



Site Preparation for
the ThingWorx Applications
(ThingWorx Version 8.5.7 On-Prem)

Version M

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Introduction

This document contains site preparation requirements for the installation of the ThingWorx Applications on **ThingWorx 8.5.7**. It is to be used in conjunction with the requirements of the PTC products that will interact with the ThingWorx Applications. This document also provides instructions for installing the infrastructure required for the ThingWorx Applications.

Proper site preparation is fundamental to the reliability of the ThingWorx Applications. The client is responsible for ensuring that each site is set up, upgraded, and maintained in accordance with the information provided by PTC.

If performing a new on-premises install, use **Chapter 1. New Installation**.

If performing an upgrade on an existing ThingWorx solution, skip to **Chapter 2. Upgrade from Existing ThingWorx Installation**.

1. New Installation (On-Premises)

1.1. Prerequisites and System Requirements

System specifications may call for improvements as scale increases.



Install SQL Server, ThingWorx, and Kepware each on their own separate server (i.e., 3 total servers x 2 environments = 6 total servers). Refer to [4. Appendix B – On Prem Installation Software/Hardware Requirements](#).

During the entire project duration, PTC must have administrator rights on these servers to perform necessary activities.

SQL Server



The following are requirements for ThingWorx Apps to function:

- Server and database time zones must be in UTC.
- Server and database collations must be set to SQL_Latin1_General_CP1_CI_AS.
- Place the database and log files on separate drives.
- Ensure that the SQL user to be used by the TWX Apps has "dbo" assigned as default schema.

Verify that the SQL server meets the requirements as detailed in the [ThingWorx System Requirements](#). For capacity planning concerns, these requirements should explain specific details. These requirements apply to both Azure SQL and MS SQL.

For more information regarding how to install SQL server, see the following general resources:

- [MS SQL Database Installation and Configuration](#)
- [MS SQL Server Installation Guide](#)
- [.Net Framework Requirements](#)

ThingWorx Server



The following are requirements for ThingWorx Apps to function:

- Must be running ThingWorx 8.5.7
- Server time zone must be in UTC.
- Tomcat must be configured for UTC time zone.

Best Practice: Two drives are required – one for the OS and one for ThingWorx/Tomcat. Do not install ThingWorx and Tomcat on the OS or (C:) drive. Install them together on a dedicated separate drive (e.g., D: drive). This separation ensures that Tomcat isn't negatively affected by any C: drive policies and allows for replacing the C: drive while retaining Tomcat-related data.

System Requirements

Review the system requirements for the ThingWorx version to be installed.

- [ThingWorx 8.5 System Requirements](#)

ThingWorx Composer Browsers

ThingWorx Composer is an HTML application that runs in a browser. The required minimum resolution for the ThingWorx Composer is 1280 x 800. The required minimum resolution for the ThingWorx Apps is 1366 x 768. The ThingWorx Apps are currently only supported by Google Chrome web browser.

Kepware Server



All data required for RTPPM must come from Kepware tags. This includes production counters, downtime statuses, waste quantities, active product, and active work order.

Only one Kepware server is needed to support both QA and Production environments, if OPC Aggregator can be leveraged. OPC Aggregator is a free offering to supplement Kepware Server.



This is a list of relevant Kepware Server resources:

- [Kepware Server Manual](#) (includes system requirements)
- [Kepware Server Secure Deployment Guide](#)
- [Secure AlwaysOn Connections between Kepware and ThingWorx](#)

This is a list of relevant OPC Aggregator resources:

- [OPC Aggregator User Manual](#)

Some PLC's cannot allow multiple Kepware connections. If there are multiple connections, they may hinder performance. As such, it is best practice to use one server to host both Kepware Server and OPC Aggregator. This combination can sufficiently provide data to both QA and Production ThingWorx environments using different Industrial Connections. The Kepware Server instance used by the Production environment should ideally point directly to original tag addresses. The tags used by the QA environment should point to mirrored tags in the OPC Aggregator, such that the QA environment is looking at different tag addresses than Production but the same data.

The interface between Kepware and ThingWorx is driven by Kepware Server, such that one Kepware Server cannot connect to more than one ThingWorx instance at a time.

Email Server Requirements

The ThingWorx Applications can send emails for many different contexts (e.g., alarm triggered, operator requesting help). To enable this functionality, the Applications must be configured to connect to an email server and requires the below information:

SMTP Server	Address of the server from which e-mails are sent
SMTP Server Port	Port through which ThingWorx logs in to the mail server to send e-mails
POP3 Server	Address of the server from which e-mails are received
POP3 Server Port	Port through which ThingWorx logs in to the mail server to check and retrieve e-mails
Use TLS	Indicates whether to use TLS (Transport Layer Security)
Use SSL	Indicates whether to use SSL (Secure Sockets Layer)

Mail Account User	The username for the e-mail account that is used to send and retrieve e-mails on the given mail server. This is different than the from field value, which is used for the sender address when sending e-mails. The from field value need to be a valid e-mail account.
Mail Account Password	The password for the e-mail account. For Gmail (and in other cases), the specified e-mail account can be updated to allow less secure app sign-in (see KCS Article CS200624).
Default From Field	Refers to the e-mail address to use as the from address when no address is specified when invoking the SendMessage services. This is primarily used when sending Notifications e-mails.

