PlantPAx Distributed Control System - Template User Manual

System Release 5.0

PlantPAx
Distributed Control System

Allen-Bradley
by ROCKWELL AUTOMATION

FactoryTalk
by ROCKWELL AUTOMATION

Rockwell Automation

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

> **WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

> **ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

> **IMPORTANT** Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.

> **SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

> **BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

> **ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

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Appendix A

Software Product keys and Activations

Notes:

Rockwell Automation Publication 9528-UM001I-EN-P - February 2021

This template user manual describes how to leverage virtual image templates when deploying a virtualized PlantPAx® Distributed Control System (DCS). PlantPAx virtual image templates are pre-configured, virtual system elements of your PlantPAx system.

This manual also describes how to manage and configure templates as individual virtual system elements, and how to configure them to work together.

- **Define and Procure** - Helps you understand the elements of the PlantPAx system to make sure that you buy the proper components.
- **Install** - Provides direction on how to implement the PlantPAx system architecture to help develop your application.
- **Prep** - Provides guidance on how to get started and learn the best practices for developing your application.
- **Develop** - Contains the application-specific libraries and objects that are used to construct your application that resides on the PlantPAx architecture.
- **Operate** – Provides guidance on how to verify and maintain your systems for operation of your plant.

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Configure System Software section updated for clarity.	102
Configure the FactoryTalk Directory section updated for clarity.	116
Install VantagePoint Server Software section updated for clarity.	124

Purpose of this Manual

Virtualization is the abstracting of the operating system from the hardware to enable running multiple virtual machines on one piece of hardware. This manual shows how to use templates to configure virtualized system elements.

Virtual image templates are provided for the following PlantPAx system elements:

- Process Automation System Server (PASS)
- Engineering Workstation (EWS)
- Operator Workstation (OWS)
- SQL Server - AppServ-Info (SQL)
- Process Automation Domain Controller (PADC)
- Historian Server - AppServ-Info (Historian)
- Batch Management Server - AppServ-Batch
- Asset Management Server - AppServ-Asset
- Operator Workstation Application Server - AppServ-OWS

- Engineer Workstation Application Server - AppServ-EWS
- VantagePoint® Server - AppServ-Info (VantagePoint)

In addition to these virtual templates, this manual has deployment instructions for the consolidated PASS (PASS-C) and associated OWS (OWS ISO). The PASS-C and OWS ISO are designed to deploy on a physical machine.

Before you Begin

IMPORTANT	Our templates can be used with any virtualization software. We use VMware for the procedures in this document.

Obtain PlantPAx virtual image templates, PASS-C, and OWS ISO USB devices by the following methods:

- Media - Order a physical copy of the virtual image template. End user is responsible for the proper Microsoft® licensing.
- Electronic Software Delivery (ESD) - Download an electronic copy of the virtual image template from the Product Compatibility and Download Center (PCDC) website. When you download the PASS-C or OWS ISO, you receive an ISO file that you can use to create a bootable device.

Virtual servers require Microsoft OS License Keys for Windows Server operating systems.

Virtual workstations require a Microsoft OS License Key for Windows operating systems.

Tip: Remote Desktop Services uses its own method of licensing clients that log on to Remote Desktop Services servers. This method is separate from licensing for the Windows Server family of operating systems. Therefore, AppServ-OWS and AppServ-EWS Remote Desktop Connections must receive a valid license. This license is issued by a Remote Desktop Licensing Server before they can log on to a Remote Desktop Session Host or Connection Broker.

For licensing of these components, contact your Microsoft distributor.

FactoryTalk Activation Certificates contain serial numbers and product keys for the Rockwell Automation products that correspond to the templates.

See PlantPAx Virtual Image Template Catalog Numbers on page 9

IMPORTANT	If you already own individual product activations, these activations can also be used to activate the virtual image templates.

A domain controller is recommended to be configured and accessible on the network.

vSphere Web Client is used to deploy virtual machines.

vCenter server is optional and enables you to create your own virtual image templates and increase your ability to manage a virtualized control system.

Microsoft Operating System Software Licensing

Each server or workstation instance that is deployed from a template, bootable device, or ISO needs its own Microsoft operating system license and Rockwell Automation® software licenses.

The end user is responsible for properly licensing a Microsoft OS for each template deployed. Additional licenses can be purchased from your Microsoft distributor.

PlantPAx Virtual Image Template Catalog Numbers

Virtual Template	Cat. No.	Description
PASS	9528-PASSVTENM	USB device contains the virtual image template for the PASS. The end user is responsible for acquiring the appropriate Microsoft OS license for Server 2016. All required Rockwell Automation software is pre-installed but not activated.
EWS	9528-EWSVTENM	USB device contains the virtual image template for the engineering workstation. The end user is responsible for acquiring the appropriate Microsoft OS license for Windows 10. All required Rockwell Automation software is pre-installed but not activated.
OWS	9528-OWSVTENM	USB device contains the virtual image template for the OWS. The end use is responsible for acquiring the appropriate Microsoft OS license for Windows 10. All required Rockwell Automation software is pre-installed but not activated.
AppServ-OWS, AppServ-EWS	9528-APPXWSENM	USB device contains the virtual image template for AppServ-OWS and AppServ-EWS. The end user is responsible for acquiring the appropriate Microsoft OS license for Server 2016. All required Rockwell Automation software is pre-installed but not activated. You must also purchase the appropriate Windows CAL from a Microsoft distributor. **IMPORTANT:** Each client needs an RDS CAL license.
AppServ-Info (Historian)	9528-APPHISENM	USB device contains the virtual image template for AppServ-Info (Historian). The end user is responsible for acquiring the appropriate Microsoft OS license for Server 2016. All required Rockwell Automation software is pre-installed but not activated.
AppServ-Asset	9528-APPASMENM	USB device contains the virtual image template for AppServ-Asset. The end user is responsible for acquiring the appropriate Microsoft OS license for Server 2016. All required Rockwell Automation software is pre-installed but not activated.
AppServ-Info (SQL)	9528-APPSQLENM	USB device contains the virtual image template for AppServ-Info (SQL). The end user is responsible for acquiring both the appropriate Microsoft OS license for Server 2016 and Microsoft SQL server.
AppServ-Info (VantagePoint)	9528-APPVTPENM	USB device contains the virtual image template for AppServ-Info (VantagePoint). The end user is responsible for acquiring the appropriate Microsoft OS license for Server 2016. Most required Rockwell Automation software is pre-installed but not activated. The FactoryTalk VantagePoint software is not pre-installed for your convenience.
AppServ-Batch	9528-APPBATENM	USB device contains the virtual image template for AppServ-Batch. The end user is responsible for acquiring the appropriate Microsoft OS license for Server 2016. Most required Rockwell Automation software is pre-installed but not activated. The FactoryTalk Batch software is not pre-installed.
Domain controller	9528-PADCVTENM	USB device contains the virtual image template for a Domain controller. The end user is responsible for acquiring the appropriate Microsoft OS license for Server 2016. You must also purchase the appropriate Windows CAL from a Microsoft distributor.

System Element	Cat. No.	Description
PASS - C (Consolidated)	9528-PASSCENM	USB device contains a bootable image to install a consolidated PASS on a physical machine. The consolidated PASS includes Historian, VantagePoint, Asset Management, OWS, and EWS. The end user is responsible for acquiring the appropriate Microsoft OS license for Server 2016. A Rockwell Automation license is required for software activation.
OWS ISO	9528-OWSISOENM	USB device contains a bootable image to install an operator workstation on a physical machine. The end user is responsible for acquiring the appropriate Microsoft OS license for the Windows 10 operating system. A Rockwell Automation license is required for software activation.

Build Details

PlantPAx Virtual Image Template

Element	Category	Description
Process Automation System Server (PASS)	Operating system	Microsoft Windows Server 2016 Standard

	Rockwell Automation software	• FactoryTalk Services Platform
		  – FactoryTalk Services platform software, version 6.20.00
		  – FactoryTalk Activation Manager software, version 4.04.14
		  – FactoryTalk Linx software, version 6.20.00
		• FactoryTalk View Site Edition Client software, version 12.00.00
		• FactoryTalk View Site Edition Server software, version 12.00.00
		• FactoryTalk View Studio Enterprise software, version 12.00.00
		• FactoryTalk Alarm and Events software, version 6.20.00
		• FactoryTalk Diagnostics software, version 6.20.00
		• FactoryTalk Historian SE Live Data Interface, version 7.00.00
		• Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13

Engineering Workstation (EWS)	Operating system	Microsoft Windows 10 Enterprise LTSC 2019

	Rockwell Automation software	• FactoryTalk Services Platform
		  – FactoryTalk Services Platform software, version 6.20.00
		  – FactoryTalk Linx software, version 6.20.00
		  – RSLinx® Classic software, version 4.20.00
		  – FactoryTalk Activation Manager software, version 4.04.14
		• FactoryTalk View Site Edition Client software, version 12.00.00
		• FactoryTalk View Site Edition Server software, version 12.00.00
		• FactoryTalk View Studio Enterprise software, version 12.00.00
		• FactoryTalk Alarm and Event software, version 6.20.00
		• FactoryTalk Diagnostics software, version 6.20.00
		• RSLogix 5000® Professional software, versions 20.05.00
		• Studio 5000 Logix Designer® application, versions 33.00.00, 32.03.00, 31.02.00, 30.02.00, 28.03.00, 24.02.00, 21.03.02
		• Studio 5000 Application Code Manager, version 4.00.00
		• RSNetWorx™
		  – RSNetWorx for EtherNet/IP™ software, version 28.01.00
		  – RSNetWorx for ControlNet® software, version 28.01.00
		  – RSNetWorx for DeviceNet® software, version 28.01.00
		• FactoryTalk AssetCentre
		  – FactoryTalk AssetCentre Client software, version 10.00.00
		• FactoryTalk Historian SE Management Tools, version 7.00.00
		• Studio 5000® Logix Emulate™, version 33.00.00
		• ControlFLASH Plus™ software, version 3.01.00
		• ControlFLASH™ software, version 15.03.00
		• Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13

	Additional third-party software	• Microsoft SQL Server 2012 SP4 Management Tools • Microsoft SQL Server 2012 SP4 Client Connectivity
Operator Workstation (OWS)	Operating system	Microsoft Windows 10 Enterprise LTSC 2019

	Rockwell Automation software	• FactoryTalk Services Platform
		  – FactoryTalk Services Platform software, version 6.20.00
		  – FactoryTalk Linx software, version 6.20.00
		  – RSLinx Classic software, version 4.20.00
		  – FactoryTalk Activation Manager software, version 4.04.14
		• FactoryTalk Diagnostics software, version 6.20.00
		• FactoryTalk View Site Edition Client software, version 12.00.00
		• FactoryTalk Alarm and Event software, version 6.20.00
		• FactoryTalk AssetCentre Client software, version 10.00.000
		• Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13

Process Automation Domain Controller (PADC)	Operating system	Microsoft Windows Server 2016 Standard

Element	Category	Description
Application Server OWS (AppServ-OWS)	Operating system	Microsoft Windows Server 2016 Standard

	Rockwell Automation software	• FactoryTalk Services Platform
		  – FactoryTalk Services Platform software, version 6.20.00
		  – FactoryTalk Linx software, version 6.20.00
		  – RSLinx Classic software, version 4.20.00
		  – FactoryTalk Activation Manager software, version 4.04.14
		• FactoryTalk View Site Edition Client software, version 12.00.00
		• FactoryTalk Diagnostics software, version 6.20.00
		• FactoryTalk Alarm and Event software, version 6.20.00
		• FactoryTalk AssetCentre Client software, version 10.00.00
		• Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13

Application Server EWS (AppServ-EWS)	Operating system	Microsoft Windows Server 2016 Standard

	Rockwell Automation software	• FactoryTalk Services Platform
		  – FactoryTalk Services Platform software, version 6.20.00
		  – FactoryTalk Linx software, version 6.20.00
		  – RSLinx Classic software, version 4.20.00
		  – FactoryTalk Activation Manager software, version 4.04.14
		FactoryTalk View Site Edition Client software, version 12.00.00
		• FactoryTalk View Site Edition Server software, version 12.00.00
		• FactoryTalk View Studio Enterprise software, version 12.00.00
		• FactoryTalk Alarm and Event software, version 6.20.00
		• FactoryTalk Diagnostics software, version 6.20.00
		• RSLogix 5000® Professional software, versions 20.05.00
		• Studio 5000 Logix Designer® application, versions 33.00.00, 32.03.00, 31.02.00, 30.02.00, 28.03.00, 24.02.00, 21.03.02
		• Studio 5000 Application Code Manager, version 4.00.00
		• RSNetWorx
		  – RSNetWorx for EtherNet/IP software, version 28.01.00
		  – RSNetWorx for ControlNet software, version 28.01.00
		  – RSNetWorx for DeviceNet software, version 28.01.00
		• FactoryTalk AssetCentre
		  – FactoryTalk AssetCentre Client software, version 10.00.00
		• FactoryTalk Historian SE Management Tools Suite, version 7.00.00
		• Studio 5000 Logix Emulate, version 33.00.00
		• ControlFLASH Plus software, version 3.01.00
		• ControlFLASH software, version 15.03.00
		• Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13

	Additional third-party software	• Microsoft SQL Server 2012 SP4 Management Tools • Microsoft SQL Server 2012 SP4 Client Connectivity
Application Server Historian (AppServ-Info Historian)	Operating system	Microsoft Windows Server 2016 Standard

	Rockwell Automation software	• FactoryTalk Services Platform
		  – FactoryTalk Services Platform software, version 6.20.00
		  – FactoryTalk Activation Manager software, version 4.04.14
		  – FactoryTalk Diagnostics software, version 6.20.00
		• FactoryTalk Alarm and Event software, version 6.20.00
		• FactoryTalk Historian Site Edition Server, version 7.00.00
		• FactoryTalk Historian ActiveView software, version 7.00.00
		• FactoryTalk Historian DataLink software, version 7.00.00
		• FactoryTalk Historian Management software, version 7.00.00
		• FactoryTalk Historian ProcessBook software, version 7.00.00
		• FactoryTalk Historian SE Live Data Interface, version 7.00.00
		• Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13
		• FactoryTalk Linx software, version 6.20.00

Element	Category	Description
Application Server Asset Management (AppServ-Asset)	Operating system	Microsoft Windows Server 2016 Standard
	Rockwell Automation software	• FactoryTalk Services Platform – FactoryTalk Services Platform software, version 6.20.00 – FactoryTalk Diagnostics software, version 6.20.00 – FactoryTalk Linx software, version 6.20.00 – RSLinx Classic software, version 4.20.00 – FactoryTalk Activation Manager software, version 4.04.14 – FactoryTalk Alarm and Event software, version 6.20.00 • FactoryTalk AssetCentre – FactoryTalk AssetCentre Server software, version 10.00.00 – FactoryTalk Asset Centre Client software, version 10.00.00 • Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13
	Additional third-party software	Microsoft SQL Server Express 2016 SP2 Advanced (includes Management Studio)
Application Server Information SQL (AppServ-Info-SQL)	Operating system	Microsoft Windows Server 2016 Standard
	Microsoft SQL Server Standard 2016 (includes Management Studio)	Microsoft SQL Server Standard 2012 SP4 (includes Management Studio)
Application Server Information VantagePoint® (AppServ-Info-VantagePoint)	Operating system	Microsoft Windows Server 2016 Standard
	Rockwell Automation software	• FactoryTalk Services Platform – FactoryTalk Services Platform software, version 3.00.00 – FactoryTalk Activation Manager software, version 4.02.00 – FactoryTalk Diagnostics software, version 3.00.00 – FactoryTalk Linx software, version 6.00.00 • FactoryTalk VantagePointSystem Server software, version 8.10.00 • Rockwell Automation Windows Firewall Configuration Utility, version 1.00.10
Application Server Batch Management (AppServ-Batch)	Operating system	Microsoft Windows Server 2016 Standard
	Rockwell Automation software	• FactoryTalk Services Platform – FactoryTalk Activation Manager software, version 4.04.14 – FactoryTalk Diagnostics software, version 6.20.00 – FactoryTalk Services Platform software, version 6.20.00 – RSLinx Classic software, version 4.20.00 • FactoryTalk Batch, version 14.00.00 • Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13

USB Devices

Element	Category	Description
PASS-C (consolidated)	Operating system	Microsoft Windows Server 2016 Standard

	Rockwell Automation software	• FactoryTalk Services Platform
		  – FactoryTalk Services platform software, version 6.20.00
		  – FactoryTalk Activation manager software, version 4.04.14
		  – FactoryTalk Linx software, version 6.20.00
		  – RSLinx Classic software, version 4.20.00
		• FactoryTalk View Site Edition Client software, version 12.00.00
		• FactoryTalk View Site Edition Server software, version 21.00.00
		• FactoryTalk View Studio Enterprise software, version 12.00.00
		• FactoryTalk Alarm and Event software, version 6.20.00
		• FactoryTalk Diagnostics software, version 6.20.00
		• FactoryTalk Historian SE Live Data Interface, version 7.00.00
		• Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13
		• FactoryTalk Historian SE software, version 7.00.00
		• FactoryTalk AssetCentre Server, version 10.00.00
		• FactoryTalk AssetCentre Client, version 10.00.00
		• RSLogix 5000 Professional software, versions 20.05.00
		• Studio 5000 Logix Designer application, versions 33.00.00, 32.03.00, 31.02.00, 30.02.00, 28.03.00, 24.02.00, 21.03.02
		• Studio 5000 Application Code Manager, version 4.01.00
		• ControlFLASH software, version 15.03.00
		• ControlFLASH Plus software, version 3.01.00

	Additional software	SQL Server Express 2016
Operator Workstation (OWS ISO)	Operating system	Microsoft Windows 10 Enterprise LTSC 2019

	Rockwell Automation software	• FactoryTalk Services Platform
		  – FactoryTalk Services platform software, version 6.20.00
		  – FactoryTalk Linx software, version 6.20.00
		  – RSLinx Classic software, version 4.20.00
		  – FactoryTalk Activation manager software, version 4.04.14
		• FactoryTalk Diagnostics software, version 6.20.00
		• FactoryTalk View Site Edition Client software, version 12.00.00
		• FactoryTalk Alarm and Event software, version 6.20.00
		• FactoryTalk AssetCentre Client, version 10.00.00
		• Rockwell Automation Windows Firewall Configuration Utility, version 1.00.13

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
EtherNet/IP Network Devices User Manual, ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications.	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at rok.auto/literature.

Basics of Virtualization

Virtual Image Templates

Rockwell Automation offers virtual image templates as an option to deploy a virtualized PlantPAx® system. The PlantPAx Virtual Image Templates deliver all system elements as pre-installed, drop-in virtual machines. The industry also refers to virtualized system elements as virtual appliances. However, in this manual, virtual system elements are referred to as virtual image templates because you can use them to deploy as many virtual appliances as you want.

The virtual image templates are delivered as an Open Virtual Appliance (OVA) file on USB devices or via the Web. With OVA files, you can use any virtualization platform for deployment. The guidelines that are contained in this manual are for setup and deployment of the templates in a VMware vSphere environment.
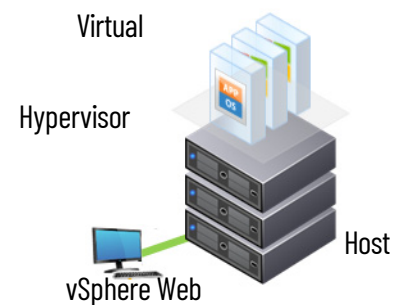
The virtual image templates help to reduce validation costs and initial engineering time, enhance scalability, simplify upgrades, and patch management. Only one copy of the virtual image templates is needed for a project.

Some of the benefits of a virtualized PlantPAx system include the following:

- Increased energy savings
- Extended system life
- Reduced system footprint and hardware cost
- Increased up time and availability
- Self-contained simulation and engineering
- Faster server provisioning
- Improved disaster recovery

Flexibility and ease of deployment are key when designing a virtual infrastructure. Both intangibles are a part of the PlantPAx system.

Choose a Hypervisor

IMPORTANT	The following procedures apply only to virtual templates. Skip to <u>Chapter 6</u> if you are deploying a PASS-C or OWS ISO

A hypervisor is computer software that manages a physical host server and allocates computing resources to run multiple guest operating systems. Each guest is a virtual machine (VM) that runs in the host server with its own memory, storage, and CPU allocation on the host.

IMPORTANT	Rockwell Automation recommends and tests on VMware hypervisors. Other hypervisors are available; however, we describe using PlantPAx image templates on the VMware vSphere ESXi hypervisor.
	For a production environment, we recommend a minimum of a VMware vSphere Essentials Kit. The vSphere Essentials Kit supports 6 CPUs and a vCenter server access to key virtual components at a minimum cost.

Depending on the make and model of your host server, the hypervisor installation files are available directly from the manufacturer's website. These custom downloadable packages often contain drivers for specialized hardware. If a customized download is not available from the vendor, you can download the hypervisor directly from the VMware website.

1. Log in to the vendor or VMware website.
2. Find the support or downloads section and search for hypervisors.
3. Select the latest version of hypervisor that is supported on your server hardware or choose the version of which you have licensing.
4. Download the hypervisor.

Install a Hypervisor

This section describes how to install the VMware vSphere ESXi hypervisor to a host server. To install the hypervisor on your server, we recommend that you copy the installer image (.iso) to a DVD. If desired, you can also copy the installer image (.iso) to a USB drive (at least 1 GB).

Copy Installer Image to DVD

1. Right-click the downloaded installer image and choose Burn disk image.
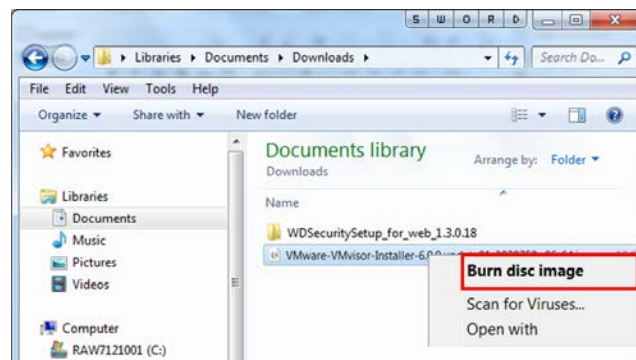
2. Select the DVD drive where you will write the data, and select Burn. Select Close when the DVD is completed.
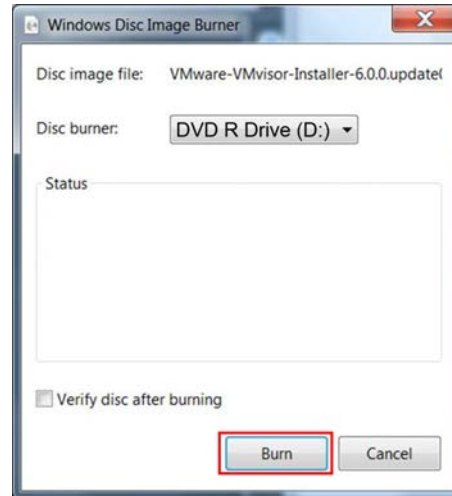
Copy Installer Image to USB Drive

IMPORTANT	Before starting this procedure, make sure that the USB drive has enough space on it to hold the hypervisor 'ISO' file.

1. Right-click the downloaded installer image and choose copy.
2. Select a location on the USB drive, right-click, and choose paste.
3. When the file copy is completed, you can remove the USB drive.

Use a DVD or USB Drive to Start Server

When you start the server, make sure to choose the DVD or USB drive that contains the installer image as the booting address. Complete these steps to install the ESXi (hypervisor).

1. Insert the DVD or USB drive into the host physical server.
2. Select the optional booting address during the server startup.
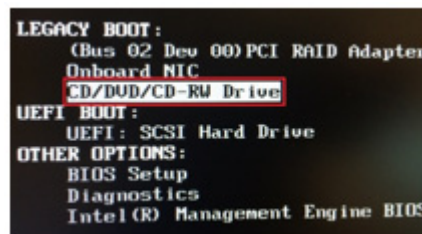
3. Press Enter to continue'.
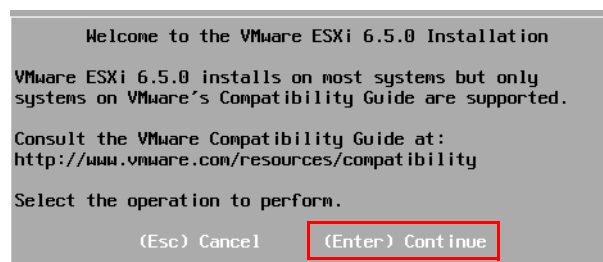
4. On the End User License Agreement (EULA) page, read the EULA, and press F11 to accept the terms of the EULA and continue.

```
                End User License Agreement (EULA)

  VMWARE END USER LICENSE AGREEMENT

  PLEASE NOTE THAT THE TERMS OF THIS END USER LICENSE
  AGREEMENT SHALL GOVERN YOUR USE OF THE SOFTWARE, REGARDLESS
  OF ANY TERMS THAT MAY APPEAR DURING THE INSTALLATION OF THE
  SOFTWARE.

  IMPORTANT-READ CAREFULLY: BY DOWNLOADING, INSTALLING, OR
  USING THE SOFTWARE, YOU (THE INDIVIDUAL OR LEGAL ENTITY)
  AGREE TO BE BOUND BY THE TERMS OF THIS END USER LICENSE
  AGREEMENT ("EULA").  IF YOU DO NOT AGREE TO THE TERMS OF
  THIS EULA, YOU MUST NOT DOWNLOAD, INSTALL, OR USE THE
  SOFTWARE, AND YOU MUST DELETE OR RETURN THE UNUSED SOFTWARE
  TO THE VENDOR FROM WHICH YOU ACQUIRED IT WITHIN THIRTY (30)
  DAYS AND REQUEST A REFUND OF THE LICENSE FEE, IF ANY, THAT

            Use the arrow keys to scroll the EULA text

      (ESC) Do not Accept          (F11) Accept and Continue
```

5. Select the disk where you will install the vSphere Hypervisor and press Enter to continue.

```
              Select a Disk to Install or Upgrade

  * Contains a VMFS partition
  # Claimed by VMware vSAN

  Storage Device                                      Capacity
  -----------------------------------------------------------------
  Local:
     VMware    Virtual disk      (mpx.vmhba0:C0:T0:L0)    40.00 GiB
  Remote:
     (none)



     (Esc) Cancel     (F1) Details     (F5) Refresh    (Enter) Continue
```
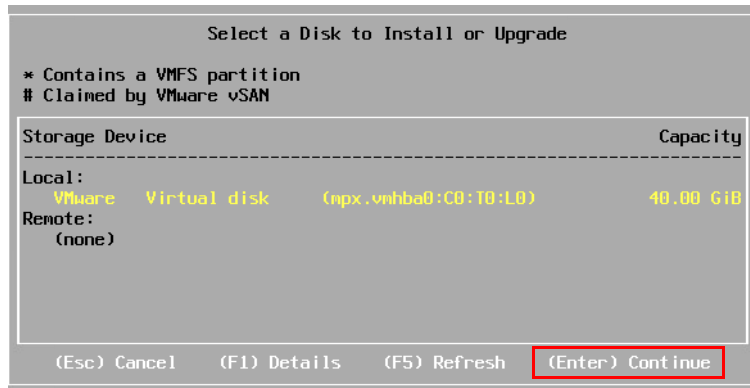
6. Select the desired keyboard and press Enter to continue.

```
              Please select a keyboard layout

  Swiss French
  Swiss German
  Turkish
  US Default
  US Dvorak
  Ukrainian
  United Kingdom

            Use the arrow keys to scroll.

  (Esc) Cancel      (F9) Back      (Enter) Continue
```

7. Type a root password, retype the password, and press Enter to continue.

```
              Enter a root password

     Root password: ********
  Confirm password: ********

                Passwords match.

  (Esc) Cancel      (F9) Back      (Enter) Continue
```
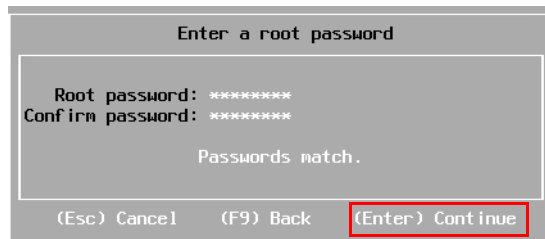
IMPORTANT   Remember this password; you use it again in future steps.

8. Press F11 to Install.

```
                      Confirm Install

     The installer is configured to install ESXi 6.5.0 on:
                      mpx.vmhba0:C0:T0:L0.

               Warning: This disk will be repartitioned.


       (Esc) Cancel        (F9) Back        (F11) Install
```
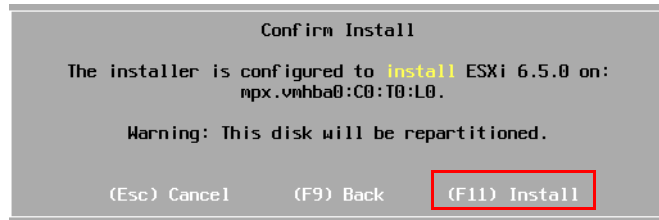
9. Remove the DVD or USB device and press Enter to shut down and restart. The server shutdown takes a few minutes.

```
                   Installation Complete

    ESXi 6.5.0 has been installed successfully.

    ESXi 6.5.0 will operate in evaluation mode for 60 days.
    To use ESXi 6.5.0 after the evaluation period, you must
    register for a VMware product license.

    To administer your server, navigate to the server's
    hostname or IP address from your web browser or use the
    Direct Control User Interface.

    Remove the installation media before rebooting.

    Reboot the server to start using ESXi 6.5.0.
                      (Enter) Reboot
```

Assign an IP Address to the Host

You must assign an IP address to the host so that it is on the desired network and can communicate with the client workstations. For example, you can deploy a virtual image template in this server remotely from another workstation on the same network.

> For the displays in this section, use the arrow keys on your keyboard to move between the fields on the pages.

1. After the system restarts, press F2 to Customize System/View Logs.

```
        VMware ESXi 6.5.0 (VMKernel Release Build 5969303)

        VMware, Inc. VMware7,1

        2 x Intel(R) Xeon(R) CPU E5-2640 v4 @ 2.40GHz
        64 GiB Memory




        Download tools to manage this host from:
        http://172.18.1.13/  DHCP)
        http://[fe80::25u:5bff:feb2:34d6]/ (STATIC)




    <F2> Customize System/View Logs              <F12> Shut Down/Restart
```
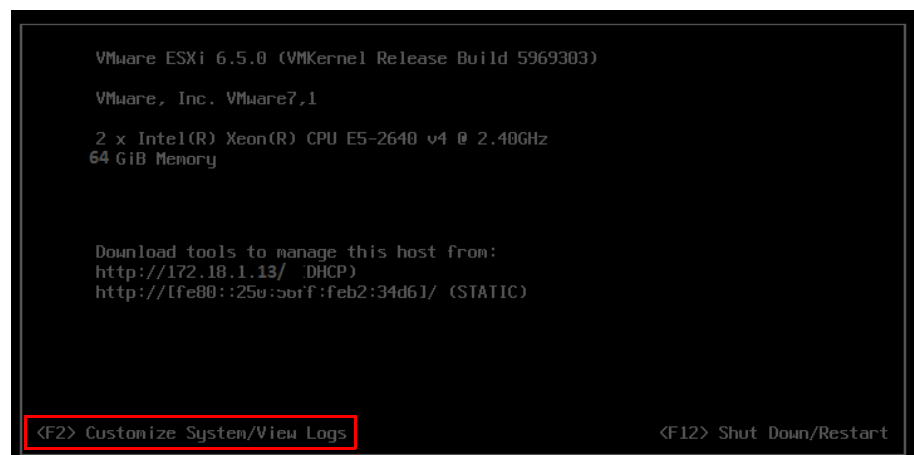
2. Enter the Login name and password that was created in <u>Use a DVD or USB Drive to Start Server</u>.
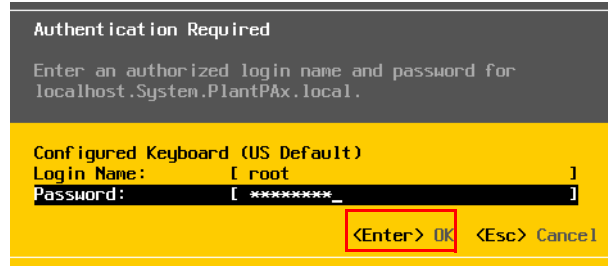
3. Select 'Configure Management: Network.'
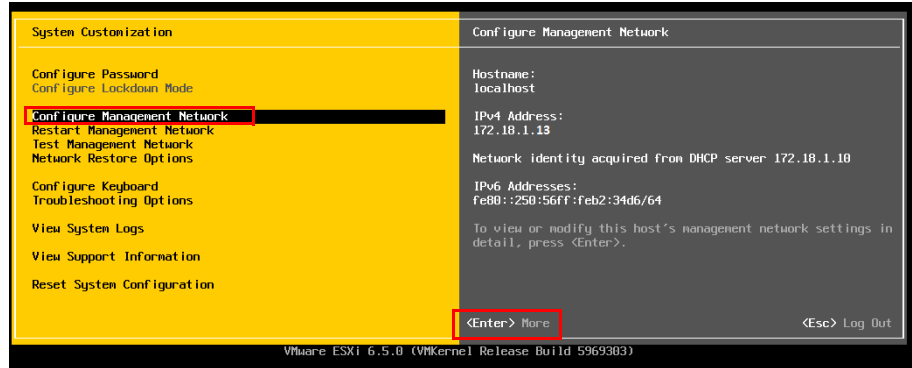
4. Select 'IPv4 Configuration.'

5. Select 'Set static IP address and network configuration' and press the Space bar. (The presence of a small circle between the parentheses indicates that this option is selected.) Select the IP address, Subnet Mask, and default gateway address and enter the appropriate values for your system and organization.
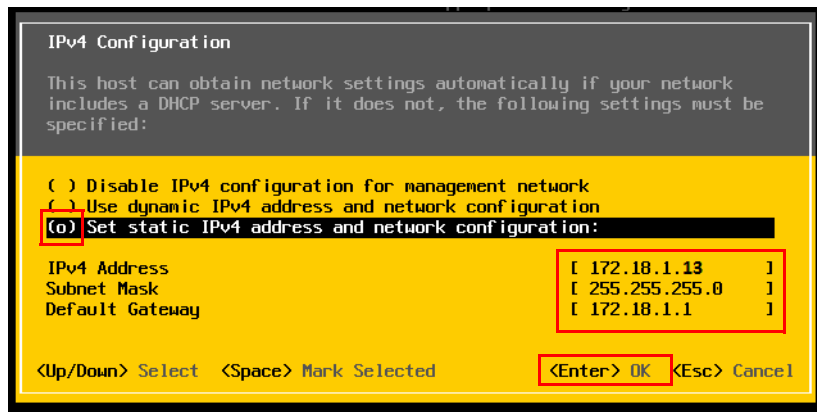
6. On the Configuration Management Network page, press <Esc> to Exit. A message appears to confirm that you want to change the management network of the host. Select Yes.
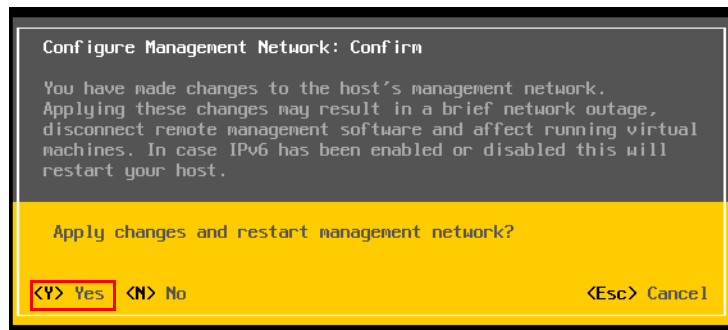
7. On the System Customization screen, press <Esc> to log out. You have assigned an IP address to the host server.

Using a vSphere Web Client

1. Open a web browser and type the IP address that you created for the hypervisor host. A security warning appears the first time that you connect to the ESXi host server.

2. Select Advanced.
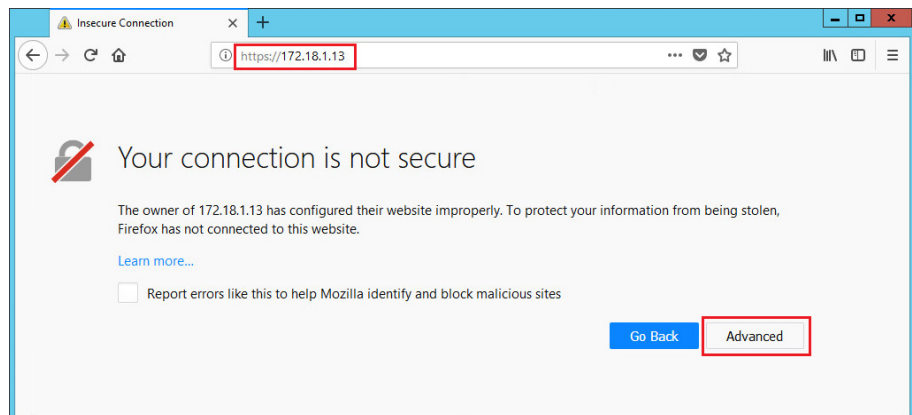
3. The security warning expands with an invalid certificate message. Select Add Exception.

172.18.1.13 uses an invalid security certificate.

The certificate is not trusted because the issuer certificate is unknown.
The server might not be sending the appropriate intermediate certificates.
An additional root certificate may need to be imported.

Error code: SEC_ERROR_UNKNOWN_ISSUER
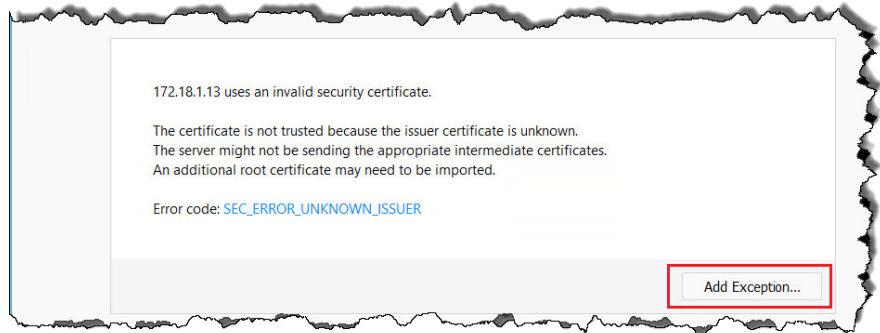
Add Exception...

