User Manual

Original Instructions



PlantPAx Distributed Control System

Verification and Troubleshooting





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.

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



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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The PlantPAx^{*} system provides a modern approach to distributed control by using common technology (integrated architecture) shared with all other automation disciplines within the plant. This approach creates a seamless information flow across the plant to create optimization opportunities and enables a Connected Enterprise.

Our scalable platform provides you with the flexibility to implement a system appropriate for your application. Figure 1 shows the documents (this manual in the highlighted section) that are available to help design and implement your system requirements.

Figure 1 - PlantPAx System Implementation and Documentation Strategy



- **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 install the PlantPAx system.
- **Prep** Provides guidance on how to get started and learn the best practices to follow before you develop your application.
- **Develop** Describes the actions and libraries necessary to construct your application that resides on the PlantPAx system.
- **Operate** Provides guidance on how to verify and maintain your systems for operation of your plant.

Purpose of the User Manual

This document provides procedures on how to verify and troubleshoot the PlantPAx system. A Microsoft[®] Excel[®] workbook, which is included with this manual, contains checklist worksheets to verify and document that your system design aligns with PlantPAx system recommendations. This manual also offers steps on how to troubleshoot your system if performance expectations are not met.

Summary of Changes

The table indicates the updated information in this manual.

Торіс	Page
Each server can now have 20,000 alarms	101
Virtual memory load value increased to 3 GB	106

Additional Resources

These documents contain additional information that concern-related products from Rockwell Automation.

Resource	Description
PlantPAx Distributed Control System Selection Guide, publication <u>PROCES-SG001</u>	Provides basic definitions of system elements and sizing guidelines for procuring a PlantPAx system.
PlantPAx Distributed Control System Reference Manual, publication PROCES-RM001	Provides characterized recommendations for implementing your PlantPAx system.
PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u>	Provides procedures to configure infrastructure components for your PlantPAx DCS systems.
PlantPAx Distributed Control System Application Configuration User Manual, publication <u>PROCES-UM003</u>	Describes procedures to start development of your PlantPAx distributed control system.
Rockwell Automation Library of Process Objects Reference Manual, publication <u>PROCES-RM002</u>	Provides common procedures for using the Rockwell Automation Library of Process Objects. Manual also includes procedures for Alarm Builder and security codes.
Rockwell Automation Library of Process Objects: Logic Instructions Reference Manual, publication <u>PROCES-RM013</u>	Provides controller codes and tags for Rockwell Automation Library objects. The objects are grouped by family and attached as Microsoft Excel files to the manual PDF file.
Rockwell Automation Library of Process Objects: Display Elements Reference Manual, publication <u>PROCES-RM014</u>	Provides common display elements for the Rockwell Automation Library. For improved accessibility, the elements are combined into one manual.
PlantPAx Virtualization User Manual, publication 9528-UM001	Describes the catalog numbers and details for using virtual image templates to configure virtual machines.
Product Compatibility and Download Center at http://www.rockwellautomation.com/rockwellautoma- tion/support/pcdc.page	Website helps you find product-related downloads including firmware, release notes, associate software, drivers, tools, and utilities.

You can view or download publications at

<u>http://www.rockwellautomation.com/global/literature-library/overview.page</u>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Overview

A well-performing process control system is critical to the operation of your plant. It is important to have a strategy to verify that the system is performing properly before initial deployment. Equally important is being ready to respond if the system isn't performing at the expected level.

Performance of the PlantPAx^{*} system is dependent upon following the design and application rules that are provided by the PlantPAx Reference Manual. These rules and guidelines are developed through a process called characterization. Characterization is the activity of measuring system performance against key operational criteria called Critical System Attributes (CSAs). CSAs define what is expected in terms of performance of the PlantPAx system.

This manual describes how to monitor performance and verify PlantPAx system design against CSA recommendations by using the PlantPAx system checklists. Before you implement the checklists, make sure that your controllers are properly configured to extract diagnostic information. Chapter 6 explains how the L_CPU Add-On Instruction and FactoryTalk* Linx (data server) are initially configured to access computer data from system servers.

<u>Figure 2</u> describes the three main topics in this manual to help you choose the information. Click the link or see the respective page number for procedures.



Figure 2 - Topics in This Manual

Attached to this manual is a folder (PlantPAx Checklist) that has five checklist spreadsheets. Each checklist is an individual worksheet in one Microsoft[®] Excel[®] workbook. The worksheets are organized by discipline or system element. We refer to the individual worksheets as checklists throughout this manual.

The checklists cover the following areas of the system design:

- System infrastructure
- Servers and workstations
- System architecture
- Process Automation System Server (PASS)
- Controllers

			System Infrastr	ucture Che	cklist		
	System Name:		0				
	Design Element		Observed Value		Results	Notes	
6	Hardware	BIOS Power saving o	ptions disabled ?	Yes	4		
	Virtualization	Using Virtualization	1?	Yes▼	~	/	
	Humandisar	CPU Utilization	0	%			
	nypervisor	Memory	0	%		See <u>Chapter 2</u> for	
	Humanyisor	CPU Utilization	0	%		icon descriptions.	
	пурегизог	Memory	0	%			
	Hypervisor C N	CPU Utilization	0	%			
		Memory	0	%			
ons. ≺		CPU Utilization	0	%			
	Memory		0	%			
	Domain	All Servers and Wor are on the same Do	kstations main	No 💌	ĩ		
		Bandwidth Utiliz %			• /		
		Packet Error Rate	-1				
	Network Temperature C	Temperature OK	No 💌		×		
	CPU Utilization %						
L		Memory Utilization					
		Computer Name:	System Role	2		Page 1	
				Ģ			
labs —	→	System Infrastruct	<server or="" td="" v<=""><td>WS name></td><td>System</td><td>Architecture <pass> <c< td=""><td>ontroller></td></c<></pass></td></server>	WS name>	System	Architecture <pass> <c< td=""><td>ontroller></td></c<></pass>	ontroller>

Rows gauge performance valuations.

The five checklists are accessible via tabs on the bottom of the MS Excel workbook. Tabs that have labels inside brackets indicate checklists that can be renamed to match system elements in your application. For example, <PASS> can be copied and renamed to <PASS01>, <PASS02>, if two PASS servers are to be verified on the system.

Each checklist verifies design attributes that meet the following criteria:

- Easily observable: This manual instructs you where and how to check the design attribute. You can use one or multiple checklists. See the table in <u>Chapter 2</u> for recommended selections that are based on the system stage.
- 2. **Common:** The checklists are designed to verify applications that have configurations aligned with PlantPAx system recommendations. There are possibilities that some valid configurations are not covered by PlantPAx system documentation. In these cases, the associated attributes are not included in the checklists or these manuals.

3. Clear impact: The user experience benefits if the system conforms to the provided limits.

The manual instructions also help spotlight potential issues that could affect performance. <u>Chapter 8</u> provides some basic troubleshooting examples and procedures if your system is not meeting performance expectations.

The MS Excel workbook is attached within the PDF manual. <u>Appendix A</u> instructs you how to access the Excel file.

To make sure that you have the latest checklists, see the Knowledgebase Answer ID 771236 at <u>https://www.rockwellautomation.custhelp.com</u>.

Verification tools are included in the Knowledgebase article. These tools either assist or perform necessary actions that are required to complete the checklist. The tools are described in a 'Before You Begin' section of each checklist chapter.

Notes:

Verification Recommendations

In today's automated manufacturing environments, it is important at various stages of development to make sure that applications align with PlantPAx[®] system recommendations. Pinpointing snags during pre- and post-configuration stages can help reduce costly downtime.

Periodic evaluation after startup also can be done to verify the accumulated affect of process and system changes.

<u>Table 1</u> defines which checklists to use to verify compliance with the guidelines that are outlined in the PlantPAx Distributed Control System (DCS) Selection Guide (<u>PROCES-SG001</u>) and Reference Manual (<u>PROCES-RM001</u>).

Similar to a snapshot, each checklist verifies respective system design attributes to provide an overall picture of your plant operation at any given time.

	PlantPAx System Checklists						
Development Stage	System Infrastructure	Server or Workstation	System Architecture	PASS	Controller		
	See <u>page 15</u>	See <u>page 39</u>	See <u>page 65</u>	See <u>page 87</u>	See <u>page 113</u>		
System prep is complete per the instructions in the PlantPAx DCS Infrastructure Configuration User Manual, publication <u>PROCES-UM001.</u> Not all application code is complete.		•	•				
Code is complete, but not running on equipment or network that is being used for the production environment (for example, acceptance testing).				•	•		
Code is complete, running in production environment (for example, site and acceptance testing).	•	•	•	•	•		

Table 1 - Checklist Selection

Checklist Flexibility and Visual Clues

Each checklist contains entry fields that gather information for the selected design element. You do not have to use all five checklists. As <u>Table 1</u> shows, use only the checklists that are required to verify that functionality is compliant with system guidelines.

Table 2 summarizes each checklist.

Table 2 - Checklist Content

System Area	Description
System infrastructure	Verifies system infrastructure elements that are shared across all servers and workstations. For example, virtual hypervisor and network.
<server name="" or="" workstation="">⁽¹⁾</server>	Verifies the loading and configuration of each individual server and workstation. Use this checklist to review each server and workstation on your system.
System architecture	Verifies the design and configuration of your system components. The checklist includes FactoryTalk® View, FactoryTalk® Historian, and FactoryTalk AssetCentre software configurations.
<pass>⁽¹⁾</pass>	Verifies applications that PASS servers host. Review includes FactoryTalk View Site Edition (SE) design attributes, alarm setup, and communication.
<controller>⁽¹⁾</controller>	Verifies the application and load on your controller. Use this checklist to review each controller on your system.

(1) Duplicate and rename a new checklist for each controller, PASS, server, or workstation in your system.

In the Results column, one of five icons appears from the status of the Observed Value.

		System Architecture Checklist					
	System Name:						
	Desig	n Element	Observed Valu	e	Results	Notes	
Type values or make selections as instructed per entry field.		Number of HMI Servers	0		•	Results show compliance	
	FactoryTalk	Number of Alarm Servers	0		•		e or require
	View Application Design	Number of Data Servers	0		•		
		Each HMI and Data Server is in its own Area		•	•		

Table 3 - Checklist Icon Descriptions

lcon	Description
×	Failure – requires correction
ĩ	Warning – requires additional attention to confirm if results are acceptable for your system
4	Passed – aligns with system recommendations
	Not applicable — not completed or does not apply
0	Information only – documentation or calculation purposes only

IMPORTANT A successful PlantPAx system design has completed checklists that do not have any failures and all warnings are addressed. You can attach reports to a checklist for categories that are information only.

Before You Begin

Checklist procedures operate under the following assumptions:

- Your PlantPAx system is operable (for example, the HMI application is running and the latest operating system patches are installed).
- You have access to Microsoft[®] Excel[®] software to complete a checklist.

System Infrastructure Checklist

	This chapter describes verification procedures for virtualized or traditional system infrastructure. Common infrastructure attributes, including network switches, servers, and workstations, are reviewed to make sure of PlantPAx [*] system compliance.
	The purpose of this checklist is to verify your system data against PlantPAx system design recommendations. The collection of data lets you analyze overall system performance and pinpoint any potential performance issues.
	The Microsoft [®] Excel [®] worksheet, which we refer to as a checklist, has entry fields to document system design information. There are five icons that indicate the status of the entered information and actions to be taken, if necessary. The checklist data provides a snapshot of whether your system is operating efficiently.
	To access this checklist, click the System Infrastructure tab on the Microsoft Excel workbook.
Before You Begin	The System Infrastructure checklist procedures operate under the following assumptions:
	• Your PlantPAx system is operable (for example, the HMI application is running and the latest operating system patches are installed).
	• You have access to Microsoft Excel software to complete the checklist.
	 The FactoryTalk[®] Network Manager[™] is available to generate network switch information. Access the Network Manager from the Product Compatibility and Download Center (PCDC).
	TIP The download of the tool is not required. If this tool is not used, you can collect information manually from the web pages of each Stratix [®] switch.
	Your system infrastructure has been configured per the following instructions in the PlantPAx DCS Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u> .

- You have defined a range of IP addresses for the DHCP server in the domain, if applicable for your system.
- You have created groups and assigned users in the domain controller.
- If you are using virtualization, the VMware vSphere Client software is installed and connected to a vCenter server or ESXi (hypervisor) host.

Click the page number or the links in the workflow for quick access to specific information.





Hardware

IMPORTANT You can only access a computer BIOS when restarting that computer. Make sure that you are in a non-productive environment to restart a computer.

BIOS Power-saving Options Disabled?

T

From the computer BIOS, verify that the BIOS power-saving options are disabled. Power-saving options reduce computer resources for your system elements.

- 1. From the checklist pull-down menu, choose Yes or No to indicate if you have disabled power-saving options in all computers in the system.
- 2. Observe your results and make necessary changes.

٠	Not complete until an option is chosen.
4	Yes; pass.
×	No; fail. Correct and reverify.

Virtualization

Your PlantPAx system servers and workstations can be deployed in a traditional and a virtualized environment. Traditional, for our purposes, means that each server or workstation uses an operating system (OS) that is natively on the computer. Virtual machines are installed on an operating system (OS) that is independent of the computer hardware being used.

Using Virtualization?

This row verifies if virtualization is used.

- 1. From the checklist pull-down menu, choose Yes or No to indicate if you are using a virtual environment.
- 2. Observe your results and make any necessary changes.



Hypervisor

This section applies only if virtualization is being used. The row verifies the settings, sizing, and loading of the virtual infrastructure. A hypervisor is a software program that allows multiple operating systems to share one hardware host. Each operating system appears to have the host processor, memory, and other resources all to itself.

IMPORTANT We recommend that you perform the verification procedure for every host server (hypervisor) in your PlantPAx system.

Before you begin, generate a host summary report to gather performance readings to this section of the checklist. Complete these steps.

1. Open a web browser.

We recommend Firefox web browser.

- 2. Type the IP address of the vCenter server. The web login page appears.
- 3. Click the web client.
- 4. Type your user name and password for the single-server login.

If a group of ESXi hosts is available in the selected context, select the host or group of hosts from the Source list, and then click Next. This action generates an HTML output. Print the output and attach the information to the Hypervisor checklist section.

TIP In the Notes section of the checklist, record the CPU and memory utilization. You can also use the memory information in the Data server section of the PASS checklist. See <u>page 106</u>.



CPU Utilization

The checklist row verifies the CPU utilization of the hypervisor.

- 1. From the host summary report that is generated on <u>page 18</u>, record the CPU utilization in the checklist and press Enter.
- 2. Observe your results and make necessary changes.



For virtual image recommendations per system element, see the PlantPAx DCS Selection Guide, publication <u>PROCES-SG001</u>.

Memory

The checklist row verifies the memory utilization of the hypervisor.

- 1. From the host summary report that is generated on <u>page 18</u>, record the CPU utilization in the checklist and press Enter.
- 2. Observe your results and make necessary changes.

٠	Not complete until a value is entered.
4	Yes; pass. Memory utilization is within 50% of used resources.
×	No; fail. Memory utilization exceeds system recommendations.

For virtual image recommendations per system element, see the PlantPAx DCS Selection Guide, publication <u>PROCES-SG001</u>.

Resource Pool Allocation

Each virtual machine (VM) consumes a portion of the hypervisor resources. Resource allocation is performed on an individual VM basis by using shares, reservations, and limits. Setting these values on every VM is time-consuming. Resource pools, however, provide dynamic allocation of CPU and memory resources for efficiently scaled servers and workstations.

Virtual memory shares are set by priority: High, Normal, Low depending on the minimum reservation per system element. <u>Table 4</u> shows our recommendation for three resource pools with the server-type allotment.

Table 4 - Server Resource Pool Allocation

Resource Pool Name	CPU Shares	CPU Reservation	Memory Shares	Memory Reservation	Server or Workstation		
High	High	50% of available host CPU Hz	High	Minimum as specified for each virtual template	PASS OWS AppServ-OWS		
Normal	Normal	Zero	Normal	Zero	EWS AppServ-EWS AppServ-Asset AppServ-Batch AppServ-Info		
Low	Low	Zero	Low	Zero	FactoryTalk Directory Domain Controller		

For more information on resource pool allocation, see the PlantPAx DCS Reference Manual, publication <u>PROCES-RM001</u>.

Domain

This section of the checklist verifies that all system servers and workstations are on a Windows Domain per system recommendations.

All Servers and Workstations on Same Domain

This row on the checklist verifies that the servers and workstations are configured on the DNS server. Complete these steps.

1. Open the Server Manager, click Tools, and choose DNS.



2. Verify that all servers and workstations are listed on the DNS Manager dialog box.

File Action View Help	Type Start of Authority (SOA)	Data
	Type Start of Authority (SOA)	Data
 DNS PADCA Forward Lockup Zones System.PlantPAx.local System.System.PlantPAx.local System.PlantPAx.local System.PlantPax.local	Type Start of Authority (SOA)	Data
ASH403 ASISDT ASISDT ASISDT ASOSINT ASOSIN2 ASOSIN3 ASOSIN4 ASOSIN6 ASOSIN6	Name Server (NS) Host (A) Host (A)	padcb.system.plantp padca.system.plantp 172.18.1.10 172.18.1.11 10.68.33.36 172.18.1.42 172.18.1.43 172.18.1.44 172.18.1.71 172.18.1.71 172.18.1.71 172.18.1.71 172.18.1.15 172.18.1.48 172.18.1.59 172.18.1.35

You also can use this list to complete the Servers and Workstations section on page 38.

3. From the checklist pull-down menu, choose Yes or No if you are using a Windows Domain.

4. Observe your results and make necessary changes.



Network

This section describes how to run the FactoryTalk[®] Network Manager[™] tool to monitor your network. The tool accesses Stratix[®] and Cisco[®] network switches to diagnose the health of the network, and inventories device types and other parameters on the network.

IMPORTANT	Example screen facsimiles in this section could be different than shown
	because of updates to FactoryTalk Network Manager. For current installation
	and operating instructions, see the FactoryTalk Network Manager Quick
	Start Guide, publication <u>FTNM-QS001</u> .

Network Manager Considerations

To download and install the tool, go to the PCDC at <u>https://compatibility.rockwellautomation.com/Pages/home.aspx#/scenarios</u>

Before you use the tool, consider the following for best performance:

- You cannot use Internet Explorer with these procedures. We recommend that you use Chrome or Firefox web browser.
- The password 'admin123' must be changed after you initially open the software. We recommend that you create dedicated users to your application configuration and disable default user names.
- When you create an access profile, make sure that the SSH protocol is enabled and the SNMP is configured in all switches as documented in Chapter 1 of the PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u>.
- To enable external access, you must create an inbound Windows firewall connection (TCP 8443).

First Time Network Manager Logon

This section describes procedures for initially logging on to the tool. Complete these steps.

TIP Steps 1...5 must be configured for each computer that is using the Network Manager. Steps 6...8 are performed once.

1. Open the Chrome or Firefox web browser.

We are adding an exception because the network manager is using a self-signed certificate.



- 2. Click Advanced.
- 3. Click Add Exception.



4. Type the URL <https://hostname:portNum/login>, replacing <hostname> with the host name of the network manager server. We suggest this firewall rule to allow for traffic on port number 8443.

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://localhost:8443/login	2
Certificate Status	
This site attempts to identify itself with invalid information.	
Wrong Site	
The certificate belongs to a different site, which could mean that someone is trying to impersonate this site.	
Unknown Identity	
The certificate is not trusted because it hasn't been verified as issued by a trusted authority using a secure signatu	re.
☑ <u>P</u> ermanently store this exception	
Confirm Security Exception Cancel	

5. Confirm Security Exception.

A Welcome Login dialog box appears.

6. Type systemadmin for the user name and admin123 for the password.

Login	× +		_ 🗆 X
(←) → ୯ 🏠	🛈 🔬 https://localhost:8443/login	◙ ☆	li\ ⊡ ≡
	Factory Talk [®] Network Manager		
	Welcome. Log In.		=
	systemadmin		
	•••••	\bigcirc	
		_	
© 2016-2018 Rockwell Autom Rights Reserved	ation, Inc. All Version : 1.4.1-1		~

7. Retype admin123 in the Current Password text box, and then type a new password.

	Cł	nange P	asswo	rd		×	+		•	x
¢	\rightarrow	G	ŵ		()	ß	https://localhost:8443/iot/change-password 🛛 🐨 💟 🏠	lii\ 🗉		Ξ
				<i>Factory</i> System A	Tal	K . N	letwork Manager trator, First time login or password has been reset, please change password			
				Curren Passwo New Pa Confirr Passwo	nt ord assw m Ne ord	rord	•••••• •••••• •••••••			
							Password Policies			
© R	201 Sight	16-2011 s Rese	8 Rock erved	well Automatio	on, In	ic. All	Version : 1.4.1-1			

8. To confirm the entry, retype the new password.

9. Type systemadmin and the new password.

Login	× +	×
← → ♂ ŵ	① ▲ https://localhost:8443/login?logout … ♥ ☆	\ ⊡ ≡
	Factory Talk Network Manager	
	Welcome. Log In.	
	You have logged out successfully.	
	systemadmin	
	······	
© 2016-2018 Rockwell Automati Rights Reserved	on, Inc. All Version : 1.4.1-1	

The Network Manager dashboard appears.

