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Production Management

FactoryTalk® ProductionCentre

PLANT OPERATIONS
RELEASE 10.4
SERVER INSTALLATION GUIDE – JBOSS STAND-ALONE

PUBLICATION PCJBSA-IN104A-EN-E

ALLEN-BRADLEY • ROCKWELL SOFTWARE

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Read Me First

In this chapter

Audience and Expectations

This book is intended for experienced professionals who understand their company's business needs, the technical terms used, and software dependencies described in this guide. We expect the user to be experienced with administering the following applications and technologies:

- Operating systems
- Web server environments
- Application server environments

IMPORTANT: If you plan on using this stand-alone installation in a production environment, you must purchase the licenses for JBoss through Red Hat directly.

This guide covers FactoryTalk® ProductionCentre (called FTPC hereafter) installation using the stand-alone installer for JBoss, but it assumes that the supporting network equipment and software are or can be installed. This document does not provide installation instructions for related components, like Internet connections, but it does describe configuration settings required to run this software. It assumes that you have already installed the database server and created Production and ODS databases. For more information about setting up your database, please refer to the *FactoryTalk ProductionCentre Database Installation Guide*. To set up an FTPC server on JBoss for a non-default or clustered environment, refer to the *FactoryTalk ProductionCentre Server Installer Guide - JBoss Advanced*.

IMPORTANT: You cannot migrate from a JBoss stand-alone installation to a JBoss advanced installation. To go from stand-alone to advanced, you must first completely uninstall the JBoss stand-alone installation and then install the JBoss advanced installer from scratch.

Organization

This book contains the following chapters and appendices:

- **Chapter 1, "Installation Overview and Checklists"** - Provides checklists for installing FTPC in the JBoss environment.
- **Chapter 2, "Operating System Products"** - Describes the installation and configuration of the supported operating systems.

- **Chapter 3, "Install FTPC Stand-Alone"**- Provides instructions for installing and configuring FTPC.
- **Chapter 4, "Configure the Database Connections"** - Provides instructions for configuring and initializing the database through FTPC Administrator.
- **Chapter 5, "Upgrading FTPC"** - Provides instructions for upgrading FTPC.
- **Appendix A, "Using the Shop Operations HMI Client"**- Provides instructions for downloading and using the Shop Operations HMI Client on a FactoryTalk View display.
- **Appendix B, "Shop Operations Server"** - Provides instructions for installing and monitoring Shop Operations Server through the administration console.

Other Information Sources

In addition to this guide, you should review the following books, articles, and help topics.

Product Installation Documentation Set

This installation guide was designed to be used with the following guides, available at the FTPC software download web site:

- *FactoryTalk ProductionCentre Supported Platforms Guide* for a list of supported hardware and software.
- *FactoryTalk ProductionCentre Database Installation Guide* for instructions on installing and configuring the database.

Related Documentation

The following table lists other available documents that are related to FTPC installation and upgrades.

Topic	Title	Location
Required third party software installation and configuration	Third party software documentation, such as *Installing SQL Server* or *Getting Started with JBoss.*	JBoss, or Microsoft web site or manual
Installation issues such as: • General installation and patches • Performance • Security	Keyword: • Install • Performance • Security	FTPC online knowledge base

Solutions and Technical Support

To access FTPC online knowledge base articles, contact Technical Support at (440) 646-3434.

Types of User Logins

FTPC installations require four types of user logins.

- **Installation (or Operating System) Login** allows the user to install and configure the operating system, JBoss Application Server, and FTPC.

  The user must be added to the Administrator group on the machine where you will install JBoss and FTPC.

- **Database User** configures the databases. You must create a Database User with the minimum database privileges. See the *FactoryTalk ProductionCentre Database Installation Guide* for information about creating database logins.

- **FTPC Administrator Login** allows the user to connect to, initialize, and migrate databases. Currently, the default user name/password used for logging into FTPC Administrator is *admin/admin*. You can change the password in FTPC Administrator, but you cannot change the user name.

- **FTPC User Login** is needed with the FTPC Custom Security Provider and allows the user to access the FTPC application through a web browser. A default administrative user is created during installation. The default user name/password is *admin/admin.* Additional administrative uses are created in Process Designer by a user with the Administrator privileges who is using the FTPC Custom Security Provider. If you are using another security model, you must create the user according to those requirements.

NOTE: The default user name/password used for logging into FTPC Administrator is not the same default administrative user is created during FTPC installation.

Chapter 1

Installation Overview and Checklists

In this chapter

The stand-alone installer is intended to be used to build systems that do not have the performance or platform requirements that a clustered system might and can only be used on a supported version of the Windows operating system. See the *FactoryTalk ProductionCentre Supported Platforms Guide* for more information about the supported versions. The FTPC stand-alone installer automatically installs and configures the following products:

- JBoss Application Server and the JBoss MQ messaging service
- Apache Tomcat
- Java™ 2 SDK
- Microsoft SQL Server Driver for JDBC
- FTPC EAR files

The stand-alone installer builds an FTPC application server system with the following configuration. If you need to configure a system that is different from this, use the FTPC Advanced Installer for JBoss and the respective installation guide.

- **JBoss Application Server**: FTPC must run under JBoss. In addition to installing JBoss Application Server, the stand-alone installer deploys all FTPC EAR files to the C:\Rockwell\PO<*version*>.<*build*> directory.
- **FTPC Application Security**: The FTPC application server must use the FTPC Custom Security Provider to authenticate users.
- **Single-Server**: You cannot use the stand-alone installer to install FTPC in a configuration that uses load-balancing or failover.
- **JDBC Drivers**: The stand-alone installer automatically installs and references the MSSQL Server JDBC drivers in FTPC.
- **Tomcat Servlet Engine**: The stand-alone installer automatically installs the Tomcat Servlet Engine.
- **Network Ports**: The stand-alone installer automatically configures the network ports. The stand-alone installer does not support changing the listener ports for any component being installed.
  - ❖ Configures the HTTP listener port for FTPC Home to 8080.
  - ❖ Configures the Tomcat listener port to 8081.
- **Windows Services**: after completing this instructions, the following Windows Services will be created:
  - ❖ Apache Tomcat: runs the Tomcat Server as a service.
  - ❖ JBoss[EAP]<*version*>GA: runs the JBoss Application Server as a service.

New FTPC Installation Checklist

The FTPC Server Checklist describes the procedure for installing and configuring the software required to set up a stand-alone server system.

Table 1-1 FTPC Server Checklist in a New Environment

Done?	Step	Page
1.	Review software and hardware requirements in the *FactoryTalk ProductionCentre Supported Platforms Guide* to verify you have the supported versions and sufficient hardware. Find this guide at the FTPC software download web site.	
2.	Make sure the database server software is installed and the required databases have been created and configured. Refer to the *FactoryTalk ProductionCentre Database Installation Guide* for instructions.	
3.	Review "Types of User Logins" and verify that you have sufficient permissions and privileges.	page 8
4.	"Install Windows"	page 14
5.	"Verify Operating System Language Support"[b]	page 14
6.	"Verify Network Connections"	page 15
7.	"Install the Web Browser"	page 15
8.	"Stop Other Applications" using install ports	page 18
9.	"Install FTPC Stand-Alone"	page 17

[a]FAT file system is not supported.
[b]If using FTPC message object, verify the operating system provides language support.

Upgrade FTPC Installation Checklist

The stand-alone FTPC installation checklist describes the procedure for upgrading and configuring the software required to set up an application server that will serve a stand-alone system.

Table 1-2 FTPC Server Checklist - Upgrade

Done?	Step	Page
1.	Review software and hardware requirements in the *FactoryTalk ProductionCentre Supported Platforms Guide* to verify you have the supported versions and sufficient hardware. Find this guide at the FTPC software download web site.	
2.	Upgrade required third-party software.	

Table 1-2 FTPC Server Checklist - Upgrade

Done?	Step	Page
3.	“Pre-upgrade Preparation”	page 44
4.	“Upgrading FTPC”	page 43
5.	“Install FTPC Stand-Alone”	page 17
6.	“Upgrade FTPC From a Previous Build”	page 46
7.	“Additional Upgrade Activities”	page 47

Chapter 2

Operating System Products

In this chapter:

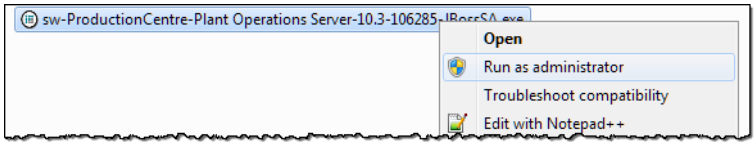
The following sections provide information on the Windows installation and configuration.

Install Windows

See the *FTPC Supported Platforms Guide* for a list of specific Windows, Windows Server, and Windows service pack versions supported on the FTPC application server and clients.

IMPORTANT: If installing FTPC on a client machine running Windows 10, you must install FTPC as an administrator (right-click the installer > Run as administrator).

Figure 2-1: Install as Administrative User



NOTE: If you will be launching FTPC applications (i.e., Process Designer or Shop Operations) using Java Web Start, make sure your client machine has a Java version higher than 1.5 installed and that the JAVA_HOME environment variable is defined.

For application server installations, the NTFS file system must be used. Client machines can use any file system.

If JBoss and FTPC will be installed on a new machine, then a Windows administrator should follow the Microsoft documentation to install the operating system. The default installation selections support FTPC.

Verify Operating System Language Support

If you are planning to use the Process Designer **Message object** to localize your applications, the operating system on the FTPC Application Server system and clients must support the locale being used. Verify that you have the operating system support for the languages defined in the message object.

The operating system Regional Options on the client must be one of the locales defined in the Message object. After installing FTPC, see the Process Designer Online Help for more information about setting your locale and display language.

Verify Network Connections

The FTPC Application Server systems and all FTPC clients must be connected over the network using TCP/IP. See the operating system documentation for information about network setup and configuration.

Install the Web Browser

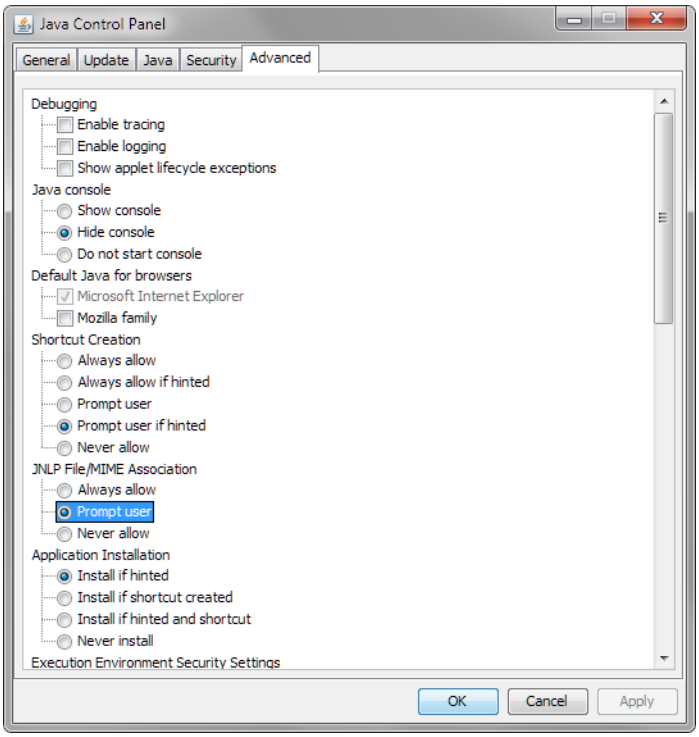
FTPC supports Internet Explorer, Google Chrome and Edge on Windows 10. For more information about the exact versions that FTPC supports, please review the *FactoryTalk ProductionCentre Supported Platforms Guide*.

TIP: From the Java Control Panel, you can enable Java content for your browser and configure security levels.

Configure the Java JNLP Setting

In order to launch the FTPC applications, set your Java JNLP setting to at least **Prompt User** (Control Panel > Java > Advanced Tab > "JNLP File/MIME Association).

Figure 2-2: JNLP File/MIME Association Setting



Chapter 3

Install FTPC Stand-Alone

In this chapter:

If you are upgrading from a previous FTPC installation, please refer to “Upgrade FTPC Installation Checklist” on page 11 for information.

Stop Other Applications

Before you can install FTPC using the JBoss Stand-Alone Installer, you must stop any other applications that listen on ports 8080 or 8081. If IIS, Apache, or any other HTTP Server is started, it may interfere with the JBoss Stand-Alone Installer.

To stop the services on a Windows server:

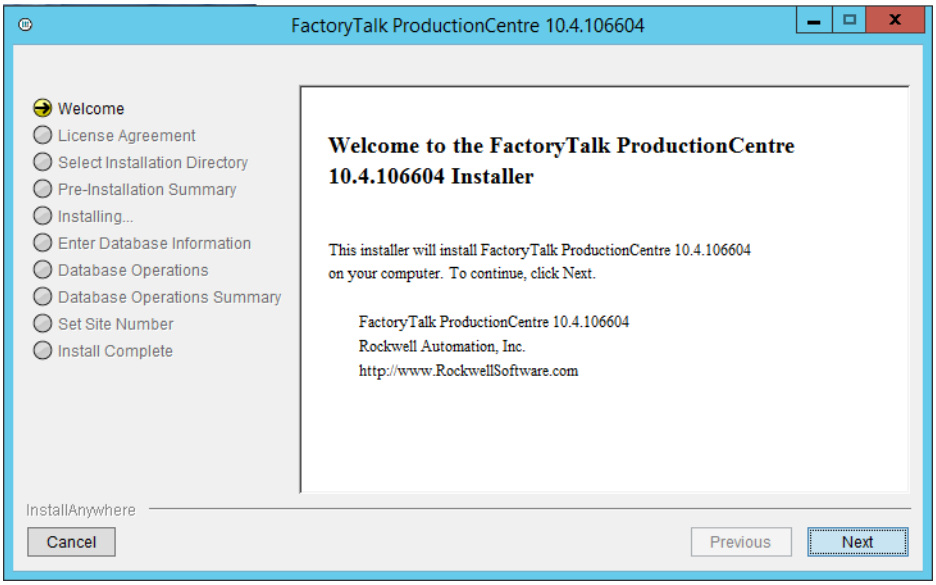
1. Select Start > Settings > Control Panel > Administrative Tools > Services.
2. If the World Wide Web Publishing Service is running, stop the service.
3. Set the Startup Type to Manual. Click [OK].
4. Stop any other HTTP Servers or applications using the ports listed, and set the Startup Type to Manual. Click [OK].
5. Close the window.

Run the FTPC Installer

The FTPC JBoss installer is available from the FTPC download site. To download and run the FTPC JBoss installation executable:

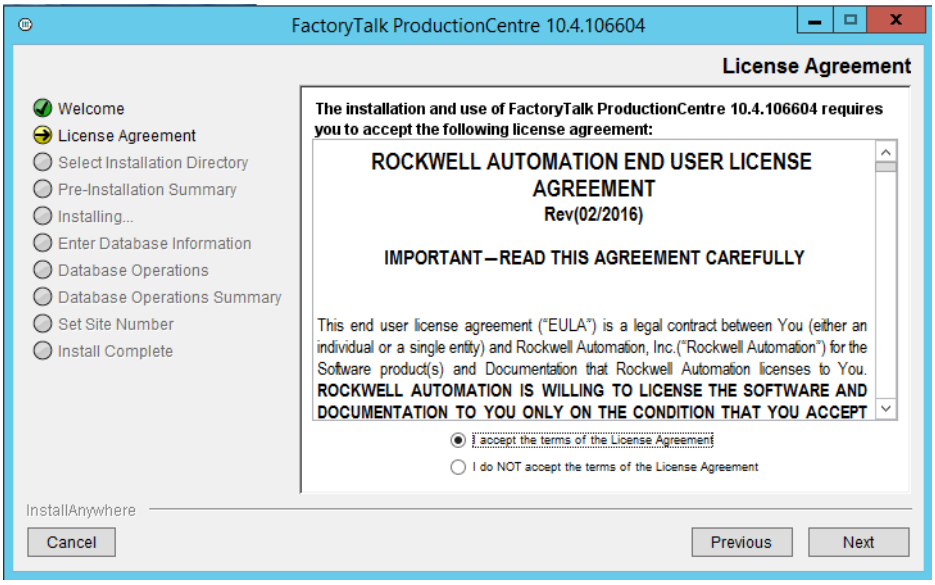
1. Log in to Windows as the Installation Administrator. This is required because you are installing FTPC immediately after downloading it. See “Types of User Logins” on page 8 for more information.
2. To run the FTPC installer, right-click on the installation executable file and select *Run as administrator.* You will be asked to confirm that you want to install FTPC. Click [Yes] to begin the extraction.
3. On the welcome screen, click [Next].

Figure 3-1: Welcome Screen



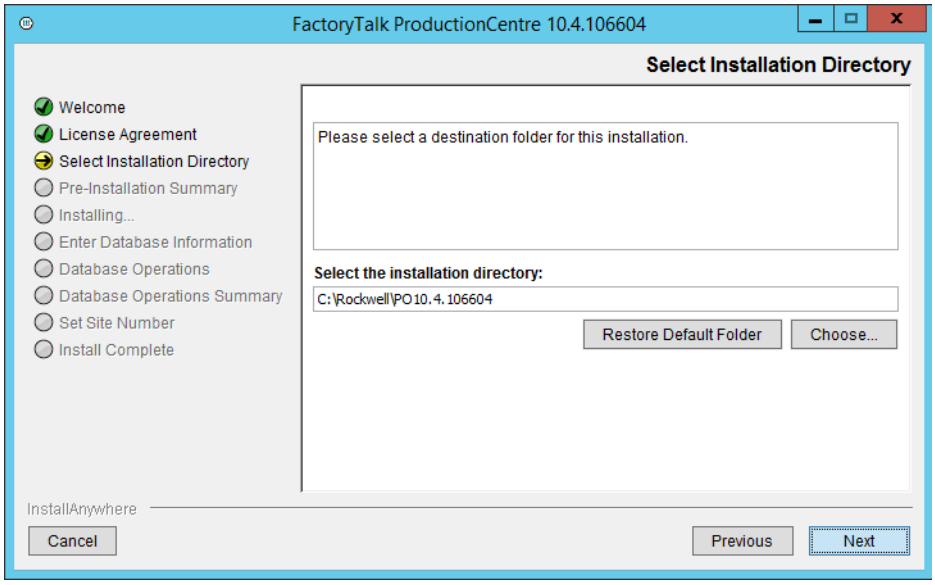
4. In the License Agreement screen, accept the license agreement, and then click [Next].

Figure 3-2: License Agreement



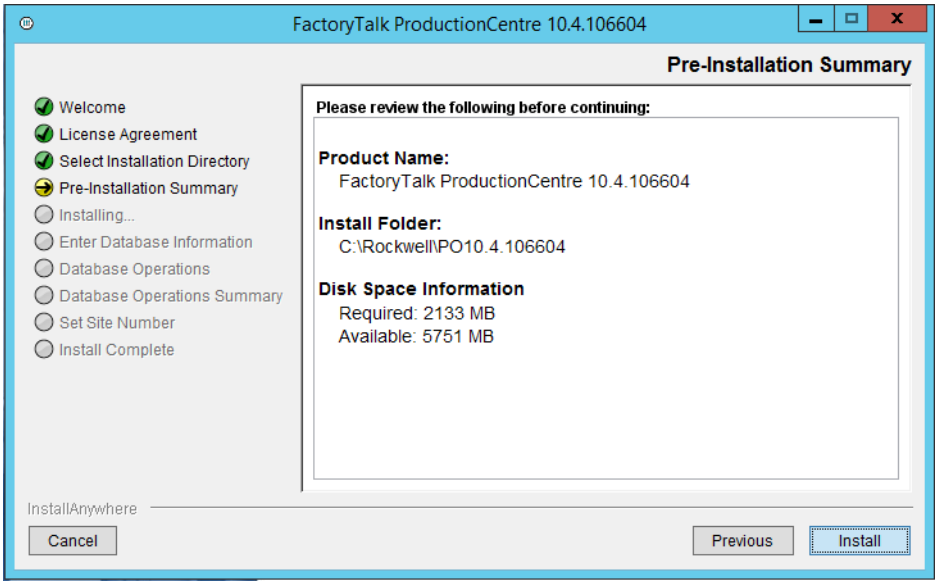
5. On the Select Installation Directory screen, accept the default location or browse to a new location. Click [Next] once the directory has been specified.

