SmartPlant P&ID
Installation and Upgrade Guide

PROCESS, POWER & MARINE

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S ECTION 1

Welcome to SmartPlant

The Intergraph SmartPlant family of process industry solutions is an open line of discipline-specific software tools that provide an integrated solution for the entire plant life cycle. Knowledge-based, intuitive, easy-to-use, accessible, flexible, and data-driven, SmartPlant supports global workflows.   The software enables users to create logical and physical definitions of the plant model and enables access to plant data from conceptual design to decommissioning.

SmartPlant is the fulfillment of the Intergraph vision to speed and improve the creation of information and to provide this data to multiple users at any moment in the appropriate form. Workflows are compressed, reducing production time, lowering costs, enhancing global execution, and extending the life and usability of plant information.

The successor to the Intergraph Plant Design System (PDS), SmartPlant includes expanded functionality for front-end engineering and design (FEED), construction, operation, and maintenance phases.

Installation Checklist

For the recommended installation workflow, see the *SmartPlant P&ID Installation Checklist*: SPPIDInstall_Checklist.xlsx. The checklist is located in the same folder as this installation guide.

Introducing SmartPlant P&ID

SmartPlant P&ID creates intelligent P&IDs by populating the database with relevant plant data.   This method provides valuable information throughout the plant life cycle.   As a data-centric, rule-based solution for the P&ID life cycle, SmartPlant P&ID helps users improve design quality, data consistency, and standards compliance.   With quick access to supporting engineering data, SmartPlant P&ID significantly cuts design and modification time and increases accuracy with its exclusive data-centric approach and use of design rules, automatic checks, and drag-and-drop capabilities.

SmartPlant P&ID is vastly different from graphic-driven P&ID solutions of today.   All data from the P&ID is stored in the plant database and adheres to plant standards.   The graphical representation of the P&ID is a view or a report of the data.   The strong data import and export facilities of SmartPlant P&ID allow users to populate the system with relevant plant data, such as process data from process simulation databases based on Aspen Basic Engineering from Aspen Technologies, Inc. or equipment and line lists.   You can then use this information in the SmartPlant P&ID Stockpile to design the P&ID.

The rule-based and automation capabilities of SmartPlant P&ID also differentiate it from other P&ID systems.   SmartPlant P&ID features a comprehensive, user-definable rule-based system that assists the engineer during the design phase of the plant and subsequent life cycle phases.   Data is entered directly into the database; rules are executed; and feedback is immediate.   The design rule-base confirms data consistency and compliance with plant and engineering standards, allowing faster, more efficient design with less iteration.

SmartPlant P&ID incorporates the latest Microsoft technologies, such as OLE automation, to provide integration with existing data and other systems.   Running on various Microsoft Windows operating system platforms, SmartPlant P&ID does not require a traditional, expensive CAD engine for the creation of P&IDs. The open architecture of SmartPlant P&ID permits integration with other systems, such as Intergraph PDS, SmartPlant Instrumentation, and Aspen Basic Engineering, all of which allow users to share data with third-party software.

SmartPlant P&ID Program Group

SmartPlant P&ID provides multiple views of a central, unified data structure that represents the plant model.   A view is a visual presentation of the data in the plant model and can be a schematic drawing or a table.   The plant model is the computer representation of the conceptual design, including all plant components and their relationships.   By manipulating model views, you can organize the information within the plant model to better understand and maintain the data.

SmartPlant P&ID has several programs and utilities for running and managing your plant data.

SmartPlant P&ID provides the design environment for SmartPlant P&ID drawings.

SmartPlant P&ID Engineering allows you to edit your data while disallowing graphical changes.

SmartPlant P&ID Drawing Manager allows you to create and delete drawings, manage drawing versions, and print multiple drawings. Drawing Manager also allows you to perform Workshare and project-specific commands.

SmartPlant P&ID Insulation Specification Manager allows you to create and modify lookup tables for insulation specifications and thicknesses.

SmartPlant P&ID Options Manager defines plant-wide graphic standards for symbology, gapping, heat tracing, and formats.   Options Manager also defines paths to SmartPlant P&ID files and directories.

SmartPlant P&ID Rule Manager defines rules for placement and property copying on placement.

S ECTION 2

Internationalization

Supporting internationalization in a homogeneous environment is one of the enhancements available in SmartPlant Enterprise. A homogeneous environment uses elements from only a single locale. For example, a German customer running on a German operating system using only German characters and German cultural conventions is a fully supported homogeneous environment configuration.

Homogeneous Environments

When starting a new project, use extra care during installation and configuration to ensure the proper creation and maintenance of homogeneous environments:

- All the computers (servers and clients) within an integrated SmartPlant Enterprise implementation must have the same regional settings, and no one should change the regional settings after the project has started.

- Do **not** cross the decimal locale boundary. This is the most common cause of numeric data corruption and calculation errors. Having users with different regional settings (like with a period versus a comma for the decimal point) causes the software to interpret values unpredictably. For example, a pipe run with a pressure of 35.3 psi can be read by the software as 353 psi to the user with different regional settings. A cable length defined as 39 ft 11,21 inches has been interpreted as 121718910971323 meters when published to an XML file. These incorrect interpretations may be used in internal software calculations and can be impossible to backtrack or correct. Do not change the decimal point character to try to solve an issue. Doing so will only corrupt values in the database or in text files.

- Do **not** cross the character-set locale boundary. For example, the character set boundary between Western (Latin-based) and Eastern Europe (Cyrillic-based), or between Eastern Europe and Japan.

- Create Oracle databases using AL32UTF8 for the database character set and AL16UTF16 for the NLS character set.

- Never modify the NLS_LANG registry entry on an Oracle client. Doing so causes the character data not to convert to Unicode.

- Create Microsoft SQL Server databases with locale-specific collation settings and ensure that all databases have the **same** setting.

Heterogeneous Environments

In contrast, a heterogeneous environment using elements from different, or even multiple locales, **is not supported**. Many customers are currently operating in unsupported heterogeneous environments and are often not aware of that fact. Examples of heterogeneous environments:

- Entering or viewing Japanese data on an US/English operating system

- Using German Regional Settings (where the decimal point is a comma) on a US/English operating system

- Using databases with different character encodings such as CL8MSWIN1251 or JA16SJIS
- Using multiple languages in a project, **especially** when crossing language-group boundaries
- Using an English server with different local language clients

International / Bi-lingual Projects

International bi-lingual projects are possible; however, great care must be used when configuring these environments. Limitations exist and must be properly understood:

- Oracle and MS SQL Server databases can reside on any language operating system, as long as the databases have been created and configured with proper Unicode and collation settings.

- All SQL Server databases must have the same collation setting and reflect the "master" language. Text is stored, sorted, indexed, and presented based on the collation setting. You must determine which language will be used primarily to generate output (P&IDs, SLDs, reports, approval documents, and so forth.) If Russian and English text is entered, and Russian is the target locale, the chosen collation should be based on the Cyrillic character set.

- All Microsoft operating systems (Japanese, Russian, German, and so forth) can enter English characters. The reverse, however, is not true in most cases.

- Keyboard-locale can be changed as long as a character-set and code-page boundary is not crossed. For example, English, German, French, and Spanish characters can all be used in the same project because the same Windows® code-page (1252) is used. However, Russian characters (code-page 1251) cannot be used in a US/English environment.

- You must decide which language operating system will be the master for bi- lingual projects.

The following is an example of a Russian-based project:

Companies in the United States and the United Kingdom are working a project with a Russian company and the deliverables (drawings, reports, and so forth) must ultimately be provided in Russian. The companies in the U.S. and the U.K. are working the project using the "master" Russian operating systems (possibly using virtual Russian operating systems running on VMware Workstation). The U.S. and U.K. companies can install and use English Microsoft Office products on the Russian operating system because Office products are globally enabled. If a Russian interface exists for the SmartPlant Enterprise application, then Russian users can use the Russian interface while the English-speaking users would continue to use the US/English interface. English-speaking engineers can enter English characters. Russian-speaking engineers can enter Russian characters.

However, because the Russian locale uses different decimal and character-set locales, everyone (English and Russian engineers) **must** use the Russian decimal symbol which is a comma. For customization purposes, databases can be modified to accommodate new Russian-specific requirements (fields, properties, and so forth.) Using filters, display sets, and other software features, bi-lingual projects can be further customized. Graphic data, reports, and so forth can be created in either or both languages.

CAUTION Do not change regional settings to reflect a U.S. environment in order to resolve problems in a non-US/English homogeneous configuration. Doing this creates a heterogeneous configuration that **will** cause other possibly hidden problems that cannot be corrected. Everyone working on a project must use the same regional settings and character set throughout the life of the project.

Citrix XenApp Solutions for International Projects

Using Citrix XenApp Solutions, you can define environments that isolate users from having to interact with non-native language operating systems while improving data integrity and minimizing opportunities for data corruption. However, users still have to enter data using master locale conventions for the project (decimal separator and date conventions, for example). You can create these environments using different combinations of languages, but some limitations exist. For example, you cannot use Russian and Chinese text together in a project. In addition, special language characters (the German ä and ß for example) cannot be used if the master locale is outside the western Latin-based languages (the master locale is Russian, Chinese, Japanese, or Korean for example).

Questions and Assistance

Please contact your support representative for assistance and answers to your questions: see *Intergraph Customer Support* (*http://support.intergraph.com/*).

Hardware and Software Recommendations

Before beginning an installation of the SmartPlant software, verify that your servers meet the requirements in this section.

NOTE We recommend that you do *not* install the SmartPlant software on the database server.

SmartPlant P&ID Database Server

Hardware Recommendations

SmartPlant P&ID testing is done on computers having a 2.4 GHz processor and 4 GB of RAM. For additional details regarding platform support, please review the latest compatibility matrix available on *Intergraph SmartSupport* (*http://smartsupport.intergraph.com*). If you cannot access the compatibility matrix, contact *Intergraph Support* (*http://support.intergraph.com/*).

