ThingWorx Manufacturing and Service Apps Customization Guide*.

The alerts are delivered to each recipient based on their **Notification Preference** on **Configuration and Setup ► Users**.

7. Click **Save** to create the alert.

# Configuring Notification Delivery

On the **Notification Delivery** tab, you can configure the delivery of alert notifications by email and text.

The screenshot shows the 'Notification Delivery' configuration page in the ThingWorx interface. At the top, there are tabs for 'Equipment', 'Alerts', 'Notification Delivery', and 'Users'. The 'Notification Delivery' tab is active. The page is divided into two main columns. The left column is for 'Enable Email Delivery' and the right column is for 'Enable Text Delivery'. Both are checked. The email section includes fields for SMTP Server, SMTP Server Port (0), Email Account, Email Account User Password, From Address, and checkboxes for Use SSL and Use TLS. It also has fields for Connection Timeout (ms) and Operation Timeout (ms), both set to 30000, and fields for SOCKS Host and SOCKS Port (0). The text section includes a note about Twilio, fields for Phone Number Registered with Twilio, Twilio Account SID, and Twilio Authentication Token, and a dropdown for URL Shortening Service (None). A 'Link Setup' section contains a field for Public Gateway URL (https://MyCompany.com/). A 'Save' button is located at the bottom right.

To configure notification delivery:

1. Enable one or both services by checking the appropriate boxes at the top of the page, and enter the necessary information for your company.
  - For email notification delivery, enter the following information:
    - The address and port for the SMTP mail server used to send emails.
    - The email account used to send the alert notifications, and its password, if required by the SMTP mail server.
    - The email address that is to appear in the **From** field of the email message.
    - Select whether to use SSL or TLS for encryption, or neither.
    - Specify the connection and operation timeouts in milliseconds, or accept the defaults.

- Specify the SOCKS proxy server host name and the port for the SOCKS proxy server, if one is used with the SMTP mail server.
- For text notification delivery:
  - To use texts to send email notifications, sign up for a free account at [twilio.com](https://www.twilio.com). The fields here should match the fields that appear after you complete your sign up with Twilio.
  - If configured, select a URL shortening service. For more information, see [URL Shortening Service on page 61](#).
- 2. In the **Link Setup** section, specify the public gateway portion (basic http: address to the server) of the URL for links to your system.

For example, if the **Public Gateway URL** value is specified as `https://acme.com/`, then this URL:

```
http://10.155.20.100:8080/Thingworx/Runtime/index.html#master=PTC.Factory.AlertMonitoring.Master&mashup=PTC.Factory.AlertManager.AlertMonitor&selectHistory=false&sourceProperty=sensor1&source=Asset_Pump1&selectSummary=true
```

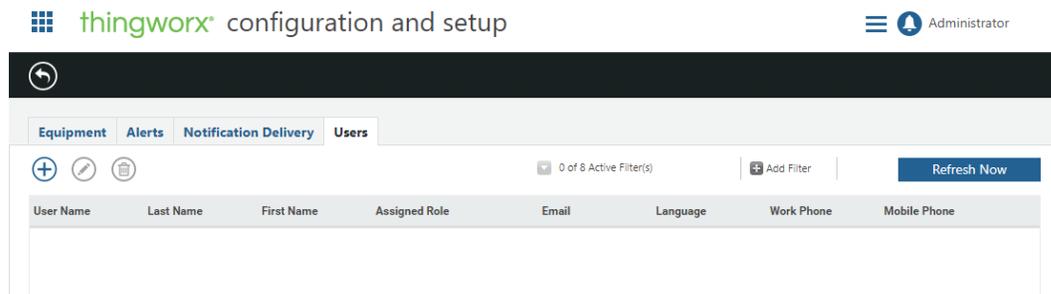
appears as a hyperlink in the email message as:

```
https://acme.com/Thingworx/Runtime/index.html#master=PTC.Factory.AlertMonitoring.Master&mashup=PTC.Factory.AlertManager.AlertMonitor&selectHistory=false&sourceProperty=sensor1&source=Asset_Pump1&selectSummary=true
```

- 3. Click **Save**.

# Configuring Users

On the **Users** tab, you can configure the users of your system and their assigned roles. The assigned role determines the areas of the apps which are accessible to the user.



To create a user:

1. From the **Users** tab, click .

The 'CREATE USER' dialog box is shown. It has several sections: 'User' with fields for 'User Name \*', 'First Name \*', 'Last Name \*', and 'Language' (set to 'English'); 'Security' with fields for 'Password \*' and 'Confirm Password \*'; 'Role Assignment' with a list of roles: 'Controls Engineer', 'Maintenance Engineer', 'Maintenance Manager', and 'Production Manager'; 'Contact Information' with fields for 'Email \*', 'Work Phone \*', and 'Mobile Phone'; and 'Notification Preference' with checkboxes for 'Email' and 'SMS', and a note 'Standard message rates may apply.'. At the bottom right, there are 'OK' and 'Cancel' buttons.

2. Enter profile information for the user. Keep the following in mind:

- **User**—
  - The **User Name** must be unique.

- The **Language** selected determines the display language for the user.
- **Contact Information**—
  - The **Notification Preference** selections for each user determine if and how alerts are delivered to that user. The **Email** and **Mobile Phone** values entered are used for the **Email** and **SMS** notification methods, respectively.
  - The **Mobile Phone** number is required if **SMS** is selected for the user's **Notification Preference**. Use the format: +<number with international code>
- **Security**—Passwords are case sensitive and must contain at least 15 characters.
- **Role Assignment**—
  - You can assign multiple roles for a user. The roles determine which areas of the apps are accessible by the user. If a user is assigned to multiple roles, the result is permissions common to all roles – not the union of the role permissions.
  - Each role is described in the following table. Begin by creating a user for yourself in the Controls Engineer role.

<b>Role</b>	<b>Access</b>
Controls Engineer	All tiles
Production Manager	<b>Production Advisor</b> <b>Alert Monitoring</b> <b>Trending and Troubleshooting</b>
Maintenance Manager	<b>Asset Advisor</b> <b>Alert Monitoring</b> <b>Trending and Troubleshooting</b> <b>Configuration and Setup:</b> ◆ <b>Equipment</b> ◆ <b>Alerts</b>
Maintenance Engineer	<b>Asset Advisor</b> <b>Alert Monitoring</b> <b>Trending and Troubleshooting</b> <b>Configuration and Setup:</b> ◆ <b>Alerts</b>

3. Click **OK**.
4. Repeat steps 1 through 3 to create additional users.

# 3

## Apps Overview

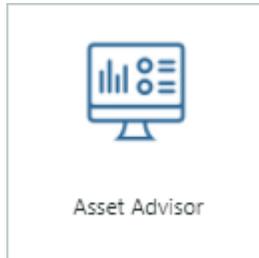
Asset Advisor .....	35
Controls Advisor .....	42
Production Advisor .....	53
Alert Monitoring .....	56
Trending and Troubleshooting .....	58

The ThingWorx Manufacturing Apps console can include one or more of the following tiles. The tiles you see depend upon your user role, as well as your company's license and implementation of the product.