In addition, the appropriate ports allowing communication between the ThingWorx and email servers must be opened.

For more information, refer to the [ThingWorx Mail Configuration support page](#).

1.2. Infrastructure & Architecture

Before beginning the configuration of the ThingWorx Applications, two distinct and identical environments (QA and Production) must be configured. These environments must comply with the prerequisites and system requirements as well as the installation and configuration details mentioned in this document.

With this type of deployment, the customer is responsible for ThingWorx and Kepware installation. Refer to **4. Appendix B – On Prem Installation Software/Hardware Requirements** and **5. Appendix C – ThingWorx Applications System Architecture Design** for more details. ThingWorx and the databases can be at the plant, site, or private data center. Kepware would also be implemented on-premises.

1.3. Order of Installation

The following is required to properly install the necessary infrastructure for each environment (QA and Production).

There are two phases that make up the installation:

- Installing SQL server, ThingWorx (including Tomcat), and ThingWorx Manufacturing Apps (including database configuration).
- Installing Kepware Server, then performing the tags configuration for the ThingWorx Applications.

These two phases can happen concurrently (as shown in the diagram below). The ThingWorx Apps installation and configuration may be performed only after both phases have been completed.



SQL Server Installation



The Manufacturing Apps and ThingWorx Apps should both be on the same database. The ThingWorx database should be separate from this, resulting in a total of 2 databases:

1. ThingWorx Foundation
2. Manufacturing Apps / ThingWorx Apps

- Install the SQL Server instance as described in the [prerequisites](#).

ThingWorx Installation

1. Download the ThingWorx installation package for the appropriate ThingWorx version (8.5.7) from the PTC support site, using the link provided in the contract. Unzip the downloaded installation package.



Use the ThingWorx-Platform-MSSQL-X-X-X package to install ThingWorx.

The "ThingWorx-Foundation-Installer-mssql-windows-X-X-X" package is not compatible with ThingWorx Applications.

2. Before installing ThingWorx, ensure that the database for ThingWorx and the database user are created as described in [SQL Server Installation](#).
3. Follow the installation instructions for the ThingWorx version being installed. These instructions can be found here: [ThingWorx 8.5.7](#).



After copying the platform-settings JSON file, update the file with the contents from Step 4 below

Best practice: for Windows, do not install Tomcat on the OS drive (C:).

4. Modify the **platform-setting.json** file as needed for the configuration, and as shown in the following example. Replace the content highlighted in red with values appropriate for the configuration. Ensure that the **ScriptTimeout** setting is set to 500.

For more information, see [platform-settings.json Configuration Details](#).

```
{
  "PlatformSettingsConfig": {
    "ExtensionPackageImportPolicy": {
      "importEnabled": true,
      "allowJarResources": true,
      "allowJavascriptResources": true,
      "allowCSSResources": true,
      "allowJSONResources": true,
      "allowWebAppResources": true,
      "allowEntities": true,
      "allowExtensibleEntities": true
    },
    "AdministratorUserSettings": {
      "InitialPassword": "<choose Password>"
    },
    "BasicSettings": {
      "BackupStorage": "/ThingworxBackupStorage",
      "DatabaseLogRetentionPolicy": 7,
      "EnableBackup": false,
      "EnableHA": false,
      "EnableSystemLogging": false,
      "EnableSSO": false,
      "FileRepositoryRoot": "/ThingworxStorage",
      "HttpRequestHeaderMaxLength": 2000,
      "HttpRequestParameterMaxLength": 2000,
      "InternalAesCryptographicKeyLength": 128,
      "Storage": "/ThingworxStorage",
      "ScriptTimeout": 500
    }
  },
  "ContentTypeSettings": {
```