Supported Operating Systems

- Microsoft Windows Standard Server 2008 R2 Service Pack 1, 64-bit
- Microsoft Windows Enterprise Server 2008 R2 Service Pack 1, 64-bit

Supported Database Servers

- Microsoft SQL Server 2012 R1
- Oracle Database 11g Release 2 (11.2.0.4), 64-bit (Standard or Enterprise)

SmartPlant P&ID Workstation

Hardware Recommendations

SmartPlant P&ID testing is done on computers having a 2.4 GHz processor and 4 GB of RAM. For additional details regarding platform support, please review the latest compatibility matrix available on *Intergraph SmartSupport* (*http://smartsupport.intergraph.com*). If you cannot access the compatibility matrix, contact *Intergraph Support* (*http://support.intergraph.com/*).

Recommended Disk Space

- Oracle 32-bit Client: **1.0 GB**
- Full installation of SmartPlant P&ID: **0.3 GB**

NOTE Additional disk space is required for software prerequisites and optional software that you install.

Supported Operating Systems

- Microsoft Windows 7 Professional and Enterprise Service Pack 1, 64-bit

NOTE SmartPlant P&ID is certified on Windows 7 with UAC 'On' at Level 3 (Default)

Supported Database Clients

- Oracle 11g Client Release 2 (11.2.0.4), 32-bit

IMPORTANT

- Microsoft .Net Framework 4.0 (installed with SmartPlant P&ID) must be installed before installing Oracle 11g 32-bit Client.
- The client database software must be of the same version as the server database software.
- Oracle 32-bit Client is required for both 32-bit and 64-bit Oracle databases.
- Do not use Oracle 'light client' as it does not include some of the required .dll files.

NOTE For SQL Server, no client installation is required.

Software Prerequisites

- Microsoft .Net Framework 4.0 and 4.5
- SmartPlant License Manager (SPLM) 2010 Client (11.00) or 2012 Client (12.00). The licensing is delivered on its own CD that comes with your SmartPlant P&ID product DVD.
- Microsoft Internet Explorer 9, 10, or 11, 64-bit (required for viewing the Readme file, the report generated from Rule Manager, and the Online documentation delivered with the software)
- Microsoft XML Core Services (MSXML) 6.0 Service Pack 1 or 6.0 Service Pack 3

Optional Software

CAUTION Apart from SmartSketch, SmartPlant Engineering Manager, and Intergraph Smart 3D SP3DPIDClient, the following software programs are not Intergraph corporation software and are owned by third parties. It is the responsibility of the customer to select at its sole discretion the applicable third party software the customer desires to use to generate reports and Intergraph makes no recommendation as to the choice of said third party software. The customer is responsible for obtaining a valid license to use said third party software from the owner of said third party software and to pay any license fees to the owner of said third party software for the use of said third party software. INTERGRAPH DISCLAIMS AND MAKES NO WARRANTY EITHER EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY OR THE WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE IN REGARDS TO SAID THIRD PARTY SOFTWARE.

- For administrative functions, SmartPlant Engineering Manager 2014 R1

- PDF reader (for viewing the printable guides and for displaying the license agreement when installing Intergraph Smart 3D SP3DPIDClient)

- Microsoft Excel from Office 2007 Service Pack 2, with Hot Fix package, Office 2010 Service Pack 1 or 2 (32-bit only), or Office 2013 Service Pack 1 (32-bit only). (Microsoft Excel is required for working with report templates, importing and generating reports, importing from SmartSketch, saving drawings as MicroStation or AutoCAD, and for viewing the Installation Checklist and various other files.)

- Intergraph Smart 3D SP3DPIDClient 2014 R1 (10.01.15.0060) for use with Smart 3D 2014 or 2014 R1. This software is required for using SmartPlant 3D specifications in the SmartPlant P&ID Piping Specification Utility and is available on the SmartPlant P&ID product DVD.

- For working in a thin client environment, Citrix XenApp 6.5 or Citrix XenDesktop 7.0 RDS on Windows Server 2008 R2 Service Pack 1, 64-bit (Standard or Enterprise)

- One of the following drawing software programs (for compatibility with the 'Save As' feature):
  - SmartSketch 2014 or 2014 R1
  - Autodesk AutoCAD 2012
  - Bentley MicroStation V8

Before You Install

Before you begin installing the software, verify that the computers on which the software components will be installed meet the requirements described in the *Hardware and Software Recommendations* (on page 13).

Loading SmartPlant P&ID Prerequisite Software

Install any required prerequisite software which is not yet installed on your computer.   The following software is required:

- SmartPlant License Manager.

- Microsoft .Net Framework. If working on an Oracle platform, you must install .Net Framework 4.0 *before* installing Oracle client. For details, see *Installing Oracle Client > Prerequisites* (on page 20).

- In order to use the Piping Specification Utility with SmartPlant 3D, you must install the Intergraph Smart 3D SP3DPIDClient. For details, see *Install Intergraph Smart 3D SP3DPIDClient* (on page 23).

NOTES

- Requirements may vary depending on your particular configuration.

- If .Net Framework is not installed or if .Net 4.0 client profile is installed, the software prompts you to install Microsoft .Net Framework 4.5; after installation, the **Welcome** page of the setup appears. If .Net 4.0 Extended (FULL) is installed, the SmartPlant P&ID installation installs Microsoft .Net Framework 4.5 as part of the software setup.

- For details of the specific software versions that are compatible with your product and working environment, see *SmartPlant P&ID Workstation* (on page 14).

Using Environment Variables for Tracking Licensing

If you are using SmartPlant License Manager 2010, SmartPlant License Manager 2012, or a later version, an administrator can create environment variables to customize license tracking. These variables match the columns in the SmartPlant License Manager logging file (or journal report).   The variable name must exactly match the column name.

The environment variables can be added and changed using automated scripts, custom product launching utilities, or manually (as shown in the below example). The environment variables can be defined at the system level or user level.   If the environment variable(s) is added at both the system and user levels, the user level will take precedence over variable(s) added at the System level.

Any of the following variables can be defined as needed.

ProjectName - Defines the project name. There is a maximum of 50 characters.

NodeName - Defines the node name. There is a maximum of 30 characters.

UserNameEx - Defines the user name. There is a maximum of 50 characters.

NOTE Please contact your support representative if you need assistance.

Add an Environment Variable

The following steps are an example of how to manually add new environment variables.

1. Open **Control Panel**.

2. Click **System Properties** and select the **Advanced** tab.

3. Click **Environment Variables...**.

4. Click **New User Variable**.   Define the new variable name and value.
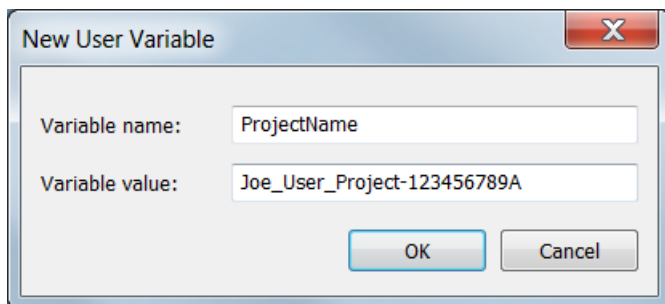
5. Click **OK** to add the variable.

S E C T I O N 5

Oracle Installation and Configuration

For SmartPlant P&ID, Oracle client installation only is required. You install Oracle client after the Oracle database server installation has been completed. For details of Oracle server installation, refer to the *SmartPlant Engineering Manager Installation and Upgrade Guide*.

Oracle Instances

If one server hosts the databases of several products, Intergraph recommends that each product's database be a separate instance, each of which can host multiple plants.

The advantage of placing each product's database in its own instance is that only the affected application will be off-line during backup, performance tuning, and other database maintenance activities. Additionally, global tuning parameters that apply to one instance can be tailored to the specific product requirements.

According to Oracle documentation, the only limit to the number of instances you can have on any machine is the availability of resources. However, the number of instances on one database server should be minimized, because each additional instance places additional load on the server.

Each instance adds redundant tablespaces, rollback segments, background processes, and memory requirements for each SGA (System Global Area). For this reason, you should start by putting the database of one product for several plants into a single instance. Then, when the number of plants increases, or a plant becomes very large, consider separating the database into new instances, adding server memory, or even adding database servers.

Installing Oracle Client

The Oracle client provides SmartPlant P&ID with the means to interface with the Oracle database server. You can install the Oracle client either on a file server or on the local station. If you install the Oracle client on a station, make sure you have the appropriate access rights to the Oracle database server.

After the Oracle client installation process is complete, you proceed by installing SmartPlant P&ID. Before you start the installation process, make sure that the machine (file server or local station) has access to a CD-ROM or DVD drive. If your machine does not have access to a suitable drive, you need to copy all the installation files from the installation media to your local hard disk.

Prerequisites

- Make sure that a compatible Oracle server version is installed.

- Set up your client Windows regional and language options as you require.   You can only set up these options before the client installation.   If you want to change the regional and language options after the installation, you will have to reinstall the Oracle client for the changes to take effect.

- For the current version of SmartPlant P&ID, Microsoft .Net Framework 4.0 must be installed *before* installing Oracle client. If Oracle client was installed before .Net Framework, you may see the following message when opening Drawing Manager:
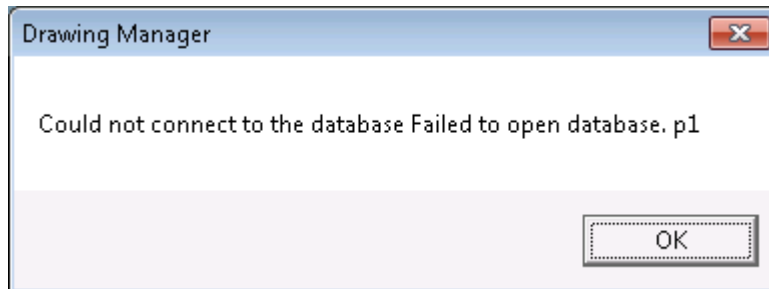
To fix the problem, do the following:

1. Uninstall Oracle client.

2. Install Microsoft .Net Framework 4.0 (delivered on the SmartPlant P&ID DVD layout).

3. Install Oracle client.

Install Oracle Client

IMPORTANT Before installing Oracle Client, ensure that you have met the conditions specified under Prerequisites.