4. Contact your IT department if you want a security certificate for your ESXi host server. To ignore the warning, select Confirm Security Exception.

Add Security Exception   x

You are about to override how Firefox identifies this site.
Legitimate banks, stores, and other public sites will not ask you to do this.

Server
Location: https://172.18.1.13/   Get Certificate

Certificate Status
This site attempts to identify itself with invalid information.   View...

Unknown Identity

The certificate is not trusted because it hasn't been verified as issued by a trusted authority using a secure signature.

☐ Permanently store this exception

Confirm Security Exception   Cancel

5. Log in to the VMware ESXi Host using the credentials created in Use a DVD or USB Drive to Start Server. (The default user name is 'root'.)

6. Select Navigator.

Vrtx01b2 - VMware ESXi   ×   +

← → C ⌂   ⓘ 🔒 https://172.18.1.13/ui/#/host

vmware ESXi

🖥 Vrtx01b2

🔷 Manage with vCenter Server | 📑 Create/Register VM | 🔴 Shut down | 🔁 Reboo

Vrtx01b2
Version: 6.5.0 Update 1 (Build 6765664)
State: Normal
Uptime: 14.81 days

Navigator
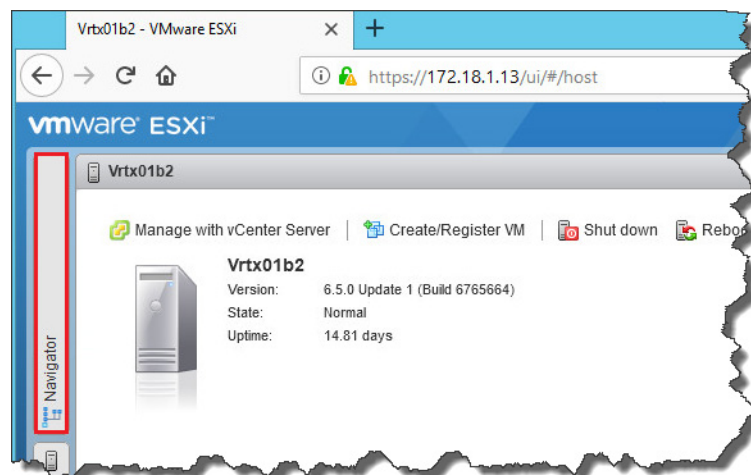
7. Select Manage, Licensing, Actions, and Assign License.
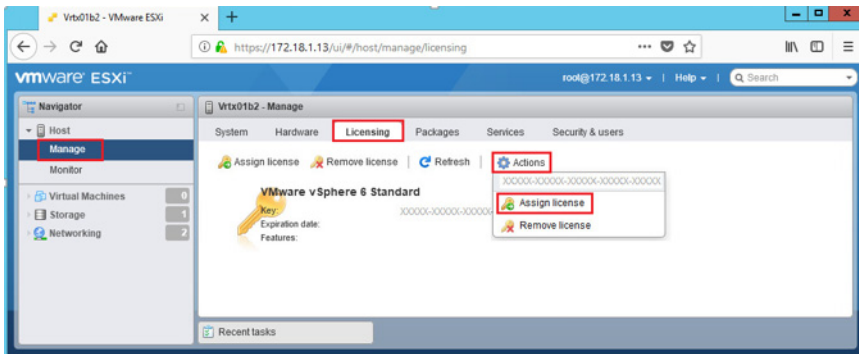
8. Enter the license key and Check Licenses.
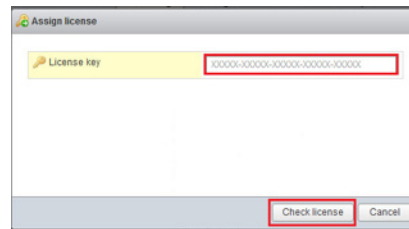
9. Select Assign License. After it is assigned, a list of features that are associated with the license is displayed.
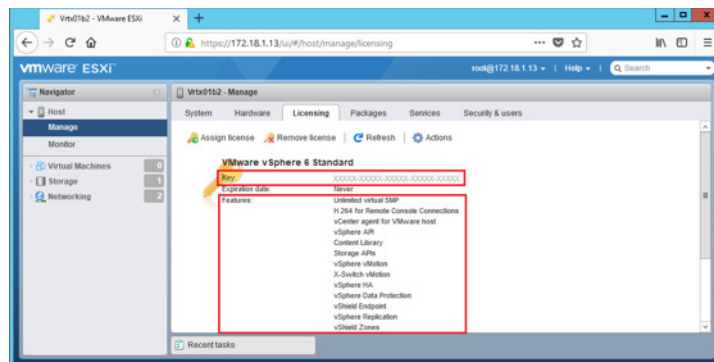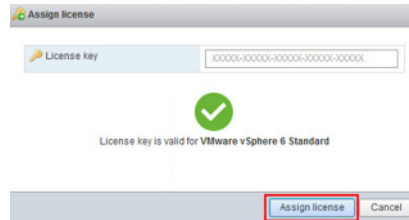
Notes:

Deploy PlantPAx Virtual Machines

Distributed control systems are composed of several industry-accepted system elements. Virtual Image Templates are virtualized system elements, which contain the software and tools that comprise a specific system element. The templates are a framework to deploy the necessary system elements for a PlantPAx® system in a virtual environment conveniently and consistently.

This chapter describes how to deploy PlantPAx image templates to create virtual machines and how to configure the initial settings when powering up for the first time.

A virtual machine acts independently and has its own resource allocation from the host. You interact with virtual machines as if they are on a dedicated workstation with their own physical resources.

Deploy PlantPAx Virtual Image from OVA file

This section describes the first-time deployment of a PlantPAx virtual image. The virtual image can be deployed from a purchased USB drive or from a web download stored locally on a workstation.

> TIP: If the virtual image template is sourced from a USB drive, we advise you to copy the files to your workstation and use the copies to speed the deployment process.

The workstation would be the same computer where you are using the vSphere Web Client to connect to the host server.

This deployment procedure is applicable to all PlantPAx virtual templates, and is required every time a virtual image template is deployed for the first time into your system.

> **IMPORTANT** If you plan to deploy a domain controller, it is recommended that the domain controller is the first element that is deployed in the system. The PADC template facilitates future activities, such as creating your own virtual image templates and deploying virtual images to your system at your convenience.

1. Open a web browser and enter the IP address that you created for the host server. Enter the user name and password for the EXSi host, and Select Log in
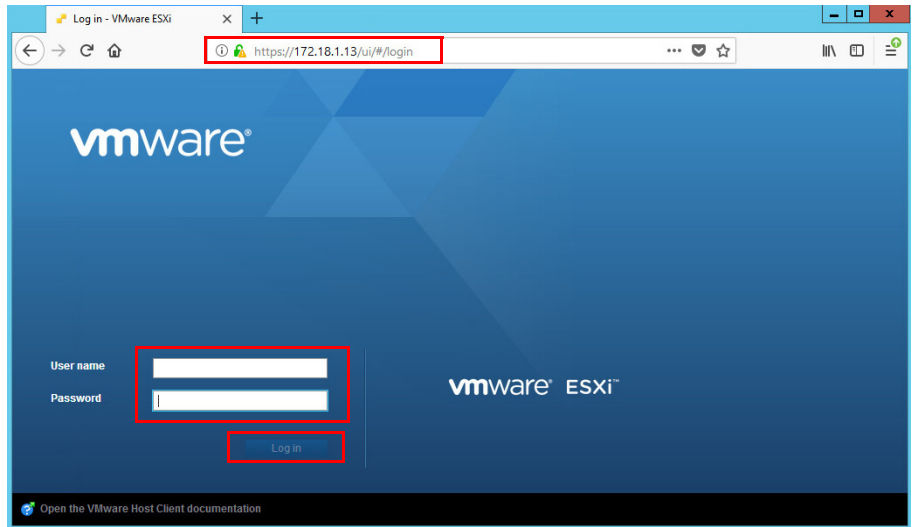
2. In the Navigator pane, select Virtual Machines and choose Create/Register VM.
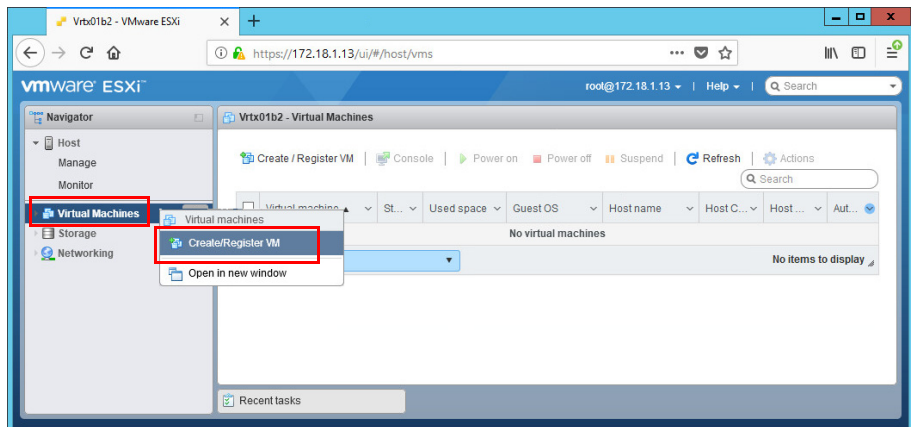
3. Select 'Deploy a virtual machine from an OVF or OVA file'.
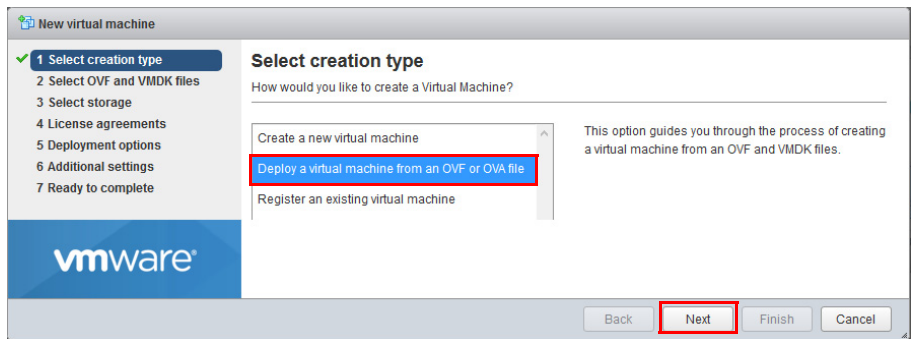
4. Enter a name for the virtual machine.
   Click in the shaded area and select the .ova file to be used.
   The virtual file displays with the name.
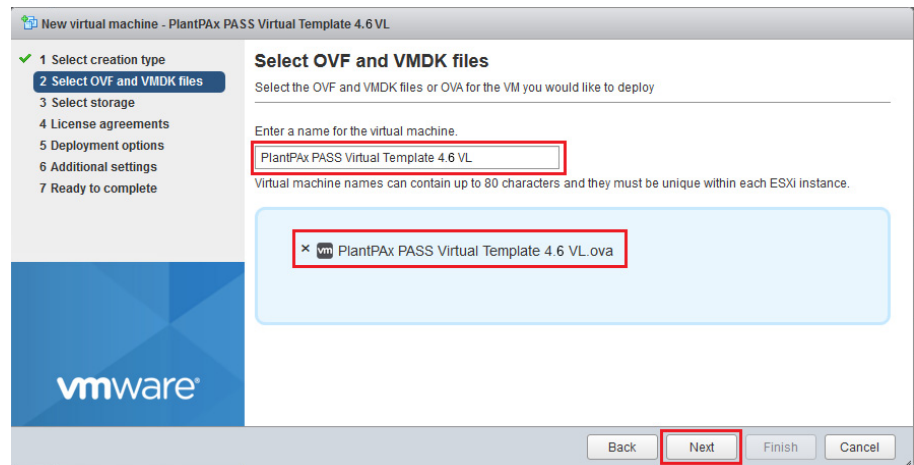
5. Select the datastore for your configuration and disk files storage..
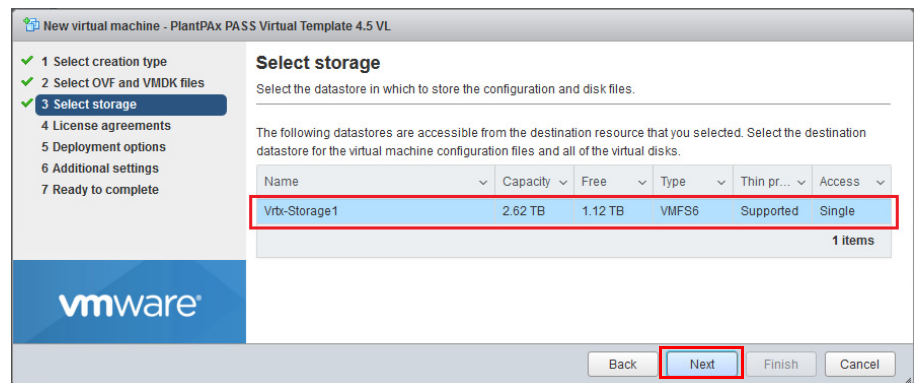
	IMPORTANT	There are two main formats for storing virtual images: OVF (open virtual format) and OVA (open virtual appliance). Our templates are for appliances, which are self-contained virtual system elements. VMware software labels the wizard 'OVF Template' but ignore because your PlantPAx Virtual Image Templates in the OVA format are suitable for this procedure.

6. Use defaults for network mapping and disk provisioning, and select 'Power on automatically.'
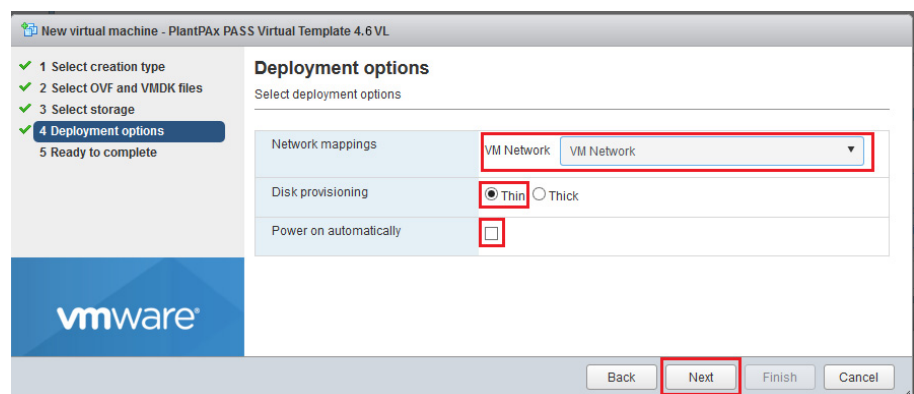
7. Select Finish to upload the virtual template.
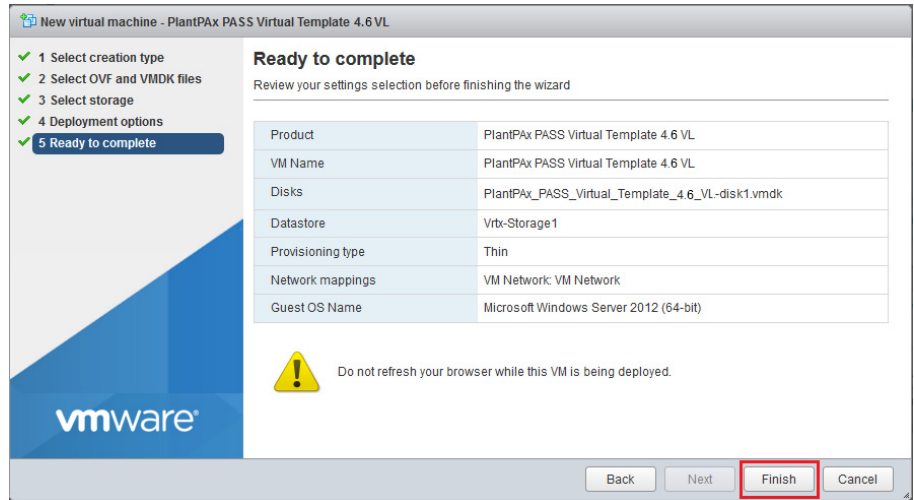
The completion percentage is shown at the bottom.
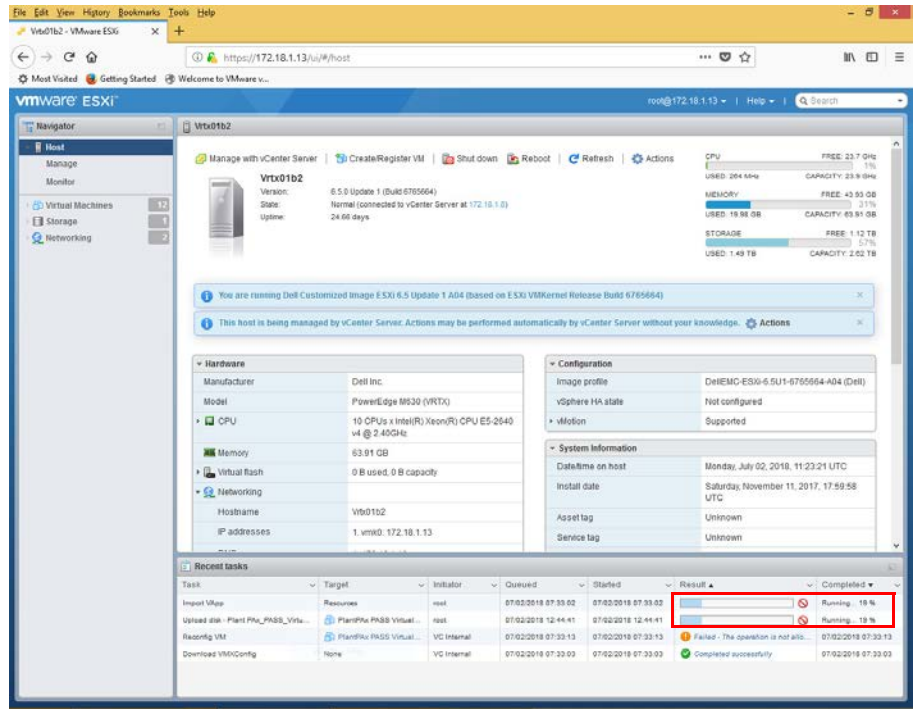
The Result column shows 'Completed successfully' when the template upload finishes.

Power On the Virtual Machine

1. Open a web browser and enter the IP address that you created for the host server. Enter the user name and password for the EXSi host, and Select Log in
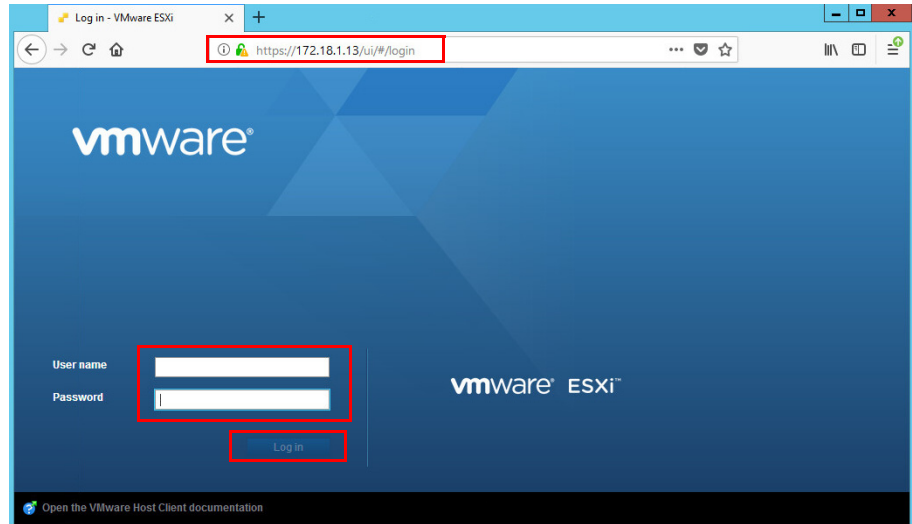
2. Right-click the Virtual Machine and choose Power>Power on.
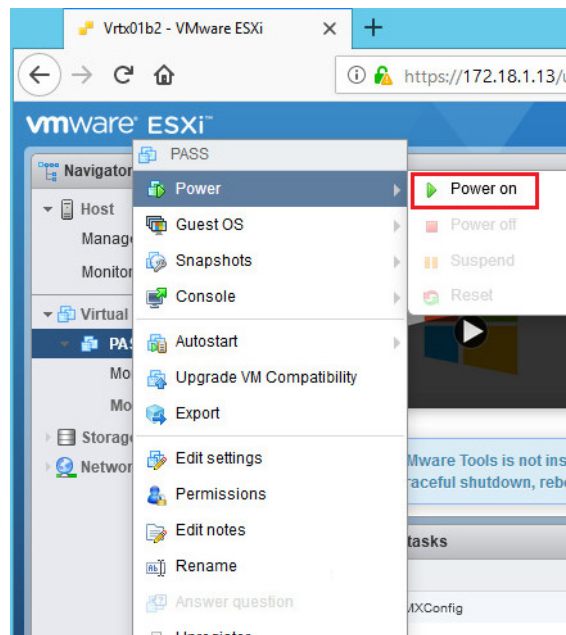
> **IMPORTANT**   When powering on the virtual machine for the first time, the screen can remain black for several minutes.

Windows Out of Box Experience

The Windows Out of Box Experience (OOBE) consists of displays that require customers to accept the end users license agreement (EuLA), connect to the internet, log in with or sign up for a Microsoft® Account, and share information with the OEM.

Complete these steps for the initial configuration of all virtual machines that were deployed using PlantPAx image templates.

Windows Server 2016 virtual machines require the OOBE following initialization:

1. Choose the appropriate location, language, and keyboard settings and Next.
2. Enter the product key to activate windows or choose to activate later.
3. On the EULA dialog box, read the license terms and Accept.
4. Type a password for Administrator, retype the password to verify, and Finish.

Windows 10 LTSC virtual machines require the following OOBE initialization:

1. Click 'Skip for now' for an internet connection.
2. On the EULA dialog box, read the license terms and Accept.
3. Type a user name and Next
4. Create a password, retype password to verify, and Finish.
5. Create security questions, and Next.
6. Click No when prompted to make Cortana your personal assistant.
7. Turn off all privacy settings for your device and Accept.
8. Enter the Windows product key.

Initial Windows Login

A logon message appears, which prompts you to press Ctrl + Alt + Delete key combination to unlock'.

1. **DO NOT** press Ctrl + Alt + Delete for a virtual machine.
2. Instead press Ctrl + Alt + Insert. this is the VMware key combination to unlock.
3. Type the Administrator password that you created and Press Enter.

If you see the Other-User logon, type 'Administrator', type the administrator password that you created and Press Enter. Wait until you see the network message in the following steps.

1. Select 'Yes' to allow the PC to be discoverable.
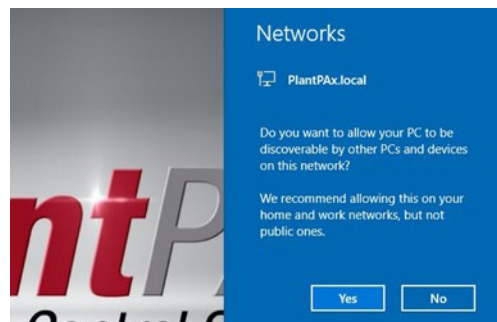
If you skipped the product key earlier, another dialog window appears to remind you that Windows must be activated.

2. In the Product Key window, enter a valid Windows Product Key.
3. Verify that the product key is correct.

4. Select OK in the message window when the product key was installed successfully.

5. Select OK in the activation window.

6. Activate the key with a KMS server; your company's or Microsoft's. See Appendix A for more licensing information.

VMware Tools

The VMware vSphere Client software has better graphic performance with the VMware Tools SVGA driver installed. The VMware Tools package also supports required shared folders and drag-and-drop features.

Other tools in the package support synchronization of time in the guest operating system, copy and paste between guest and host, and improved mouse performance in some guest operating systems.

Complete these steps to install or upgrade VMware tools on the VMware Virtual Machine.

IMPORTANT	Images that are shown in this section are VMware vSphere software, version 6.5.

1. Open a web browser and type the IP address that you created for the host server.

2. Enter the user name and password for the local host, and click Log in.

3. From the Navigator in the left pane, right-click the virtual machine in which you want to update or install VMware Tools. Select Guest OS and choose Install VMware Tools.

IMPORTANT	The guest OS of the virtual machine must be running.
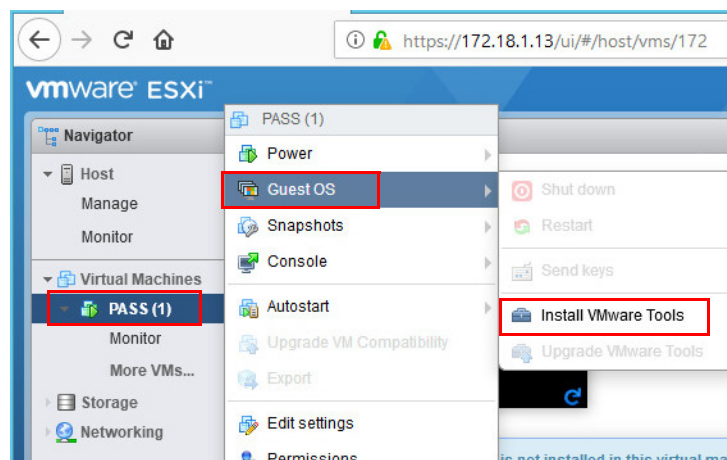
4. Open Windows Explorer on the virtual machine image that you want to install VMware Tools.

5. Select 'This PC' to view the tools to install on Drive D.
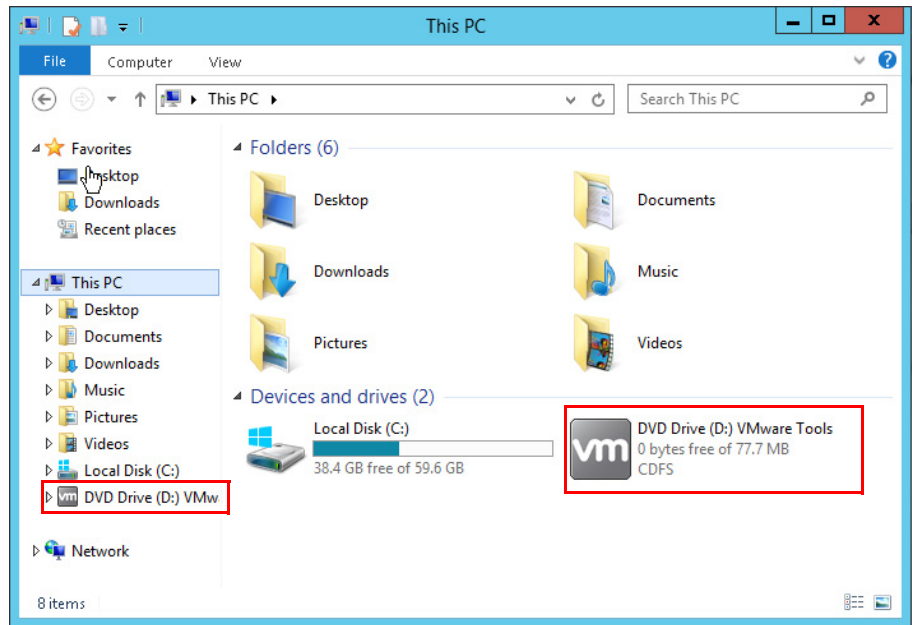
6. Double-click the DVD drive to initiate the install.

7. When the VMware Tools Setup Welcome window appears, select Next to start the setup wizard.

Display	Action
Choose Setup Type	Select Complete
Ready to Install VMware Tools	Select Install
Completed VMware Tools Setup Wizard	Select Finish
VMware Tools Setup Restart	Select YES

If you are using the free version of VMware ESXi hypervisor, which doesn't include a vCenter server, then you can skip chapter 3 and proceed to chapter 4 to continue with Windows server configuration.

VMware ESXi vCenter Server

A VMware vCenter server is an optional component that allows for centralized management of your virtual infrastructure. You can manage multiple hosts servers and access all VMs from one vSphere Web Client.

While a vCenter server may not be needed with small systems, it is highly recommended and required with large systems. Following are some of the key features that a vCenter server provides:

- Single sign-in authentication (Domain controller required)
- Access multiple hosts, all VMs, datastores, and networks from one console
- Organize inventory objects such as hosts, folders, and clusters into datacenters
- Create templates for future virtual machine deployments
- Clone existing VMs, even when powered on
- Migrate VMs between hosts and datastores
- View alerts and notifications that are required to help prevent or remedy the emerging issues

IMPORTANT	A vCenter server can contain multiple datacenters. Larger organizations can use multiple datacenters to represent organizational units in their enterprise. Inventory objects can interact within datacenters, but interaction across datacenters is limited. For example, you can move a virtual machine with vMotion technology across hosts within a DataCenter but not to a host in another DataCenter.

Install a vCenter Server

There are two installation types for a vCenter server.

- vCenter Server for Windows software runs on a Microsoft® Windows server operating system. This Windows OS can run on a physical computer or as a virtual machine on a host server.
- vCenter Server Appliance (vCSA) runs as a virtual machine based on SUSE Linux Enterprise Server 64-bit and comes as an OVF appliance ready for use.

There are differences in scalability (number of hosts and VMs), database options, performance, and security in each vCenter server type. Determine which option best fits your environment before implementing a vCenter server for infrastructure. This section shows how to install a vCenter Server Appliance.

Perform these steps on the workstation you use to manage your virtual appliances (templates and machines).

1. On the VMware website, download the vCenter Server Appliance 6.5 software and mount the .iso image.
2. Start the vCenter Server Appliance 6.5 installer. Choose vCenter Server 6.5 appliance>vcsa-ui-installer>win32>installer.exe.
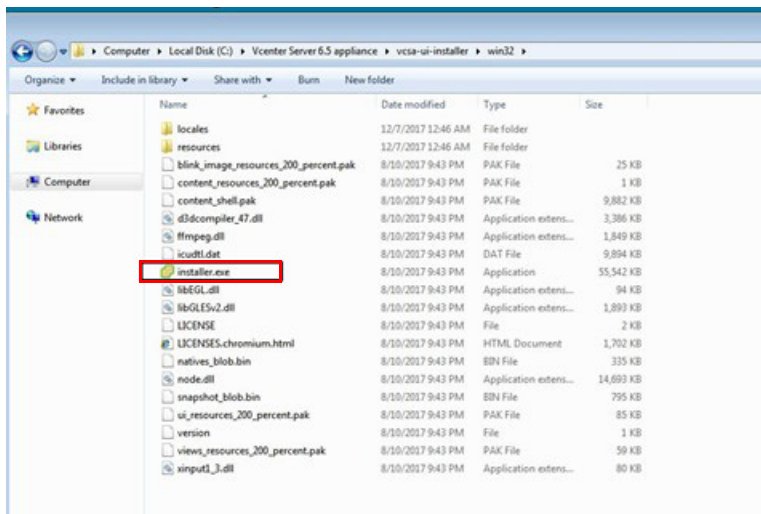
3. Select Install. The install wizard opens.
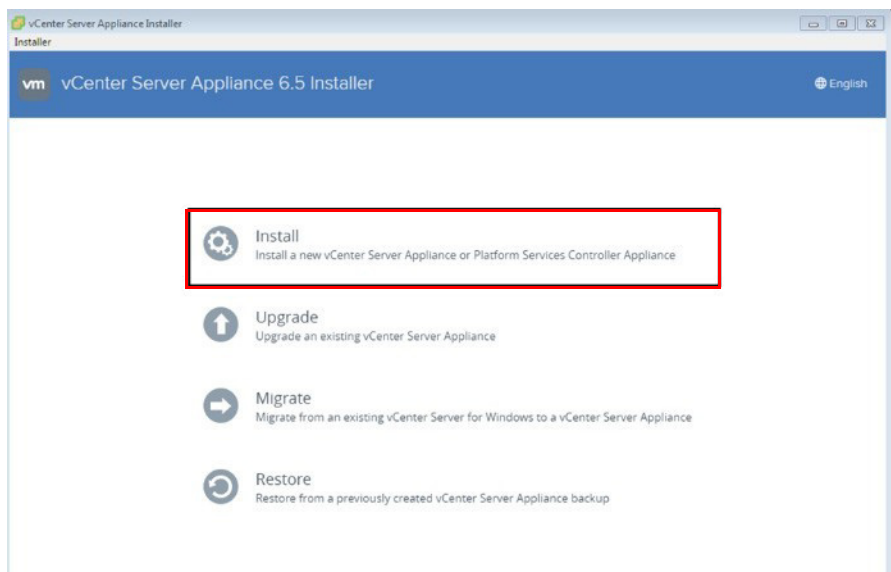
Wizard Page	Action
Introduction	Select Stage 1. Deploy appliance.
End User License Agreement	Check I accept the terms of the license agreement
Select Deployment Type	Select vCenter Server with an Embedded Platform Services Controller
Appliance Deployment Target	Enter the ESXi host information of the location where the vCenter server appliance is deployed, and enter the host credentials.
Certificate Warning	Select YES
Set up appliance VM	Enter the name for the appliance and set the root password.
Select deployment size	Select the deployment size for your environment.
Select datastore	Select the datastore where the VCSA appliance is stored.
Configure network settings	Configure the networking for the VCSA appliance. Put the IP address that is used in both the DNS forward and reverse lookup zones.
Ready to complete stage 1	Verify that the configuration is correct on the summary dialog box.
Install Stage 1 Deployment Complete	Select continue to proceed to stage 2 setup
Stage 2 Introduction	Select Next

Wizard Page	Action
Appliance Configuration	Set the Time Synchronization mode. Enable SSH Access.
SSO Configuration	Enter a domain name, password, and site name.
Configure CEIP	Check to participate in the Customer Experience Improvement Program (CEIP) if interested.
Ready to complete	Verify that the configuration is correct on the summary dialog box.

Create a DataCenter

A DataCenter is the primary container of inventory objects such as hosts and virtual machines.

With the creation of the DataCenter, we show you how to make a copy of a virtual image and turn it into a template for future deployments.

> **IMPORTANT** The images that are shown in this section are VMware vSphere Client software, version 6.5.

1. In a Web Browser, enter the IP address of the computer where your vCenter Server is installed.
2. Click vSphere Web Client (Flash).
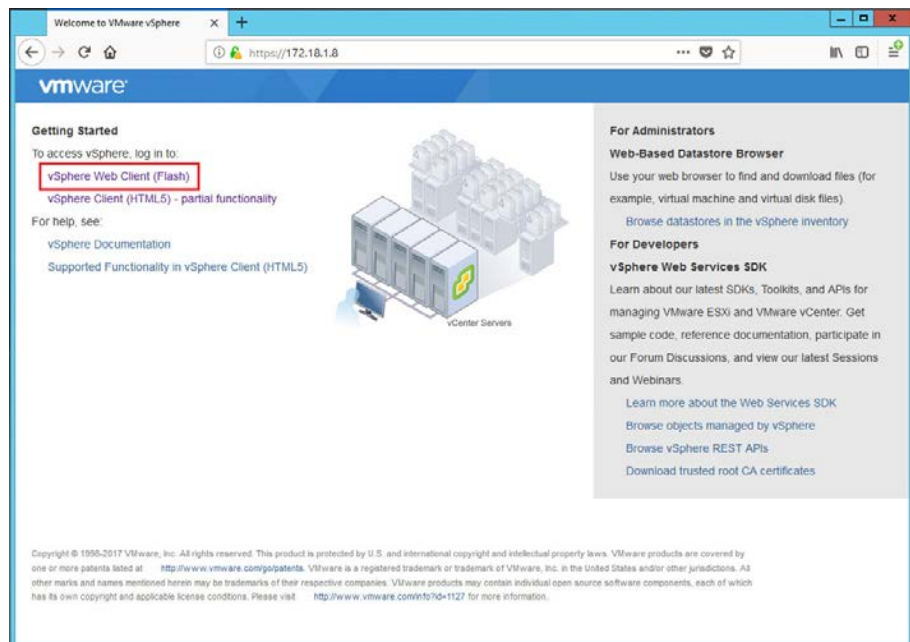
3. Enter the Username and Password. Use the User name and password that you created for the vCenter Server.
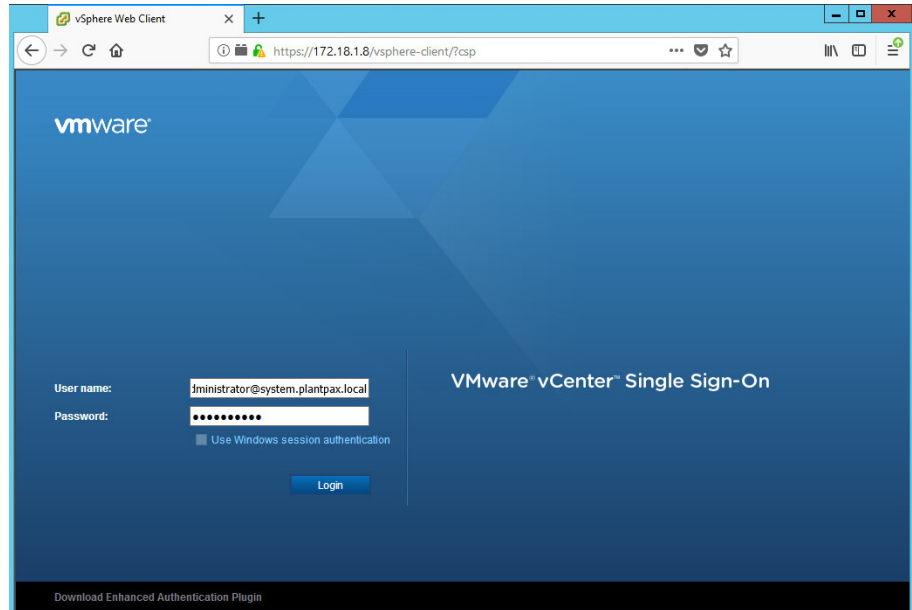
IMPORTANT	The user name consists of the vCenter Single Sign-On user name plus '@' plus the Domain name.
	In our example, the user name is 'administrator@system.plantpax.local'.