- **Asset Advisor**
- **Controls Advisor**
- **Production Advisor**
- **Alert Monitoring**
- **Trending and Troubleshooting**
- **Configuration and Setup**

The following sections provide information on each of the tiles, except for **Configuration and Setup**, which was covered in the previous chapter.

# Asset Advisor



Asset Advisor monitors the health and status of your equipment, and provides real-time feedback of sensor details, and alerts. This allows you to understand how your equipment is being utilized, how it performs, and ultimately improves the efficiency of that equipment.

The following sections highlight features of Asset Advisor.

## Asset List

- The asset list page provides a summary view of all assets in the system, including their status and any automatically detected threshold alerts.
- Filter the list to show only those assets in certain states, or by model number, related site, or related line.
- Assets can be sorted by **Name**, **Model Number**, **Serial Number**, or **Criticality**.
- At a glance, view the asset status and threshold alerts for the asset. Weekly totals are also displayed, including both active and historical alerts. If there are

currently active threshold alerts, the alert icon displays a red dot (  ).

- Click the **Alerts** link in the status message to open the alert monitor page displaying detailed information for the alerts.
- Click on the asset name or image to view the asset in more detail.

thingworx asset advisor Administrator

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**FILTERS** << Sort Order: Criticality 1 - 10 of 12 Assets | 1 2 Next >

**Monitor Status**

Unplanned Downtime

Warning (1)

Unavailable

Planned Downtime (6)

Running (5)

Not Configured

**More**

Model Number

Select a Model ▾

Related Lines

Select a Related Line ▾

Related Site

Select a Related Site ▾

**1-1\_SinkingEDM**



Model Number:	ws10u
Serial Number:	4Xn8Py5y
Description:	
Location:	
Related Lines:	1-1_Line
Related Site:	Needham Factory

**Warning:** 8 hrs 23 mins

**Alerts:** 1 active

Weekly total: 1

**2-1\_Bender**



Model Number:	7wjht
Serial Number:	bD2U98Wj
Description:	
Location:	
Related Lines:	2-1_Line
Related Site:	Needham Factory

**Planned Downtime:** 8 hrs 23 mins

**Alerts:** No active

Weekly total: 0

**2-1\_LaserCutter**



Model Number:	k9081
Serial Number:	iVnoqKMh
Description:	
Location:	
Related Lines:	2-1_Line
Related Site:	Needham Factory

**Planned Downtime:** 8 hrs 23 mins

**Alerts:** No active

Weekly total: 0

## Asset Detail

You can further investigate asset issues on the detail page of the asset.

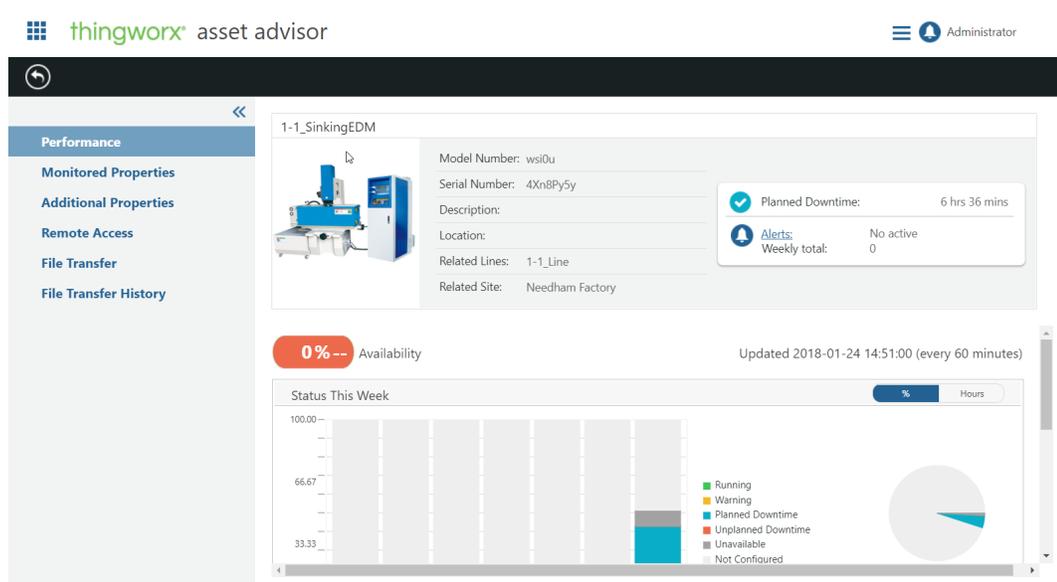
- Switch between viewing **Performance**, **Monitored Properties**, or **Additional Properties**.
- Optionally, perform actions on assets remotely using **Remote Access** and **File Transfer**, and view **File Transfer History**. For more information, see [Remote Access and Control on page 62](#).
- View general asset profile information such as model and serial numbers.
- View asset alerts. Click  to open **Alert Monitoring** for additional details.

## Asset Detail — Performance

You can view the distribution of the monitor status over this week in a bar graph or in a pie chart. You can also toggle between viewing by percentage or hours.

Both the availability calculation and graph are updated based on the **KPI Calculation Period** value set in **Configuration and Setup ► Equipment ► General Information** for the equipment.

You can also view the performance distribution over the current day with a slider, allowing you to view the performance in the desired time period.



## Asset Detail — Monitored Properties

View real-time data from all sensors configured on the asset and their current readings. All numerical properties defined on the asset display in **Monitored Properties**.

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1-1\_SinkingEDM



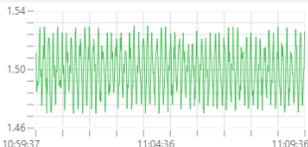
Model Number: wsi0u  
Serial Number: 4Xn8Py5y  
Description:  
Location:  
Related Lines: 1-1\_Line  
Related Site: Needham Factory

**Warning:** 8 hrs 41 mins  
**Alerts:** 1 active  
Weekly total: 1

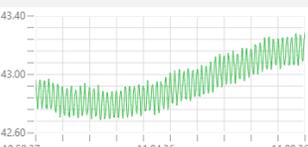
### Monitored Properties

1 - 3 of 3 Properties

Property Name	Current
Current Value	1.53



Property Name	Temperature
Current Value	43.29



Property Name: Velocity

## Asset Detail — Additional Properties

Additional properties configured on the asset display here. These properties are configured in **Configuration and Setup ► Equipment**.

The screenshot shows the 'Additional Properties' section of the Asset Advisor interface. The left sidebar contains a navigation menu with the following items: Performance, Monitored Properties, Additional Properties (highlighted), Remote Access, File Transfer, and File Transfer History. The main content area displays the asset details for '1-1\_SinkingEDM'. The details include a small image of the asset, a Model Number (wsi0u), Serial Number (4Xn8Py5y), Description, Location, Related Lines (1-1\_Line), and Related Site (Needham Factory). A status box shows 'Planned Downtime: 6 hrs 38 mins' and 'Alerts: No active, Weekly total: 0'. Below the details is a table titled 'Additional Properties' with the following data:

Name	Value	Last Updated
Temperature	35.29243087768555	2018-01-24 07:55:58
Voltage	24.12535858154297	2018-01-24 07:55:58
Current	1.509133219718933	2018-01-24 07:55:58

## Asset Detail — Remote Access

- **Remote Access** is a set of optional features that can be added to **Asset Advisor** by importing the Asset Remoting extension using ThingWorx Composer.