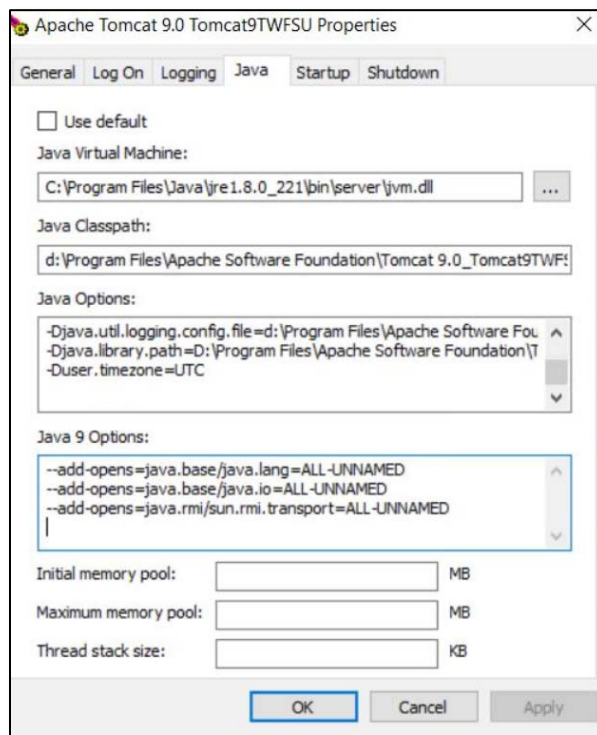
```
"supportedMediaEntityContentTypes": [  
  "video/3gpp2",  
  "x-unknown/x-unknown",  
  "audio/x-aac",  
  "audio/x-aiff",  
  "video/x-ms-asf",  
  "audio/basic",  
  "video/x-msvideo",  
  "image/cgm",  
  "text/css",  
  "application/vnd.ms-excel",  
  "application/msword",  
  "application/vnd.ms-word.document.macroenabled.12",  
  "application/vnd.openxmlformats-officedocument.wordprocessingml.document",  
  "application/vnd.ms-word.template.macroenabled.12",  
  "application/vnd.openxmlformats-officedocument.wordprocessingml.template",  
  "image/vnd.dwg",  
  "image/vnd.dxf",  
  "application/x-msmetafile",  
  "audio/flac",  
  "application/x-gtar",  
  "application/x-gzip",  
  "text/html",  
  "image/x-icon",  
  "model/iges",  
  "application/x-iso9660-image",  
  "application/json",  
  "video/mpeg",  
  "audio/x-mpegurl",  
  "audio/mp4",  
  "video/mp4",  
  "audio/midi",  
  "video/quicktime",  
  "audio/mpeg",  
  "application/msproject",  
  "application/msoutlook",  
  "application/octet-stream",  
  "application/msonenote",  
  "application/vnd.ms-powerpoint",  
  "application/vnd.ms-powerpoint.template.macroenabled.12",  
  "application/vnd.openxmlformats-officedocument.presentationml.template",  
  "application/vnd.ms-powerpoint.addin.macroenabled.12",  
  "application/vnd.ms-powerpoint.slideshow.macroenabled.12",  
  "application/vnd.openxmlformats-officedocument.presentationml.slideshow",  
  "application/vnd.ms-powerpoint.presentation.macroenabled.12",  
  "application/vnd.openxmlformats-officedocument.presentationml.presentation",  
  "x-ptc/x-part",  
  "application/vnd.ms-publisher",  
  "application/x-rar-compressed",  
  "application/rsd+xml",  
  "application/rtf",  
  "text/richtext",  
  "application/vnd.stardivision.draw",  
  "application/vnd.stardivision.calc",  
  "application/sdp",  
  "application/vnd.stardivision.writer",  
  "application/vnd.ms-powerpoint.slide.macroenabled.12",  
  "application/vnd.openxmlformats-officedocument.presentationml.slide",  
  "application/x-tar",  
  "image/tiff",  
  "text/plain",  
  "application/visio",  
  "audio/wav",  
  "audio/x-ms-wax",  
  "video/x-ms-wm",  
  "audio/x-ms-wma",  
  "application/x-ms-wmd",  
  "video/x-ms-wmv",  
  "video/x-ms-wmx",  
  "application/vnd.ms-wpl",  
  "video/x-ms-wvx",  
  "application/vnd.ms-excel.addin.macroenabled.12",  
  "application/vnd.ms-excel.sheet.binary.macroenabled.12",  
  "application/vnd.ms-excel.sheet.macroenabled.12",  
  "application/vnd.openxmlformats-officedocument.spreadsheetml.sheet",  
  "application/vnd.ms-excel.template.macroenabled.12",  
]
```


```

        "application/vnd.openxmlformats-officedocument.spreadsheetml.template",
        "text/xml",
        "application/vnd.ms-xpsdocument",
        "application/xml",
        "application/zip",
        "application/ed",
        "application/octet-stream",
        "image/svg+xml"
    ],
    "PersistenceProviderPackageConfigs": {
        "MssqlPersistenceProviderPackage": {
            "ConnectionInformation": {
                "driverClass": "com.microsoft.sqlserver.jdbc.SQLServerDriver",
                "jdbcUrl":
"jdbc:sqlserver://<SQLSERVER>:1433;databaseName=thingworxdb1;applicationName=Thingworxdev;",
                "password": "<password>",
                "username": "twadmin"
            }
        }
    }
}
}
}
}

```

- In addition to the standard Java Options to be configured for ThingWorx, ensure the following options are configured:





Ensure that you add the following option (also shown in screenshot above):

-Duser.timezone = UTC

ThingWorx Manufacturing Apps Installation

1. Create a separate database for the ThingWorx Manufacturing Apps (for example, **mfnfgappprod1**) that will serve as the database for the Manufacturing Apps and the ThingWorx Apps. Ensure that the database has the following settings:
 - o Collation is set to **SQL_Latin1_General_CP1_CI_AS**
2. Create a user (e.g., **mfnfgappadmin**) with **sysadmin** rights for the installation. The rights for this user can be restricted to **db_owner** after the installation. Ensure that the SQL user has **dbo** assigned as default schema.
3. Follow the instructions provided in the ThingWorx Manufacturing Apps online reference: [ThingWorx Apps 8.5.2](#). The following packages need to be installed:
 - Thingworx-Apps-8.5.2-extension-bundle
 - Remote-Access-Extension-1.2.0

Note: the “Update the Script Timeout Setting” does not need to be performed since the script timeout setting was already set to 500 in the **platform-settings.json** update.

4. If an error occurs that prevents extension import, refer to this [support article](#).

Kepware Installation

A Kepware Server installation with the correct drivers (e.g., ControlLogix) is a prerequisite for the ThingWorx Applications. For information on installing Kepware Server, see the [Kepware Server 6.X Installation Guide](#).