The DataCenter is the primary container of inventory objects such as hosts and virtual machines.

4. From The VMware vSphere Web Client dialog box, highlight your vCenter Server, and click 'Create DataCenter'.
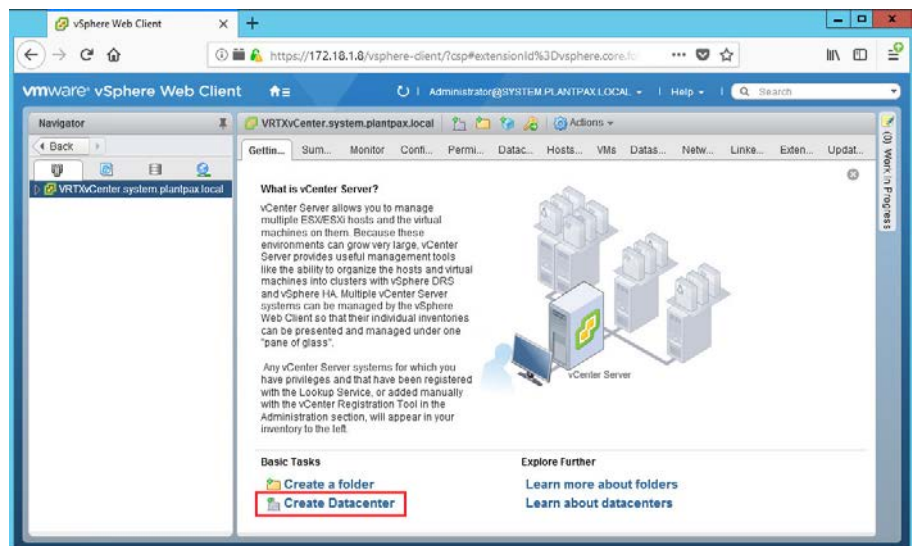
5. When prompted, type a name for the new DataCenter ('New DataCenter' in our example) and click OK.
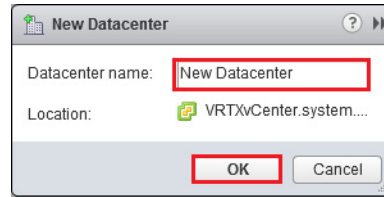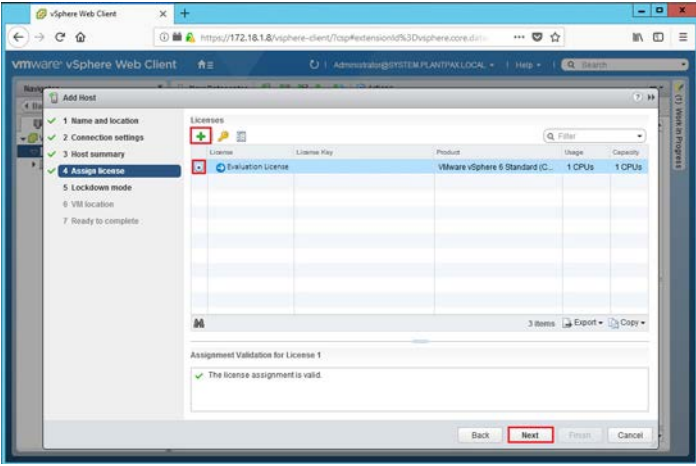
Add a Host

The host is the physical server where the virtual image is to be deployed.

1. The New DataCenter is added under the vCenter Server. Highlight the New DataCenter and select 'Add a Host' to add a host server. The add host wizard starts.
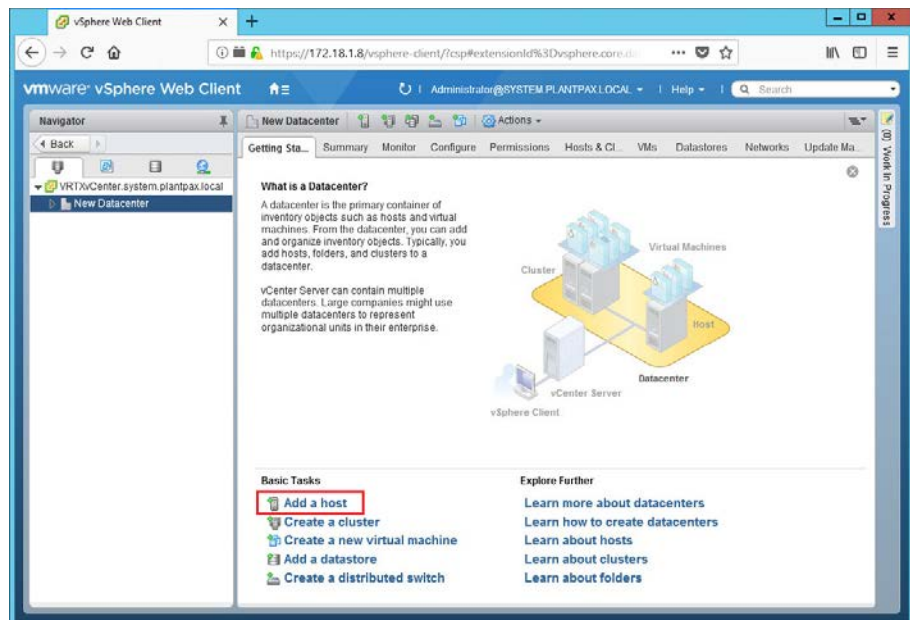

Wizard Page	Action
Name and Location	Enter the Host IP address
Connection Settings	Enter the Username and Password
Host Summary	Verify the settings

Wizard Page	Action
Assign a license	• If you use the trial license that came with the VMware vSphere Hypervisor, select the default Evaluation License • If you have purchased a permanent license, Select the Plus Sign to assign a new license key to this host. Enter the license key.
Lockdown Mode	Select Disabled
VM location	Select the DataCenter that you created. **IMPORTANT**: Because a vCenter server can manage multiple host servers, make sure to create/select the proper DataCenter and host server where the virtual machines reside. These organizational features help improve your understanding of your infrastructure and help with the management of servers.
Ready to complete	Verify that the configuration is correct.

2. The Host is added under the DataCenter. The Navigator section of the vSphere Web Client window now includes the vCenter server (VRTXvCenter), the DataCenter (New DataCenter), and the Host (172.18.1.13) as shown in the following image.
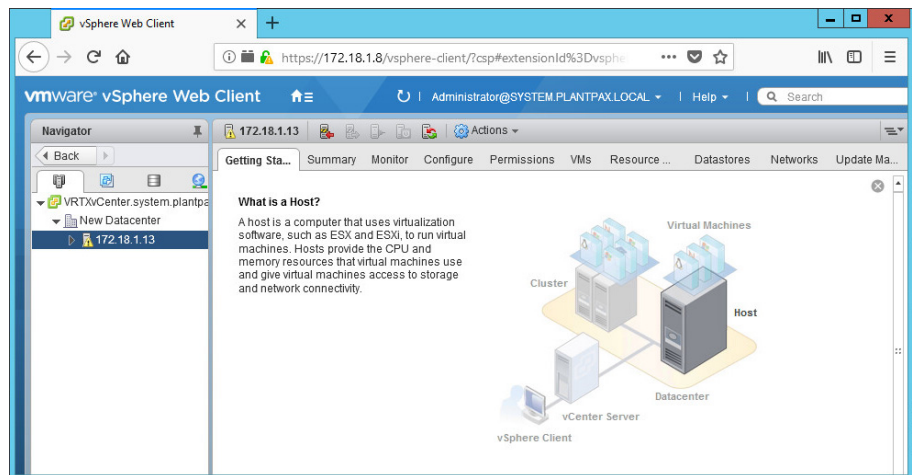
Create a Template

This section shows how to create your own templates. These templates can be based off the original PlantPAx® virtual image template and customized into your own templates.

Start with an existing virtual machine. This VM may receive changes such as additional software, security patches, and configurations that you plan on reusing throughout your infrastructure. When you are finished modifying the VM, it is cloned, and a template is created.

> To help prevent VMs from containing duplicate system identifiers, it is recommended to run Windows SYSPREP on the operating system before creating a template.

This template can be used to deploy other images. You can store the original template for safekeeping in case you modify your templates.

1. Right-click the virtual image that you want to clone and choose Clone>Clone to Template to open the wizard.

Wizard Page	Action
Select a name and folder	Enter a name for the new template and select a location
Select a compute resource	Select a host location to store the new template
Select storage	Select the disk format, storage policy, and the hypervisor that manages the resources of the server that hosts this template. **Disk Format Options:** • *Same format as source* - Use the same format as the original disks. • *Thick Provision Lazy Zeroed* - Disk storage is allocated immediately in a default thick format. Blocks containing older data on the storage device are cleared only when the virtual machine writes new data to the disk for the first time. • *Thick Provision Eager Zeroed* - Disk storage is allocated immediately in a default thick format where blocks on the physical storage device are formatted with zeros to overwrite any older data. • *Thin Provision* - Disk storage is allocated on demand as data is written to virtual disks.
Ready to complete	Verify that the configuration is correct. **IMPORTANT:** The process of cloning a virtual machine to a template can take up to 30 minutes. This time is largely dependent on the size of the hard disk drive of the virtual machine you are making a template from.

> TIP: Consider the clone to virtual machine option as a manual method to back up fully configured and running virtual machines. The cloned image can be stored on a local or remote VMF5 datastore, or a remote datastore on a Windows server featuring network file storage (NFS) capability.

Deploy Your Own Template

When you have virtual image templates that are loaded into your DataCenter, you can deploy any number of virtual images from those templates. Additional deployments can be performed from these new templates.

1. In a Web Browser, enter the IP address of the computer where your vCenter Server is installed.

2. Click vSphere Web Client (Flash).
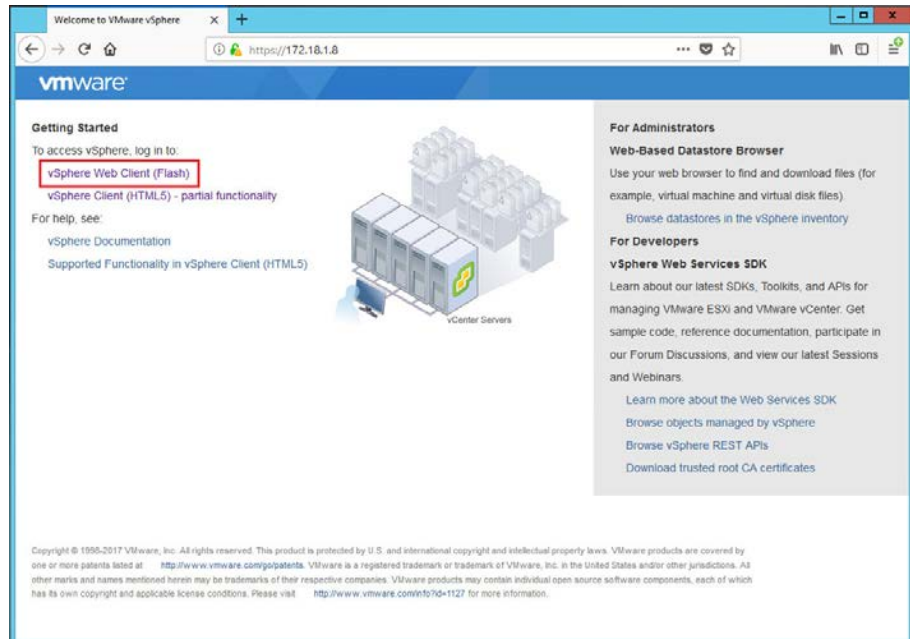
3. Enter the Username and Password. Use the User name and password that you created for the vCenter Server.
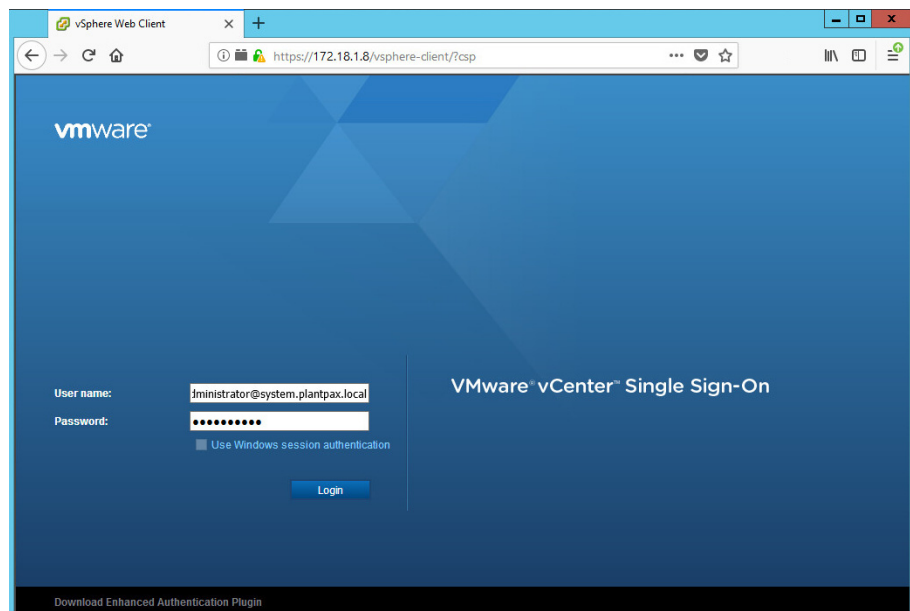

IMPORTANT	The user name consists of the vCenter Single Sign-On user name plus '@' plus the Domain name.
	In our example, the user name is 'administrator@system.plantpax.local'.

4. From the left side of the vSphere Web Client window, highlight your vCenter Server, then select the 'VMs' tab. Select the 'VM Templates in

Folders' tab, then right-click the template that you plan to deploy to a New Virtual Image. Select 'New VM from This Template'.
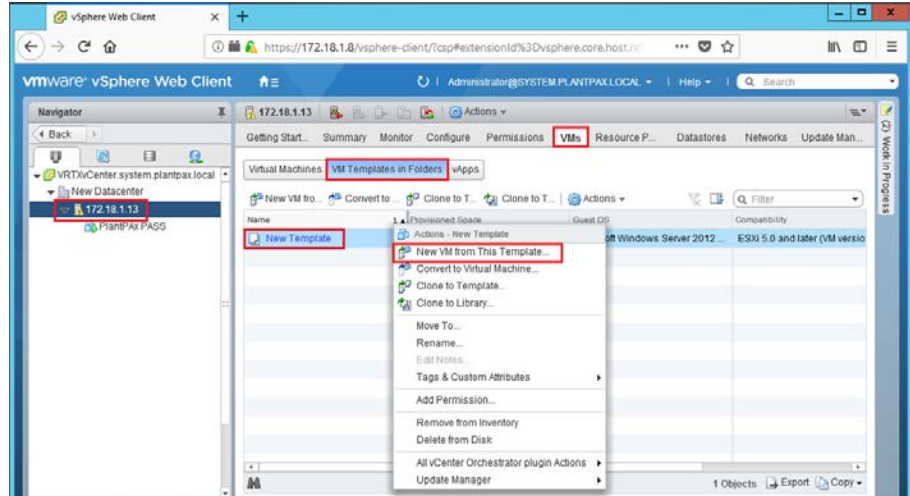
5. In the Name box, type a name for the virtual machine. In the Inventory Location box, select a location to store the new virtual machine.
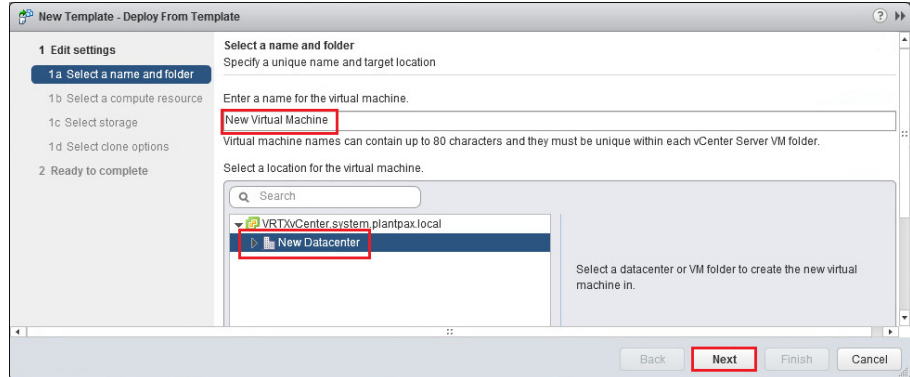
6. The 'Select storage' step appears.

- In the 'Select virtual disk format' box, select "Thin Provision'.
- In the 'VM storage policy" box, select 'Datastore Default'.
- Select the Datastore to host the cloned template.
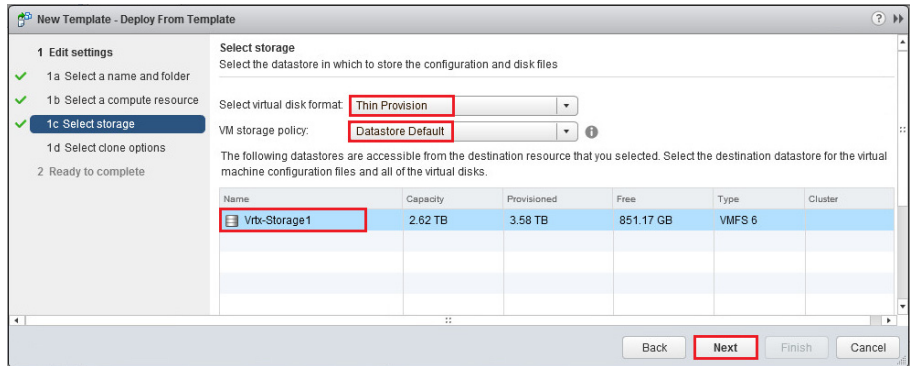
Format	Description
Same format as source	Use the same format as the original disks.
Thick Provision Lazy Zeroed	Disk storage is allocated immediately in a default thick format. Blocks containing older data on the storage device are cleared only when the virtual machine writes new data to the disk for the first time.
Thick Provision Eager Zeroed	Disk storage is allocated immediately in a default thick format where blocks on the physical storage device are formatted with zeros to overwrite any older data.
Thin Provision	Disk storage is allocated on demand as data is written to virtual disks.

7. The 'Select clone options' step appears.

- Clear 'Customize the operating system'. We recommend that no Customization is done at this stage.
- Clear 'Customize this virtual machine's hardware (Experimental)'.
- Clear 'Power on virtual machine after creation'.
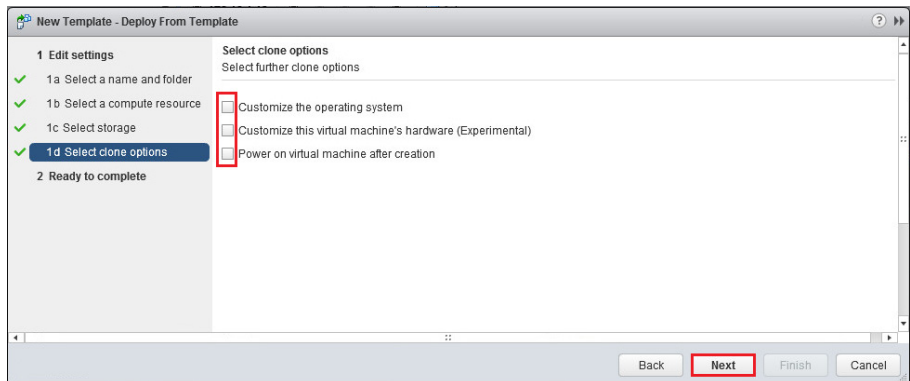
IMPORTANT When you clone a virtual machine or deploy a virtual machine from a template, you can customize the guest operating system of the virtual machine. Customizing guest operating systems can help prevent conflicts if virtual machines with identical settings are deployed.

You can specify the customization settings when you launch the Guest Customization wizard during the cloning or deployment process

8. The 'Ready to Complete' step appears. Select one of the following to verify settings:

- If there is incorrect information, click Back to correct the information.
- If the information is correct, click Finish.

IMPORTANT	The process of deploying a virtual machine from a template can take up to 30 minutes. The time that is required is largely dependent on the size of the hard disk drive of the template you are using to deploy a virtual machine.

9. You can view the status of the task by finding 'Clone virtual machine' in Recent Tasks at the bottom of the window. When the status = Completed, the cloning is finished.

Optional Virtual Machine Interactions

To help expedite the use of your virtual machines, consider the following options:

-
-

Initiate Automatic Startup

1. In a Web Browser, enter the IP address of the computer where your vCenter Server is installed. This IP address was created in Assign an IP Address to the Host.
2. On the Welcome to VMware vSphere screen, click vSphere Web Client (Flash).
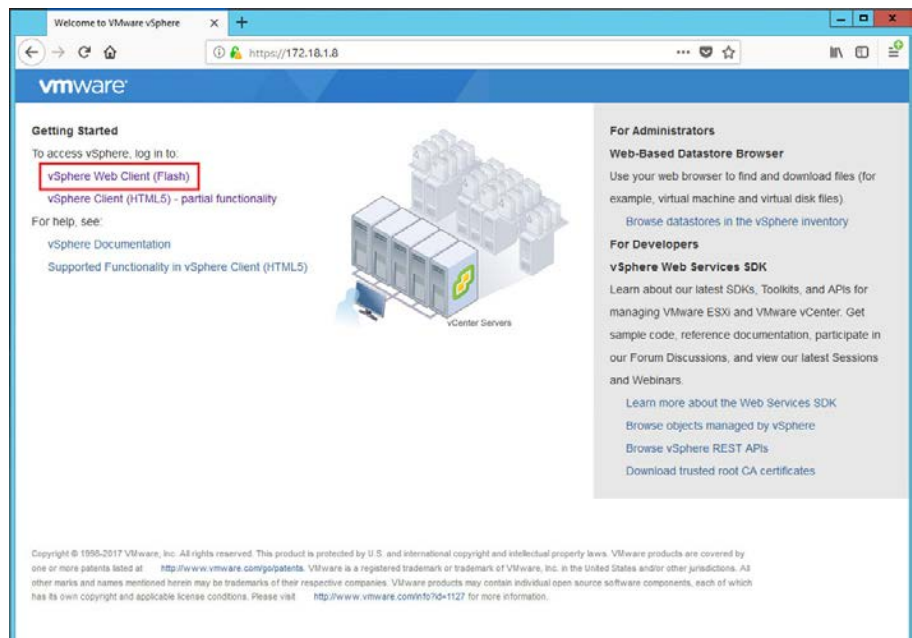
3. Enter the Username and Password. Use the User name and password that you created for the vCenter Server in <u>Install a vCenter Server</u>. Click Login.
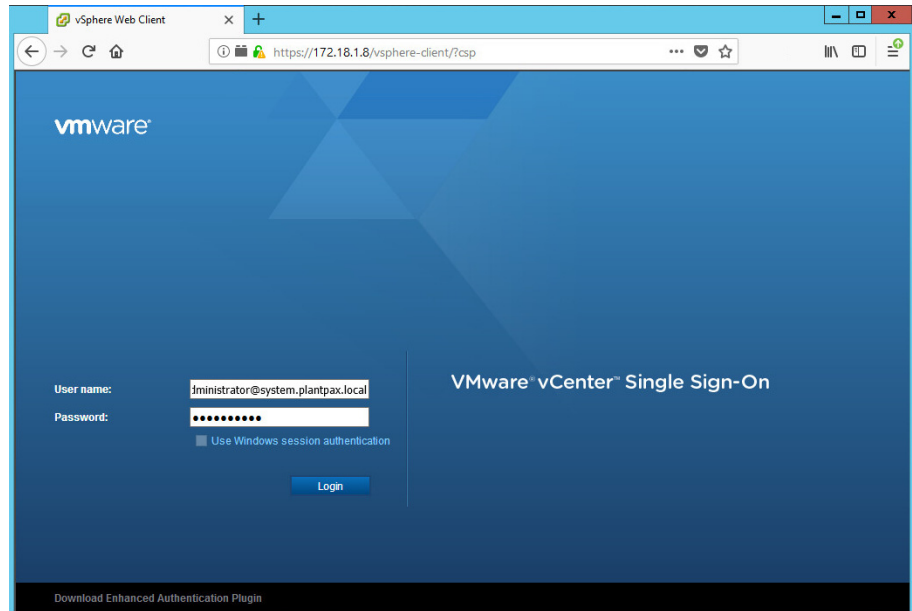

IMPORTANT	The user name consists of the vCenter Single Sign-On user name plus '@' plus the Domain name.
	In our example, the user name is 'administrator@system.plantpax.local'.

4. Select the Host Server, then select the Configure Tab, then select VM Startup/Shutdown. On the VM Startup/Shutdown window, click 'Edit'.
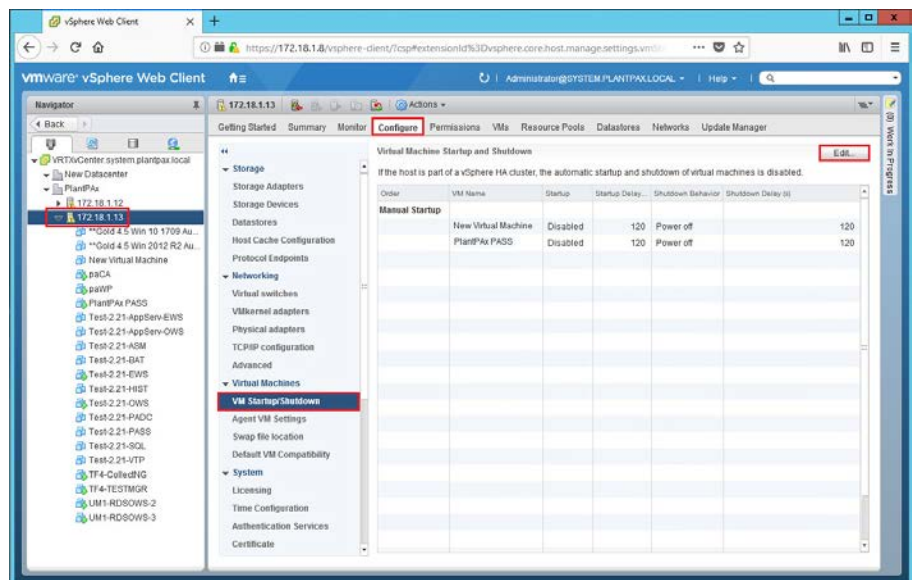
5. Check 'Automatically start and stop virtual machines with the system'. Click the Up Arrow to move the desired Virtual Machine host server from the Manual Startup category up to the Automatic Startup category.

You can select additional images and click the Up Arrow or Down Arrow to determine the startup order as shown in the following image. A sequential number order appears.
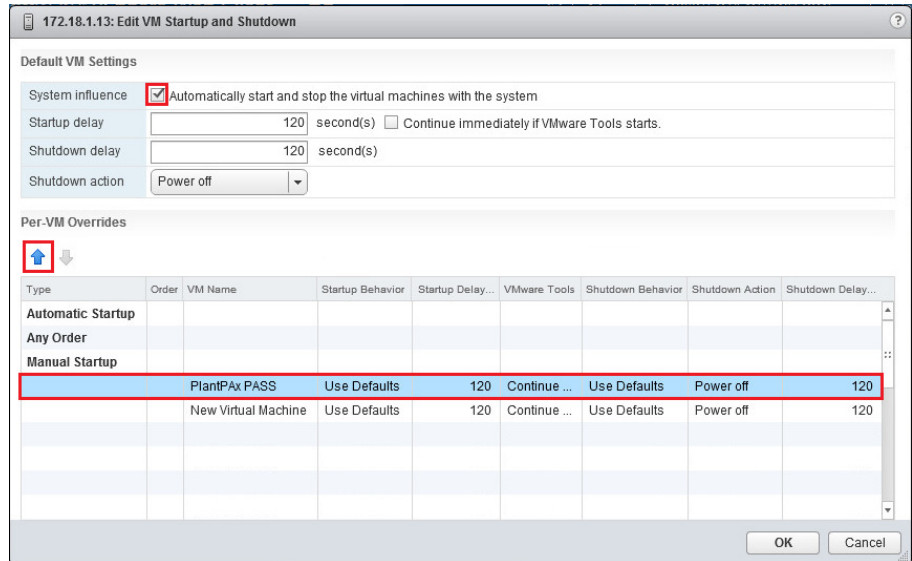
6. When you are satisfied with the Startup order, click OK.
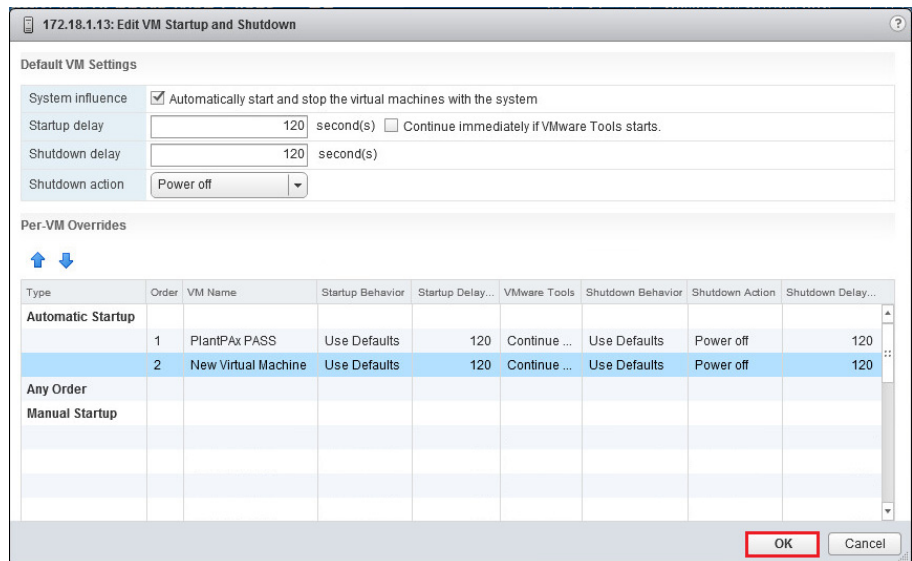
7. The Virtual Machines are now configured for Automatic Startup as shown in the following screen capture.
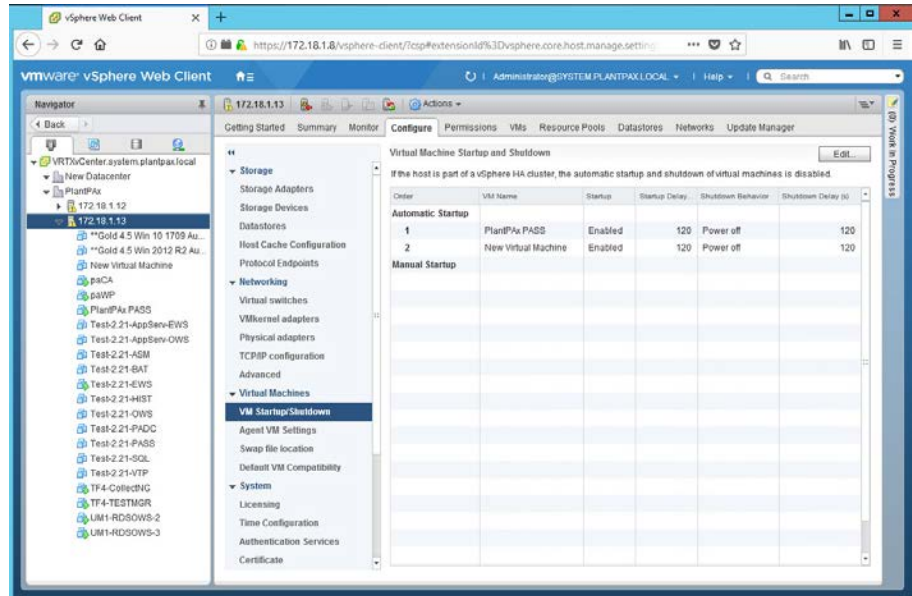
IMPORTANT	Following is the recommended startup order for the typical system elements of a virtual PlantPAx system.
	1. Process Automation Domain Controller - PADC
	2. SQL server - AppServ-Info (SQL)
	3. Process Automation System Server - PASS
	4. Engineering Workstation Application Server (AppServ-EWS)
	5. Redundant Process Automation System Server - PASS
	6. Batch Management Server (AppServ-Batch)
	7. Operator Workstation Application Server (AppServ-OWS)
	8. Historian server - AppServ-Info (Historian)
	9. VantagePoint® server - AppServ-Info (VantagePoint)
	10. Asset Management server (AppServ-Asset)
	11. Level 3 devices and computers

Send Commands to Host Server

You can also send shutdown and restart commands directly to the host server via the vSphere Web Client.

1. On the vSphere Web Client window, right-click a host server and choose either Shut Down or Reboot.
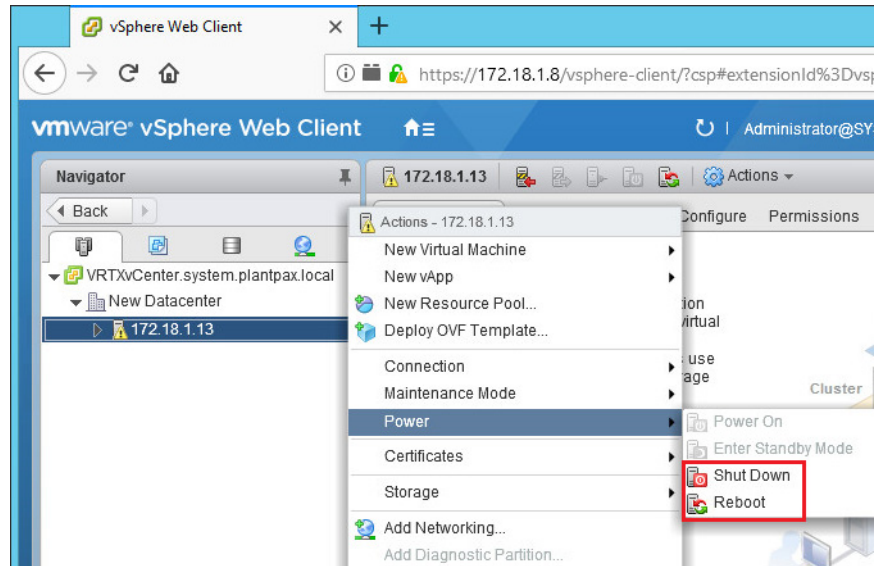
2. In the confirmation window, type a reason for the Shut Down or Reboot and click OK or Cancel.
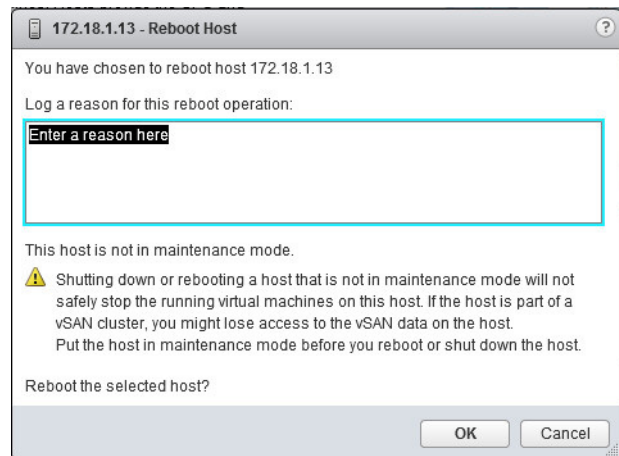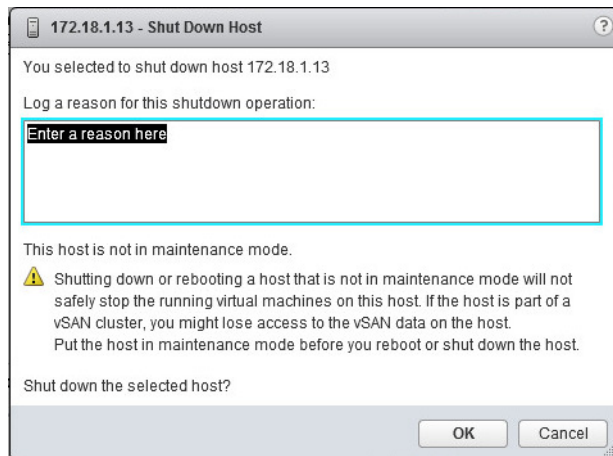
Set Resource Pool Priority

You can set the priority of the resource allocation that your virtual machine requires from the host server. The allocation of CPU and memory resources depends on performance needs. A virtual machine can be grouped for High Performance, Normal Performance, or Low Performance depending on its performance needs.

> **IMPORTANT** For more information and resource pool priority recommendations for servers and workstation, see Resource Pool Allocation in the PlantPAx System
> Reference Manual, publication PROCES-RM001.

1. In a Web Browser, enter the IP address of the computer where your vCenter Server is installed. This IP address was created in <u>Assign an IP Address to the Host</u>.