The extension includes the following features.

- **Remote Access**
- **File Transfer**
- **File Transfer History**

### Note

Once the extension has been imported, assets also need to be configured to be remotely accessed. For more information, see [Remote Access and Control on page 62](#).

- If the asset is already configured for remote access, click the **Launch Remote Access** button to connect directly to the asset for the purpose of executing software patches or changing configuration settings – without the need to make a field trip.
- If the extension has been imported, but the asset has not been configured for **Remote Access**, a message is displayed in the page asking you to notify your system administrator.

1-1\_SinkingEDM

Model Number: wsi0u  
 Serial Number: 4Xn8Py5y  
 Description: Demo asset (Asset\_1-1\_SinkingE...  
 Location:  
 Related Lines: 1-1\_Line  
 Related Site: Needham Factory

Warning: 9 hrs 50 mins  
 Alerts: 2 active  
 Weekly total: 2

Remote Access  
 To access this asset remotely, click the following button.  
 Launch Remote Access

### Asset Detail — File Transfer

- If the asset is configured for file transfer, you can upload files to, or download files from the asset for the purpose of software upgrade or configuration changes using the **File Transfer** page.
- If the asset has not been configured for file transfer, a message is displayed in the page asking you to notify your system administrator.

1-1\_SinkingEDM

Model Number: wsi0u  
 Serial Number: 4Xn8Py5y  
 Description: Demo asset (Asset\_1-1\_SinkingE...  
 Location:  
 Related Lines: 1-1\_Line  
 Related Site: Needham Factory

Warning: 9 hrs 52 mins  
 Alerts: 2 active  
 Weekly total: 2

File Transfer

Local  Refresh Now  
 Choose File No file chosen Upload

Name	Modified Date

Remote  Refresh Now

- in
- out
- updates
- staging

Message	Source Path	Source Repository	State	Target Path	Target Repository	Timestamp

### Asset Detail — File Transfer History

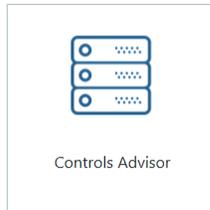
- If the asset is configured to display file transfer history, information is displayed in the lower half of the asset detail page enabling you to manually browse file transfer history or quickly find an entry by entering a date range.

You can also find an entry by applying a standard filter from a drop-down menu.

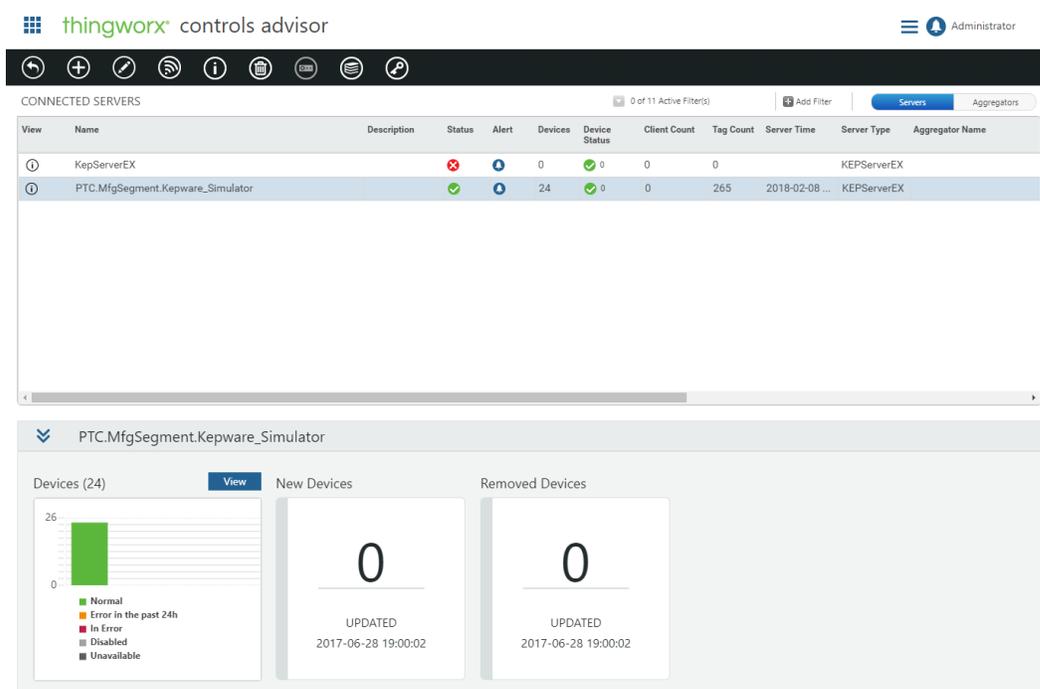
- If the asset has not been configured for file transfer history, a message is displayed in the asset detail page asking you to notify your system administrator.

The screenshot shows the Thingworx Asset Advisor interface. At the top, the logo 'thingworx asset advisor' is on the left and 'Administrator' is on the right. Below the header is a navigation bar with a back arrow and a left arrow. On the left side, there is a sidebar menu with the following items: Performance, Monitored Properties, Additional Properties, Remote Access, File Transfer, and File Transfer History (which is highlighted). The main content area displays the details for asset '1-1\_SinkingEDM'. It includes a small image of the asset, a list of properties (Model Number: wsi0u, Serial Number: 4Xn8Py5y, Description: Demo asset (Asset\_1-1\_SinkingE..., Location, Related Lines: 1-1\_Line, Related Site: Needham Factory), and an alert summary box showing a warning for 9 hrs 52 mins and 2 active alerts with a weekly total of 2. Below the asset details is a 'File Transfer History' section. It features a filter bar with 'Start Time' (2018-Feb-07 13:29:03), 'End Time' (2018-Feb-14 13:29:03), '0 of 6 Active Filter(s)', 'Add Filter', and 'Export' buttons. Below the filter bar is a table with columns: User, Timestamp, Message, Source Path, Target Repository, and Target Path. The table is currently empty.

# Controls Advisor



**Controls Advisor** enables a Controls Engineer to connect and remotely monitor KEPServerEX and aggregator connections and devices in real time. After the connections are set up, the Controls Engineer is notified instantly of data communication errors that may result in a loss of critical production data. Aggregators are discussed in the following sections.



View	Name	Description	Status	Alert	Devices	Device Status	Client Count	Tag Count	Server Time	Server Type	Aggregator Name
	KepServerEX		✖	🔔	0	✔ 0	0	0		KEPServerEX	
	PTC.MfgSegment.Kepware_Simulator		✔	🔕	24	✔ 0	0	265	2018-02-08 ...	KEPServerEX	

PTC.MfgSegment.Kepware\_Simulator

Devices (24)

New Devices: 0

Removed Devices: 0

The following list highlights the features of **Controls Advisor**.