1. Start the Oracle Universal Installer.

2. On the **Select Installation Type** page, from the list, select one of the following:

   - **Administrator** — For users who need Administrator functions, such as the ability to create tablespaces.

   - **Runtime** — For all other users.

3. Click **Next**.

4. On the **Download Software Updates** page, select **Skip software updates** and click **Next**.

5. On the **Select Product Languages** page, select **English** and click **Next**.

6. On the **Specify Installation Location** page, click the **Browse** button next to the **Oracle Base** field and locate where you want to install the software.

   NOTE The **Software Location** field is updated according to the information in the **Oracle Base** field. if you want to change this location use the **Browse** button to navigate to the required location.

7. Click **Next**.

8. On the **Perform Prerequisite Checks** page, click **Next**.

9. On the **Summary** page, click **Install**.

10. On the **Finish** page, on completion of the installation, click **Close**.

11. Restart the client machine.

12. Create an alias to the Oracle database on the client machine using Oracle Net Manager.

   TIP The alias name can contain any alphanumeric characters without spaces.

13. Install the appropriate Oracle client patch.

CAUTION After installation, you must *not* change any of the default values of the NLS_LANG parameter on the client.

Installing the Software

This section describes how to install SmartPlant P&ID and supporting software. Before you begin installing the software, verify that the computers on which the software components will be installed meet the requirements described in the *Hardware and Software Recommendations* (on page 13).

The Open Database functionality, incorporated into all parts of the SmartPlant software, allows you to install pieces of the software on several different workstations. You do not have to maintain a server for just SmartPlant Engineering Manager. For example, you can install SmartPlant Engineering Manager and its related managers on one workstation, SmartPlant P&ID and its related managers on a different workstation, and the reference data on yet another workstation or file server.

NOTE During installation of the software, you have the option of installing the fully functional SmartPlant P&ID or SmartPlant P&ID Engineering, which allows data editing, but does not allow placement, moving, or deleting items on the drawing sheet.

Install Intergraph Smart 3D SP3DPIDClient

In order to use the Piping Specification Utility with Smart 3D, you must install the Intergraph Smart 3D SP3DPIDClient.

IMPORTANT Before installing Intergraph Smart 3D SP3DPIDClient, you must uninstall any previous installation of SmartPlant 3D Piping Specification Remote Access Client.

1. Insert the SmartPlant P&ID DVD into the drive. If the installation does not start automatically, double-click setup.exe in the main folder.

2. On the **Welcome** page, click the **Additional Software** link.

3. On the **Additional Software** page, click **Intergraph Smart 3D SP3DPIDClient**.

4. In the wizard that opens, on the **Welcome** page, click **Next**.

5. On the **Software License Agreement** page, select your country from the list.

6. Click **Display** to view and read the license agreement. You must have a PDF reader installed to be able to view the Software License Agreement.

7. Close the Software License Agreement window, and then click **Yes** to accept the license agreement.

8. On the **Destination Folder** page, accept the default installation path or if desired, specify a different path, and then click **Next**.

9. On the **Ready to Install Intergraph Smart 3D SP3DPIDClient** page, click **Install**.

10. On completion of the installation, click **Finish** to close the installation wizard.

Grant Permissions to Write to a Registry Key

During the installation process, you may receive an error stating that setup does not have permission to modify one or more registry keys.   This procedure explains how to grant write permissions to the registry keys.

1. Click **Start** > **Run**.

2. Type **regedit.exe**, and click **OK**.

3. In the left window, do one of the following:

   - For a 32-bit machine, select the **HKEY_LOCAL_MACHINE\Software\Intergraph\Applications** registry key.

   - For a 64-bit machine, select the **HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Intergraph\Applications** registry key.

4. Right-click and on the shortcut menu, click **Permissions**.

5. On the **Permissions for Applications** dialog box, click **Advanced**.

6. At the bottom of the **Advanced Security Settings for Applications** dialog box, clear the option: **Include inheritable permissions from this object's parent**.

7. On the security dialog box that appears to verify your change, click **Remove**.

8. Reselect the **Include inheritable permissions from this object's parent** check box.

9. Select the **Replace all child object permissions with inheritable permissions from this object** check box.

Uninstall a Previous Version of SmartPlant P&ID

1. From the Windows **Control Panel**, select **Programs and Features** > **Uninstall a Program**.

2. Select **Intergraph SmartPlant P&ID** and then click **Uninstall**.

   TIP To uninstall a previous Service Pack, select the appropriate row in the list of installed programs.

3. At the message prompt to confirm removal of the software, click **Yes**.

4. On the **Maintenance Complete** page, click **Finish**.

Install SmartPlant P&ID

IMPORTANT

- SmartPlant License Manager software is required for concurrent licensing for both the core SmartPlant P&ID product and for each feature, therefore you must install and configure SmartPlant License Manager on your workstation before installing SmartPlant P&ID. This licensing software is delivered on its own media. For more information about using and configuring concurrent licensing, refer to the *SmartPlant License Manager Online Help*.

- If you previously uninstalled a SmartPlant P&ID 2009 SPx Hot Fix, before installing the current version of SmartPlant P&ID, you must first run the CleanUp Utility. To download and run this utility, go to the URL for *Intergraph Smart Support* (*http://smartsupport.intergraph.com*), then under **Find the answer to your question** type **20488** and follow the instructions.

1. Insert the SmartPlant P&ID DVD into the drive. If the installation does not start automatically, double-click setup.exe in the main folder.

2. On the **Welcome** page, click the **Additional Software** link if you want to perform any of the following installations:

   - *Install SmartPlant P&ID Reference Data* (on page 33)

   - *Install Intergraph Smart 3D SP3DPIDClient* (on page 23)

   - Install SmartPlant Engineering Manager (for details, see *SmartPlant Engineering Manager Installation and Upgrade Guide*)

   NOTE After installing additional software and closing the setup, to continue with the installation of SmartPlant P&ID, on the **Additional Software** page, click **Back**.

3. To install SmartPlant P&ID, click **Start Setup**.

4. On the **Details and Features** page, enter your user name and company details.

   NOTES

   - By default, the user name and company name are obtained from the Registry. You may change the values, but you may not leave these fields blank.

   - For an evaluation copy of the software, these fields are mandatory.

5. Enter your product serial number.

6. Under **Select Installation Mode**, choose whether to install SmartPlant P&ID or SmartPlant P&ID Engineering.

7. Under **Select Features to Install**, select any additional features that you want to install.

   NOTE Drawing Manager is always installed, together with SmartPlant P&ID or SmartPlant P&ID Engineering, regardless of any other features you select.

8. In the **Install Path** field, accept the default installation path or if desired, specify a different path, and then click **Next**.

9. On the **License Agreement** page, select your country or region from the list to view the license agreement in your language and then select the **I agree to the license agreement and conditions** check box.

10. Click **Install**.

11. On completion of the installation, if you want to open the Readme file, select **View Readme**.

12. Click **Finish** to close the installation wizard.

`NOTES`

▪ If you try to install SmartPlant P&ID software when you do not have write permissions to the registry on the computer on which you are installing, a warning message appears. For details of what to do if you see this message, see *Grant Permissions to Write to a Registry Key* (on page 24).

▪ The driver used for printing the PDF files, SmartPlant PDF Converter (Amyuni 4.5), is included in the SmartPlant P&ID installation. This printer is used for PDF generation and should not be removed or used for any other purpose.   If you are unable to generate PDF files because this driver is missing, restore the driver by running the executable file *InstallPDFConverter.exe*, which is installed by default in the software installation folder path ..\SmartPlant\P&ID Workstation\bin.

Modify or Uninstall the Latest Version of SmartPlant P&ID

1. In the Windows **Control Panel**, navigate to the **Programs and Features** window.

2. From the list of installed programs, select **Intergraph SmartPlant P&ID 2014 R1** and then click **Change**.

3. On the page that appears, click **Modify**.

4. On the **Modify / Uninstall** page, select one of the following options:

   ▪ **Add or Remove Features**

   ▪ **Repair**

   ▪ **Uninstall**

5. Click **Next**.

   `NOTE` If you selected **Repair** or **Uninstall**, a wizard page opens with progress bars for the overall process and individual details.

6. If you selected **Add or Remove Features**, under **Select Features to Add or Remove**, do the following:

   a. Select the check boxes beside those features that you want to add.

   b. Clear the check boxes beside those features that you want to remove.

   c. Click **Update**.

   `NOTE` The **Add or Remove Features** option only adds or removes the additional features; it does not remove Drawing Manager or SmartPlant P&ID / SmartPlant P&ID Engineering.

7. On completion of the process, click **Finish**.

Installing SmartPlant P&ID in Silent Mode

Silent mode installation involves running a command at the command prompt with arguments specifying the license activation, product serial number, and installation path. In addition, you can specify which individual software features to install and the path of the log file.

`IMPORTANT`

- Because SmartPlant P&ID installation requires SmartPlant License Manager for concurrent licensing, you must first install the SmartPlant License Manager software on your workstation and on every other workstation where you are going to install SmartPlant P&ID in silent mode. For more information about installing and configuring SmartPlant License Manager, see the *SmartPlant License Manager Online Help*.

- You must ensure that there is sufficient disk space on each workstation for the installation.