2. On the Welcome to VMware vSphere screen, click vSphere Web Client (Flash).
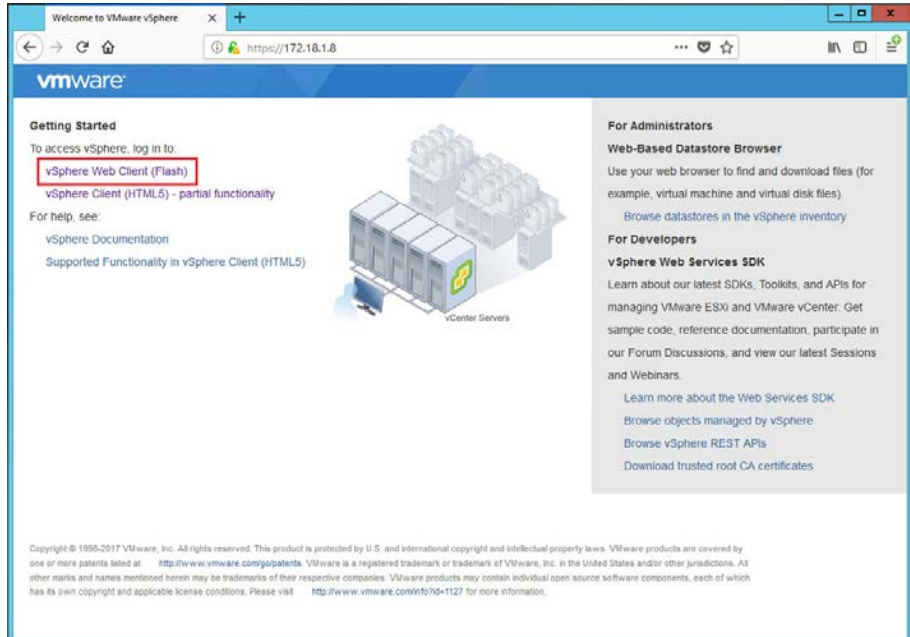
3. Enter the Username and Password. Use the User name and password that you created for the vCenter Server in <u>Install a vCenter Server</u>. Click Login.
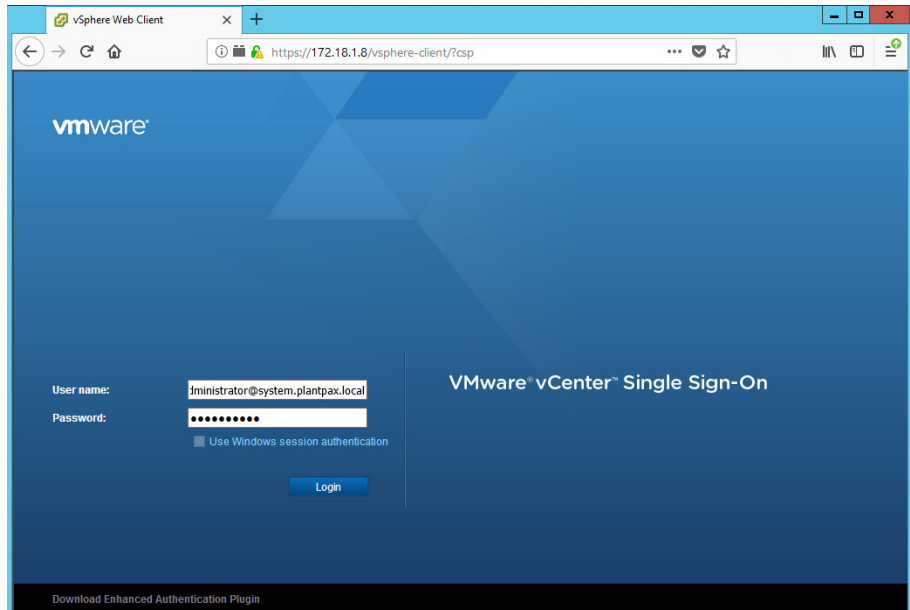
IMPORTANT	The user name consists of the vCenter Single Sign-On user name plus '@' plus the Domain name.
	In our example, the user name is 'administrator@system.plantpax.local'.

4. Right-click a host server and choose New Resource Pool.
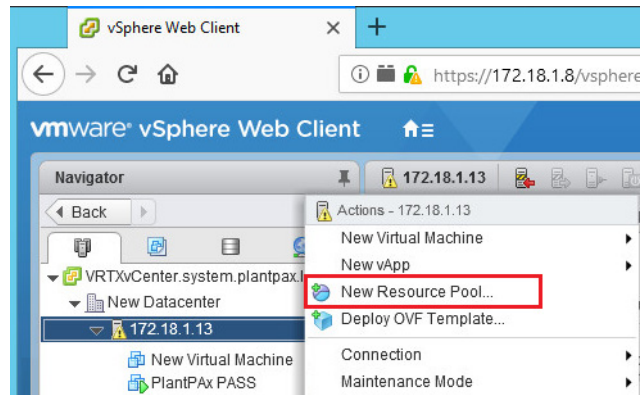
5. Type the priority in the Name text box. For example, High Performance. From the Shares pull-down menu, select 'High' for the CPU and Memory Resources categories.
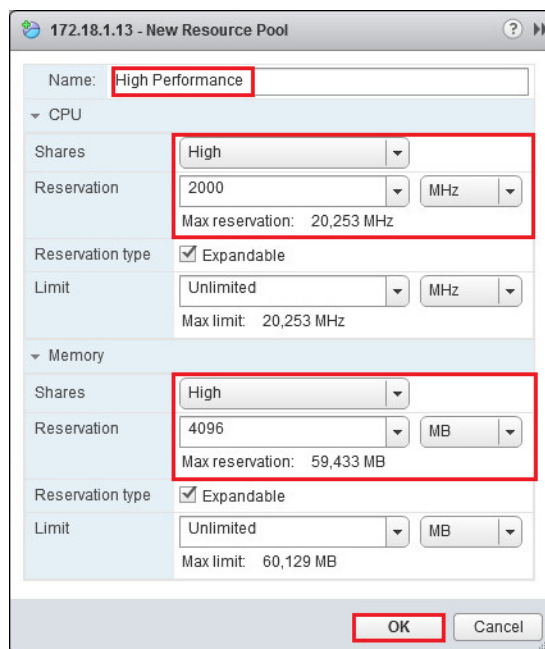
6. Repeat step 1 through step 5 for each virtual machine depending if the priority is High Performance, Normal Performance, or Low Performance.

    The priority types appear in the tree for the host server.

7. Drag-and-drop virtual machines to the Resource Pool that matches the needs and intended use. Settings for that resource pool are assigned.
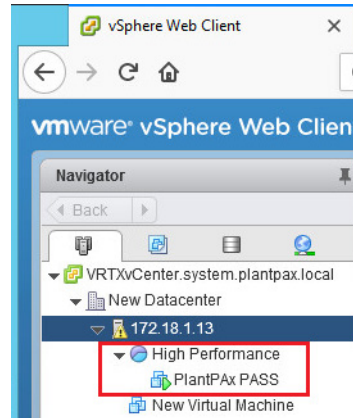
Common Windows Configuration

The PlantPAx® system servers and workstations (virtual machines) are built on Microsoft® Windows operating systems that require some basic configuration.

Windows Server 2016 Standard virtual machines are as follows:

- Process Automation Domain Controller - PADC
- Process Automation System Server - PASS
- SQL Server - AppServ-Info (SQL)
- FactoryTalk® Historian Server - AppServ-Info (Historian)
- FactoryTalk Batch Management Server - AppServ-Batch
- FactoryTalk Asset Management Server - AppServ-Asset
- Operator Workstation Application Server - AppServ-OWS
- Engineer Workstation Application Server - AppServ-EWS
- FactoryTalk VantagePoint® Server - AppServ-Info (VantagePoint)

Microsoft Windows 10 Enterprise LTSC 2019 virtual machines are as follows:

- Operator Workstation - OWS
- Engineer Workstation - EWS

This chapter describes how to set up the new operating systems after the you power them on for the first time, complete the OOBE initializations and install VMware Tools.

IMPORTANT	If you plan to deploy a domain controller, we recommend that you configure the domain controller before any other system element. See publication PROCES-UM100.

Local Administrator User Accounts

The default administrator account is often disabled to harden the operating system. We suggest that you create an Administrator user account for each user that requires administrative privileges. This safeguards server corruption by restricting access to the default administrative account, and creates a backup of critical system information. Each user can be delegated a separate user account with password protection.

1. Navigate to the Control Panel.
2. Select User Accounts.
3. Select Manage another account.
4. Select 'Add a user account' below the Administrator icon.
5. Enter a name for the user that is being added, a password, retype the password for verification, and a hint to remind you of the password.
6. Select Next, and then Finish on the next dialog box.

7. Select the user that you created.

8. Select 'Change the account type'.

9. On the next window, select Administrator and click 'Change Account Type'.
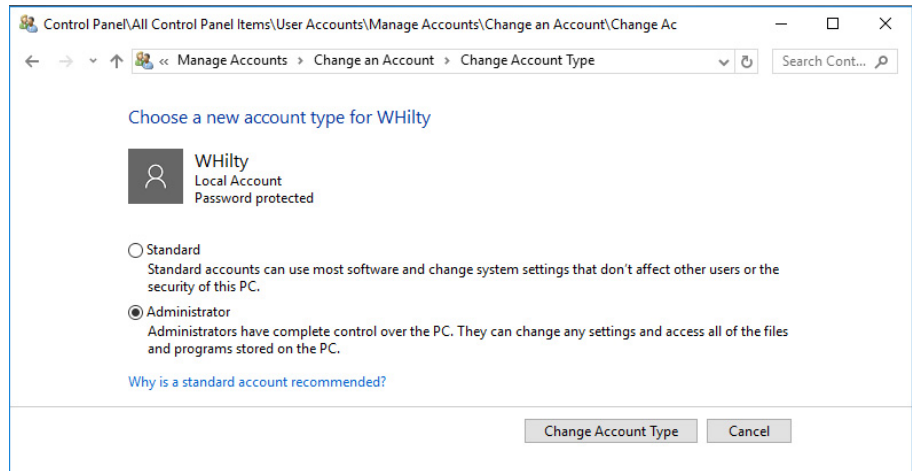
10. Sign out of Windows.

11. Press Ctrl+Alt+Insert.

IMPORTANT	Even though 'Press Ctrl + Alt + Delete ...' is displayed on the screen, you must press Ctrl + Alt + Insert to access the virtual machine. The sequence 'Ctrl + Alt + Del' is reserved for the terminal from where you connect to the server that hosts the virtual machine.

12. Log in with the user that was created.

Toolbar for Programs Menu

Newer Microsoft operating systems lack the traditional Start Menu that contains an easily navigated programs menu.

Create a traditional style program menu on the lower right side of the Windows task bar using the following steps.

When complete, select the double arrow symbol next to Programs » on the task bar and launch a traditional programs menu.

1. Navigate to the Control Panel and choose File Explorer Options.

2. On the View Tab, select 'Show hidden files, folders, and drives' and click OK.
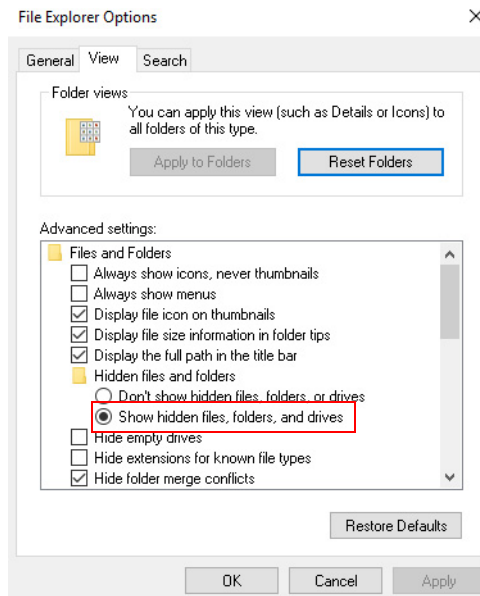
3. Right-click on the main windows taskbar, select Toolbars>New Toolbar.

4. On the New Toolbar window, navigate to your Programs folder. C:\ProgramData\Microsoft\Windows\StartMenu\Programs

5. Click Select Folder.

The result is a custom menu with easy access to Rockwell Software conveniently located on the Windows taskbar.
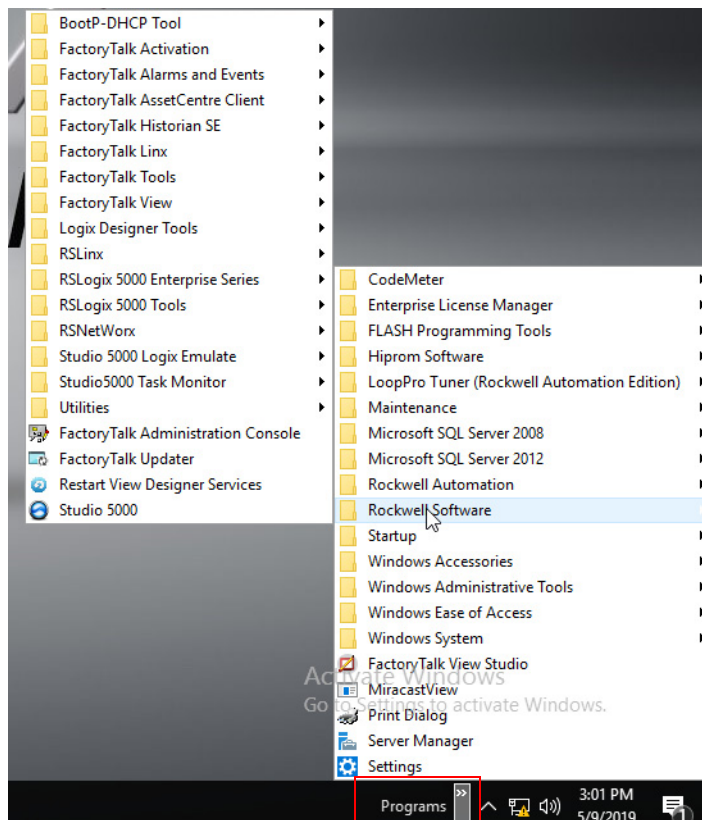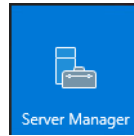
6. Before proceeding, click the Date/Time in the lower right-hand corner of the desktop. Verify that the Date and Time settings are correct.

7. Turn off the 'Set time automatically' feature in the Date and Time settings.

Rename the Computer

Complete these steps to rename the computer.
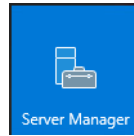
1. Select ![Server Manager] from the windows menu to open the Server Manager.

2. On the Server Manager window, select Local Server and then click the computer name.
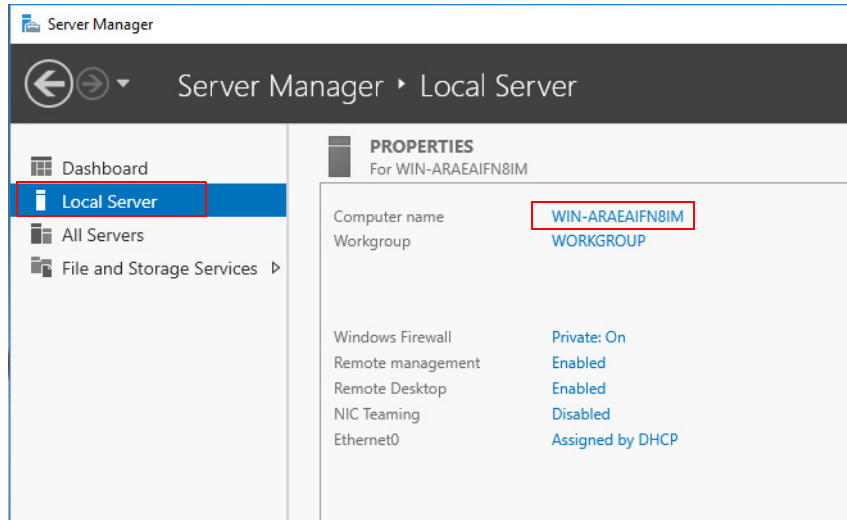
3. Select Change on the System Properties dialog box.
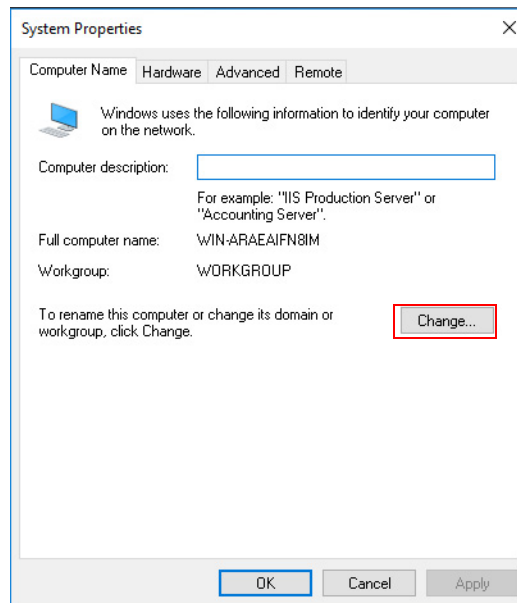
4. Type a new computer name.

IMPORTANT   Do not use spaces, hyphens, or any special character symbols.

5. Select a Domain or Workgroup and click OK.

IMPORTANT   We recommend that you restart your computer so that these changes take effect.

---

6. Enter an administrator username and password.
7. Select OK when the welcome to domain window appears.
8. Restart the virtual machine for the changes to the settings to take effect.
9. Log in by using your domain credentials or the local user administration account previously created.

Verify Ethernet Network Adapter Settings

The PlantPAx DCS Configuration and Implementation User Manual, publication [PROCES-UM100](#) contains configuration information procedures for Domain or Workgroup infrastructures, such as managing IP addresses and computer name resolution.

To help with stable communications, we recommend configuring the speed, duplex, and power management settings for the Ethernet adapter.

IMPORTANT   The configuration parameters that are described in this section apply to typical network infrastructures recommended for PlantPAx systems. Note that speed/duplex settings vary depending upon the network switch configuration.

---

1. Navigate to the Control Panel.
2. Select Network and Sharing Center.
3. In the Network and Sharing Center window, select Change Adapter Settings.
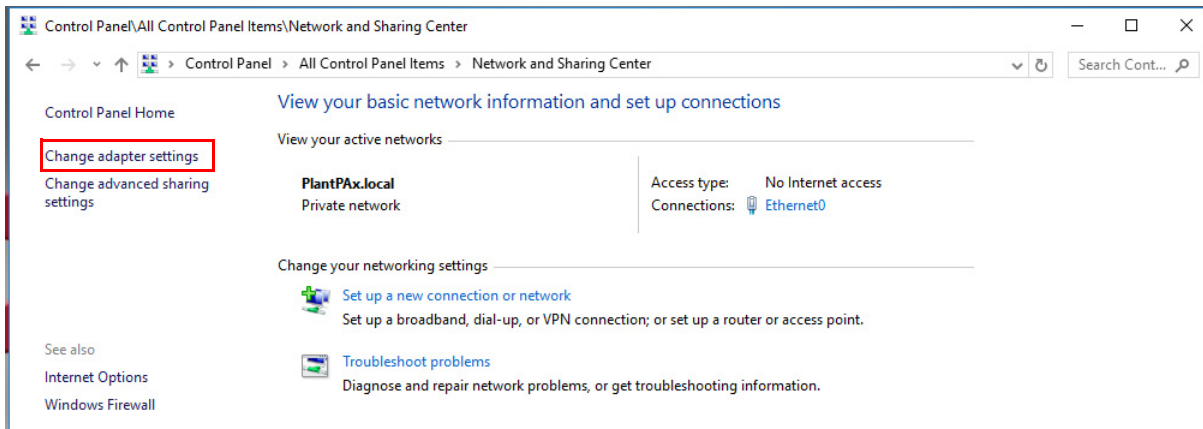
4. Right-click the Ethernet network connection and choose Properties.
5. If asked, type your password and click Yes.

6. In the Ethernet Properties dialog box, select Configure.
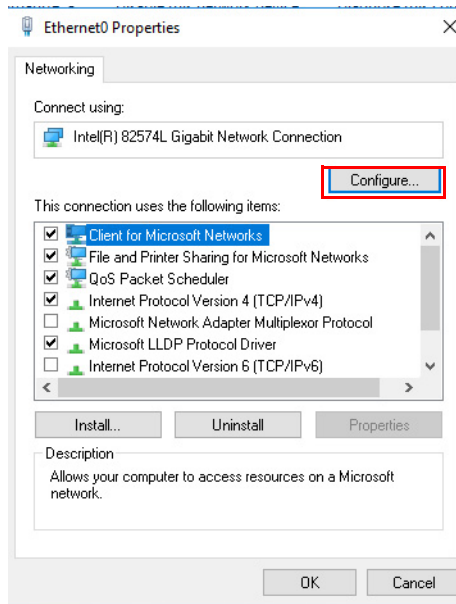
7. Choose the Advanced tab.
8. Select Speed and Duplex and then choose Auto Negotiation.
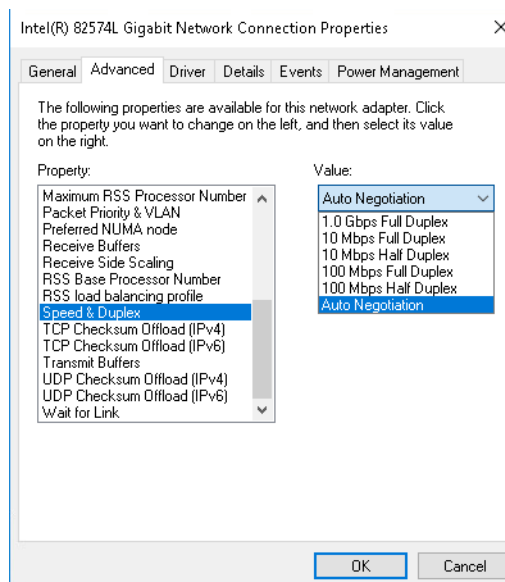
9. Select the Power Management tab.
10. Clear the 'Allow the computer to turn off this device to save power' checkbox.
11. Select OK.

Verify Remote Settings

Complete these steps to configure remote settings for a virtual image to allow remote connections to this computer.

1. Right-click the Windows Start icon and choose System.
2. Select Remote settings.
3. In the Remote Assistance Section at the top of the window, verify that the checkbox to 'Allow Remote Assistance connections to this computer' is not checked.

4. In the Remote Desktop Section, select the 'Allow remote connections to this computer' box.
5. Select OK.

Verify the Processor Scheduling Setting

Complete these steps to adjust processor scheduling for best performance in the Windows Server operating system.

1. Right-click the Windows Start icon and choose System.
2. Select the Advanced system settings.
3. Select Settings in the Performance section.
4. Choose the Advanced tab.
5. Select Background services in the Processor scheduling section to adjust for the best performance.
6. Select OK twice.

Notes:

Configure PlantPAx System Servers

PlantPAx® system servers are based on Windows Server operating systems. This chapter describes how to configure system-specific elements and basic Rockwell Software setups.

Virtual templates are available for the following PlantPAx server system elements:

- Process Automation Domain Controller - PADC
- Process Automation System Server - PASS
- SQL Server - AppServ-Info (SQL)
- FactoryTalk® Historian Server - AppServ-Info (Historian)
- FactoryTalk Batch Management Server - AppServ-Batch
- FactoryTalk Asset Management Server - AppServ-Asset
- Operator Workstation Application Server - AppServ-OWS
- Engineer Workstation Application Server - AppServ-EWS
- FactoryTalk VantagePoint® Server - AppServ-Info (VantagePoint)

The required Rockwell Automation® software for each virtual server is included and pre-installed in the virtual image templates, but not activated. See Software Product keys and Activations for activation procedures.

IMPORTANT	If you plan to deploy a domain controller, we recommend that you configure the domain controller before any other system element.

Configure the PADC Virtual Server

A domain controller is a server that responds to security authentication requests (logging in, checking permissions, and so forth) within the Windows server domain. A domain grants you access to a number of network resources (such as applications and printers) with the use of one user name and password combination.

The PlantPAx system uses a domain controller to store user account information, authenticate users, enforce security policies and best networking practices such as automatic network address assignment. Domain authentication is recommended, whether it is an existing domain or a new one.

Before configuring the domain controller, complete the following tasks:

- Deploy PlantPAx Virtual Machines.
- VMware ESXi vCenter Server.
- Common Windows Configuration

Once you have completed these tasks, see the PlantPAx DCS Configuration and Implementation User Manual, publication, [PROCES-UM100](#), for domain controller configuration procedures, such as:

- Creating a primary domain controller
- Creating an additional domain controller
- Configuring domain controllers
- Creating roles, areas and users
- Configuring group policy management
- Configuring group policies
- PlantPAx user policy objects

Configure the PASS Virtual Server

The Process Automation System Server (PASS) hosts essential software components to run your system. The data, human-interface (HMI), and alarm servers reside in the PASS.

The PASS hosts the FactoryTalk Services Platform that provides a set of common services (such as diagnostic messages, health monitoring services, and access to real-time data).

Before configuring the PASS Server, complete the following tasks:

- [Deploy PlantPAx Virtual Machines](#).
- [VMware ESXi vCenter Server](#).
- [Common Windows Configuration](#)

Once you have completed these tasks, see the PlantPAx DCS Configuration and Implementation User Manual, publication, [PROCES-UM100](#), for PASS configuration procedures, such as:

- Configuring FactoryTalk components
- Configuring HMI, DATA, and ALARM servers
- Redundant PASS considerations
- Configuring runtime security

Configure the SQL Virtual Server

The AppServ-Info (SQL) server is a database that is used to store Process data for FactoryTalk AssetCentre, FactoryTalk VantagePoint, FactoryTalk Batch, and FactoryTalk Historian Asset Framework (AF) software programs. FTLinx and FactoryTalk Alarm and Event server also use the SQL database.

Before configuring the server, complete the following tasks:

- [Deploy PlantPAx Virtual Machines](#).
- [VMware ESXi vCenter Server](#).
- [Common Windows Configuration](#)

IMPORTANT	Use this procedure if you are installing SQL Standard on this server and are either installing a separate Historian server or are not using a Historian server. If you install a standalone Historian Server with SQL Express, skip this section and proceed to [Configure the Historian Virtual Server on page 70](#)

IMPORTANT	If you install both an Historian and SQL server, Complete VMware ESXi vCenter Server on both servers before continuing with this procedure.

Complete SQL Server 2016 Installation
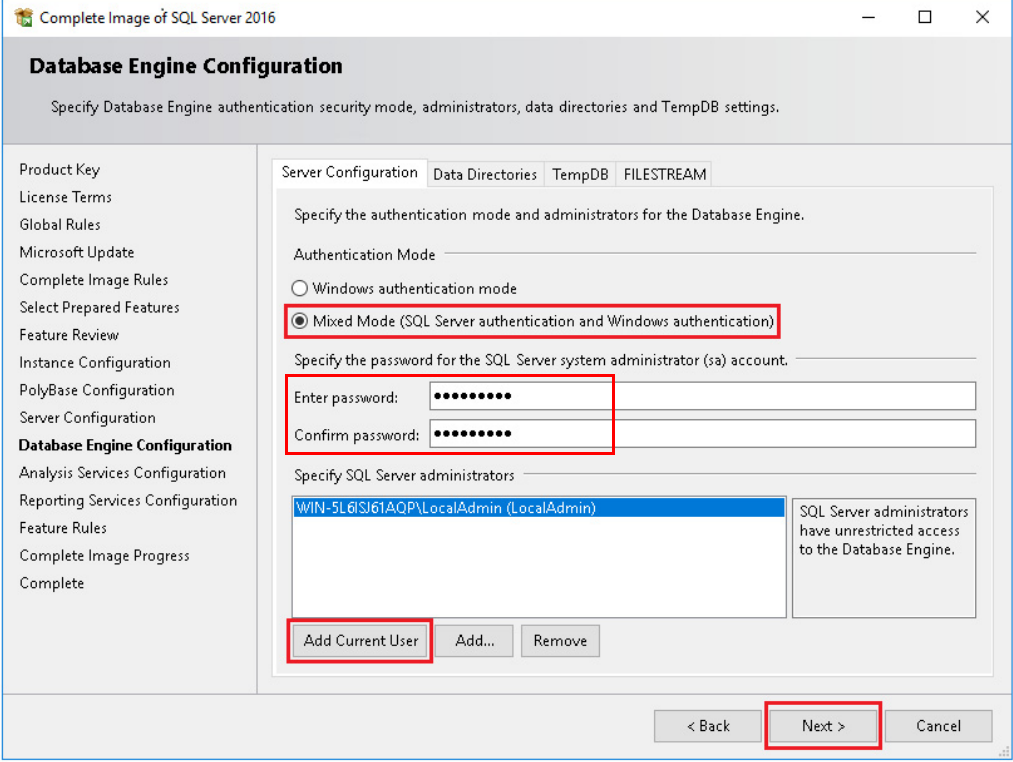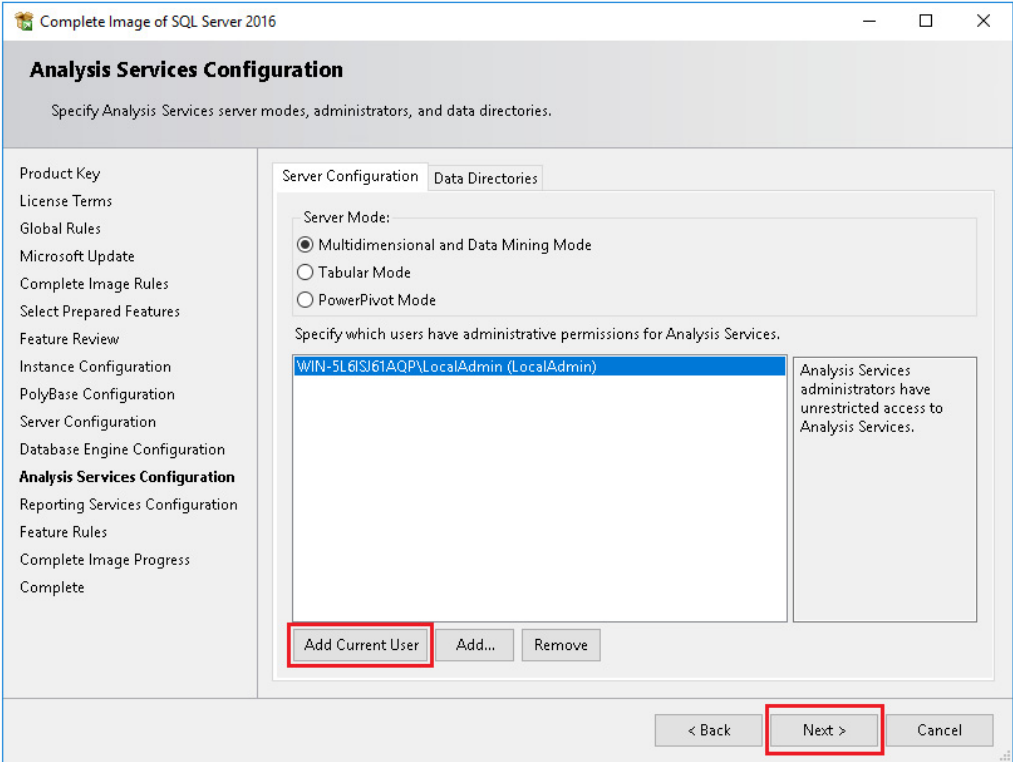
1. On the virtual image desktop, click the Programs icon and choose Microsoft® SQL Server 2016>Configuration Tools>Complete SQL Server 2012 Installation.

2. Click Yes to allow the changes to be made to the device.

3. An installation wizard to complete image of SQL Server 2016 appears. Complete the wizard as follows:

IMPORTANT	For the remainder of the installation, default selections are shown and we do not recommend any changes. Some PlantPAx configurations require these default selections. We recommend accepting the defaults, prove the system, and make changes later. Corresponding notice is provided where exceptions to this configuration are considered for changing now. Otherwise, simply click Next on the following screen captures to complete the process.

Wizard Page	Action
Setup Support Rules	Select OK once the rules have passed.
Product Key	• Select Specify a free edition and then select Evaluation from the pull-down menu for a 90-day trial. • Select Enter the product key and type your key to license your software.
License Terms	Read the license terms, and select 'I accept the license terms'
Microsoft Update	Accept Default
Complete Image Rules	Select Next once the rules have passed
Select Prepared Features	Select Complete a prepared instance of SQL Server 2016
Feature Review	Review the features to be configured
Instance Configuration	Select Default Instance
PolyBase Configuration	Select Use this SQL Server as a standalone PolyBase-enabled Instance
Server Configuration	Select Default

Wizard Page	Action
Database Engine Configuration	• Select Mixed Mode • Enter and confirm the password • Select Add Current User
Analysis Services Configuration	Select Multidimensional and Data Mining Mode Select Add Current User

Wizard Page	Action
Reporting Services Configuration	Select Reporting Services Native Mode > Install and Configure
Feature Rules	Select Next once the rules have passed
Complete Image Process	Select Next once Complete
Complete	Select Close to complete the wizard

Install Historian Asset Framework on SQL Server

Installation of FactoryTalk Historian Asset Framework (AF) software is required to take advantage of the capabilities. Where the AF software is installed depends upon whether a Historian Collective will be used and if a separate SQL server is used.

If you choose to use a Historian Collective, you cannot install AF software on either of the Historian servers. We recommend that you install FactoryTalk Historian Asset Framework (AF) software on a separate SQL server virtual machine. Instructions are included in the SQL server section (see page 102).

If the AF software cannot be installed on the SQL server, see the FactoryTalk Historian SE Installation and Configuration Guide for more information on locating your Asset Framework Server. The guide is available on the Historian server at C:\Program Files (x86)\Common Files\Rockwell\Help.

The procedures in this section apply only if you plan to do the following:

- Use FactoryTalk Historian Asset Framework in your PlantPAx system
- Install Asset Framework Server on the SQL Server

IMPORTANT	If you are not installing Asset Framework on the SQL Server, not deploying a Historian server, or installing a standalone Historian or you can skip this section. Proceed to Add Local User to the SQL Server on page 68.

IMPORTANT	The installation files are not included in the SQL Server template. The installation files for services platform are located in the Historian template in c:\install files\7.00.00\FTHistorian\SE-DVDDL. If Historian is already deployed on the network, access the installation files through the network. Otherwise, the Historian template can be downloaded from the Product Compatibility and Download Center (PCDC) at http://compatibility.rockwellautomation.com/Pages/home.aspx.

FactoryTalk Historian SE installation media

1. Download the FactoryTalk Historian SE installation media.
2. Copy the Historian installation files to the local hard disk drive on the virtual SQL server into the c:\Install Files\ directory.

This installation is a 2-step process. Before the FactoryTalk Historian Asset Framework can be installed, the FactoryTalk Service Platform is required as a prerequisite, as is the Microsoft .NET Framework 4.8.
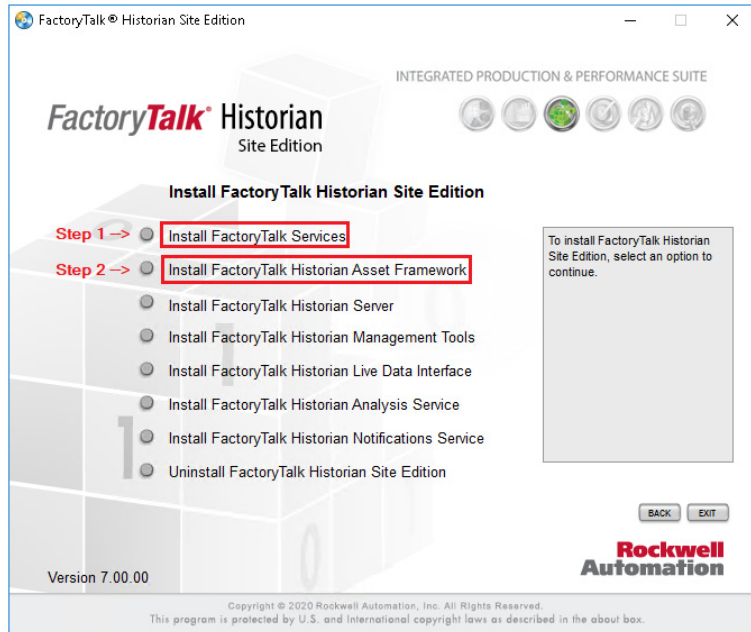
Install FactoryTalk Services Platform

Perform these steps to install FactoryTalk Services Platform.

1. Navigate to the installation files.
   c:\Install Files\7.00.00-FTHistorian-SE-DVDDL\

2. Select Setup.exe.

3. Select 'Install FactoryTalk Historian Site Edition'.

4. Select 'Install FactoryTalk Services'.

5. Select 'Install FactoryTalk Services' on this screen as well.

6. Select 'Customize'.
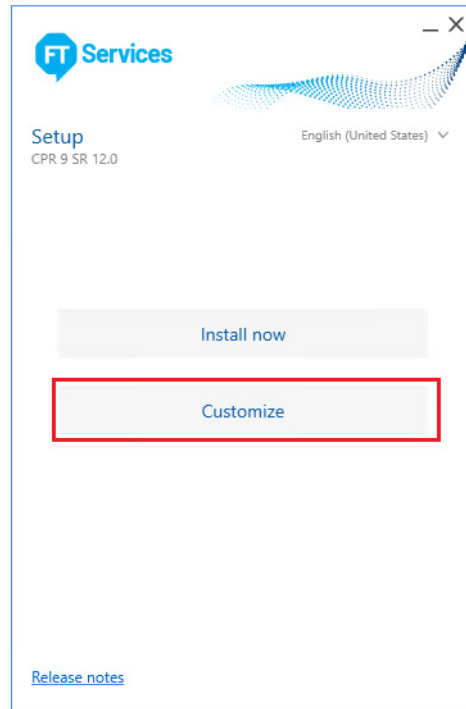
7. Clear all software products **except** for FactoryTalk Services Platform and select Install.
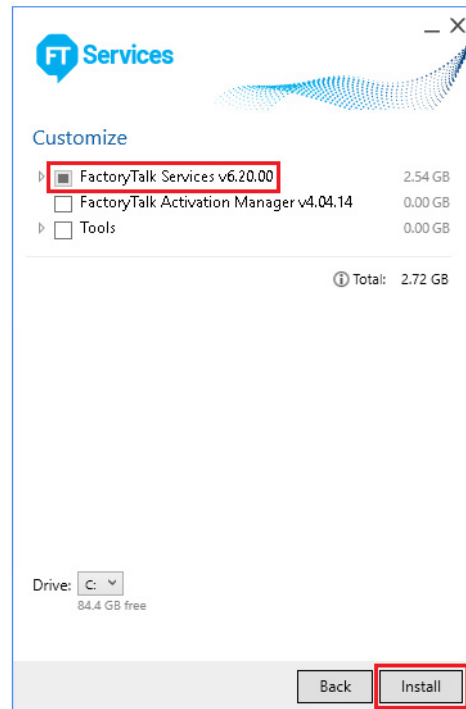
8. Read the EULA, and select Accept all.

   The installation takes several minutes to complete. The Microsoft .NET Framework 4.8 component may also be installed. If so, a restart is required.

9. Select 'Restart now' if prompted or if the installation is complete.

10. Log in to the SQL server again. The installation may continue after the restart. Let it complete.
11. Select 'Restart now' once the installation is completed.