- **Discover**  — Scans the server and creates the devices in ThingWorx Manufacturing Apps. Repeat this action as you add and remove devices from KEPServerEX.
- **Create Server**  — Add new servers. Aggregators are created when you

select **Legacy and Non-Keeware OPC servers** from the **Server Type** drop-down list on the **Create Server** window.

- Switch the **CONNECTED SERVERS** table view between **Servers** and **Aggregators** using the toggle button in the upper right corner of the page. For more information on aggregators, see the following sections.

## Connecting KEPServerEX to ThingWorx

### Creating a Server Connection

KEPServerEX can be used to directly connect to devices (direct connection), or as an aggregator to connect to legacy KEPServerEX and 3rd party OPC Server. The **Controls Advisor** provides the capability to monitor all KEPServerEX and 3rd party OPC servers connected directly or using an aggregator to the ThingWorx instance in a single page.

In order to make a connection between KEPServerEX and ThingWorx, an industrial gateway must be created in ThingWorx. The industrial gateway is a ThingWorx thing that is used to establish the connection information between ThingWorx and KEPServerEX as it holds some of the connection information.

In addition to the industrial gateway thing, a remote thing is created. The remote thing represents the server (KEPServerEX or 3rd party OPC server) being monitored within Controls Advisor. This remote thing holds the properties mapped to a tag. Both things are automatically created when creating a connection from the app.

Finally, the project property on the KEPServerEX server connecting to ThingWorx must then be configured to establish the connection to the remote thing using the industrial gateway.

The first time the Controls Engineer logs into the app, a check is made to determine whether or not a server connection already exists.

- If a server does not exist, the Controls Engineer is guided to create his first connection to a KEPServerEX.
- If a server does exist, the Controls Engineer is taken directly to the console page.

During the initial flow, the Controls Engineer is asked for a server name, the type of connection (aggregator or direct connection to devices), and information required to configure its KEPServerEX project properties. The Controls Engineer is then automatically directed to the server list page where he can monitor the server.

To connect to additional KEPServerEX servers, a **Create Server** action is available in the action toolbar of the server list page. This enables the Controls Engineer to create a remote thing in ThingWorx representing the connection to a specific KEPServerEX server. Selecting this action opens a window where the following information can be specified.

- **Server Name** — This corresponds to the remote thing name that is displayed in **Controls Advisor**.
- **Description** — Enter an optional description.
- **Server Type** — Select the type of server being created, **KEPServerEX** or **Legacy and Non-Keeware OPC servers**.

CREATE SERVER

Server Detail

Server Name \*

Description

Server Type \*

KEPServerEX

Select **Legacy and Non-Keeware OPC Servers** from the **Server Type** list to connect KEPServerEX V6.1 and lower or non-Keeware OPC servers. An aggregator server is required.

OK Cancel

The Controls Engineer is then presented with instructions on how to configure the project properties on the KEPServerEX server. These instructions can be printed for future reference.

---

 **Note**

**Controls Advisor** does not support cases where KEPServerEX is connected directly to devices and used as an aggregator simultaneously.

---

## Displaying Connected Servers

When accessing **Controls Advisor**, the Controls Engineer is presented with a page that displays server information.

There are two views in this page.

- **Server** — Displays servers connected to devices (directly connected or thru an aggregator).
- **Aggregators** — Displays Servers that are used as aggregators.

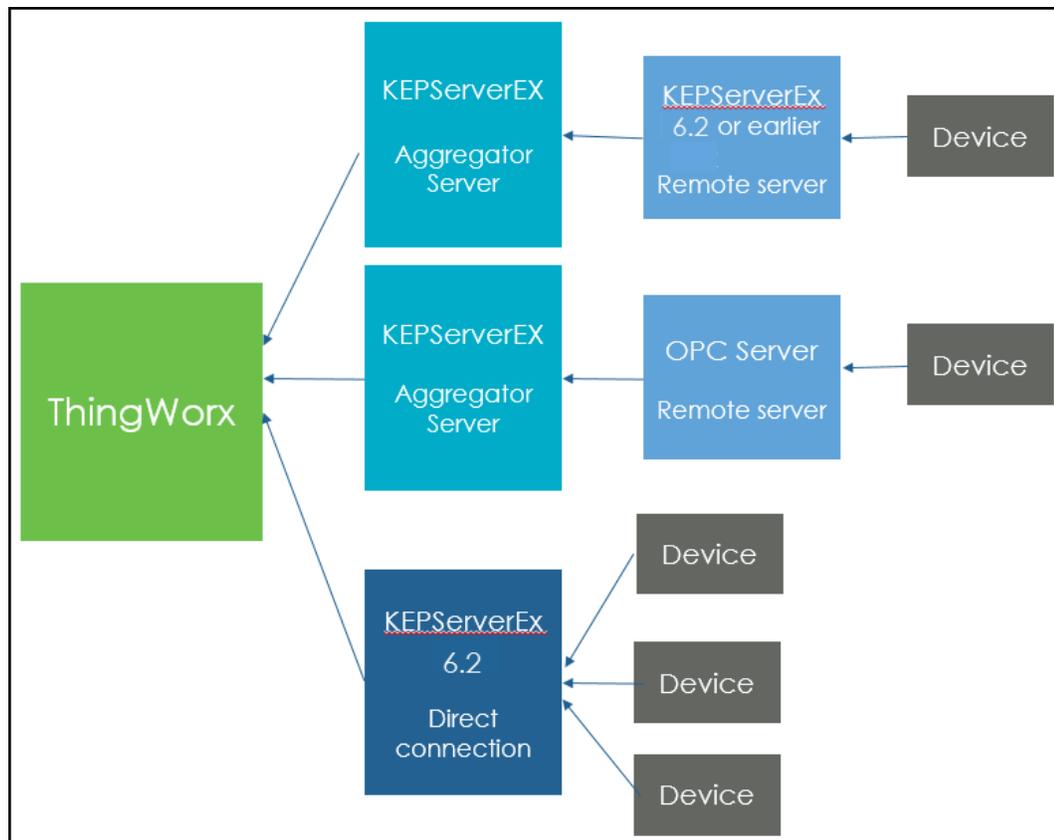
---

### Note

- The first server in the list is selected by default when accessing the page.
  - It is not possible to deselect items in the list.
- 

## Understanding Aggregators

An aggregator server is required for non-Keplware servers and KEPServerEX servers prior to version 6.2. The graphic below describes the relationships among the server and devices.



## Working with Aggregators

### Discovering Remote Servers

When creating a server connection and selecting **Legacy and Non-Kepware OPC servers** from the **Server Type** drop-down list in the **Create Server** window, the system assumes that the KEPServerEX has remote OPC or legacy KEPServerEX servers connected as OPC devices.

The action **Discover Legacy KEPServerEX and OPC Servers** is available in the **Aggregators** view of **Controls Advisor**. Selecting a KEPServerEX aggregator and invoking this action, produces the following result.

The list of remote servers associated to the selected aggregate server is scanned and compared to the list of remote servers already discovered.