If OPC Aggregator is to be leveraged, it may be downloaded from the following link: [OPC Aggregator Download](#) (via PTC Support, free with ThingWorx license).

Kepware: PLC, Drivers, and Tag Configuration

Before starting the ThingWorx Application setup, all PLC tags and drivers for each piece of equipment must be configured in Kepware Server. It is best practice for ThingWorx to have scan rates configured for remotely bound properties, as opposed to configuring these scan rates in Kepware. Refer to the tag sections later in this document for information on the tags that are required for each of the ThingWorx Applications.

Kepware-ThingWorx Industrial Connection

The Industrial Connection between ThingWorx and Kepware Server must be configured before the ThingWorx Applications configuration is performed.

ThingWorx Applications Installation

For each of the ThingWorx Apps to be installed, there is an associated installation guide included in the download package. It is mandatory to begin with the CORE installation guide, as it does not have any other ThingWorx Apps installations as prerequisites.



Before performing an installation according to the guide, be sure all prerequisites for that guide are satisfied.

1.4. Real-Time Production Performance Monitoring

Tag Requirements

The Real-Time Production Performance Monitoring (RTPPM) Application models will use the values from a specific group of OPC tags to deliver RTPPM functionality.

Tag	Description	Data Type	Example Data
Production Counter	This production counter tag is incremented whenever good product is produced.	Integer or Float	Increase: 214, 217, 221, 228, 0, 3, 7 Value: 15, 14, 16, 12
Running Status	This tag has a designated value representing the Running state (usually 0). A non-running value indicates that the equipment is going through downtime. The non-running value represents a fault code that coordinates with a fault on the downtime reason tree.	Integer	0, 0, 2, 2, 0, 0, 1, 1, 3, 3, 0, 0
Waste Counter	This waste counter tag is incremented whenever Defective product is produced by the equipment.	Integer or Float	Increase: 187, 189, 190 Value: 2, 5, 1, 0

Active Job Order	The job order that is currently running on the equipment. Also used to group production as separate production events.	String	"WO_123456", "WO_987654"
Active Product Code	This tag specifies the product number which is currently running on the equipment.	String	"P456789", "Q123789"

Production Counter Tag

- The production counter tag is used to track production quantity for a production event.
- This tag should be either: 1) a totalizer tag that continuously increments up from zero until it resets back to zero; or 2) a value tag, where the value received corresponds to the actual value produced.
- A single production counter tag is required for each production unit if production is to be automatically captured. Production events can be manually entered using the Operator Dashboard.
- This tag counts the material produced at the production unit (the output).
- The data type of this tag depends on the type of material that is being measured. For example, for a Bottle Filler the data type will be INTEGER, while for a Liquid Filter the data type may be FLOAT.
- The tag value should not increment if material flow is impossible due to a closed valve, closed gate, or stopped motor. The control system should contain the necessary logic to ensure a reasonably accurate representation of the material flow.
- This tag is also used for performance rate measurements, so it must be a "good production" tag. This allows for waste to be automatically captured using the [Waste Counter Tag](#), where the total production is the aggregate of the Production Counter and the Waste Counter. Note: if the production counter represents Total Production instead of Good Production, waste cannot be automatically captured and must instead be entered manually.
- An increase production counter tag counts to a known value and then rolls over to zero once it reaches that value. For example: 1; 2; 3; 4; ...; 9994; 9995; 9996; 9997; 9998; 9999; 10000; 0; 1; 2; and so on. If there is a pre-configured rollover value at which the tag resets, and that value is configured in RTPPM, then the tag may not also reset for other situations (e.g., shift end, day end, product change). If the rollover value is not defined in RTPPM, then the increase tag must reset to 0 before it begins incrementing again.

Downtime Fault (Running Status) Tag

- The downtime fault tag is used to determine whether the equipment is running or is down.
- A specific value indicates that the machine is running, all other values indicate a downtime condition. Downtime conditions are mapped in the downtime value table.
- A single integer tag is required for each production unit where downtime will be reported.
- Running is defined as the equipment producing one or more units of product within a time range. The time range and the minimum number of units depend on the production unit.

Waste Counter Tag

- The waste counter tag is used to track waste quantity for a production event.
- This tag is either a totalizer waste tag that continuously increments up from zero until it resets back to zero, or a value tag, meaning the value received corresponds to the actual waste value.
- A single waste counter tag is required for each production unit if waste is to be automatically captured. Operators can manually enter waste using the Operator Dashboard.
- This tag is used to assign the waste quantity based on the value of the tag's previous and current values. Note that a waste record is created for every production event, even if no waste quantities exist.
- An increase waste counter tag counts to a known value and then rolls over to zero once the known value is reached. For example: 1; 2; 3; 4; ...; 9994; 9995; 9996; 9997; 9998; 9999; 10000/0; 1; 2; and so on. If there is a pre-configured rollover value at which the tag resets, and that value is configured in RTPPM, then the tag may not also reset for other situations (e.g., shift end, day end, product change). If the rollover value is not defined in RTPPM, then the increase tag must reset to 0 before it begins incrementing again.

Running Product Tag

- The running product tag creates a product change event based on a change of value. The tag should provide the product name as the tag value.