Figure 3-3: Select Installation Directory



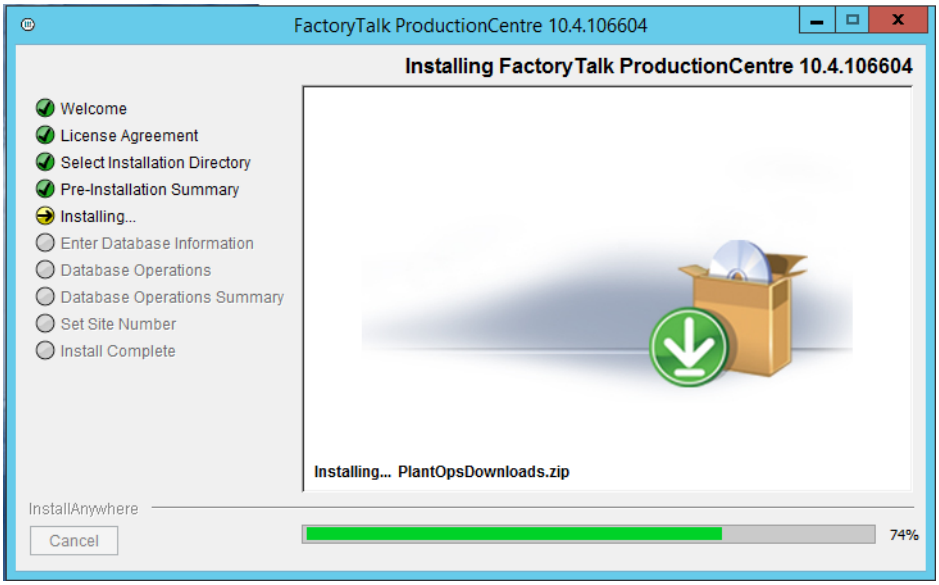
6. On the Pre-Installation Summary screen, click [Install] to start the installation. The installation process may take several minutes to complete.

Figure 3-4: Pre-Installation Summary



The installation progress will be shown as follows:

Figure 3-5: Installation Progress

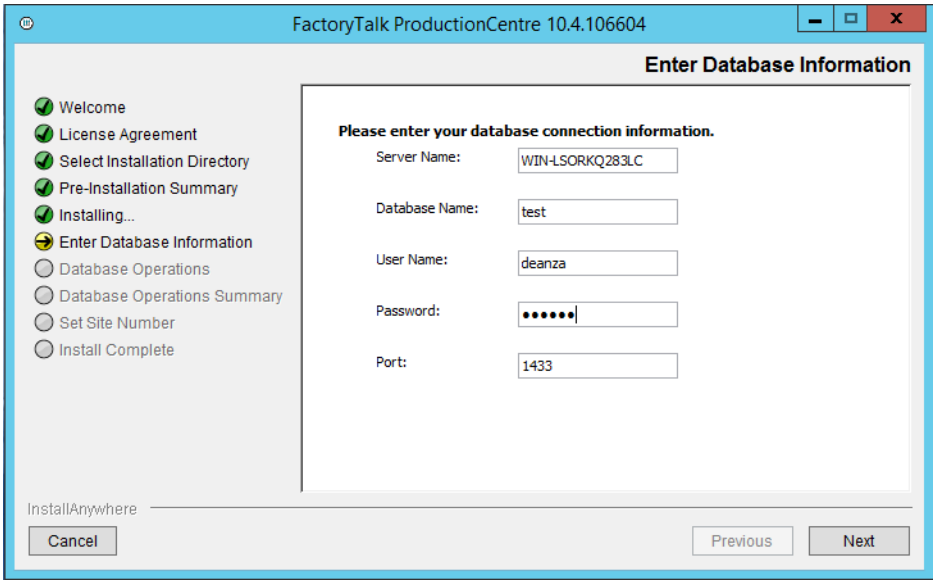


7. On the Enter Database Information screen, enter the following information, then click [Next]:

IMPORTANT: Entering database information is required. Only MS SQL Server databases are supported.

- **Server Name**: enter the database server machine name.
- **Database Name**: enter the name of the production database.
- **User Name**: enter the database user name.
- **Password**: enter the database password.
- **Port**: enter the database port number (the default is 1433).

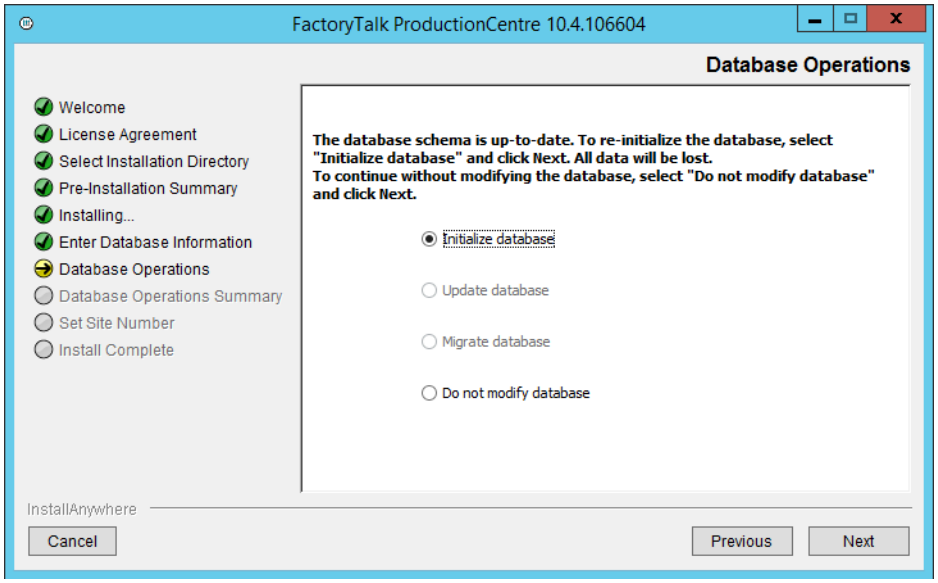
Figure 3-6: Enter Database Information



8. On the Database Operations screen, select one of the following radio buttons depending on the action you wish to take. Then, click [Next]:

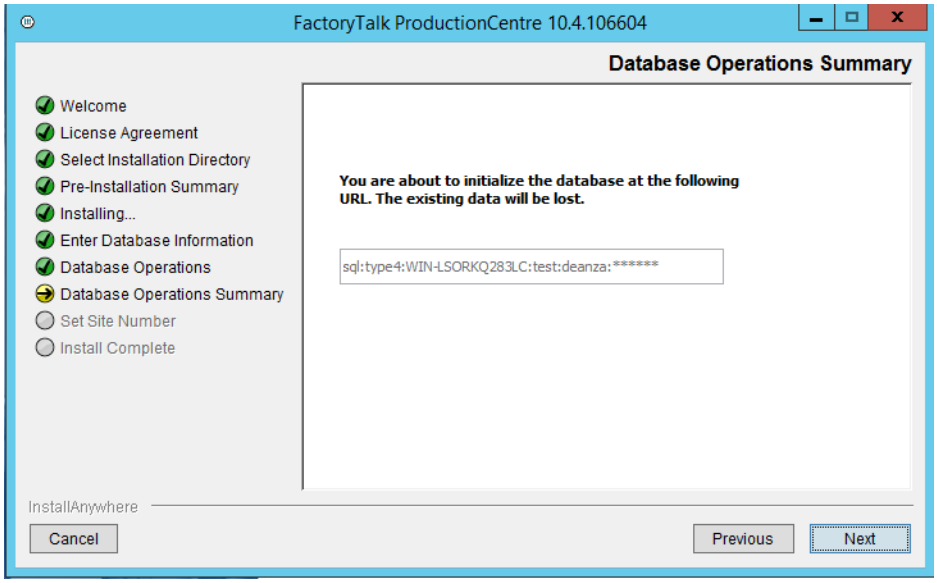
   - **Initialize database**: select this radio button to initialize the production database. Choose this option if this is a new installation and your database contains no data. Continue to the next step.
   - **Update database**: select this radio button to update the production database from one minor schema version to another minor schema version (for example, 10.42 to 10.43). This option is not available if your database is up-to-date.
   - **Migrate database**: select this radio button to migrate the production database from one major schema version to another major schema version (for example, 9.4 to 10.4). For more information about migration, see “Migrate the Databases” on page 48. The Migrate database radio button is only available if you are upgrading from a previous version of FTPC. Otherwise, it is grayed out.
   - **Do not modify database**: select this radio button to leave the database unmodified. A screen displays indicating that no changes are to be made to the database. Click [Next] and skip to step 11 on page 24.

Figure 3-7: Database Operations



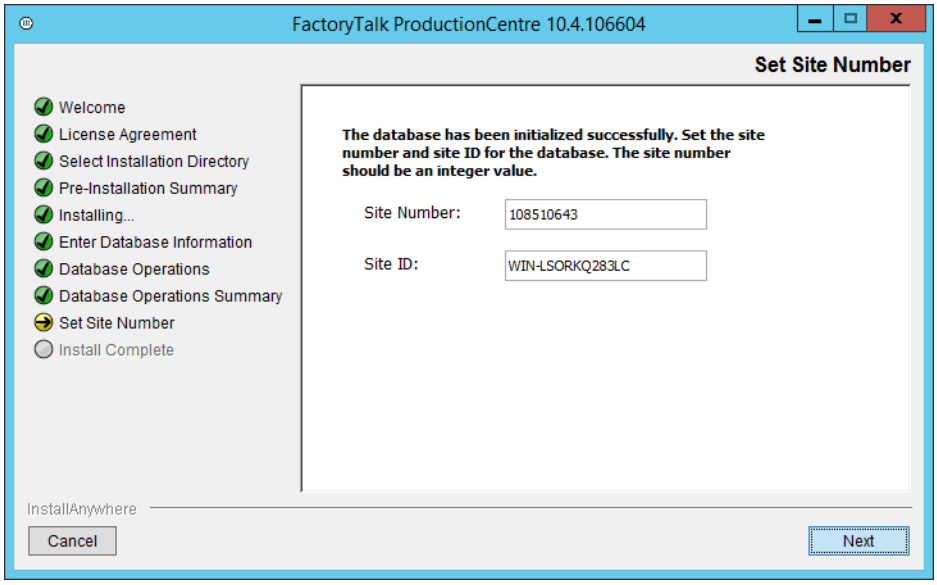
9. If you chose to initialize the database, the Database Operations Summary screen will display the database information again. Ensure that this is the correct database, and then click [Next] to begin the initialization.

Figure 3-8: Database Operations Summary



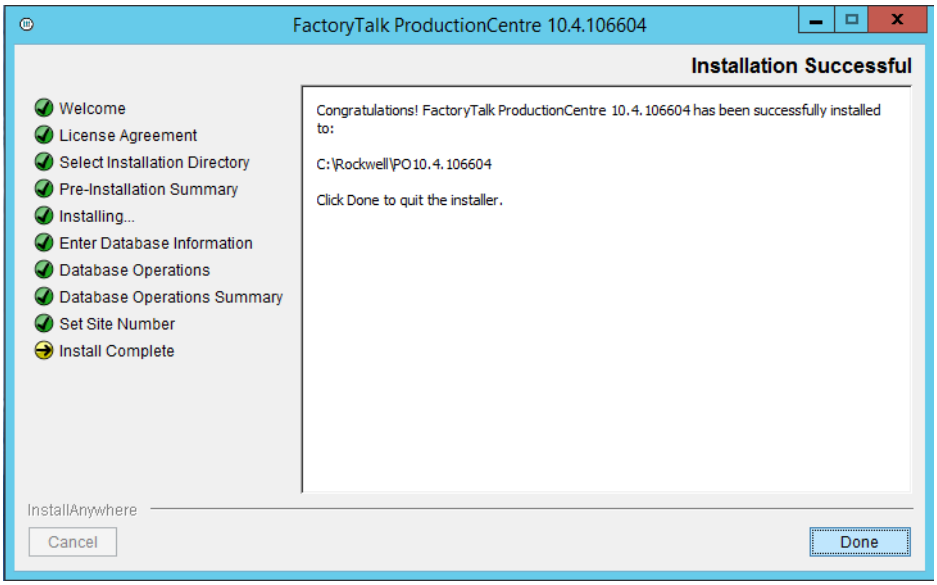
10. After the database has finished initializing, define the site number and ID on the Set Site Number screen. Either accept the default site number and site ID or enter a unique integer value for the site number and any alpha-numeric site ID and click [Next]. The site number will identify your database, so make a note of it for possible future use.

Figure 3-9: Set Site Number



11. On the Installation Successful screen, click [Done].

Figure 3-10: Installation Successful



12. Start the ActiveMQ, JBoss, and Tomcat servers as either processes or services (but not both). Both methods are explained below:

- As processes: select Start > Programs > Rockwell Software > FactoryTalk ProductionCentre [*release_number*] > Start Servers.

  A command line window opens for each server. Do not close these windows as that will kill the process and is not the recommended method to shut down these servers. The JBoss server has finished the startup

sequence when you see a command line entry indicating the amount of time it took to start:

```
Started in 2m:45s:906ms
```

If you use this menu item to start the servers, then when you need to stop the servers, you must use only the “Stop Servers” menu item to do so.

- As services: register the services by selecting Start > Programs > Rockwell Software > FactoryTalk ProductionCentre [*release_number*] > Register Servers in Windows Services. A command line window opens and confirms that the services were registered successfully. If they were not registered successfully, a detailed error message will be displayed. Press any key to close the window.

  To start the services, select Start > Programs > Rockwell Software > FactoryTalk ProductionCentre [*release_number*] > Start Servers in Windows Services. The Windows command line window opens. The servers have finished the startup sequence when you see the following command line entry:

  ```
  Press any key to continue...
  ```

  If you use this menu item to start the servers, then when you need to stop the servers, you must use only the “Stop Servers in Windows Services” menu item to do so.

IMPORTANT: If you choose to start JBoss server as a service, the user who starts the server must have administrator privileges on the computer where JBoss is being started.

IMPORTANT: To stop the server, always use the Start > Programs > Rockwell Software > FactoryTalk ProductionCentre [release_number] menu selections. Do not use any other method. Always stop the servers before shutting down or rebooting the machine.

Remove the MetaspaceSize Parameters

Remove the JBoss server's MetaspaceSize parameters by performing the following steps:

1. Open the standalone.conf.bat file in a text editor. This file is located at the following location by default: c:\Rockwell\PO<*version*>.<*build*>\jboss\bin\
2. Search for the following line:

   ```
   set "JAVA_OPTS=-Xms1G -Xmx1G -XX:MetaspaceSize=96M
   -XX:MaxMetaspaceSize=256m"
   ```

3. Delete the MetaspaceSize parameters so that the line now looks like the following:

```
set "JAVA_OPTS=-Xms1G -Xmx1G
```

4. Save and close your file.

Verify the standalone.conf.bat File

Because ActiveMQ forces users to explicitly whitelist packages that can be exchanged using ObjectMessages, please add the following configuration to the standalone.conf.bat file located at <*JBoss_install*>\bin:

```
set "JAVA_OPTS=%JAVA_OPTS%
-Dorg.apache.activemq.SERIALIZABLE_PACKAGES=*"
```

Configure Default Tab Behavior (Optional)

By default, applications launched in Shop Operations and Process Designer exhibit the Metal Look and Feel (LAF) for the Tab key behavior. This results in some unexpected behavior if you are used to working in an environment with the Windows LAF. For example:

- In the Metal LAF, when you hit the Tab key, the focus moves to the next button, but the default button does not change. The default button is activated by hitting the Enter key (even when it does not have the focus). The focus button is activated using the spacebar.
- In the Windows LAF, when you hit the Tab key, the focus moves to next button, and it also becomes the default button. The default/focus button is activated by hitting the Enter key or the spacebar.

NOTE: The default button is only configured for certain built-in dialogs (e.g., Performer Signature). Most dialogs and forms do not have a default button.

To configure the Tab key behavior to reflect a Windows LAF, perform the following:

1. Open the *DSPlantOperations.ear* file and extract the *PlantOpsStaticContent-JBoss.war* file. The *DSPlantOperations.ear* file is located at <*FTPC_install*>\jboss\standalone\deployments.

   where <*FTPC_install*> is where you installed FTPC.

2. Open the *PlantOpsStaticContent-JBoss.war* file and extract the *ProcessDesigner.htm* and *ShopOps.htm* files.
3. Open the *ProcessDesigner.htm* file using a text editor.
4. Locate the **uiDefaultButtonFollowFocus** argument and update it to *true*:

```
<param name="uiDefaultButtonFollowFocus" value="true" />
```

5. Save the *ProcessDesigner.htm* file.
6. Open the *ShopOps.htm* file using a text editor.
7. Repeat Step 4.
8. Save the *ShopOps.htm* file.
9. Update the *PlantOpsStaticContent-JBoss.war* file with the updated *ProcessDesigner.htm* and *ShopOps.htm* files.
10. Update the *DSPlantOperations.ear* with the *PlantOpsStaticContent-JBoss.war* file you updated in step 9.
11. Deploy the *DSPlantOperations.ear* file on the application server.

IMPORTANT: This configuration only affects the Tab key's behavior. It does not produce a complete Windows LAF.

See the *FactoryTalk ProductionCentre Activity Developers Guide* for configuration required in the IDE to support the Windows LAF for the Tab key behavior.

Fit-For-Purpose Configurations

The sections described here are only required if you will be running any Fit-For-Purpose applications (e.g., Modular Framework, Production Management, etc.) on FTPC.

Enable SSL for Encryption

Perform the steps outlined in these sections to enable Secure Sockets Layer (SSL) for data encryption.

The purpose of these instructions is to set up SSL in a way that will force FTPCApps to be used over SSL but will not affect the operation of FTPC remote clients (e.g., Shop Operations, Shop Operations Server, and Process Designer).

Create the Required Security Components

To enable SSL, you need to create keystores, a self-signed certificate, and trustores. The following steps show how to complete this process with a self-signed certificate. You will want to consider using a certificate issued from a trusted certificate authority.

1. Open a command window and go to <*JBoss_home*>\jboss\standalone\configuration

```
cd $JBOSS_HOME\jboss\standalone\configuration
```

2. Create a private/public key pair with the keytool:

```
%JAVA_HOME%\jboss\bin\keytool -genkeypair -alias jboss-ssl
-keyalg RSA -keystore server.keystore -storetype JKS -validity
1095


Enter keystore password: yourpassword

What is your first and last name? First Last

What is the name of your organizational unit? XYZ Unit

What is the name of your organization? Company Inc

What is the name of your City or Locality? My City

What is the name of your State or Province? XX

What is the two-letter country code for this unit? US

…[no]: Enter yes to confirm

Enter a key password for <jboss-ssl>: Press RETURN to use the

same keystore password.
```

This creates the server.keystore file that contains the newly-generated public and private key pair.

Configure the JBoss Configuration File

After your SSL components have been created, update your JBoss standalone-full.xml file located at <*JBoss_install*>\jboss\standalone\configuration.

1. Make a copy of your original standalone-full.xml file and rename the copy standalone-full-ssl.xml.
2. Open standalone-full-ssl.xml in a text editor.
3. Add a keystore and truststore to the ProductionCentreRealm by changing the following:

```
<security-realm name="ProductionCentreRealm">
  <authentication>
     <jaas name="ProductionCentre"/>
  </authentication>
</security-realm>
```

to the following:

```
<security-realm name="ProductionCentreRealm">
   <server-identities>
      <ssl>
         <keystore path="server.keystore"
relative-to="jboss.server.config.dir"
```

```
keystore-password="yourpassword"/>
      </ssl>
   </server-identities>
   <authentication>
      <truststore path="server.truststore"
relative-to="jboss.server.config.dir"
keystore-password="yourpassword"/>
      <jaas name="ProductionCentre"/>
   </authentication>
</security-realm>
```

4. If security-domain for jmx-console is configured, change the configuration for the security-domain to use the *Remoting* and *RealmDirect* login modules:

```
<security-domain name="jmx-console" cache-type="default">
   <authentication>
      <login-module code="Remoting" flag="optional">
         <module-option name="password-stacking"
value="useFirstPass"/>
      </login-module>
      <login-module code="RealmDirect" flag="required">
         <module-option name="password-stacking"
value="useFirstPass"/>
      </login-module>
   </authentication>
</security-domain>
```

5. Configure UnderTow to have an https-listener and to redirect HTTP access to /FTPCApps to the HTTPS URL:

```
<subsystem xmlns="urn:jboss:domain:undertow:3.1">
   <buffer-cache name="default"/>
   <server name="default-server">
      <http-listener name="default" redirect-socket="https"
socket-binding="http"/>
      <https-listener name="https"
verify-client="NOT_REQUESTED"
security-realm="ProductionCentreRealm"
socket-binding="https"/>
   <host name="default-host" alias="localhost">
      <location name="/" handler="welcome-content"/>
          ...
         <filter-ref name="http-to-https"
```

```
predicate="equals(%p,8080) and path-prefix['/FTPCApps']"/>
   </host>
      ...
   <filters>
      ...
      <rewrite name="http-to-https" redirect="true"
target="https://%A:8443%U"/>
   </filters>
</subsystem>
```

6. Save and close your file.

Enforce Security Version

In order to disallow any attempts by TLS/SSL to negotiate down to a version prior to 1.1, please perform the instructions outlined in the following Red Hat solution: https://access.redhat.com/solutions/1364853

Enable Debug Logging (Optional)

To enable SSL debug logging, perform the following steps.

1. Open the standalone.conf file located at <*JBoss_install*>\jboss\bin.
2. Add the following line:

   ```
   JAVA_OPTS="$JAVA_OPTS -Djavax.net.debug=ssl:handshake"
   ```

3. Save and close your file.
4. Open the standalone-full-ssl.xml file located at <*JBoss_install*>\jboss\standalone\configuration.