Discovering Assets

This section describes how to configure the tool to retrieve network asset information that comprises your system. Complete these steps.



1. From the Network Manager dashboard, click Operate>Dashboard.

2. Click Asset Discovery and then New Discovery Profile.

Dashboard	× +		5						
(←) ở ŵ	① 🔒 https://localhost	t:8443/iot/group-dashboar	d d						
			<u>ج</u>	Asset Discovery	×	+			4
Design Operat	te Maintain Se	ettings	5	← → ♂ ŵ		🛈 <u> h</u> tt	tps://localhost:8443/iot	t/asset-discovery	-
			-	Factory Talk	letwork Ma	nager	Operate >	Asset Discovery	
Alarms	Asset Discovery	Audit Trails	Da	New Discovery Profil	le) Discove	ery Profile	(S)		
				Name	🔺 Туре		IP Address	Netmask	Acce
Factory Talk Netwo	ork Manager Operate	: > Dashboard	2					No data	to display
Groups	Y		Dashboard						
Root (0)			No devices a						
		and the second se	and	and a second second second	and the second s		and the second s		Sund.

- 3. To define a discovery profile, you do the following:
 - a. Type a profile name. For example, PlantPAx.
 - b. Click IP Scan and type a range of IP addresses.
 - c. Type a Netmask.
 - d. Click Create New Access Profile.

Asset Discovery	× +							×
€ → ♂ û	🛈 🙆 http	os://localhost:8443/io	t/asset-discovery			◙ ☆	lii\ 🗉	≡
Factory Talk Network	Manager					<u>ب</u> ٥	i - 9	
< Back to Discovery Profile			New Discove	ery Profile				^
A discovery profile defines the meet the Link Layer option discovers the settings that will be used during di Name* PlantPAx Discovery Mechanism	chanism by which e network hop-by-h iscovery.	the network or a section hop starting at the seed I	of the network is discove	red by the system. The rofile that is attached to	IP Scan option discovers d the discovery profile speci	levices within the range of fies the access credential	IP addresses, and s and transport	
IP Scan 🔵 Link L	ayer	Start IP* 172.18.0.1		End IP*		Netmask* 255.255.255.0		
Access Profile* Select your options Assign to Group Root	• •	Don't see the access pro	file you need? <mark>Create Ne</mark>	w Access Profile				

- 4. To define an access profile, do the following:
 - a. Click Advanced.
 - b. Type an access profile name. For example, PlantPAx Profile.
 - c. Type the user name and password that matches the network switches configuration.
 - d. Reenter the same password to confirm the entry.

An access profile contains access credentials and transp of network devices. These details are stored in a secure, must match the values configured on the set of devices b	ort settings that are used by the syste encrypted database. The values spec eing managed by the system.	m to manage a specific set ified in the access profile	Simple Advanced
lamo*		Description	
PlantPAx Profile	0	Description	¢
PlantPAx Profile Device Access Settings Jser Name*	0	Description	•
PlantPAx Profile Device Access Settings	0	Description	•
PlantPAx Profile Device Access Settings Jser Name* admin Password*	0	Description Enable Password	

- 5. Delete the defaults Community String (public).
- 6. Type your Community String. The example references the switch configuration that is documented in the PlantPAx Distributed Control System Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u>.
- 7. Click Secure.

New Access Profile				×
SNMP Settings * V3 V2C Community Strings PlantPAX ×			© Ø	
☐ V1 Access Mechanism Regular Secure Transport Settings	Port# 443	SSH Port# 22		=

8. Click Save.

	New	Discov	very Profile	
N Access Profile				
□ V1				
Access Mashaniam				
	Port #		SSH Port #	
Regular 🔵 Secure	443		22	
Transport Cottings				
Transport Settings				
Transport Settings	Socondo	•	Port #	
Transport Settings Timeout	Seconds	0	Port #	
Transport Settings Timeout 5 Retries	Seconds	0	Port#	
Transport Settings Timeout 5 Retries 1	Seconds	0	Port#	
Transport Settings Timeout 5 Retries 1	Seconds	0	Port≢ 161	
Transport Settings Timeout 5 Retries 1	Seconds	0	Port≢ 161	
Transport Settings Timeout 5 Retries 1	Seconds	e e	Port# 161	
Transport Settings Timeout 5 Retries 1	Seconds	Image: Cancel	Port# 161 Save	

9. To access your profile, click the Access Profile pull-down menu and choose your access profile name.

The name is the same as entered in $\underline{\text{step 4}}$.

Asset Discovery × +					x
(←) → ⊂ ŵ 💿 🖗	https://localhost:8443/iot/asset-discovery		… ◙ ☆	111	≣
	· operate / Asset Discovery			•	^
				2	
< Back to Discovery Profile	New Discov	erv Profile			^
A discovery profile defines the mechanism by the Link Layer option discovers the network ho settings that will be used during discovery.	which the network or a section of the network is disco p-by-hop starting at the seed IP address. The access	vered by the system. The IP Scan option discove s profile that is attached to the discovery profile s	rs devices within the range of IP address pecifies the access credentials and trans	es, and port	
Name*					
PlantPAx	0				=
Discovery Mechanism					=
	Start IP*	End IP*	Netmask*		
IP Scan 🔵 Link Layer	172.18.0.1	172.18.0.100	255.255.255.0		
Access Profile*					
Select your options	Don't see the access profile you need? Create N	lew Access Profile			
Select your options					
PlantPAx Profile	0				

10. Click Save.

Name*			
PlantPAx	θ		
Discovery Mechanism			
	Start IP*	End IP*	
IP Scan 🔵 Link Layer	172.18.0.1	172.18.0.100	
Access Profile*	D	and Oracle New Access Deaths	
PlantPAX Profile	Don't see the access prome you	need? Create New Access Profile	
Assign to Group			
Root -	0		

Your profile information appears in respective columns.

11. Click Scan Now.

	Asset Discovery	× +								X
¢	$ ightarrow$ C' $rac{1}{2}$	🛈 <u>८</u> ht	tps://localhost:8443/iot/asset	-discovery			💟 🕁		III\ 🗉	
1	Factory Talk ⁻ Networ	k Manager		t Discovery			• •	Î ? ·		-
	New Discovery Profile 1 Di	iscovery Profile	e(s)					With Selected	9	0
						Discovery Pro	file PlantPAx has been c	reated		\rightarrow
	Name	Туре	IP Address	Netmask	Access Profile	Group	Last Run		Actions	- }
0	PlantPAx	IP Scan	172.18.0.1-172.18.0.100	255.255.255.0	PlantPAx Profile	Root			Scar Nov	
					Show	rows: 25 🔻	Go to page	1 1-1 of 1	•	•
V		han good w	- Andrew March	A second	-	Jon Son				-

This procedure can take several minutes to discover network assets.

Checking Inventory

This section describes how to inventory and license the assets in your system.

	Asset Discovery	× +								x
¢)→ C' û	🛈 윮 http	s://localhost:8443/iot/asset-d	liscovery			🔽 🕁		III\ 🗊	≡
	Design Operate	Maintain	Settings						×	< ^
	Alarms	Asset Discove	ery Audit Tra	ills	Dashboard		nventory	Topolog) Jy	
	Factory Talk ' Networ	k Manager	Operate > Asset	Discovery			<u>م</u> ا] 0 ·	1 -	=
	New Discovery Profile 1 D	iscovery Profile(s)					With Selected	<u>ب</u>	3
				(Discovery Profil	e PlantPAx has been o	reated		×
0	Name	Туре	IP Address	Netmask	Access Profile	Group	Last Run		Actions	
	PlantPAx	IP Scan	172.18.0.1-172.18.0.100	255.255.255.0	PlantPAx Profile	Root	2018-06-18 09:50:2	20	Scan Now	n /
					Show ro	ws: 25 💌	Go to page	1 1-1 of 1	•	

1. Click Operate>Inventory.

2. Click Select All and click 'With Selected'.

Inventory	× -	F							_ □	x
← → ♂ ŵ	0	🛈 🔒 https://localhost:8443/iot/inventory 🛡 🏠 📗							lii\ 🗊	≡
Factory Talk Netwo	ork Manag	er Operate					0		0 · 1	
Device Filters	 了13	Device(s)	ALL 🔻 Se	earch Licensed Devic	Ces	Q		With Sele	cted 🕓 🐯	
▼ CATEGORY	Alarm Status	Name	IP Address	State	Connected To	Product ID	Group	Tags	Vendor	
 Licensed Devices All Devices 		SW001	172.18.0.1	Unlicensed		1783-IMS28RAC	Root	+	Rockwell Automation/Allen- Bradley	
DEVICE TYPE		SW010	172.18.0.10	Unlicensed		1783-IMS28NAC	Root	+	Rockwell Automation/Allen- Bradley	
Switch (13)		SW020	172.18.0.20	Unlicensed		1783-BMS20CGN	Root	+	Rockwell Automation/Allen- Bradley	=
MULTIPROTOCOL (13)		SW021	172.18.0.21	Unlicensed		1783-BMS20CGN	Root	+	Rockwell Automation/Allen- Bradley	
▼ STATE		SW022	172.18.0.22	Unlicensed		1783-BMS20CGN	Root	+	Rockwell Automation/Allen- Bradley	
Unlicensed (13)		SW023	172.18.0.23	Unlicensed		1783-BMS20CGN	Root	+	Rockwell Automation/Allen- Bradley	
 VENDOR Rockwell Automatio n/Allen-Bradley (13) 		SW030	172.18.0.30	Unlicensed		1783-HMS16TG4CGN	Root	+	Rockwell Automation/Allen- Bradley	_
		SW031	172.18.0.31	Unlicensed		1783-HMS16TG4CGN	Root	+	Rockwell Automation/Allen- Bradley	

3. Click the Change License State pull-down, and choose Licensed.

Perform Action		
Delete		
Derete		
Change License State		
Select a state		~
Select a state		
Unlicensed		
Licensed		
 Security 	Enter or select up to 5 tags	•
	Add Remove	
Export Devices		
 Relacted Davisa(a) 		
 Selected Device(s) 		
O 25 Devices on page		

4. Click Yes.



The Inventory dialog reappears with 'Licensed' for the state of the selected device filters.

5. Click a switch name to collect information for the checklist.

		× +	https://localh	ost	8443/int/inventory				🖸 🕁		
Factory Talk Netwo	ork I	Manager	Oper	ate	> Inventory				• • •	Î	@ · L ·
Device Filters			vice(s)		ALL 🔻 Se	earch Licensed Dev	ices	Q		With Sel	ected 🕝 🔅
▼ CATEGORY								Transitioning 13 de	vices to Licensed	l state. Vi	ew Details ×
Licensed Devices	0	Alarm Status	Name	•	IP Address	State	Connected To	Product ID	Group	Tags	Vendor
All Devices	0		SW001		172.18.0.1	Licensed		1783-IMS28RAC	Root	+	Rockwell Automation/Allen- Bradley
 DEVICE TYPE Switch (13) 			SW010		172.18.0.10	Licensed		1783-IMS28NAC	Root	+	Rockwell Automation/Allen- Bradley
V PROTOCOL	0		SW020		172.18.0.20	Licensed		1783-BMS20CGN	Root	+	Rockwell Automation/Allen- Bradley
□ MULTIPROTOCOL (13)	0		SW021		172.18.0.21	Licensed		1783-BMS20CGN	Root	+	Rockwell Automation/Allen- Bradley
 STATE Licensed (13) 			SW022		172.18.0.22	Licensed		1783-BMS20CGN	Root	+	Rockwell Automation/Allen- Bradley
	0		SW023	_	172.18.0 3	Licensed	_	1783-BMS20CGN	Root	.	Rockwell Automation/Aller



Information for the selected switch, such as temperature, CPU usage, and bandwidth, appears.

6. Click Open Device Manager.

Details for the selected switch appear.

7. Click the Monitor tabs and choose Port Statistics.

AB Alle	n-Bradley	Stratix 5700 Solution					Rockwell Automation
•		Device Manager - Switch		🏫 Dashboard Con	figure Monitor	Admin 🔻	🧃 G 🖨 🛡
Statistics	Port Statistics						
-	-						Data unit Byte ME
Overview	I ransmit Det	all Receive Detail					
Port	Transmitted	Total Transmitted(pack	Received	Total Received(pac	Total Transmit Erro	Total Receive Errors(pa	Last Counter Res
🗌 Fa1/1	1490507449	129209863	3046944415	88739227	0	0	never
Fa1/2	2577241737	64941318	63033294	811426	0	0	never
🗌 Fa1/3	4208561681	36538471	1008070288	47064174	0	0	never
□ Fa1/4	617366345	50021211	490208512	3999222	0	0	never
🗌 Fa1/5	0	0	0	0	0	0	never
Fa1/6	0	0	0	0	0	0	never
□ Fa1/7	0	0	0	0	0	0	never
🗌 Fa1/8	0	0	0	0	0	0	never
🗌 Fa1/9	2807855157	301267212	3494011366	253046194	0	0	never
G Fa1/10	1825837203	300566185	328351730	153007124	0	0	never
🗌 Fa1/11	0	0	0	0	0	0	never
G Fa1/12	0	0	0	0	0	0	never
G Fa1/13	0	0	0	0	0	0	never
G Fa1/14	0	0	0	0	0	0	never
G Fa1/15	0	0	0	0	0	0	never
□ Fa1/16	0	0	0	0	0	0	never
□ Fa1/17	0	0	0	0	0	0	never
G Fa1/18	0	0	0	0	0	0	never
Gi1/1	3056293385	208664003	465233108	441022589	0	0	never
Gi1/2	0	0	0	0	0	0	never

Checking Topology

A topology diagram appears. You can move the switches around for better visibility, if desired.



Checklist Options

You have the option of manually generating additional checklist information into the following rows:

- Bandwidth Utilization %
- <u>Packet Error Rate</u>
- <u>Temperature OK</u>
- <u>CPU Utilization %</u>
- <u>Memory Utilization</u>

Bandwidth Utilization %

.

This row verifies that the allocation of bandwidth resources is within PlantPAx system recommendations.

- 1. Identify and record the highest bandwidth utilization percentage of all network switches.
- 2. Observe the results and make any necessary changes.

•	Not complete until a value is entered.
×	50% and up is a fail. Review and verify the network architecture for system compliance or call a Rockwell Automation [®] Support representative.
4	Pass.

Packet Error Rate

This row verifies that the error rate for message handling is zero to comply with PlantPAx system recommendations.

- 1. Identify and record the highest packet error rate for messaging and press Enter.
- 2. Observe the results and make any necessary changes.

•	Not complete until a value is entered.
×	Fail. Error rate is greater than 0. If the error rate is not zero, but not increasing, we recommend a reset. Review and verify the network architecture for system compliance or call a Rockwell Automation Support representative.
4	Pass.
Temperature OK

This row verifies that all devices are not reporting a high temperature reading.

- 1. From the checklist pull-down menu, choose Yes or No to indicate whether the temperature of all switches is within system recommendations.
- 2. Observe the results and make any necessary changes.

•	Not complete until an option is chosen.
×	No; fail. Rectify the environment and verify the network design. You also can call a Rockwell Automation Support representative.
4	Yes; pass.

CPU Utilization %

This row verifies the percentage of CPU resources that are allocated to a device.

- 1. Identify and record the highest CPU utilization percentage of all switches, and press Enter.
- 2. Observe the results and make any necessary changes.



Memory Utilization

This row verifies the percentage of memory that is used by a network switch.

- 1. Identify and record the highest memory utilization percentage of the memory that is reserved, and press Enter.
- 2. Observe the results and make any necessary changes.

•	Not complete until a value is entered.
×	No; fail. Memory usage is greater than 50%. Review and verify the network architecture for system compliance or call a Rockwell Automation Support representative.
4	Yes; pass.

Servers and Workstations

This informational row documents all your system servers and workstations. You can use the list on the DNS Manager dialog box, as shown on <u>page 22</u>.

- Type the computer name for the system element and press Enter. For example, PASS01.
- 2. From the System Role pull-down menu, choose the role.

For example, domain controller, PASS, EWS. For the PASS--C choose PASS.

3. Repeat <u>step 1</u> and <u>step 2</u> for each server and workstation in your system.

When all entry fields are verified, type the name of the person who completed the checklist and the completion date. We suggest that you store the checklist and any attachments in an accessible location to compare with future system data. Discrepancies can show potential issues that could adversely affect performance.

You can close the Microsoft Excel workbook or click another tab to continue to verify data.

Server or Workstation Checklist

This chapter describes verification procedures of basic configuration for each server and workstation in the PlantPAx[°] system.

The purpose of this checklist is to verify your system data against PlantPAx system design recommendations. The collection of data lets you analyze overall system performance and pinpoint any potential performance issues.

The Microsoft[®] Excel[®] worksheet, which we refer to as a checklist, has entry fields to document system design information. There are five icons that indicate the status of the entered information and actions to be taken, if necessary. The checklist data provides a snapshot of whether your system is operating efficiently.

To access this checklist, click the <Server or WS Name> tab on the Microsoft Excel workbook.

IMPORTANT	Complete this checklist for each computer on your system. To duplicate a checklist, do the following:
	• Right-click the <server name="" or="" ws=""> tab and choose Move or Copy.</server>
	Click Create a copy and then click OK.
	 Double-click the checklist name and type a name that identifies the computer that you are verifying.

Before You Begin

The Server or Workstation Name checklist procedures operate under the following assumptions:

- Your PlantPAx system is operable (for example, the HMI application is running and the latest operating system patches are installed).
- You have access to the following tools to complete the checklist:
 - Microsoft Excel software
 - Performance Monitor (PerfMon) utility is connected to the servers and workstations that are being verified

Click the page number or the links in the workflow for quick access to specific information.



Figure 4 - Server or Workstation Workflow

Operating System

The rows in this checklist section verify the following operating system requirements:

- Windows Firewall Being Used
- Operating System Valid
- <u>Rockwell Software Patches Applied</u>
- <u>NIC Power-saving Options Disabled</u>
- <u>Windows Power-saving Options Disabled</u>
- Desktop Experience Enabled in RDS Server
- <u>Adjust for Best Performance is Selected</u>
- Data Execution Prevention (DEP) Turn On for Essential Items
- <u>User Account Control (UAC) Never Notify</u>
- <u>Windows Automatic Update is Disabled</u>
- Event Viewer Is Not Presenting Errors
- <u>NSLookup Resolved</u>

IMPORTANT Complete this checklist for each server and workstation in your system.

Windows Firewall Being Used

A Windows firewall, whether Microsoft or third-party software, helps prevent outside intrusion to system operations. This row makes sure that the Windows firewall with inbound rules is active in the system. For firewall rules, see 'Enable Windows Firewall' in the PlantPAx DCS Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u>.

To check if the firewall state is enabled, complete these steps before completing this section.



1. Open the Control Panel of the computer and choose Windows Firewall.

2. Make sure that Windows Firewall is enabled, and then choose Advanced Settings.

If the firewall is not enabled (off), you receive a warning message. Proceed to <u>step 4</u>.

The display example is an enabled firewall. You must repeat these steps for each computer in your system.

) 🍥 👻 🛧 🌌 🕨 Control Pa	nel 🕨 All Control Panel Items 🕨 Windows Firewall	V C Searc	h Control Panel
Control Panel Home	Help protect your PC with Windows F Windows Firewall can help prevent hackers or ma Internet or a network.	irewall licious software from gaining access to your P	C through the
Change notification settings	🖉 🧭 Domain networks	Cor	inected 🔿
Turn Windows Firewall on or off	Networks at a workplace that are attached to a c	lomain	
Restore defaults	Windows Firewall state:	On	
Advanced settings Troubleshoot my network	Incoming connections:	Block all connections to apps that are no of allowed apps	t on the list
	Active domain networks:	System.PlantPAx.local	
	Notification state:	Do not notify me when Windows Firewal new app	l blocks a
	Private networks	Not cor	nnected 📀
	Guest or public networks	Not cor	inected 🕑
See also			
Action Center			

Rules that are created by the Windows Firewall Utility appear under Inbound Rules. Use this list for <u>step 3</u>.