Specify the FactoryTalk Directory Location

After the FactoryTalk Service Platform has been installed, now is a good time to specify the network FactoryTalk Directory location, which is typically on the PASS.

1. Select the Programs icon and choose Rockwell Software>FactoryTalk Tools>Specify FactoryTalk Directory Location.
2. Select Yes to allow the application to make changes to the device.
3. In the FactoryTalk Directory Server Location Utility dialog box, Select Browse (ellipsis '...').
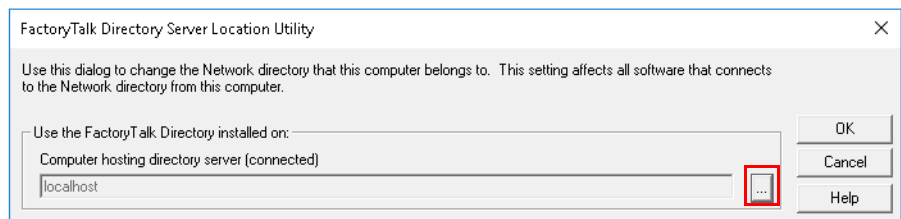
4. Enter your FactoryTalk Directory Administration Console credentials into the login screen and click OK.
5. Select Remote computer and click Browse.
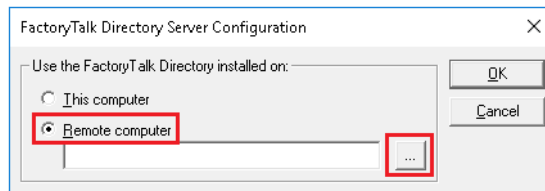
IMPORTANT	Browse can be inactive if Network Discovery and File Share are not turned on. If Browse is inactive, type the computer name of the virtual machine that is hosting the FactoryTalk Directory.
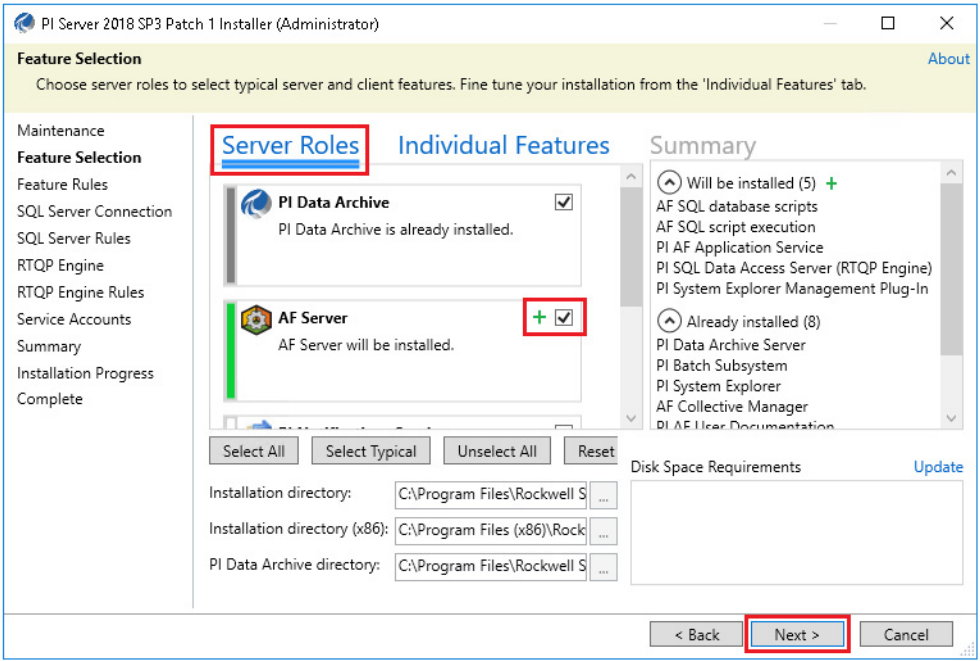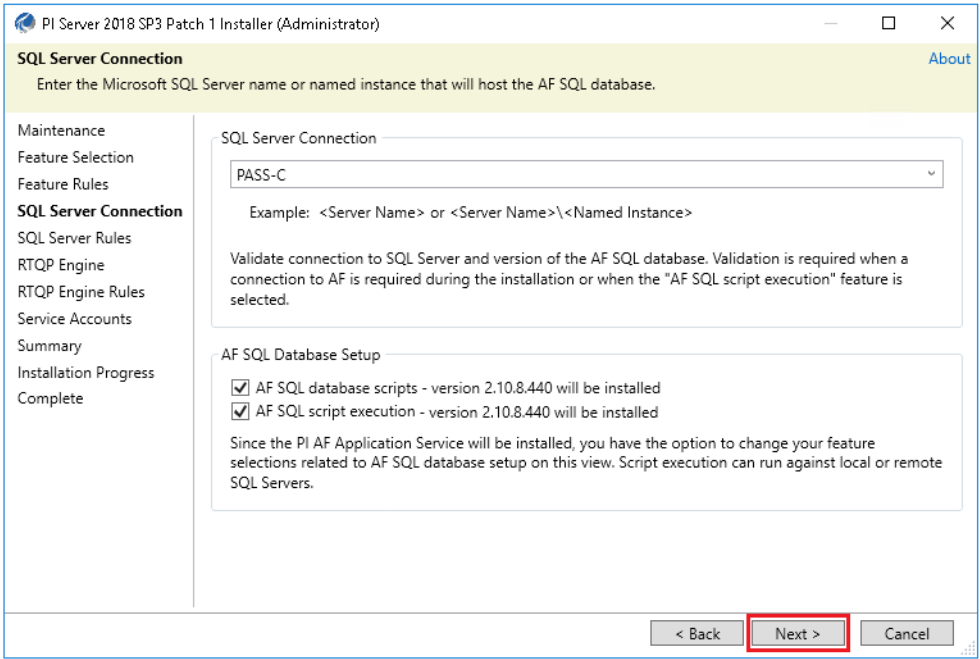
6. Navigate the network to find the computer name of the server (typically PASS) that is hosting the FactoryTalk Directory services. Click OK.
7. Select OK to accept the location.
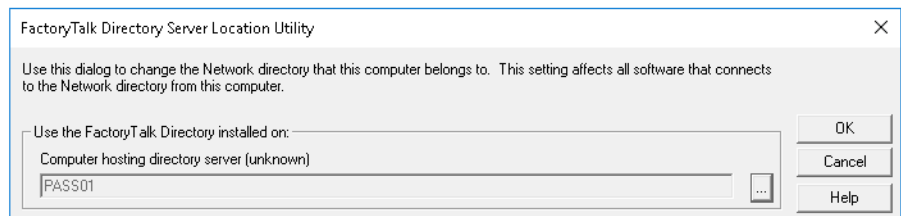
8. Select OK to finalize the location.
9. When prompted, enter your credentials and click OK.
10. Restart after you make this change.

Install Historian Asset Framework

1. Navigate to the installation files.
   c:\Install Files\7.00.00-FTHistorian-SE-DVDDL\Redist\PIServer\

2. Double-click PI-Server_2018-SP3-Patch-1_.exe

3. An installation wizard to complete install of Asset Framework appears. Complete the wizard as follows:

Wizard Page	Action
Maintenance	Select Modify.
Feature Selection	From Server Roles, Select AF Server.
Feature Rules	Accept defaults.
SQL Server Connection	Enter the server name that will host the Asset Framework SQL database. For database setup, select both AF SQL database scripts and AF SQL script execution.

Wizard Page	Action
RTQP Engine	Accept defaults.
RTQP Engine Rules	Select 'Yes, I want to use a self-signed certificate.'
Service Accounts	Accept defaults.
Summary	Select Modify.
Installation Progress	Select Modify when the installation progress has completed.
Complete	Verify the modify completed successfully. Select Close.

IMPORTANT	At the end of the installation process (approximately 15...20 minutes), the Release Notes display in a separate window. The installation process is not complete until you close the Release Notes window.

Add Local User to the SQL Server

The installers for Rockwell Automation software use Windows Authentication instead of SQL Server Authentication. To complete the installation of Rockwell Automation software in system elements that connect to the SQL server, add a local administrator account to the SQL server login. These steps are to be performed regardless if you use a Historian server collective.

1. On the virtual image desktop, click the Programs icon and choose Microsoft SQL Server Tools 18>Microsoft SQL Server Management Studio 18.
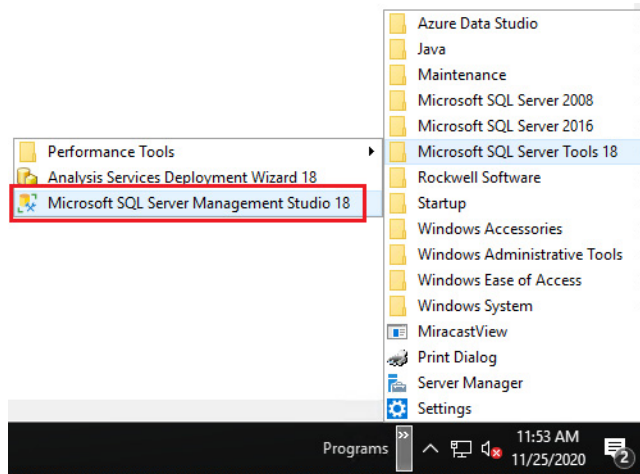
2. On the Connect to Server dialog box, log in to the 'sa' account with SQL Server Authentication.
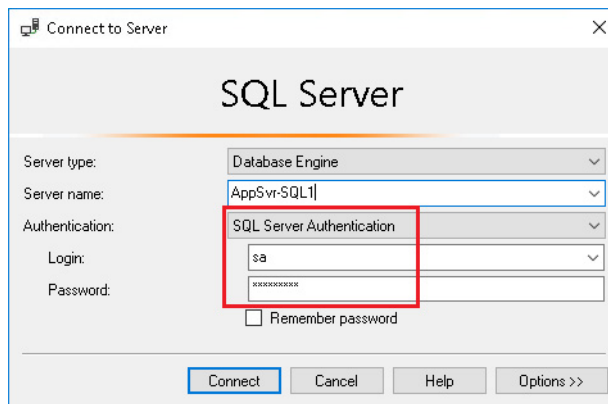
3. Type the password that you created during the SQL installation (see Configure the SQL Virtual Server).

4. Select Connect.

5. In the Object Explorer, right-click Security and choose New>Login.
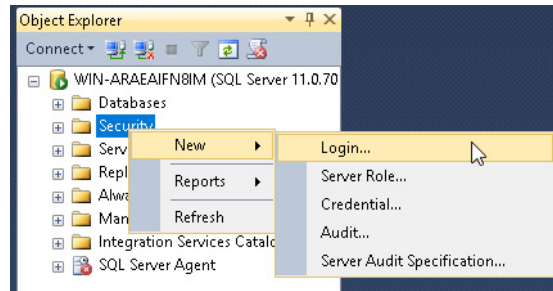
6. Select Search next to Login Name on the Login - New window.

7. Enter your security credentials.

8. On the Select User or Group dialog page, Select Advanced.
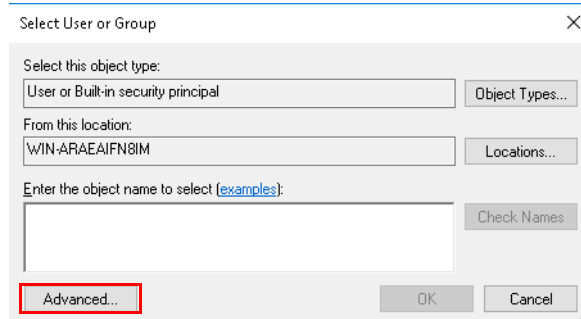
9. In the Select User or Group dialog box, Select Find Now.

   The Search Results are populated.
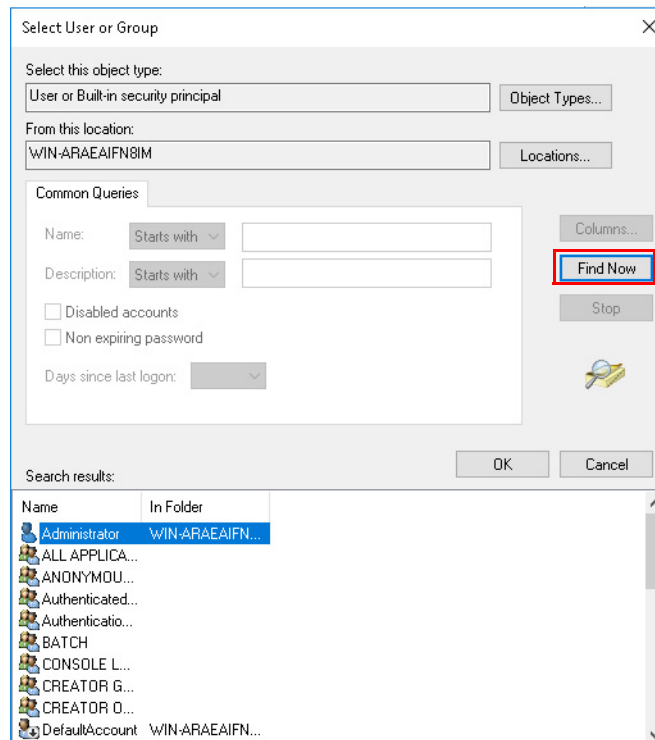
10. In the Search Results area, select the local administrator account that is logged in and select OK.

The 'object name' area on the Select User or Group dialog box is populated.
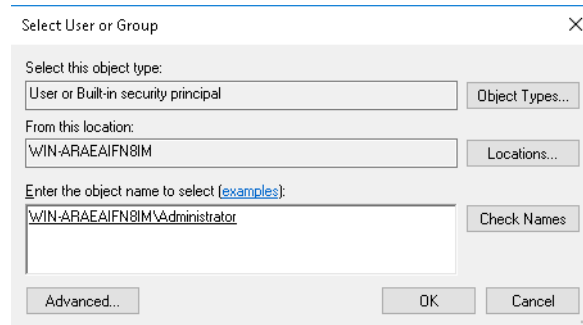
11. Select OK.
12. The Login name is populated on the Login - New window.
13. Select OK.

Configure the Historian Virtual Server

This template represents a base installation of a FactoryTalk Historian SE server. The template excludes optional features, such as Advanced Server or Datalink.

The first step is to decide whether your Historian is going to be set up as a collective of servers or as a standalone Historian server. This decision affects the following:

- Where the SQL database is installed
- Where the Historian Asset Framework software is installed

Historian Collective

A Historian collective is recommended for PlantPAx systems.

A collective is composed of two or more FactoryTalk Historian servers that are configured to store and write identical data on each server for high availability. The server collective receives data from one or more interfaces and responds to requests for data from one or more clients. When one server becomes unavailable, another server that contains the same data responds to requests for that data.

If you are implementing a collective, you must deploy two Historian server virtual machines. Complete all sections of this manual for each Historian server.

Before configuring the server, complete the following tasks:

- [Deploy PlantPAx Virtual Machines](#).
- [VMware ESXi vCenter Server](#).
- [Common Windows Configuration](#)

Once you have completed these tasks, see the PlantPAx DCS Configuration and Implementation User Manual, publication PROCES-UM100, for Historian configuration procedures, such as:

- Configuring Servers for a Collective
- Creating a Collective
- Client to server connections
- Historian to FactoryTalk Directory Connection
- Configuring Redundant Node Interfaces
- Configuring PI Performance and PI Buffering
- Configuring Data Collection
- Configuring Historian Asset Framework

Additional Historian Resources

Refer to the PlantPAx DCS Configuration and Implementation User Manual, publication PROCES-UM100, for Historian configuration procedures.

When the template is installed, we recommend that you review the FactoryTalk Historian publication at http://literature.rockwellautomation.com/idc/groups/literature/documents/in/hse-in025.pdf).

IMPORTANT	See the pages that are referenced in the FactoryTalk Historian SE Installation and Configuration Guide, publication HSE-IN025A:
	- Verify that Historian Services are Running
	- Verify that Historian Server is Updating Data for Default Tags
	- Prepare PI MDB to AF Synchronization
	- Create Security Mappings
	- Adding the Server to the FactoryTalk Directory Connection
	- Assigning License Activations to the Historian Server

Configure the Batch Virtual Server

This section provides procedures to install FactoryTalk Batch independently, with FactoryTalk eProcedure®, or with Event archiver.

Before configuring the server, complete the following tasks:

- Deploy PlantPAx Virtual Machines.
- VMware ESXi vCenter Server.
- Common Windows Configuration

Specify FactoryTalk Directory Location

Complete these steps to specify the FactoryTalk Directory location.

1. On the virtual image desktop, select the Programs icon and choose Rockwell Software>FactoryTalk Tools>Specify FactoryTalk Directory Location.
2. In the FactoryTalk Directory Server Location Utility dialog box, select Browse (ellipsis '...').
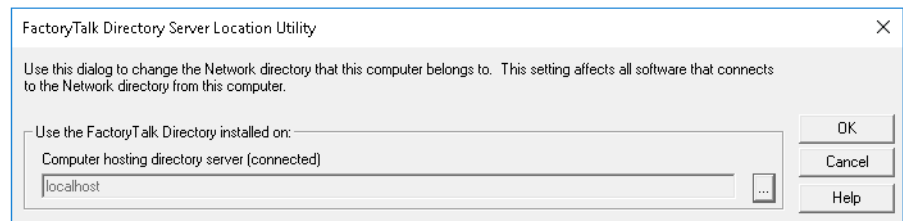
3. In the FactoryTalk Directory Server Configuration dialog box, select Remote Computer.
4. Enter the name of your PASS server, or select Browse (ellipsis '...'), search for, and select your PASS server.
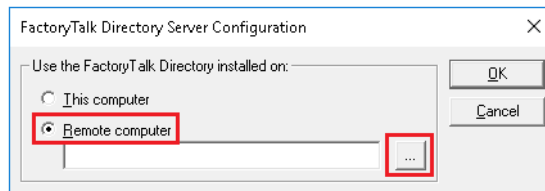
IMPORTANT	Browse can be inactive if Network Discovery and File Share are not enabled.

5. Select OK
6. On the FactoryTalk Directory Server Location Utility dialog box, select OK to accept the changes.
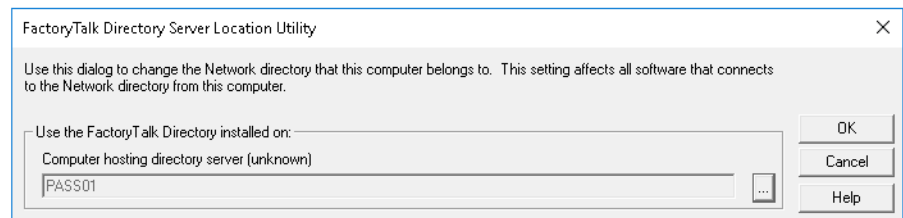
7. Log in to the FactoryTalk server when prompted.
8. Restart the virtual machine.

Install FactoryTalk Batch

The Batch virtual server provides efficient, consistent predictable batch processing and supports the reuse of code, recipes, phases, and logic. FactoryTalk Batch combines the ISA S88 standard with proven technology that provides the flexibility you need to supply your product to market faster.

1. On the desktop, double-click the shortcut to the Batch Installation file folder.
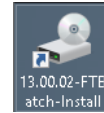
2. Double-click Setup.exe.
3. When the Setup window displays, select Next.
4. Clear the checkbox for FactoryTalk Event Archiver. Leave FactoryTalk Batch v14.00 checked.
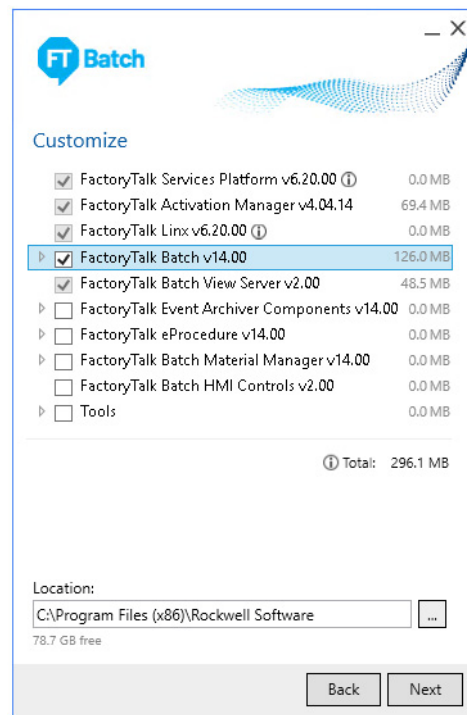
5. Permission requested. Check to allow changes to this computer.
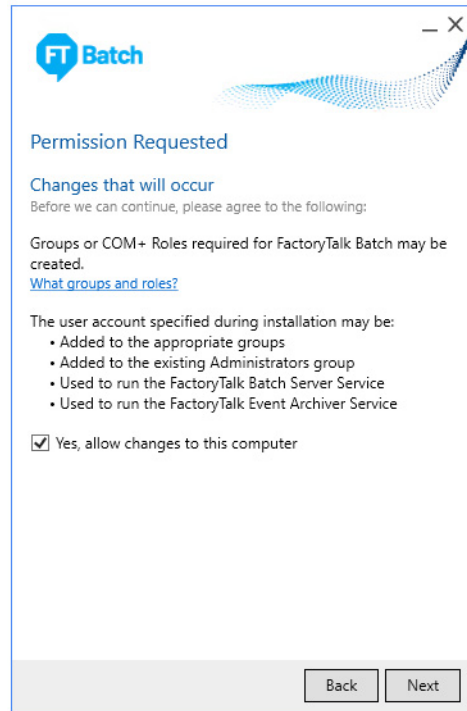
6. Select Network Directory.
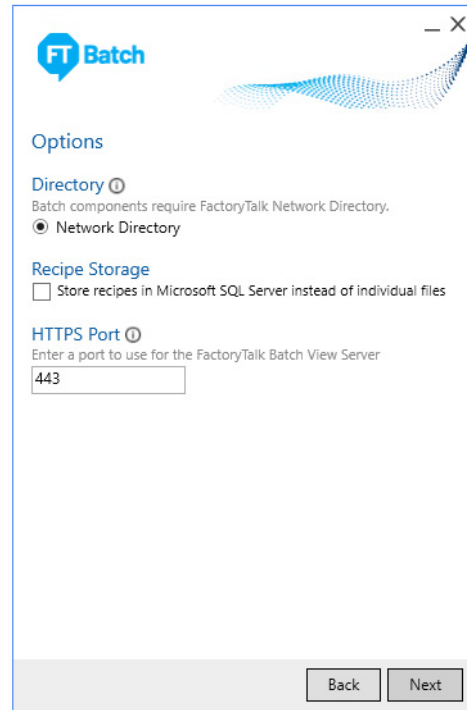
7. Enter a user name and password for the batch server.

8. Select Install.
9. On the EULA page, read the license agreement and click 'Accept all'. Installation takes approximately 15 minutes.
10. Select whether to activate now or later. You must be connected to the Internet to activate now.
11. Select Close.

Install FactoryTalk eProcedure

The eProcedure template lets you step through the process of creating and commanding a batch. You can view equipment or procedures for batches running within the plant.

IMPORTANT	You must have FactoryTalk Batch installed on the server to complete the following procedure.

1. On the desktop, double-click the shortcut to the Batch Installation file folder.
2. Double-click Setup.exe.
3. When the Setup window displays, select Customize.

4. Check FactoryTalk eProcedure v14.00 and click Next.
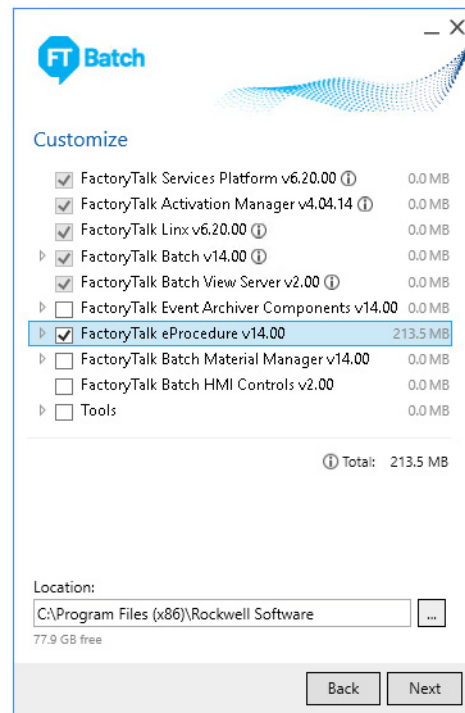
5. Select Network Directory and click Next.
6. Enter a user name and password for the batch server.
7. Select Modify.
8. On the EULA page, read the license agreement and Select 'Accept all'.
9. Select Close when the modification is complete.

Install FactoryTalk Event Archiver

Complete these steps to install the FactoryTalk Event Archiver to insert batch record data.

IMPORTANT	You must have FactoryTalk Batch installed on the server to complete the following procedure.

1. On the desktop, double-click the shortcut to the Batch Installation file folder.
2. Double-click Setup.exe.
3. When the Setup window displays, click Customize.

4. In the FactoryTalk Batch window, select FactoryTalk Event Archiver v14.00.
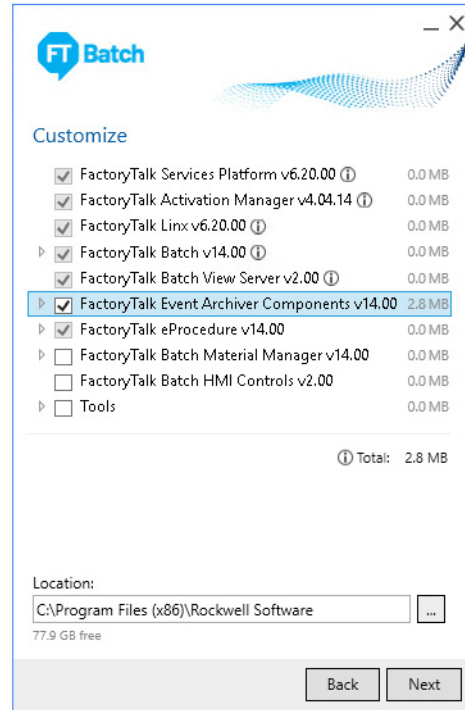
5. Select Next.

6. Enter your SQL server name. Use the Default Instance, Source Name, and Include Batch Reports.
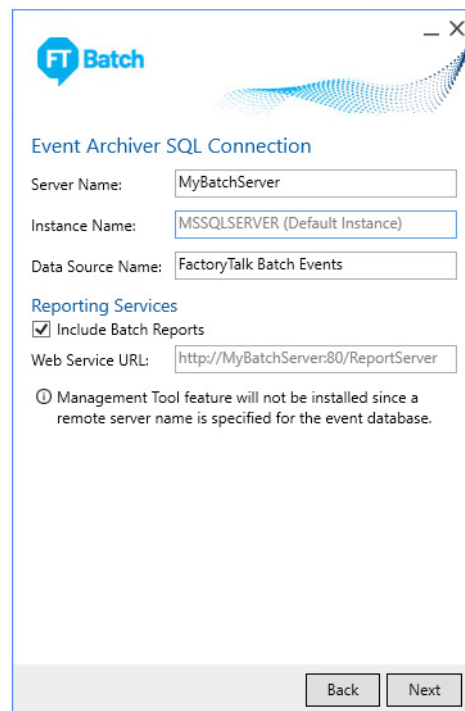
7. Select Next.

8. Select Modify once the connection is validated.

9. On the EULA page, read the license agreement and select 'Accept all'.

10. Select Close once the modification is complete. Installation takes approximately 3 minutes.

Complete Batch Installation

At this point, the FactoryTalk Batch virtual server is ready for use. Review the Installation Guide for FactoryTalk Batch, publication BATCH-IN002.

We recommend that you use a domain. If the Batch server is in a workgroup, complete these additional tasks:

- Add an incoming firewall rule
- Disable Administrative Approval Mode

For these procedures, see the Batch Installation Guide ('Configure Batch Server to run in a Workgroup') and the eProcedure manual.

- The FactoryTalk Batch Installation Guide is in your template at C:\Install Files\Batch Installation Software\14.00.00-FTBatch-DVD
- The FactoryTalk Batch Administrator's Guide is in your template at c:\ Program Files (x86)\Commion Files\Rockwell\Help.

Configure the Asset Management Virtual Server

An asset management server (AppServ-Asset) helps to manage and maintain plant operations. The AppServ-Asset server provides controller data backup for disaster recovery, diagnostics, calibration, and real-time monitoring. The server also audits equipment and network health to improve overall resource availability.

Before configuring the server, complete the following tasks:

- Deploy PlantPAx Virtual Machines.
- VMware ESXi vCenter Server
- Common Windows Configuration

Configure a Firewall

This section describes how to enable a firewall.

IMPORTANT	Before proceeding, there must be a connection between this computer and the computer where the FactoryTalk Directory resides. There must also be a connection between this computer and the SQL server.

1. On the virtual image desktop, click the Programs icon and choose Rockwell Software>FactoryTalk Tools>Windows Firewall Configuration Utility.
2. If the firewall has not been enabled, the following dialog box can open. Select Yes to enable the firewall and continue.
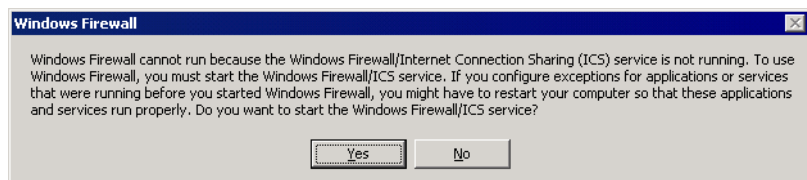
3. In the Rockwell Software Windows Firewall Configuration Utility window, select Accept. If no changes are required, select Exit.
4. Select OK on the Confirm Windows Firewall Changes dialog box.

5. The utility configures the Windows firewall and the firewall is set to a new state (if different).

Specify FactoryTalk Directory Location

In this section, you specify the location of the FactoryTalk Directory.

1. On the virtual image desktop, click the Programs icon and choose Rockwell Software>FactoryTalk Tools>Specify FactoryTalk Directory Location.

2. In the FactoryTalk Directory Server Location Utility dialog box, select Browse (ellipsis '...').

3. In the FactoryTalk Directory Server Configuration dialog box, select Remote Computer. Enter the name of your PASS server, or select Browse (ellipsis '...'), search for, and select your PASS server.

4. On the FactoryTalk Directory Server Location Utility dialog box, select OK to accept the changes.
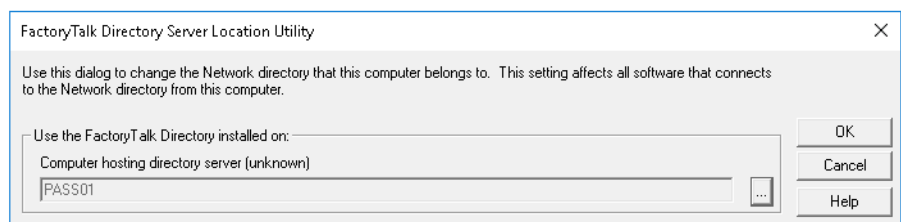
5. Log in to the FactoryTalk server when prompted.

6. Restart the virtual machine.

Create a New Inbound Rule

There must be an inbound rule that allows a connection through the firewall to the AppServ-Info (SQL) server.

1. On the virtual image desktop, click the Programs icon and choose Administrative Tools>Windows Firewall with Advanced Security.

2. In the Windows Firewall with Advanced Security, select Inbound Rules.

3. Right-click Inbound rules and select New Rule.
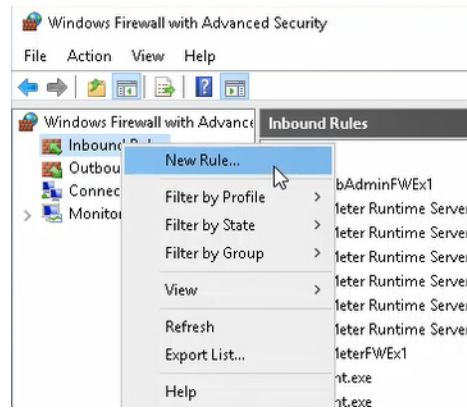
4. In the Rule Type dialog box, select Port and then select Next.
5. Select TCP and Specify local ports.
6. Type '1433' as the specific local port.
7. Select Next.
8. Select 'Allow the connection' and then select Next.
9. Make sure that all boxes are checked and select Next.
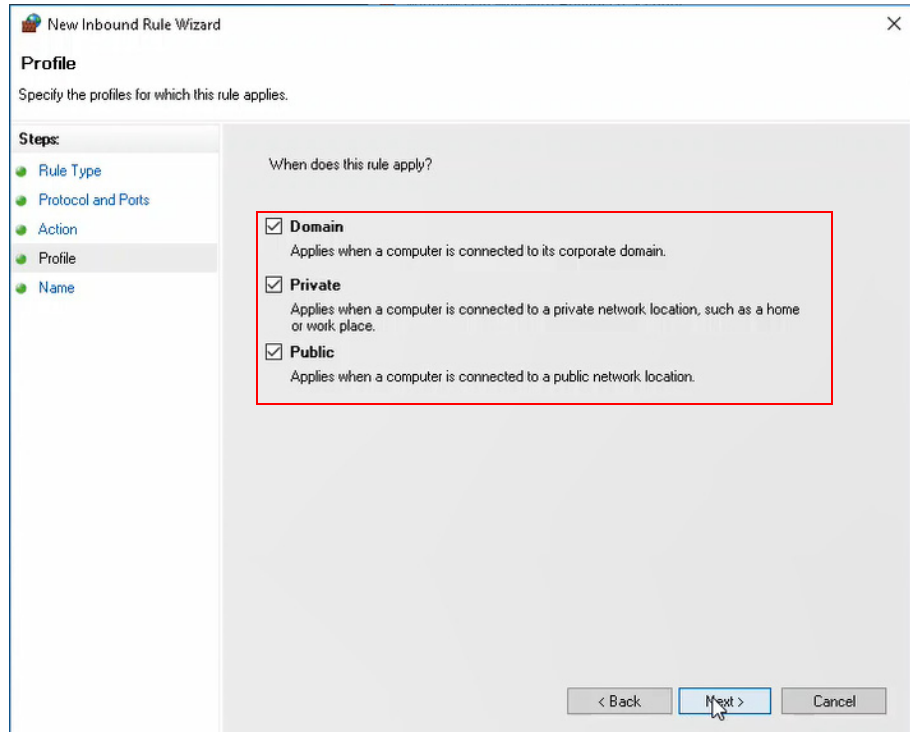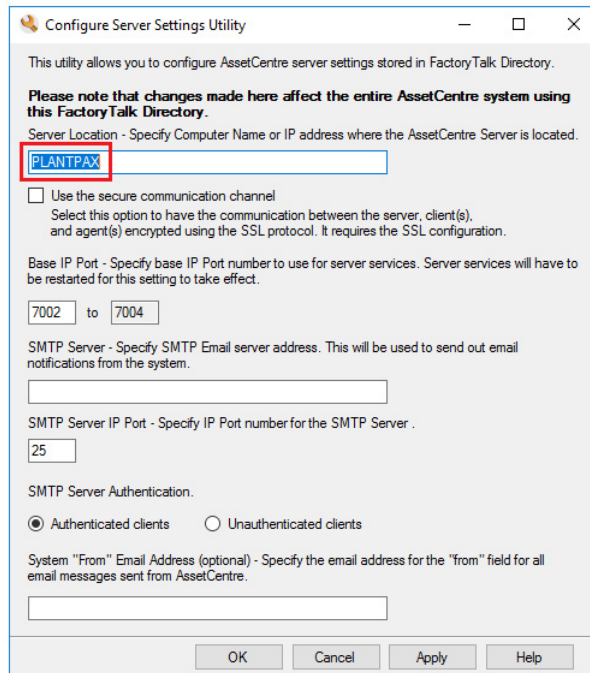
10. Enter External SQL Connection in the Name field and click Finish.
11. The firewall now permits connections to the external SQL server in a secure manner.

Configure FactoryTalk AssetCentre Software

Configure FactoryTalk AssetCentre (FTAC) server settings stored in the FactoryTalk Directory.

1. Navigate Programs>Rockwell Software>FactoryTalk Asset Centre Server>Server Settings to launch the Server Setting Utility.
2. Enter a user name and password and click OK.
3. Enter the server location by typing the new computer name.

Update FactoryTalk AssetCentre SQL Instance

If the FactoryTalk AssetCentre server was installed before renaming the computer and/or specifying a SQL database location, you must update the FactoryTalk AssetCentre SQL server instance by using select AssetCentre utilities.

1. On the FactoryTalk AssetCentre server computer, locate the application utilities in the FTAC Server Repair folder on the desktop.

2. Start by running the FTAssetCentre.DBInstaller.exe utility, which will install/upgrade the database. Enter the Server information based the edition of SQL.

   • Enter the SQL server computer name and instance for SQL Server Standard. For example, PLANTPAXSQL\PAxINSTANCE

   - If using the default SQL instance, enter only the SQL server computer name.