5. Add the following lines to enable TRACE level logging.

```
<logger category="org.jboss.as.domain.management.security">
   <level name="TRACE"/>
</logger>
<logger category="org.jboss.remoting">
   <level name="TRACE"/>
</logger>
<logger category="org.jboss.sasl">
   <level name="TRACE"/>
</logger>
<logger category="org.jboss.as.security">
   <level name="TRACE"/>
</logger>
<logger category="org.jboss.security">
   <level name="TRACE"/>
</logger>
<logger category="org.undertow">
   <level name="TRACE"/>
</logger>
```

6. Save and close your file.

Verify the JBoss Installation

To verify that JBoss was installed properly:

1. Select Start > Run.
2. In the Open dialog, enter `cmd`, and then click [OK].
3. Enter the following in one line at the command prompt to start the JBoss Server:

   ```
   <JBoss_install>\bin\standalone.bat -c standalone-full-ssl.xml
   -b 0.0.0.0
   ```

   where <*JBoss_install*> is the directory where you unzipped the JBoss files and x.x.x.x is the binding address.

   If SSL debug logging has been enabled, run the following:

   ```
   <JBoss_install>\bin\standalone.bat -c standalone-full-ssl.xml
   -b 0.0.0.0 -Djavax.net.debug=ssl:handshake
   ```

4. Access the JBoss home page at http://<*Machine_Name*>:<*Port*>, where <*Machine_Name*> is the name of the application server machine where FTPC will be deployed and <*Port*> is the HTTP port, such as 8080.

   If JBoss was successfully installed and started, you should see the JBoss home page.

Launch the Applications

NOTE: If you will be launching FTPC applications (i.e., Process Designer or Shop Operations) using Java Web Start, make sure your client machine has a Java version higher than 1.5 installed and the JAVA_HOME variable is defined.

To run the FTPC applications:

1. Access the FTPC home page by entering the following case-sensitive URL in a web browser:

   http://<*machine_name*>:<*port_number*>/PlantOperations/index.htm

   where <*machine_name*> is the name of the machine where FTPC and JBoss are installed and <*port_number*> is the HTTP server port number, such as 8080.

   When accessing the FTPC home page:

- ❑ If you have any JRE that supports Web Start on your client machine, then the JRE supported by Plant Operations will be downloaded onto your machine. You will not be prompted, and Administrative privileges are not required. If you have multiple versions of a JRE installed, the FTPC Java client will only use one for the deployment Web Start. After deployment, FTPC will download and use only the version that it supports.
- ❑ If you do not have a JRE version that supports Web Start or no JRE at all on your client machine, you will be prompted to install the JRE supported by Plant Operations. The logged-on user must have Administrative privileges to install the JRE.

Figure 3-11: FTPC Home Page

2. Click on the appropriate link to launch the application. The JAR files associated with the application will download to C:\.FTPC\<*serverHost*>\ProductionCentre\. The JAR files are only downloaded once.

IMPORTANT: Do not modify any of the downloaded JAR files.

NOTE: If using Java Web Start, please make sure your Java console is configured correctly according to "Configure the Java JNLP Setting" on page 15. If you see a prompt regarding JNLP files (Figure 3-12), save the file, open the folder location (Figure 3-13), and then execute the file by double-clicking it.

Figure 3-12: JNLP File Prompt

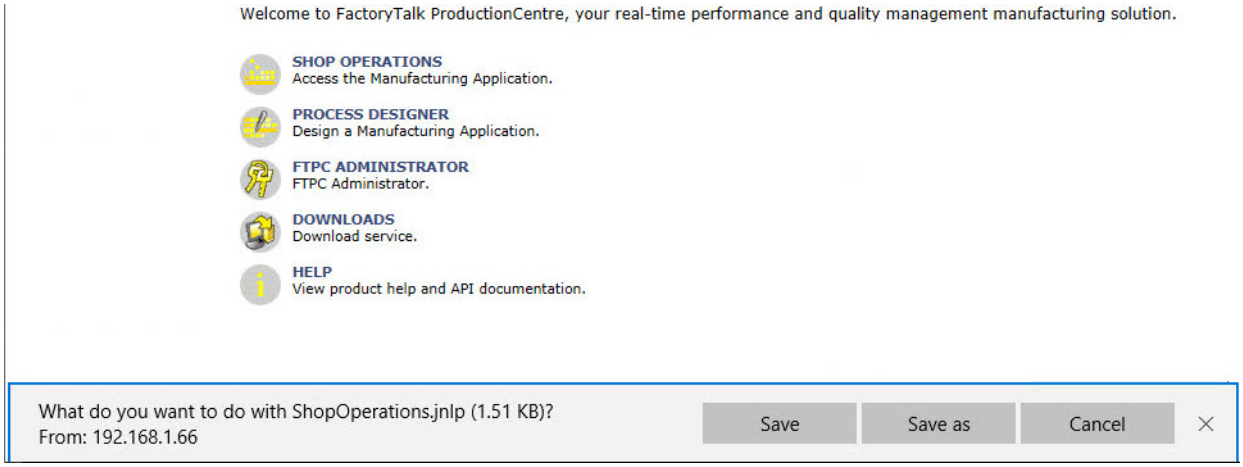
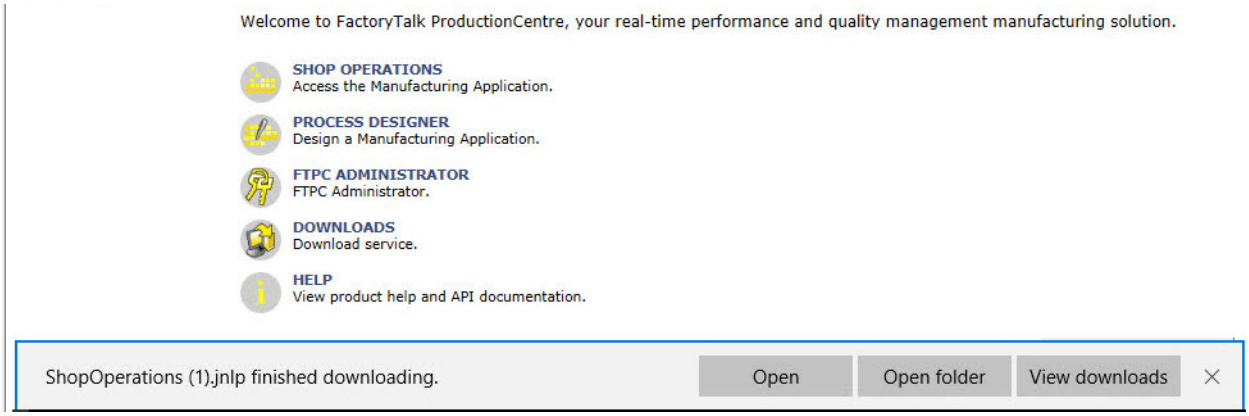


Figure 3-13: Open JNLP Folder



If you have upgraded to a new version FTPC, the system will check if the JAR files are up-to-date. If they are not, everything in the client cache will be deleted when new JAR files to be downloaded are detected. If the deletion returns an error (for example, some files are locked due to an application running), a dialog displays asking you to close all FTPC applications (Process Designer, Shop Operations, etc.) and then try again.

The main page has links to individual pages that use an Web Start to launch the individual applications. You can create bookmarks that take you directly to the individual application's home page. The URLs are listed below:

- **Shop Operations**: http://<*server*>:<*port*>/PlantOperations/ShopOps.htm
- **Process Designer**: http://<*server*>:<*port*>/PlantOperations/ProcessDesigner.htm
- **FTPC Administrator**: http://<*server*>:<*port*>/FTPCAdmin/FTPCAdmin

If you encounter an out-of-date error with Internet Explorer when trying to launch the FTPC applications, perform the following steps:

1. Run the following in a command window:

```
reg add "HKCU\Software\Microsoft\Internet
Explorer\VersionManager" /v DownloadVersionList /t REG_DWORD
/d 0 /f
```

2. Delete the versionlist.xml file located at C:\Users\<*username*>\AppData\Local\Microsoft\Internet Explorer\VersionManager.

Chapter 4

Configure the Database Connections

In this chapter

Once you have installed FTPC, you can set up your database connections manually.

Configure and Deploy the Datasources

To set up your SQL Server database connections, perform the following set of instructions.

IMPORTANT: You must have your Production datasource configured before you finish the Custom Security Provider configuration.

NOTE: When creating your XML files, make sure the XML is formatted according to the XML structure. Copying and pasting from this guide will not work without reformatting the XML.

To set up a new MS SQL Server database configuration manually, perform the following steps.

1. Navigate to <*jboss_install*>\standalone\configuration\ and open standalone-full.xml using a text editor.
2. After the <datasources> element, add the following text:

```
<datasource jndi-name="java:/jdbc/PlantOperationsActiveDB"
pool-name="PlantOperationsActiveDB" enabled="true"
use-java-context="true">
  <connection-url>
    jdbc:sqlserver://<host>:1433;DatabaseName=<DatabaseName>;
```

```
    responseBuffering=adaptive
  </connection-url>
  <driver>SqlServerJDBC</driver>
  <pool>
    <min-pool-size>5</min-pool-size>
    <max-pool-size>200</max-pool-size>
  </pool>
  <security>
    <user-name>username</user-name>
    <password>password</password>
  </security>
  <validation>
    <check-valid-connection-sql>
      select count(*) from SITE_INFO
    </check-valid-connection-sql>
    <background-validation>true</background-validation>
    <background-validation-millis>15000
    </background-validation-millis>
  </validation>
  <timeout>
    <blocking-timeout-millis>60000</blocking-timeout-millis>
    <idle-timeout-minutes>0</idle-timeout-minutes>
  </timeout>
  <statement>
    <track-statements>false</track-statements>
    <prepared-statement-cache-size>50
    </prepared-statement-cache-size>
  </statement>
 </datasource>
```

where:

- <***host***> is the hostname of the database server.
- <***DatabaseName***> is the database name.
- <***username***> is the database user name.
- <***password***> is the database password.

NOTE: The password is not encrypted by default. The application server relies on file security to keep the password secure.

NOTE: When creating your XML files, make sure the XML is formatted according to the XML structure. Copying and pasting from this guide will not work without reformatting the XML.

3. Before the </drivers> element, add the following text:

```
<driver name="SqlServerJDBC"
```

```
module="com.microsoft.sqlserver.jdbc">
  <driver-class>
    com.microsoft.sqlserver.jdbc.SQLServerDriver
  </driver-class>
</driver>
```

4. Save your work and close the file.

Register the Databases

Before you can initialize or migrate a database, the database must be registered in FTPC Administrator so that FTPC Administrator can be used to manage the database.

NOTE: Registering your databases in FTPC Administrator does not create the connection to the application server. This is done when you deploy the datasources. See "Configure and Deploy the Datasources" on page 36 for details.

---

1. Click the *Register Database* link on the home page to go to the Database Registration screen.
2. Enter the following information:
   - **Name**: enter a name or ID for the administered component. The name should be unique among all administered components managed by this FTPC Administrator.
   - **Description**: enter a description for the administered component for ease of identification.
   - **Type**: Select either *Production* or *ODS*.
   - **Vendor**: Select *MS SQL*.
   - **Drive Type**: Specifies the driver type to use for this connection.
     - If this is a Microsoft SQL Server database, the driver type is *type4*.
     - If you want to set up database mirroring for a Microsoft SQL Server database, the driver type is *mirroring*.
     - If you want to set up AlwaysOn Availability Groups for a High Availability configuration, the driver type is *alwaysOnGroup*.

   The following properties displayed depends on the Vendor and Driver Type chosen:

   - *(Type4 Only) Server:* enter the server name for the database.
   - *(Mirroring Only) Principal and Mirror Server*: for both the principal server and the mirror server, enter the host node definition separated by a comma. For example, serverA,serverB. In this instance, serverA is the principal server, and serverB is the mirror server.

- *(AlwaysOn Groups Only) Listener Server*: enter the listener server's IP address.
- *Database Name*: enter the name of the database.
- *User Name*: enter the user name for a user who has privileges on this database.
- *Password*: enter the password corresponding to the user name.
- *Port*: enter the port on which you will connect to the database. The default is 1433.
- **Change Comment**: Enter a comment for this action.

All fields are required except for the **Description** and **Change Comment** fields.

3. Click [Verify] to test the database connection.

> **NOTE:** You must verify the database connection in order to save your registration. The OK button will not be enabled until the database connection is verified.

If the Administered Component (Service) is not running, the verification will fail even if the information is correct. A dialog will be displayed to inform you if the test succeeded or failed.

4. Click [OK] to close the registration dialog and [OK] again to save the registration. A dialog asking for your password displays.
5. Enter your password and click [OK]. A registration confirmation dialog displays.
6. Click [OK] to close the confirmation dialog.

Initialize the Databases

> **NOTE:** Only complete the following steps if this is the first time you are setting up your database.

If you are working with a new database, you must initialize it using FTPC Administrator. When you initialize a database, all data (both runtime and buildtime) is deleted and all the tables that FTPC needs to store the data will be created. Additionally, the administration user (admin/admin) that can log into all FTPC applications is also created. Always back up the database before initializing it.

IMPORTANT: **Initializing the Production database resets values used by the Live Transfer process. If you are using Live Transfer and you reinitialize your Production database, then you must either reinitialize your ODS or change the site number of your Production database.**

To initialize a database:

1. Select the database on the home page, and then click **Initialize Database**.
2. Configure the following:
   - In the **Table Space Mapping** section, assign file groups to each index and table group.
   - In the **Site Info** section, set the database's site number and site ID. This site number must be unique across all (Production and ODS) databases. Once a site number is set, it cannot be changed unless you re-initialize your database. The site ID can be changed after it is saved.
   - **Change Comment**: Enter a comment for the action.
3. Click [OK]. A confirmation dialog displays.
4. Enter your password into the confirmation dialog and click [OK] to start the initialization. Once you have started the initialization, the progress is tracked on a progress bar in a dialog. After initialization is complete, the dialog closes.
5. Repeat steps step 1 through step 4 for any additional Production and ODS databases that need to be initialized.
6. Stop and restart your application server and all running client applications. If you are running Tomcat, you must also restart Tomcat.

If initialization fails:

1. Delete and recreate the database.
2. Run initialization again.

Define JMS Connection Information

For any feature that uses ActiveMQ, the JMS connection information must be defined from FTPC Administrator.

To configure the JMS connection information, perform the following steps:

1. Select the database on the home page, and then click **Edit Configuration**.
2. Edit the following fields:
   - **JMS UserName**: Enter the user name for the JMS connection. If left blank, FTPC will use default values.
   - **JMS Password**: Enter the password for the JMS connection. If left blank, FTPC will use default values.

TIP: For ActiveMQ, the user name and password are optional.

- **JMS Server URL**: Enter the server URL of the JMS connection. If ActiveMQ is not running on the local machine, change the default value of localhost to the hostname or IP address of the machine running ActiveMQ.

3. Click [OK]. A confirmation dialog displays.
4. Enter your password into the confirmation dialog and click [OK] to save the changes.

TIP: For more information on configuring the JMS connection information, please refer to the *FactoryTalk ProductionCentre Administrator User's Guide*

Disable the Ability to Delete or Rename Users (Optional)

You can disable the ability to delete users or change user names. This is done by running the dsDisallowUserDeletion stored procedure on the Production database after initializing the database. This is not intended to be reversible. If you want to change the setting after this stored procedure has been run, you must call FTPC Customer Support for assistance. Because this stored procedure exists only on an initialized Production database, a database administrator must perform this task directly on the Production database.

After the dsDisallowUserDeletion procedure has been run, you must stop and restart the JBoss server. You will not be able to change a user ID or delete a user using the Process Designer interface, the Process Designer API, or the Integrate Web Services API. An error will be returned indicating that this action is not allowed.

Chapter 5

Upgrading FTPC

In this chapter

Pre-upgrade Preparation

The following sections must be performed if you are upgrading from a previous FTPC installation. If you are upgrading your release of FTPC from a previous build, you must completely uninstall the previous version of FTPC before installing the new one. You cannot install one version on top of an older version. In addition, if the schema version has changed, you must migrate your databases. For complete instructions for migrating the databases, refer to the *FactoryTalk ProductionCentre Administrator User's Guide*.

TIP: In the following steps, *<jboss_install>* is the installation directory of the JBoss server.

Disconnect All Clients

Make sure all clients are disconnected from the application server by closing all instances on Shop Operations, Shop Operations Server, Process Designer, and FTPC Administrator. This reduces the chances of the upgrade encountering any problems when deleting obsolete JAR files.

Verify that no clients are running by opening the Windows Task Manager and selecting the **Show processes from all users** checkbox under the Processes tab. Then verify that no java.exe processes are running.

Unlock JRE

Verify that the JRE (C:\.FTPC\<*app_server*>\jre<*version*> by default) is not locked by making sure that the *jre* folder or a file in it is not opened in another program.

Back Up the FTPC Databases

Make sure you have backed up the Production and ODS databases. This will allow you to recover if you encounter problems with the upgrade.

Uninstall the FTPC Applications

When you run the uninstaller program to uninstall FTPC, both the applications and the JBoss application server are removed. You can also uninstall FTPC from *Add or Remove Programs* in the Control Panel.

To uninstall FTPC:

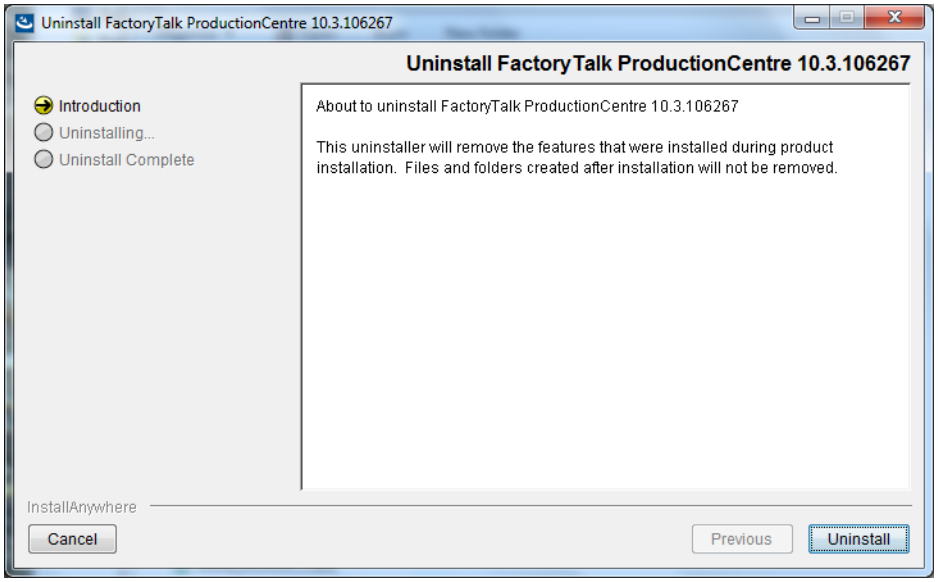
NOTE: If JBoss, Tomcat, and ActiveMQ have been installed as Windows services, they must be removed before executing the uninstaller. Complete steps 1 and 2 in order to do this.

1. Open a command prompt as an Administrator.
2. Navigate into the directory C:\Rockwell\PO<*version*> and call

   ```
   services.bat remove
   ```

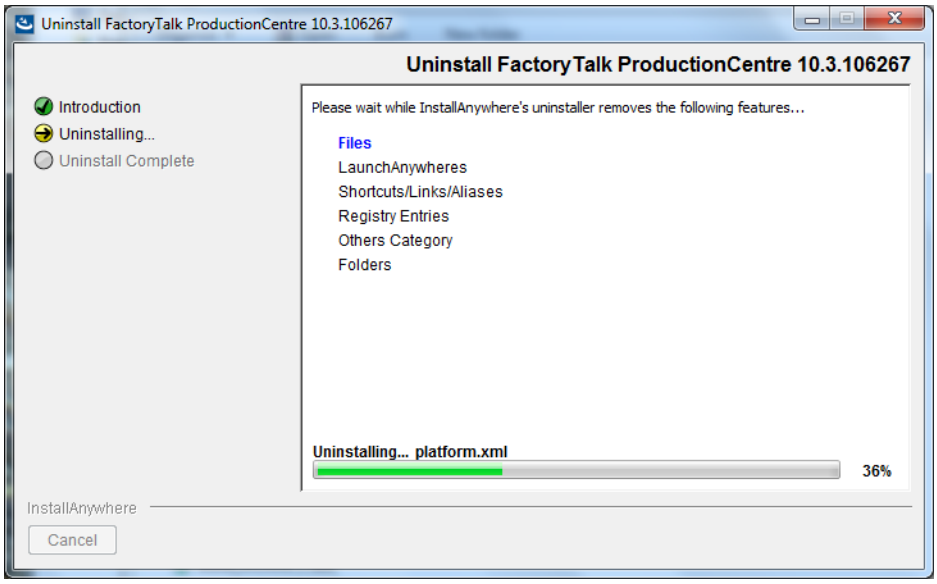
3. Open Windows Explorer. Navigate to where you chose to install FTPC.
4. Double-click *Uninstaller.exe*. The uninstall welcome screen displays.