Inbound rules explicitly allow or block inbound network traffic that matches the criteria in the rule. You must verify that Rockwell Automation software is allowed.

@	Windows Firewa	all with Advanced Security			X
File Action View Help					
🗢 🄿 🙍 🖬 🗟 🖬					
🧟 Windows Firewall with Advance	Inbound Rules			Actions	
🗱 Inbound Rules	Name	Group	^	Inbound Rules	
Connection Sequeits Pulse	🕜 AlarmQB.exe		=	Mew Rule	_
N Monitoring	🖉 AlarmQB.exe			ST Ciltar hu Desfile	
p age meritering	🔮 AlarmQB.exe			The riter by Profile	
	AlarmQB.exe			Y Filter by State	•
	AlmCliSrvWrap.exe			🕎 Filter by Group	•
	MIT CliSrvWrap.exe			View	•
	AlmCliSrvW/rap.exe			Refresh	
	MimClistVWrap.exe				
	Almivipx.exe			By Export List	
	AlmMny ava			🕜 Help	
	AlmMny eye			- C	
	AlmSrv.exe				
	🕜 Architect.exe				
	🐼 Architect.exe				
	🕜 Architect.exe				
	Ø Architect.exe				
	🕑 CodeMeter Runtime Server				
	😨 CodeMeter Runtime Server				
	🔮 CodeMeter Runtime Server				
	🔮 CodeMeter Runtime Server				
	🔮 CodeMeter Runtime Server				
	CodeMeter Runtime Server		~		
< III >	< III		>		

- 3. From the checklist pull-down menu, choose Yes or No if a Rockwell Automation entry is 'Enabled' with the firewall.
- 4. Observe your results and make any necessary changes.

•	Not complete until an option is chosen.
Ŷ	No; warning. Write in the Notes column what solution is providing firewall protection or why it was disabled on this system.
4	Yes, pass. We recommend that you follow firewall rules that are detailed in the PlantPAx DCS Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u> .

Operating System Valid

This row verifies that the server or workstation operating system that you are using matches PlantPAx system recommendations.

IMPORTANT	The following PlantPAx system firmware and software versions use these Windows operating systems:
	PlantPAx system 4.6 : Windows 2016, 64 bit (servers); Windows 10, 64 bit (workstations)
	PlantPAx system 4.5 : Windows 2012 R2, 64 bit (servers); Windows 10, 64 bit (workstations)
	PlantPAx system 4.0 : Windows 2012 R2, 64 bit (servers); Windows 8.1, 64 bit (workstations)
	PlantPAx system 3.0 : Windows 2008 R2, 64 bits (servers); Windows 7 64 bit (workstations)
	For details, see the PlantPAx DCS Selection Guide, publication <u>PROCES-SG001</u> .

- 1. From the checklist pull-down menu, choose Yes or No whether you are using a valid OS for the PlantPAx system.
- 2. Observe your results and make any necessary changes.

•	Not complete until an option is chosen.
ĩ	No; warning. Confirm and record in the Notes column that the OS being used is supported by the installed products. NOTE: System performance can be impacted by a mismatch of operating systems within the system.
4	Yes, pass.

Rockwell Software Patches Applied

This row verifies if you are using the latest software patches for the Rockwell Automation software that is installed on your PlantPAx system. Before updating system software, we recommend that you verify software updates on a non-production system or when the facility is non-active.

IMPO	IMPORTANTThe Patch Validator tool verifies current software versions on your system. The tool also installs a patch roll-up.To download, see the Knowledgebase Answer ID 30393 at https://www.rockwellautomation.custhelp.com.		
1. F	rom the cl ou are usir	necklist pull-down menu, choose Yes, No, or N/A whether ng the current software patches.	
2. C	Observe yo	ur results and make any necessary changes.	
	N/A; you are in a production environment.		
	Ŷ	No, warning. Write the Patch Validator version or date last used in the Notes section. When time permits, use the tool to perform a patch roll-up. For procedures, see the PlantPAx DCS Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u> .	
	4	Yes, pass.	

NIC Power-saving Options Disabled

This row verifies that you have disabled power-saving for the Network Interface Card (NIC). The NIC card connects a workstation to other devices on the network. The power-saving feature turns off the network card when not in use, which can interfere with network throughput.

Complete these steps to disable NIC power-saving.

- 1. In Microsoft Windows, open the Control Panel and choose Network and Sharing Center.
- 2. Click Change adapter settings on the Network and Sharing Center dialog box.

¥.	Network and Sha	aring Center	×
🛞 💿 - 🕆 🔛	Control Panel > All Control Panel Items > Networ	k and Sharing Center	v ♂ Search Co ,P
Control Panel Home	View your basic network info	rmation and set up connection	ns
Change adapter setti	View your active networks		
Change advanced sh settings	aning ra-int.com Public network	Access type: Connections:	Internet Ethemet
	Change your networking settings		
	Set up a new connection or Set up a broadband, dial-up,	network or VPN connection; or set up a router	or access point.

- Network

 Image: Second and provide and Internet + Network

 Organize + Disable this network device
 Diagnose this connection

 Ethernet re-initiant
 Survey

 Intel(R) 32574L Signol
 Disable

 Status
 Diagnose

 Bridge Connections
 Create Shortcut

 Delete
 Rename

 Properties
 Properties
- 3. Right-click the Network adapter and choose Properties.

- 4. Click Configure, then click the Power Management tab.
- 5. Make sure the 'Allow the computer to turn off this device to save power' is disabled (no check mark).



- 6. From the checklist pull-down menu, choose Yes or No whether the NIC power-saving is disabled.
- 7. Observe the results and make any necessary changes.

•	Not complete until an option is chosen.
×	No, fail. Correct and reverify.
~	Yes, pass.

Windows Power-saving Options Disabled

This row verifies that you have disabled power-saving for the Windows operating system. The power-saving feature turns off Windows OS features when not in use, which can interfere with network throughput.

Complete these steps to disable Windows power-saving.

- 1. In Microsoft Windows, open the Control Panel and choose Power Options.
- 2. Repeat step 2 on page 45 and step 3 on page 46.
- 3. Click 'Change when the computer sleeps' on the Power Options dialog box.



4. From the Put the computer to sleep pull-down menu, choose Never.



- 5. From the checklist pull-down menu, choose Yes or No whether the Windows power saving is disabled.
- 6. Observe the results and make any necessary changes.

•	Not complete until an option is chosen.
×	No, fail. Correct and reverify.
4	Yes, pass.

Desktop Experience Enabled in RDS Server

This row applies to only those application servers that are using Remote Desktop Server (RDS) functionality, such as the AppServ-EWS or AppServ-OWS. RDS enables multiple instances of the OWS and EWS as thin clients from one server. Thin clients can run applications and process data on a remote computer to minimize the amount of information on a network.

Complete these steps for AppServ-OWS and AppServ-EWS servers that are using RDS functionality.

- 1. From the Windows server, open Server Manager.
- 2. Click Local Server and review the Roles and Features listings.

🕒 🗸 Server Ma	nager • Lo	ocal Server • 🗷	Man	age Tools View Hel
Dashboard				
Local Server				
All Servers				
File and Storage Services D	ROLES AND FE	ATURES		
IIS	All roles and featur	res 60 total		TASKS 💌
Remote Desktop Services ▷	Filter	◄ (ii) ◄ (ii)		۲
	Server Name	Name	Туре	Path
	EWS02	.NET Framework 3.5 Features	Feature	.NET Framework 3.5 Fea
	EWS02	.NET Framework 3.5 (includes .NET 2.0 and 3.0)	Feature	.NET Framework 3.5 Fea
	EWS02	User Interfaces and Infrastructure	Feature	User Interfaces and Infra
	EWS02	Desktop Experience	Feature	User Interfaces and Infra
	EWS02	Server Graphical Shell	Feature	User Interfaces and Infra
			-	

- 3. From the checklist pull-down menu, choose Yes, No, or N/A whether desktop experience is enabled for RDS servers.
- 4. Observe the results and make any necessary changes.

•	N/A; not using RDS option.
×	No, fail. Correct and reverify.
4	Yes, pass.

Adjust for Best Performance is Selected

This row verifies that Windows settings are enabled for best performance. When Adjust for Best Performance is selected, enhanced features that are not used are turned off, which yields more memory and performance for the system.

Complete these steps.

- 1. In Microsoft Windows, open the Control Panel and choose System.
- 2. Click Advanced system settings, and on the Advanced tab click Settings.

	System	
	a france	Computer Name Hardware Advanced Remote
) • † 🔤 • Cantrol	Panel + All Control Panel Rems + System	You must be logged on as an Administrator to make most of these changes
Control Panel Home	View basic information about your comou	Performance
Device Manager		Visual effects, processor scheduling, memory usage, and visual memory
lemote cetterio	Windows edition	
dvanced system settings	Windows server 2012 #2 standard	Setting:
are new queen terrings	e 2013 Microsoft Corporation, As rights	It as Dodlar
	Later A	Deskine settings selated to use size in
	System	Deticiop seconds reverse to your agrin
	Processor: Indel(k) Acon(k) CPU IS 4	Settions
	System type 64-bit Operating System 2	all and the second seco
	Pen and Touch: No Pen or Touch Input is a	Startup and Recovery
		System startup, system failure, and debugging information
AA	Computer name, domain, and workgroup settings	
and the second		Settings
		· · · · · · · · · · · · · · · · · · ·
		Envirogment Variables.
		OK Cancel Apply

The Performance Options dialog box appears.

3. On the Visual Effects tab, make sure 'Adjust for best performance' is enabled.



- 4. From the checklist pull-down menu, choose Yes or No whether best performance for Windows is enabled.
- 5. Observe the results and make any necessary changes.

•	Not complete until an option is chosen.
×	No, fail. Correct and reverify.
4	Yes, pass.

Data Execution Prevention (DEP) Turn On for Essential Items

This row verifies that Windows settings are enabled for essential Windows programs and services.

Complete these steps.

- 1. In Microsoft Windows, open the Control Panel and choose System.
- 2. Click Advanced system settings, and on the Advanced tab click Settings.

	Sy	stem 2	Computer Name Hastware Advanced Results
Control Panel Home Device Manager Remote settings	Panel + All Control Panel Items + View basic information Windows edition Windows Server 2012 R2 Sb	System	You must be logged on as an Administrator to make most of these change Performance Visual effects, processor scheduling, memory usage, and visual memory
Advanced system settings	© 2013 Microsoft Corporat reserved. System Processor: Installed memory (RAM):	ion, All rights	User Profiles Desktop settings selated to your sign-in Signings
	System type Pen and Touchs Computer name, domain, and	No Pen or Touch Input is a workgroup settings	Statup and Recovery System statup, system failure, and debugging information Settings
			Envirogment Vaisbler

The Performance Options dialog box appears.

3. On the Data Execution Prevention tab, make sure 'Turn on DEP ...' is enabled.

Performance Options	×
Visual Effects Advanced Data Execution Prevention	
Data Execution Prevention (DEP) heles protect grant damage from views and other security threats. How does I work3 Turn on DP for essential Windows programs and services orly O Turn on DP for all programs and services except those I	
select:	7
Add Remove Your computer's processor supports hardware-based DEP.	
OK Carrel And	v
OK Cancel Appl	У

User Account Control (UAC) Never Notify

This row verifies that a user is never notified by the UAC.

Complete these steps.

- 1. In Microsoft Windows, open the UAC settings.
- 2. Confirm 'Never Notify' is enabled.

0	User Account Control Settings	_ =	x
Choose when to be User Account Control he Ifell me more about User Always notify	e notified about changes to your computer Ips prevent potentially harmful programs from making changes to your computer Account Control setting	t.	
 	Never notify me when: Apps try to install software or make changes to my computer I make changes to Windows settings		
Never notify	Not recommended.		
	SOK Cancel		

Windows Automatic Update is Disabled

This row verifies that Windows automatic update is disabled. Disabling this functionality helps prevent updates that have not been qualified by Rockwell Automation from being installed on the workstation or server.

We recommend that you verify and test updates before being installed.

Complete these steps.

- 1. In Microsoft Windows, open the Control Panel and choose Windows Update.
- 2. Make sure that the update option is disabled.



- 3. From the checklist pull-down menu, choose Yes or No whether Windows automatic update is enabled.
- 4. Observe the results and make any necessary changes.



Event Viewer Is Not Presenting Errors

This row verifies that the Event Viewer is not showing errors in the logs. All errors must be corrected before you can proceed. Complete these steps.

1. In Microsoft Windows, click Administrative Tools and choose Event Viewer.





The Event Viewer window appears. Make sure that you check each log.

- 2. Verify that the logs do not contain errors.
- 3. From the checklist pull-down menu, choose Yes or No whether there are errors on the Event Viewer window.

4. Observe the results and make any necessary changes.



NSLookup Resolved

This procedure verifies the mappings of IP addresses to host names. The steps apply if you are using a domain or a workgroup.

- 1. At the Command Prompt, type the NSLookup and server name and press Enter.
- 2. If you receive the message 'DNS Request Timed Out', choose No for the NSLookup Resolved pull-down menu.
- 3. If the NSLookup provides the server name and IP address (as shown in the example) then communication is good and NSLookup has resolved successfully. Choose Yes from the pull-down menu for NSLookup Resolved.



If the NSLookup ping does not provide a server name and IP address, go to the Troubleshooting scenarios, starting on <u>page 131</u>, to resolve the issue.

Performance

The Windows Performance Monitor (PerfMon) utility provides a snapshot of the current performance of a computer. Subsequent snapshots can show deteriorated performance for maintenance updates. The report information is used to complete the <u>Basic System Checks</u> and <u>Resource Overview</u> sections of the checklist.

Generating a Performance Report

This section explains how to generate the PerfMon report.

IMPORTANT The Performance Monitor tool can increase CPU usage by 5...10%. However, the procedure does not affect the general report data.

1. Click Administrative Tools and choose Performance Monitor.



2. Click to expand Data Collector Sets>System, right-click System Diagnostics and choose Start.

0			Performance Monitor		
🔊 File Action View	v Window Help				
🗢 🔿 🙍 📉 🗙	🖾 🐼 🚺 🖬 🕨	P			
🔊 Performance		N	lame		
🔺 🔂 Monitoring Tool:	5	10	INT Kernel		
📰 Performance	Monitor		Operating System		
🔺 🛗 Data Collector Se	ts		Processor		
User Defined			System Services		
🛛 📫 System			Logical Disk Dirty Test		
🔊 System Di	a nu a shi a s		SMART Disk Check		
I Syst	Start		AntiSpywareProduct		
Event I	Stop		FirewallProduct		
📑 Startup i	Save Template		AntiVirusProduct		
р 💶 керотта	Data Manager		UAC Settings		
	Latest Report		Windows Update Settings		
			Performance Counter		
	New	•	BIOS		
	View	٠	Controller Classes		

The system diagnostics procedure takes about 1 minute.

3. To view the report, click to expand Reports>System>System Diagnostics and choose the desired report.



IMPORTANT You can copy information in the 'Basic System Checks' (page 58) and 'Resource Overview' (page 61) sections of the report into the checklist. Each system check and component on the report is explained in the following pages.

We recommend that you perform the following optional steps to save the report electronically for future reference.

		Performance Monitor					
File Action View Window Help							
🔿 🙍 🐹 🗮 🕢 🚺 🖬 🖬	1						
Performance	Name	Date modified	Туре	Size			
🚰 Monitoring Tools	AntiSpywareProduct	2/17/2016 12:25 PM	XML File	2 KB			
📰 Performance Monitor	AntiVirusProduct	2/17/2016 12:25 PM	XML File	2 KB 10 KB			
📑 Data Collector Sets	BIOS	2/17/2016 12:25 PM	XML File				
User Defined	Controller Classes	2/17/2016 12:25 PM	XML File	77 KB			
🔺 System	Cooling Classes	Cooling Classes 2/17/2016 12:25 PM XML File					
System Diagnostics	Desktop Rating	Desktop Rating 2/17/2016 12:25 PM XML File 2 K					
System Performance	Disk Settings	Disk Settings 2/17/2016 12:25 PM XML File 14					
📑 Event Trace Sessions	FirewallProduct	2/17/2016 12:25 PM	XML File	2 KB			
Startup Event Trace Sessions	Input Classes	Choose default program	hoose default program				
Reports	Interactive Session Processes	Conduction of the second se		26 KB			
Wer Defined	Interactive Sessions	Send to		7 KB			
⊿ 🔝 System	Logged On Users	Cut	_	31 KB			
2 System Diagnostics	Logical Disk Dirty Test	Сору		2 KB			
Sustem Performance	Memory Classes	Create shortcut		785 KB			
p and system renormance	Motherboard Classes			103 KB			
	Network Classes	Delete		72 KB			
	NTFS Performance	Rename		2 KB			
	NtKernel.etl	Properties		1,296 KB			
	Operating System	2/17/2016 12:25 PM	XML File	20 KB			
	Performance Counter	2/17/2016 12:25 PM	Performance Mon	2,048 KB			
	PlugAndPlay Classes	2/17/2016 12:25 PM	XML File	908 KB			

1

4

4. Click the folder icon, select all files, and click Copy.

5. Create a local folder to store the reporting files, right-click and choose Paste.



The report is named 'report.html' in the specified directory.

6. To match the computer that was tested, rename the report.

The report is in HTML format and can be opened in most web browsers.

Basic System Checks

See <u>page 55</u> to generate a report by using the Performance Monitor utility. The report information is used to verify the following checklist rows:

- OS Checks
- Disk Checks
- <u>Security Center Checks</u>
- <u>System Service Checks</u>
- <u>Hardware Device Driver Checks</u>

In the electronic report, each of these items can be expanded in the list to view additional information.

OS Checks

This row of the checklist verifies that the attributes of the operating system conform to PlantPAx system recommendations.

- 1. Click the pull-down menu on the checklist.
- 2. Choose Passed or Not Passed based on the information on the Performance Monitor report, as shown on page 55.
- 3. Observe the results and make any necessary changes.

•	Not complete until an option is chosen.
×	No, fail. Review your computer configuration and make changes or upgrades to make sure that servers and workstations are within recommended limits.
4	Yes, pass.

Disk Checks

This row of the checklist verifies the status of the disks in the operating system.

- 1. Click the checklist pull-down menu.
- 2. Choose Passed or Not Passed based on the information on the Performance Monitor report, as shown on page 55.
- 3. Observe the results and make any necessary changes.

•	Not complete until an option is chosen.
×	No, fail. Address any drive issues on the computer or server that did not pass and reverify.
~	Yes, pass.

Security Center Checks

This row of the checklist verifies system security-related information.

- 1. Click the checklist pull-down menu.
- Choose Passed or Not Passed based on the information on the Performance Monitor report, as shown on page 55.
- 3. Observe the results and make any necessary changes.



System Service Checks

This row of the checklist verifies the state of system services.

- 1. Click the checklist pull-down menu.
- 2. Choose Passed or Not Passed based on the information on the Performance Monitor report, as shown on page 55.
- 3. Observe the results and make any necessary changes.

•	Not complete until an option is chosen.
×	No, fail. Address any system service issues on the computer or server that did not pass and reverify.
4	Yes, pass.

Hardware Device Driver Checks

This row of the checklist verifies the Windows management of supported devices in your PlantPAx system.

- 1. Click the checklist pull-down menu.
- 2. Choose Passed or Not Passed based on the information on the Performance Monitor report, as shown on page 55.
- 3. Observe the results and make any necessary changes.

٠	Not complete until an option is chosen.
×	No, fail. Address any device driver issues on the computer or server that did not pass and reverify.
4	Yes, pass.

Resource Overview

See <u>page 55</u> to generate a report by using the Performance Monitor utility. The report information is used to verify the following checklist rows:

- <u>CPU(%)</u>
- <u>Network (%)</u>
- <u>Disk (/sec)</u>
- <u>Memory (%)</u>

CPU (%)

This row of the checklist verifies that the CPU load complies with PlantPAx system recommendations.

- 1. Type a value and click the checklist pull-down menu.
- 2. Choose Passed or Not Passed based on the information on the Performance Monitor report, as shown on <u>page 55</u>.
- 3. Observe the results and make any necessary changes.

•	Not complete until an option is chosen.
×	No, fail. Resize the system or split the servers for more CPU in a virtual environment.
4	Yes, pass.

Network (%)

This row of the checklist verifies that the busiest network adapter is < 50%.

- 1. Type a value and click the checklist pull-down menu.
- 2. Choose Passed or Not Passed based on the information on the Performance Monitor report, as shown on page 55.
- 3. Observe the results and make any necessary changes.



Disk (/sec)

This row of the checklist verifies the operations per second performed by the hard disk drive.