Running Job Order Tag

- Job order may also be referred to as "work order" or "production order".
- Like the running product tag, a control system can have a running Job Order tag for each machine center that contains the active Job Order.

- The running Job Order tag provides the current Job Order or job order name as a value. The tag value changes at the completion of the order.

1.5. Asset Monitoring Utilization

Tag Requirements

The Asset Monitoring Utilization (AMU) Application model will monitor and use the values from a specific group of OPC tags to deliver AMU functionality. For each asset within the AMU Application, the tags listed below are required. Suggestions regarding the tag naming convention are also provided.



Tag sampling rate cannot be lower than 1 minute.

Tag Name	Description
<EQUIPMENTNAME>.Status	This tag determines whether the unit is to be considered Running or Down.
<EQUIPMENTNAME>.<Property1>	Property tracked tag
<EQUIPMENTNAME>.<Property2>	Property tracked tag
<EQUIPMENTNAME>.<PropertyN>	Property tracked tag
<EQUIPMENTNAME>.<Property9>	Property tracked tag

Status Tag

- The asset status tag is used to determine whether the asset is running or down.
- The client can define what "Running" and "Down" represent for each asset. For example, the status can distinguish whether the asset is actively contributing to a work unit's production, or it can distinguish whether an asset is currently experiencing downtime.
- The asset status tag must have either Boolean or integer data type. By default, 1 or TRUE represents Running and all other values represent Down.

Property Tag

- For a given asset, the AMU application enables tracking up to 9 properties in real time.
- Each tracked property must be represented by a tag.

1.6. Connected Work Cell

Tag Requirements

The Connected Work Cell (CWC) Application only requires tags for work instructions involving smart tools (e.g., smart screwdrivers, conveyor gates) or PLC's. Out of the box, CWC does not have a required predefined tag list. The number of tags per device are dependent on what the tool vendor or PLC programmer have made available. At times, Kepware Advanced Tags may be created on Kepware Server to convert/parse the source tag data.

The Smart Tool to be used with the CWC application must use drivers compatible with Kepware Server. To see Kepware compatible drivers, refers to this [link](#)

The following table provides a sample tag list for a single smart screwdriver within the CWC application.

Device	Station	Tag Name	Read Only, Read/Write	Description
Smart Screwdriver 1	<EQUIPMENTNAME>	Torque	Read Only	Last torque
Smart Screwdriver 1	<EQUIPMENTNAME>	Program Number	Read/Write	Sets screwdriver to program number
Smart Screwdriver 1	<EQUIPMENTNAME>	Screw/Insert number	Read Only	The screw number to fasten.

Attribute Tag

- For a given equipment attribute, the CWC application allows the user to specify if its source is **Manual Entry** or an **IOT Device**.
- Setting the source to **IOT Device** connects to the Industrial Connector specified for the Station or Smart Tool, which then allows for the tag to be selected.

- Smart Tool and Station attribute tags are created and assigned in the same manner. The key difference is that Smart Tool tags are specifically used in 'Smart Tool' steps, while Station tags are used in 'Manual Entry' or 'Calculation' steps.
- Smart tool work instructions will read the designated tag's current value and live values during execution. It is important to understand how the tag behaves and how much noise may exist and affect CWC before the desired value is registered.
- CWC can write a pre-defined value to a Kepware tag. If this feature is leveraged in conjunction with OPC Aggregator, special consideration is required to ensure QA writes do not affect the Prod environment

CWC Endpoint Requirements

CWC can ingest and output relevant data as a means of communicating with external sources. Some examples include importing serial number and job orders, as well as exporting routes and production notifications. For a complete list of available endpoints and specific information (e.g., required inputs, outputs, permissions) for each, please refer to the **CWC Configuration Guide**.

1.7. Solution Maintenance



Do not perform any upgrades before contacting PTC to confirm that compatibility has been successfully tested.

Maintenance Plan

Ensure that the database administrator adds the ThingWorx and the Manufacturing Applications databases to the maintenance plan.

Recommendations

- Configure a full back-up on a daily basis.

- Index fragmentation (The database administrator can analyze to determine frequency).
- SQL report to check for fragmentation, deadlock, size, and so on.
- Optimize the SQL server configuration following best practices (e.g., database on a separate drive, TempDB, Logfiles, MaxMemory, FillFactor, MaxDop).
- Any other applicable best practices as determined by the database administrator.

1.8. Site Roles Requirements

All implementation types require identifying and configuring the site roles with appropriate personnel. Certain roles may be combined if the team has all the required skills.

- **Manager or Coordinator** – This person is the single point of contact for the PTC team. They are responsible for coordinating with different client departments such as Information Technology (IT), Operational Technology (OT), and Security.
- **Information Technology (IT) Administrator** – This person has all super user rights to the client IT infrastructure. They are responsible for providing access to the PTC team to configure the ThingWorx Applications. The IT Administrator is responsible for the upkeep, configuration, and reliable operation of multi-user applications, such as ThingWorx. The user assigned to this role has the necessary rights for installing, upgrading, and configuring the ThingWorx Applications, ThingWorx. and so on.
- **Operational Technology (OT) Administrator** – This person has super user rights to the client OT infrastructure such as PLCs and Kepware. They are responsible for setting up PLC tags in Kepware and configuring the Industrial Connection to ThingWorx.
- **Security Administrator** – This person has access to client security infrastructure such as firewalls. They are responsible for setting up the security settings required for the ThingWorx Applications such as adding firewall rules, opening ports, and so on.
- **Manufacturing Technical Lead** – This person has full access to all equipment on the shop floor. Along with OT Administrator, the Manufacturing Technical Lead is responsible for helping the PTC team to generate integration scenarios such as downtime, product change, workorder change, and so on. If convenient, this role can be merged with the ThingWorx Application Administrator or ThingWorx Application Super User.