Figure 5-1: Uninstall Welcome Screen



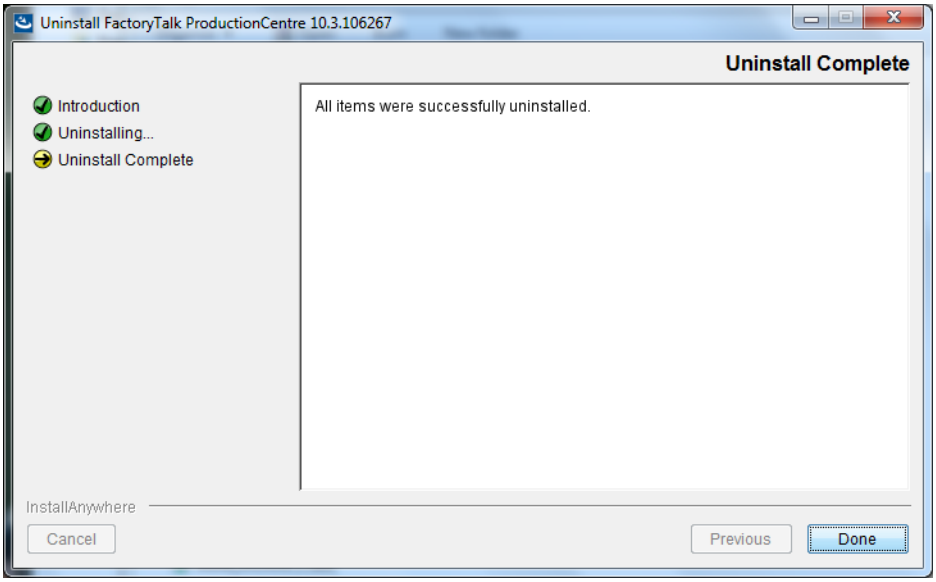
5. Click [Uninstall]. The installer displays a progress screen as FTPC is uninstalling.

Figure 5-2: Uninstall Summary Screen



The Uninstall Complete screen displays when the uninstall is complete.

Figure 5-3: Uninstall Complete Screen



6. Click [Done] to exit the uninstaller.

Upgrade FTPC From a Previous Build

1. Follow the procedures in Chapter 3, “Install FTPC Stand-Alone” to install the new build.

2. If your databases need to be migrated, the Data Migration screen appears. Depending on whether the schema version has changed (check the release notes to find out) select the “Migrate database” radio button or the “Do not modify database” radio button, and click [Next].
3. Start the JBoss and Tomcat servers as either processes or servers (but not both). Both methods are explained below.
   - As processes: select Start > Programs > Rockwell Software > FactoryTalk ProductionCentre [*release_number*] > Start Servers.

     The Windows command line window opens. Do not close the command line window. This kills the process and is not the recommended method to shut down the JBoss and Tomcat servers. The JBoss and Tomcat servers have finished the startup sequence when you see a command line entry indicating the amount of time it took to start (it may take several minutes for the JBoss server to start):

     ```
     Started in 2m:45s:906ms
     ```

   - As services: select Start > Programs > Rockwell Software > FactoryTalk ProductionCentre [*release_number*] > Start Servers in Windows Services.

     The Windows command line window opens. The JBoss and Tomcat servers have finished the startup sequence when you see the following command line entry:

     ```
     Press any key to continue...
     ```
4. To launch the FTPC home page, see “Launch the Applications” on page 32 for details.

Additional Upgrade Activities

The following section must be performed if you have upgraded from a previous FTPC installation. Before migrating your database, please make sure to do the following tasks to your system:

Oracle

- ❑ Change the JOB_QUEUE_PROCESSES initialization parameter to disable jobs during migration.
- ❑ Turn off the archive log mode for the duration of the migration

NOTE: If you have multiple users (schema) in Oracle do not perform the tasks listed above, instead disable or delete any jobs (FTPC only uses the DBMS_JOB scheduler) that perform operations on the database being migrated. Also, if you have multiple users in Oracle, turning off archive log mode is NOT recommended to increase migration speed because it affects the entire database.

SQL Server

❑ Disable the SQL Server Agent in order to disable jobs during migration.

> **NOTE:** If you have multiple databases on your SQL Server instance, disable or delete any SQL Server Agent jobs that perform operations on the database being migrated.

Migrate the Databases

If the schema has changed between the releases, then migrate your databases.

1. From the FTPC home page, launch FTPC Administrator. See "Launch the Applications" on page 32 for details.
2. Enter the default FTPC Administrator user name and password when prompted, *admin/admin*.

   The FTPC Administrator home page displays.
3. Select the database on the home page, and then click **Migrate Database**.
4. Optionally, enter a change comment for this action.
5. Click [OK]. A confirmation dialog displays.
6. Enter your password into the confirmation dialog and click [OK] to start the migration. Once you have started the migration, the progress is tracked on a progress bar in a dialog. After migration is complete, the dialog closes.
7. Exit FTPC Administrator.
8. Stop and start the application server. If you are running Tomcat, you must also restart Tomcat.

> **IMPORTANT:** **If you are migrating from a pre-8.2 release, after you have migrated your ODS, you must configure and run the *populatePdXfrUpdatePid.bat* file to completion. When migrating an existing pre-8.2 ODS, the migration process creates a new column called *pd_xfr_update_pid* in any table that is loaded by Live Transfer. This column stores the original Production database's *xfr_update_pid* value. For the migrated ODS, this value is based on the information in the XFR_LOAD_LOG table. To initially populate the *pd_xfr_update_pid* column, you must configure and run the *populatePdXfrUpdatePid.bat* file after you have migrated your ODS.**

See the *FactoryTalk ProductionCentre Administrator User's Guide* for more information on the *populatePdXfrUpdatePid.bat* file and migrating your ODS.

Upgrade the Message Pack

If you upgrade your FTPC build but have a database from the prior build, the latest message set for PlantOperationsErrorMessages is not automatically updated. You must update the message set in FTPC Administrator.

To update the message set:

1. Open FTPC Administrator.
2. In the home page, select your database and click **Update System Messages.**
3. Optionally, enter a comment for the action. This comment will be entered into the DS_ADMIN_LOG table as part of the audit control records.
4. Click [OK]. A confirmation dialog displays.
5. Enter your password into the confirmation dialog and click [OK] to start the update. Once you have started the update, the progress is tracked on a progress bar in a dialog. After update is complete, the dialog closes.

Appendix A

Using the Shop Operations HMI Client

In this appendix

There is an FTPC Shop Operations HMI Client that can be placed onto a FactoryTalk View display. This control has properties and methods that can be called via Visual Basic Applications (VBA) scripting. The Shop Operations HMI Client needs to be installed in each computer where FactoryTalk View Site Edition Client or FactoryTalk View Studio will display the Shop Operations HMI Client.

IMPORTANT: A build for the Shop Operations HMI Client is not provided with FTPC 10.4. In order to use this client with 10.4, you must download the FTPC 10.3 Shop Operations HMI Client.

Audience and Expectations

These instructions are written with the expectation that the user is familiar with:

- ❑ Visual Basic programming
- ❑ FactoryTalk View Studio and FactoryTalk View Site Edition client

IMPORTANT: Although FTPC supports Java 8, the HMI client requires Java 7.

Install the Shop Operations HMI Client

Before you install the Shop Operations HMI Client, verify that the following conditions are met:

- Ensure that FactoryTalk View is installed before running the HMI Client installer. For more information, please refer to the FactoryTalk View documentation.
- The Shop Operations HMI Client version must match that of the FTPC version you are running. To verify this, check the build numbers in the name of the executables.
- The logged-in user must have administrative privileges.
- The Oracle JRE must be configured as the default plug-in. The version must match the Oracle JDK version listed in the *FactoryTalk ProductionCentre Supported Platforms Guide*.

IMPORTANT: The Oracle JRE must be installed in a directory without any spaces. The Shop Operations HMI Client will not work correctly otherwise.

To install the Shop Operations HMI Client, perform the following directions.

1. Obtain the Shop Operations HMI Client installer for your application server and copy it to your machine.
2. Double-click the Shop Operations HMI Client installer. When the welcome screen appears, click [Next].
3. Accept the terms of the license agreement and click [Next].
4. Enter or browse to a location to which the Shop Operations HMI Client files will be extracted and click [Next]. The default location is C:\Rockwell\FT_ProductionCentre\ShopOps_AX.

IMPORTANT: If you choose your own installation location, note that the directory name cannot contain any spaces.

---

5. On the JRE Installation Reminder screen, click [Next].
6. On the Pre-Installation Summary screen, verify the installation details and click [Install] to start the installation.
7. If you have not already installed the necessary JRE version, a warning appears telling you that the JRE is necessary to run the Shop Operations HMI client and prompting you to install it now. Otherwise, skip ahead to step 10.
8. If you have not previously installed the necessary JRE, a License Agreement now appears. Read the agreement. If you agree, click [Install].

Figure A-1: JRE Runtime Environment License

9. When the JRE has finished installing, a Java Setup - Complete dialog appears. Click [Finish] to exit the install wizard.

Figure A-2: Installation Complete

10. When all the files have been placed on the hard drive, an Installation Complete screen appears. Click [Finish] to exit the program.

Set Java Runtime Properties

After you install the JRE, set the Java runtime properties:

1. Go to Window's Control Panel and double-click on **Java**.
2. Check the Java runtime parameters by going to the *Java* tab and clicking [View...]. The Java runtime parameter should be listed as:

   -Dcom.datasweep.plantops.j2eevendor\=JBoss -Djava.ext.dirs\=\Java\jre7\lib\ext;\Java\jre7 axbridge\lib;\Users\<*user_name*>\Application Data\Rockwell Automation\FactoryTalk ProductionCentre\jars\ShopOps

   where <*user_name*> is the name of the logged-in user.
3. Open the *deployment.properties* file, located by default at C:\Users\<*user_name*>\AppData\LocalLow\Sun\Java\Deployment where <*user_name*> is the name of the logged-in user.
4. Make sure it contains the following settings:

```
deployment.javaws.jre.0.registered=true
deployment.javaws.jre.0.platform=1.8
deployment.javaws.jre.0.osname=Windows
deployment.javaws.jre.0.path=C\:\\Program Files\\Java\\jre7\\
bin\\javaw.exe
deployment.javaws.jre.0.product=1.8.0_<version>
deployment.javaws.jre.0.osarch=x86
deployment.javaws.jre.0.location=http\://java.sun.com/product
```

```
s/autodl/j2se

deployment.javaws.jre.0.enabled=true
```

5. In addition to the settings in the previous step, make sure the *deployment.properties* file also contains the following settings:

```
deployment.javaws.jre.0.args=-Dcom.datasweep.plantops.j2eevendor\=JBoss
-Djava.ext.dirs\=\\Java\\jre7\\lib\\ext;\\Java\\jre7\\axbridge\\lib;\\Users\\<user_name>\\Application Data\\Rockwell Automation\\FactoryTalk ProductionCentre\\jars\\ShopOps
-Djava.net.preferIPv4Stack\=true
```

Note this information in case another application modifies these settings and you need to restore them.

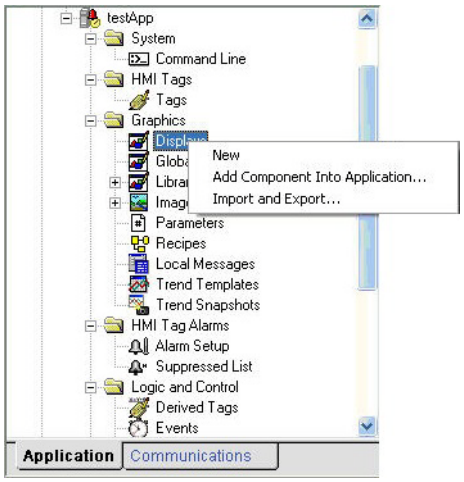
NOTE: If you choose to edit this file, you *must* use Notepad. Other text editors add hidden characters that may cause Java to fail. Note also that the line breaks shown here should be edited out.

Add the Shop Operations HMI Client to an HMI Display

After you have installed the Shop Operations HMI client, add the client to an HMI display. To do so, follow the directions below.

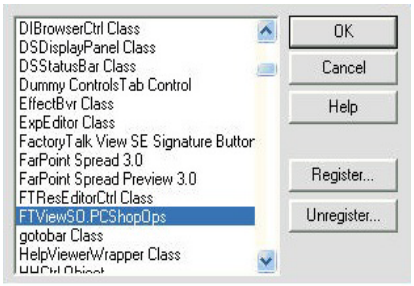
1. Open FactoryTalk View Studio.
2. Open your existing application or create a new application inside FactoryTalk View Studio.
3. Inside your application, under the Graphics node in the left-hand pane, right-click Displays and select *New* to create a new display. The new display appears.

Figure A-3: Add the Shop Operations HMI Client to the New Display



4. Add the ActiveX control to the FactoryTalk View display by selecting File > Objects > ActiveX Control.... A dialog appears prompting you to insert an ActiveX control.

Figure A-4: Insert an ActiveX Control

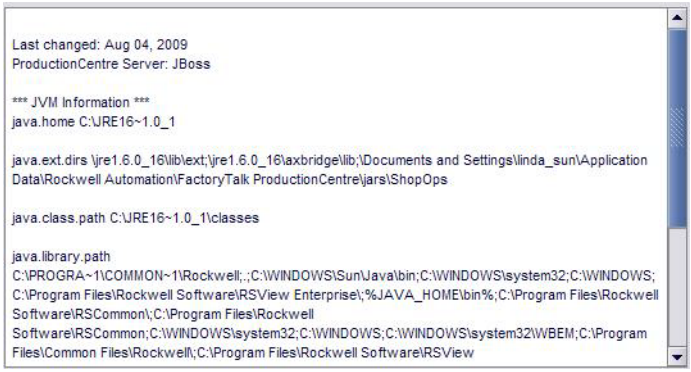


5. Select *FTViewSO.PCShopOps*, then click [OK].

IMPORTANT: When you open the window to select the Shop Operations HMI Client control to add to your display, two Shop Operations ActiveX controls appear: FTViewSO.PCShopOps and AXShopOps Bean Control. It is very important that you select FTViewSO.PCShopOps. AXShopOps Bean Control is intended for use only by the application.

The Shop Operations HMI Client is added. The following output screen displays the results of the installation.

Figure A-5: Results of Successful Installation



6. Right-click the control you just added, and select *VBA Code*. The Microsoft Visual Basic editor appears. You are ready to start adding your code to instruct the control where to connect, to log on to the FTPC Shop Operations HMI Client, open a specific form, or whatever else your application calls for. Go to the next section for the Visual Basic API.

Visual Basic API

Following is the Visual Basic API available for use with the Shop Operations HMI Client.

- Public Event propertyChangedByPDForm()
- Public Function changePassword(ByVal newPwd As String) As Integer
- Public Function closeSOForm() As Integer
- Public Function connectToServer(ByVal jnp As String, ByVal http As String) As Integer
- Public Function getChangedPropertyName() As String
- Public Function getChangedPropertyValue() As String
- Public Function logOff() As Integer
- Public Function logOn(ByVal userName As String, ByVal password As String) As Integer
- Public Function openSOForm(ByVal formName As String) As Integer
- Public Function setBooleanGlobalProperty(ByVal propName As String, ByVal booleanValue As Boolean) As Integer
- Public Function setDoubleGlobalProperty(ByVal propName As String, ByVal doubleValue As Double) As Integer
- Public Function setLanguage(ByVal language As String) As Integer
- Public Function setLanguageCountry(ByVal language As String, ByVal country As String)
- Public Function setLanguageCountryVariant(ByVal language As String, ByVal country As String, ByVal pcVariant As String)
- Public Function setLongGlobalProperty(ByVal propName As String, ByVal longValue As Long) As Integer
- Public Function setNormalScreen() As Integer
- Public Function setStation(ByVal stationName As String, ByVal timeOut As Boolean) As Integer
- Public Function setStringGlobalProperty(ByVal propName As String, ByVal stringValue As String) As Integer
- Public Function setTouchScreen() As Integer

This example performs the following tasks:

- Connects to a server using the host name *samplehostname* and remote port 8080.
- Sets the http port to 8080.
- Logs in user *userid*, with the password *password.*

- Sets the language to French (“fr”).
- Sets the language country to French Canada (“fr”, “CA”).
- Sets the language country variant to French Canada Automotive (“fr”, “CA”, “Automotive”).
- Defines the form that will be opened.

```
FTViewSOPCShopOps1.ConnectToServer
 ("remote://samplehostname:8080",
"http://samplehostname:8080")
FTViewSOPCShopOps1.LogOn("userid", "password")
FTViewSOPCShopOps1.SetLanguage("fr")
FTViewSOPCShopOps1.SetLanguageCountry("fr", "CA")
FTViewSOPCShopOps1.SetLanguageCountryVariant("fr", "CA",
"Automotive")
FTViewSOPCShopOps1.OpenSOForm("formName")
```

Once you enter the code into the Visual Basic editor, you must test the code. To do so, either test the display or launch FactoryTalk View Site Edition Client. If the code shown in this example were to be located in the Display_Load method, the display would connect, log on, and open the form once the display was loaded.

Return Codes for the API

The table below lists numerical codes that describe information or the status of the operation. Return codes that range between 1 and 99 are error indicators. 101 through 199 are informational.

NOTE: For every operation, code 0 appears for a successful operation. If the operation fails, the default error code is 1. If there is more information about the cause of the failure, other more descriptive error codes *may* appear.

Code	Meaning
Error Codes	
0	Operation ok
1	Operation failed
2	Error when getting database information
3	Database schema error
4	Application error
5	System error
6	Invalid username password
7	Invalid password length

Code	Meaning
8	Invalid argument
9	Password expired
51	Not connected
52	Not logged on
53	No privilege
Informational Codes	
101	Password about to expire
102	Default form loaded

Uninstall the Shop Operations HMI Client

To uninstall the Shop Operations HMI Client, perform the following directions.

WARNING: Do not use FactoryTalk View to unregister the Shop Operations HMI Client. Use the Shop Operations HMI uninstaller.

1. In Windows Explorer, navigate to:

   C:\<*ShopOperations_AXinstall_location*>\ShopOps_AX_uninst. Double-click uninstaller.exe.
2. When the uninstall wizard appears, click [Next].
3. Select the features you want to uninstall (or accept the default selections) and click [Next].
4. Click [Uninstall] to start the uninstallation.
5. A screen appears telling you that the uninstallation was successful. Click [Finish] to continue.

Upgrade the Shop Operations HMI Client

The build numbers for the Shop Operations HMI Client and for FTPC must match. Therefore, uninstall, reboot, and reinstall the Shop Operations HMI Client each time you upgrade FTPC.

IMPORTANT: Because of a known Microsoft issue, the following three steps are necessary when upgrading to a new build. For more information about this issue, please refer to Microsoft's support website, http://support.microsoft.com.

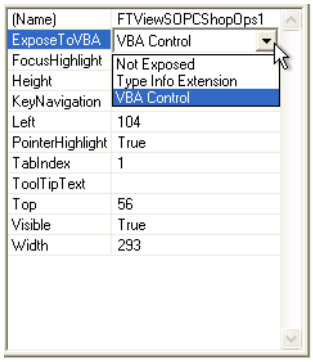
1. Delete the *FTViewSO.exd* file from <*FTViewStudio_install*>\RSView Enterprise\VBA, where <*FTViewStudio_install*> is the location where FactoryTalk View Studio is installed on your system.
2. Back up and remove your HMI client's current *deployment.properties* file to allow the HMI installer to generate a new file. You can modify the file to reapply any custom configuration after the installation.

NOTE: After installing the new HMI client, you do not need to replace the ActiveX control from each display. The following steps allow you to upgrade the ActiveX control for your all of your views.

---

3. Open FactoryTalk View Studio.
4. Open your existing application or create a new application inside FactoryTalk View Studio.
5. Create a new display for the open application.
6. Add the ActiveX control to the FactoryTalk View display by selecting File > Objects > ActiveX Control
7. Unregister the ActiveX control you just added by clicking [Unregister…].
8. Re-register the same control by clicking [Register] and selecting the correct OCX file.
9. In the Property Panel for the Shop Operations HMI Client, change the control's *ExposeToVBA* property from *Not Exposed* to *VBA Control*.

Figure A-6: Property Panel



Appendix B

Shop Operations Server

In this chapter:

Shop Operations Server is a Java application that performs as a runtime client to Plant Operations server. It provides a runtime environment for event sheets, which are non GUI-driven applications developed in Process Designer. Operationally, Shop Operations Server is downloaded to and run on a separate machine from the Plant Operations server. Each Shop Operations Server instance runs one event sheet.

Shop Operations Server runs in Windows and Linux. A Java Service Wrapper is used to install and run Shop Operations Server as a Windows service or Linux daemon. This allows Shop Operations Server to run in the background and be automatically started when the operating system boots up.

Shop Operations Server also contains an embedded servlet engine to process web services events and to host an administration console that is used for configuration and monitoring of event sheets. An event sheet running in two Shop Operations Server instances can have failover support when the Shop Operations Server instances are configured for failover. Note that Shop Operations Server cannot write to remote file systems.