   • Enter ".\sqlexpress" if using SQL Server Express.
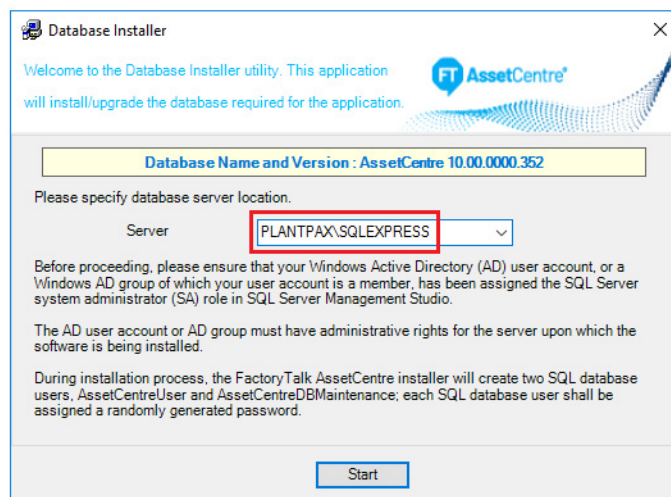
3. Run the FTAssetCentre.AosCatalogImport.exe utility, which imports the AssetCentre Catalog data into the database.
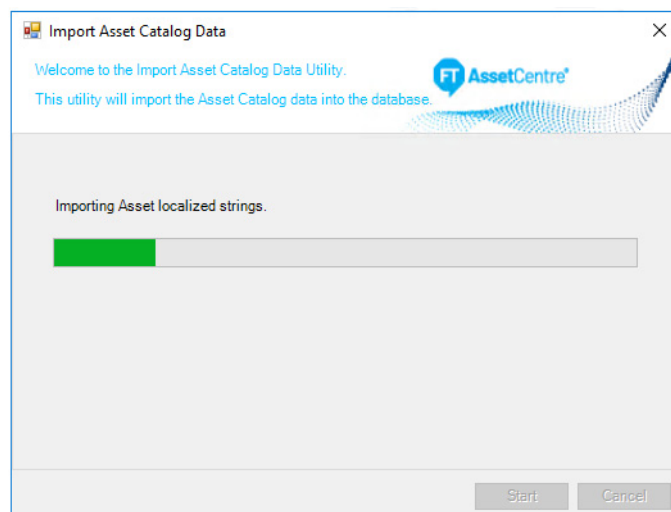
4. Make note of the FTAssetCentre.DataSourceEditWizard.exe utility. This utility can change the system password that FactoryTalk AssetCentre server uses to connect to the SQL Server database and can also change the SQL Server that is used by FactoryTalk AssetCentre.

5. Restart FactoryTalk AssetCentre server computer.

Configure the AppServ-OWS/AppServ-EWS Virtual Servers

This section describes procedures for configuring an AppServ-OWS and AppServ-EWS. The procedure is the same for both servers.

Application servers for EWS and OWS allow multiple instances of EWS and OWS workstations to be deployed by using Microsoft Remote Desktop Services (RDS).

Before configuring the server, complete the following tasks:

- Deploy PlantPAx Virtual Machines.
- VMware ESXi vCenter Server if deployed on a server.
- Common Windows Configuration if deployed on a workstation.

The Rockwell Automation software for the AppServ-OWS and AppServ-EWS virtual templates is included and pre-installed in the virtual image templates, **but not activated**. See Software Product keys and Activations for activation procedures. See PlantPAx Virtual Image Template Catalog Numbers for product catalog numbers.

IMPORTANT	If you already own individual product activations, these activations also can be used to activate the instances of these virtual image templates you deploy. Each instance requires its own Rockwell Automation license and Microsoft license.

Specify the FactoryTalk Directory Location

IMPORTANT	To complete this procedure, a PASS server must be configured on your system. The workstation being configured must have an established connection with the PASS server.

Complete these steps to specify the network FactoryTalk Directory location for EWS and OWS workstations.

1. Click the Programs icon and choose Rockwell Software>FactoryTalk Tools>Specify FactoryTalk Directory Location.
2. Click Yes to allow the application to make changes to the device.
3. In the FactoryTalk Directory Server Location Utility dialog box, click Browse (ellipsis '...').
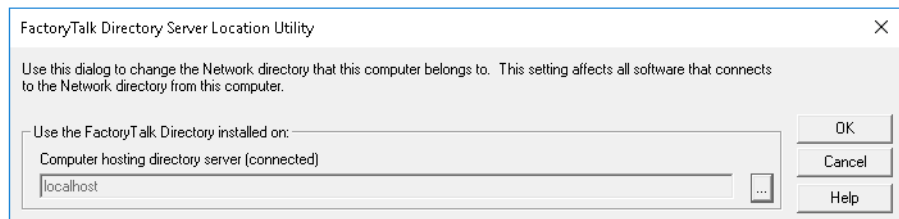
4. Type your FactoryTalk Directory Administration Console credentials into the login screen and click OK.

5. Click Remote computer and click Browse.
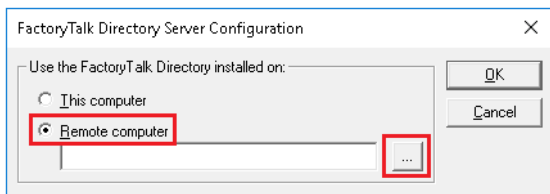
| **IMPORTANT** | Browse can be inactive if Network Discovery and File Share are not turned on. |

6. Navigate the network to find the computer name of the server (typically PASS) that is hosting the FactoryTalk Directory services. Click OK.

   If Browse is inactive, type the computer name of the virtual machine that is hosting the FactoryTalk Directory.

7. Select OK to accept the location.

8. Select OK to finalize the location.
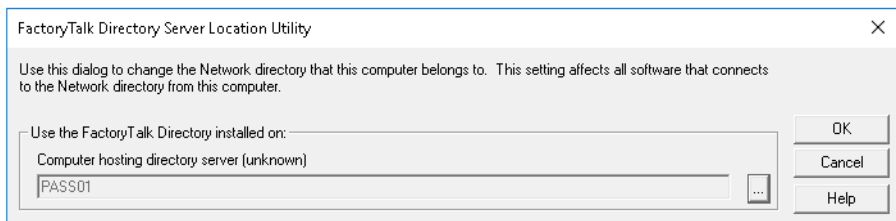
9. When prompted, type the FactoryTalk Directory Administrator username and password and click OK.

   Tip: The credentials were configured in Configure the PASS Virtual Server.

10. Restart after you make this change.

Install PI Builder Excel Add-in for Microsoft Excel

PI Builder is a Microsoft Excel® add-in that lets you use Excel to create, view, and modify PI points and Asset Framework objects in your Historian database. With PI Builder, you can make bulk tag edits by importing and exporting your spreadsheet.

All functionality of the prior PI Tag Configurator has been replaced with PI Builder, which is included with the PI SMT and PI Data Archive setup kits (as part of the PI AF Client installer).

| **IMPORTANT** | This section is not performed for OWS. Proceed to Configure Remote Desktop Services on page 85. |

| **IMPORTANT** | Microsoft Excel software must be installed for these procedures. |

If Microsoft Excel was installed after the Historian software, the AF Client features will must be modified to include the PI Builder feature.

1. Run the PI-Server_2018-SP3-Patch-1.exe file included as part of the installation media in the \Redist\PIServer\ folder.

2. Choose to Modify the installation and click Next.

3. Select PI Builder on the Individual Features tab and click Next.
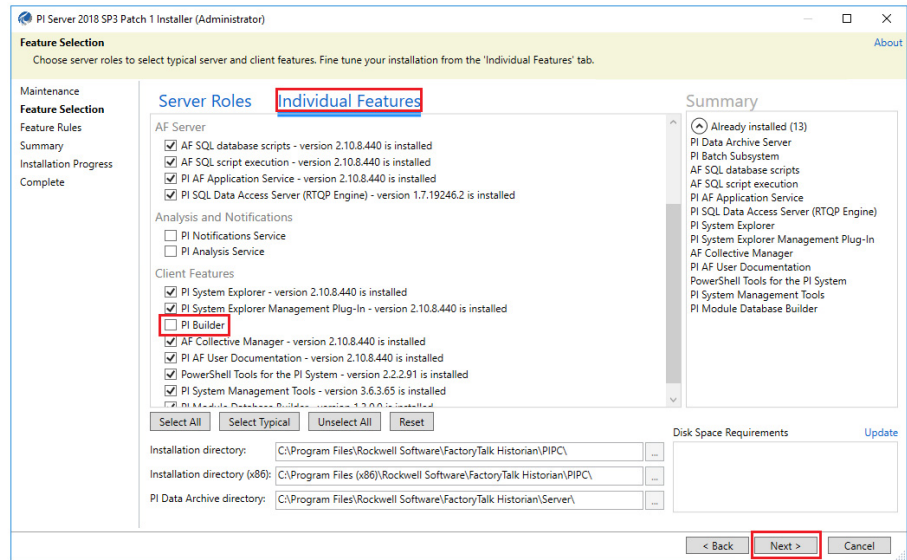
4. Restart the computer after the installation is complete.

To retrieve and publish PI AF objects, PI Builder must connect to a PI AF database and for PI points a PI Data Archiver server.

1. Open your version of Microsoft Excel and click the PI Builder tab.
2. In the Connections group on the upper left corner. Select your Data Server, Asset Server, and Database as available.
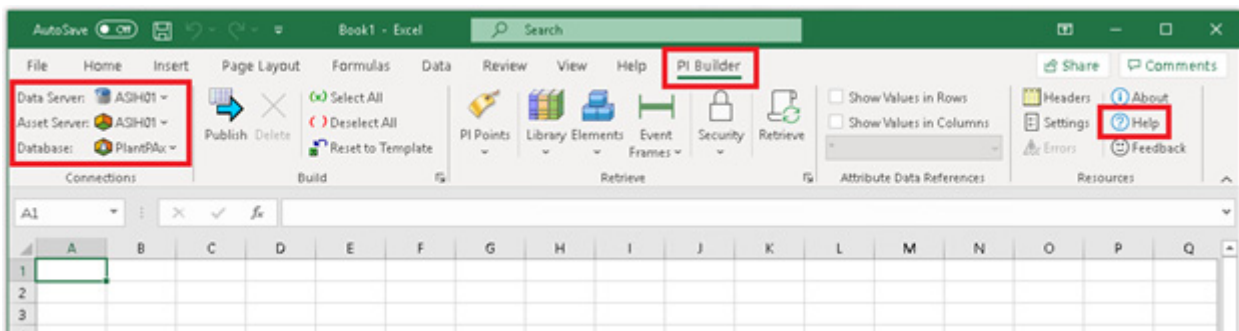
Configure Remote Desktop Services

The AppServ-OWS and AppServ-EWS provide PlantPAx users with an alternative to the standard OWS and EWS client machine (physical or virtual). Both application servers use Microsoft Remote Desktop Services (RDS). RDS technology allows multiple instances of the OWS and EWS from one virtual server.

This architecture is ideal for PlantPAx users that use thin clients as Operator and Engineering workstations.

IMPORTANT	A valid FactoryTalk activation is still required for each instance of the OWS and EWS that is in use.
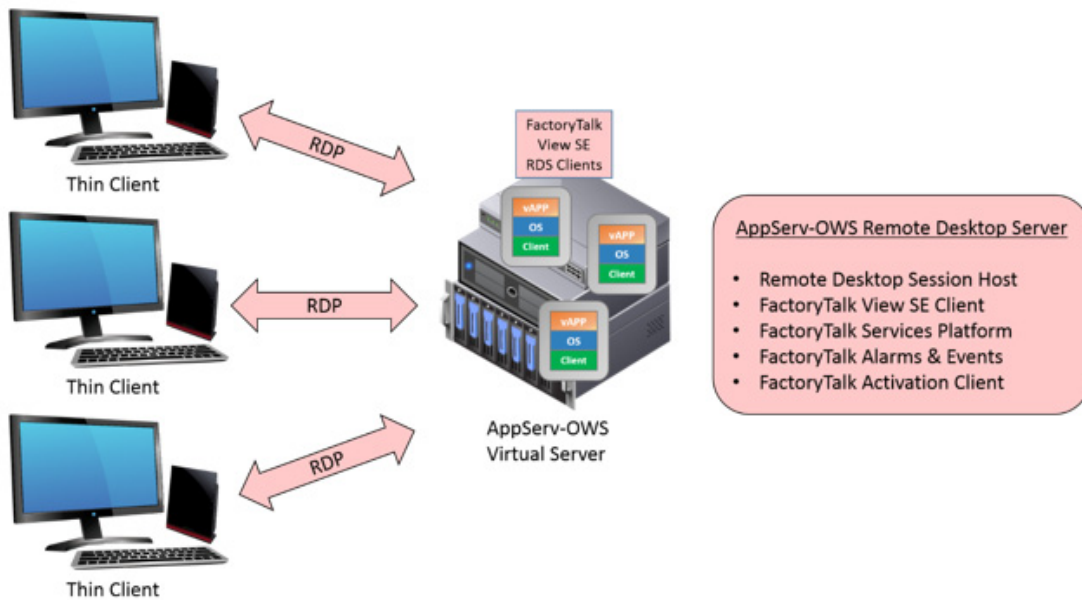
Microsoft RDS (formerly known as Terminal Services) is a standard role that is built into the Windows server family of operating systems. RDS provides remote access to applications and data on a remote computer over a network. This solution minimizes the amount of information traveling across your network.

RDS can be used as an administrative tool to connect to a remote machine and perform maintenance tasks. RDS can also be used as a thin client solution to let remote clients execute applications or even access the entire desktop of the host server.

The thin client solution is a transparent system that runs applications and performs data processing and storage functions on a remote computer. This solution minimizes the amount of information traveling across your network. While multiple sessions can run on one server, each user can see only their individual session. Only the user interface is shown on client, user input from client is redirected over the network to the remote desktop session. User's desktops are transmitted to clients for display by using terminal emulation software. Similarly, the software sends command functions such as keyboard inputs and mouse clicks across the network between the client and the server.

The PlantPAx AppServ-OWS and AppServ-EWS are pre-configured with the RDS server role. This configuration provides a thin client solution for FactoryTalk View SE clients.

Users, with the proper credentials, can log in into the AppServ-OWS and AppServ-EWS and run the desired application.

One Rockwell Automation software activation key is required for each remote desktop session.

Remote Desktop Services with FactoryTalk View SE

RDS features the following benefits with FactoryTalk View SE software:

- **Increased network flexibility:** RDS lets you deploy thin and ultrathin clients on the plant floor or out in the field. The minimal requirements of RDS clients allow for various thin products that are designed to handle most environmental conditions. These conditions include radical temperatures, extreme vibrations, or areas where mobility is key.

  Users can gain access to an RDS over any Transmission Control Protocol/Internet Protocol (TCP/IP) connection, including the following:

  - Remote access
  - Ethernet
  - Internet
  - Wireless
  - Wide area network (WAN)
  - Virtual private network (VPN)

- **Lower cost of ownership:** A thin client typically consists only of the operating system and the Remote Desktop Connection software. RDS delivers a virtual Windows Server experience from server to clients, regardless of what operating system the client uses.

- **Minimize downtime:** Upgrade your entire FactoryTalk View SE installation with one operation. Because FactoryTalk View SE products install only on the server side, any future software upgrades are limited to the server, making software upgrades on clients a thing of the past.

- **Improve data security:** A FactoryTalk View SE architecture that uses RDS is less vulnerable to security threats. RDS lets you focus your security measures on the server because all data is processed on the server, which you can manage in a secure location.

RDS has the following limitations with FactoryTalk View SE software:

- The Microsoft RDS protocol does not transfer the physical display aspect ratio (height/width proportion) from the server to its clients. Clients must specify the display properties (resolution, aspect ratio, color depth, and so forth) for each session they create. Verify the appearance of the application visually on the Remote Desktop clients before placing the system in a production environment, modifying graphics as necessary.

- If your FactoryTalk View SE client configuration (.cli) enables 'Show Diagnostics List', the list shows all activity from all clients that run on the same Remote Desktop session host. Although each instance of the FactoryTalk View SE client runs in a separate session, they are all hosted on the same computer. And, they share common log resources. This amount of activity can be confusing for HMI operators because they see diagnostic activity on their client that they did not initiate.

Additional Services

IMPORTANT	You can add additional role services to your server depending on your specific deployment of RDS and connectivity needs. These added services can add additional configuration beyond which this base RDS has been configured for.

Tip: Remote Desktop Services uses its own method of licensing clients that log on to Remote Desktop Services servers. This method is separate from licensing for the Windows Server family of operating systems. Therefore, AppServ-OWS and AppServ-EWS Remote Desktop Connections must receive a valid license. This license must be issued by a Remote Desktop Licensing Server before they can log on to a Remote Desktop Session Host or Connection Broker.

For volume licensing of these components, contact your Microsoft distributor.

Configure the VantagePoint Virtual Server

AppServ-Info can be configured as a decision support tool by using FactoryTalk VantagePoint EMI software. VantagePoint EMI is a powerful web-based business intelligence solution that is designed specifically for industrial environments with premier Logix integration. VantagePoint EMI integrates all data into one information management and decision support system by connecting to your Logix controllers, OPC data sources, Historians, and SQL/Oracle Databases. With an AppServ-Info (VantagePoint) system element in your PlantPAx DCS, you can access your production data from anywhere including your shop floor devices, personal computer, or your mobile phone or tablet.

Before configuring the server, complete the following tasks:

- Deploy PlantPAx Virtual Machines.
- VMware ESXi vCenter Server
- Common Windows Configuration

Specify the FactoryTalk Directory Location

IMPORTANT	To complete this procedure, a PASS server must be configured on your system. The workstation being configured must have an established connection with the PASS server.

1. Select the Programs icon and choose Rockwell Software>FactoryTalk Tools>Specify FactoryTalk Directory Location.

2. Select Yes to allow the application to make changes to the device.

3. In the FactoryTalk Directory Server Location Utility dialog box, select Browse (ellipsis '...').
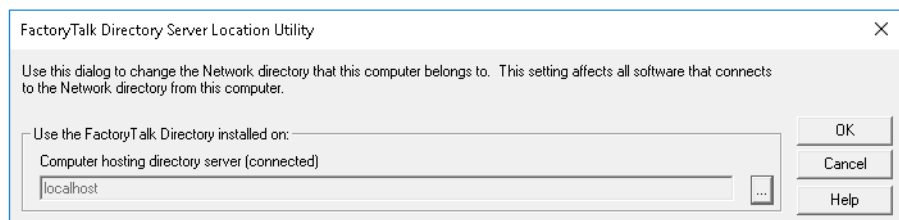
4. Enter your FactoryTalk Directory Administration Console credentials into the login screen and select OK.

5. Select Remote computer and select Browse.
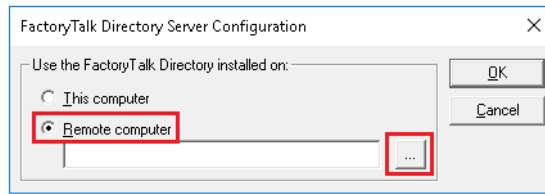
> **IMPORTANT**   Browse can be inactive if Network Discovery and File Share are not turned on.

6. Navigate the network to find the computer name of the server (typically PASS) that is hosting the FactoryTalk Directory services. Select OK.

   If Browse is inactive, type the computer name of the virtual machine that is hosting the FactoryTalk Directory.

7. Select OK to accept the location.

8. Select OK to finalize the location.
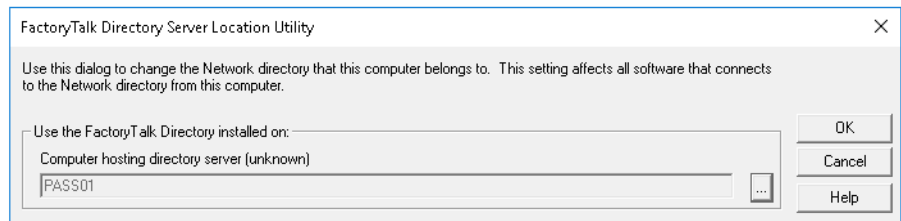
9. When prompted, type the FactoryTalk Directory Administrator username and password and select OK.

   The credentials were configured in <u>Configure the PASS Virtual Server</u>.

10. Restart after you make this change.

Install VantagePoint Server Software

1. Navigate to the installation setup folder:
   c:\Install Files\8.20.00-VantagePoint-EMI-DVD

2. Double-click setup.exe.

3. Select Install FactoryTalk VantagePoint.

4. On the next dialog screen, select Install FactoryTalk VantagePoint.

5. If you have not installed Microsoft Excel, you see this warning. Read the warning and, according to your needs, click Yes or No.

   In our example, we click Yes to show the installation of FactoryTalk VantagePoint when Microsoft Excel is not installed in the VantagePoint Server.

6. Select Next on the Wizard Welcome page.

7. Read the License Agreement, select 'I accept the terms in the License Agreement'.

8. Select Express on the 'Choose Setup Type' page.

   A warning appears if you have not installed Microsoft Excel.

9. Select OK.

10. In the Database Connection Information page, type the name of the SQL server, click SQL Server, and type credentials for the database.
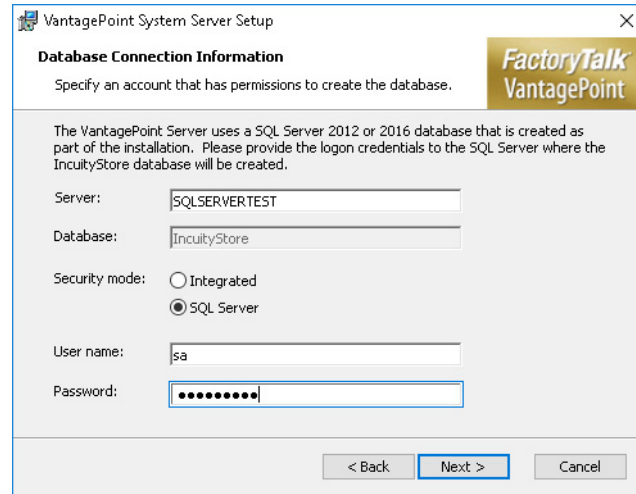
IMPORTANT	Type the password that you created when completing the SQL Server installation when deploying the SQL Server template.

11. Select Next.

12. Enter the Domain name, user name for the Domain controller, and password for the Domain controller in the System/Office User page

13. Select Next.

14. Select Install.

15. Select Finish.
    A DOS window opens to finish the configuration. It closes automatically.
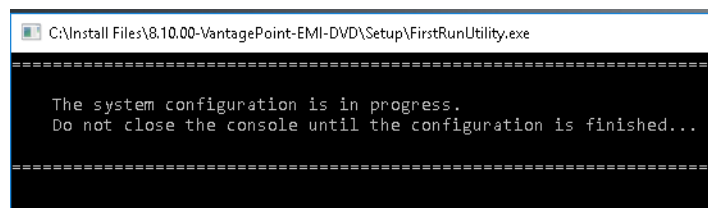
Install Microsoft Excel Add-In

IMPORTANT	If you are installing FactoryTalk VantagePoint in a VantagePoint server with Microsoft Excel installed on it, install the Microsoft Excel Add-In for FactoryTalk VantagePoint during the FactoryTalk VantagePoint installation.

The Microsoft Excel add-in enables FactoryTalk VantagePoint to generate Excel spreadsheet reports. Complete these steps to install the Excel Add-On software.

1. Navigate to the installation setup folder:
   c:\Install Files\8.20.00-VantagePoint-EMI-DVD

2. Double-click setup.exe.

3. Select Install FactoryTalk VantagePoint.
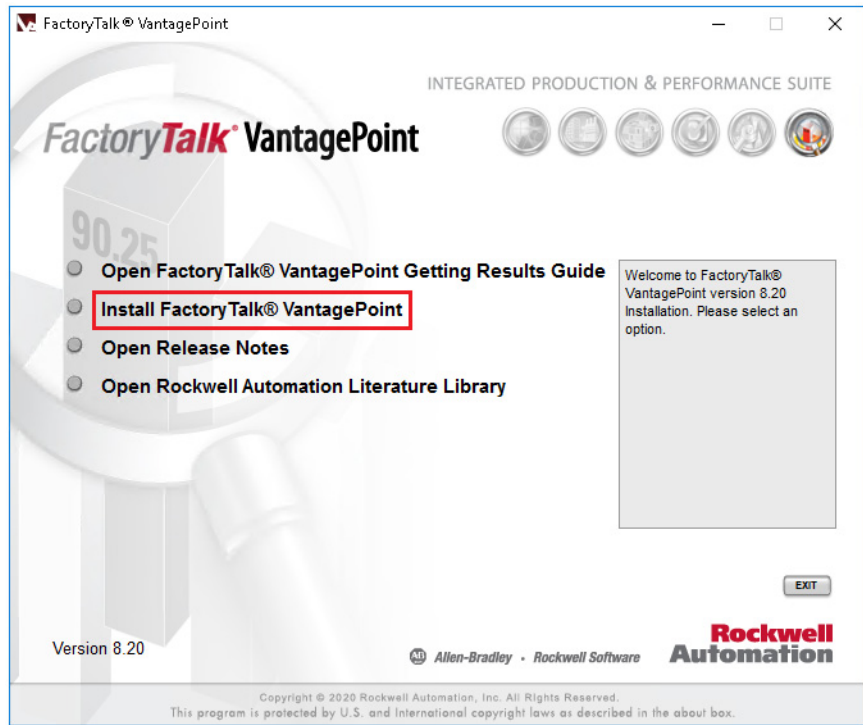
4. Select Install FactoryTalk VantagePoint.
5. Select Next on the Wizard Welcome page.
6. Select Modify on the Modify, Repair, or Remove installation page.
7. Select the VantagePoint Office pull-down menu and select 'Will be installed on local hard disk drive.'
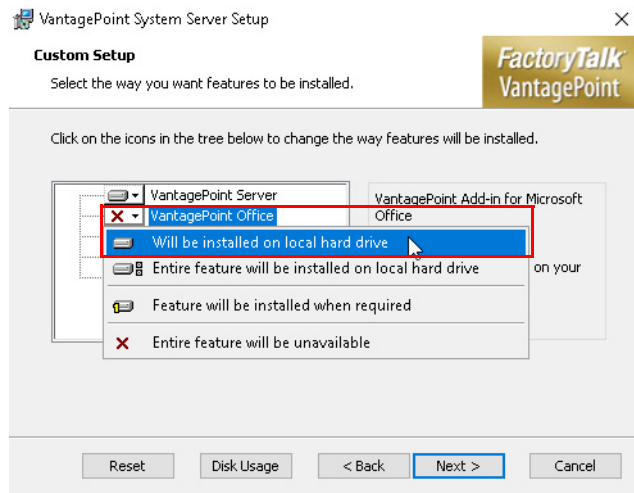
8. Select Next.
9. Select Install.
10. Enter the Domain name, user name for the Domain controller, and password for the Domain controller in the System/Office User page
11. Select Next.
12. The Microsoft Excel software program starts and a VantagePoint Configuration warning appears.
13. Close Microsoft Excel and click OK in the warning.

14. A series of VantagePoint server configurations are performed. You return to the VantagePoint Manager window when the configurations are done.

15. Select Finish.

Notes:

PASS-C / OWS ISO Images for PCs

This chapter describes how to install and configure physical computers using the PASS-C server and OWS workstation pre-built ISO images.

This option provides for multiple system elements to be consolidated on the same physical server, which is referred to as PASS-C.   Ideal for small and medium systems, we suggest that your system not have more than 2000 I/O points for this consolidated server.

The pre-built ISO images contain a Windows Server 2016 operating system and pre-installed applications. The PASS-C image supports system elements such as:

- FactoryTalk® Directory
- Data server
- HMI server (one server license only is required)
- Alarm server
- FactoryTalk Historian
- FactoryTalk VantagePoint®
- FactoryTalk AssetCentre
- SQL server

The OWS image contains a Microsoft® Windows 10 Enterprise LTSC 2019 operating system and supports client-side elements. The following elements are suitable for interfacing with a PASS-C or even with a virtual PASS:

- HMI Client
- FactoryTalk AssetCentre Client

IMPORTANT	The USB device contains a bootable installation of a PASS-C server or OWS workstation.
	A purchase of a PASS-C or OWS ISO includes an Electronic Software Delivery (ESD) version available for download from the Product Compatibility and Download Center. The ESD is one file (.ISO type) which can be used to create your own bootable device. Typical bootable devices that you can create are DVDs and USB storage devices. We do not provide procedures for creating bootable devices. Several third-party resources are available (for example, PowerISO, RUFUS, and so on) for purchase.

Install Pass-C Operating System

The following steps are comparable to a retail Windows Server 2016 Standard operating system, the difference is the PASS-C ISO image contains additional pre-installed software.

1. Make sure that your computer is capable of booting from a USB drive. Enter the BIOS Setup as the computer is powering on (typically by pressing the F2 key). Make sure that the Boot options include booting from a USB device.

2. Shut down the computer and connect the USB drive.

3. Turn on the computer. While the computer is powering on, strike the F12 key to open the boot options screen.

4. Select the USB device containing the PASS-C installation.

5. On the Windows Setup dialog box, select your options from the pull-down menus.

6. Click Next.

7. Enter the product key or Click I don't have a product key.

8. Select Install Now.

9. Select "I accept the license terms", and click Next.

10. Custom (installation).
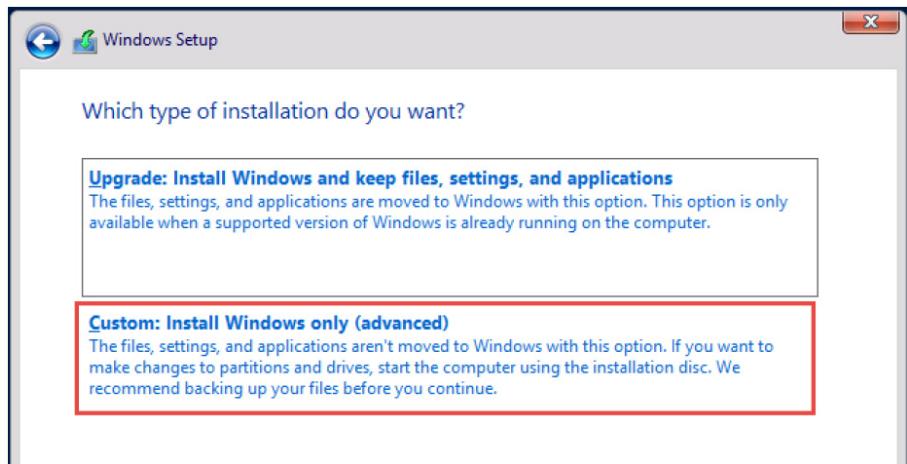
11. To store the installation, select the hard disk drive.

If necessary, delete any existing drive partitions and format the drive location.
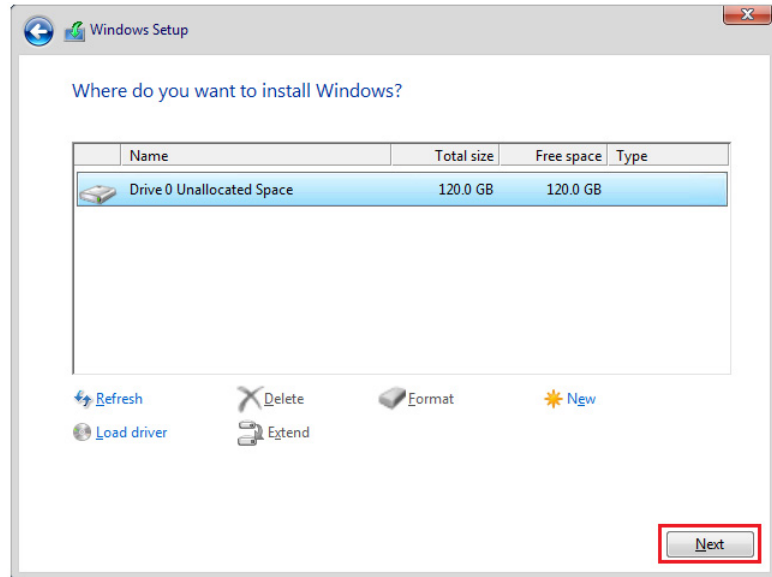
12. Select Next. The installation typically takes about an hour. The computer automatically restarts. You must log on to complete the installation.

13. Enter an Administrator password (for your system).

14. Enter a confirmation password.

Configure Windows Settings

1. Login using the administrator account and password that was created in the previous step.

2. In the Product Key window, enter a valid Windows Server Product Key and click OK.

3. Verify that the product key is correct and select Yes.

4. Select OK in the message window when the product key was installed successfully.

5. Install any required drivers for your hardware (graphics, Ethernet, chipset, and so on).

6. Right-click the windows start icon and select 'System'.

7. Select 'Change Settings'.

8. Select Change on the System Properties dialog box.

9. Enter the new computer name. Click OK.

> **IMPORTANT**   Do not use spaces or any special character symbols.

10. Acknowledge any prompts that indicate that a restart is required.

> **IMPORTANT**   Do not restart your computer now.

11. Select the Advanced tab.
12. Select Settings in the Performance section.
13. Choose the Advanced tab.
14. Select Background services in the Processor scheduling section to adjust for the best performance.
15. To help protect against viruses and security threats, select the Data Execution Prevention tab.

16. Select 'Turn on DEP for essential Windows programs and services only'.

17. Acknowledge the prompt that changes take effect on restart.

IMPORTANT	Do not restart your computer now.

18. Select OK to close the window.

19. On the Remote tab, select 'Allow remote connections to this computer'.

20. Select OK to enable the Remote Desktop Firewall exception.

21. Remove the check mark from the 'Allow connections only from computers ...' box and click Apply.

> **IMPORTANT**   Do not restart your computer now.

22. Select Restart Later.
23. Navigate to the Control Panel.
24. Select Power Options.
25. Select 'High Performance' in the Preferred Plans section.

Ethernet Network Adapter Settings

The PlantPAx® DCS Configuration and Implementation User Manual, publication PROCES-UM100 contains configuration information procedures for Domain or Workgroup infrastructures, such as managing IP addresses and computer name resolution.

To help with stable communications, we recommend configuring the speed, duplex, and power management settings for the Ethernet adapter.

> **IMPORTANT**   The configuration parameters that are described in this section apply to typical network infrastructures recommended for PlantPAx systems. Note that speed/duplex settings may vary depending upon the network switch configuration.

1. Navigate to the Control Panel.
2. Click Network and Internet.
3. Click Network and Sharing Center.

4. In the Network and Sharing Center window, click Change Adapter Settings.

5. Right-click the Ethernet network connection and choose Properties.
6. If asked, enter your password and click Yes.
7. In the Ethernet Properties dialog box, select Configure.

8. Select the Advanced tab.
9. Select Speed and Duplex and then choose Auto Negotiation.

10. Select the Power Management tab.
11. Select the 'Allow the computer to turn off this device to save power' checkbox.
12. Select OK.
13. Restart your computer.

Configure System Software

The PASS-C image contains SQL Server 2016 Express instance for use with Asset Centre and other applications. This is a free edition of SQL Server, with some limitations, a 10 GB maximum database size, and is intended for small PlantPAx system applications.

For larger PlantPAx system applications, a standard SQL Server prepared instance can be completed. Standard SQL Server 2016 offers an evaluation period for 180 days, before it expires and will require a licensed product key.

> **IMPORTANT**   SQL Server Express has already been installed on this machine. If you plan to use SQL Express, skip to SQL Registered Server Names. If you plan to use SQL Server 2016 Standard, continue with the next procedure.

Complete SQL Server 2016 Installation

Do the following if you choose to use SQL Server 2016:

1. On the virtual image desktop, click the Programs icon and choose Microsoft SQL Server 2016>Configuration Tools>Complete SQL Server 2016 Installation

2. Click Yes to allow the changes to be made to the device.
3. An installation wizard to complete image of SQL Server 2016 appears. Complete the wizard as follows:

> **IMPORTANT**   For the remainder of the installation, default selections are shown and we do not recommend any changes. Some PlantPAx configurations require these default selections. We recommend accepting the defaults, prove the system, and make changes later. Corresponding notice is provided where exceptions to this configuration are considered for changing now. Otherwise, simply click Next on the following screen captures to complete the process.

Wizard Page	Action
Setup Support Rules	Select OK once the rules have passed.
Product Key	• Select Specify a free edition and then select Evaluation from the pull-down menu for a 90-day trial. • Select Enter the product key and type your key to license your software.
License Terms	Read the license terms, and select 'I accept the license terms'

Wizard Page	Action
Microsoft Update	Accept Default
Complete Image Rules	Select Next once the rules have passed
Select Prepared Features	Select Complete a prepared instance of SQL Server 2016
Feature Review	Review the features to be configured
Instance Configuration	Select Default Instance
PolyBase Configuration	Select Use this SQL Server as a standalone PolyBase-enabled Instance
Server Configuration	Select Default
Database Engine Configuration	Select Mixed Mode Select Add Current User
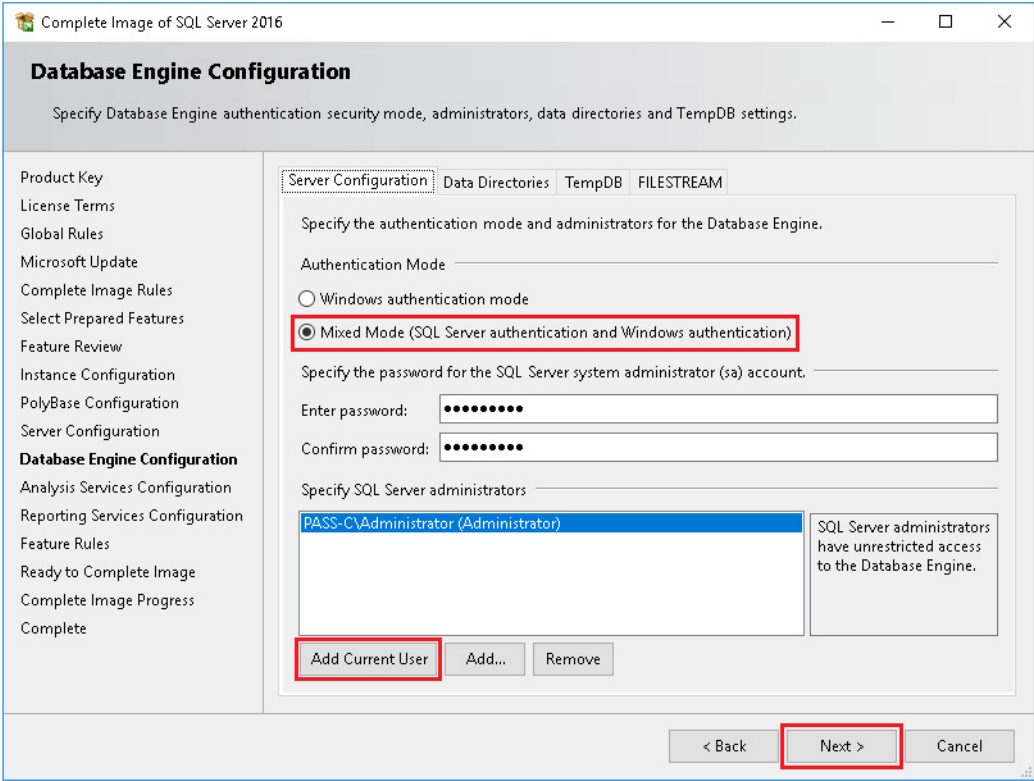
Wizard Page	Action
Analysis Services Configuration	Select Multidimensional and Data Mining Mode Select Add Current User Select Reporting Services Native Mode > Install and Configure
Reporting Services Configuration	Select Reporting Services Native Mode > Install and Configure
Feature Rules	Select Next once the rules have passed
Complete Image Process	Select Next once Complete
Complete	Select Close to complete the wizard

SQL Registered Server Names

Use the Microsoft SQL Server Management Studio to update the registered server names. This procedure applies to SQL Express and SQL Server.