- 1. Type a value and click the checklist pull-down menu.
- 2. Choose Passed or Not Passed based on the information on the Performance Monitor report, as shown on page 55.
- 3. Observe the results and make any necessary changes.



Memory (%)

This row of the checklist verifies the memory capacity of the server or workstation.

- 1. Type a value and click the checklist pull-down menu.
- 2. Choose Passed or Not Passed based on the information on the Performance Monitor report, and type the usage.
- 3. Observe the results and make any necessary changes.



When all entry fields are verified, type the name of the person who completed the checklist and the completion date. We suggest that you store the checklist and any attachments in an accessible location to compare with future system data. Discrepancies can show potential issues that could adversely affect performance.

You can close the Microsoft Excel workbook or click another tab to continue to verify data.

Notes:

System Architecture Checklist

This chapter describes verification procedures for the overall layout of your PlantPAx^{*} system architecture. You can review essential PASS and HMI attributes.

The purpose of the checklist is to verify your system data against PlantPAx system design recommendations. The collection of data lets you analyze overall system performance and pinpoint any potential performance issues.

The Microsoft^{*} Excel^{*} worksheet, which we refer to as a checklist, has entry fields to document system design information. There are five icons that indicate the status of the entered information and actions to be taken, if necessary. The checklist data provides a snapshot of whether your system is operating efficiently.

To access the checklist, click the System Architecture tab on the Microsoft Excel workbook.

Before You Begin

The System Architecture checklist procedures operate under the following assumptions:

- Your PlantPAx system is operable (for example, the HMI application is running and the latest operating system patches are installed).
- You have access to Microsoft Excel software to complete the checklist.
- You have configured the following FactoryTalk[®] software:
 - View Site Edition
 - AssetCentre
 - Historian Site Edition
- You also have configured the FactoryTalk Historian SE Excel Add-In tool.

Click the page number or the links in the workflow for quick access to specific information.

Figure 5 - System Architecture Workflow



FactoryTalk View Application Design

The rows in this checklist section verify that the following FactoryTalk View application design attributes comply with system recommendations:

- <u>Number of HMI Servers</u>
- <u>Number of Alarm Servers</u>
- <u>Number of Data Servers</u>
- Each HMI and Data Server Is in Its Own Area

You can view these attributes in the FactoryTalk Administration Console or the FactoryTalk View Studio software program.

	Z FactoryT	alk Administration Console	_ 🗆 X
	Eile View Tools Window Help		
Alarm Server Data Server HMI Server	Explorer X Network (PASS01) Image: Area Image: Area <		
			NUM

IMPORTANT See <u>page 14</u> for descriptions of the five symbols that indicate the status of the Observed Value. Faults must be corrected and warnings must be satisfactorily reviewed for verification.

Number of HMI Servers

The number of servers and how they are configured can impact the speed of system communication. Complete these steps to make sure that your HMI server count is within supported system limits. Servers can be simplex or redundant.

- 1. Using the application tree in the FactoryTalk Administration Console, select the project to be analyzed.
- 2. Reference, identify, and count all HMI servers in your system. Then, type the number of HMI servers into the checklist and press Enter.

If an HMI server is secondary, do **not** add the secondary HMI server to the count.

3. Observe your results and make any necessary changes.



Number of Alarm Servers

Complete these steps to make sure that your alarm server count is within supported system limits. Servers can be simplex or redundant.

- 1. Using the application tree in the FactoryTalk Administration Console, select the project to be analyzed.
- 2. Reference, identify, and count all alarm servers in your system. Then, type the number of alarm servers into the checklist and press Enter.
- 3. Observe your results and make any necessary changes.



Number of Data Servers

Complete these steps to make sure that your data server count is within supported system limits.

- 1. Using the application tree in the FactoryTalk Administration Console, select the project to be analyzed.
- 2. Reference, identify, and count all data servers in your system. Then, type the number of data servers into the checklist and press Enter.
- 3. Observe your results and make any necessary changes.



Each HMI and Data Server Is in Its Own Area

Server segregation helps optimize performance. To help prevent unpredictable search results, do **not** insert a server into the application root path. Each server must be in its own area.



- 1. From the checklist pull-down menu, choose Yes or No if each HMI and Data server is in its own area.
- 2. Observe your results and make any necessary changes.



FactoryTalk View HMI Servers (PASS)

The rows in this checklist section verify that the HMI servers on the PASS comply with system recommendations for these design attributes:

- Uses Data Logging
- Dedicated Servers?
- <u>Redundancy Status</u>

IMPORTANT See <u>page 14</u> for descriptions of the five symbols that indicate the status of the Observed Value.

Uses Data Logging

We recommend the use of FactoryTalk Historian software rather than FactoryTalk View SE data logs to collect and analyze system data. The Historian software is robust and scalable.

To check if data logs are used in a FactoryTalk View SE project, open a Data Log folder in the HMI server. Verify the data log model is empty.



Complete these steps.

- 1. From the checklist pull-down menu, choose Yes or No to verify if data logs are used.
- 2. Observe your results and make any necessary changes.



Dedicated Servers?

To help prevent unpredictable communication, you cannot have two servers of the same type hosted on one computer. The computer can host multiple servers as long as they are different types. For example, a computer can host one HMI server and one alarm and event server.

You can have multiple data servers as long as they are not the same type. For example, you can have a FactoryTalk Linx server and a RSLinx[®] Classic server.

Complete these steps to verify that each HMI server (primary and backup) is operating on a unique host.

1. Open your application in FactoryTalk View Studio software.

2. Right-click the HMI server, and choose Properties to confirm the computer host name.

회	FactoryTalk View Studio - View Site Edition (Network Distributed
File View Settings Tools Window Help	
Explorer - PlantPAx_HMI	PlantPAx_HMI Properties
Network (PASS01) PlantPAx	General Redundancy Components
Runtime security	Name:
d⊂# Alarm	PlantPAx_HMI
PlantPAx_AES	Description:
Alarm and Event Setup Data Data Data Data Dat Dat Dat Dat Dat Dat	
E PlantPAx_HMI	Computer hosting the server:
System	PASS02A
Policies	Startup Type
Computers and Groups	Con demand (vectoridancy millior disabled) Or demand vectoridancy millior disabled) Or demand vectoridancy millior disabled) Or demand vectoridancy millior disabled)
Users and Groups	Project file (relative to server computer):
E Connections	C: \Users\Public\Pocuments\RSView Enterprise\SE\HMI Projects\PlantPAx_HMI
	Number of displays: 186 Licensed maximum: Unlimited

3. For a redundant server, click the Redundancy tab to confirm the computer that hosts the secondary server.

eral	Redundancy Com	ponents		
Prov	ide redundancy using) a second	ary server	
S	econdary server			
2	omputer hosting the s	erver:		
16	3400000			10000
S	rassuze tartyp type: oad and run startup c	omponents	s when operating system in	itializes
S L N	racityp type: oad and run startup c lumber of displays:	components	s when operating system in Licensed maximum:	itializes Unlimited
S L N S	ASSU28 tartyp type: oad and run startup o lumber of displays: witchover options Continue using the	components 177 secondary	s when operating system in Licensed maximum: server even when the prir	ilializes Unlimited nary server
S L N S	ASSU28 tartyp type: oad and run startup o lumber of displays: witchover options Continue using the becomes available Switch over to the p	components 177 secondary again primary serv	s when operating system in Licensed maximum: server even when the prir ver when it becomes avail	utializes Unlimited nary server able

- 4. From the checklist pull-down menu, choose Yes or No.
- 5. Observe your results and make any necessary changes.



Redundancy Status

Using the FactoryTalk Administration Console, complete these steps to verify the status of your redundant servers.

♥ File View Tools Window Helj	FactoryTalk Administration Console
Explorer Network (PASS01) PlantPAx PlantPAx PlantPAx_AES PlantPAx_DAT PlantPAx_THMI System Action Groups Computers and Groups Connections	Server Status - PlantPAx/Area:PlantPAx_HMI X Server status Primary server: PASS02A Primary status: Active Secondary server: PASS02B Secondary status: Standby Switchover options Continue using the secondary server even when the primary server becomes available again © Switch over to the primary server when it becomes available Server switchover Click the Switchover button to switch the Active server. The server that is currently on standby will become the Active server and the Active server will become the Standby server. Switchover OK Apply Cancel Help
Application Communications	

1. Right-click the HMI server and choose Server Status.

- 2. Select one of the following based on the status.
 - a. If the status for one server is 'Active' and the other server is 'Standby', choose Synched.
 - b. If you have different results, choose 'Not Synched'. Identify the servers that are 'Not Synched' in the Notes field of the checklist.
- 3. From the checklist pull-down menu, choose an option and press Enter.
- 4. Observe your results and make any necessary changes.

•	Does not apply for non-redundant systems.
~	Synched; pass.
ĩ	Warning, not synched. IMPORTANT: Even though synchronization is not a necessary configuration for all primary and secondary servers, we recommend that you test the switchover configuration for all servers.
FactoryTalk Alarm and Event Servers (PASS)

The rows in this checklist section verify that the alarm servers on the PASS comply with system recommendations for these design attributes:

- Dedicated Servers?
- <u>Redundancy Status</u>

Dedicated Servers?

See <u>Dedicated Servers? on page 70</u> for how to verify a primary and secondary alarm server.

You must not host multiple alarm servers on one PASS server.

Redundancy Status

See <u>Redundancy Status on page 72</u> for how to verify the status of redundant alarm servers.

Alarm History Enabled

This row makes sure that you have put a check mark in the Enable History box to log alarm history.

1. On the FactoryTalk Administration Console, click the alarm server in the left pane.



- 2. On the Alarm and Event Server Properties dialog box, verify that the Enable History box is checked.
- 3. From the checklist pull-down menu, choose Yes or No whether alarm history is enabled.
- 4. Observe your results and make any necessary changes.

	•	Does not apply for non-redundant systems.
_	4	Yes, pass.
_	ĩ	No, warning. Consider how you want to store alarm history.

FactoryTalk View Data Servers (PASS)

The rows in this checklist section verify that your data servers on the PASS are configured within the following acceptable system limits:

- Dedicated Servers?
- <u>Redundancy Status</u>

Dedicated Servers?

See <u>Dedicated Servers? on page 70</u> for how to verify a primary and secondary data server.

You must not host multiple data servers of the same type on one PASS server.

Redundancy Status

See <u>Redundancy Status on page 72</u> for how to verify the status of redundant data servers.

IMPORTANT Even though synchronization is not a necessary configuration for all primary and secondary servers, we recommend that you test the switchover configuration for all servers.

FactoryTalk AssetCentre (AppServ-Asset)

The rows in this checklist section verify how many assets are being processed per agent. A general rule is not to exceed 100 assets over a 12-hour period per agent.

Make sure that the following system design elements are within system limits:

- Number of Assets
- Number of Disaster Recovery (DR) Assets
- <u>Number of Agents</u>
- How Often DR Assets Configured to Upload

Complete these steps to access FactoryTalk AssetCentre software client information to enter in the checklist for verification.

1. On the AssetCentre menu bar, select Help and click About.

🔌 Factor	yTal	k AssetCentre	_	• x
File Edit View Tasks Tools Windows	Hel	p		
🜵 🛃 🍛 🍫 🗊 🛅 💥 🔩 Asset		Contents	Archive	**
Asset View 📮 🗙	0	Show Help F1		
🤣 Design 🍟		Installation Guide		
AssetCentre		Quick Start		
		About		
			_	

2. In the Components box, select FactoryTalk AssetCentre Server Features.

About F	actoryTalk AssetCentre
FactoryTalk AssetCentre v. 8.00.00.199 (c) 2018 Rockwell Automation Inc. Components:	Warning: This computer program is protected by copyright law and retensitonal treates. Unsubtrated reproduction or distribution of the program, or any portion of it. In any result nervee civil and constructions of the protecuted to the maximum extent possible under the law.
Contact Information Factory Talk AssetCentre Client Features Factory Talk AssetCentre Server Features - Coded Assences	
Component details: Name: Name: Agent Groups Homation Agent Groups Homation Factor Talk AssetCantre Server Desater Recovery - Rotowal Disaster Recovery - Motoman Disaster Recovery - Motoman Calinotan Management - Rein de bandheid. V	Details: Lucensed Asset Capacity: Unlimited Asset licenses in use: 0 Total system assets: 1
III > Server Licensed to: Windows User	Refresh Copy Info

System information appears in the Details pane.

Number of Assets

Complete these steps to document the number of managed system assets.

- **TIP** AssetCentre licensing determines the allowable number of assets. A base license includes 10 assets.
- 1. From the Details pane of the FactoryTalk AssetCentre dialog box (see page 75), type the number for the 'Total system assets'.

2. Observe your results.



Number of Disaster Recovery (DR) Assets

The general rule is not to exceed 100 assets over a 12-hour period per agent.

1. Type the number of controllers that are configured for Disaster Recovery and press Enter.

To access this information, click Disaster Recovery - Rockwell in the left pane of the AssetCentre dialog box. See <u>page 75</u>.

IMPORTANT While a Disaster Recovery license is required for this functionality, we strongly recommend this system backup.

2. Observe your results and make any necessary changes.



Number of Agents

Agents are programs that communicate with the FactoryTalk AssetCentre server and perform server tasks, such as disaster recovery.

By using agents, work is distributed and shared among computers to help spread processing load. You can view the number of agents in the bottom-right corner of the AssetCentre dialog box.



- 1. Type the number of AssetCentre agents and press Enter.
- 2. Observe your results and make any necessary changes.



How Often DR Assets Configured to Upload

This row is used **only** if you are using disaster recovery. In FactoryTalk View AssetCentre software, you can determine the frequency that the assets are scheduled to upload.

1. Type the number of days between asset uploads and press Enter.

To view this information, click Schedules>Timing properties on the AssetCentre dialog box.



2. Observe your results and make any necessary changes.



The rows in this checklist section verify that the following FactoryTalk View Historian SE design attributes comply with system recommendations:

- Points in Use
- Points Limit
- Fastest Scan Class
- Number of Interfaces
- <u>Buffering Enabled and Running</u>
- <u>Unit Fail Over Enabled and Running</u>
- <u>Collective Enabled and Running</u>

Points in Use

A Historian point establishes the data flow to and from the Historian server.

A Historian point does not necessarily correspond to a 'point' on the field device. For example, one 'point' on a device can consist of a process variable, an analog alarm, and source quality. These pieces of information require three separate Historian points.

- 1. On the checklist, type the number of points that are in use and press Enter.
 - a. To view the number of points on the FactoryTalk Administration Console dialog box, click System and choose Connections>Historical Data>Historian SE server
 - b. Right-click Properties and then click the Point Sources tab.

Production Historian - Hist	torian Server Connectio	n Prope
General Licensing Point Source	es	
Interface Type	Points in Use	Limit
Rockwell	7	0
General	0	0
Interface Type Allocation	Points in Use	Limit
FTLD	7	0
	General Licensing Point Source Interface Type Rockwell General Interface Type Allocation FTLD	General Licensing Point Sources Interface Type Points in Use Rockwell 7 General 0 Interface Type Allocation Points in Use FTLD 7

FactoryTalk Historian SE (AppServ-Info)

A warning displays if the number of points is more than the points limit, which indicates additional licensing is required.

2. Observe the results and make any necessary changes.

•	Not complete until points are added.
£	Warning; number of points exceeds the points limit. Write in the Notes section whether you need to add licenses or reduce the number of configured points in the Historian software.
4	Pass; number of points is less than the points limit.

Points Limit

This row is dependent on Point in Use and, therefore, not optional despite being informational only. The license limit number is used in the evaluation if the points in use exceed the license limit.

1. On the checklist, type the limit number and press Enter.

The information is identified in the Points Sources tab of the FactoryTalk Administration Console dialog box.

See page 78 for an example.

2. Observe the results.



Baseline documentation purposes only. This value sets a benchmark that can be compared to future server results. The comparison can identify a potential issue with too many points per license.

Fastest Scan Class

This row identifies the scan rate that is used in FactoryTalk Live Data to send controller information to the Historian server. To view this information, you must have the FactoryTalk Historian SE Excel Add-in tool configured.

IMPORTANT For procedures on how to configure the Excel Add-In Tool, see the PlantPAx DCS Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u>.

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FILE	HOME INS	SERT P.	AGE LAYOUT	FORM	ULAS	DA	TA R	EVIEW VI	EW VA	ANTAGEPO	INT PI D	ATALINK	PI BUILE	DER	Sigr	n in 🔍
Data Server: Asset Server: Database:	PlantPAx *	Publish	Delete	elect All Deselect All Reset to Ten	nplate	PI Pe	pints Lib	rary Element	s Event Frames *	Refresh	Show Valu	es in Rows es in Colum	ns 📰	Headers Settings	About 7 Help	
Com	nections		bullu		19	V		ints		GEL	Attribute Da		5	Kesourc	65	~
A1	- * E >	< 🗸	$f_{\mathcal{K}}$			-	Find PI P	oints								~
A	В	С	D	Е	F		<u>All Digita</u>	al States	1	J	К	L	м	N	0	
1	_					20	Ling old	ital States								
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11																
12																
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16		0														
	Sheet1	(+)								-					_	

1. From the PI Builder tab, click PI Points and choose All PI Points.

2. Use defaults and click OK.

Select Object Types and Column Headers	x
Object Type: PIPoint	~
Object Types: 1 selected, Columns: 31 selected	
Bit Ø Avværet Column Ø General ■ Ø General ■ Ø Bit Ø Bit Ø Bit	ب
<u>Clear All</u> <u>Select All</u> More <u>Attribute Columns</u>	
Description:	
The columns in this group are required. They may not be deselected and neither the group nor the 'Selected(x)' column may be moved.	^
OK Cancel Reset	

3. From the checklist pull-down menu, select the scan rate that matches the smallest number you observed in the list of points in the Scan column.

FI Data Asser	LE HO Server: @ t Server: @	× c ² × ∓ DME INSE ↓ × ↓ PlantPAx *	ert Publisł	PAGE LAN	(OUT (x) Select () Desel	FORMULA t All ect All to Templa	AS DATA	REVIEW	/ VIEW	VANTAGE		F PI DATAL Show Values in Show Values in	INK Rows Colun	PI BUILDER	 M → C Sigr About Help 	in P
Connections Build G Retrieve G Attribute Data References Resources									^							
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1	compmin	compdevpe	ercent	excdev	excmax	excmin	excdevpercent	scan	hutdown	span	step	typicalvalue	zero	datasecurity		
2	0		0	0	600	0		1	1	1	1	1	1	piadmin: A(r,w)	FTHAdminis	strat
3	0		0.2	0.2	600	0	0.1	1	1	200	0	140	0	piadmin: A(r,w)	, FTHAdminis	strat
4	0		0.2	0.1	600	0	0.1	1	1	100	0	50	0	piadmin: A(r,w)	FTHAdminis	trat
5	0		0	0	600	0	0	1	1	7	1	2	2	piadmin: A(r,w)	FTHAdminis	trat
6	0		0.2	0.1	600	0	0.1	1	1	100	0	50	0	piadmin: A(r,w)	FTHAdminis	trat
7	0		0	0	600	0	0	1	0	100	1	50	0	piadmin: A(r,w)	FTHAdminis	strat
8	0		2	4	600	0	1	1	1	400	0	290	0	piadmin: A(r,w)	FTHAdminis	strat
9	0		0	0	600	0	0	1	1	4	1	3	3	piadmin: A(r,w)	FTHAdminis	strat
10	0		2	2	600	0	1	1	1	200	0	140	50	piadmin: A(r,w)	FTHAdminis	strat
11	0		0	0	600	0	0	1	0	100	1	50	0	piadmin: A(r,w)	FTHAdminis	trat
12	0		0	0	600	0	0	1	0	100	1	50	0	piadmin: A(r,w)	FTHAdminis	trat
13	0		0	0	600	0	0	1	1	1	1	1	30	piadmin: A(r,w)	FTHSupervi	sors
14	0		0.5	0.25	600	0	0.25	1	1	100	100 0 5		0	piadmin: A(r,w)	FTHSupervis	sors
15	0		0.5	0.25	600	0	0.25	1	1	100	0	50	0	piadmin: A(r,w)	FTHSupervi	sors
16	0		0.5	0.25	600	0	0.25	1	1	100	0	50	0	piadmin: A(r,w)	FTHSupervi	sors 👻
	(Sheet1	(Ð						÷ 4						Þ
REA	DY											Ħ	8		++	100%

TIP The number in the scan column represents the scan class, not time.

4. Observe your results and make any necessary changes.



For details on how to install the Historian SE Excel Add-In tool, see the PlantPAx DCS Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u>.

Number of Interfaces

This row identifies the number of FactoryTalk Live Data interfaces in your Historian configuration.