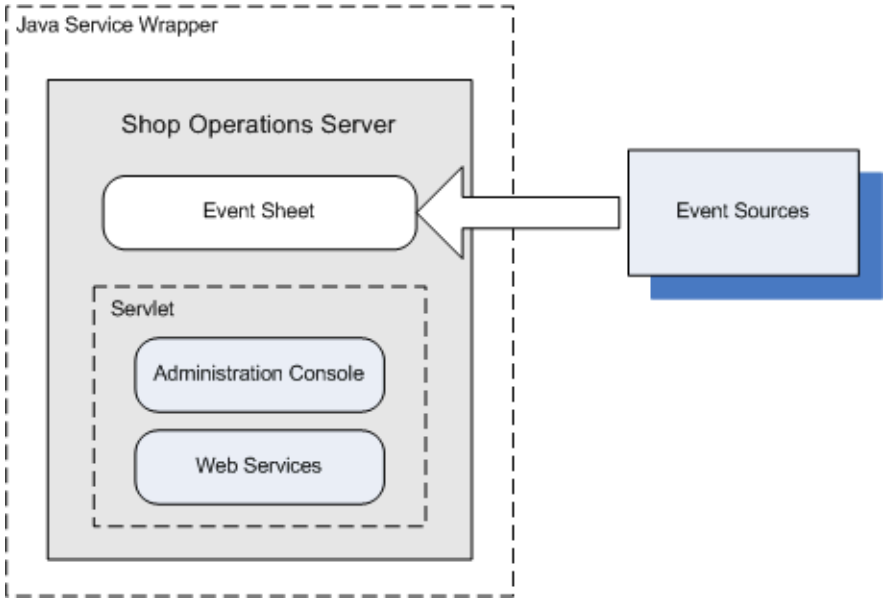
Event sheets running in Shop Operations Server support the creation and management of event sources for executing script code. Supported event sources are:

- FactoryTalk Live Data
- Timer (repetitive events)
- Calendar (scheduled events)
- Serial port (RS232)
- Socket (TCP/IP and UDP multicast)
- Message groups (from other event sheets and forms)
- Web services
- Event sheet events (Pnuts script functions and events such as before or after an event sheet is started or stopped)

Event sheets provide a framework for developing non GUI-driven applications. Process Designer is used to develop event sheets that are then run in Shop Operations Server, which can be configured to provide failover for event sheets.

Figure B-1 provides an overall functional depiction of Shop Operations Server.

Figure B-1: Shop Operations Server



This chapter describes the installation, configuration, administration, and operation of Shop Operations Server.

Prerequisites

These instructions are written with the expectation that the user is familiar with Windows services and how to install them.

Downloading Shop Operations Server

To download the Shop Operations Server archive, follow the steps below.

1. From the FTPC home page, click the Downloads link.
2. From the Downloads page, click the Shop Operations Server link. The Shop Operations Server archive is the ShopOperationsServer.zip file.
3. A dialog appears, prompting you to specify an extraction location on the target machine. Navigate to the location of your choice.
4. Extract the contents of ShopOperationsServer.zip into the desired location. These Shop Operations Server folders are extracted to this location: *bin*, *conf*, *lib*, *logs*, *java*, *META-INF*, *plug-ins*, and *properties.* Note the following folders:
   - **bin** - contains the Windows batch files used to install, start, stop, and uninstall Shop Operations Server. It also contains the Java Service Wrapper wrapper.exe file from Tanuki Software for running the Windows

service. The ShopOperationsServer.xml configuration file is also in this folder.

- **conf** - contains the wrapper.conf file used to configure the Shop Operations Server.
- **lib** - contains the Java library (JAR) files. The NativeLibsWin32.jar subfolder contains native Windows DLL files.
- **logs** - contains the wrapper.log file. This file contains error and informational messages as well as application information originating from the println script statement. This is a rolling log file, so older files will have a number appended to the end of the file name (e.g., 1, 2, 3...) up to the number of log files configured for retainment. Consult these files if the application is not functioning correctly.

Installing Shop Operations Server

To install Shop Operations Server, you must either be logged in as a Windows administrator or be in the Windows administrator user group.

Installing as a Windows Administrator

If you are logged in as a Windows administrator, perform the following steps.

1. In Windows Explorer, navigate to <*ShopOpsServer_install*>\conf, where <*ShopOpsServer_install*> is the location where you extracted the Shop Operations Server files.
2. Open wrapper.conf in a text editor and modify the wrapper.java.additional.2 setting. You will see several lines that begin with wrapper.java.additional.2. Locate the one for your application server type, and uncomment it. Verify that all the other server types are commented out.
3. Add an additional wrapper.java.additional property after the other wrapper.java.additional properties and name it accordingly. For example, if there are eight wrapper.java.additional properties, this new property would be added after wrapper.java.additioal.8 and be called wrapper.java.additional.9.

> **NOTE:** This step is only needed if the code requires additional lines. If no additional lines are needed, skip this step.

4. Save your work and close the file.
5. Set the JAVA_HOME variable on your computer to <*JRE_install*>, where <*JRE_install*> is the location where the Oracle JRE is installed on your computer.

6. In <*ShopOpsServer_install*>\bin, open ShopOperationsServer.xml in a text editor.
7. Locate the http-uRL and iiop-uRL properties and verify that they are configured correctly for your installation. For example: http://<*server_name*>:<*embedded_port*> where <*server_name*> is the name of the machine where FTPC is installed, and <*embedded_port*> is the web server port number.
8. Locate the jetty-port value. This is the embedded web service port number. Set it to a port that will not conflict with any other processes running on the computer. Save your work and close the file.
9. In Windows Explorer, navigate to <*ShopOpsServer_install*>\bin.
10. Double-click on InstallApp-NT.bat to install the Windows service.
11. Double-click on StartApp-NT.bat to run the Windows service.

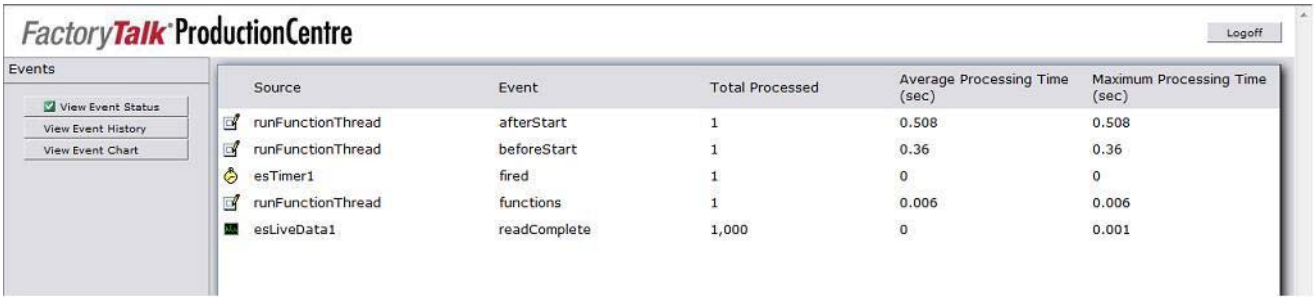
> **TIP:** See "Run Shop Operations Server" on page 68 for additional methods for running Shop Operations Server.

12. Open a browser and go to http://<*ShopOpsServer_name*>:<*jetty_port*>/ShopOperationsServer.

Figure B-2: Shop Operations Server Login

13. When the Shop Operations Server Login page appears, enter your user name and password. The following screen appears. The default login user/password is *admin/admin*. This can be changed later.

Figure B-3: Shop Operations Server Administrative Console



14. (Optional) If you want to run multiple Shop Operations Servers on a machine, the Shop Operations Server archive must be copied to different locations on the machine and each instance must be configured separately. If you want to enable failover support, then two Shop Operations Servers must be running the same event sheet. If one Shop Operations Server is running, then the other will be in standby mode and will only start processing if the first Shop Operations Server stops running. For more information about configuring failover support, see "Configuring Failover" on page 88. To install multiple Shop Operations Server services, note the following:

- Each Shop Operations Server must be installed on a separate directory.
- The jetty-port property must be configured in the ShopOperationsServer.xml file located in the bin subdirectory. The port for the embedded jetty web server must be unique.
- The ntservice.displayname property must be configured in the wrapper.conf file located in the Shop Operations Server's conf directory so that the name of each Shop Operations Server service is unique. For example:

  wrapper.ntservice.displayname=Rockwell Shop Operations Server2
- The ntservice.name property must be configured in the wrapper.conf file located in the Shop Operations Server's conf directory so that the name of each Shop Operations Server service is unique. For example:

  wrapper.ntservice.name=Rockwell Shop Operations Server2
- (Optional) Update the corresponding service description property. For example:

  wrapper.ntservice.description=Shop Operations Server

15. (Optional) To use a third-party jar, uncomment the Java Library Path property and add the location of the jar to it. This property is configured in the wrapper.conf file located in the Shop Operations Server's conf directory.

wrapper.java.library.path.1=../lib;../lib/NativeLibsWin32.jar

IMPORTANT: If you will be running Shop Operations Server with Live Data, the Java Library Path property line must be uncommented.

Installing as an Administrator User Group Member

If you are not a Windows administrator but are in the administrator user group, perform the following steps.

1. Follow step 1 through step 8 of "Installing as a Windows Administrator" on page 64.
2. Go to Start > All Programs > Accessories. Right-click on Command Prompt and select *Run as Administrator.* The command prompt window opens.
3. Change to the location of the Shop Operations Server installation bin folder.
4. Run the following command:

   ```
   InstallApp-NT.bat
   ```

5. Follow step 11 through step 13 of "Installing as a Windows Administrator" on page 64.

Modifying the Startup Delay Interval (Optional)

If your application server and Shop Operations Server are both running on the same machine and are both configured to run as Windows services, Shop Operations Server may start up before the application server is ready to communicate. In this situation, the Shop Operations Server will receive an exception when it tries to connect to the application server and then terminate. To solve this problem, you can configure Shop Operations Server to have a delayed startup by defining the following configuration parameters in the Java Service Wrapper configuration files.

If Shop Operations Server is started as a service, perform the following directions.

1. Navigate to <*ShopOpsServer_install*>/conf where <*ShopOpsServer_install*> is the location where Shop Operations Server is installed.
2. Open the wrapper.conf file and locate the following line:

   ```
   wrapper.startup.delay.service=0
   ```

3. Configure the startup delay in seconds. The default is 0 (no delay).
4. Save your work and close the file.
5. Restart Shop Operations Server.

If Shop Operations Server is started from the console, perform the following directions.

1. Navigate to <*ShopOpsServer_install*>/conf where <*ShopOpsServer_install*> is the location where Shop Operations Server is installed.
2. Open the wrapper.conf file. Locate the following line:

   ```
   wrapper.startup.delay.console=0
   ```

3. Configure the startup delay in seconds. The default is 0 (no delay).
4. Save your work and close the file.
5. Restart Shop Operations Server.

Because of the delayed startup, Shop Operations Server will be able to connect to the application server after it starts. The optimum startup delay for your system depends on many factors, including your hardware and software configuration. Please contact your administrator for more information.

Configure the Function Thread Pool Size (Optional)

If your event sheet will process events that will be handled in parallel, the events should be handled with Function.runFunctionThread(...), which allows events to be processed by a pool of worker threads. The default number of worker threads is 25. The optimum number of threads for your application may vary depending on your system configuration. This number can be changed if necessary, within the limits of your system configuration. To do so, perform the following steps.

1. In <*ShopOpsServer_install*>\bin, open ShopOperationsServer.xml in a text editor.
2. Locate the following line and define the number of worker threads. The default is 25.

   ```
   function-thread-pool-size="25"
   ```

3. Save your work and close the file.
4. Restart Shop Operations Server.

Run Shop Operations Server

Shop Operations Server can be started and stopped using the following methods.

- To run Shop Operations Server as a Windows service, use the Windows Services Control Panel. Look for the “Rockwell Shop Operations Server” service. Before you can run Shop Operations Server as a service, you must install it as a service by running the InstallApp-NT.bat file located at <*SOS_install*>\bin.

  To run Shop Operations Server as a service, you must either be logged in as a Windows administrator or be in the Windows administrator user group. If you

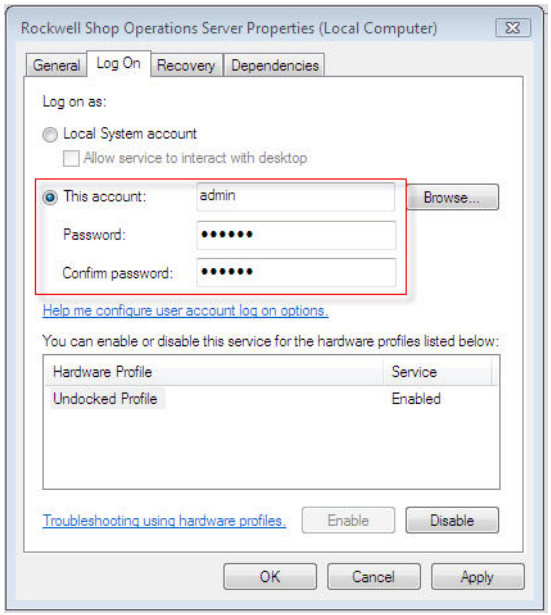
are not a Windows administrator but are in the administrator user group, perform the following steps.

a. To register Shop Operations Server as a service, open the Services console by going to Start > Run and entering services.msc.

b. In the list of services, right-click on *Rockwell Shop Operations Server* and select Properties.

c. Select the Log On tab, and select *This Account*.

Figure 0-1: Log On Tab



d. Enter the system administrator's user name and password, then click [OK].

e. Go to Start > All Programs > Accessories. Right-click on Command Prompt and select *Run as Administrator*. The command prompt window opens.

f. Change the location to <*SOS_install*>\bin.

g. Run the following command:

```
StartApp-NT.bat
```

h. To stop Shop Operations Server, run the following command:

```
StopApp-NT.bat
```

- If you want to use the Java wrapper, run the App.bat file located in the <*SOS_install*>\bin folder from the command line. This method automatically creates the wrapper.log file because it calls the Java wrapper to start Shop Operations Server. Use this method if you want the wrapper to restart the JVM if it is unexpectedly stopped.

NOTE: When using the Java wrapper with Windows, the socket connection may close unexpectedly at the OS level. See http://wrapper.tanukisoftware.com/doc/english/release-notes.html for details.

- If you do not want to use the Java wrapper, run the runSos.bat file from the command line. This file is also located in the <*SOS_install*>\bin folder. Running this file will not create the wrapper.log file.

Administering Shop Operations Server

The Shop Operations Server administration console allows the user to configure the system, view the event log, view event history, and monitor system performance. To access the administration console, go to http://<*server_name*>:<*port*>/ShopOperationsServer.

NOTE: If you are using Internet Explorer 9, please click the Compatibility View icon in your browser's address bar to display the administration console's login page correctly.

The GUI is customized based on which of the five system-defined groups the logged-in user is a member of. Access is defined as follows:

- PlantOpsGuest: can view statistics only, cannot change anything.
- PlantOpsOperator: can view statistics, view the error log, and invoke events.
- PlantOpsSupervisor: has PlantOpsOperator privileges plus the ability to turn statistics on/off and change the configuration of statistics gathered.
- PlantOpsDesigner: has PlantOpsSupervisor privileges plus the ability to change the event sheet configured to run on the Shop Operations Server.
- PlantOpsAdmin: has PlantOpsDesigner privileges plus the ability to configure the logged-in username/password and change the server configuration.

An ability to log out of the administration console is also provided. Online help is provided through the use of tool tips where appropriate.

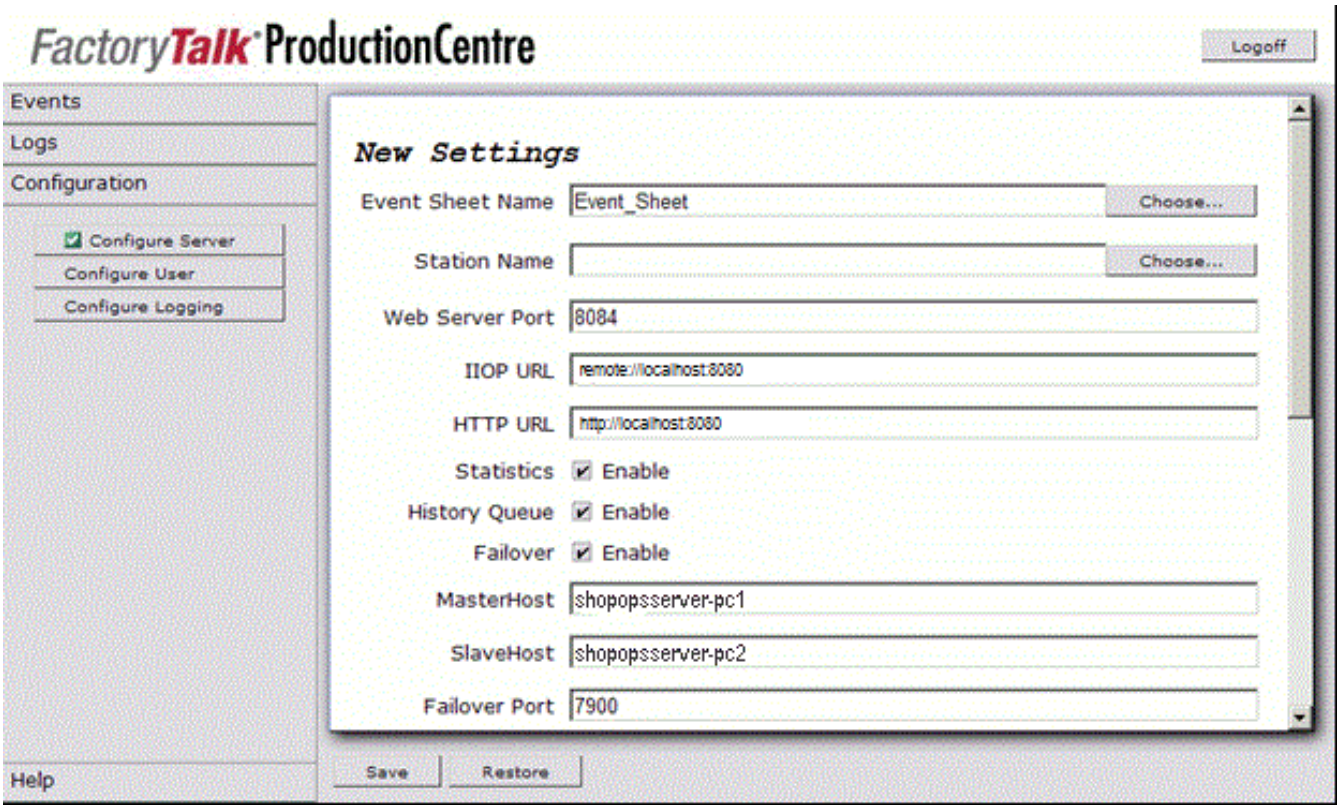
IMPORTANT: Before restarting either an application server or database server, stop Shop Operations Server, then restart it after the other servers are running.

NOTE: If Shop Operations Server is stopped while processing events, the currently executing event will be aborted and all outstanding events discarded. Therefore, the server should be stopped when it is idle (i.e., let all outstanding events complete first). The administration console can be used to choose a time when there is no activity by inspecting server status pages.

Configuring the Server

To configure the server, in the left navigation pane, click [Configuration], then [Configure Server].

Figure B-4: Configuring the Server



The following items, located in the *New Settings* section, can be configured for the server:

- Event Sheet Name: Select an event sheet from a list of event sheets stored in the database by clicking [Choose...] or enter the name of an event sheet in the database.
- Station Name: Select a station from a list of stations stored in the database by clicking [Choose...] or enter the name of a station in the database.
- Web Server Port: Enter Shop Operation Server's jetty port number.
- IIOP URL: A pre-configured default value is provided.

- HTTP URL: A pre-configured default value is provided.
- Enable the Statistics flag for charting purposes.
- Enable the event History Queue flag for monitoring purposes.
- Enable the Failover flag to enable and configure Shop Operations Server failover. Refer to the section "Configuring Failover" on page 88 for information on how failover works and instructions to fill in the MasterHost, SlaveHost, and Failover Port fields.

NOTE: If you want to preserve the existing settings in the ShopOpsServer.xml file, then be sure to save a copy of the file. Any changes you make will overwrite this file.

To save your changes to the ShopOpsServer.xml file, click [Save]. Changes to the following require a restart of Shop Operation Server:

- Event Sheet Name
- Station Name
- IIOP URL
- HTTP application server URL
- Embedded web server port number
- Failover Enable check box
- MasterHost
- SlaveHost
- Failover Port

To undo changes that have not been saved yet, click [Restore] before you click [Save]. This will reset the values to those stored in the ShopOpsServer.xml file.