1. Log in to the computer as Administrator.
2. Navigate to Programs>Microsoft SQL Server Tool 18\Microsoft SQL Server Management Studio 18 and launch SSMS.
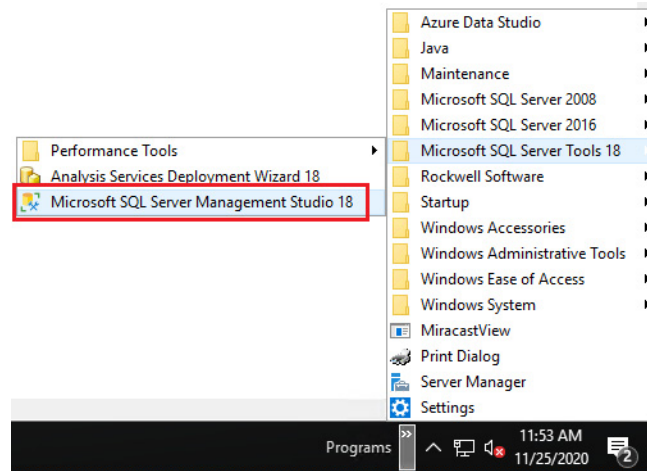
3. Connect to the SQL server.
   - For SQL Express, enter the server name\instance as <ComputerName>\SQLEXPRESS

     Login for SQLEXPRESS uses SQL Server Authentication 'sa' account and default password 'Rockwell1'
   - For SQL Server enter the servername without instance as simply <ComputerName>

     Login for SQL Server was defined during installation.
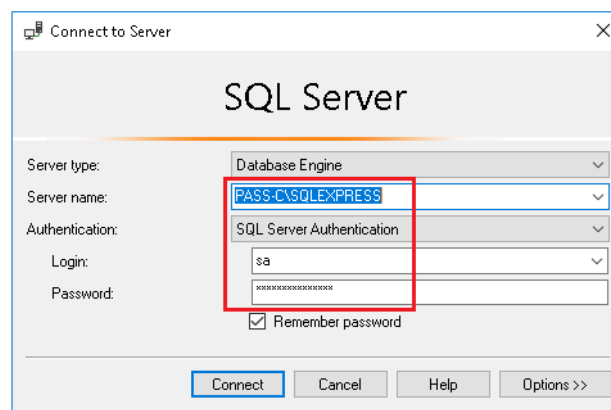
> **IMPORTANT** When using SQLEXPRESS, after you complete the initial connection, you can change your sa password under Options.

4. In SQL Server Management Studio use the menu to select View>Registered Servers.
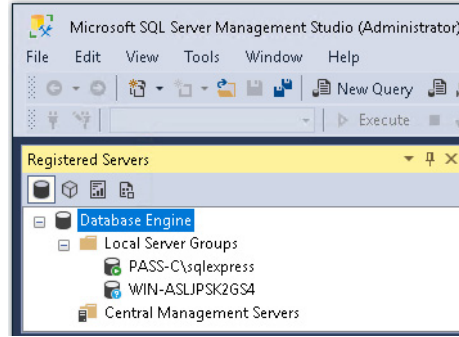
- Green icon indicates connected servers
- Blue icon indicates unconnected servers

5. Record any unconnected server names, for use in the Update SQL after Computer Rename section.

6. Right click any unconnected servers and select properties.

7. Use the drop down to select the server name and then edit the registered server name to represent this computer.
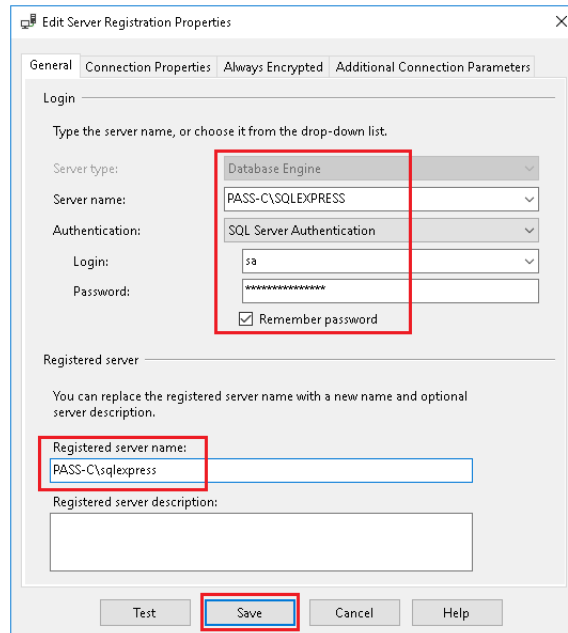
Update SQL after Computer Rename

When you change the name of the computer that is running SQL, use the following procedure to update system metadata for remote connections. This procedure applies to SQL Express and SQL Server.

1. In SQL Server Management Studio, select 'New Query' from the toolbar.
2. Enter the following code into the SQLQuery*.sql field, replacing old computer name with the unconnected server name recorded earlier and supplying the new computer name.

```
EXEC sp_dropserver '<oldcomputername>\instance';
GO

EXEC sp_addserver '<newcomputername>\instance' ,
local;
GO
```
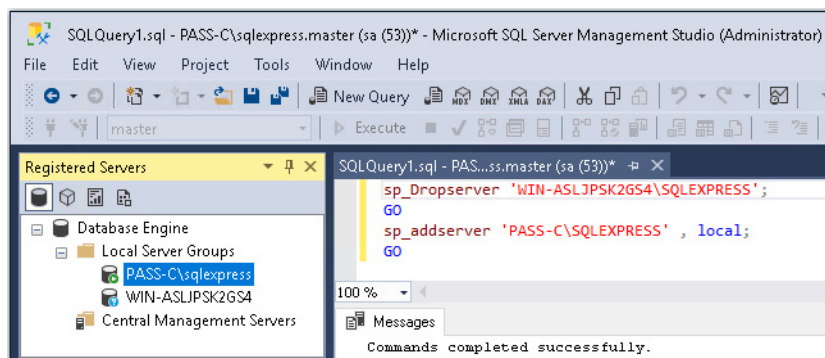

3. Select the 'Execute' button, from the toolbar, to run the query.
4. To verify the update, select 'New Query' from the toolbar and enter the following code into the SQLQuery*.sql field

```
select * from sys.servers;
```
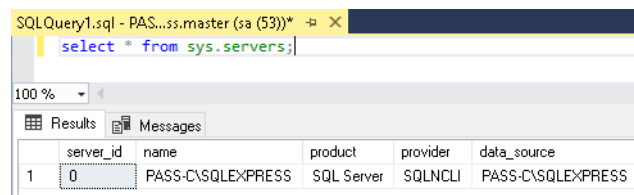

Add New Administrator Login to SQL

Use the SQL Server Management Studio to create a security login for the new local administrator. This procedure applies to SQL Express and SQL Server.

1. Expand the Security folder and right-click the Logins folder to select New Login.
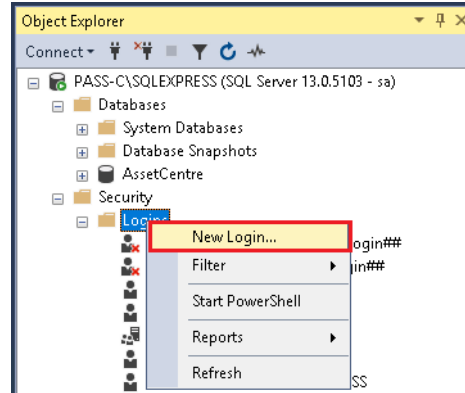
2. Select Search.

3. Enter 'computername\administrator' in the object name box and select Check Names.
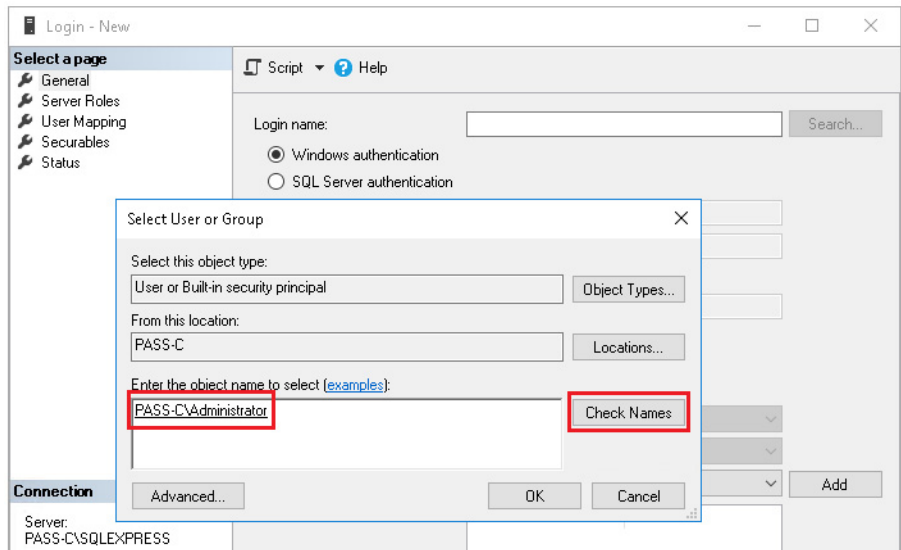
4. Verify that the user is successfully verified and select OK.

5. Select Server Roles and checkboxes for public and sysadmin.
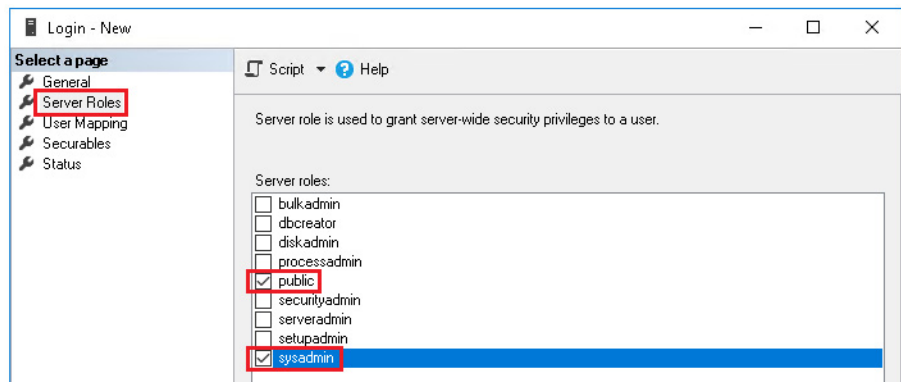
6. Select Securables and then select Search.

7. For the Add Objects dialog, select the last option for the server COMPUTERNAME\INSTANCE.
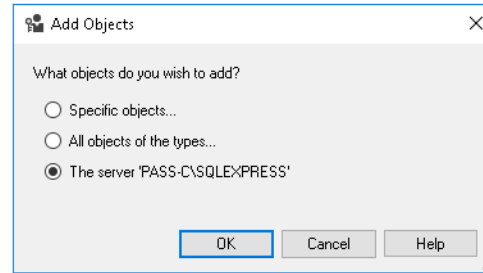
8. The server name appears under Securables. In the Permission section, select Grant to enable the Connect SQL option.
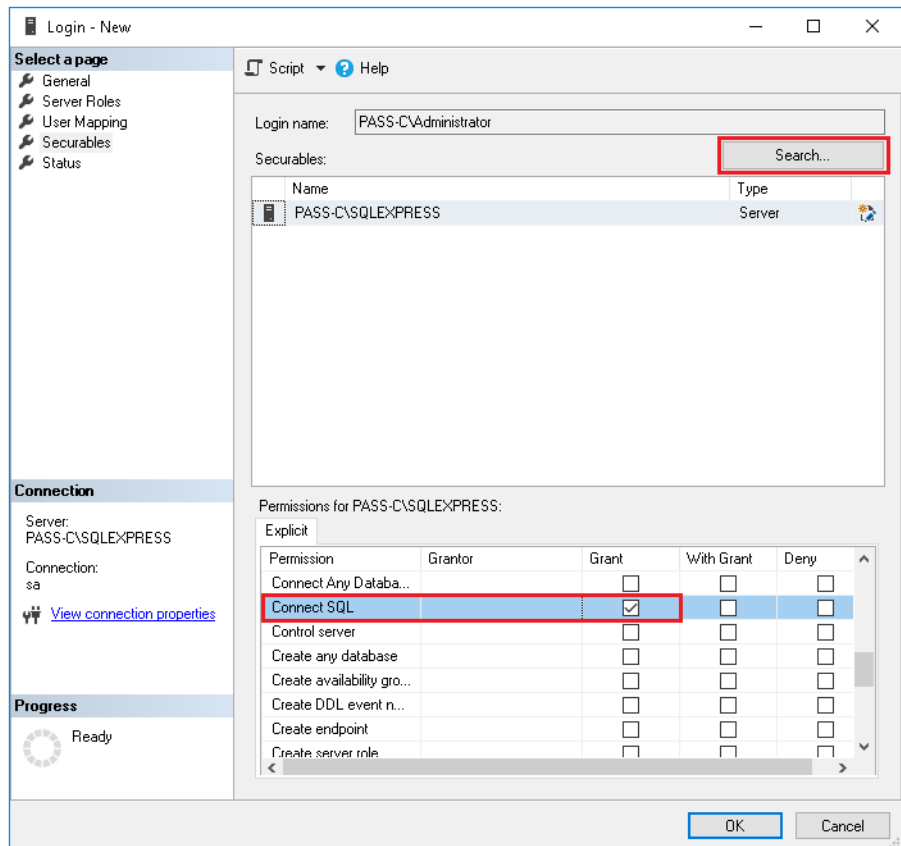
9. Select OK

Delete Old Administrator Login to SQL

Prior to deleting the old administrator, use the SQL Server Management Studio to transfer the AssetCentre database ownership to the new administrator.

1. To transfer AssetCentre database ownership, select 'New Query' from the toolbar.

2. Enter the following code into the SQLQuery*.sql field and replace <computername> with the current computer name.

   ```
   ALTER AUTHORIZATION ON DATABASE:: AssetCentre To
   [computername\Administrator];
   ```
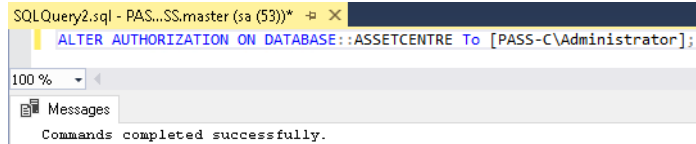

3. Click the 'Execute' button to run the query and change ownership.

4. Expand the Security>Logins folder from the SQL Server Management Studio configuration tree.

5. Right-click on prior or unused Administrator accounts and choose Delete.
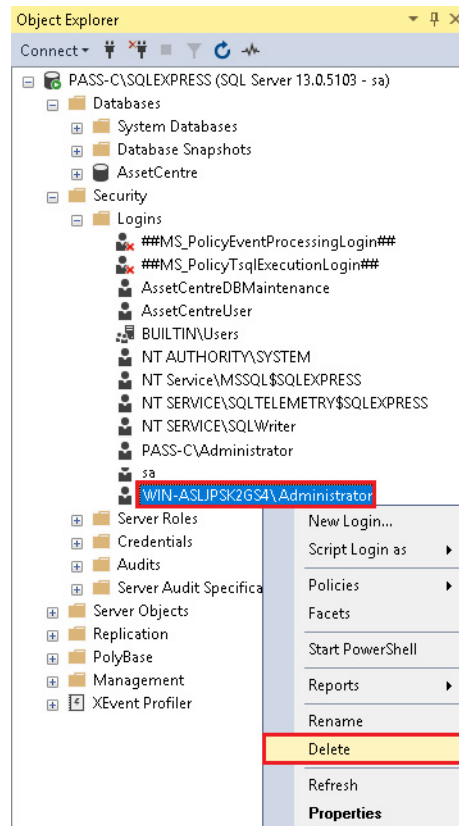
6. Select OK and accept any prompts.

Configure AssetCentre User Account

1. Right-click on AssetCentreUser under Logins and choose Properties.
2. Configure a password for the account.

3. Select OK.
4. Close SQL Server Management Studio.
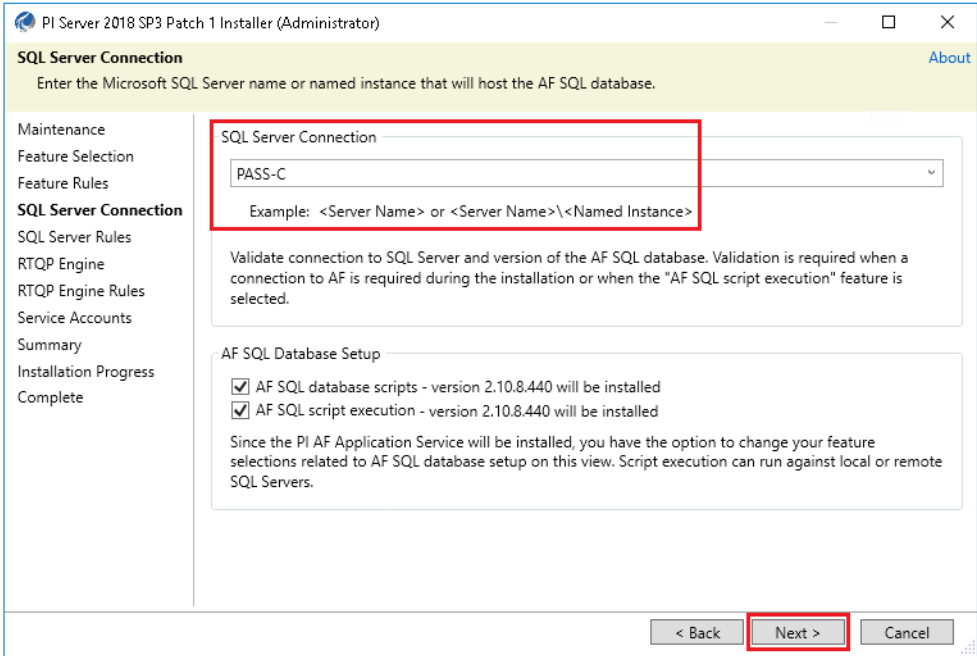
Install Historian Asset Framework

The procedures in this section apply only if you plan to do the following:

- Use FactoryTalk Historian Asset Framework in your PlantPAx system
- Install Asset Framework Server on the Server

1. Navigate to the installation files.
   c:\Install Files\7.00.00-FTHistorian-SE-DVDDL\Redist\PIServer\
2. Double-click PI-Server_2018-SP3-Patch-1_.exe
3. An installation wizard to complete install of Asset Framework appears. Complete the wizard as follows:

Wizard Page	Action
Maintenance	Select Modify.
Feature Selection	From Server Roles, Select AF Server.
Feature Rules	Accept defaults.

Wizard Page	Action
SQL Server Connection	Enter the server name that will host the Asset Framework SQL database. For database setup, select both AF SQL database scripts and AF SQL script execution.
RTQP Engine	Accept defaults.
RTQP Engine Rules	Select 'Yes, I want to use a self-signed certificate.'
Service Accounts	Accept defaults.
Summary	Select Modify.
Installation Progress	Select Modify when the installation progress has completed.
Complete	Verify the modify completed successfully. Select Close.

•

> **IMPORTANT** At the end of the installation process, the Release Notes display in a separate window. The installation process is not complete until you close the Release Notes window.

Verify the AFServers Database and Account

Complete these steps to verify that the Historian AF database and user group were added to your computer.

1. Click the Programs icon and choose Microsoft SQL Server 2018>Microsoft SQL Server Management Studio 18.
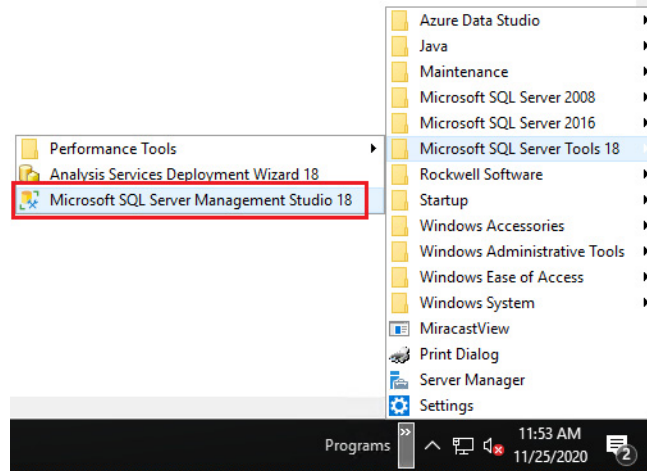
2. Enter the server name.
- The Server name is <ComputerName> if using SQL standard
- The Server name is <ComputerName>\SQLEXPRESS' if using SQL Express.

IMPORTANT	<ComputerName> = The computer name set in Configure Windows Settings

3. Log on by using the 'sa' account and the password.
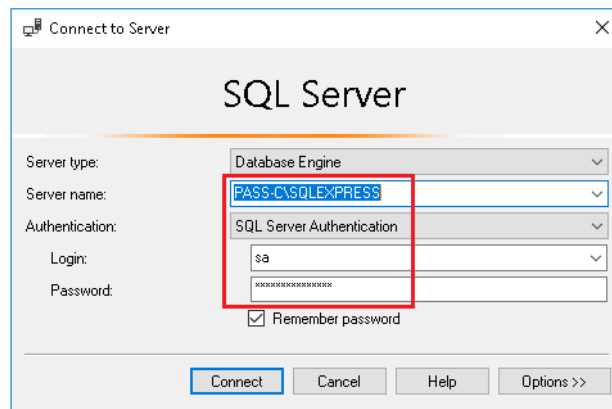
IMPORTANT	After you complete the initial settings, change your logon and password settings under Options.

4. Select Connect.

5. From the SQL Server Management Studio configuration tree, expand the Databases folder and verify that PIFD appears in the list.
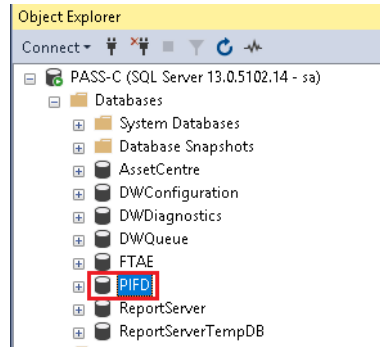
6. Expand the Security\Logins folder and verify that the AFServers user group was added.
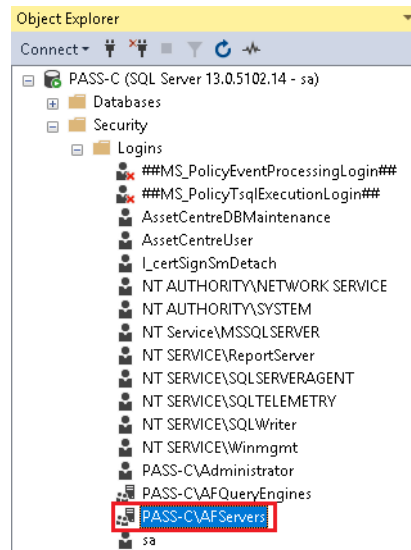
7. If the PIFD database or AFServers group do not appear, reinstall the Historian Asset Framework.

8. Close SQL Server Management Studio.

Configure the FactoryTalk Directory

1. Navigate to the FactoryTalk Directory Configuration Wizard.
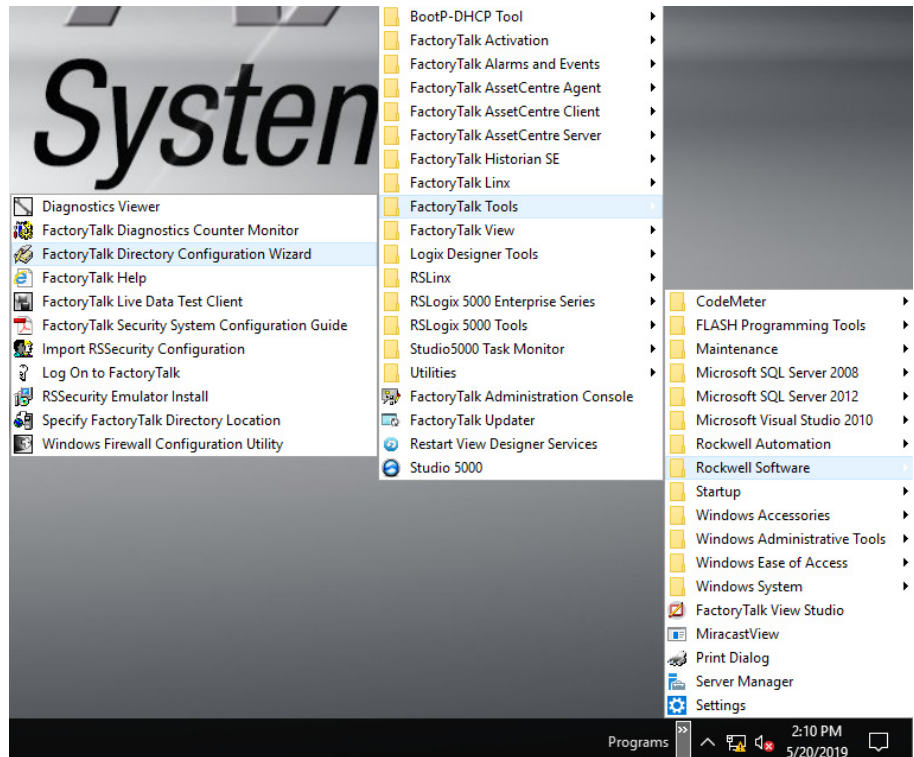
2. Select both boxes under configure settings to configure the Network and Local directories and click Next.
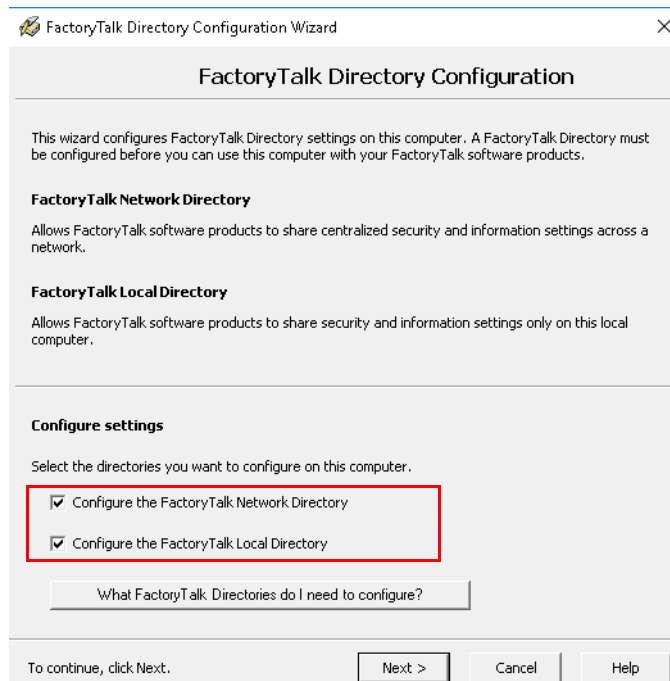
3. Enter the administrator user name and password.

> **IMPORTANT** Step 3 must be done twice. You have to enter a user name and password for each directory (local and network).

4. Select Close in the summary window once complete.

Delete "Unused" Computer Names from Directory

1. Navigate to
   Programs>Rockwell Software>FactoryTalk Administration Console.
2. Select Network (directory) and click OK.
3. Expand System>Computers and Groups>Computers in the explorer pane.
4. Right-click any unused computer names and choose Delete. The original computer name, before it was renamed, typically shows up here.
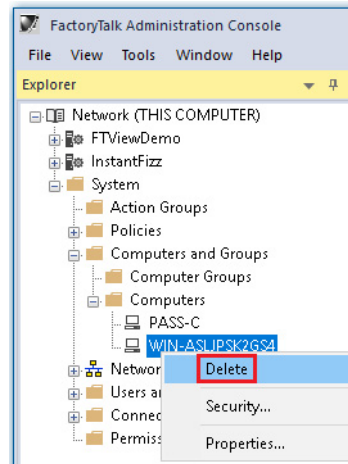
5. If a prompt appears, select Yes.
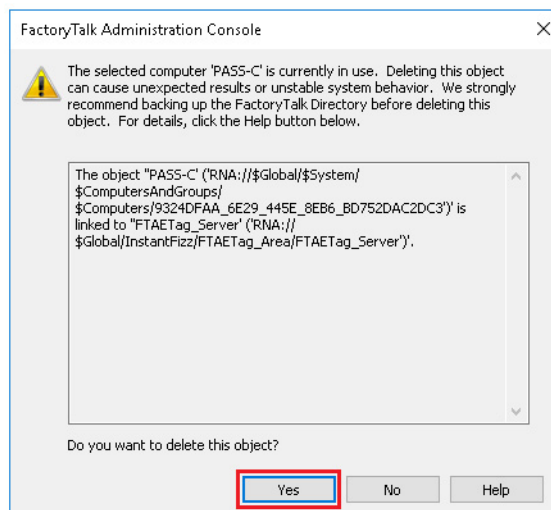
6. Expand Users and Groups>User Groups in the explorer pane.
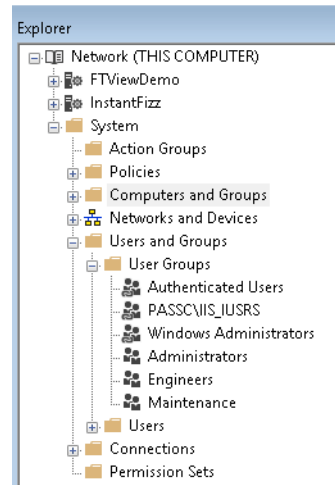
Recreate IIS_IUSRS User Group

Ensure the IIS_IUSRS user group is a windows-linked user group by removing the prior group and recreating for this new computer.

1. Right-click the IIS_IUSRS user group and choose Delete.
2. Select Yes.
3. Add the IIS_IUSRS user group and link with the new computer name.

   From the Explorer pane, right-click the User Groups folder and choose New>Windows-Linked User Group.
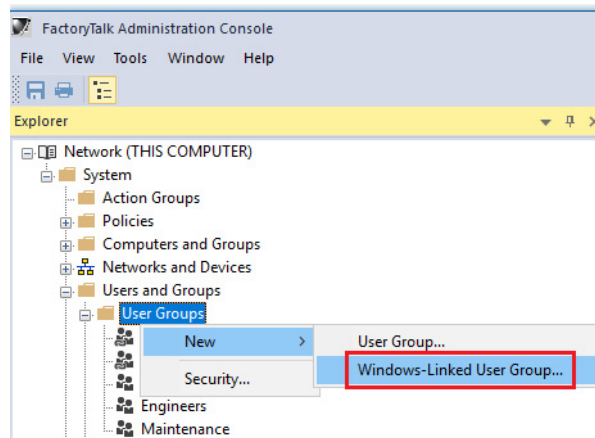
4. Select Add.

5. Select Advanced.
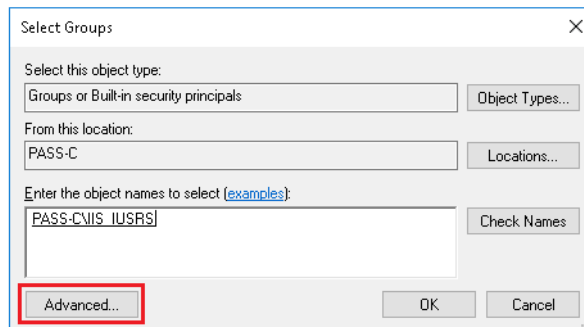
6. Select Find Now, select IIS_IUSRS, and select OK.
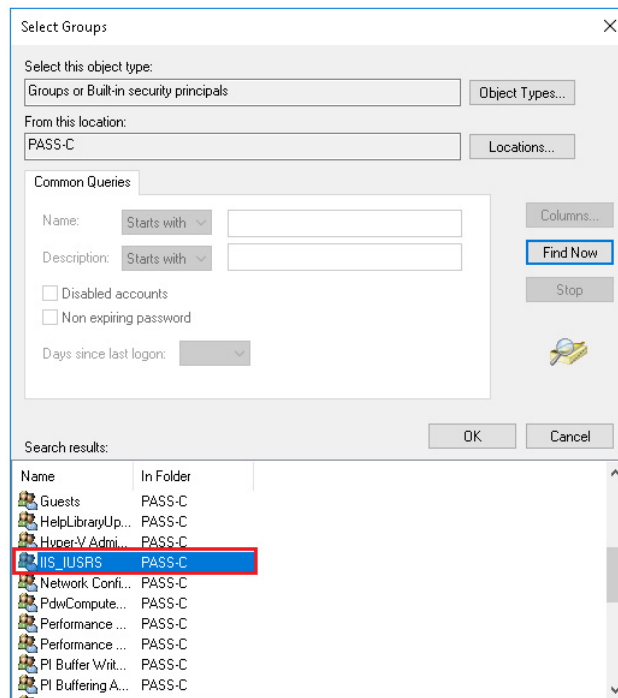
7. Verify that the user group is correct, and select OK.
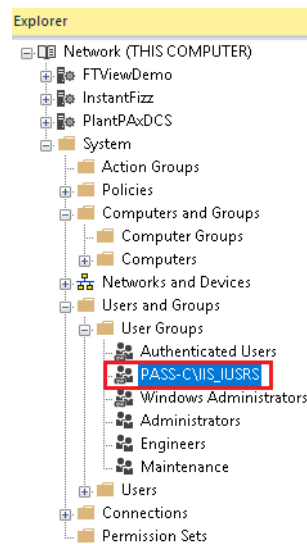
8. Restart your computer.

Configure FactoryTalk AssetCentre (FTAC) Server

Configure FactoryTalk AssetCentre (FTAC) server settings stored in the FactoryTalk Directory.

1. Navigate Programs>Rockwell Software>FactoryTalk Asset Centre Server>Server Settings to launch the Server Setting Utility.
2. Enter a user name and password and click OK.
3. Enter the server location by typing the new computer name, then click Apply.

Update FactoryTalk AssetCentre SQL Instance

If the FactoryTalk AssetCentre server was installed before renaming the computer and/or specifying a SQL database location, you must update the FactoryTalk AssetCentre SQL server instance by using select AssetCentre utilities.

1. On the FactoryTalk AssetCentre server computer, locate the application utilities in C:\Program Files (x86)\Rockwell Software\AssetCentre Server\Bin\ directory.
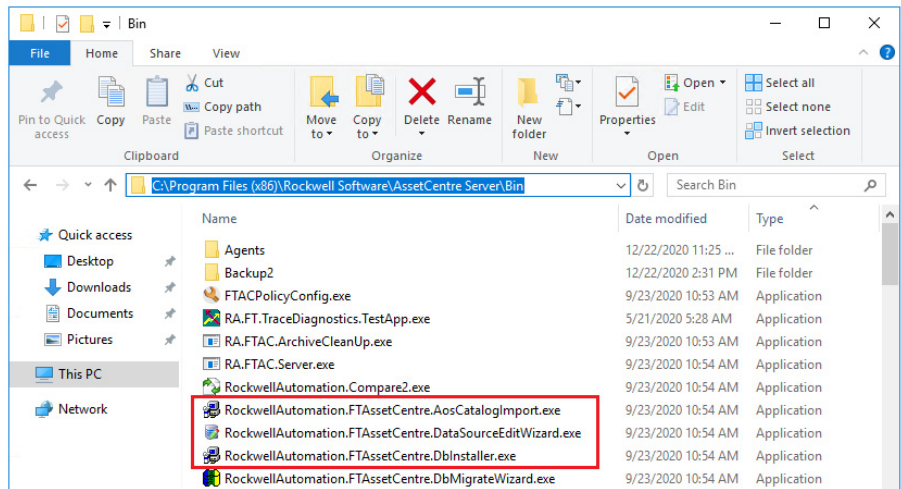
2. Run the FTAssetCentre.DBInstaller.exe utility, which will install/upgrade the database. Enter the Server information based the edition of SQL. Use a period (.) for SQL Server Standard or enter ".\sqlexpress" if using SQL Server Express.
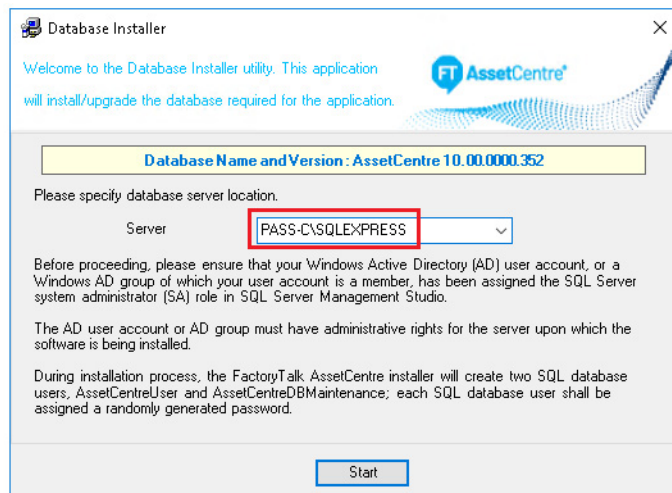
3. Run the FTAssetCentre.AosCatalogImport.exe utility, which will import the AssetCentre Catalog data into the database.
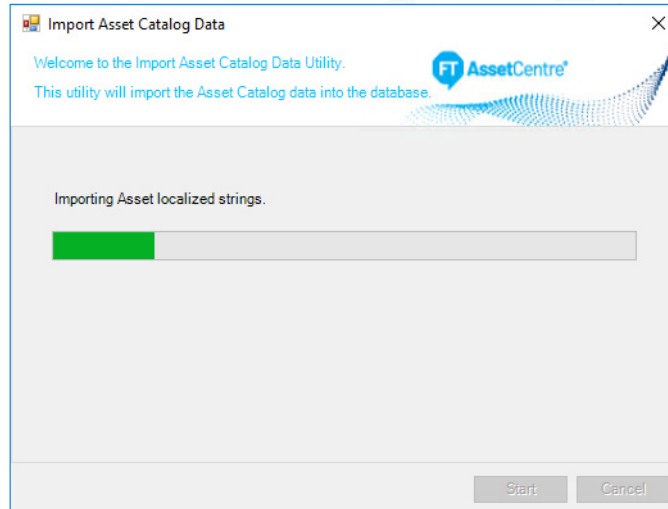
4. Make note of the FTAssetCentre.DataSourceEditWizard.exe utility. This utility can change the system password that FactoryTalk AssetCentre server uses to connect to the SQL Server database and can also change the SQL Server that is used by FactoryTalk AssetCentre.