- Prior to creating a silent setup of SmartPlant P&ID over a network, ensure that the following conditions exist:

  - For a new release, all previous existing versions of SmartPlant P&ID on the target machine have been uninstalled prior to network installation.

  - The target machine does not have a directory by the same name to which SmartPlant P&ID is to be installed.

  - The target machine meets the free disk space recommendations specified in *SmartPlant P&ID Workstation* (on page 14).

  - All applications are closed.

Install SmartPlant P&ID in Silent Mode

- At each workstation on which you want to install the software, open a **Command Prompt** window and type the silent installation command according to the following syntax:

```
"<setup source folder path>\setup.exe" /install /silent
InstallFolder="<path>" /log "<log file path and name>.log"
SLAACCEPT="YES" SERIALNUM="<product serial number>" ADDLOCAL="ALL"
```

`CAUTION` Ensure that the command line includes spaces where shown before and after arguments.

`NOTES`

- Double quotes are required only if the path to the setup.exe file contains spaces.

- Argument values are case sensitive.

- Mandatory arguments are validated by the setup procedure. If an argument or option is missing, the setup stops and a log is produced with the name of the missing argument.

Example command line for SmartPlant P&ID installation:

```
"\\SPPIDInstall\Setup Files\Setup.exe" /install /silent
InstallFolder="C:\Program Files (x86)\SmartPlant" /log"
C:\Setup.log" SLAACCEPT="YES" SERIALNUM="012345678" ADDLOCAL="ALL"
Pause
```

Example command line for SmartPlant P&ID Engineering installation:

```
"\\SPPIDInstall\Setup Files\Setup.exe" /install /silent
InstallFolder="C:\Program Files (x86)\SmartPlant" /log"
C:\Setup.log" SLAACCEPT="YES" SERIALNUM="012345678" PIDMODE="1"
ADDLOCAL="ALL"
Pause
```

Command Line Arguments

Argument	Description	Mandatory	Notes
<setup source folder path>	The path to the file that launches the setup	**Yes**	
setup.exe	The name of the file that launches the setup	**Yes**	
-install	Install product	No	
-uninstall	Uninstall product	No	
-repair	Repair product	No	
-modify	Modify product features	No	
-s, -silent	Silent mode	**Yes**	This argument is required for silent mode installation, together with the mandatory custom command line arguments; otherwise, the installation user interface is displayed.
-l, -log	Specifies a log file	No	If the log argument is used, a valid file path and name must be specified.
InstallFolder	Specifies the installation folder	No	The default installation folder should be set in bundle.wxs. If no value is specified, the default installation folder path is: "C:\Program Files (x86)\SmartPlant\".
SLAACCEPT	Approve license agreement	**Yes**	Accepted value: **YES**
SERIALNUM	Sets the serial number to be used for installation	**Yes**	A valid serial number

Argument	Description	Mandatory	Notes
USERNAME	Sets the user name	See 'Notes'	This argument is mandatory for an Evaluation Mode installation
COMPANYNAME	Sets the company name	See 'Notes'	This argument is mandatory for an Evaluation Mode installation
PIDMODE	Determines the installation mode (installs SmartPlant P&ID or SmartPlant P&ID Engineering)	No	Accepted values: ■ **0** — Installs SmartPlant P&ID (this is the default if no argument is specified) ■ **1** — Installs SmartPlant P&ID Engineering
ADDLOCAL	The value of the **ADDLOCAL** argument is a list of features that are to be installed locally. If the **ADDLOCAL** argument is not present in the command line, the software installs features according to the default settings (for details, see the Notes below).	No	For use with the /install and /modify arguments. Accepted values: ■ **ALL** — installs all available features ■ Specified list of features delimited by commas. The features must be present in the Feature column of the Feature table. The features available for this product are listed in the Notes below.
REMOVE	The value of the **REMOVE** argument is a list of features that are to be removed or excluded when modifying an installation.	No	For use with the /modify argument. Accepted values: ■ **ALL** — removes or excludes from the installation all features, including the main application ■ Specified list of features delimited by commas. The features must be present in the Feature column of the Feature table. The features available for this product are listed in the Notes below.

NOTES

- Command line arguments and their values are case-sensitive; therefore you must ensure that they are typed exactly as shown in the above table.

- Each command line argument must be preceded by a '-' or '/' delimiter, for example: –install - silent or /install / silent

- If none of the arguments: **install**, **uninstall**, **repair**, or **update** is specified, **install** is assumed as the default.

- Drawing Manager and either SmartPlant P&ID or SmartPlant P&ID Engineering are always installed. You can use the following **ADDLOCAL** / **REMOVE** arguments (case-sensitive) for installing or removing specific features:

Feature	Argument Value	Notes
SmartPlant P&ID / SmartPlant P&ID Engineering and Drawing Manager	SPPID	These features are always installed regardless of whether this argument is specified for **ADDLOCAL**. To install these features alone, use the syntax **ADDLOCAL = "SPPID"**. When using the syntax **REMOVE = "SPPID"**, *all* software features are uninstalled.
Options Manager	OPTIONSMGR	This feature is *not* installed by default if **ADDLOCAL** is not present in the command line
Insulation Specifications Manager	INSULATIONMGR	This feature is *not* installed by default if **ADDLOCAL** is not present in the command line
Rule Manager	RULEMGR	This feature is *not* installed by default if **ADDLOCAL** is not present in the command line

To install specific features, use the syntax: ADDLOCAL="FEATURE1,FEATURE2", for example: ADDLOCAL="OPTIONSMGR,RULEMGR". To skip or remove specific features, use the syntax: REMOVE="FEATURE1,FEATURE2", for example: REMOVE="INSULATIONMGR".

- When including the /modify argument, if a feature is not included in the **ADDLOCAL** or **REMOVE** arguments, that feature remains unmodified; if it was not initially installed, it will not be subsequently added, and if it was initially installed, it will not be removed.

- After a successful installation, you may be required to restart the computer.

- If a mandatory parameter or value is missing or the value is incorrect, the installation will stop and an error will be recorded in the log file. It is recommended that after installation, you check the .log file to ensure that the installation proceeded without errors. If the silent installation was successful, at the end of the .log file, the following string appears:

  Exit code: 0x0

Silent Mode Installation Example Scripts

NOTES

- These examples show the use of either '/' or '-' as argument delimiters.

- The 'Pause' command is optional and is used to display completion of the process in the **Command Prompt** window.

- A value of '%tmp%' for the log file path can be used to write the log file to the active user's local 'Temp' folder.

Install All Features

```
"\\SmartPlant P&ID\Setup Files\Setup.exe" /install /silent
InstallFolder="C:\Program Files (x86)\SmartPlant" /log "C:\Install.log"
SLAACCEPT="YES" SERIALNUM="012345678" PIDMODE="0" ADDLOCAL="ALL"
Pause
```

Install SmartPlant P&ID Engineering Mode with All Features

```
"\\SmartPlant P&ID\Setup Files\Setup.exe" /install /silent
InstallFolder="C:\Program Files (x86)\SmartPlant" /log "C:\Install.log"
SLAACCEPT="YES" SERIALNUM="012345678" PIDMODE="1" ADDLOCAL="ALL"
Pause
```

Install Specific Features

```
"\\SmartPlant P&ID\Setup Files\Setup.exe" -install -silent
InstallFolder="C:\Program Files (x86)\SmartPlant" -log "%tmp%\Install
Part.log" SLAACCEPT="YES" SERIALNUM="012345678"
ADDLOCAL="OPTIONSMGR,RULEMGR"
Pause
```

Uninstall the Product

```
"\\SmartPlant P&ID\Setup Files\Setup.exe" -uninstall -silent -log
"C:\Uninstall.log"
Pause
```

Repair the Product

```
"\\SmartPlant P&ID\Setup Files\Setup.exe" -repair -silent -log
"C:\Repair.log"
Pause
```

Modify Product Features

```
"\\SmartPlant P&ID\Setup Files\Setup.exe" /modify /silent /log
"C:\Update Features.log" ADDLOCAL="OPTIONSMGR" REMOVE="RULEMGR"
Pause
```

Configuring Reference Data for SmartPlant P&ID

SmartPlant Reference Data for P&ID contains the symbols, rules, labels, styles, templates, insulation specification and other information that you use to create a P&ID. The default location for the reference data is ..\SmartPlant\P&ID Reference Data.

If the reference data is located elsewhere, use SmartPlant P&ID Options Manager to identify the location of symbols, rules, labels, and other reference data for the application. You can also define symbology for graphics, default formats for data, and key distances that affect the behavior of the application. Usually, a project manager sets these options at the beginning of a project. The project manager seldom modifies these options except on rare occasions when project requirements dictate a change. For more information, see *Customizing Your Reference Data* (on page 73).

IMPORTANT

- If you are upgrading from a previous version of the software, you may also need to upgrade your reference data. For details, see *Upgrading Reference Data* (on page 57).

- You do not need to set the default data locations in Options Manager before creating a P&ID in SmartPlant Drawing Manager. These locations are set at the time of plant structure creation. The drawing template path should be set to the correct node name and share name so that the software can locate the templates for P&ID creation. For the correct share name, see *Install SmartPlant P&ID Reference Data* (on page 33).

- For a configuration in an integrated environment, be sure the **SmartPlant Resource Path** setting in Options Manager points to the SmartPlant Resources folder installed with the SmartPlant P&ID reference data.

Install SmartPlant P&ID Reference Data

1. Insert the SmartPlant P&ID DVD into the drive. If the installation does not start automatically, double-click setup.exe in the main folder.

2. On the **Welcome** page, click the **Additional Software** link.

3. On the **Additional Software** page, click **SmartPlant P&ID Reference Data**.

4. On the SmartPlant P&ID Reference Data Setup Wizard **Welcome** page, click **Start Setup** to start the reference data setup wizard.