The following field updates take effect immediately and do not require a server restart:

- Enable statistics flag
- Enable history queue flag

Configuring the User

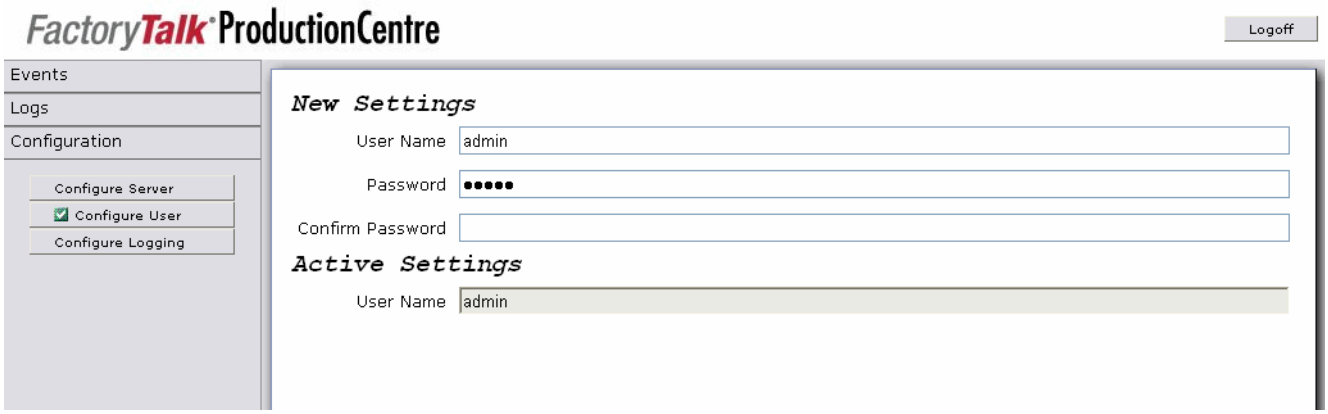
The Configure User screen allows the administrator to specify the username and password of the logged-in user who will be processing event sheets. To configure the user, in the left navigation pane, click [Configuration], then [Configure User]. Enter or confirm the following information, and then click [Save] to save the information to the ShopOperationsServer.xml file.

- User Name
- Password

- Confirm Password

Once you have saved your changes, the configuration populates the *Active Settings* section. This section displays the currently saved configuration and is read-only.

Figure B-5: Configuring the User



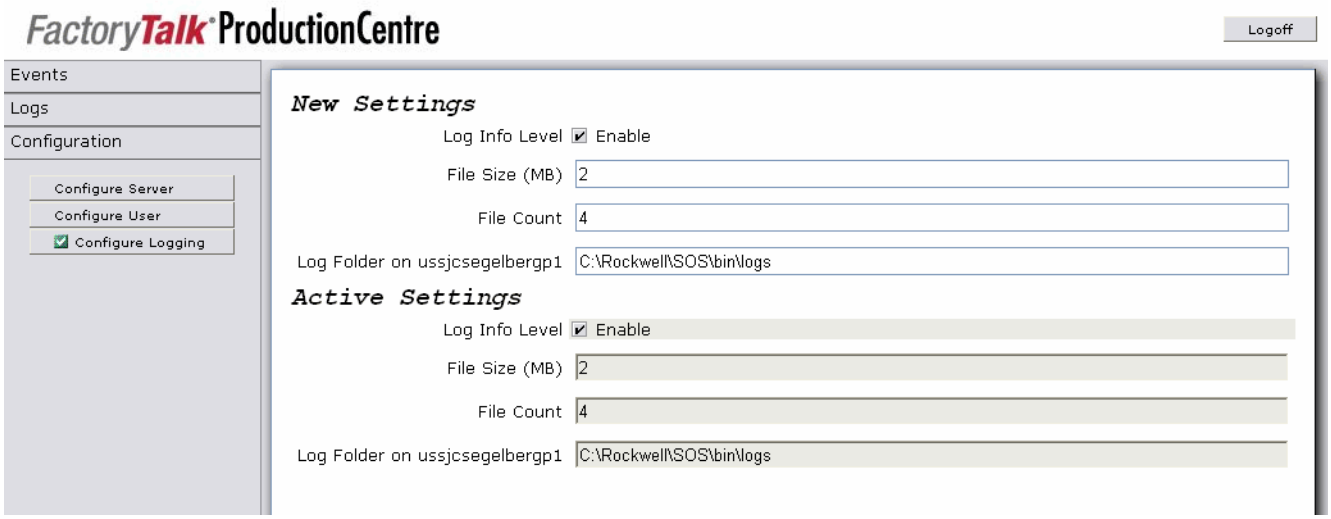
Configuring Logging

The Configure Logging screen allows the administrator to edit server logging parameters. To configure logging, in the left navigation pane, click [Configuration], then [Configure Logging]. Either accept the default configuration parameters or enter your own information.

- Log Info Level: Enable this flag if you want informational messages as well as errors to be logged. If not enabled, then only errors will be logged. Note that informational logging will negatively impact performance.
- File Size: Enter the maximum file size to allow in megabytes for each log file.
- File Count: Enter the maximum number of files to keep on disk. The oldest file past the file count will be deleted.
- Log Folder on <*machine name*>: Define the path on the specified machine to the location of the log files. The name of each log file is ShopOpsServerLogX.X.xml where X.X indicates the log's rollover sequence. The most recent log is always numbered 0.0, and the next most recent is 0.1, etc. This file logs information about the execution of the event sheet currently running, such as scripting errors and events that have fired. Once you have saved your changes, the configuration populates the *Active Settings* section. This section displays the currently saved configuration and is read-only.

IMPORTANT: If you have multiple instances of Shop Operations Server installed on one machine, each instance must have a unique log folder defined.

Figure B-6: Configuring Logging



Using Event Sheets

NOTE: The following section provides a general overview of the structure and function of event sheets. For detailed instruction on creating and configuring event sheets, please refer to the Process Designer and Objects Online Help.

Event sheets provide a framework for developers to create GUI-less applications. Shop Operations Server provides a runtime environment for executing script in event sheets. Event sheets can also be debugged in test mode in Process Designer. An event sheet:

- Is a top-level object (like a form).
- Contains definitions of events grouped into a container type. Event containers have properties and their events have associated script. The types of event containers are as follows:
  - ActivityEvent: allows the application developer to specify an event to configure, execute, and monitor the execution of activities.
  - ActivitySetEvent: allows the application developer to specify an event to configure, execute, and monitor the execution of activity sets.

  - CalendarEvent: allows the application developer to specify an event that fires based on the Gregorian calendar.
  - JMS MessageEvent: allows the application developer to send and receive JMS messages using an event sheet.
  - LiveDataEvent: allows the application developer to specify an event that fires based on data from the Live Data server.
  - MessageGroup Event: provides communication capability over a JGroup channel.
  - SerialEvent: allows the application developer to specify an event that fires based on data received on a serial port.
  - SocketEvent: allows the application developer to specify an event that fires based on data received on a socket.
  - TimerEvent: allows the application developer to specify an event that repeats after a specified time interval.
  - WebServiceEvent: allows the application developer to specify an event that is invoked by an external web services operation.
  - UserWebServiceEvent: allows the application developer to specify an event that is invoked by an external user-defined web services operation.
- Supports standard import/export behavior to a DSX file.
- Has script executed when an event occurs.
- Has properties.
- Has events.

Some events in the containers must be triggered by an external application:

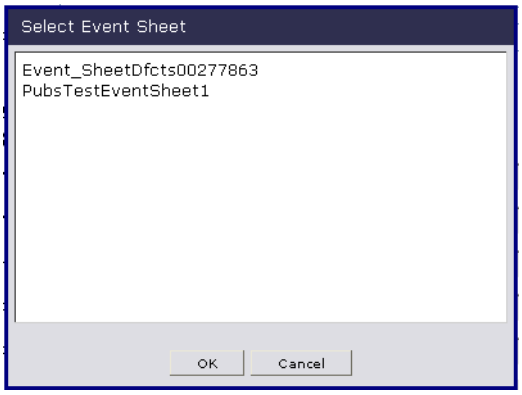
- JMS Message: a JMS messageEvent (receiver) is triggered when a JMS message is received.
- Live Data: an OPC server that is monitoring tag values is the source for data change events. The *readComplete* and *writeComplete* events are triggered whenever an asynchronous read or write to a tag completes. The *shutdownRequest* event is triggered when a request is made to shut down an OPC server. The *cancelComplete* event is triggered when an asynchronous read or write is canceled.
- Message Group: the messageGroupEvent is triggered when another form or event sheet sends an application message or when a shared hash table or queue data structure is modified by another form or event sheet.
- Serial: the dataReceivedEvent is triggered when data is received on a serial communication port.
- Socket: the dataReceivedEvent is triggered when data is received on a Windows socket.

- Web Service: the webServiceEvent is triggered when the signalEvent() operation is invoked on the web services interface.
- User Web Service: the userWebServiceEvent is triggered by the user-defined web services class that was created by extending the UserService class.

Run an Event Sheet

1. Log on to the Shop Operations Server administrative console.
2. Choose an event sheet from the server configuration page or type in its name.

Figure B-7: Select Event Sheet



3. Stop Shop Operations Server by navigating to <*ShopOpsServer_install*>\bin in Windows Explorer and double-clicking on StopApp-NT.bat to stop the Windows service.
4. Restart Shop Operations Server by navigating to <*ShopOpsServer_install*>\bin in Windows Explorer and double-clicking on StartApp-NT.bat to start the Windows service.

IMPORTANT: If you make any changes to an event sheet that is running in Shop Operations Server, you must stop and restart all instances of Shop Operations Server running that event sheet. This guarantees that the latest version of the event sheet is being executed.

Monitor the Event Sheet

The Shop Operations Server administration console allows the user to monitor the event sheet's performance in a number of different ways. The purpose of the Shop Operations Server event pages and charts is to help you understand how your server is performing.

View Event Status

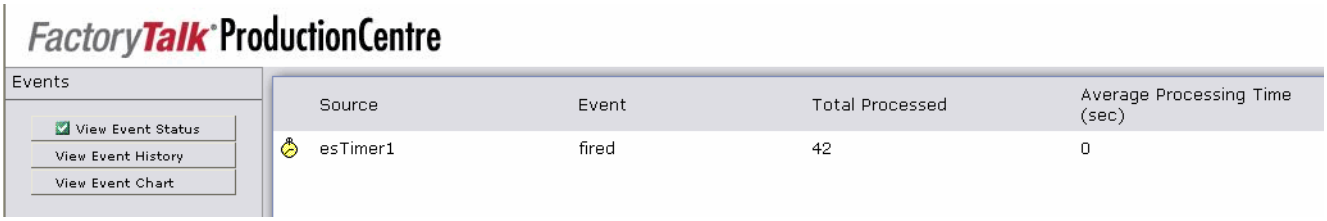
The navigation buttons at the bottom of the View Event Status screen allow you to view the following information about your events.

Figure B-8: Bottom Pane Navigation Buttons

- "Events Summary" consists of a table with the following columns:
  - Source: the source of the event.
  - Event: the name of the event.
  - Total Processed: the number of events processed.
  - Average Processing Time (sec.): the average amount of time in seconds required for processing the event.
  - Maximum Processing time (sec.): the maximum amount of time in seconds required for processing the event.

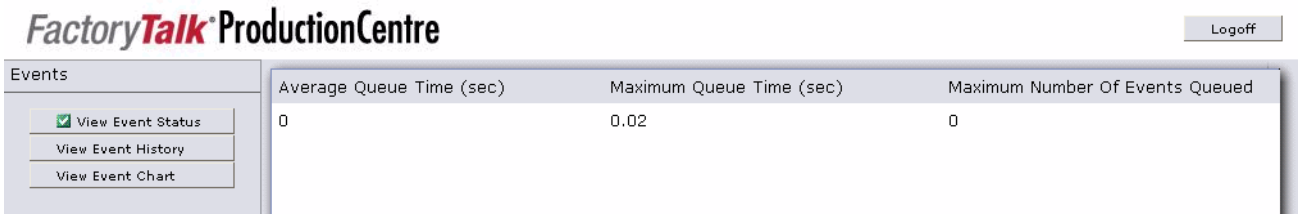
  If an event source has unusually large processing times compared to the others, it could indicate that this event is taking too long to execute and thus is a candidate for optimization. Also, if there is a big difference between the average and maximum times, this could indicate that the server is not performing in an optimal manner.

Figure B-9: Events Summary



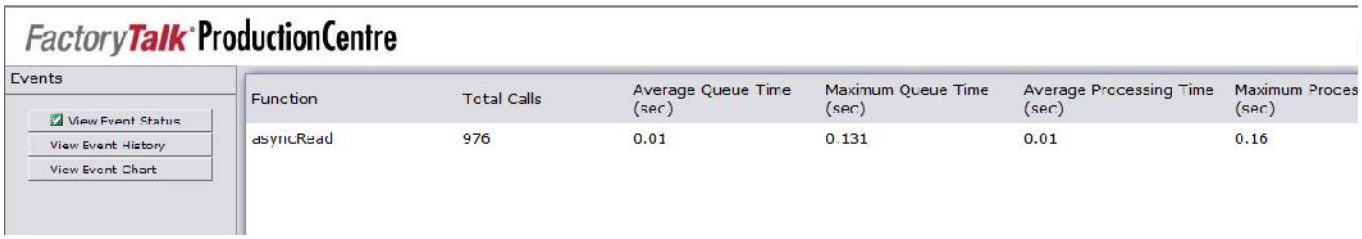
- "Queue Time" shows the average time an event spent in the queue, the maximum time spent in the queue, and the maximum number of events that were waiting in the queue. Large queue times and a large queue count indicate that the server is not processing events fast enough to keep up with new ones arriving.

Figure B-10: Queue Time



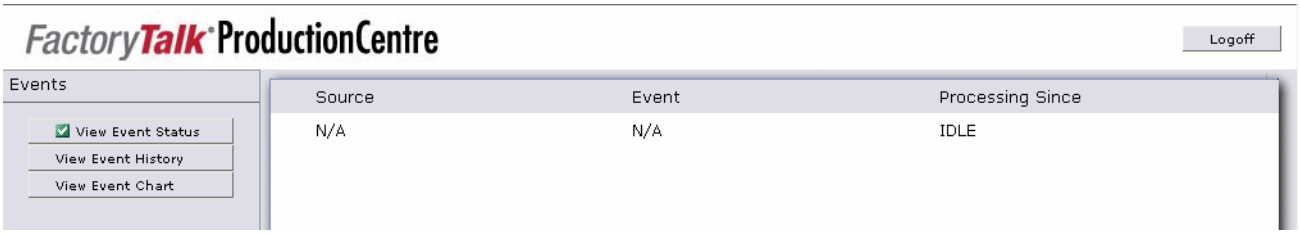
- "Function Thread" shows the total number of times the function was called, the average and maximum queue times for the event that called the function, and the average and maximum processing times for the event that called the function. This information can be used to identify script code isolated to a particular event sheet function that could be a candidate for performance optimization.

Figure B-11: Function Thread



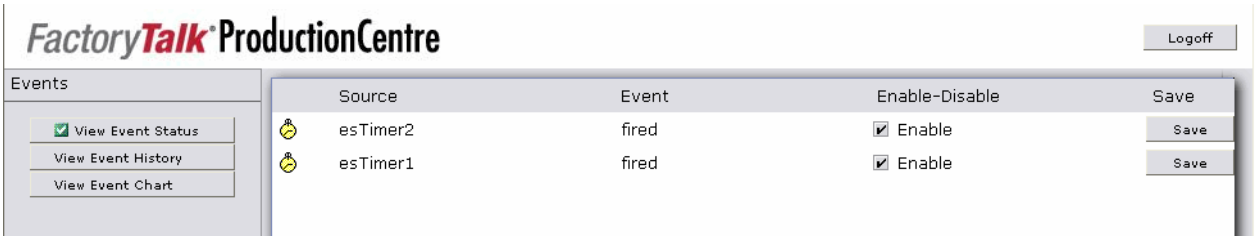
- "Current Event" shows the currently executing event source, the name of the event, and the time when it started processing. A single event that takes an exceptionally long time to process could either indicate inefficient script code or a large amount of processing that needs to be done.

Figure B-12: Current Event



- "Manage Event" allows the user to temporarily enable or disable each event in the event sheet from within the Administrative Console. To enable or disable an event, click the checkbox in the Enable/Disable column in the appropriate row. Clicking [Save] in the row of the event that has been enabled or disabled updates that event definition and saves the entire event sheet.

Figure B-13: Manage Event



- "Refresh" updates the results displayed in the table using the most current information available.

NOTE: The tables are not refreshed automatically.

- "Reload" updates the event sheet using any changes saved in Process Designer since the server was started. This button is disabled when failover is enabled.

NOTE: If you delete or rename your currently running event sheet in Process Designer, clicking Refresh or Reload will not affect your event sheet's performance. Event sheets are stored in Shop Operations Server's cache. To clear the cache, you must stop and restart Shop Operations Server for your changes to take effect.

View Event History

The View Event History screen displays the following columns:

- Source: the source of the event
- Event: the name of the event
- Event time: the time the event was put into the processing queue
- Queue Time: the amount of time spent in the queue
- Processed time: the time the event started processing
- Processing time (sec.): the amount of time in seconds spent processing the event

A large queue time indicates that the server is not keeping up with new events coming in. A large processing time could indicate inefficiencies in the script code.

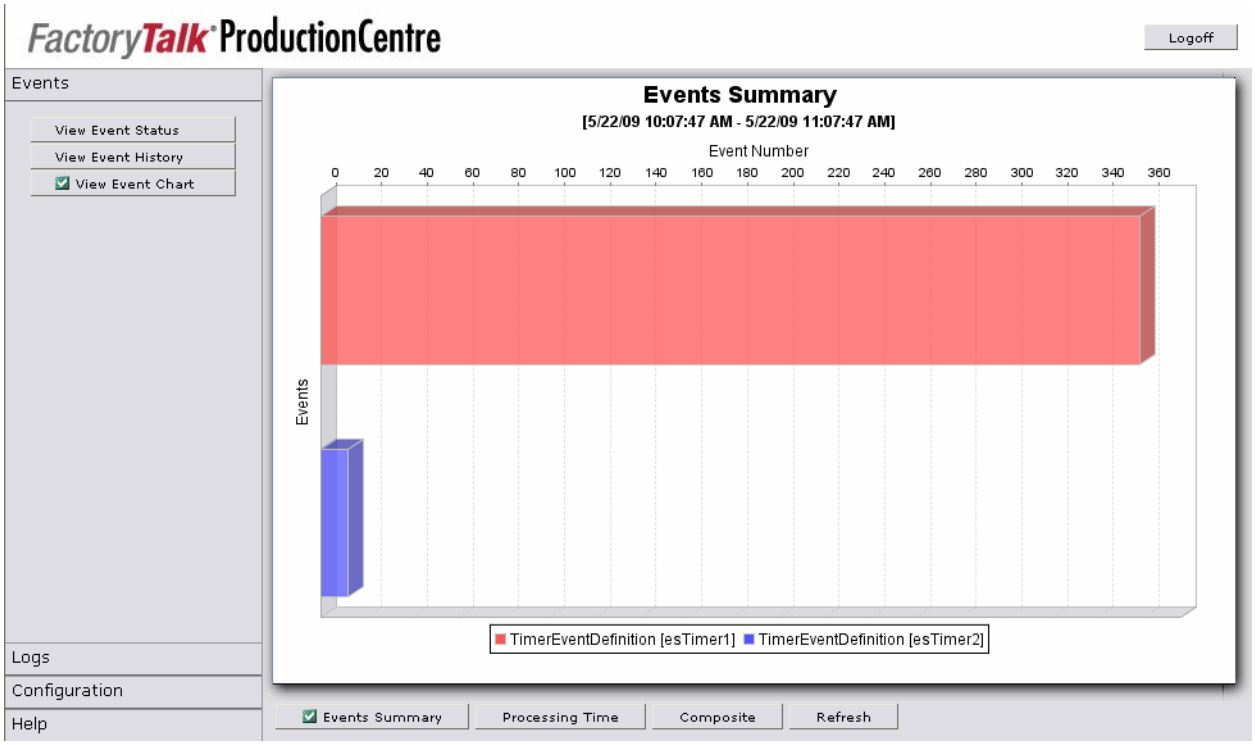
Figure B-14: View Event History

View Event Chart

View Event Chart allows the user to view a variety of reports about the events being processed. The reports include:

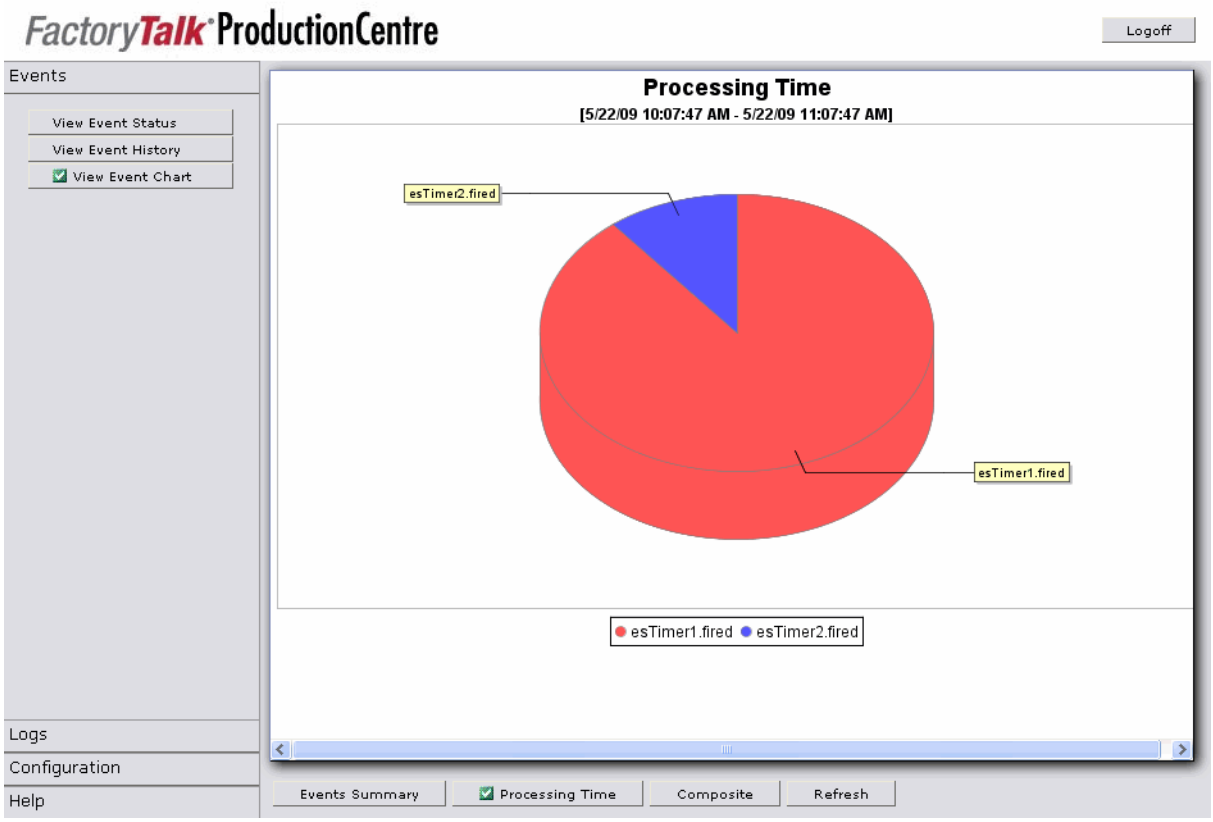
- **Event Summary**: a bar chart of the count of events processed, separated according to event source. A large number of events of a particular source could be expected, or it could indicate that the volume is higher than anticipated.