- **ThingWorx Application Administrator or Process Engineer** – This person has a deep understanding of the ThingWorx Applications and is responsible for configuring certain aspects of the ThingWorx Applications, such as plant configuration, equipment, characteristics, and reason trees.
- **ThingWorx Application Super User** – This person has a deep understanding of the ThingWorx Applications. They are responsible for executing acceptance testing and making sure that the system is processing all data as expected.
- **Plant Manager** – This person is responsible for the whole plant. They oversee all daily operations of the plant and ensure that policies and procedures are followed.
- **Line Manager** – This person monitors the production and is responsible for escalating all production issues.
- **Operator** – This person is the end user of the ThingWorx Applications. They interact with the applications daily.

1.9. Site Verification

A PTC team member will verify that the installations meet the requirements before proceeding with the implementation project's Kickoff Phase. Should a requirement not be met, the implementation may be delayed and may incur charges for additional services.

Ensure that all the requirements listed in **3. Appendix A – Site Readiness Checklist** have been fulfilled.

2. Upgrade from Existing ThingWorx Installation (On-Premises)

If ThingWorx is already installed into the infrastructure, follow **6. Appendix D – ThingWorx Upgrade Flowchart** to verify if the installation is compatible for ThingWorx Application. Also refer to **7. Appendix E – ThingWorx Upgrade Questions and Answers** for more information.

2.1. Prerequisites and System Requirements

See section 1.1. Prerequisites and System Requirements.

2.2. Infrastructure and Architecture

See section 1.2. Infrastructure & Architecture.

2.3. Validate Existing Installation

See section 1.3. **Order of Installation** and validate the current environment against the mentioned requirements and procedures.

2.4. Real-Time Production Performance Monitoring

There is no specific instruction for implementing RTPPM on an existing ThingWorx installation. For general information, see section 1.4. **Real-Time Production Performance Monitoring**.

2.5. Asset Monitoring Utilization

There is no specific instruction for implementing AMU on an existing ThingWorx installation. For general information, see section 1.5. **Asset Monitoring Utilization**.

2.6. Connected Work Cell

There is no specific instruction for implementing CWC on an existing ThingWorx installation. For general information, see section **1.6. Connected Work Cell**.

2.7. Solution Maintenance

There is no specific instruction regarding solution maintenance on an existing ThingWorx installation. For general information, see section **1.7. Solution Maintenance**.

2.8. Site Roles Requirements

There is no specific instruction regarding site role requirements on an existing ThingWorx installation. For general information, see section **1.8. Site Roles Requirements**.

2.9. Site Verification

There is no specific instruction regarding site verification on an existing ThingWorx installation. For general information, see section **1.9. Site Verification**.

3. Appendix A – Site Readiness Checklist

This site readiness checklist helps ensure that the site is ready to proceed with the installation of RTPPM, AMU, or CWC. All items in this checklist should be completed once the site preparation phase of the project is complete.

- ThingWorx is on a separate server from SQL Server
- SQL Server is in UTC
- SQL Server collation is set to `SQL_Latin1_General_CP1_CI_AS`
- ThingWorx database collation is set to `SQL_Latin1_General_CP1_CI_AS`
- ThingWorx server is in UTC
- ThingWorx version is 8.5.7
- ThingWorx Manufacturing Apps database created
- ThingWorx Manufacturing Apps database is separate from the ThingWorx database
- ThingWorx Manufacturing Apps database is in UTC
- ThingWorx Manufacturing Apps database collation is set to `SQL_Latin1_General_CP1_CI_AS`
- ThingWorx Manufacturing Apps is installed on the ThingWorx server
- Appropriate ports are open for communication between SQL Server and ThingWorx
- SQL Server user with administrator (read/write/delete) permissions in the ThingWorx Manufacturing Apps database
- PTC personnel have required access to servers
- PTC personnel have administrator rights in the ThingWorx composer
- Industrial Connection between Kepware and ThingWorx is properly set up
- JSON configuration file is properly set up (`platform-settings.json`)
- All required Kepware tags are configured according to the ThingWorx Application that will be used (RTPPM, AMU, CWC)
- All required email server configuration is gathered, and the proper ports are open
- A Database maintenance plan is in place