- If a remote server of the same name is already in the list it is kept.
- If a remote server is not in the list, but on the aggregate, it is added.
- If a remote server is in the list, but not on the aggregate, it is deleted from ThingWorx.



#### Note

A server name must be unique in ThingWorx. If there is a uniqueness conflict, the server is ignored and the next remote server is created. At the end of the discovery, a system message displays the path of the ignored remote servers and explains why they were not created. You must then rename the servers in Kepware and re-discover them.

---

### Editing a 3rd party OPC Remote Server

3rd party OPC vendors have their own tag structure that can be different from the KEPServerEX tag structure. When a remote server is connected via an aggregator, KEPServerEX, system tags cannot be bound automatically. In the **Edit Server** window, the Controls Engineer is able to manually map the following system tags to any data point of the selected remote server. The following system tags can be mapped.

- Client Count (integer)
- Tag Count (integer)
- Current Server Time (date)

When browsing the remote server, the tag picker automatically selects the remote server, the tags with improper types are automatically filtered out.

The image shows a software dialog box titled "EDIT SERVER". It is divided into two main sections. The top section, labeled "Description", contains a large empty text area. The bottom section, labeled "Properties", contains three rows of input fields. Each row has a label on the left and a small icon on the right. The labels are "Client Count", "Tag Count", and "Server Time". The icons are a key icon and a lock icon. At the bottom of the dialog box, there are two buttons: "OK" (blue) and "Cancel" (grey).

---

 **Note**

- You cannot edit system tags of a KEPServerEX server.
  - As the server status is calculated based on the Current Server Time property changing, the 3rd party OPC server status shows as OFF until the Current Server Time is mapped to a tag.
- 

## Working with Devices

### Discovering Devices

A **Discover Devices** action is available in the action toolbar of the **Connected Servers** page. The discovery of the device is scheduled and occurs automatically once a day at midnight. During the initial discovery, the system scans the server and for each device, creates a remote thing in ThingWorx corresponding to the device. No device is created when the remote server is not a KEPServerEX. Devices for 3rd party OPC servers must be created manually.

Discoveries scan the list of devices on the server and compare it to the list of devices already discovered.

- If the device of the same Device Name is already in the list, it is kept.
- If a device is not in the list but on the server, it is added.
- If a device is in the list, but not on the server, it is deleted from ThingWorx.

When a device is deleted, the device is deleted in ThingWorx and all data associated to the thing properties are deleted as well. The binding is removed and tags are unsubscribed. After discovery is complete, a warning indicator is displayed in the **Devices** column of the servers list indicating that a change occurred (some devices were added or removed during last discovery).

You are notified in two widgets about the number of devices added or removed.

- The number of **New Devices** corresponds to the total number of devices added during the discovery. This value is persisted until the next discovery.
- The number of **Removed Devices** corresponds to the total number of devices removed during the discovery. This value is persisted until the next discovery.
- The date is the date of the last discovery.

---

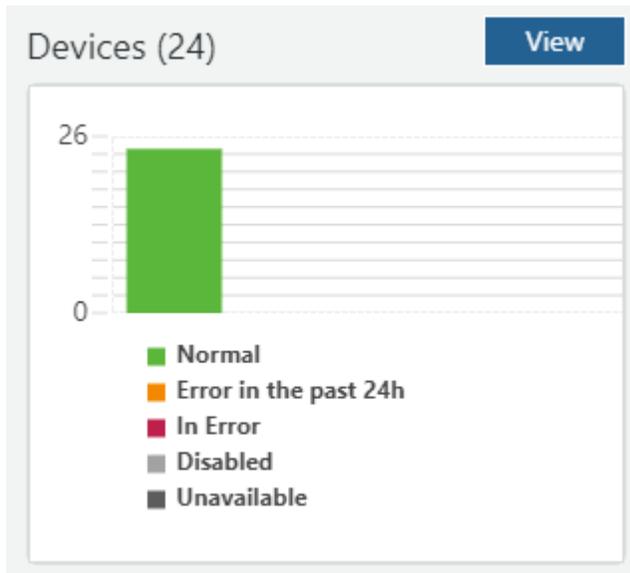
 **Tip**

The widgets are not refreshed until you select another row/server.

---

The devices that have been discovered on the server are displayed in the **Devices** widget shown in the following figure. Each bar represents the number of devices within a specific status for the devices connected (already discovered) to the server.

- Normal
- Errors in the past 24h
- In Error
- Disabled
- Unavailable



After each discovery, the **Devices** widget is updated along with the **New Devices** and the **Removed Devices** widgets. A **View** button is available in the **Devices** widget to access the device list page.

---

#### **Note**

When a device is renamed in KEPServerEX, it is not automatically renamed in the app. Upon next discovery, the device is removed and a new device with the new name is added.

---

### Creating Devices



A **Create Device** action is available in both the server view page and the device list page. This action is only valid when the selected server is a remote 3rd party OPC Server. You can only create devices manually by selecting the **Create Device** action.

---

#### **Tip**

- The **Create Device** action is disabled when selecting a KEPServerEX server (remote or not).
  - The **Discover Devices** action is disabled when selecting a remote 3rd party OPC Server.
-

When creating a device, you can specify or map pre-defined properties to tags by browsing the remote server using the tag picker (only the selected remote server can be browsed).

---

 **Note**

If a value is entered manually, it becomes a static value for the property. No automatic binding occurs if a path to a tag is entered.

---

You cannot edit the fields. A **Clear** action is available to clear the tag name. After selecting **OK**, the binding is done, the table is refreshed, and the values appear in the table. Unless there is a mapping for those tags, the values appear blank in the server list page and in the device list page.

### **Editing Devices**

Devices can be edited from the device list page. When selecting a device and the **Edit Device** action, the window displays all the properties associated to the devices. Any device can be edited, and the tag mapping of the device properties changed. However, the name of the device cannot be edited.

**EDIT DEVICE**

**Device Detail**

Device Name\* PTC.MfgSegment.Kepware\_Simulator\_LineGroup1.1

Connection Type Ethernet

**Device Properties**

Error State PTC.MfgSegment.Kepware\_Simulator\_LineGroup

Time In Error PTC.MfgSegment.Kepware\_Simulator\_LineGroup

Demotion State

Scan Mode PTC.MfgSegment.Kepware\_Simulator\_LineGroup

Scan Rate PTC.MfgSegment.Kepware\_Simulator\_LineGroup

Tx

Rx

Device ID PTC.MfgSegment.Kepware\_Simulator\_LineGroup

Successful Read

Successful Write

Failed Read

Failed Write

Pending Read

Pending Write

Enabled PTC.MfgSegment.Kepware\_Simulator\_LineGroup

OK Cancel

## Deleting a Server Connection

The Controls Engineer can delete a server from the server list. A pop-up appears to confirm the action. When deleting a server, all ThingWorx artifacts with respect to the server are deleted, including devices. All local bindings from the remote server thing properties to any asset, line, or trend properties are also deleted.

When you delete a remote server connected to an aggregator, the following occurs.

- All devices that are associated to the remote server are deleted.
- All local bindings from the remote servers thing properties to any asset, line, or trend properties are also deleted.

When you delete an aggregator, the following occurs.