5. On the **Details and Features** page, under **Select Features to Install**, make sure that the **SmartPlant Electrical Reference Data** check box is selected.

6. In the **Install Path** field, accept the default installation path or if desired, specify a different path, and then click **Next**.

7. On the **License Agreement** page, select your country or region from the list to view the license agreement in your language and then select the **I agree to the license agreement and conditions** check box.

8. Click **Install**.

9. On completion of the installation, if you want to open the Readme file, select **View Readme**.

10. Click **Finish** to close the installation wizard.

11. After installation, do the following:

   a. Share the folder that contains the reference data. All SmartPlant users must be granted read permission to this share. Write permission to the share is required to make changes to the symbols, rules, templates, and other reference data.

   b. Ensure that the **SmartPlant Resource Path** setting in Options Manager points to this folder.

IMPORTANT We recommend that you make a copy of the reference data and store it with your plant files. This common practice will help you with future service pack installations, data recovery, and so forth.

Working in Thin Client Mode

You can use SmartPlant P&ID in thin client mode, which supports Citrix. When working in an integrated environment, thin client mode operation is used as the means of providing Workshare.

CAUTIONS

- When you access the SmartPlant P&ID application via Citrix, we strongly recommend that you do not perform any administration activities that run automatically for a long time on a client machine. When you execute administration activities via Citrix client, the software actually performs these activities on the server side, while the client remains idle, and the connection to Citrix is lost, possibly resulting in corruption of data. Examples of these types of administration activities are: upgrading the database to a new version or importing a large number of drawings.
As a workaround, we recommend that you perform these kinds of activities either on your database server machine or on a client machine using a configuration other than Citrix.

- When using thin client mode, all users share a common database, resulting in intellectual property being shared between all sites.

NOTE In a Citrix environment, links within a .chm file to open a web browser will not work. To view the linked web page, copy and paste the web address into the web browser on your local machine.

Comparison of Thin Client Mode and SmartPlant P&ID Workshare

For data sharing between sites, you can use SmartPlant P&ID's Workshare functionality or you can run SmartPlant P&ID in thin client mode using Citrix XenApp.

Using SmartPlant P&ID Workshare

Users on the host and on each satellite work in separate databases. This means that it is possible to segregate intellectual property between sites by transferring only the data that needs to be shared. When using Workshare, it is necessary to update reference data at remote locations and to move data between sites.

Using Thin Client Mode

All users share a common database, so that there is no need to update reference data at remote locations or to move data between sites.

Tuning the Software for Use in Thin Client Mode

The following procedures describe special instructions for the installation of SmartPlant P&ID when working in thin client mode on a Citrix machine. Tuning SmartPlant P&ID involves performing the following operations:

- Installing SmartPlant P&ID on Citrix.

- Creating Global Objects.

- Publishing the SmartPlant P&ID program to enable it to be viewed on a web page or in a published Citrix application list.

Create Global Objects

In order to run SmartPlant P&ID via Citrix using Oracle, users or groups that will be using SmartPlant P&ID are required to be included in the "Create Global Objects" policy security setting.

1. In Windows, open Control Panel.

2. Click **Administrative Tools**.

3. Double-click the **Local Security Policy** icon.

4. In the left pane of the window that opens, expand the hierarchy **Local Policies** > **User Rights Assignment**.

5. In the right pane, double-click **Create global objects**.

6. On the **Create global objects Properties** dialog box, click **Add User or Group**.

7. On the dialog box that opens, add the users or groups that will be using SmartPlant P&ID.

Publish SmartPlant Applications Using XenApp 6.5

You need to publish the application to allow you to view the data using a web page.

IMPORTANT You must perform this procedure for each executable file for which you want to view data; for example, the SmartPlant P&ID program (SmartPlantPID.exe), Drawing Manager (DrawingManagerEXE.exe), Options Manager (Options Manager.exe), Rule Manager (Rule Manager.exe), and so forth.

NOTE The SmartPlant P&ID program and SmartPlant P&ID Engineering cannot co-exist on the same machine, therefore they cannot both be published on the same Citrix server.

1. Click **Start** > **All Programs** > **Administrative Tools** > **Citrix** > **Management Consoles** > **Citrix AppCenter**.

2. Under your farm, click **Applications**.
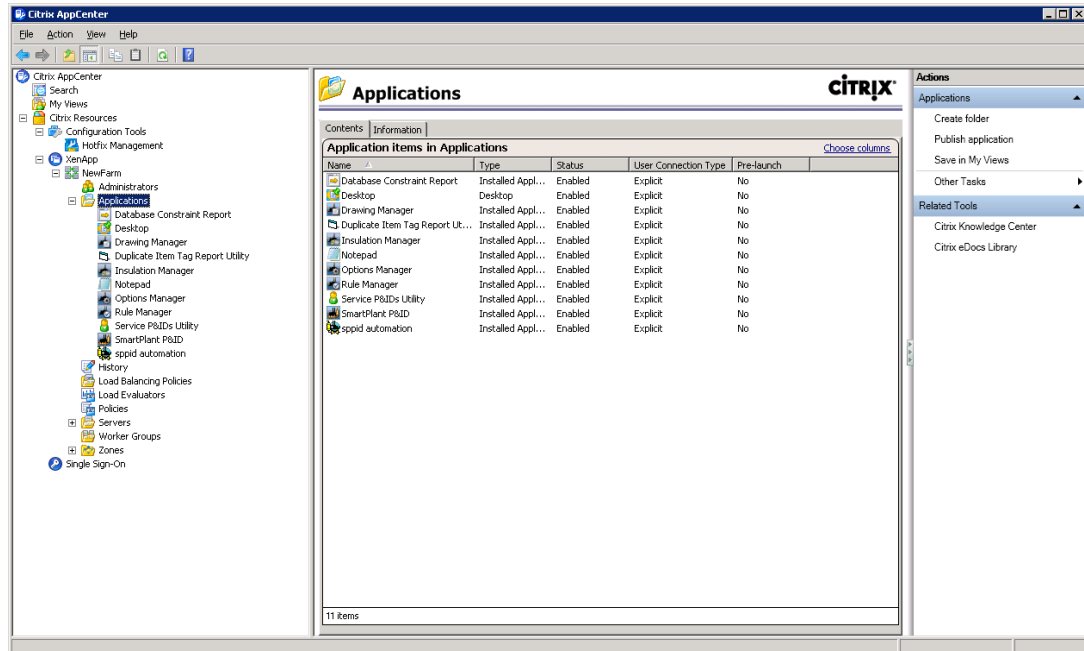
3. Click **Action** > **Publish application**.
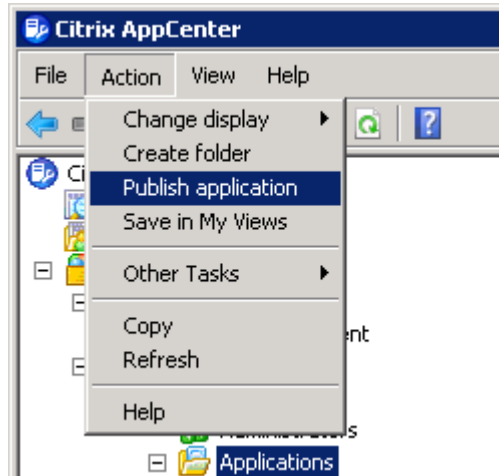
4. On the **Publish Application** wizard **Welcome** page, click **Next**.

5. On the **Name** page, enter values for **Display name** and **Application description**, and then click **Next**.

6. On the **Type** page, choose the application type options as follows:

   a. Select the **Application** option button (the default).

   b. Under **Application type**, click **Accessed from a server**.

   c. From the **Server application type** list, select **Installed application**.
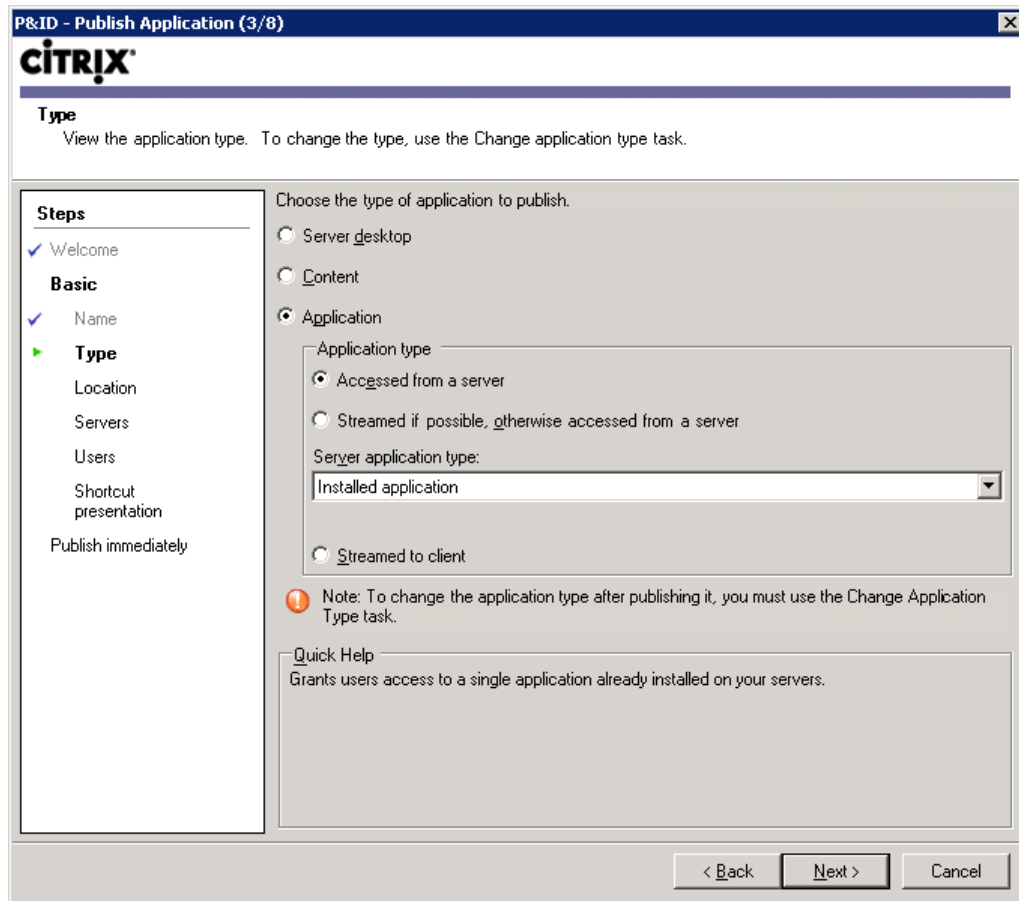
    d.   Click **Next**.