Figure B-15: View Event Chart



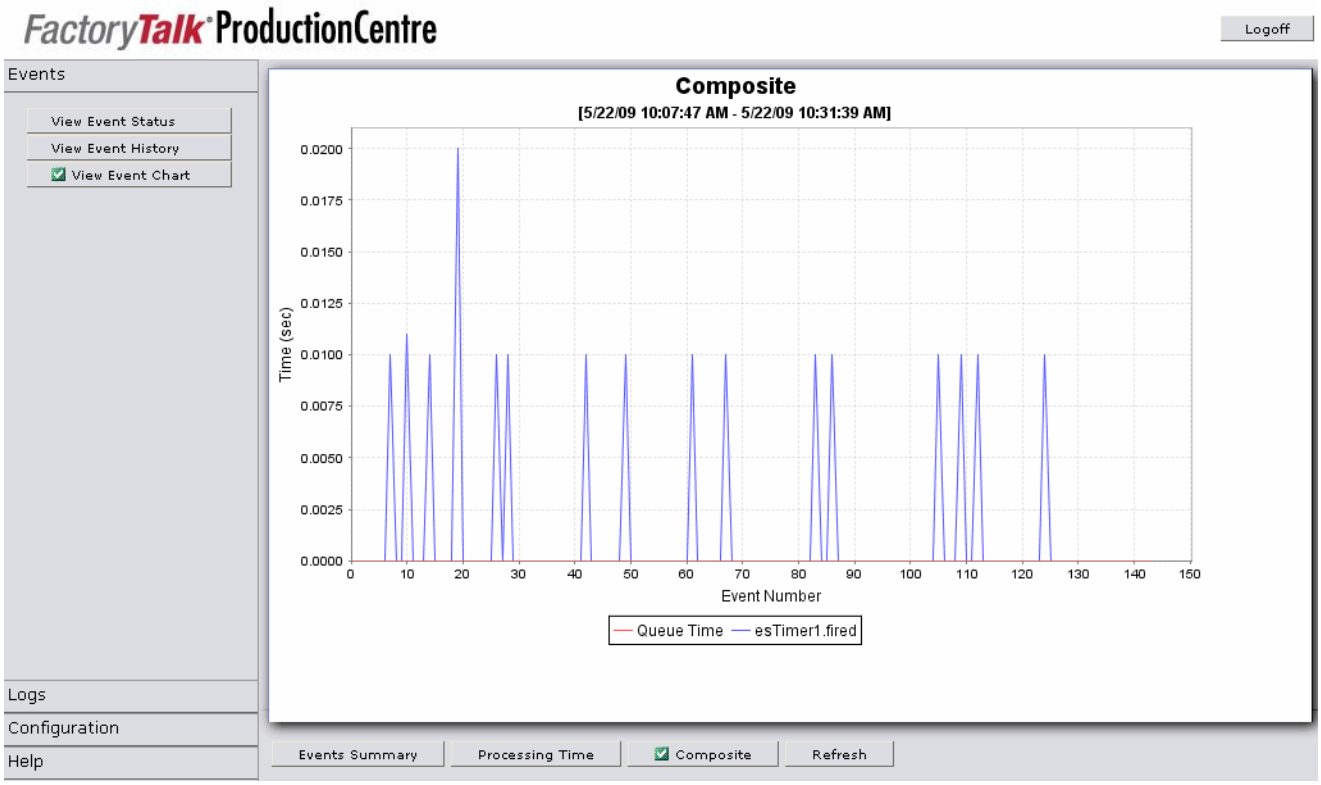
- **Processing Time**: a pie chart of the total processing times by event source. A large portion of the pie indicates that this event source is consuming the majority of the available processing time compared to other events. This might be expected, or it could indicate inefficient script.

Figure B-16: Processing Time Pie Chart



- **Composite**: shows a line chart for queue and processing times by event (new events are recorded on the right-hand side of the chart). A queue time that tends to increase over time indicates that the server is not keeping up with the volume of new events coming in. Large processing times could indicate inefficient script.

Figure B-17: Composite Chart



- "Refresh" redraws the charts using the most current information available.

Viewing Logs

The Shop Operations Server administration console allows the user to view the following types of logs:

- Error/Informational Logs
- Println Outputs
- Application Logs

Viewing Error/Information Logs

The View Logs screen displays information about any informational or error entries logged. Each log entry includes the following information:

- an icon that indicates whether the entry is for an error or is informational only. Depending on the type of entry, one of the two following icons will be displayed:
  - An informational entry will include a light bulb.
  - An error entry will include a traffic warning sign.

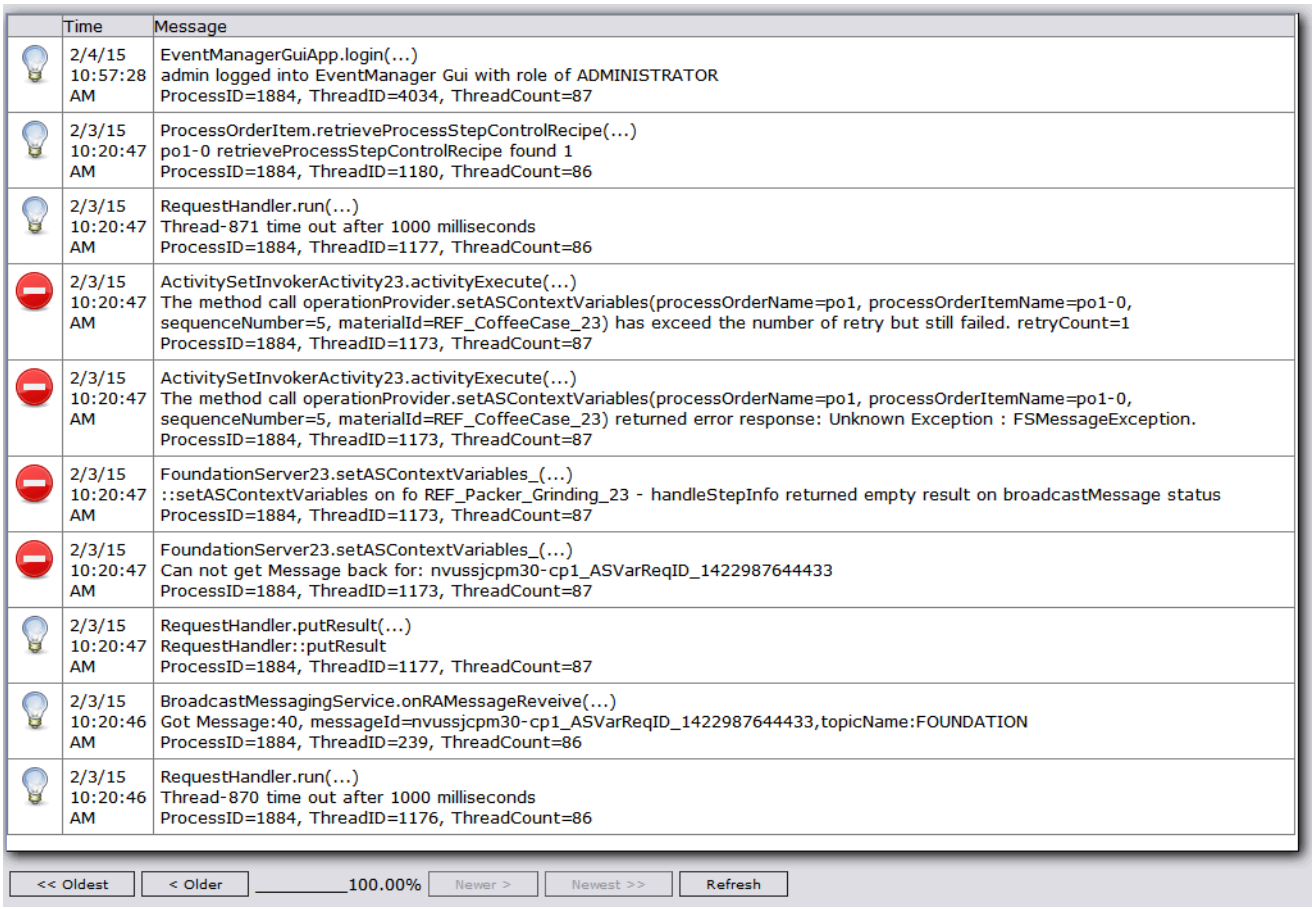
- time the log entry was created.
- detailed information about the entry.

When the server is not executing script as expected, use the View Logs screen to see if any errors were logged that would indicate the root cause of the problem.

- [<<Oldest] shows the page with the oldest log entries.
- [<Older] shows the next page with older log entries.
- [Newer>] shows the next page with newer log entries.
- [Newest>>] shows the page with the newest log entries.
- [Refresh] rereads the log file from the disk.

An indicator of the current page's relative position in the log file is displayed. For example, "20%" indicates that the current page is 20% of the way through all entries in the log file.

Figure B-18: Error/Information Log



Logging Debug Messages

If you want the Error/Information log to list debug messages as well, set the log level to FINE in the ShopOperationsServer.xml file located in the *<SOS_Install>*\bin folder. This level is set to INFO by default.

```
<log-level>INFO</log-level>
```

NOTE: This setting also affects the Plant Operations Server and Client logs as well as any Foundation Server and Live Data entry in these logs.

If you no longer want the debug messages to appear in the Error/Information log, set the log level back to INFO or SEVERE.

It is also recommended that you increase the log file count to at least 10. The default is 4.

```
log-file-count="4"
```

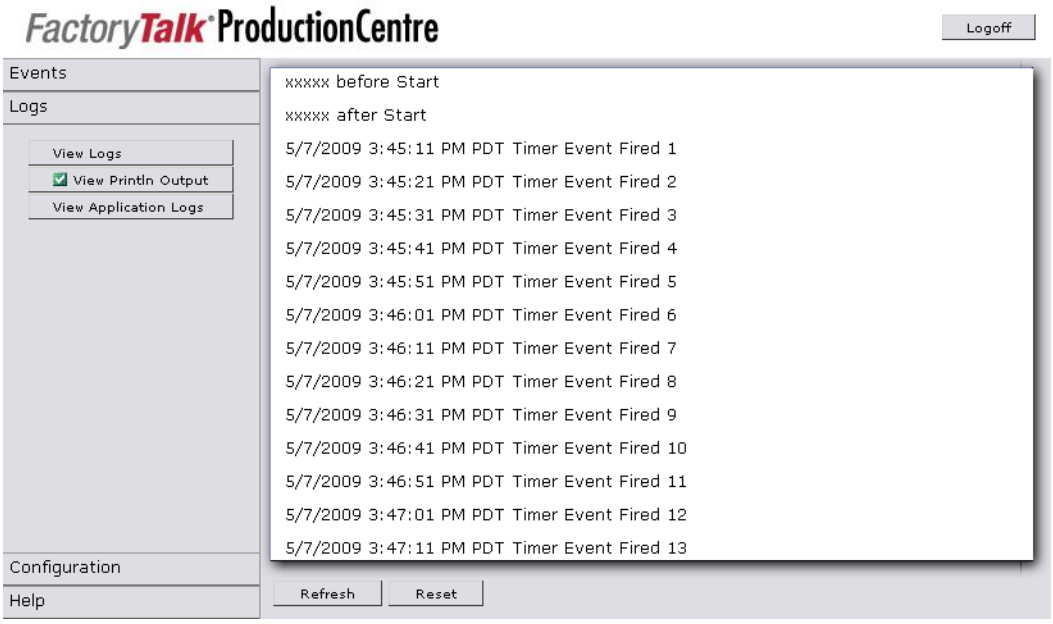
Viewing Println Output

The View Println Output screen displays the output that has been scripted inside the event sheet (i.e., messages generated by the println() method). The most recent 500 println messages are stored and displayed with the oldest message being displayed first.

Click [Refresh] to fetch the latest data that Shop Operations Server has generated. The console does not automatically refresh the screen after it is first displayed.

Click [Reset] to clear all previously collected data from Shop Operations Server. Restarting Shop Operations Server also clears all previously collected data.

Figure B-19: View Println Output



Viewing Application Logs

The View Application Logs screen enables you to view a list of application log messages filtered by the Application object, date, and time. These messages are stored for 30 days by default and then purged.

An Application Log stores an application's debugging messages. These messages are the application log items that are created and enabled in Process Designer using the Application object editor and then written to the Application Log using the *writeApplicationLogMessage (ApplicationLogItem, String)* method. Application log items are written to the Application Log if both of the following conditions are met:

- ❑ The application log item is enabled.
- ❑ If the application log item is a child of another application log item, the parent application log item is also enabled.

Please see the *Process Designer and Objects Help* for more information on creating and enabling application log items.

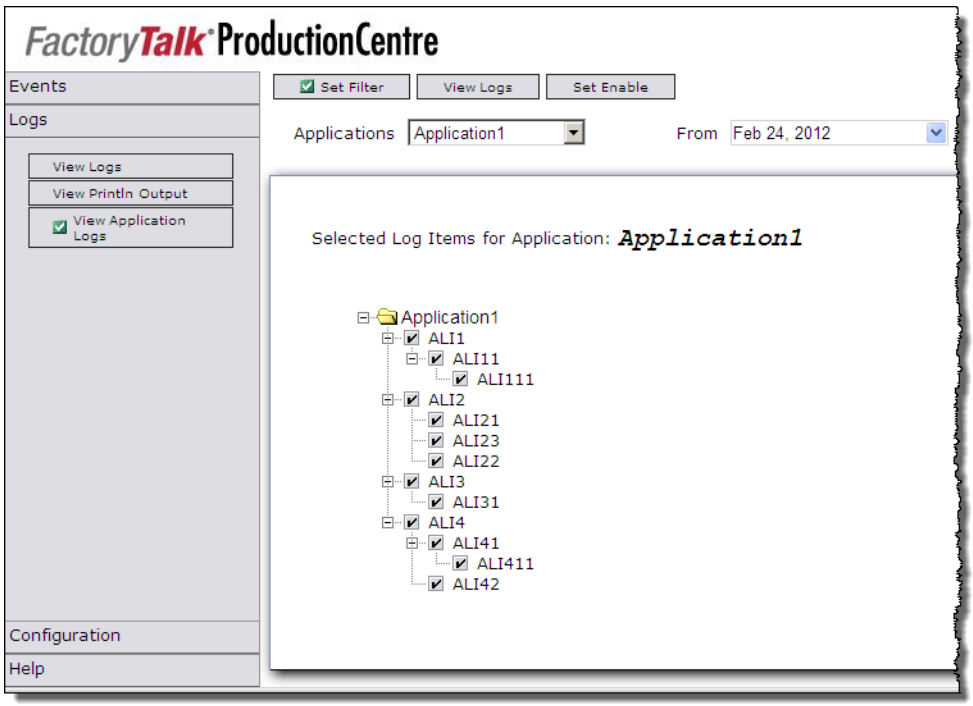
Application Logs are located at C:\.FTPC\<*serverHost*>\ProductionCentre\logs\ApplicationLog. The log for each client is only available on that specific client.

To view an Application Log:

1. Go to Logs > View Application Logs.

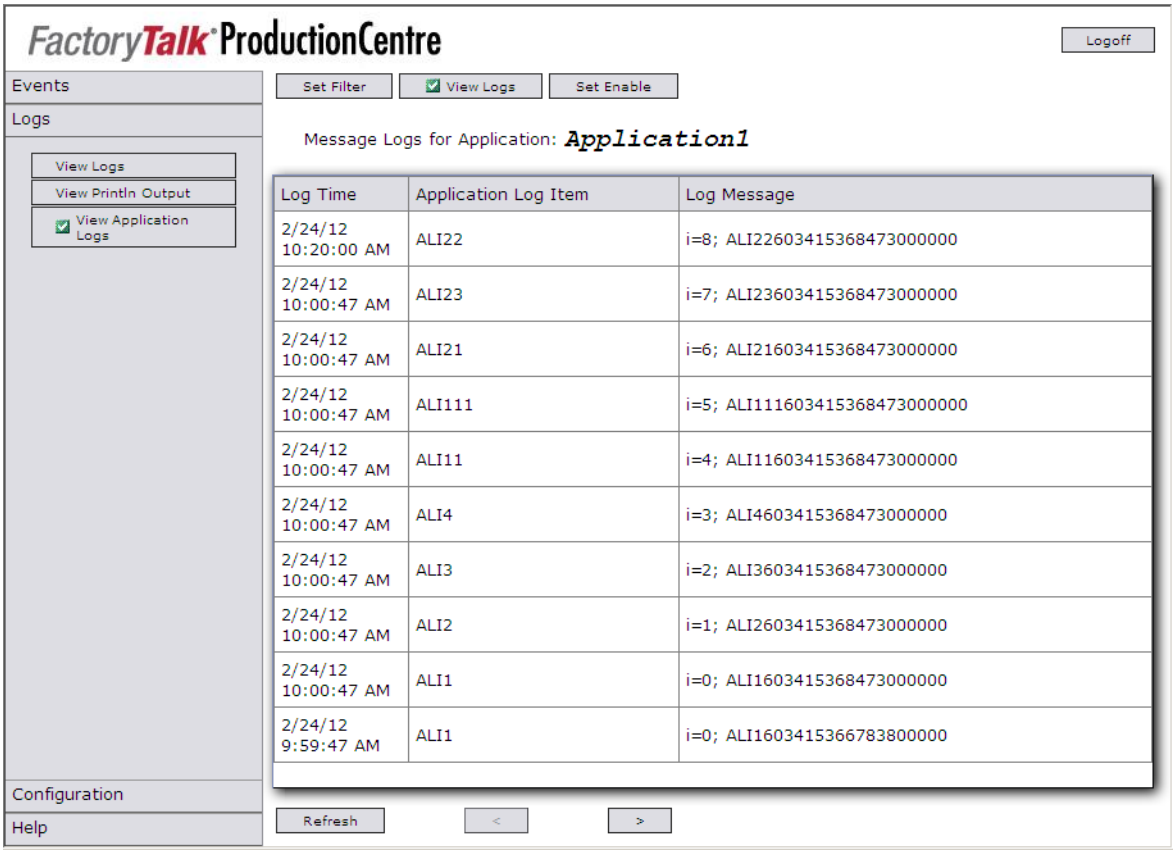
2. Select an Application object, a day, and a time period using the drop-down menus at the top of the screen. The application and its corresponding application log items for the selected objects display.

Figure B-20: Set Filter Display



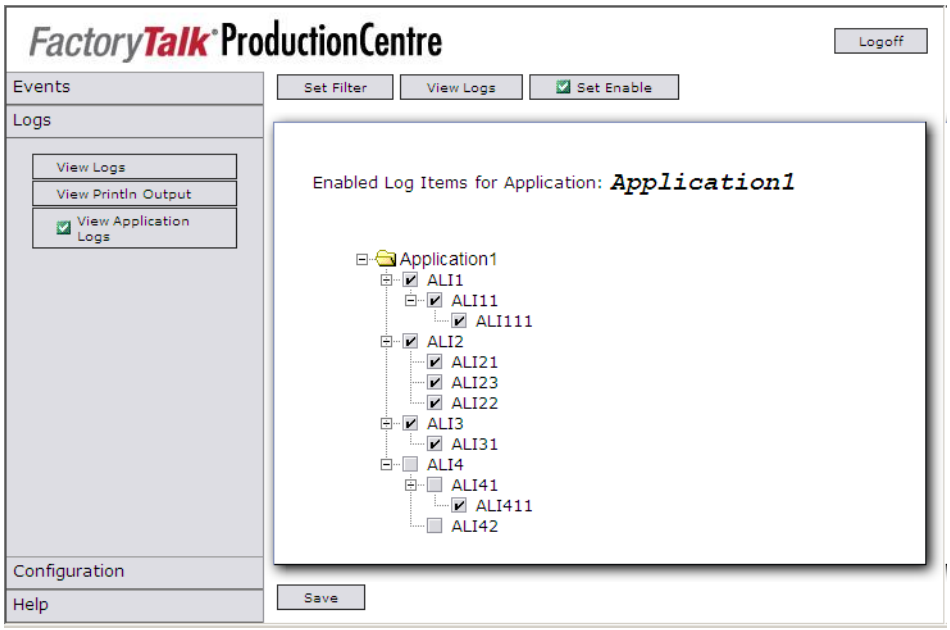
3. Select the items you want displayed in the Application Log.
4. Click [View Logs] to display the Application Log. Use the [<] and [>] buttons to navigate through the log.