1. On the checklist, type the number of FactoryTalk Live Data interfaces in your Historian configuration and press Enter.

2. Observe your results and make any necessary changes.



Buffering Enabled and Running

This row verifies that buffering is configured properly in your Historian application for a redundant system only. Buffering is recommended to maintain data collection in the event the connection to the server is lost.

- 1. From the checklist pull-down menu, select Yes or No and press Enter.
- 2. Observe your results and make any necessary changes.



IMPORTANT This procedure is executed in all interface nodes in the Data server (not on the Historian server). Open the PI Interface Configuration Utility and click Tools>Buffering.

1	Buffering Manager	= 🗆 X	
File	View Help		
Buff Config	ering Manager uration, monitoring, and troubleshooting of buffering		
Globa	1		
⊿ € Ti	Global Buffering Status here are no reported issues.	PI messages	
▶ 0. If	0 seconds estimated buffer capacity all connections are severed, estimated time until data loss	Settings	
O events in queue Total queued events for all servers			
▶ 0 To	total events sent otal queued events sent for all servers		
Logic Select	al Servers a server below for more detailed information		

As shown, make sure that Global Buffering Status is checked.

Unit Fail Over Enabled and Running

For redundant interface nodes only, this row verifies that unit failover is configured properly in your Historian application.

- 1. From the checklist pull-down menu, select Yes or No and press Enter.
- 2. Observe your results and make any necessary changes.



IMPORTANT This procedure is executed in all interface nodes in the Data server (not on the Historian server). Open the Interface Configuration Utility, select the interface, and choose Failover under Unilnt.

Ĩĉu	PI Interface Configuration Utility - FTLDInt1
Interface Tools Help [•] ≧ ≍ ■ ▶	
Interface: FTLD1 (FTLC Type: FTLDInt Description: Default FTLC Versions: FTLDInt.exe	Imit I) > ASIH01 Imit Rename Rockwell FactoryTalk Live Data PI Data server Connection Status Interface created by the FTH configure wizard. ASIH01A System. Plant F version 4.6.0.60 Unint version 4.6.0.60
General FTLDint Service Unitt - Failover - Reformance Counters - Performance Points - PisDK - Disconnected Startup - Debug	Unlint Fallover Phase 1 Phase 2 Fallover ID# for this instance: 1 NPASS02AVFTLDint1 Fallover ID# of the other instance: 1 NPASS02AVFTLDint1 X Browse Do not fallover when both interfaces lose connection to PI Fallover control toas are unsellicted (not scan based) Rate at which the heattbeat point is updated (checked: 5000 milliseconds Reret UF0 Type:
Interface Status	Status Tag Exdesc PointSource La Created ASH01+FTLDirt_1_FTLD_UF02_ActiveID [UF02_ActiveID FTLD 1 Created ASH01+FTLDirt_1_FTLD_UF02_Heatbeat_1 [UF02_Heatbeat:1] FTLD 1 Created ASH01+FTLDirt_1_FTLD_UF02_Heatbeat_2 [UF02_Heatbeat:2] FTLD 1
Ready	Running FTLDInt1 - Installed

Collective Enabled and Running

This row verifies that a collective is properly configured for redundant Historian systems.

For high availability purposes, a server collective consists of two FactoryTalk Historian SE servers (primary and secondary) that have the same configuration database. This combination lets you take a server offline for maintenance or an upgrade without disrupting the availability of data to the clients.

Collectives	Collective Name: ASIH01	Collection ID:					
ASIH01	Collective Name: ASINOT	077b9cd a 404 4c50 0052 44 db at 41					
	Description:	Statu:					
	Last Configuration						
	Change Time: 11-Oct-2015 23:58:46	Good					
	♦ X Ø						
	0 10						
	and the second sec						
	<u> </u>						
	ASIHO18 asih01a						
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	ASIH018 asih01a ASIH018 asih01a Attributes Name Description Collective	asih01a ASIH01	^				
	ASIH018 asih01a	asih01a ASIH01 ASIH01A, System, PlantPAx, local	^				
	ASIH018 asih01a	asih01a ASIH01 ASIH01A, System, PlantPlax, local Primary	A 100 - 1				
	ASIH018 asih01a 24 Attributes Name Description Collective FDDN Bole ComeDasied	ash01a ASIH01 ASIH01A, System, PlantPAx, local Primary MA	< ×				
	ASIHO18 esih01a	ash01a AsiH01 AsiH01A.System.PlantPAx.local Primary MIA					
	ASIH018 asih01a 24 ASIH018 asih01a ASIH018 asih01a Particular Name Description Collective FDDN RDN RDN RDN Tomember server computer hostname.	asih01a ASIH01 ASIH01A, System, PlantPAx, local Primary N/A	<				

- 1. From the checklist pull-down menu, select Yes or No.
- 2. Observe your results and make any necessary changes.



For details on how to configure a collective, see the PlantPAx DCS Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u>.

When all entry fields are verified, type the name of the person who completed the checklist and the completion date. We suggest that you store the checklist and any attachments in an accessible location to compare with future system data. Discrepancies can show potential issues that could adversely affect performance.

You can close the Microsoft Excel workbook or click another tab to continue to verify data.

Notes:

PASS Checklist

This chapter describes the verification procedures for systems servers that comprise the Process Automation System Server (PASS). The PASS is a required system element that hosts essential software components that run the system.

The purpose of the checklist is to verify your system data against PlantPAx[®] system design recommendations. The collection of data lets you analyze overall system performance and pinpoint any potential performance issues.

The Microsoft[®] Excel[®], which we refer to as a checklist, has entry fields to document system design information. There are five icons that indicate the status of the entered information and actions to be taken, if necessary. The checklist data provides a snapshot of whether your system is operating efficiently.

To access the checklist, click the <PASS> tab on the Microsoft Excel workbook.

IMPORTANT	Complete the PASS checklist for each PASS (or PASS-C) server on your system. To duplicate a checklist for each PASS, do the following:
	 Right-click the <pass> tab and choose Move or Copy.</pass>
	Click Create a copy and then click OK.
	• Double-click the checklist name and type a name that identifies the PASS that you are verifying.

Before You Begin

The PASS checklist procedures operate under the following assumptions:

- Your PlantPAx system is operable (for example, the HMI application is running and the latest operating system patches are installed).
- You have access to Microsoft Excel software to complete the checklist.
- You have access to each PASS server.
- You have downloaded the Graphic Audit Tool, which examines your HMI server application running on the PASS server. See <u>page 89</u>.

Optional

- FactoryTalk[®] View displays have been downloaded as described in the Knowledgebase article 771236 and imported into your HMI server.
- A PDF printer is installed on the Engineering and/or Operator Workstation. You can print and view FactoryTalk View reports.

Click the page number or the links in the workflow for quick access to specific information.

Figure 6 - PASS Workflow



Run the Graphic Audit Tool

To verify your FactoryTalk View Site Edition (SE) HMI design elements, you must download the Rockwell Automation[®] Graphic Audit Tool. The audit tool, which is contained in the zip file within the checklist download, analyzes exported HMI displays.

The reports for the Graphic Audit Tool show color-coded information. Yellow and red warnings indicate where displays are close to or exceed recommended PlantPAx guidelines. To configure the audit tool and print results, complete these steps.

- 1. Before you run the audit tool, you need to export the HMI application graphic files to an XML format. In FactoryTalk View Studio, browse to the Graphics folder in your project and right-click Displays.
- 2. Choose 'Import and Export...'

Make note of the directory path to which you are exporting the displays. You need this information in <u>step 5</u>.

IMPORTANT To limit the number of library object displays from the export, de-select display names that start with (RA-BAS), (RA-EH), (RA-Seq), (RA-UI), and (RA-Lib). To de-select a display, click the box to remove a check mark.

	Graphics Import Export Wizard - Displays to Ex	port
Explorer - PlantPAx_Alarms	Select the displays to export: V (FRAME-LIB) Alarm-Explorer V (FRAME-LIB) Alarm-HistoryDisplay V (FRAME-LIB) Alarm-ShelvedDisplay V (FRAME-LIB) Alarm-Summary V (FRAME-LIB) Alarm-Summary V (FRAME-LIB) Alarm-Summary V (FRAME-LIB) Houtonbar V (FRAME-LIB) Houtonbar V (FRAME-LIB) Header V (FRAME-LIB) Help V (FRAME-LIB) Help V (FRAME-LIB) RSLinxEnterprise	 (FRAME-LIB) System (FRAME-LIB) Template Alam-E (RA-BAS) Buit-In Autotune-Fax (RA-BAS) Buit-In Autotune-Hel (RA-BAS) Buit-In CC Autotune (RA-BAS) Buit-In CC-Faceplate (RA-BAS) Buit-In CC-Faceplate (RA-BAS) Buit-In CC-Quick (RA-BAS) Buit-In CC-Quick (RA-BAS) Buit-In CC-Autotune
Cloba Globa G	Select All Clear All Clear All Clear All Clear All Clear All Clear All	Cancel Help

- 3. Extract the Graphic Audit Tool from the zip file within the checklist download.
- 4. Double-click the executable file, GraphicAudit.exe.

M	Graphic	Audit (V	ersion 1.11)			x
Application: SE - Network Name:	SE - Local C ME	A A	rea name (e.g. rea	Brewing/HM	0.		
PlantPAx			Data Client Create files for Data Client tool				
Create file of global obje	ects found	0.0000	C Total tay	μ (• U	nique tags		
C:\checklist displays	C AMIL Nes to perform auc	at operations	on				
Audit type: FileniPAx		Audit		☐ Debug i	mode	He	Hp
Graphic Name	Total Tags	Unique Tags	Expressions	Alarm Functions	Global Objects	Display Type	Max Upd Rate
•							

The Graphic Audit dialog box appears.

5. Complete the Graphic Audit Tool dialog box.

Field	Description
Application SE - Network SE - Local ME	Click SE - Network
Name Area Name (for example, Brewing/HMI)	The Name and Area Name are used only to generate Data Client XML files and are not used in the audit operation. See Graphic Audit Tool Help.rtf
Create file of expressions and commands found Create file of global objects found	file in the zip file for more details. To create the respective files, check the boxes.
Data Client Create files for Data Client tool Total tags Unique tags	To enable Create files for Data Client, check the box, and then select Unique tags.
Folder that contains graphic XML files to perform audit operations on	Click Browse (''ellipsis) to select the directory path where you exported your graphic XML files in <u>step 2</u> .
Audit type	Choose PlantPAx from the pull-down menu. This choice uses rules that are specific to the PlantPAx system.

6. To generate the report, click Audit.

Application			Area name (e.g. Brewing/	HMI):		1			
	·Local C	ME	-							
Name:			Pro-							
PlantPAx		-	Data Client				11			
and the second sec			Create I	les for Data (Sient tool					
Create file of expressions a	Create file of expressions and commands found		C Total tage (Unique tage							
Create file of global objects	found		S. 589	a coditive in the	Cristion suga					
- Folder that contains graphic >	ML files to perform	audit operatio	ins on:							
C-Ulanus Administration Dark	too\Euported divel	No.					- 1			
C. Oses vidin iso and otes	nop iz sponeo dapa	ay»								
Audit type: PlantPAx	•	Au	dit	T Deb	ug mode		Help			
				_						
Results:										
Results	-							Allow	1	<u> </u>
Result:	Total Tags	Unique	Expressions	Alarm	Global	Display	Max Tag	Allow Multiple	Cache Alter	Always
Results: Graphic Name	Total Tags	Unique Tags	Expressions	Alarm Functions	Global Objects	Display Type	Max Tag Update Rate	Allow Multiple Running Conjec	Cache After Displaying	Always Updatir
Results: Graphic Name	Total Tags	Unique Tags	Expressions	Alarm Functions	Global Objects	Display Type	Max Tag Update Rate	Allow Multiple Running Copies	Cache Alter Displaying	Always Updatir
Results: Graphic Name (APP) Buttons (APP) Disclary	Total Tags 0	Unique Tags 0	Expressions 0 951	Alarm Functions 0	Global Objects 0	Display Type replace	Max Tag Update Rate	Allow Multiple Running Copies false	Cache Atter Displaying false	Always Updatir false
Results: Graphic Name (APP) Buttons (APP) Display (APP) Modes	Total Tags 0 1590 2122	Unique Tags 0 1012 1594	Expressions 0 861	Alarm Functions 0 0	Global Objects 0 56	Display Type replace replace	Max Tag Update Rate 1 0.25	Allow Multiple Running Copies false false	Cache After Displaying false false	Always Updatir false false
Graphic Name (APP) Buttons (APP) Display (APP) Motors (APP) DD	Total Tags 0 1590 2127 809	Unique Tags 0 1012 1584 559	Expressions 0 861 1076 518	Alarm Functions 0 0 0	Global Objects 0 56 87 32	Display Type replace replace replace	Max Tag Update Rate 1 0.25	Allow Multiple Running Copies false false false	Cache After Displaying false false false	Always Updatir false false false
Graphic Name (APP) Buttons (APP) Display (APP) Motors (APP) PID (APP) Tank	Total Tags 0 1590 2127 809 57	Unique Tags 0 1012 1584 568 24	Expressions 0 861 1076 518 24	Alarm Functions 0 0 0 0 0	Global Objects 0 56 87 32	Display Type replace replace replace replace	Max Tag Update Rate 1 0.25 1 1	Allow Multiple Running Copies false false false false	Cache Atter Displaying false false false false	Always Updatir false false false false
Result: Graphic Name (APP) Buttons (APP) Display (APP) Motors (APP) PID (APP) Tank (APP) Tank	Total Tags 0 1590 2127 809 57 25	Unique Tags 0 1012 1584 568 24	Expressions 0 861 1076 518 24 13	Alarm Functions 0 0 0 0 0 0	Giobal Objects 0 56 87 32 1	Display Type replace replace replace replace replace	Max Tag Update Rate 1 0.25 1 1 1 1	Allow Multiple Running Copies false false false false false	Cache After Displaying false false false false false false	Always Updatir false false false false false
Result: Graphic Name (APP) Buttons (APP) Display (APP) Motos (APP) PID (APP) Tank (APP) Tank2 (APP) Tank2	Total Tags 0 1590 2127 809 57 25 20	Unique Tags 0 1012 1584 568 24 19	Expressions 0 861 1076 518 24 13 15	Alarm Functions 0 0 0 0 0 0 0 0	Giobal Objects 0 56 87 32 1 1 2	Display Type replace replace replace replace replace replace	Max Tag Update Rate 1 0.25 1 1 1 1 1	Allow Multiple Running Copies false false false false false false false	Cache After Displaying False False False False False False	Always Updatir false false false false false false
Results: Graphic Name (APP) Buttons (APP) Display (APP) Motors (APP) Motors (APP) Tank (APP) Tank2 (APP) Tank3 (APP) Tank3 (APP) Agaves	Total Tags 0 11590 2127 809 57 25 30 300	Unique Tags 0 1012 1584 568 24 19 19 19	Expressions 0 861 1076 518 24 13 15 324	Alarm Functions 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Global Objects 0 56 87 32 1 1 2 2 2	Display Type replace replace replace replace replace replace replace replace	Max Tag Update Rate 1 0.25 1 1 1 1 1 1	Allow Multiple Running Copies false false false false false false false false	Cache After Displaying false false false false false false false false false	Always Updatir false false false false false false false
Results: Graphic Name (APP) Buttons (APP) Display (APP) Photoss (APP) PID (APP) Tank (APP) Tank (APP) Tank2 (APP) Tank3 (APP) Valves (FBAME) P1 (Description	Total Tags 0 1590 2127 809 57 25 30 680 0 0	Unique Tags 0 1012 1584 24 19 19 19 19 0 0	Expressions 0 861 1076 518 24 13 15 334 0	Alarm Functions 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Global Objects 0 56 87 32 1 1 2 2 2 2 2 2 2 0	Display Type replace replace replace replace replace replace replace replace	Max Tag Update Rate 1 0.25 1 1 1 1 1 1 1	Allow Multiple Running Copies false false false false false false false false false false	Cache After Displaying false false false false false false false false false false	Always Updatir false false false false false false false false false
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Results Graphic Name (APP) Buttons (APP) Display (APP) PiD (APP) Tank (APP) Tank2 (APP) Tank2 (APP) Tank3 (APP) Valves (FRAME) P11 Description (FRAME) P11 Footer (FRAME) P11 Hooter	Total Tags 0 1590 2127 809 57 255 30 680 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Unique Tags 0 1012 1584 568 24 19 19 459 0 0 0 0 0	Expressions 0 861 1076 518 24 13 15 334 0 1 15	Alarm Functions 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Global Objects 0 56 87 32 1 1 2 2 2 2 2 0 0 4 4 5 6 87 32 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Display Type replace replace replace replace replace replace replace replace replace	Max Tag Update Rate 1 0.25 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Allow Multiple Running Copies false false false false false false false false false false false	Cache After Displaying False False False False False False False False False False False	Always Updatir false false false false false false false false false false
Results Graphic Name (APP) Buttons (APP) Display (APP) Motors (APP) Motors (APP) Tank (APP) Tank (APP) Tank (APP) Tank2 (APP) Tank3 (APP) Valves (FRAME) P11 Footer (FRAME) P11 Header (FRAME) P11 Header (FRAME) P11 Header	Total Tage 0 1590 2127 809 57 255 300 680 680 0 0 0 0 0 0 0 0 0 0 0	Unique Tags 0 1012 1584 568 24 19 19 19 19 0 0 0 0 0 0 0 0 0	Expressions 0 861 1076 518 24 13 15 3344 0 1 15 0 0	Alarm Functions 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Global Objects 0 560 877 322 1 1 1 2 2 222 0 0 4 4 5 0 0	Display Type replace replace replace replace replace replace replace replace replace	Max Tag Update Rate 1 0.25 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Allow Multiple Running Copies false false false false false false false false false false false false false false	Cache After Displaying false false false false false false false false false false false false false	Always Updatin false false false false false false false false false false
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The processed displays are listed in the Results pane of the Graphic Audit dialog box.

The tool creates four Excel (.xls) files in the same directory as the XML files.

7. To print, select \$AuditResults.xls in the XML file directory and click Print.

IMPORTANT	A yellow warning indicates that you are above a threshold that affects your ability to meet critical system attributes for system performance. A red error indicates that you are above the supported limit of a PlantPAx system.
	You must correct red errors. If you do not plan to adjust yellow warnings, document in the Notes column that you have reviewed and accepted any impact to system performance.

With the Audit report information, complete the PASS checklist as described in the following pages.

FactoryTalk View SE (HMI) Server

The rows in this checklist section verify that the following HMI server design attributes comply with these recommendations:

- Using HMI Server?
- <u>Number of Displays</u>
- <u>Total Tags on Server</u>
- Unique Tags
- Expressions
- <u>Global Objects</u>
- <u>Display Type</u>
- <u>Max Tag Update Rate</u>
- Display Cache
- <u>Always Updating</u>

Using HMI Server?

This row in the Notes column verifies if the PASS has an HMI server.

- If Yes, continue to answer the additional HMI verification fields.
- If No, proceed to FactoryTalk Alarm and Event on page 100.

If you have a redundant HMI server, you need to complete only one PASS checklist for the pair of servers.

Number of Displays

The number of displays and license type does not appear on the Graphic Audit Tool report. To view the information on the HMI Properties dialog box, complete these steps.

- 1. In FactoryTalk View Studio, right-click the HMI server in the Explorer pane.
- 2. Choose Properties.

lorer - PlantPAx_HMI	PlantPAy HMI Properties
Arevork (PASSO) BellantPAx Face Area BellantPAx Area BellantPAx Alarm Alarm	General Redundancy Components Name: PlostPax_sM41
PlantPAx_HMI System m HMI Tags Graphics HMI Tags HMI Tags	Description:
Logic and Control	Computer hosting the server:
Bata Log System Action Groups Policies	Starbus Type On demand (Redundancy will be disabled) Con demand (Redundancy will be disabled) Con demand and run startup components when operating system initializes
Computers and Groups End Stroups	Project file (relative to server computer):
a ☐ Users and Groups a ☐ Connections	Number of displays: 186 Licensed maximum: Unlimited

In the checklist, verify that you are not using more screens than your license allows. If you exceed this license, there is the possibility that screens fail to display when requested.

- 1. Type the number of displays that appear at the bottom of the Properties dialog box.
- 2. Press Enter.
- 3. In the next row of the checklist, select the license that is shown at the bottom of the Properties dialog box.
- 4. Click the pull-down menu to select a display license (100, 250, or unlimited) that corresponds to the selected license type.
- 5. Observe your results and make any changes.