- All remote servers related to the aggregator are deleted.
- All devices that are associated to each remote server are deleted.
- All local bindings from the remote servers thing properties to any asset, line, or trend properties are also deleted.

---

 **Note**

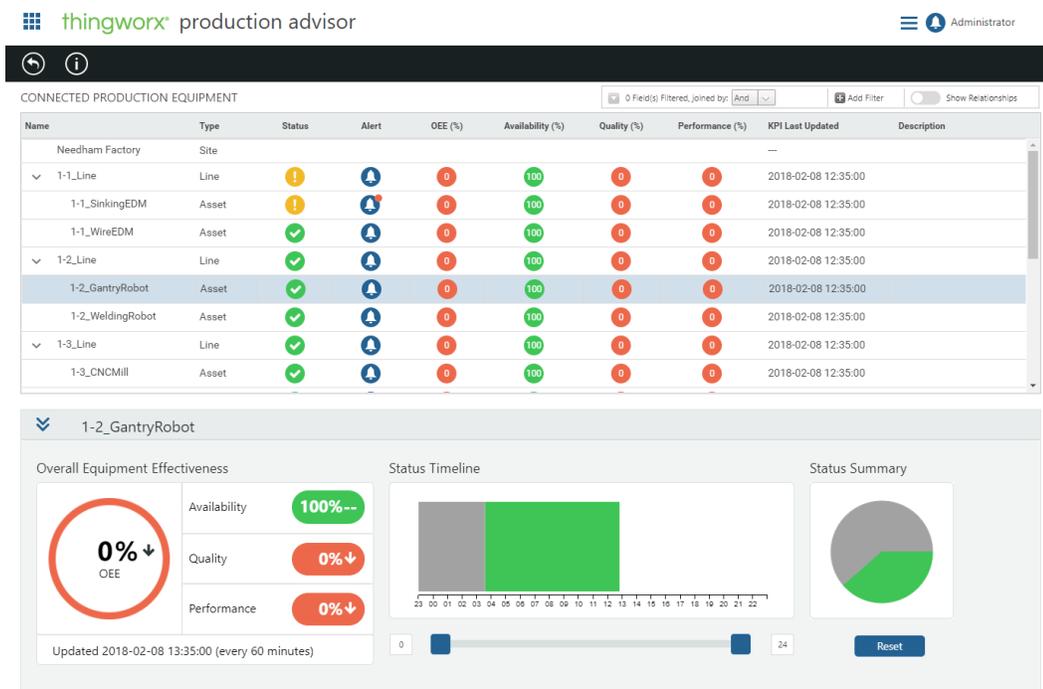
Data associated to the server properties that are stored in the ThingWorx database are not deleted and are re-used in trends if a new remote thing is created with the same name.

---

# Production Advisor



With **Production Advisor**, plant managers have the ability to view real-time operational performance data that is unified from disparate sources. This enables fast-informed decisions with contextual information, as well as the ability to drill down for root cause analysis. Sample pages are shown in the following figures.



## Production Advisor Features

- Use the filter options at the top of the page to create filters for the lines and assets that display.
  - Add multiple filters.
  - Determine the logical operator between created filters.
  - Display related lines or assets with the **Show Relationships** option.
- Click the view production history data icon  for detailed information on the equipment, such as performance and status history.

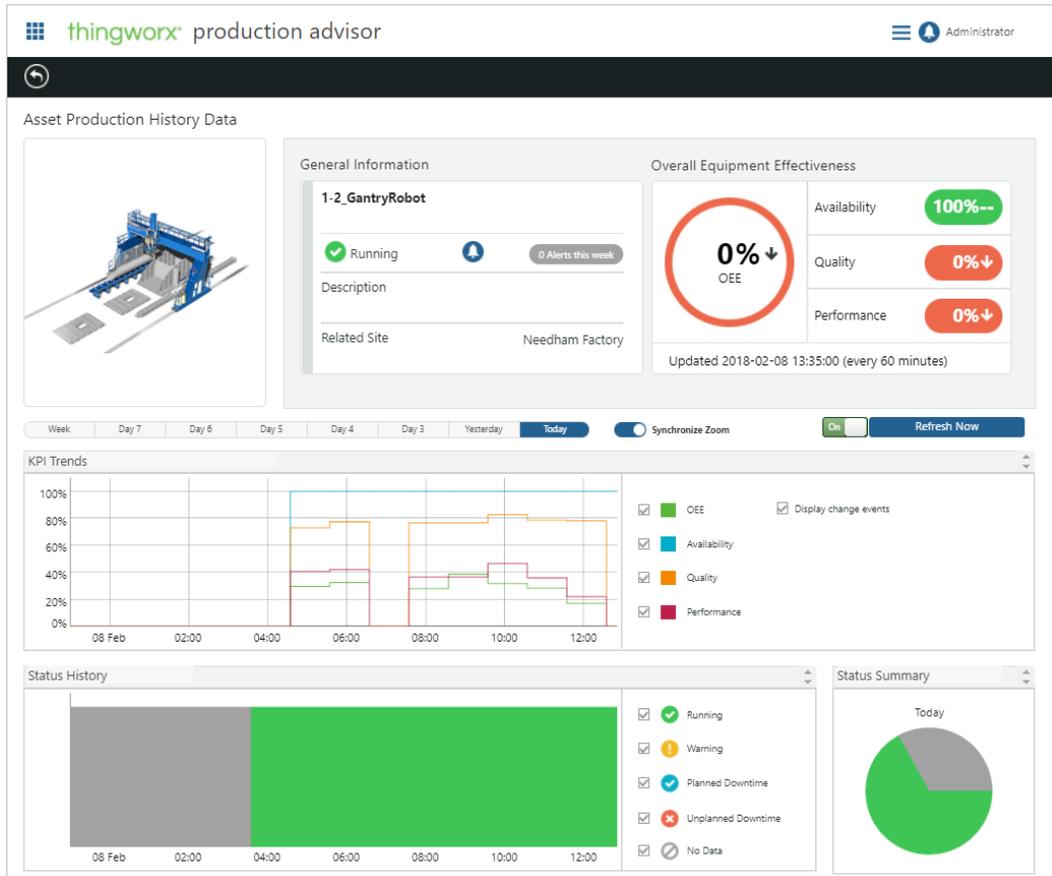
- On the **KPI Trends** and **Status History** graphs, click and drag to zoom in and double-click to zoom out. **Synchronize Zoom** means when you zoom in on one graph, the other graph zooms to the same time frame.
- Navigate back in time using preset time ranges to show up to a week of data.
- Refresh data on the graphs manually or automatically using the **Refresh Now** option.
- On the **KPI Trends** graph, show and hide change events using the **Display change events** check box. These events are flagged on the graph and listed below the check box.

---

 **Tip**

The system can display the following types of change in the **KPI Trends** graph.