Figure B-21: View Logs Display



5. Click [Refresh] to redisplay the log after changing the filtering criteria or to display the most up-to-date messages. The console does not automatically refresh the screen after it is first displayed.
6. Click [Set Filter] to change the application log items displayed in the Application Log.
7. Click [Set Enable] to enable and disable application log items.

Figure B-22: Set Enable Display



8. Select the items you want enabled or disabled and then click [Save]. Your changes will be reflected in Process Designer after you have refreshed Process Designer.

Configuring Failover

Two Shop Operations Server instances running the same event sheet can be configured with master and slave roles to provide failover capability for the event sheet. The master and slave instances run as a two-instance cluster in an active-standby configuration with the two instances running on separate physical or virtual machines with unique IP addresses. Both instances must be identically configured with the same event sheet. Each instance runs only one event sheet.

Configuration for failover is performed using the Shop Operations Server administration console for each instance (Figure B-4 on page 71). The IP addresses or hostnames of the machines running the master and slave instances are explicitly entered together with a common port number. This configuration allows a TCP connection to be established between the master and slave instances. This connection is used to send messages between the master and slave instances to establish that each instance is performing its role as master or slave. The messages are sent between a default interval period of 500 milliseconds. This interval period is known as the *failover ping period*.

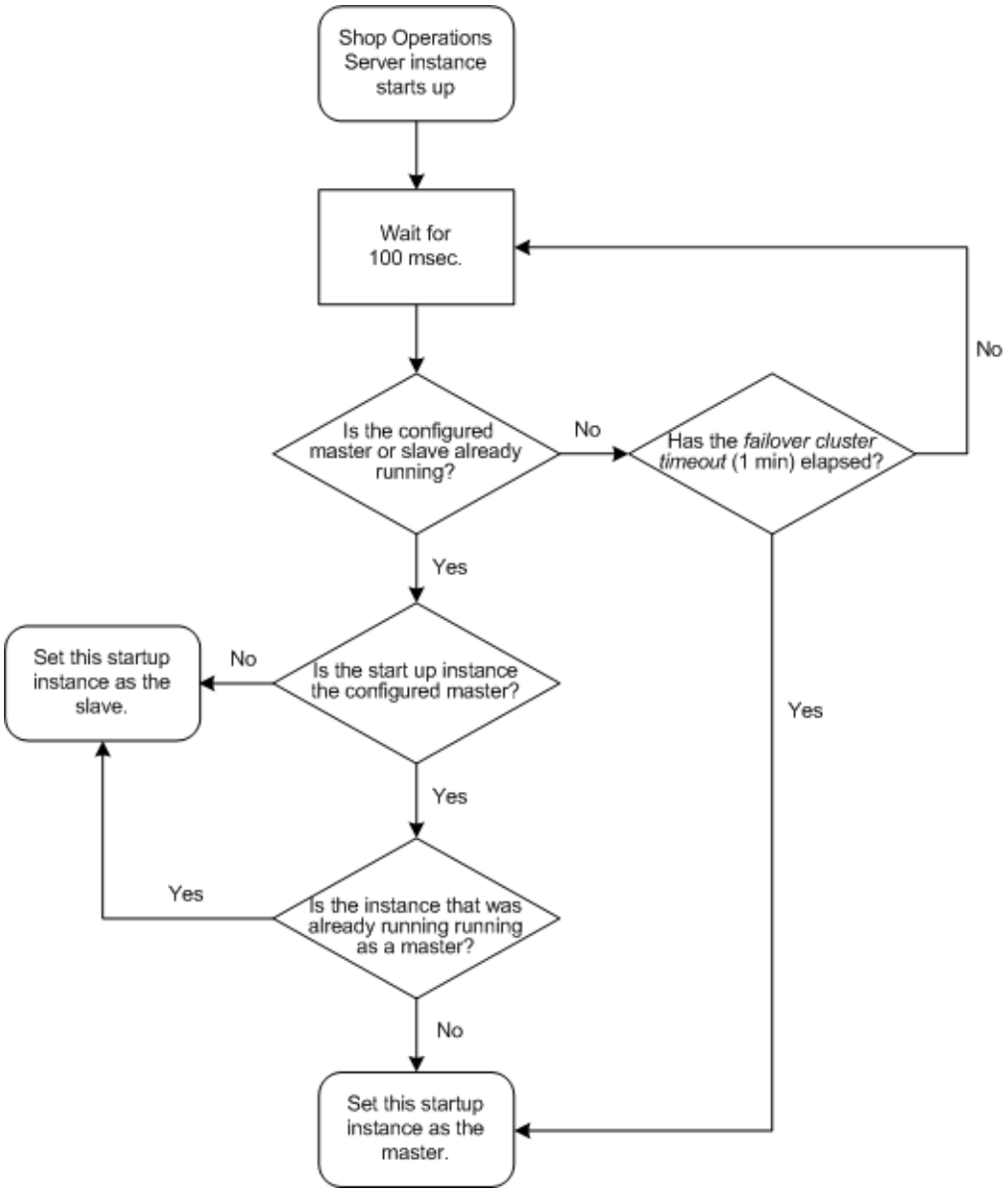
During startup, the master should be started before the slave. Thereafter, the slave must be started and running within 60,000 milliseconds (1 minute) of the startup of the master in order for the slave to be acknowledged. If the slave takes longer to start up and run, the master will start processing first. If the slave starts up later, it

will join the running master in a cluster as the slave instance. This time period when the master waits for the slave to start up is known as the *failover cluster timeout*.

If the configured slave is started before the master, it will wait the duration of *failover cluster timeout* for the master to start. If the master is not started and running after *failover cluster timeout* has elapsed, the configured slave is promoted to be the master instance and starts processing its event sheet. Thereafter, if the configured master is started, it will detect that a master instance is already running and will demote itself to be the running slave instance.

The flowchart in Figure B-23 describes the logic used by each Shop Operations Server instance when it starts up.

Figure B-23: Startup logic for the master or slave Shop Operations Server instance



To determine if the master instance has failed, the slave instance uses the consecutive occurrence of the following two criteria:

- when no message is received from the master after an interval period of 500 milliseconds (the *failover ping period*), and
- the last message received from the master is older than 3,000 milliseconds; this time value is known as the *failover connection timeout*.

NOTE: If you need to change the default values of *failover ping period*, *failover cluster timeout*, or *failover connection timeout*, contact Rockwell support.

When these two criteria are met, the master is assumed to have failed. The slave instance is promoted to be the master instance and begins processing as the master. If the configured master is started up successfully later, it detects that an existing master is running and demotes itself to be the slave instance.

NOTE: In order for the slave to promote itself to the master, it must verify that it can communicate with JBoss using port 7. Please make sure port 7 is not blocked.

To configure Shop Operations Server for failover, do the following for both the master and slave instances:

1. Open a browser and go to http://<*ShopOpsServer_name*>:<*jetty_port*>/ShopOperationsServer.
2. When the Shop Operations Server Login page (Figure B-2) appears, enter your username and password. The default login user/password is admin/admin.
3. When the administration console web page appears, in the left navigation pane, click [Configuration], then [Configure Server].

   The server configuration settings web page (Figure B-4) appears.
4. To enable the current Shop Operations Server for failover, click the Failover check box.
5. In the MasterHost field, enter the IP address or hostname of the physical or virtual machine running the master Shop Operations Server instance.
6. In the SlaveHost field, enter the IP address or hostname of the physical or virtual machine running the slave Shop Operations Server instance.

NOTE: Do not enter “localhost” in the MasterHost or SlaveHost field. Also, if you are using two VMware virtual machines for failover, one to run the master Shop Operations Server instance and one to run the slave Shop Operations Server instance, specify the IP address assigned to the VMware network adaptor of each virtual machine in the MasterHost or SlaveHost field.

7. In the Failover Port field, enter the port number that is used for master-slave communication. This value must be between 1025 to 65535. The default is 7700.
8. Click [Save] to save the changes you made.
9. Restart the Shop Operations Server.

10. Ensure that you enter identical settings for both the master and slave instances.

Limitations

When a connection failure occurs between the master and slave instances that does not involve failure of the master instance, such as a network connection failure, a scenario can occur where two master instances exist concurrently. For example, assume that the configured master and slave instances are running in their respective roles when a network connection failure occurs between them. During this network failure, the slave instance does not receive any messages from the master instance after the *failover ping period*, and the last message received from the master was older than the *failover connection timeout* value. The slave instance concludes that the master has failed, promotes itself to be the new master instance, and starts processing its event sheet. All this while, the configured master instance is still running but not communicating with the configured slave instance. When the network connection is recovers, two conflicting master instances exist.

When two master instances are detected, the system will restart the master node that has the shorter run cycle, and that node will become the slave node.

If there is a communication loss or a temporary promotion from slave to master, when network stability is restored, the longest-running node becomes the designated master.

Uninstalling Shop Operations Server

To uninstall the Shop Operations Server, run the UninstallApp-NT.bat script. This script uninstalls the Shop Operations Server Windows service. Once you have done that, back up your installation directory at <*ShopOpsServer_install*> and then delete it.

Upgrading Shop Operations Server

To upgrade FTPC, you must uninstall the old version and install the newest version of SOS. For directions on how to uninstall SOS refer to “Uninstalling Shop Operations Server” on page 92. Make sure that SOS is completely uninstalled before reinstalling the newest version. Refer to “Installing Shop Operations Server” on page 64 for instructions on how to properly install SOS.

Appendix C

Troubleshooting

In this appendix

The following sections describe troubleshooting methods for FTPC issues you may encounter.

Viewing Available Log Files

If you encounter errors when running FTPC, refer to the log files listed in the following sections for information about the errors.

NOTE: The rockwell_client_dir define controls where the log files are stored by SOS and <*serverHost*> is the name of the machine on which the client JAR files are downloaded. If you define rockwell_client_dir, the location of the log files will change. For more information on how to change the default location, please refer to "Installing as a Windows Administrator" on page 64.

Server-Side Log Files

Depending on the error messages you receive, refer to the log files saved on the application server machine in the following directories:

Table C-1 Server-Side Log File Locations

Category	Log File Location
Messages generated if you are running JBoss as a Windows service using the local system account	For **Windows 2008** and **2012**, the default location for this directory is: C:\Users\<*user_home*>\AppData\Roaming\Rockwell Automation\FactoryTalk ProductionCentre\logs, where <*user_home*> is the home of the user that starts JBoss.
Errors related to migration and messages concerning initializing, migrating, and reorganizing databases using FTPC Administrator	For **Windows 2008** and **2012**, the default location for this directory is: C:\Users\<*user_home*>\AppData\Roaming\Rockwell Automation\FactoryTalk ProductionCentre\logs\PlantOpsAdminServer\DsPlantOpsAdminServer.html, where <*user_home*> is the home of the user that starts JBoss.
Errors related to middle-tier issues	For **Windows 2008** and **2012**, the default location for this directory is: C:\Users\<*user_home*>\AppData\Roaming\Rockwell Automation\FactoryTalk ProductionCentre\Logs\PlantOpsServer\plantOpsServerLog.html, where <*user_home*> is the home of the user that starts JBoss. If you want to log debug messages as well, set the logging level to FINE. See "Logging Debug Messages" on page 84 for details.

Once a log file reaches a certain size, the logging information is sent to a new log file, so multiple files may be present in these directories. To locate the most recent log file, look at the file with the latest timestamp and a name ending in .html.

Client-Side Log Files

If you receive FTPC errors while running the application as a client, look for the following folder:
C:\.FTPC\<*serverHost*>\ProductionCentre\logs\PlantOpsClient\PlantOpsClientLog.html

Once a log file reaches a certain size, the logging information is sent to a new log file, so multiple files may be present in this directory. To locate the most recent log file, look at the file with the latest timestamp and a name ending in .html.

If you want the PlantOpsClientLog.html file to log debug messages as well, set the logging level to FINE. See “Logging Debug Messages” on page 84 for details.

Consolidated Log

The CONSOLIDATED_LOG database table contains messages from the following clients:

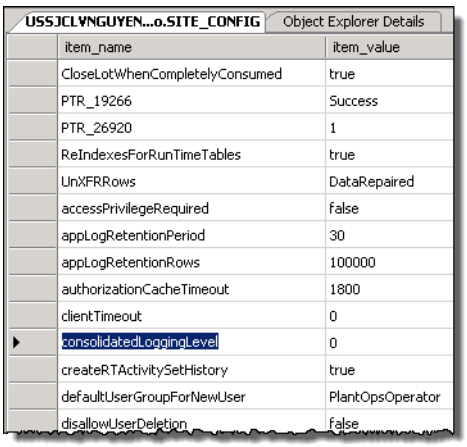
- Shop Operations
- Shop Operations Server
- The Middletier
- Any WebServices client running through a proxy server (See “Running FTPC Through a Proxy Server” on page 98 for details.)

Any messages that are currently logged to the PlantOpsClient log file should also be logged in the Consolidated Log. Using this centralized view of log messages across clients, you can isolate and investigate information logged based on specific criteria (for example, information from a particular Shop Operations Server client). Each entry captures both client and server times for the log message as well as other details (client type, client ID, severity level, etc.).

To enable logging to this log, do one of the following:

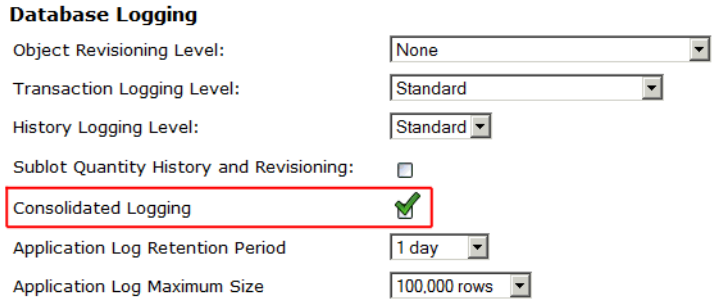
- Set the **consolidatedLoggingLevel** property in the SITE_CONFIG database table to 1.

Figure C-1: Consolidated Log Configuration (SITE_CONFIG)



- ❑ In FTPC Administrator, check the **Consolidated Logging** property in the Database Logging section of the Database Configuration screen.

Figure C-2: Consolidated Log Configuration (FTPC Administrator)



You can view the log messages from the CONSOLIDATED_LOG database table and query for log messages based on specific client criteria using the FTPC Administrator. See the *FactoryTalk ProductionCentre Administrator User's Guide* for details.

Application Log

An Application Log stores an application's debugging messages. These messages are the application log items that are created and enabled in Process Designer using the Application object editor and then written to the Application Log using the *writeApplicationLogMessage (ApplicationLogItem, String)* method. Application log items are written to the Application Log if both of the following conditions are met:

- ❑ The application log item is enabled.
- ❑ If the application log item is a child of another application log item, the parent application log item is also enabled.

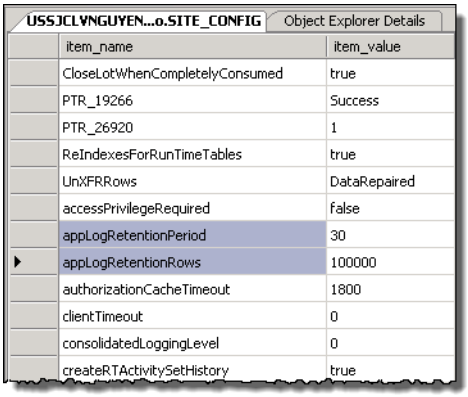
Please see the *Process Designer and Objects Help* for more information on creating and enabling application log items.

Application Logs are located at C:\.FTPC\<*serverHost*>\ProductionCentre\logs\ApplicationLog. The log for each client is only available on that specific client.

You can configure the Application Log by defining the following properties in either the SITE_CONFIG database table or FTPC Administrator:

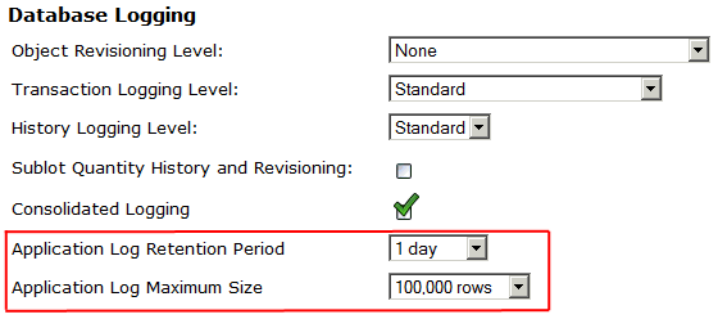
- **appLogRetentionPeriod (SITE_CONFIG)** or **Application Log Retention Period (FTPC Administrator)**: indicates the number of days the Application Log messages will be saved before they are deleted. The default is 30 days.
- **appLogRetentionRows (SITE_CONFIG)** or **Application Log Maximum Size (FTPC Administrator)**: indicates the maximum number of rows that can be stored before the messages will be deleted. The default is 100,000 rows. Therefore, by default, only the latest 100,000 messages will be stored in descending order of insertion, and the rest are deleted.

Figure C-3: Application Log Configuration (SITE_CONFIG)



item_name	item_value
CloseLotWhenCompletelyConsumed	true
PTR_19266	Success
PTR_26920	1
ReIndexesForRunTimeTables	true
UnXFRRows	DataRepaired
accessPrivilegeRequired	false
appLogRetentionPeriod	30
appLogRetentionRows	100000
authorizationCacheTimeout	1800
clientTimeout	0
consolidatedLoggingLevel	0
createRTActivitySetHistory	true

Figure C-4: Application Log Configuration (FTPC Administrator)



Messages will be deleted if either one of these criteria are met. For example, there are only 500 messages, but these messages have been saved in the database for 31 days. All the messages will be deleted because one of the criteria has been met.

You can also view this log in the Shop Operations Server administration console. This interface enables you to view a filtered list of application log messages.

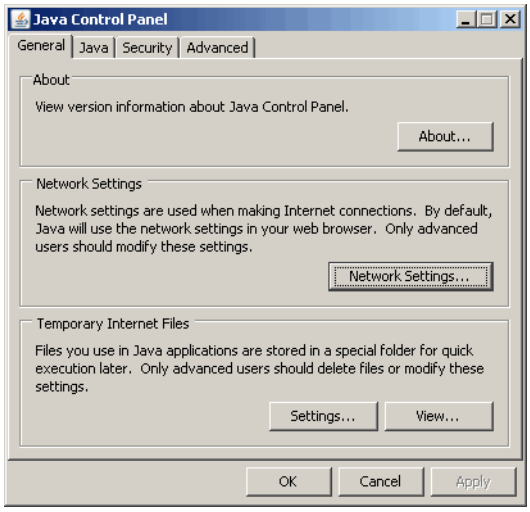
See “Viewing Application Logs” on page 85 for more details.

Running FTPC Through a Proxy Server

To set up the client machine for use with a proxy server, perform the following:

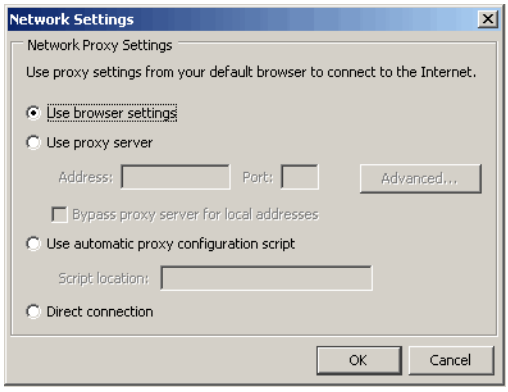
1. From the client machine’s main menu, go to Settings > Control Panel > Java.
2. Select the General tab, then click [Network Settings].

Figure C-5: LAN Settings



3. Under Network Proxy Settings, check the *Use browser settings* radio button, then click [OK] and [OK] again to close out of the Java Control Panel dialog.

Figure C-6: Proxy Server Pane



Running Java after Upgrading

When you uninstall a lower version of Java JDK or JRE and reset the JAVA_HOME, sometimes the command Java -version returns the lower Java version. To resolve this problem, you can do either of the following:

- When you run a Java command, specify the full path to the executable:

  ```
  C:\j2sdk1.8.0_<version>\bin\java.exe DSDeployTools.jar ...
  ```

- To set the PATH permanently, add the full path of the j2sdk1.8.0_<*version*>\bin directory to the PATH variable where <*version*> is the installed Java build.

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