•	Not complete until you enter a number of displays and choose a display license value (100, 250, unlimited).
4	Pass; total number of displays does not exceed the display license.
×	Fail; total number of displays exceeds the display license. Delete any unnecessary displays from the HMI server or update the license.

Use the Graphic Audit Tool information for the following checklist fields.

Total Tags on Server

The Graphic Audit Tool counts the number of tags in each graphic display and lists the results in the Total Tags column. This informational field includes values for all tags that are used in expressions, commands, and embedded variables. If the same tag is found multiple times in a graphic file, it is counted multiple times.

Type the information into the checklist row or attach the report.

lesults:		
Graphic Name	Total Tags	Unique Tags
(APP) Buttons	0	
(APP) Display	1590	1012
(APP) Motors	2127	158
(APP) PID	809	568
(APP) Tank	57	24
(APP) Tank2	25	19
(APP) Tank3	30	19
(APP) Valves	680	459
(FRAME) P1/ Description	0	0
(FRAME) P1f Footer	0	0
(FRAME) P1/ Header	9	1
(FRAME) P1f Help	0	
P1f HButtonBar	0	1
P1f Home	0	0
TOTAL	5327	358

The Total Tags on Server affect the data server memory loading that can impact CSAs.

Unique Tags

The Graphic Audit Tool color codes screen attributes that exceed PlantPAx recommendations. The row verifies if any action is necessary for a yellow warning or red error for the number of unique tags on any of the displays.

- 1. From the checklist pull-down menu, choose Yes or No to verify if there is a yellow warning in the Unique Tags column.
- 2. Observe your results and make any changes.

•	Not complete until you select an option from the pull-down menu.
Ŷ	Yes; warning. Simplify your display to use less than 1,000 unique tags on the display.
~	No; pass.

3. From the checklist pull-down menu, choose Yes or No to verify if there is a red error in the Unique Tags column.

4. Observe your results and make any changes.



Expressions

The Graphic Audit Tool color codes screen attributes that exceed PlantPAx system recommendations. The checklist row verifies that the number of expressions that are configured within each display aligns with system recommendations.

FactoryTalk View SE displays contain 'expressions' for each customized animation that holds simple or complex calculations to accomplish the animations. Each expression consumes memory and requires processing time to execute.

Many expressions can make the screen animate sluggishly and affect system performance.

- 1. From the checklist pull-down menu, choose Yes or No to verify if there is a yellow warning in the Expressions column
- 2. Observe your results and make any changes.



3. From the checklist pull-down menu, choose Yes or No to verify if there is a red error in the Expressions column.

4. Observe your results and make any changes.



Global Objects

The Graphic Audit Tool color codes screen attributes that exceed PlantPAx recommendations. The checklist row verifies that the number of global objects on displays are within system recommendations. Many global objects on an individual display can make the screen slow to appear or animate sluggishly.

- 1. From the checklist pull-down menu, choose Yes or No to verify if there is a yellow warning in the Global Objects column.
- 2. Observe you results and make any necessary changes.

•	Not complete until you select an option from the pull-down menu.
Ŷ	Yes; warning. Simplify the display and redo the verification. Or, verify the call-up time on the display is acceptable to the operator and document in the Notes column.
4	No; pass.

Display Type

The Graphic Audit Tool color codes screen attributes that exceed PlantPAx system recommendations. This row examines the screen display types.

To conserve CPU resources, we recommend that you use 'Replace' display types. This display type closes the currently displayed screen when a new screen opens. 'Overlay' display types must be managed because multiple screens open at once consumes unnecessary memory and CPU resources.

	Displa	iy Settings 📃
	Properties Behavior	
	Display Type Teplace Overlay Controp	Size O Use Current Size Specity Size in Pixels Width: 1920 Height: 928
e <u>page 99</u> for details. 🔫	Allow Multiple Running Copies Cache After Displaying No Yes Always Updating	Resize Allow Display to be Resized When Resized O Pan O Scale
	Title Bar	Position O Use Current Position © Specify Position in Pixels
	Insert Variable	X:0 Y:0 Security Code: × v

- 1. From the checklist pull-down menu, choose Yes or No to record the presence of a yellow warning in the Display Type column.
- 2. Observe your results and make any necessary changes.



Max Tag Update Rate

The Graphic Audit Tool color codes screen attributes that exceed PlantPAx system recommendations. This row examines the rate at which tags update per display.

- 1. From the checklist pull-down menu, choose Yes or No to record the presence of a yellow warning in the Max Tag Update Rate column.
- 2. Observe your results and make any changes.



- 3. From the checklist pull-down menu, choose Yes or No to record the presence of a red error in the Max Tag Update Rate column.
- 4. Observe your results and make any changes.

•	Not complete until you select an option from the pull-down menu.
×	Yes; fail. You must correct the tag update rate. For example, set the update rate within the recommendation of 0.5 seconds or 1 second, if needed, to help reduce load on the data server.
4	No; pass.

Display Cache

The Graphic Audit Tool color codes screen attributes that exceed PlantPAx system recommendations. The row examines the Cache After Displaying property of each display.

See <u>page 97</u> for an example of this setting on the Display Settings dialog box.

When displays are cached, the additional memory load of this display on the view client is persistent after call-up regardless of whether the display remains visible. This action affects system load and can ultimately affect system performance.

IMPORTANT We recommend that you use Cache After Displaying for displays only frequently accessed by the operator and not applied generally. Used sparingly on these displays, this feature improves display call-up time for important displays.

- 1. From the checklist pull-down menu, choose Yes or No to record the presence of a yellow warning in the Display Cache column.
- 2. Observe your results and make any necessary changes.

٠	Not complete until you select an option from the pull-down menu.
Ŷ	Yes; warning. Correct and reverify. Or, confirm this option is being used sparingly for frequently used displays where the incremental call-up time performance is needed.
4	No; pass.

Always Updating

The Graphic Audit Tool color codes screen attributes that exceed PlantPAx recommendations. This property can be set only if Cache After Displaying is enabled. See <u>Display Cache</u>.

See <u>page 97</u> for an example of the Display Settings dialog box.

When always updating, the additional controller and server load of this display is persistent after the initial call-up regardless of whether the display is visible. This action increases system load and can affect system performance.

IMPORTANT We recommend that you use Always Updating on displays only frequently accessed by the operator and not applied generally. Used sparingly on these displays, this feature improves display call-up time for important displays.

- 1. From the checklist pull-down menu, choose Yes or No to record the presence of a yellow warning in the Always Updating column.
- 2. Observe your results and make any necessary changes.

•	Not complete until you select an option from the pull-down menu.
Ŷ	Yes; warning. Correct and reverify. Or, confirm this option is being used sparingly for frequently used displays where the incremental call-up time performance is needed.
4	No; pass.

FactoryTalk Alarm and Event

The rows in this checklist section verify that the following FactoryTalk View Alarm and Event design attributes comply with system recommendations:

- Using Alarm Server?
- <u>Number of Alarms</u>
- Total Items
- <u>Fastest Update Rate</u>
- <u>All tags addressed from the local Data server?</u>

Using Alarm Server?

This row in the Notes column verifies if the PASS has an Alarm server.

- If Yes, continue to answer the additional Alarm verification fields.
- If No, proceed to <u>Data Server (FactoryTalk Linx) on page 106</u>.

To obtain alarm server information for the checklist, complete these steps.

- 1. In the FactoryTalk View Studio software, open your application, and navigate to your Alarm and Event server.
- 2. Double-click Alarm and Event Setup hosted on the PASS being verified and choose All Alarms.

olorer - PlantPAx_HMI *				
Network (PASS01) Image: PlantPAx Image: Plant	Al Alams Messages Tag Update	Rates		
Adarm BundPax AFS Adarm and Event Setup BandPax AFM Adarm and Event Setup BandPax HM Adion Groups Action Groups Action Groups Action Groups And Devices Computers and Groups Connections	File Auron Grand Open Aurons Grand Open Aurons Froess01 Ares01 Ares02 Process02 Ares03 Ares04 System Diagnostics	Name FIC01002_Alm_Fell FIC01002_Alm_HHDev FIC01002_Alm_HHDev FIC01002_Alm_JHHDev FIC01002_Alm_Joht FIC01002_Alm_Joht FIC02002_Alm_Joht FIC02002_Alm_JHDev FIC02002_Alm_JHDev FIC02002_Alm_Joht FIC02002_Alm_Joht FIC02002_Alm_Joht FIC02002_Alm_JHDev FIC03002_Alm_JHDev FIC03002_Alm_JHDev FIC03002_Alm_JHDev FIC03002_Alm_JHDev	Type Digital Digital Digital Digital Digital Digital Digital Digital Digital Digital Digital Digital Digital Digital Digital Digital	Input Tag /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC01] /Area,Data::[LGXC02] /Area,Data:
	Alama 111 Jama	Datasi	t may shelve tir	ne: 480 Minutes

The Alarm and Event Setup dialog box appears with data.

3. Copy the alarm values to the following checklist rows.

Number of Alarms

This checklist row lets you enter the number of alarms in your PASS server.

- 1. From the Alarm and Event Setup dialog box, type the number of alarms on the server.
 - TIP The number of alarms is listed in the lower, left corner of the Alarm and Event Setup dialog box. See <u>page 101</u> for an example.
 A FactoryTalk Alarm and Event server can have a maximum of 20,000 alarms.
- 2. Press Enter.
- 3. Observe your results and make any necessary changes.

•	Not complete until an alarm value is entered.
4	Pass; the number of alarms does not exceed 20,000 per server.
×	Fail; the number of alarms exceeds 20,000 per server. Simplify your alarm system by deleting unnecessary alarms or move alarms to another PASS server.

Total Items

This informational field provides a total number of items on the Tag Update Rates tab of the Alarm and Event Setup dialog box. See <u>page 102</u> for an example.

Type a value into the checklist row or attach a screen capture of the data.

Fastest Update Rate

The Tag Update Rates tab of the FactoryTalk Alarm and Event Setup dialog box shows the rate at which the tags in the controllers are updated. Fast update rates (lower number of seconds) increase the loading on the server.

- 1. Using the Alarm and Event Setup dialog box, scroll to identify the fastest update rate for any alarm on the server.
- 2. From the checklist pull-down menu, choose the fastest per second update rate as shown on the dialog box.



3. Observe your results and make any necessary changes.



All tags addressed from the local Data server?

The checklist row makes sure that all tag names in the Alarm and Event server are scanned by a data server hosted on the same computer. To help reduce overall load on a system, complete these steps.

1. In the FactoryTalk Administration Console or FactoryTalk View SE, right-click the data server and choose Server Status.



The Data server status dialog box appears.

rimary server:	PASS02A				
Primary status:	Active				
econdary server:	PASS02B				
econdary status:	Standby				
witchover options					
Continue using	the secondary se	erver even when	the primary serv	ver becomes availa	a <mark>ble ag</mark> ain
	he primary serve	er when it becom	ies available		
Switch over to t					
Switch over to t					
Switch over to t erver switchover lick the Switchove tandby will becom	r button to swite a the Active serv	th the <mark>Active ser</mark> ver and the Activ	ver. The server e server will beco	that is currently o ome the Standby s	n server.

2. Observe the primary and secondary status for the Data server.

- 3. In the Explorer pane, open the Alarm folder and expand the Alarm server.
- 4. Right-click and choose Open.

You also can double-click Alarm and Event Setup.





Messages Tag Update	nates				
Search for Group	Type All 🗸				
늘 ALL Alarms	Name	Туре	Input Tag	Ack Reg'd	
Linguaupad Alarms	CC100_CV1HAlarm	Digital	/Area/Data::[LGXC01]CC100.CV1HAlarm	rue	
🗷 🔤 PlantPA×_AE	CC100_CV1LAlarm	Digital	/Area/Data::[LGXC01]CC100.CV1LAlarm	rue	
	CC100_CV1ROCNegAlarm	Digital	/Area/Data::[LGXC01]CC100.CV1ROCNegAl	rue	
	CC100_CV1ROCPosAlarm	Digital	/Area/Data::[LGXC01]CC100.CV1ROCPosAlarm	rue	
	CC100_CV2HAlarm	Digital	/Area/Data::[LGXC01]CC100.CV2HAlarm	rue	
	CC100_CV2LAlarm	Digital	/Area/Data::[LGXC01]CC100.CV2LAlarm	rue	
	CC100_CV2ROCNegAlarm	Digital	/Area/Data::[LGXC01]CC100.CV2ROCNegAl	true	
	CC100_CV2ROCPosAlarm	Digital	/Area/Data::[LGXC01]CC100.CV2ROCPosAlarm	rue	
	CC100_CV3HAlarm	Digital	/Area/Data::[LGXC01]CC100.CV3HAlarm	true	
	CC100_CV3LAlarm	Digital	/Area/Data::[LGXC01]CC100.CV3LAlarm	rue	
	CC100_CV3ROCNegAlarm	Digital	/Area/Data::[LGXC01]CC100.CV3ROCNegAl	true	
	CC100_CV3ROCPosAlarm	Digital	/Area/Data::[LGXC01]CC100.CV3ROCPosAlarm	rue	
	CC100_SPHAlarm	Digital	/Area/Data::[LGXC01]CC100.SPHAlarm	true	
	CC100_SPLAlarm	Digital	/Area/Data::[LGXC01]CC100.SPLAlarm	rue	
	CV200_Alm_ActuatorFault	Digital	/Area/Data::[LGXC01]CV200.Alm_ActuatorF	true	
	CV200_Alm_IntlkTrip	Digital	/Area/Data::[LGXC01]CV200.Alm_IntlkTrip	rue	
	CV200_Alm_IOFault	Digital	/Area/Data::[LGXC01]CV200.Alm_IOFault	true	
	D45D100_Alm_DeviceF	Digital	/Area/Data::[LGXC01]D4SD100.Alm_DeviceF	rue	
	D45D100_Alm_IntlkTrip	Digital	/Area/Data::[LGXC01]D4SD100.Alm_IntlkTrip	true	
	D4SD100_Alm_IOFault	Digital	/Area/Data::[LGXC01]D4SD100.Alm_IOFault	rue	
	FM100_Alm_EqpFault	Digital	/Area/Data::[LGXC01]FM100.Alm_EqpFault	true	
					TN

5. In the Input tag column, confirm the Alarm path is in the same computer as the Data server.

For example, /Area/Data::[LGXC01]

6. In the Explorer pane, open the Data server and right-click Server Status.



The Alarm server status dialog box appears.

Server status		
Primary server:	PASS02A	
Primary status:	Active	
Secondary server:	PASS02B	
Secondary status:	Standby	
Switchover options		
Switchover options Continue using t	the secondary	server even when the primary server becomes available again
Switchover options Continue using t Switch over to t	the secondary he primary se	server even when the primary server becomes available again ver when it becomes available
Switchover options Continue using t Switch over to t Server switchover	the secondary he primary se	server even when the primary server becomes available again ver when it becomes available
Switchover options Continue using the server of the switch over to the server switchover of the switchover standby will become standby will becom	the secondary he primary se r button to sv e the Active s	server even when the primary server becomes available again ver when it becomes available th the Active server. The server that is currently on rver and the Active server will become the Standby server.

- 7. Evaluate the primary and secondary text boxes from both servers.
- 8. From the checklist pull-down menu, choose Yes or No.
- 9. Observe your results and make any necessary changes.



Data Server (FactoryTalk Linx)

FactoryTalk View SE software uses FactoryTalk Linx software to access tags in a controller. This checklist section verifies that the Data server complies with system recommendations.

- Using Data Server?
- <u>Virtual Memory</u>
- <u>Data Server</u>

Using Data Server?

This row in the Notes column verifies if the PASS has a Data server.

- If Yes, continue to answer the additional Data server verification fields.
- If No, click another workbook tab or close the checklist.

Before proceeding with the checklist, make sure your system is running and clients have accessed all main screens and several popup windows. This produces a maximum load, which helps to create a better representation of the system load.

Virtual Memory

Virtual Memory is a real-time indicator of the internal memory resources that FactoryTalk Linx software consumes. This value increases in proportion to the loading on the data server.

This loading can increase because of the following:

- Number of controllers
- Number of tags on scan on HMI displays
- Demand for RSLinx[®] Gateway OPC server, alarms, historical polling and data logs
- Display update rate of HMI displays
- Number of active HMI clients

We recommend that this value is kept under approximately 3GB. Values beyond 3 GB indicate a heavily loaded data server and can affect system performance. We suggest that you go to the Task Manager>MoreDetails, and, from the Details tab, review the memory usage for the TagSrv.exe and RSLinxNG.exe files. Evaluate the load balance and consider adding another server.

Data Server

Data server information can be gathered for the checklist by using the L_CPU faceplates or generating a Controller report. Both options leverage the L_CPU Add-On Instruction in the controller.

Option 1: Use the faceplate data from the L_CPU Add-On Instruction. Copy the FactoryTalk Linx diagnostic information from the Add-On Instruction into the checklist. Or, you can print the faceplates and attach them to the report.

For examples of diagnostic faceplates, see the L_CPU section in the Rockwell Automation[®] Library of Logix Diagnostic Objects Reference Manual, publication <u>PROCES-RM003</u>.

Option 2: We recommend that you use the report that is included with the checklist file in the Knowledgebase Answer ID 771236 at <u>https://www.rockwellautomation.custhelp.com</u>. The report format matches the checklist rows to let you use copy-and-paste shortcuts.

IMPORTANT	The provided global object, display files, and images in the checklist file must be installed in the HMI before printing the report. The display files include the following:
	Images: icon_gray.png, icon_green.png, icon_yellow.png, icon_red.png
	Global object: (RA-LIB) Report.ggfx
	Displays: (RA-LIB) Report E.gfx, (RA-LIB) Report Controller.gfx
	In addition to FactoryTalk View SE software files, the checklist file includes verification tools and instructions.

- 1. For procedures on importing the FactoryTalk View display files, see the Rockwell Automation Library of Process Objects Reference Manual, publication <u>PROCES-RM002</u>.
- 2. In FactoryTalk View Studio, click to open the Global Objects file (RA-LIB) Report.



- 3. Select the Show Data Server and Controller Report Displays button and click Ctrl+C.
- 4. Open a screen of your choice to place the button that accesses the report displays, and click Ctrl+V.
- 5. Right-click the button and choose Global Object Parameter Values.



- 6. Complete these steps to add controller shortcuts.
 - a. Under Tag on the Global Objects Parameter Values dialog box, click Browse (ellipsis '...').
 - b. Select a controller shortcut and click OK.


c. Type a backing tag into the Value field of the Global Objects Parameter Values dialog box.

		Globa	l Object P	arameter Values
	Name	Value	Tag	Description
1	#1	{/Area/Data::[_G:C01]}	••••	1st Shortcut
2	#2			2nd Shortcut
3	#3			3rd Shortout
4	#4			4th Shortcut
5	#5		•••	5th Shortout
6	#6		•••	6th Shortout
7	#7			7th Shortout
8	#8		•••	8th Shortout
9	#9		•••	9th Shortout
10	#10			10th Shortout
				OK. Cancel Help

Insert the tag path and controller shortcut only.

- 7. Run a FactoryTalk View Client session.
- 8. Click the Show Data Server and Controller Report Displays button.

The FactoryTalk Linx Report appears.

	2			(RA-	LIB) Report F	RSLinxE - /Pla	ntPAx//Area		- 5
		Data Servers							
		Controlle	r Shortcut	Controller Path			Press to Show Shortcut Report Display	Notes	ò
		/A	rea/Data::[LG×C01]	RSLogi× 5000 Emu	lator in slot 2 of t	he virtual backplar	e		
Controller Verification, see page 117.		/Are	a/Data::[PlantPAx]	RSLogix 5000 Emu	lator in slot 3 of t	he virtual backplar	ne		
		/Are	a/Data::[LG×C01B]	RSLogi×5000 Emu	lator in slot 4 of t	he virtual backpla	ne		
		/Area	/Data::[PlantPAxB]	RSLogix 5000 Emu	lator in slot 5 of t	he virtual backplar	ne		
									_
									_
									_
		Virtual Memory		550172					-
	ſ	Control	ler Shortcut	# Polled Data Items	Avg Packets per Second	Avg Packet Response Time	Results	Notes	1
Use the information in this		/Ar	ea/Data::[LGXC01]	3	9	0	4		
section to complete the Checklist.		/Are	a/Data::[PlantPAx]	25233	75	2	4		
-		/Are	a/Data::[LG×C01B]	Ð	Ð	Ð	1		
		/Area	/Data::[PlantPAxB]	25230	0	Ð	4		
									-
									_
		<u> </u>							-
				50157					_
		Press	io kerresn rotals	50466	43	2			

9. Click the 'Press to Refresh Totals' button.

- Copy the report information (Avg Packets per Second, # Polled Data Items, Avg Packet Response Time, # Active Connections to Server, and Virtual Memory) into the checklist. Or, you can press the Print button and attach the printout to the checklist.
- 11. Observe your results.