7.   On the **Location** page, under **Command line**, click **Browse** and navigate to the executable (.exe) file for the application being published, and then click **Next**.
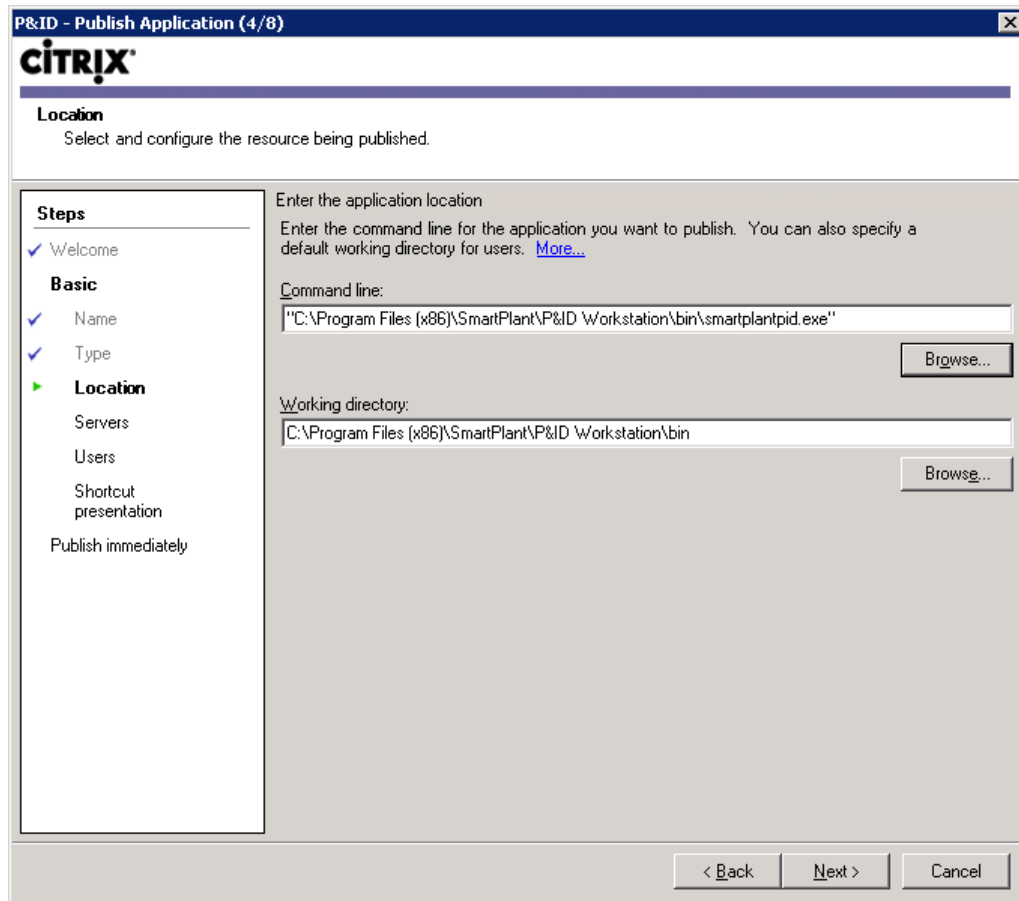
8. On the **Servers** page, do the following:

   a. Click **Add**.

   b. On the **Select Servers** dialog box, select **Servers**.

   c. Select the **Include subfolders** check box.

d. Click **Add All**.
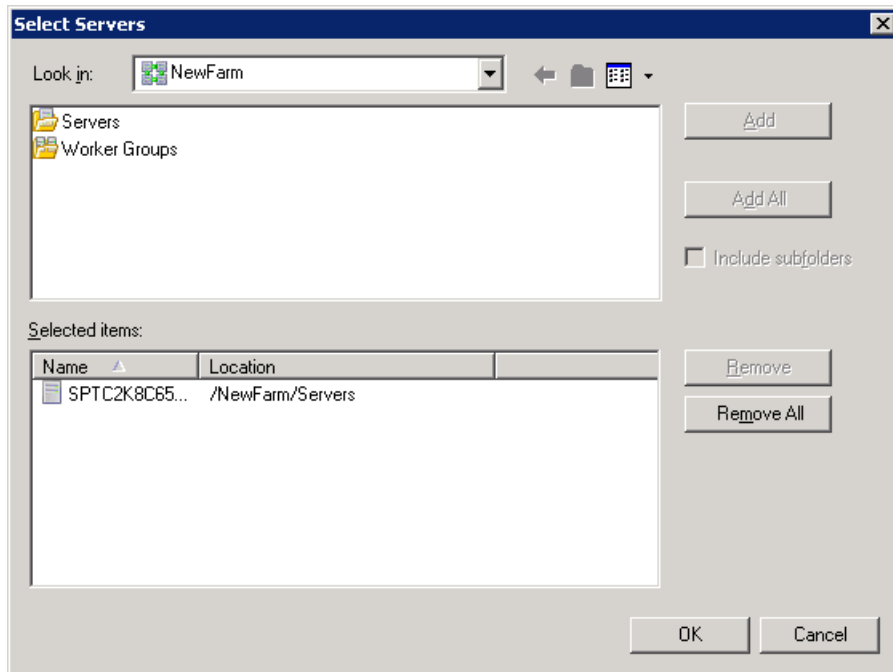
e. Click **OK** to return to the wizard **Servers** page.
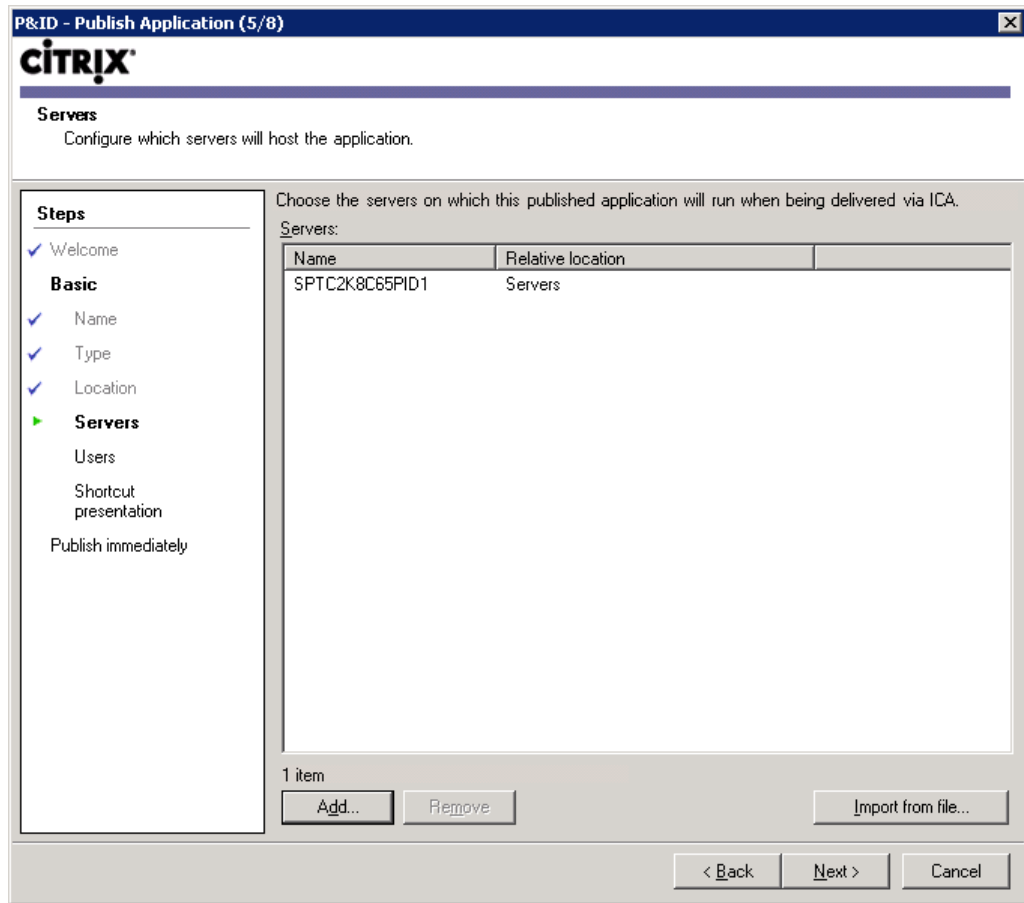
     f.   Click **Next**.