- Change to the ideal run rate value
  - Change to KPI calculation period value
  - Change to KPI parameter expressions (good count, total count, ideal run rate, quality, and performance)
-



**Note**

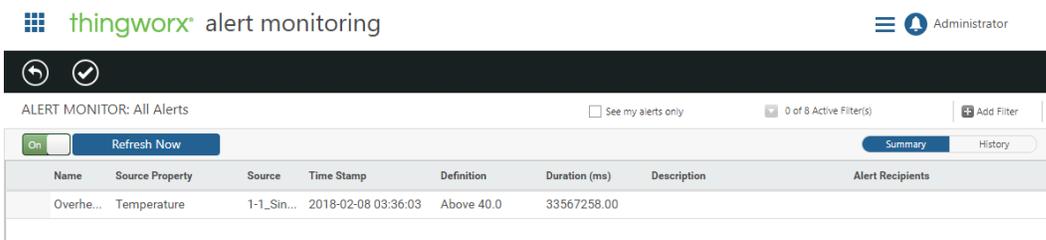
Overall Equipment Effectiveness (OEE) KPIs are calculated periodically (for a specific period of time) – the KPI calculation period.

The KPI calculation period is the time range over which a KPI is calculated for display to users. In **Production Advisor**, this is configurable for each asset and line and is calculated across multiple operation times if applicable. This applies to the **OEE**, **Availability**, **Performance**, and **Quality** KPIs. For information on specifying the KPI calculation period, see [General Information on page 17](#).

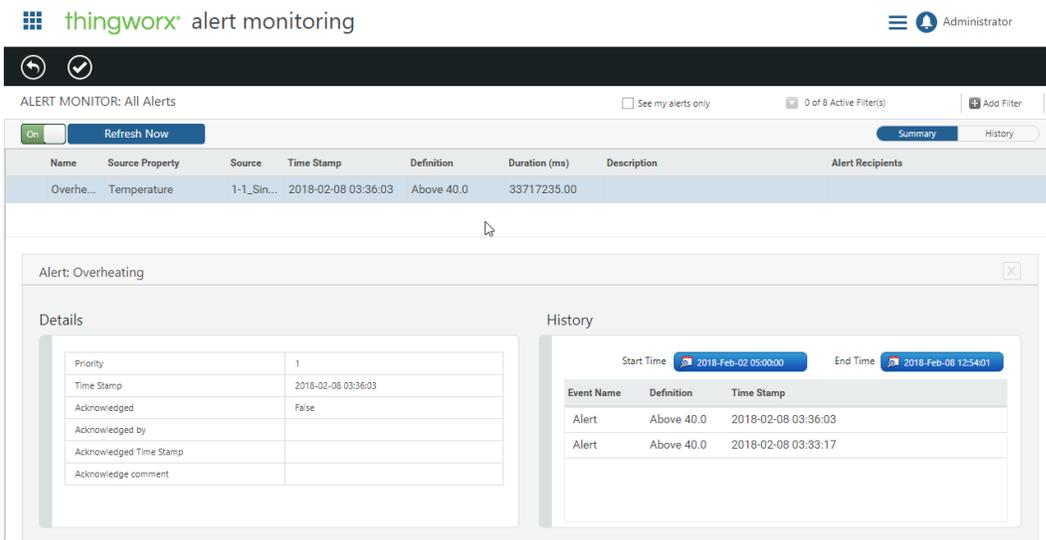
# Alert Monitoring



View active alerts and alert history for assets using the **Alert Monitoring** page. All active alerts in the system are displayed in the **Summary** view.



Click an individual alert to see more information about that alert.



To acknowledge an active alert, select the alert and click .

Once an alert has been acknowledged, a checkmark appears in the table and it no longer sends out notification messages.

thingworx alert monitoring Administrator

ALERT MONITOR: All Alerts  See my alerts only 0 of 8 Active Filter(s) Add Filter

On Refresh Now Summary History

Name	Source Property	Source	Time Stamp	Definition	Duration (ms)	Description	Alert Recipients
✓ Overh...	Temperature	1-1_Sin...	2018-02-09 03:36:08	Above 40.0	27909845.00		

Switch to the **History** view to see alert history for a selected time frame.

thingworx alert monitoring Administrator

ALERT MONITOR: All Alerts  See my alerts only 0 of 8 Active Filter(s) Add Filter

Off Refresh Now Start Time 2018-Feb-02 05:00:00 End Time 2018-Feb-08 12:54:01 Summary History

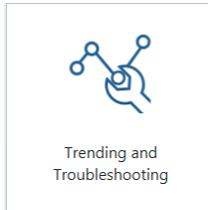
Name	Source Property	Source	Time Stamp	Definition	Event Name	Description	Alert Recipients
TagC...	TagCount	PTC.M...	2018-02-08 11:09:37	Above 500.0	AlertReset	Number of tags on Server exceeds limit	
TagC...	TagCount	PTC.M...	2018-02-08 09:09:38	Above 500.0	Alert	Number of tags on Server exceeds limit	
TagC...	TagCount	PTC.M...	2018-02-08 08:45:48	Above 500.0	AlertReset	Number of tags on Server exceeds limit	
TagC...	TagCount	PTC.M...	2018-02-08 06:45:49	Above 500.0	Alert	Number of tags on Server exceeds limit	
TagC...	TagCount	PTC.M...	2018-02-08 05:34:14	Above 500.0	AlertReset	Number of tags on Server exceeds limit	
Overh...	Temperature	1-1_Sin...	2018-02-08 03:36:03	Above 40.0	Alert		
TagC...	TagCount	PTC.M...	2018-02-08 03:34:14	Above 500.0	Alert	Number of tags on Server exceeds limit	
TagC...	TagCount	PTC.M...	2018-02-08 03:33:17	Above 500.0	AlertReset	Number of tags on Server exceeds limit	
Overh...	Temperature	1-1_Sin...	2018-02-08 03:33:17	Above 40.0	Alert		

You can access threshold alerts in **Alert Monitoring** by clicking on the alert monitor



icon.

# Trending and Troubleshooting



Use the **Trending and Troubleshooting** page to track trends that use KEPServerEX tags or properties for a given piece of equipment. Once a trend is created, you can view any of the selected properties over varying lengths of time.

thingworx trending and troubleshooting Administrator

0 of 4 Active Filter(s) Add Filter

View	Name	Description	Created On	Created By
	1-1_SinkingEDM		2018-02-14 09:3...	Administrator

OVERVIEW: 1-1\_SinkingEDM

Tag or Property Name	Resource Name	Source
Current	1-1_SinkingEDM	Current
Temperature	1-1_SinkingEDM	Temperature
Voltage	1-1_SinkingEDM	Voltage

## To create a trend:

1. At the top of the **Trending and Troubleshooting** page, click
2. In the **New Trend** window, enter a name and optionally, a description. Click **OK**.

3. On the details page of the trend, click .
4. On the **Add Tags or Properties To Trend** window, select the equipment type and piece of equipment.
5. Select up to five properties or tags to trend for the selected equipment.
6. View any of the selected properties over varying lengths of time to track the trend.

# 4

## Advanced Configurations

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Remote Access and Control.....	62

Certain configurations must be completed using ThingWorx Composer.

For information about customizing the ThingWorx Manufacturing Apps extension, refer to the *ThingWorx Manufacturing and Service Apps Customization Guide* located on the PTC Reference Documents website.