This checklist section logs information about the design elements for the communication driver (data server). You can attach faceplate printouts from the L_CPU Add-On Instruction or generate the report for these checklist fields:

- <u>Number of Polled Data Items</u>
- <u>Average Packets per Second</u>
- <u>Average Packet Response Time</u>

Number of Polled Data Items

This informational row documents the number of tags that are scanned from the controller.

Average Packets per Second

This informational row documents the communication speed of data flow between the controller and data server. If your controller consistently exceeds 400 packets per second, then it is possible your controller is overloading.

Consider reducing the number of HMI data points referenced by your HMI displays from that controller. You also can lower the screen update rate if you are experiencing performance issues.

The more controllers in your system that exceed 400 packets per second of communication, the greater your chance of overloading your data server.

Average Packet Response Time

This informational row documents the average response time of messages to the controller. If your average packet response time consistently exceeds 200 milliseconds then it is possible that your communication adapter has a potential bottleneck. Consider the following troubleshooting guidelines if your performance is not satisfactory:

- Examine your network architecture and network hardware. You could be exceeding your switch capacity or capabilities that can cause slow network performance.
- You could be using an outdated communication adapter in the path to your controller. Or, you could be exceeding the capabilities of the communication adapter.

When all entry fields are verified, type the name of the person who completed the checklist and the completion date. We suggest that you store the checklist and any attachments in an accessible location to compare with future system data. Discrepancies can show potential issues that could adversely affect performance.

You can close the Microsoft Excel workbook or click another tab to continue to verify data.

Notes:

Controller Checklist

This chapter describes verification procedures for the controllers in your system.

The purpose of the checklist is to verify your system data against PlantPAx^{*} system design recommendations. The collection of data lets you analyze overall system performance and pinpoint any potential performance issues.

The Microsoft[®] Excel[®] worksheet, which we refer to as a checklist, has entry fields to document system design information. There are five icons that indicate the status of the entered information and actions to be taken, if necessary. The checklist data provides a snapshot of whether your system is operating efficiently.

To access the checklist, click the <Controller> tab on the Microsoft Excel workbook.

IMPORTANT	Complete this checklist for each controller on your system. To duplicate a checklist for each controller, do the following:
	Right-click the <controller> tab and choose Move or Copy.</controller>
	Click Create a copy and then click OK.
	• Double-click the checklist name and type a name that identifies the controller you are verifying.

Before You Begin

The Controller checklist procedures operate under the following assumptions:

- Your PlantPAx system is operable (for example, the HMI application is running and the latest operating system patches are installed).
- You have configured and have access to the L_CPU Add-On Instruction for each controller being verified.

Optional

- The FactoryTalk^{*} View display files (included with the workbook) are downloaded to your system. See <u>page 115</u>.
- A PDF printer is installed on the Engineering and/or Operator Workstation. You can print and view FactoryTalk View reports.

Click the page number or the links in the workflow for quick access to specific information.

Figure 7 - Controller Workflow



To gather information for this checklist, you have a choice of using the L_CPU Add-On Instruction faceplates or a Controller report. Both options require that the L_CPU Add-On Instruction is running in the controller to capture information.

For more details, see page 106.

The Controller report is included in the FactoryTalk View SE display files that are included in the Knowledgebase article 771236 at https://www.rockwellautomation.custhelp.com.

IMPORTANT	The provided global object, display files, and images in the checklist files must be installed in the HMI before you print the Controller report. The display files include the following:
	<pre>lmages: icon_gray.png, icon_green.png, icon_yellow.png, icon_red.png</pre>
	Global object: (RA-LIB) Report.ggfx
	Displays: (RA-LIB) Report E.gfx, (RA-LIB) Report Controller.gfx
	In addition to FactoryTalk View SE software files, the Knowledgebase article includes verification tools and instructions.

- 1. Run a FactoryTalk View Client session.
- 2. Click the Show Data Server and Controller Report Displays button.

The [®] Enterprise Report appears.

Controller Short	cut Cont	troller Path	Pres Sho Rep	ss to Si intcut iort Dis	now play
/Area/Dat	ta::[LGXC01] RSLogi	x 5000 Emulator in slot 2 of the virtual backpla	re		
/Area/Data	::[PlantPAx] RSLog	x 5000 Emulator in slot 3 of the virtual backpla	ne		
/Area/Data	n:[LGXC018] RSLog	× 5000 Emulator in slot 4 of the virtual backpla	ine		
/Area/Data::	[PlantPAxB] RSLog	× 5000 Emulator in slot 5 of the virtual backpla	ine		

3. In the report, click the 'Press to Show Shortcut Report Display' button.

		С	ontrollers	Checklist				4
System Name:				Controller Name: Flex_HART				
Design Element Ot			bserved Value		Results		Notes	
	Shortcut:	[L7x]						
	Firmware:	Revision: 30.1	1					
Properties	Module:	1756-L75/B LC	GIX5575					
	Redundancy		Yes] No				
	Free		96.5					
	Total Used		3.5		•			
	Periodic & Event		0.0					
	Communications		0.0		•			
CPU Use	Motion:		0.0		-			
	Messaging:		0.0					
	Safety:		0.0					
	Redundancy:		0.0					
	System:		3.5					
F ould be	Minor Faults Count		0		*			
Faults	Task Overlap	(1			
	I/O Memory	Free	983160	Tot Used %	4			
Mamony	(bytes)	Used	46984	4.6				
WEITONY	Data & Logic	Free	33374072	Tot Used %				
	(bytes)	Used	180360	0.5	4			
	Total %	Current	High Water	Allowed				
		16	16	512				
	I/O	14	14	14				
	Produced Tags	0	0	0				
Connections	Consumed Tags	0	0	0	1			
	Message/Block Xfer	0	0					
	Incoming	2	2					
	Unconn Buffers	1	9	32				
	Msg/Block Cache	0	0	20				
Time Synchronization	All controllers and commun cards are time synchronize	Y. [es No	Yes No				
Application	Only Periodic Tasks used (no continuous task)	,	Yes No	Yes No				
Name:			Signature:			Date:	8/21/2018 1:45:05	

The Controllers Checklist appears.

You can click the Print button and attach the report to the worksheet.

Properties

We recommend that you use the FactoryTalk View SE (Controller report) display that is provided with the checklist files for your convenience. The Controller report is organized to match the checklist rows. Otherwise, the information from the L_CPU faceplates must be manually entered into the checklist.

To use the L_CPU faceplates, see the Rockwell Automation[®] Library of Logix Diagnostic Objects Reference Manual, publication <u>PROCES-RM003</u>.

The following rows in this checklist section provide baseline information:

- <u>Shortcut</u>
- <u>Firmware</u>
- <u>Module</u>
- <u>Redundancy</u>

Shortcut

The Shortcut field provides entry of the computer location for the controller that is being verified.

Firmware

The Firmware field provides entry of the controller firmware revision (major.minor).

Module

The Module field provides entry of the controller catalog number. For example, 1756-L75/A LOGIX 5575.

Redundancy

This row denotes if you are using a redundant controller. The Yes or No answer affects the <u>Total Used</u> CPU field.

TIP A secondary controller must be synced with the primary controller for accurate CPU usage values.

CPU Use

We recommend CPU load in a production environment to be 75% or less. It's important to keep 25% CPU capacity as reserve to handle online edits, data server switchover, and so on.

The rows in this checklist section verify that the following CPU design attributes comply with these system recommendations:

- <u>Free</u>
- Total Used
- <u>Periodic and Event</u>
- <u>Communication</u>
- <u>Motion</u>
- <u>Messaging</u>
- <u>Safety</u>
- <u>Redundancy</u>
- <u>System</u>

Free

This informational row provides entry of the amount of unused CPU resources. Use the L_CPU Usage faceplate or the Controller report display (that you imported) to get the information.

Total Used

This row, which works with the <u>Redundancy</u> field, verifies that the total CPU used for the controller is within the PlantPAx system recommendations.

- 1. In the checklist, type a number to indicate the total percentage of CPU usage.
- 2. Press Enter.
- 3. Observe your results and make any necessary changes.

٠	Not complete until a percentage of CPU usage is entered.		
4	Pass; at least 50% of free CPU usage for redundant controllers and at least 25% for simplex controllers.		
×	Fail; review your configuration, scan rates, and controller assignments and make necessary changes to fall within recommended limits.		

IMPORTANT	If the total CPU use exceeds recommendations, review the following subcategories of CPU use to determine which CPU function seems to use a large portion.
	You can attach the L_CPU faceplate or the controller report with the values for the subcategories.

Periodic and Event

This informational row documents the amount of CPU resources for periodic and event tasks.

A properly sized controller is when the execution time of all tasks is less than half of the faster task rate. Because PlantPAx recommendations specify no Continuous task, then this category is the amount of CPU time that is needed to run all of your application code in the controller.

IMPORTANT	The CPU percentages do not necessarily add up to 100% because of the
	variability between execution cycles of the listed tasks and rounding errors.
	For details, see 'Estimate Controller CPU Utilization'; in the PlantPAx DCS
	Reference Manual, publication PROCES-RM001.

Communication

This informational row provides entry of the CPU percentage that is being used to respond to communication requests.

Motion

This informational row provides entry of the percentage of CPU usage that is being used for motion.

Messaging

This informational row documents the percentage of CPU assigned to process messages.

Safety

This informational row documents the percentage of CPU that is being used for safety tasks.

Redundancy

This informational row documents the percentage of CPU that is being used for redundancy processing.

System

This informational row documents the percentage of system resources.

Faults

The rows in this checklist section use the following design attributes to verify that minor faults are resolved:

- <u>Minor Faults Count</u>
- Task Overlap

Minor Faults Count

This row shows the number of minor faults that have occurred within the controller. We recommend that all minor faults are corrected to make sure that the controller operates as intended and to reduce a potential impact to performance.

- 1. Type the number of faults, if applicable.
- 2. Press Enter.
- 3. Observe your results and make necessary changes.

•	Not complete until a number is entered.		
4	Pass; no minor faults.		
×	Fail; minor faults must be resolved and cleared. After clearing the minor faults, monitor for a period of time (at least several controller scans) before reverifying.		

Task Overlap

This row records if a task overlap has occurred. Make sure to reset minor fault counts to zero.

- 1. From the checklist pull-down menu, click Yes or No if the Task Overlap indicator shows on the faceplate or display.
- 2. Observe your results and make necessary changes.

.

•	Not complete until an option is entered.		
4	No task overlap is occurring.		
×	Fail; a task overlap is occurring and must be resolved. Make changes such as simplifying programs, lengthening the period, or raising the relative priority of your more important tasks.		

Memory

The rows in this checklist section verify that the memory allocation is within PlantPAx requirements for the following attributes:

- I/O Memory (bytes)
- Data and Logic (bytes)

 IMPORTANT
 These values are displayed on the checklist controller display, or offline on the Memory tab of the Controller Properties dialog box in the Studio 5000 Logix Designer® application. For details, see the PlantPAx Distributed Control System Reference Manual, publication <u>PROCES-RM001</u>.

I/O Memory (bytes)

The PlantPAx system requires the free I/O memory to be a minimum of 25% for simplex controllers. We recommend greater than 50% free memory for redundant controllers.

- 1. Type the total free I/O memory in bytes.
- 2. Type the total used I/O memory in bytes.
- 3. Type the Total% from the Checklist Controller display.

You can also manually calculate the Total% = Used/(Used + Free) * 100%.

- 4. Press Enter.
- 5. Observe your results and make any changes.

T

٠	Not complete until a percentage is entered.			
ĩ	Warning; I/O memory exceeds 50% for redundant controllers and 75% for simplex controllers. To reduce the number of I/O modules that are scanned by this controller, make system changes.			
4	Pass; I/O Memory is at least 50% for redundant controllers and at least 25% for simplex controllers.			

Data and Logic (bytes)

The PlantPAx system requires the free data and logic memory to be a minimum of 25% for simplex controllers. We recommend greater than 50% free memory for redundant controllers.

- 1. Type the total free data and logic memory in bytes.
- 2. Type the total used data and logic memory in bytes.
- 3. Type the Total% from the Checklist Controller display.

You can also manually calculate the Total% = Used/(Used + Free) * 100%.

- 4. Press Enter.
- 5. Observe your results and make any changes.

٠	Not complete until a percentage is entered.
Ŷ	Warning; data and logic memory exceeds 50% for redundant controllers and 25% for simplex controllers. Upgrade controller for more memory or make necessary application changes to reduce load.
4	Pass; data and logic memory is at least 50% for redundant controllers and 25% for simplex controllers.

Connections

The rows in this checklist section verify that the following connection elements are currently operating with at least 50% free connections. In addition, the total number of all connections can be no more than 50% of the total allowable connections.

- <u>Total %</u>
- <u>I/O</u>
- <u>Produced Tags</u>
- <u>Consumed Tags</u>
- <u>Message/Block Transfer</u>
- <u>Incoming</u>
- <u>Unconnected Buffers</u>
- <u>Message/Block Cache</u>
 - **TIP** Produced/consumed tags and messages are the two options for communication between controllers. To compare the differences, see Chapter 3 in the PlantPAx Distributed Control System Reference Manual, publication <u>PROCES-RM001</u>.

Total %

This row verifies if the total percentage of the connections is less than 50% of the allowed connections.

- 1. Type a number for the total percentage of the connections.
- 2. Type the current percentage, high water (maximum), and allowed percentages.
- 3. Press Enter.
- 4. Observe your results and make any changes.

٠	Not complete until a percentage is entered.
Ŷ	Warning; make necessary application changes to reduce the changes below the recommended limit.
4	Pass; total connections that are used are <50% of the allowed connections.

I/0

This row verifies if the total percentage of the I/O connections is less than 50% of the allowed connections.

- 1. Type a number for the current number of connections, high water (maximum), and allowed.
- 2. Press Enter.
- 3. Observe your results and make any changes.

	•	Not complete until a number is entered.
	ĩ	Warning; the number of I/O connections > 50% of I/O connections allowed. Devices appearing in the I/O tree that communicate to this controller contribute to the number of I/O connections used. Simplify your I/O tree/structure to communicate to fewer devices to lower the I/O connections.
_	4	Pass; I/O connections are < 50%.

Produced Tags

This row verifies if the total percentage of the produced tag connections is less than 50% of the allowed connections. Make sure the number of consumers that are configured for a produced tag is the actual number of controllers consuming it to reduce the number of connections to the controller.

- 1. Type a number for the current number of produced tag connections, high water (maximum), and allowed.
- 2. Press Enter.
- 3. Observe your results and make any changes.

•	Not complete until a number is entered.
Ÿ	Warning; the number of connections that are used to produce tags exceeds 50% of the controller capacity (but you can use 100% capacity of the communication bridge). Reduce connections by consolidating tags into one structure or tag, or by deleting all but the most crucial produced tags. Also make sure that the number of maximum consumers that are configured for a produced tag is set to the minimum needed.
4	Pass; produced tag connections that are used are <50% capacity.

Consumed Tags

This row verifies if the total percentage of the consumed tag connections is less than 50% of the allowed connections.

- 1. Type a number for the current number of consumed tag connections, high water (maximum), and allowed.
- 2. Press Enter.
- 3. Observe your results and make any changes.



Message/Block Transfer

This informational row lists the number of Message and Block Transfer connections. This allowable connection is not available from the controller.

Incoming

This informational row lists the number of Incoming connections. This allowable incoming connection is not available from the controller.

Unconnected Buffers

This row verifies that the number of unconnected buffers used are <50% allowed.

- 1. Type a number for the current number of Unconnected buffers, high water (maximum), and allowed.
- 2. Press Enter.

3. Observe your results and make any changes.



Message/Block Cache

This row verifies that messages and block caches that are used are <50% allowed.

- 1. Type a number for the current number of Message and Block Cache connections, high water (maximum), and allowed.
- 2. Press Enter.
- 3. Observe your results and make any changes.

•	Not complete until a number is entered.
Ÿ	Warning: the number of message and block transfer cache connections is > 50% of allowable connections. Simplify your communications to remote devices by using messages and block transfer communications in a cached manner to lower the connections that are used. Consider combining multiple messages or block transfers to the same devices into the same message.
4	Pass.

Time Synchronization

This row in the checklist verifies that the controller is configured for time synchronization. For details on the protocols that are used for time synching controllers to a master, see the PlantPAx DCS Infrastructure Configuration User Manual, publication <u>PROCES-UM001</u>.



Controller Is Time Synchronized

This row verifies that the controller is configured to reference the same time for any event or alarm that occurs in the system.

- 1. From the checklist pull-down menu, choose Yes or No to indicate whether the controller is configured for time synchronization.
- 2. Observe your results and make any changes.



Task Structure

This row verifies that periodic tasks only are used. Periodic tasks have a clock icon in front of the task in the Controller Organizer.



Using only periodic tasks provides the following:

- Improves predictability of the controller CPU availability for communication to the system
- Provides a more accurate view of the controller loading at runtime. With continuous task, controller loading is always 100%
- Reduces the amount of task switching that improves overall application and system performance
- Allow any free time by the controller to be used for HMI communication

Only Periodic Task Used

On the checklist, complete these steps.

- 1. From the pull-down menu, choose Yes or No to indicate whether the controller is configured for periodic tasks only.
- 2. Observe your results and make any necessary changes.

•	Not complete until an option is chosen.
4	Pass.
×	Fail; you must move code in the continuous task to a periodic task. Delete the continuous task.

When all entry fields are verified, type the name of the person who completed the checklist and the completion date. We suggest that you store the checklist and any attachments in an accessible location to compare with future system data. Discrepancies can show potential issues that could adversely affect performance.

Notes:

Troubleshooting Scenarios

This chapter provides recommendations for how to resolve issues in a PlantPAx[®] system. We provide several scenarios with procedures to show how to narrow the scope of an issue to find a solution.

Obviously we cannot include every scenario for application challenges. The checklists that are described in this manual help assist with monitoring and maintaining optimal system performance. You also have the option of calling a Rockwell Automation[®] Technical Support representative 24 hours, 7 days a week.

The workflows in this chapter illustrate how to identify the cause of an issue to assist technical support if you are unable to find a solution. We describe how to tackle two common issues: lost communication for HMI displays and sluggish HMI performance. Wire frames on HMI displays indicate that you are experiencing some type of communication loss or you cannot connect to the server.

HMI Communication Lost

Figure 8 shows a basic workflow to correct lost communication. To target the root cause, proceed through the high-level flow that focuses on areas to be examined. Click the link or go to the respective page for specific information on each topic to identify an issue.





* If you cannot open a FactoryTalk® View SE client application on your OWS, go directly to the Client/Server Communication Evaluation section on page 139.

Server and Controller Communication Evaluation

<u>Figure 9</u> shows how to diagnose a loss of communication between the (PASS) server and the controller. Make sure that the server has good quality communication with the controller and follow down the workflow to rule out any network issues.

Click the link or go to the respective page for specific information on each topic. If the server checks out okay, then you have the option to go to the client computer for additional troubleshooting or to call Technical Support.





Live Data Current Quality Good

This procedure examines whether the controller communication is available at the server level. If the current quality is 'good', then you can rule out that the server is not talking to the controller.

Complete these steps.

1. From the Engineering workstation or any client machine, click the Programs menu and choose Rockwell Software[®]>FactoryTalk Tools>FactoryTalk Live Data Test Client.



The Initial Connection dialog box appears.



2. Click FactoryTalk.

The Select FactoryTalk Directory popup window appears.

- 3. From the pull-down menu, make sure that you select Network and click OK.
- 4. From the Initial Connection dialog box, browse to the data server area and click OK.



The Create Group dialog box appears.

5. Use the default or type your own group name and click OK.



6. In the lower, left pane of the Add Item dialog box, browse to the controller, and select Online.

		Add II	tem	0
ItemID [LGXC01]array[0]		Items to	o Add: 01]array[0]	OK
Datatype Native	•			Cancel
Active	_			Advanced
	Add E	Branch	Item Properties	Help
E-RNA://\$Glob E-LGXC01 Diagr E Online - a - C	al/PlantPAx/Area/ nostic Items ray V01001	Data ~	array[100] array[100] array[101] array[102] array[103] array[104] array[105] array[106]	^

- 7. In the right pane, if no tags appear then proceed to <u>Servers Evaluation</u> on page 135. Otherwise, click any tag in the controller.
- 8. Click OK.

The FactoryTalk Live Data Test Client dialog box appears.

	Active Hate (i	Comment Value	<u>H</u> emove croup	Illudeter ((See) Dur Au
[LGXC01]array[0]		0	Good	1 (0) 0.054

9. Check that the Current Quality is 'Good'.

The 'Good' status indicates that you have communication from the server to the controller.