5. Restart FactoryTalk AssetCentre server computer.

Configure FactoryTalk Historian

Remove Old Computer Names

1. Navigate to:
    Programs>Rockwell Software>FactoryTalk Historian SE>FactoryTalk Historian SE System>AboutPI-SDK

2. In the left pane, click Connections, right-click the old server names, and choose Remove selected Server.

3. Close PI-SDK utility.

Install PI Builder Excel Add-in for Microsoft Excel

PI Builder is a Microsoft Excel® add-in that lets you use Excel to create, view, and modify PI points and Asset Framework objects in your Historian database. With PI Builder, you can make bulk tag edits by importing and exporting your spreadsheet.

All functionality of the prior PI Tag Configurator has been replaced with PI Builder, which is included with the PI SMT and PI Data Archive setup kits (as part of the PI AF Client installer).

IMPORTANT	This section is not performed for OWS. Proceed to <u>Additional Historian Resources</u>.

IMPORTANT	Microsoft Excel 32-bit software must be installed for these procedures.

If Microsoft Excel was installed after the Historian software, the AF Client features will need to be modified to include the PI Builder feature.

1. Run the PI-Server_2018-SP3-Patch-1.exe file included as part of the installation media under the \Redist\PIServer\ folder.
2. Choose to Modify the installation and click Next.
3. Select PI Builder on the Individual Features tab and click Next
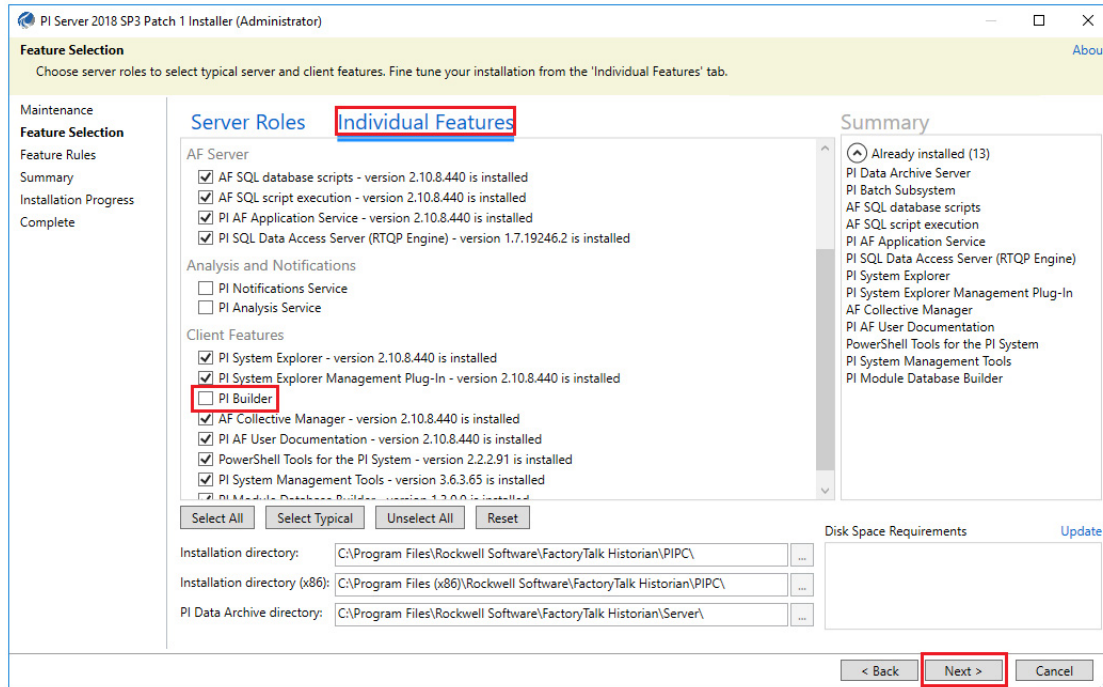
4. Restart the computer after the installation is complete.

To retrieve and publish PI AF objects, PI Builder must connect to a PI AF database and for PI points a PI Data Archiver server.

1. Open your version of Microsoft Excel and click the PI Builder tab.
2. In the Connections group on the upper left corner. Select your Data Server, Asset Server, and Database as available.
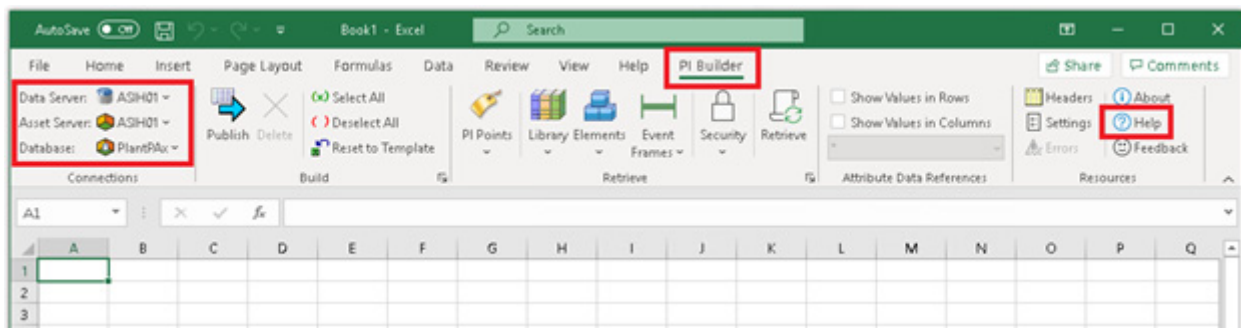
Additional Historian Resources

When the template is installed, we recommend that you review a FactoryTalk publication at http://literature.rockwellautomation.com/idc/groups/literature/documents/in/hse-in025.pdf).

IMPORTANT	See the pages that are referenced in the FactoryTalk Historian SE Installation and Configuration Guide, publication HSE-IN025A: • Verify that Historian Services are Running • Verify that Historian Server is Updating Data for Default Tags • Prepare PI MDB to AF Synchronization • Create Security Mappings • Adding the Server to the FactoryTalk Directory Connection • Assigning License Activations to the Historian Server

Install VantagePoint Server Software

1. Navigate to the installation setup folder:
   c:\Install Files\8.20.00-VantagePoint-EMI-DVD

2. Double-click setup.exe.

3. Select Install FactoryTalk VantagePoint.

4. On the next dialog screen, select Install FactoryTalk VantagePoint.

5. If you have not installed Microsoft Excel, you see this warning. Read the warning and, according to your needs, click Yes or No.

In our example, we click Yes to show the installation of FactoryTalk VantagePoint when Microsoft Excel is not installed in the VantagePoint Server.

6. Select Next on the Wizard Welcome page.

7. Read the License Agreement, select 'I accept the terms in the License Agreement'.

8. Select Custom setup type.

9. Choose the following options and select Next.
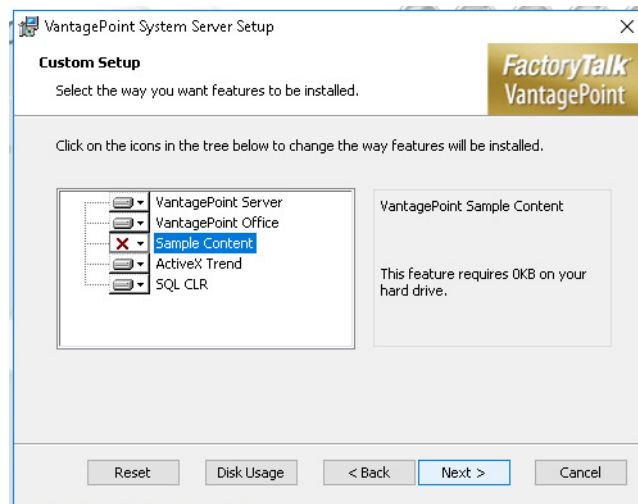
10. Enter a portal server name and select Next.

11. If you are using SQL 2016 Standard, accept the defaults and click Next. If you are using SQL Express, enter ".\sqlexpress" for the server and then click Next.
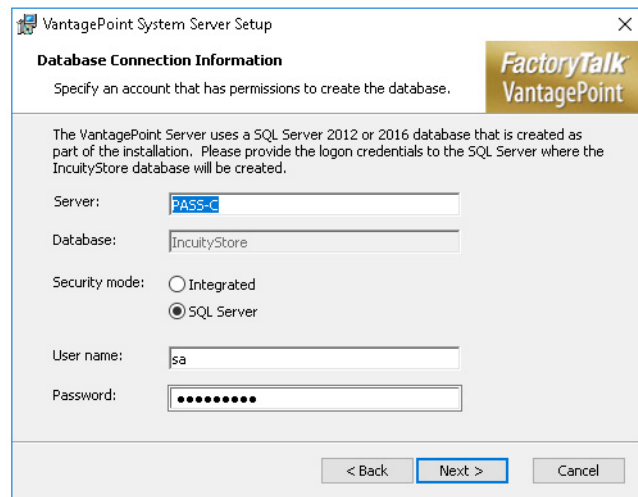
12. If you have a local user account that is specified for VantagePoint, type the user name in the prompt. Use the computer name as the domain. If you do not have a local user account, select Local Account and a user is created.
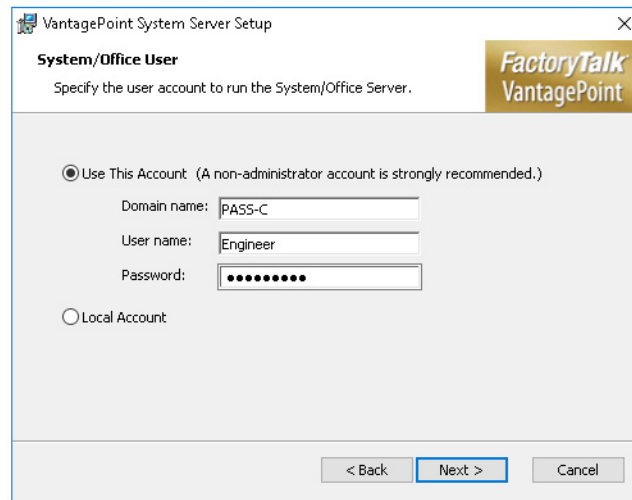
13. If Microsoft Excel is installed, the software automatically launches. Acknowledge the prompts and close Excel.
14. Select Install.

> **IMPORTANT**   Installation can take 20...30 minutes.

15. Select Finish.
16. Wait for the installation to complete. A popup window appears that informs you the configuration is still running. It closes automatically.
17. Select Exit on the Vantage Point Installer.
18. Restart your computer.

Configure HMI

Once you have completed the previous tasks, see the PlantPAx DCS Configuration and Implementation User Manual, publication [PROCES-UM100](#), for PASS configuration procedures, such as:

- Configuring FactoryTalk components
- Configuring HMI, DATA, and ALARM servers
- Redundant PASS considerations
- Configuring runtime security

Install OWS Operating System

The following steps are comparable to a retail Windows 10 Enterprise 2019 operating system, the difference is the PASS-C ISO contains additional pre-installed software.

1. Make sure that your computer is capable of booting from a USB drive. Enter the BIOS Setup as the computer is powering on (typically by pressing the F2 key). Make sure that the Boot options include booting from a USB device.
2. Shut down the computer and connect the USB drive.
3. Turn on the computer. While the computer is powering on, strike the F12 key to open the boot options screen.

4. Select the USB device containing the OWS ISO installation.

5. On the Windows Setup dialog box, select your options from the pull-down menus.

6. Click Next.

7. Click Install Now.

8. Click "I accept the license terms", and click Next.

9. Click Custom (installation).
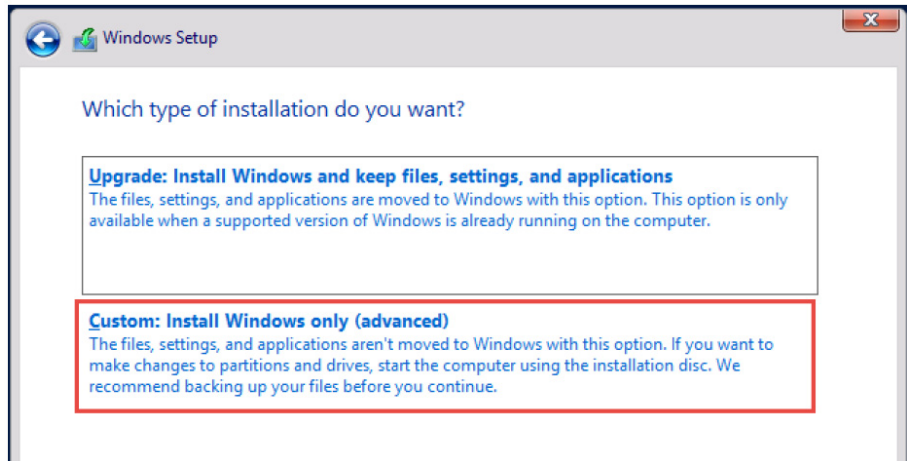
10. To store the installation, select the hard disk drive.

11. If necessary, delete any existing drive partitions and format the drive location.
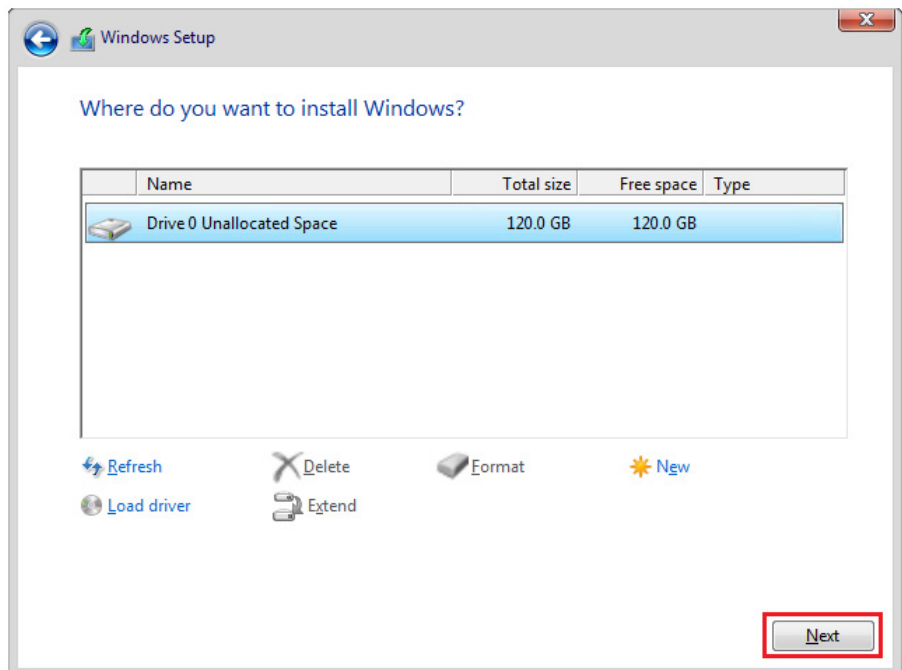
12. Click Next.

Tip: The installation typically takes about an hour.

The computer automatically restarts. You must log on to complete the installation.

Windows Out of Box Experience

The Windows Out of Box Experience (OOBE) consists of displays that require customers to accept the end users license agreement (EuLA), connect to the internet, log in with or sign up for a Microsoft Account, and share information with the OEM.

Complete these steps for the initial configuration of all virtual machines that were deployed using PlantPAx image templates.

Windows 10 Enterprise LTSC 2019 virtual machines require the following OOBE initialization:

1. Click 'Skip for now' for an internet connection.
2. On the EULA dialog box, read the license terms and Accept.
3. Type a user name and Next
4. Create a password, retype password to verify, and Finish.
5. Create security questions, and Next.
6. Click No when prompted to make Cortana your personal assistant.
7. Turn off all privacy settings for your device and Accept.
8. Enter the Windows product key.

Initial Windows Login

A logon message appears, prompting you to press Ctrl + Alt + Delete key combination to unlock'.

1. **DO NOT** press Ctrl + Alt + Delete for a virtual machine.
2. Instead press Ctrl + Alt + Insert. This is the VMware key combination to unlock.
3. Type the Administrator password that you created and Press Enter.

If you see the Other-User logon, type 'Administrator', type the administrator password that you created and Press Enter. Wait until you see the network message in the following steps.

4. Select 'Yes' to allow the PC to be discoverable.
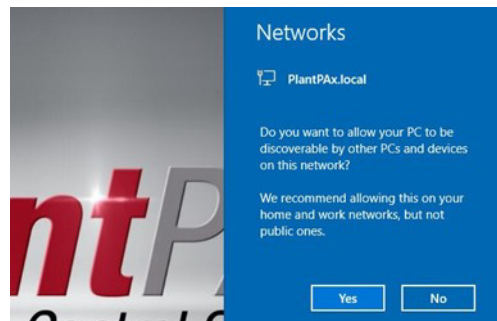
If you skipped the product key earlier, another dialog window appears to remind you that Windows must be activated.

5. In the Product Key window, enter a valid Windows Server Product Key.
6. Verify that the product key is correct.

7. Select OK in the message window when the product key was installed successfully.

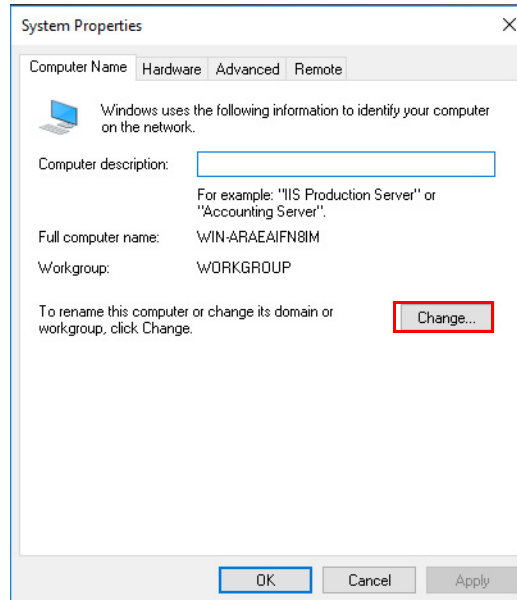8. Select OK in the activation window.

Configure Windows Settings

1. Login using the administrator account and password that was created in the previous step.

2. In the Product Key window, enter a valid Windows Server Product Key and click OK.

3. Verify that the product key is correct and select Yes.

4. Select OK in the message window when the product key was installed successfully.

5. Install any required drivers for your hardware (graphics, Ethernet, chipset, and so on).

6. Right-click the windows start icon and select 'System'.

7. Select 'Change Settings'.

8. Select Change on the System Properties dialog box.

9. Enter the new computer name. Click OK.

> **IMPORTANT** Do not use spaces or any special character symbols.

10. Acknowledge any prompts that indicate that a restart is required.

> **IMPORTANT** Do not restart your computer now.

11. Select the Advanced tab.
12. Select Settings in the Performance section.
13. Choose the Advanced tab.
14. Select Background services in the Processor scheduling section to adjust for the best performance.
15. To help protect against viruses and security threats, select the Data Execution Prevention tab.

16. Select 'Turn on DEP for essential Windows programs and services only'.

17. Acknowledge the prompt that changes will take effect on restart.

IMPORTANT   Do not restart your computer now.

18. Select OK to close the window.

19. On the Remote tab, select 'Allow remote connections to this computer'.

20. Select OK to enable the Remote Desktop Firewall exception.

21. Remove the check mark from the 'Allow connections only from computers ...' box and click Apply.

IMPORTANT	Do not restart your computer now.

22. Select Restart Later.
23. Navigate to the Control Panel.
24. Select Power Options.
25. Select 'High Performance' in the Preferred Plans section.

Ethernet Network Adapter Settings

The PlantPAx DCS Configuration and Implementation User Manual, publication PROCES-UM100 contains configuration information procedures for Domain or Workgroup infrastructures, such as managing IP addresses and computer name resolution.

To help with stable communications, we recommend configuring the speed, duplex, and power management settings for the Ethernet adapter.

IMPORTANT	The configuration parameters that are described in this section apply to typical network infrastructures recommended for PlantPAx systems. Note that speed/duplex settings may vary depending upon the network switch configuration.

1. Navigate to the Control Panel.
2. Click Network and Internet.
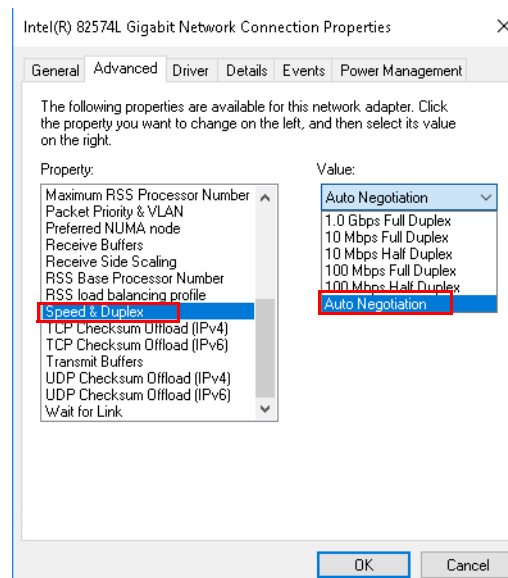3. Click Network and Sharing Center.

4. In the Network and Sharing Center window, click Change Adapter Settings.

5. Right-click the Ethernet network connection and choose Properties.
6. If asked, enter your password and click Yes.
7. In the Ethernet Properties dialog box, select Configure.

8. Select the Advanced tab.
9. Select Speed and Duplex and then choose Auto Negotiation.

10. Select the Power Management tab.
11. Select the 'Allow the computer to turn off this device to save power' checkbox.
12. Select OK.
13. Restart your computer.

Configure System Software

Specify FactoryTalk Directory Location

Specify the FactoryTalk Directory location.

1. On the virtual image desktop, select the Programs icon and choose Rockwell Software>FactoryTalk Tools>Specify FactoryTalk Directory Location.

2. In the FactoryTalk Directory Server Location Utility dialog box, select Browse (ellipsis '…').
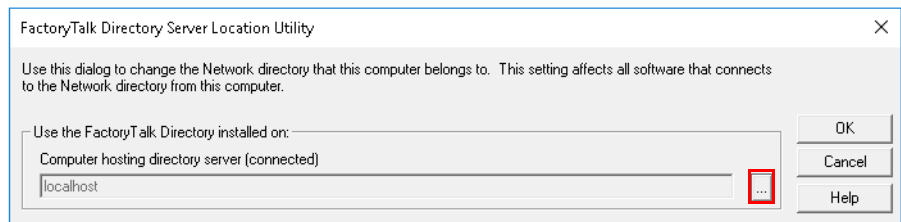
3. In the FactoryTalk Directory Server Configuration dialog box, select Remote Computer. Enter the name of your PASS server, or select Browse (ellipsis '…'), search for, and select your PASS server.
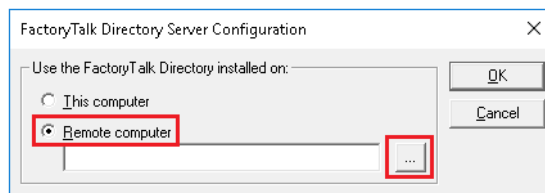
> **IMPORTANT**   Browse can be inactive if Network Discovery and File Share are not enabled.

4. On the FactoryTalk Directory Server Location Utility dialog box, select OK to accept the changes.
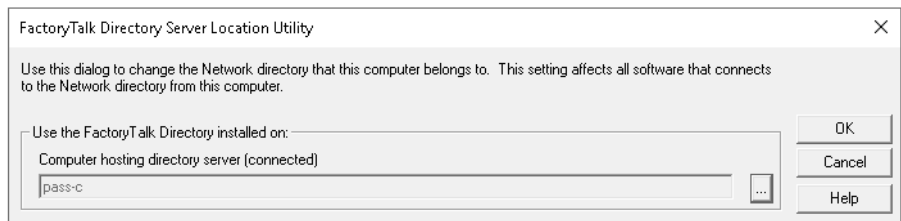
5. Log in to the FactoryTalk server when prompted.
6. Restart the virtual machine.

Configure FactoryTalk View SE Client

The FactoryTalk View SE Client software is pre-installed on the OWS. This provides an interface to connect to the HMI on the PASS-C.
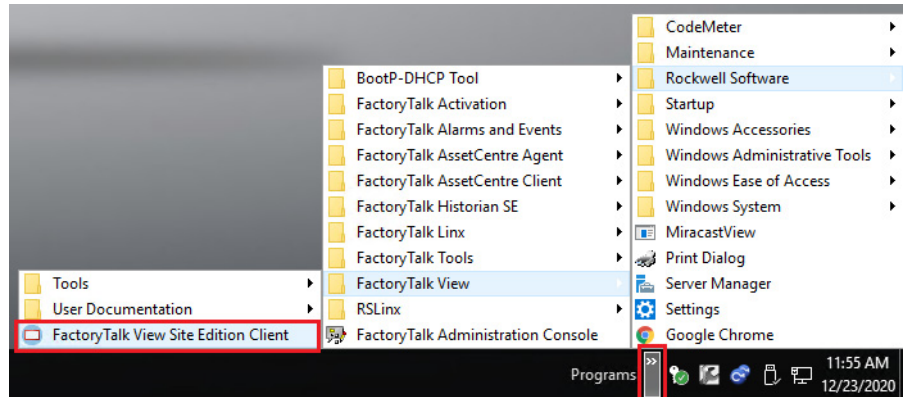
You can launch the FactoryTalk View SE Client Wizard to:

- Create a FactoryTalk View SE Client configuration file
- Edit an existing FactoryTalk View SE Client configuration file
- Run an existing FactoryTalk View SE Client configuration file
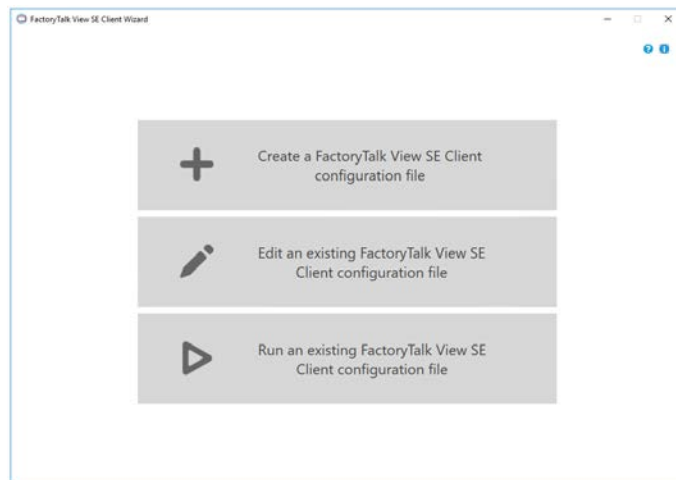

Configure Services for Historian PIPerfmon

FactoryTalk Historian, on the PASS-C, uses a PIPerfmon interface to collect performance data from computers within the PlantPAx system.

Remote computers, such as the OWS, require some configuration to allow PIPerfMon access to local performance counters.
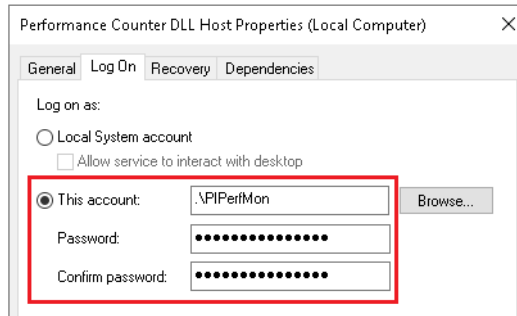
1. Enable the Remote Registry service and set the startup type to Automatic.
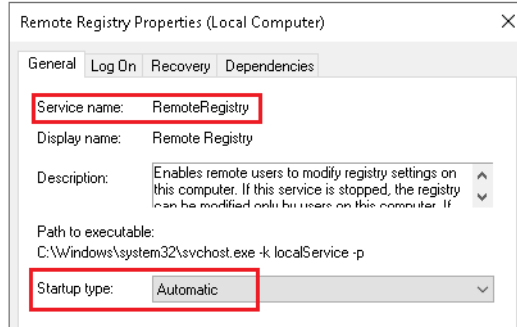
2. Create a user account (local or domain) named PIPerform and grant it the role of Performance Monitor Users.
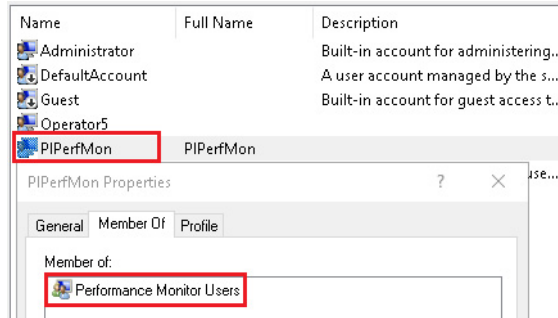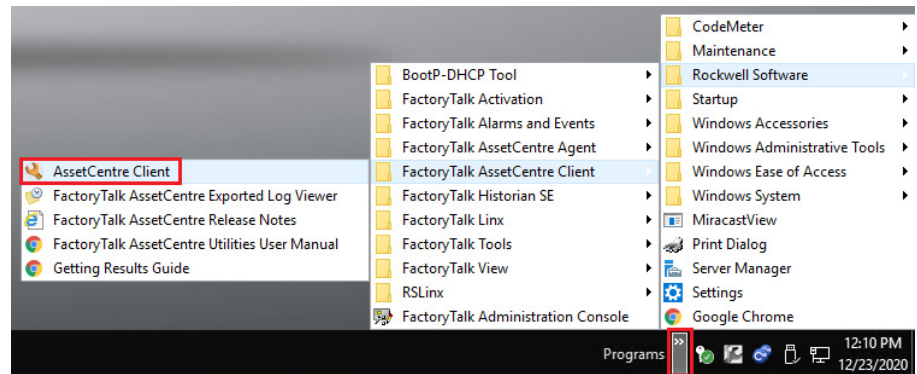

3. Modify the Performance Counter DLL Host service to Log on as the PIPerfMon account on all OWS computers.

Configure FactoryTalk AssetCentre Client

The FactoryTalk AssetCentre Client software is pre-installed on the OWS. This provides an interface to connect to the AssetCentre Server on the PASS-C.

You can launch the FactoryTalk AssetCentre Client to configure security, contacts, assets, disaster recovery schedules, and additional features as described in the FactoryTalk AssetCentre user manual.
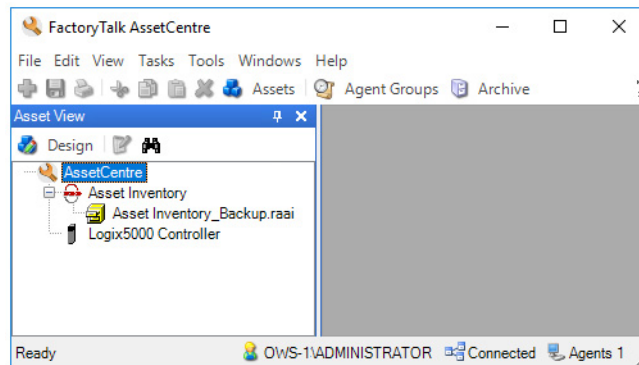
Notes:

Software Product keys and Activations

This section discusses software activations and licenses that are required for PlantPAx® virtual templates and ISO images.

Microsoft® and Rockwell Automation require software licenses to fully utilize their software.

- Microsoft uses a Product Key to activate the Windows operating system, remote desktop services, and Office apps.
- Rockwell Automation uses an Activation File to activate FactoryTalk® software packages

Microsoft Product Keys

The PlantPAx System 5.0 virtual templates and ISO images utilize Windows Server 2016 Standard and Windows 10 Enterprise LTSB 2019 operating systems.

Both operating systems initially power on with the Windows Out of Box Experience (OOBE), where you have the option to enter a product key or skip to the next step. Subsequent boots prompt to enter a product key that must be purchased from Microsoft to activate the operating system.

Slmgr.vbs Tool

If you want to do something more advanced like remove a product key, force an online activation, or extend the activation timer, you need Slmgr.vbs.

This command-line tool is included with Windows, and provides options unavailable in the standard activation interface that is provided on the Update & Security > Activation screen in the Settings app

1. Right-click the Windows [icon] icon and choose 'Command Prompt (Admin)'.
2. At the command prompt, type 'slmgr /ipk <Product key>' and press Enter to add your volume license key.
3. Click OK when a dialog box appears informing you that the product key installed successfully.
4. At the command prompt, type 'slmgr /ato' and press Enter to activate Windows.
5. Click OK when a dialog box appears informing you that the product activated successfully.
6. Close the command prompt window.

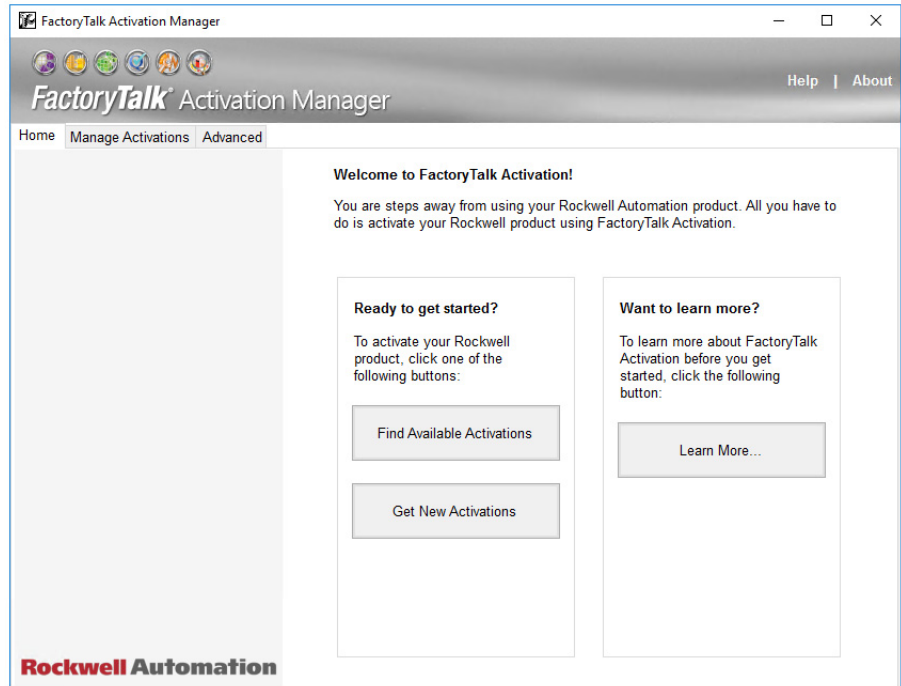# Rockwell Automation Activation Files

For continuous use of FactoryTalk products and other Rockwell Automation® software products, computers running the software must have access to activation files. FactoryTalk Activation software provides a secure, software-based system for activating Rockwell Automation software products and managing software activation files. With FactoryTalk Activation software, there is no need for a physical master disk or any physical media. Instead, activation files are generated and distributed electronically.

Concurrent activations are locked to a central activation-server computer on the network. The activation server manages a pool of activations are assigned automatically to clients that need them. These activations are returned automatically to the activation server pool when the software stops running on the client, or when the client computer shuts down.

Client computers must be configured to obtain floating activations from the activation server. A continuous network connection is also required for clients to use floating activations. After a client obtains a floating activation, if the activation server detects that the client has been disconnected, the activation is returned to the server pool.

FactoryTalk Activation Manager

FactoryTalk Activation software provides a secure, software-based system to apply Rockwell Automation licenses for continuous use of FactoryTalk software and other Rockwell Automation software products.

Consideration	Details
Software that is not activated	If the components you have installed cannot be activated, for example, because the activation server is unavailable, then the software continues to run for up to 7 days. The seven-day grace period provides time to correct the problem with acquiring activations, without disrupting critical applications. If activation is restored within 7 days, normal operations resume. If activation is not restored, the grace period expires. After the grace period expires, if you restart the components and activation remains unavailable, the software runs for 2 hours in Demo mode.
Location of activation server	Activations for Rockwell Automation software can be stored local to the system element containing the Rockwell Automation software in question or remotely depending on your preferences and needs. Typically critical system elements keep their activations locally in case the connection with the remote activation location is lost. If you want to remotely activate Rockwell Automation software in non-critical system elements consider storing them in a system element with uninterrupted connection to your PlantPAx DCS. Keep in mind the information in Consideration section "Software that is not activated" when using a remote location for activations.
Options for adding activation files to the PASS	To make concurrent floating activations available to activation clients, first you must download the activation files to the activation server computer, from the Rockwell Automation Activation window. If the PASS has internet access, see 'Open Activation Manager' in the PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication PROCES-UM100. If the PASS does not have internet access, the activations can be downloaded on another computer with internet connectivity and then transferred to the PASS.
Activation file types	There are two types of activation files: Older Flexera (.LIC) non-encrypted files that are supported by older and current software versions that can be stored locally (C:\Users\Public\Documents\Rockwell Automation\Activations) or on a Flexra USB Dongle. Newer CodeMeter (.wibu) encrypted files that are supported by current and future software versions that can be stored locally (C:\ProgramData\CodeMeter\CMAct) or on a CM USB Stick. The FactoryTalk software that is installed in the PlantPAx System 5.0 virtual templates and ISO images are current versions that compatible with Flexera and CodeMeter activations. CodeMeter is the preferred activation file type going forward.

Notes:

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

Documentation Feedback

Your comments help us serve your documentation needs better. If you have any suggestions on how to improve our content, complete the form at rok.auto/docfeedback.

Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental information on its website at rok.auto/pec.

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