4. Appendix B – On Prem Installation Software/Hardware Requirements

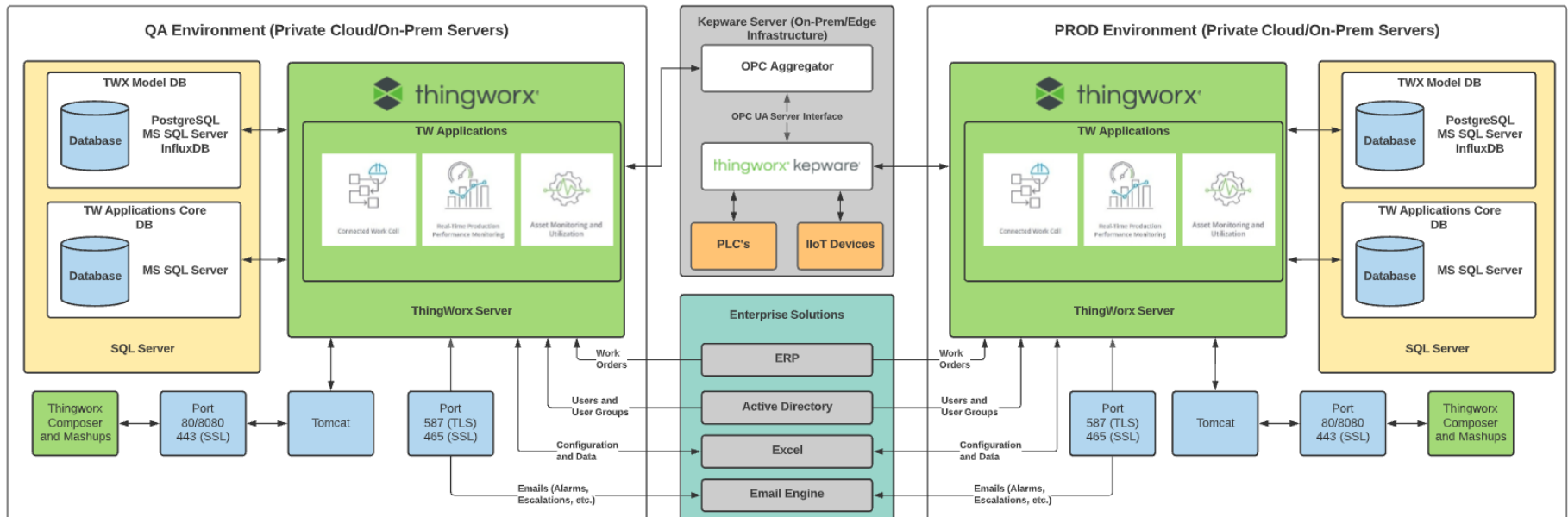
Environment	Software	OS	OS Requirements	Other Requirements	Notes
QA ThingWorx	<i>ThingWorx-Platform-Mssql-8-5-7</i>	Windows Server 2016 (64 bit-only)	Memory: 16 GB Disk Space: 100 GB Disk Speed: 10000 RPM or SSD	Server Time Zone: UTC Tomcat Time Zone: UTC Tomcat and ThingWorx must be installed on another drive than the OS	Two drives required: one for the OS, one for Tomcat and ThingWorx
PROD ThingWorx	<i>ThingWorx-Apps-8-5-2-extension-bundle</i> <i>Tomcat 8.5.51 or 9.0.35</i>				
QA MS SQL	Microsoft SQL Server 2016 or 2017	Windows Server 2016/2019 (64 bit only)	Memory: 4 GB Space: 6 GB Disk Speed: 2.0Ghz	Server and databases Time Zone: UTC This server will host two (2) database, the ThingWorx Database and the Manufacturing Apps Database Databases and server Collation: SQL_Latin1_General_CP1_CI_AS Database and SQL log files on separates driver	This server will host two (2) database, the ThingWorx Database and the Manufacturing Apps Database A maintenance plan should be put in place by the DB team
PROD MS SQL					
QA Kepware	Kepware Server 6.X	Windows Server 2012/2016/2019 (64 bit only)	Memory: 1 GB Disk Space: 530 Mb Disk Speed: 1.0Ghz	Industrial Connection between Kepware and ThingWorx properly setup All tags requirements met (RTPPM Tags , AMU Tags , CWC Tags)	
PROD Kepware					

References:

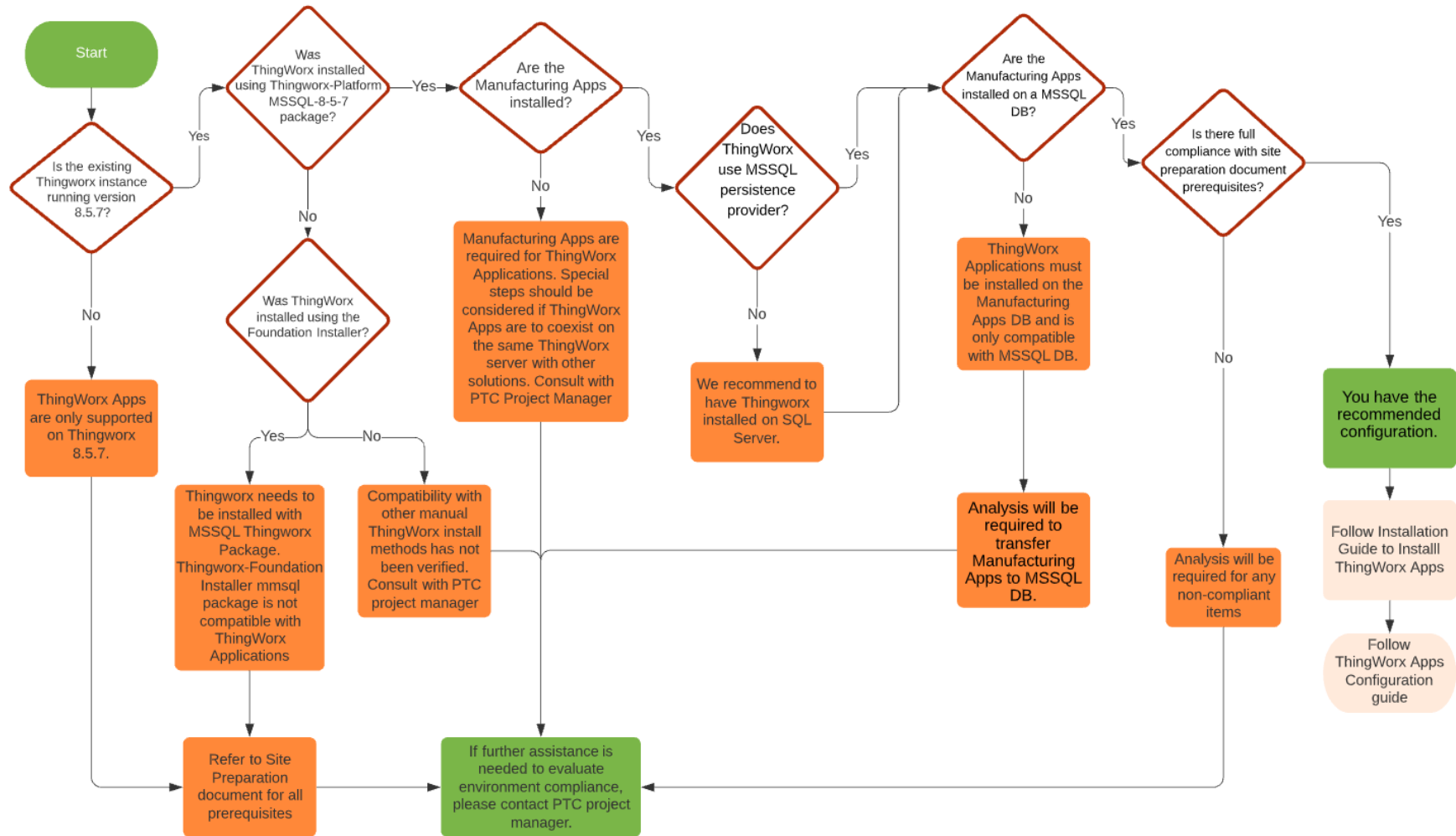
- ThingWorx : https://support.ptc.com/help/ThingWorx_hc/ThingWorx_8_hc/en/index.html#page/ThingWorx%2FHelp%2FSystemRequirements%2F8_5_system_requirements.html%23wwID0E14OS
- SQL Server : <https://docs.microsoft.com/en-us/sql/sql-server/install/hardware-and-software-requirements-for-installing-sql-server?view=sql-server-ver15>
- Kepware : <https://www.kepware.com/getattachment/e1943820-ef3c-4932-b055-4ef2a80ab863/Kepware-Server-manual.pdf>

5. Appendix C – ThingWorx Applications System Architecture Design

TW Applications System Architecture Design (On-Prem)



6. Appendix D – ThingWorx Upgrade Flowchart



7. Appendix E – ThingWorx Upgrade Questions and Answers

Question	Answer	Link
Is ThingWorx 8.5.7 installed?	ThingWorx Applications are only compatible with ThingWorx 8.5.7	https://www.ptc.com/en/support/refdoc/ThingWorx_Platform/8.5/Upgrading_to_ThingWorx_8_5
Are Tomcat and ThingWorx installed on a dedicated drive?	See prerequisite of Apache on this document.	Apache Prerequisites
Is ThingWorx installed with ThingWorx-Platform MSSQL-8-5-7 package?	ThingWorx need to be installed with MSSQL ThingWorx Package. ThingWorx-Foundation Installer MSSQL package IS NOT compatible with ThingWorx Applications	https://www.ptc.com/en/support/refdoc/ThingWorx_Platform/8.5/Upgrading_to_ThingWorx_8_5
Is the Manufacturing App installed?	Manufacturing App is required for ThingWorx Application.	SQL DB Prerequisites
Does ThingWorx use MSSQL persistence provider?	ThingWorx should be installed on SQL Server as is required for ThingWorx Applications	ThingWorx may be used with a PostgreSQL persistence provider and Manufacturing App on MSSQL.
Do the Manufacturing Apps use the same database as ThingWorx?	ThingWorx Applications are installed on the Manufacturing Apps DB and are only compatible with MSSQL DB.	Analysis will be required to transfer MnfApp on SQL. Contact the project manager for more detail.
Are the Manufacturing Apps installed on a dedicated SQL Database?	This is the recommended configuration.	Verify hardware/software prerequisite for ThingWorx App to be compliant (e.g., CPU, Memory, disk space). Refer to prerequisites section.
Are the ThingWorx Apps compatible with PostgreSQL?	The ThingWorx Apps are currently only verified to support MS SQL. The Manufacturing Apps database must be MS SQL. ThingWorx PostgreSQL database has not been verified for support.	Further investigation and extensibility would be required if PostgreSQL compatibility is requested.