9. On the **Users** page, add a domain user account that is to be granted access to the published application as follows:

     a.   Click **Add**.

     b.   On the **Select Users or Groups** dialog box, click **Add List of Names**.

     c.   Enter names using the format *user@domain*.

     d.   Click **Check Names** to verify the entered names.

e. Click **OK** on the **Account Names Checked** verification message box.
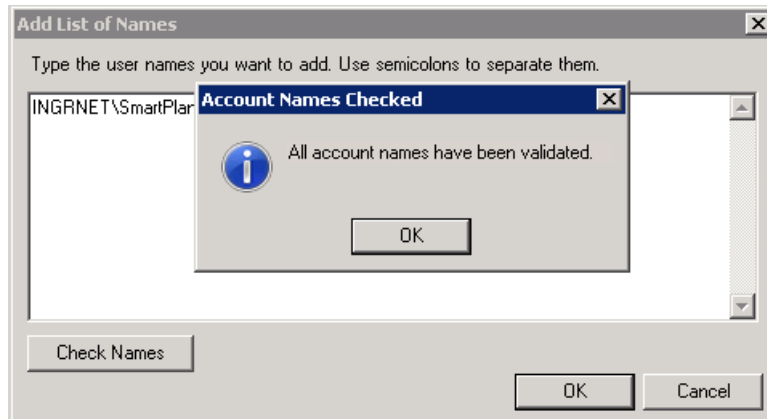
f. Click **OK** on the **Add List of Names** dialog box.

g. Click **OK** on the **Select Users or Groups** dialog box to return to the wizard **Users** page.
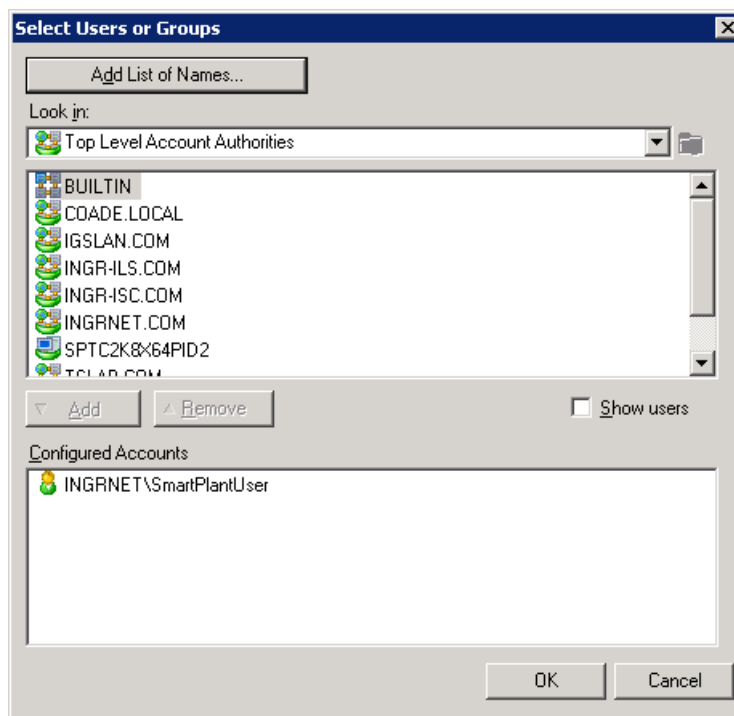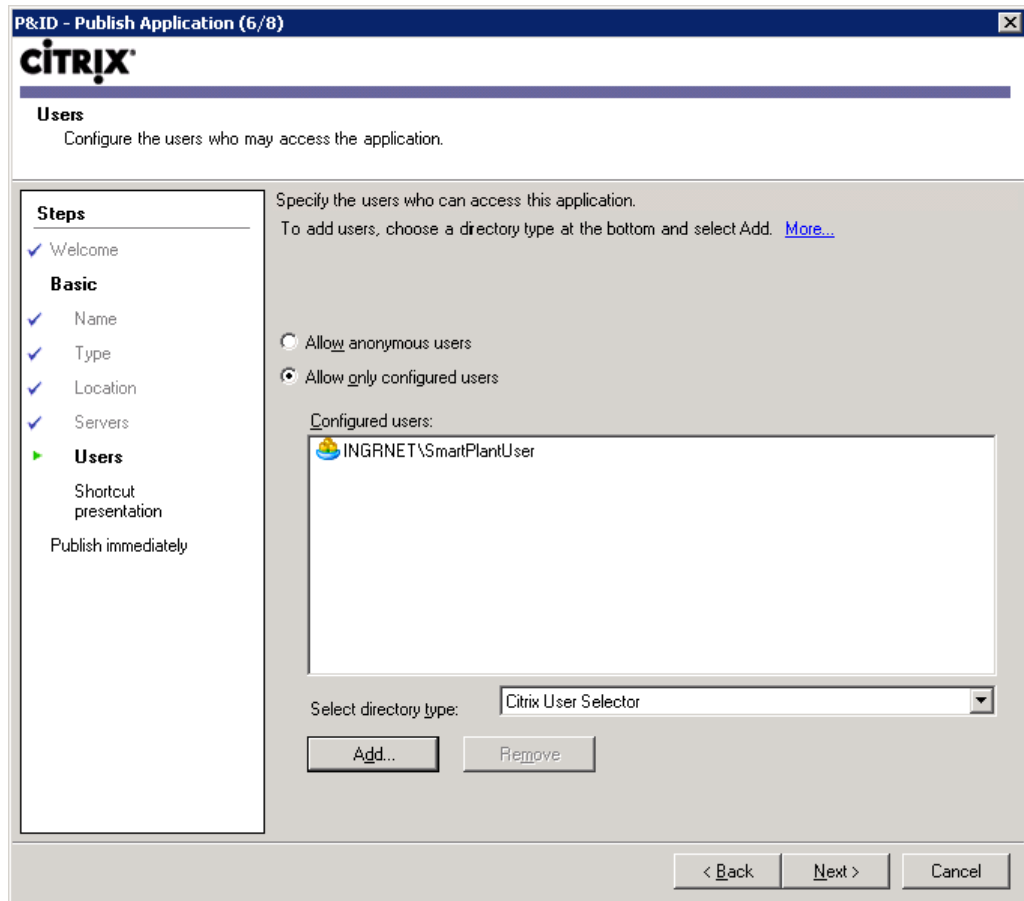
h. Click **Next**.

10. On the **Shortcut presentation** page, do the following:

a. Click **Change Icon** to change the application icon if necessary.

b. Select options for application shortcut placement as desired.
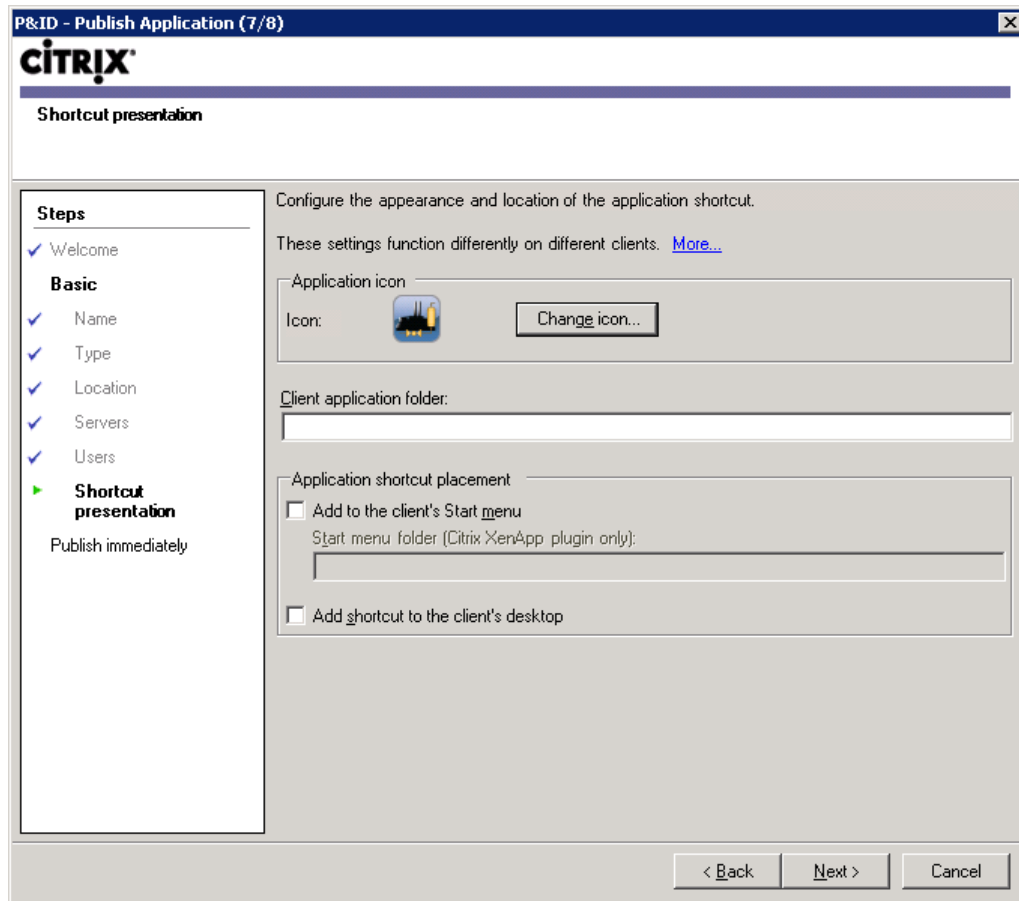
c. Click **Next**.