# URL Shortening Service

To configure the **URL Shortening Service** field on the **Configuration and Setup ▶ Notification Delivery** tab, obtain and apply a Google API key as described below. This allows you to use the Google URL shortening service for links sent in email or text alert notifications.

1. Obtain the Google API key:

---

 **Note**

This option is not available with Express or Developer Edition licenses.

- a. Go to the following URL: [https://developers.google.com/url-shortener/v1/getting\\_started#APIKey](https://developers.google.com/url-shortener/v1/getting_started#APIKey).
- b. Sign in with a Google account.
- c. Click **GET A KEY**.
- d. Enter a project name.
- e. The API key is generated. Copy the API key to a known location.
2. Apply the Google API key in ThingWorx Composer:
  - a. From **Things**, search for the **PTC.SCA.Common.GoogleUrlShortener** thing.
  - b. Edit the thing.
  - c. Select **Configuration**.
  - d. Click **Change Password** for **apiKey**.
  - e. Paste in the API key obtained in step 1.
  - f. Click **Save**.
  - g. The **PTC.SCA.Common.GoogleUrlShortener** thing now appears as a selectable value for the **URL Shortening Service** field on the **Notification Delivery** page.

# Remote Access and Control

The remote access and control extension enables you to upload and download files and access an asset remotely to interact directly with its software system. For example, you could modify asset configuration settings, install software and firmware patches, or launch the latest software release update.

The remote access and control extension includes the following optional **Asset Advisor** features:

- **Remote Access**
- **File Transfer**
- **File Transfer History**

---

## Note

Remote Access only supports VNC. It does not support SSH and Microsoft RDP.

---

## Prerequisites

- Remote access features require the use of either ThingWorx Edge MicroServer or ThingWorx Edge SDK. Refer to the *ThingWorx 8.2 System Requirements* for supported product versions.

To meet this prerequisite, do one of the following.

- Install ThingWorx Edge MicroServer. For more information, see the *ThingWorx WebSocket-based Edge MicroServer Developer's Guide* located at the [PTC Reference Documents](#) website under the product category ThingWorx Edge MicroServer.
- Use ThingWorx Edge SDK. For more information see the *ThingWorx Java SDK Developer's Guide* located at the [PTC Reference Documents](#) website under the product category ThingWorx Edge SDK

## To import the extension:

Import the extension `ThingWorx-Asset-Remoting-<version>-extension.zip` as described in [Import as a ThingWorx Extension on page 7](#).

### To configure an asset for file transfer:

1. Connect your Edge device using the Edge MicroServer or Edge SDK. For more information, refer to the guides listed in [Prerequisites on page 62](#).
2. Verify that the ApplicationKey entity exists on the ThingWorx server so that the Edge MicroServer or Edge SDK you are using can authenticate with the platform.
3. From ThingWorx Composer, navigate to the **Things** ▶ **Asset\_<asset\_name>** ▶ **General Information**.
4. Set the **Identifier**.
5. Click **Save**.

---

#### **Note**

The **File Transfer** action enables you to copy files from the local system repository, `TW.RSM.Thing.FileRepositor` to a remote location (an asset). For more information, see the ThingWorx documentation on how to customize a file repository.

---

### To configure an asset for remote access and control:

1. Configure the asset for file transfer, as shown in the previous section.
2. From ThingWorx Composer navigate to the **Things** ▶ **Asset\_<asset\_name>** ▶ **General Information** page.
3. From the **Override?** drop-down list for the **Enable Tunneling** field, select **Override – Enabled**.
4. Navigate to the **Configuration** section and click on the **Add My Tunnel** button.
  - a. The **Tunnel Name** is used to identify what tunnel to use. Enter any name.
  - b. Configure the **Host** and **Port** from the point of view of the edge device where the server component of the client/server application is running, not the ThingWorx Core. For example, when you want to access the edge device from the VNC Viewer, you would type the IP address of the device, and then the port number.
  - c. The **Port** value should be the port that the VNC server is listening on. This is typically 5900.
  - d. The **App URI** should be left as the default, as you are going to rely on ThingWorx built in VNC client.
  - e. The **# Connections** and **Protocol** can remain their default values, unless you have a reason to change them.
  - f. Click **Save**.

- g. From ThingWorx Composer, navigate to **Things** ▶ **Asset\_<asset\_name>** ▶ **Properties**.
- h. Set your VNC password on the property: **vncPassword**.

## Configuring Recommended Subsystem Settings

These recommended configuration settings for the **WSCommunicationsSubsystem** and **FileTransferSubsystem** can improve performance when performing file transfers.

- **WSCommunicationsSubsystem**—

If file transfers are expected to involve large files (greater than 20mb in size), increase the timeout value for request response messages to 180 seconds by completing the following steps.

1. In ThingWorx Composer, under **System**, click **Subsystems**.
2. In the list of subsystems, click **WSCommunicationsSubsystem**.
3. In the left-side panel, click **Configuration**.
4. In the **Amount of time a request will wait for the response message before timing out (secs)** field, enter 100.
5. Click **Save**.

- **FileTransferSubsystem**—

1. In ThingWorx Composer, under **System**, click **Subsystems**.
2. In the list of subsystems, click **FileTransferSubsystem**.
3. In the left-side panel, click **Configuration**.
4. Enter the following recommended values for each file transfer setting.

Field	Value
<b>Min Threads Allocated to File Transfer Pool</b>	100
<b>Max Threads Allocated to File Transfer Pool</b>	100
<b>Max Queue Entries Before Adding New Working Thread</b>	10000
<b>Idle Thread Timeout (sec)</b>	60
<b>File Transfer Idle Timeout (sec)</b>	300
<b>Max FileTransfer size (bytes)</b>	1000000000

5. Click **Save**.

# 5

## Frequently Asked Questions

### Terminology

- What does the term “line” mean?  
The term (production) line refers to a work center that is a collection of equipment dedicated to the manufacture of a specific number of products or product families.
- What does the term “site” mean?  
A site is a component of a manufacturing enterprise that is identified by physical, geographical, or logical segmentation.
- What does the term “enterprise” mean?  
An enterprise is one or more organizations that share a mission, goals, and objectives to offer an output such as a product or service.

### Performance and Scalability

- How many devices are supported for each server?  
A maximum of 250 devices per server are supported. Note that with a large number of devices, discovering devices for a specific server may take several minutes.

### KEPServerEX

- Can non-system tags be monitored?  
Update of KEPServerEX system tags only occurs when non-system tags associated to the server are monitored. To monitor a non-system tag, create a trend in **Trending and Troubleshooting** and add any tag from any devices.

System tags are found in the `_System` and `_Statistics` tag groups in KEPServerEX.

## Alert Notifications

- Why am I not receiving email alert notifications using gmail.com?

If you are not receiving email alert notifications on domains such as gmail.com or yahoo.com, ensure that the option to allow less secure apps is enabled for those email services. For more information, see <https://support.google.com/a/answer/6260879?hl=en>.

- How do I set up mobile alert notifications?

For mobile alert notifications, add any mobile numbers with different country codes to the Twilio account before using those mobile numbers.