If the status is 'Bad', then proceed to Servers Evaluation.

Servers Evaluation

This procedure verifies that at least one server has active status. Complete these steps for the Data server and HMI server.

1. In the FactoryTalk Administration Console or FactoryTalk View Studio, right-click the Data server and choose Server Status.

2 File Mana Cattions Teach Min	davis - 11-ba
-lie view Settings Tools win	aow Help
🖉 🖬 🗇 D 🗲 🔃 •	🙃 🗘 🖼 🛛
xplorer	x
🖃 🏉 Network (PASS01)	
PlantPAx	
🛛 🖙 Runtime Security	
📥 📑 Area	
📥 📑 Alarm	
🛓 🥐 PlantPAx_AES	
📥 📑 Data	
PlantPAx_DAT	
Communic	Delete
PlantPAx_HMI	Server Status
E System	Base setting
Action Groups	Properties
Policies	
Computers and Groups	
Users and Groups	
Connections	

The Data server status dialog box appears.

server status					
Primary server:	PASS02A				
Primary status:	Active				
Secondary server:	PASS02B				
Secondary status:	Standby				
witchover options					
Continue using I	he secondary server (even when I	the primary ser	ver becomes avail	able again
	ne primary server whe	n it become	es available		
 Switch over to t 					
 Switch over to t Server switchover 					
Switch over to t server switchover Click the Switchove standby will become standby will become	button to switch the the Active server an	Active servi d the Active	er. The server server will bec	that is currently o ome the Standby :	n server.

- 2. Make sure that the status is 'Active' for at least one of the servers.
- 3. Repeats $1 \dots 2$ for the HMI server.

In step 1, right-click the HMI server and choose Server Status.

Was Modification Made?

If you found an issue and made a correction, go back and redo the Live Data procedure. Reverify that communication has been established between the server and controller.

Network Evaluation

Now you are analyzing whether the shortcut to the controller is valid. An incorrect path affects the controller communication to the server.

- **TIP** In a redundant system, perform these steps for the Primary and Secondary servers.
- 1. In the FactoryTalk Administration Console or FactoryTalk View Studio, open the Communications Setup.

Z FactoryTalk View Studio - View Site Editio	n (Network Distributed) - [Communicati	on Setup - RNA://\$Global/PlantPAx/Ar 🗕 🗖 🗙
		- 8 ×
📝 🖶 🎒 🗅 🚅 🔃 🗖 👫 🗘 🖼		
Explorer ×	Device Shortcuts	Primary Secondary
Network (PASS01)	Add Remove Apply	RSLinx Enterprise, PASS02A
- Security	# LGXC01	는-器 EtherNet, Ethernet
		172.18.1.102, 1756-EN2T/A, 1756-EN2T/A 6
e 📑 Data		
📩 🖶 PlantPAx_DAT		□ 172 181 111 1756-EN2T/A 1756-EN2T/A 5
PlantPAx_HMI		
Action Groups		⊕] 2, 1756-EN2TR/A, 1756-EN2TR/A ⊕ ¶ 3, 1756-L75, 1756-L75 LOGIX5575
Policies		
표 몲 Networks and Devices		⊕ □ 5, 1756-EN2TR/A, 1756-EN2TR/A 1 ⊕ □ 6, 1756-L75, LGXC03
 Users and Groups Connections 		
		10, 1756-EN2T/A, 1756-EN2T/A 2
		Mode: Online Browsing: 1/56-A13/C 4 - 1/56-EN2T/A 2, 10
	Offline Tag File Shortcut Type Processor	Browse
Application Communications	Select a different path - 1756-A13/C 4 cannot be us	ed.
A new FTLD session was opened with machine E	WS02.	Clear All

2. Click the controller shortcut.

If the shortcut does not highlight the correct controller, then select the correct controller and save the shortcut.

3. With the correct shortcut selected, expand the backplane.

If you can browse, then you have communication to the controller. Proceed to <u>Was Modification Made? on page 137</u>.

If you cannot browse, then try to ping the controller from the PASS server.

- 4. To ping the controller, do the following:
 - a. Click Start and type CMD into the Search text box. A command prompt opens.
 - b. Type 'Ping xxx.yyy.zzz.aaa', where the letters represent the IP address of the communication adapter.

5. If the adapter responds, a similar display appears as shown.



6. If your device does not respond, a 'Request Timed Out' message appears.

If the ping is successful, proceed to the next diagnostic action.

7. Repeat steps $2\dots 6$ if you are using a redundant Data server.

Was Modification Made?

If you found an issue and made a correction, go back and redo the Live Data procedure. Reverify that communication has been established between the server and controller.

Review Application Code Formatting

If the server and controller are communicating and the problem still exists, we recommend that you check the project application code. Project components could be incorrectly configured.

Verify proper Live Data syntax for the following project elements:

- FactoryTalk View SE or FactoryTalk View ME:
 - Display parameter files
 - Display values, expressions, and animations
 - Global object parameters
 - Command buttons and macros
 - Data logger
 - Event detector
 - Derived tags

Contact Technical Support

Call a Rockwell Automation Technical Support representative if the problem still exists after checking the following:

- Server communication status
- Controller shortcut
- Application code syntax

Email technical support the most recent data that is compiled from the PlantPAx checklists.

IMPORTANT	If the size of the information packet cannot be sent via email, a technical
	support representative can help you post your information to the Rockwell
	Automation FTP site.

Client and Server Communication Evaluation

<u>Figure 10</u> shows a workflow to resolve lost communication between a (PASS) server and a client. Work through the diagnostic activities until you identify an issue.

Click the link or go to the respective page for specific information on each topic. If the issue still exists, contact Technical Support with the details you have compiled to help with a resolution.





Ping Command Evaluation

To check if the client computer is communicating with the server, start by pinging the computer.

Complete these steps.

1. Click Start and type CMD into the Search text box.

A command prompt opens.

2. Type 'Ping (and server name)'.

3. If the controller responds, a display appears similar to the following:



4. If your device does not respond, a 'Request Timed Out' message appears.

If the ping is successful, check your application code for proper syntax. See <u>page 137</u>.

Also, make sure the firewall rules are not blocking the communication.

Name Resolution Evaluation

This procedure verifies the mappings of IP addresses to host names. The steps apply if you are using a domain or a work group, with the latter explained last.

- 1. At the Command Prompt, type the NSLookup and server name and press Enter.
- 2. Type the name of the server that is being pinged.

If you receive the message 'DNS Request Timed Out', you typically do not have the Reverse Lookup Zone configured.

If the NSLookup ping provides the server name and IP address (as shown in the example), the server communication issue still exists.



If the NSLookup ping does not provide a server name and IP address, then proceed with the following instructions on <u>page 141</u>.

To verify that components do not have duplicate IP addresses, complete these steps.

1. From a DNS server, click Tools on the main menu and choose DNS.



The DNS Manager display appears.

	DNS Manager			X
File Action View Help				
Þ 🧆 📶 🗙 🖬 🧟 📑 🛛	1 0 6			
DNS	Name	Туре	Data	
 PADCA Forward Lookup Zones System.PlantPAx.local System.PlantPAx.local Reverse Lookup Zones Trust Points Conditional Forwarders Global Logs 	ASOSI05	Host (A)	172.18.1.13	
	ASIH01	Host (A)	172.18.1.14	
	ASIV01	Host (A)	172.18.1.16	
	ASOSI03	Host (A)	172.18.1.16	
	EWS12	Host (A)	172.18.1.18	
	OWS01	Host (A)	172.18.1.18	
	EWS02	Host (A)	172.18.1.22	
	EWS01	Host (A)	172.18.1.54	
	ASOSI06	Host (A)	172.18.1.58	
	ASOSI04	Host (A)	172,18,1,59	
	EWS10	Host (A)	172.18.1.60	
	OWS02	Host (A)	172.18.1.60	
	EWS11	Host (A)	172.18.1.61	
	ASAM01	Host (A)	172.18.1.62	
	PASA02	Host (A)	172.18.1.64	
	PASS02A	Host (A)	172.18.1.67	
	PASS02B	Host (A)	172.18.1.69	
	ASOSI02	Host (A)	172.18.1.70	
	ASIH02	Host (A)	172.18.1.71	
	ASIH03	Host (A)	172.18.1.72	
	PASA03	Host (A)	172.18.1.98	
	PASA01A	Host (A)	172.18.1.99	
	(same as parent folder)	Start of Authority (SOA)	[926], padca.syst	tem.j
	< 11			>

2. Verify each name has its own IP address to make sure that you are pinging the correct server via the client.

The example DNS Manager display shows several 'bad' computer names with the same IP address.

- 🛯 C:\Windows\System32\drivers\etc - x Home Share View ~ 0 🕌 « Local Disk (C:) 🕨 Windows 🕨 System32 🕨 drivers 🕨 etc V C Search etc Q Name Date modified Size Туре 🔆 Favorites 8/22/2013 9:25 AM Desktop hosts File 1 KB 📕 Downloads 8/22/2013 11:38 AM SAM File 4 KB E Recent places 8/22/2013 9:25 AM File 1 KB networks protocol 8/22/2013 9:25 AM File 2 KB 8/22/2013 9:25 AM 📕 This PC services File 18 KB besktop Documents L Downloads Music Pictures Videos Local Disk (C:) Metwork 5 items 1 item selected 824 bytes
- 3. If you are using a workgroup, open the hosts folder in your Windows local hard disk drive.

4. Using Notepad, open the hosts file.



5. Verify each name has its own IP address to make sure that you are pinging the correct server via the client.

Was Modification Made?

If you found an issue and made a correction, go back and ping the client computer again.

Review Application Code Formatting

If the server and controller are communicating and the problem still exists, we recommend that you check the project application code. See <u>page 137</u>.

Contact Technical Support

Call a Rockwell Automation technical support representative if the problem still exists. See <u>page 138</u>.

HMI Display Access is Slow

<u>Figure 11</u> shows a workflow to resolve sluggish HMI displays. To target the root cause, work through the diagnostic activities until you identify an issue.

Click the link or go to the respective page for specific information on each topic. You also can access a checklist that is associated with a topic. The checklist data evaluates whether elements are properly configured and follow PlantPAx system guidelines.

If the issue still exists, contact Technical Support with the details that you have compiled to help with a resolution.

Figure 11 - Resolve Slow HMI Display Callup


Application Under Limits?

A good starting point is to verify that your system design is within the sizing recommendations for a PlantPAx system. Design attributes include the number of servers, number of assets, and so forth.

To verify design attributes, see the <u>System Architecture Checklist on page 65</u>.

Controller Passed?

The next step is to check whether your controllers have the CPU and memory usage as prescribed by the PlantPAx guidelines. These percentages vary depending on whether your application uses simplex or redundant controllers.

For details, see the <u>Controller Checklist on page 113</u>.

Data Server Passed?

If the application design and controller setup are properly configured, check the Data server. Verify that the server is communicating data from the controllers to the HMI server and operator workstation.

For details, see the FactoryTalk Linx worksheet section on page 106.

Network Passed?

The health of the network is critical whether you are using a virtual or traditional operating system. There is a tool for analyzing network infrastructure.

For details, see the System Infrastructure Checklist on page 15.

Review Application Code Formatting

For details, see page 137.

Contact Technical Support

For details, see page 138.

Notes:

Access the Attachment

The Microsoft[®] Excel workbook that is attached to this PDF file contains five worksheets for verifying PlantPAx[®] system recommendations. Each tab at the bottom of the Excel[®] workbook accesses a checklist worksheet that is designed to evaluate design guidelines.

To use the Microsoft Excel workbook, click the Attachments link (the paper clip) and double-click the file.

See How to Use Attachments on page 148.



Open Content

As a precaution when you open programs or files, select one of the choices and click OK.



How to Use Attachments

		System Infrast	ructure Che	cklist			
System Name:		0					
Design Element		Observed Value		Results	Notes		
Hardware	BIOS Power saving of	options disabled ?	Yes	4			
Virtualization	Using Virtualization ?		Yes	4			
Hypervisor	CPU Utilization	0	%				
	Memory	0	%				
	CPU Utilization	0	%				
Hypervisor	Memory	0	%	•			
	CPU Utilization	0	%		1		
Hypervisor	Memory	0	%				
	CPU Utilization	0	%				
Hypervisor	Memory	0	%				
Domain	All Servers and Wor are on the same Do	kstations main	No 💌	ĩ			
	Bandwidth Utiliz %	andwidth Utiliz %					
	Packet Error Rate	cket Error Rate -1					
Network	Temperature OK	iture OK No 💌		×			
	CPU Utilization %						
	Memory Utilization						
	Computer Name: System Role		e		Page 1		
< ▶	System Infrastruc	ture <server or<="" td=""><td>WS name></td><td>System</td><td>Architecture</td><td><pass></pass></td><td><controller< td=""></controller<></td></server>	WS name>	System	Architecture	<pass></pass>	<controller< td=""></controller<>

The Microsoft Excel workbook contains several tabs to access checklist worksheets. Click a desired tab and complete the electronic form.

For details on the checklist and icon descriptions, see page 14.

A

adapter network percentage 62 additional resources 7, 8 AE server scan by data server 103 agents number of 77 alarm fastest update rate 102 number of 101 number of servers 68 total tags 102 allocation bandwidth percentage 36 device memory percent 38 device percentage 37 memory 122 resource 20 always updating 99 analysis system design 65 application design FactoryTalk View 67 area data and HMI servers 69 assets 76 check inventory 32 discover 27 DR upload 77 number of 75 attributes CPU design 118 FactoryTalk AE 100 RSLinx 110 audit graphic tool configuration 89 auto update Windows disabled 52

В

bandwidth resource allocation 36 basic system check 58 best performance Windows 49, 50, 51 BIOS disable power-saving 17 block message cache 127 buffering enabled and running 83 buffers unconnected number 126

C

cache display 99 catalog number controller 117 characterization definition 9 check asset inventory 32 basic system 58 topology 35 checklist content 14 controllers 113 flexibility and visual clues 13 icons 14 **PASS 87** server or workstation name 39 servers and workstations 15 system architecture 65 system design 10 Cisco software download 23 collective enabled and running 85 color-coded cells 89 configure graphic audit tool 89 connections consumed tags 126 I/0 125 incoming 126 memory 124 message and block transfer 126 produced tag 125 consumed tag connections 126 content checklist 14 controller checklist 113 checklist duplication 113 checklist workflow 114 faults 120 firmware revision 117 model catalog number 117 properties 117 redundant 117 shortcut path 117 time synchronization 128 count minor faults 120

CPU

design attributes 118 device allocation 37 free (unused) resources 118 load verification 61 periodic and event tasks 119 system resources 120 unused usage 118 utilization 20 current patches 45

D

data and logic memory 123 HMI server areas 69 logging 70 number of servers 68 packet connection speed 110 RSLinx Enterprise server 106 dedicated server 70 servers 73, 74 definition characterization 9 description PlantPAx 7 desktop **RDS servers 48** device memory allocation 38 temperature verification 37 diagnostics L_CPU instruction 114 diaster recovery number 76 disable BIOS power-saving 17 NIC power-saving 45 Windows auto update 52 Windows power-saving 47 discovery network assets 27 disk status operating system 59 display cache 99 number of HMI 92 type replace 97 domain same for servers and workstations 22 verification 22 download Cisco software 23 DR assets upload 77 number of assets 76 driver disk bits per second 62 Windows check 60 duplicate

controller checklist 113

Ε

enabled buffering 83 collective 85 unit failover 84 virtual 17 error message packet 36 no viewer log entries 53 evaluate system design 13 event periodic tasks 119 viewer no log errors 53 expressions HMI 95

F

FactoryTalk AE design attributes 100 Historian servers 78 network manager 23 View AE servers (PASS) 73 application design 67 AssetCentre server 75 HMI servers 92 HMI servers (PASS) 69 PASS server 74 failover unit 84 fastest alarm update rate 102 scan class 80 faults controller 120 minor count 120 minor tasks 121 firewall Windows 41 firmware controller 117 first time network logon 23 flexibility checklist 13 free CPU (unused) resources 118 I/O memory 122

G

generate controller data 114 global objects 96 graphic audit tool color-coded cells 89 configure 89

Η

hard disk drive check 62 memory capacity 63 hardware driver checks 60 requirements 17 HMI data server in areas 69 expressions 95 global objects 96 number of displays 92 number of servers 67 PASS 69 total number of tags 94 total tags on server 94 hypervisor verification 18

I

I/O connections 125 unused (free) memory 122 icon all checklists 14 incoming connections 126 interfaces number of 81 inventory check assets 32

L

L_CPU Add-On Instruction 114 limit points 79 list servers and workstations 38 load CPU verification 61 logging data 70 logon first time network manager 23

Μ

manager FactoryTalk network 23 manual PlantPAx documentation 7 purpose 7 maximum tag update rate 98 memory allocation 122 connections 124 data and logic 123 device utilization 38 hard disk drive 63 virtual priority 21 message and block transfer connections 126 block cache 127 packet error rate 36 minor fault tasks 121 faults count 120

Ν

network adapter percentage 62 discovery assets 27 FactoryTalk manager 23 NIC power-saving disabled 45 number

agents 77 alarm servers 68 alarms 101 assets 75 data servers 68 diaster recovery assets 76 global objects 96 HMI displays 92 HMI servers 67 interfaces 81 polled data items 110 unconnected buffers 126

0

operating system disk status 59 requirements 41 servers 44 verification 58 OS

disk status 59 PlantPAx standards 58 requirements 41 servers 44 **overlay**

device type 97

P

packet communication rate 36 response time 110 PASS AE servers 73 checklist 87 checklist workflow 88 data server 74 HMI servers 69 patches current 45 percentage connections 124 network adapter 62 performance report 55 resource report 61 Windows monitor 53 Windows settings 49, 50, 51 periodic event tasks 119 tasks 129 tasks used 129 **PlantPAx** description 7 manuals 7 points in use 78 limit 79 preface 7 produced tag connections 125 properties controller 117 purpose manual 7

R

RDS desktop experience 48 recommendations verification 13 redundant controller 117 status 72, 73, 74 remote desktop server functionality 48 replace display type 97 report performance 55 performance verification 61 requirements operating system 41 resource allocation 20 bandwidth utilization 36 device utilization 37 performance report 61 pool allocation 21 revision controller firmware 117 RSLinx design attributes 110

RSLinx Enterprise data server 106 running buffering 83 collective 85 unit failover 84

S

scan AE server by data server 103 fastest rate 80 security system 59 server and workstations checklist 15 list 38 same domain 22 workflow 16 AssetCentre 75 dedicated 70, 73, 74 FactoryTalk HMI 92 Historian 78 operating systems 44 or workstation name checklist 39 workflow 40 **RDS functionality 48** total HMI tags 94 shortcut path controller 117 software patches 45 state system services 60 status redundant 72, 73, 74 switches topology 35 synchronization time 128 system architecture checklist 65 workflow 66 basic check 58 CPU resources 120 design analysis 65 checklist 10 evaluate 13 element virtual 17 security 59 services state 60

T

tags HMI total 94 total alarm items 102 tasks CPU resources 119 minor faults 121 periodic 129 periodic only 129 temperature device verification 37 time synch controller 128 synchronization 128 topology check switches 35 total alarm tags 102 connection percentage 124 free CPU usage 118 HMI tags 94 HMI tags on server 94

U

unit failover 84 update rate fastest alarms 102 maximum tags 98 updating always 99 upload DR assets 77 use Historian points 78 utilization CPU resources 20

V

verification CPU load 61 domain 22 hypervisor 18 recommendations 13 virtual enabled 17 memory priority 21 system element 17 visual clues checklist 13

W

Windows

auto update disabled 52 best performance 49, 50, 51 firewall 41 performance monitor 53 power-saving disabled 47

workflow

controller checklist 114 PASS checklist 88 server or workstation name 40 servers and workstations 16 system architecture 66

Notes:

Rockwell Automation Support

Use the following resources to access support information.

Technical Support Center	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	https://rockwellautomation.custhelp.com/			
Local Technical Support Phone Numbers	Locate the phone number for your country.	http://www.rockwellautomation.com/global/support/get-support-now.page			
Direct Dial Codes	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	http://www.rockwellautomation.com/global/support/direct-dial.page			
Literature Library	Installation Instructions, Manuals, Brochures, and Technical Data.	http://www.rockwellautomation.com/global/literature-library/overview.page			
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	http://www.rockwellautomation.com/global/support/pcdc.page			

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete the How Are We Doing? form at <u>http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002_-en-e.pdf</u>.

Rockwell Automation maintains current product environmental information on its website at http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page.

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