11. On the **Publish immediately** page, click **Finish**.
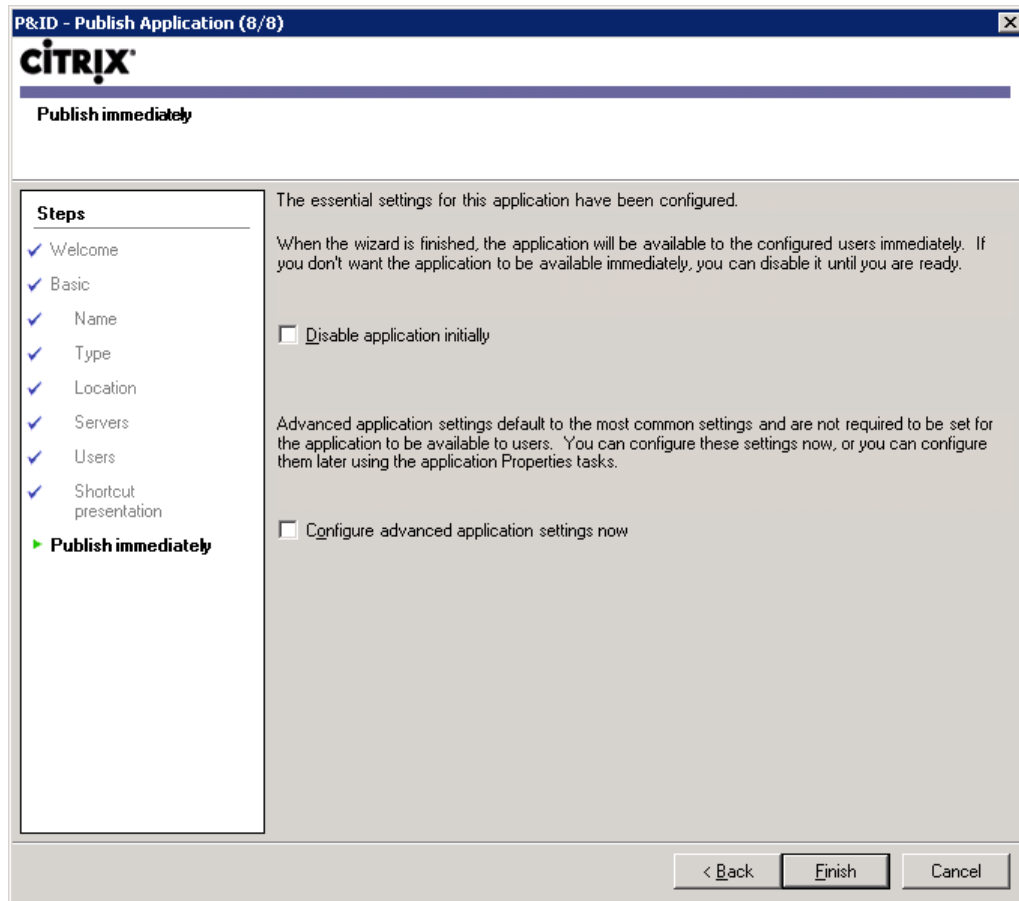
If successful, the application will appear under **Applications**.

12. Repeat the above steps for each application you want to publish.

Publish SmartPlant Applications Using XenDesktop 7.0 RDS

You need to publish the application to allow you to view the data using a web page.

IMPORTANT You must perform this procedure for each executable file for which you want to view data; for example, the SmartPlant P&ID program (SmartPlantPID.exe), Drawing Manager (DrawingManagerEXE.exe), Options Manager (Options Manager.exe), Rule Manager (Rule Manager.exe), and so forth.

NOTE The SmartPlant P&ID program and SmartPlant P&ID Engineering cannot co-exist on the same machine, therefore they cannot both be published on the same Citrix server.

1. Click **Start** > **All Programs** > **Citrix** > **Citrix Studio**.

2. In the left pane, click **Delivery Groups** and do one of the following:

- In the main window, click the **Delivery Groups** tab, select the groups, and in the **Actions** pane at the right, click **Create Application**.

- In the main window, click the **Applications** tab and in the **Actions** pane at the right, click **Add Applications**.
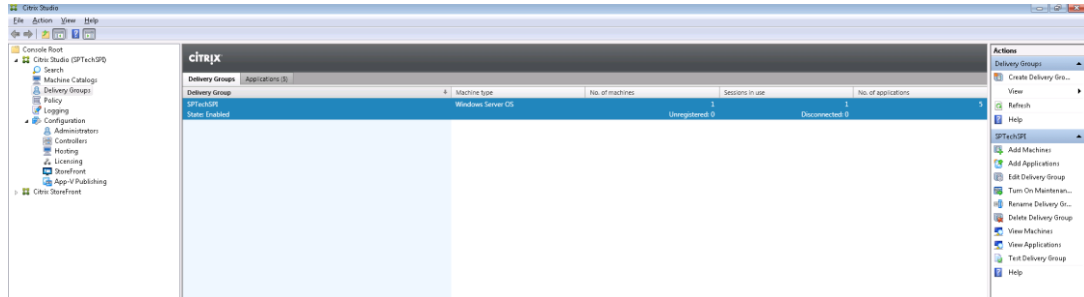
3. On the **Introduction** wizard page, click **Next**.
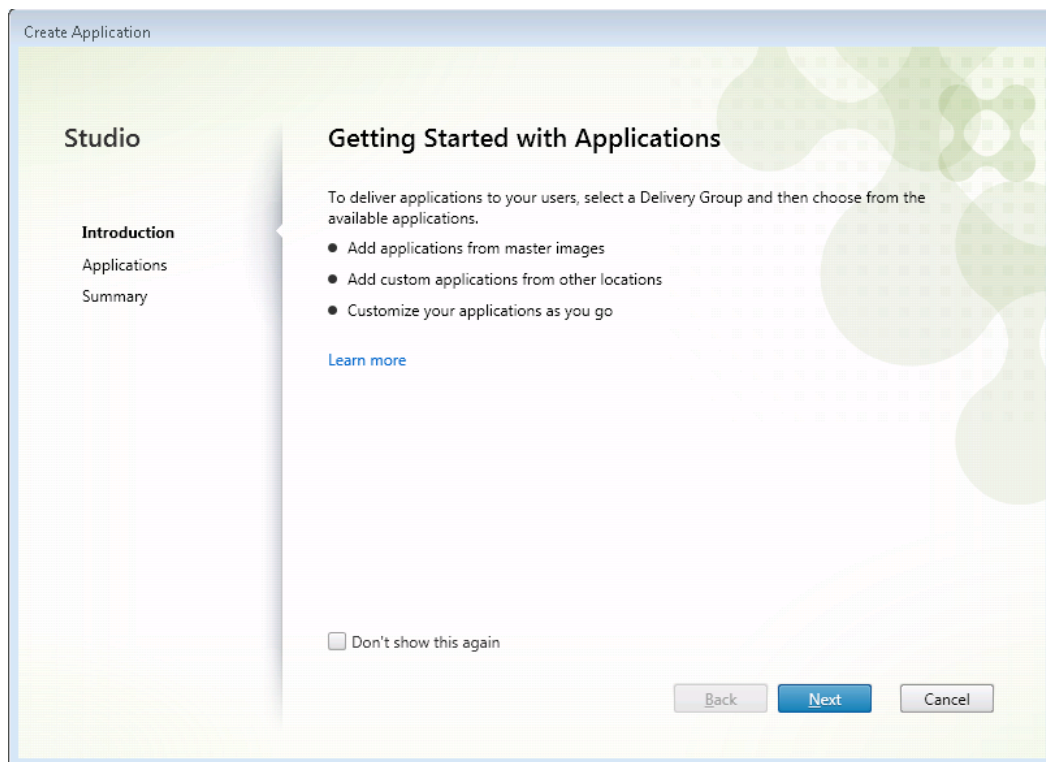
4. On the **Applications** page, select the check boxes beside the applications you want to add and click **Next**.
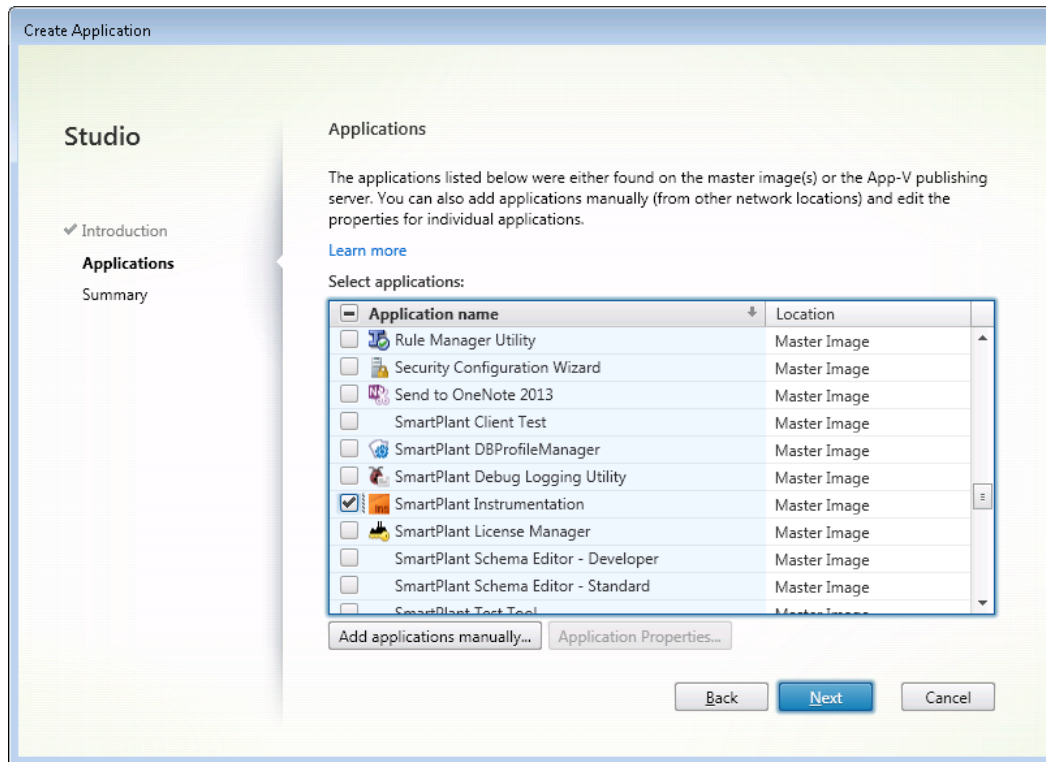
NOTE If you want to add an application from a location other than the local machine, click **Add applications manually** and in the dialog box that opens, enter the required information.

5. On the **Summary** page, click **Finish**.
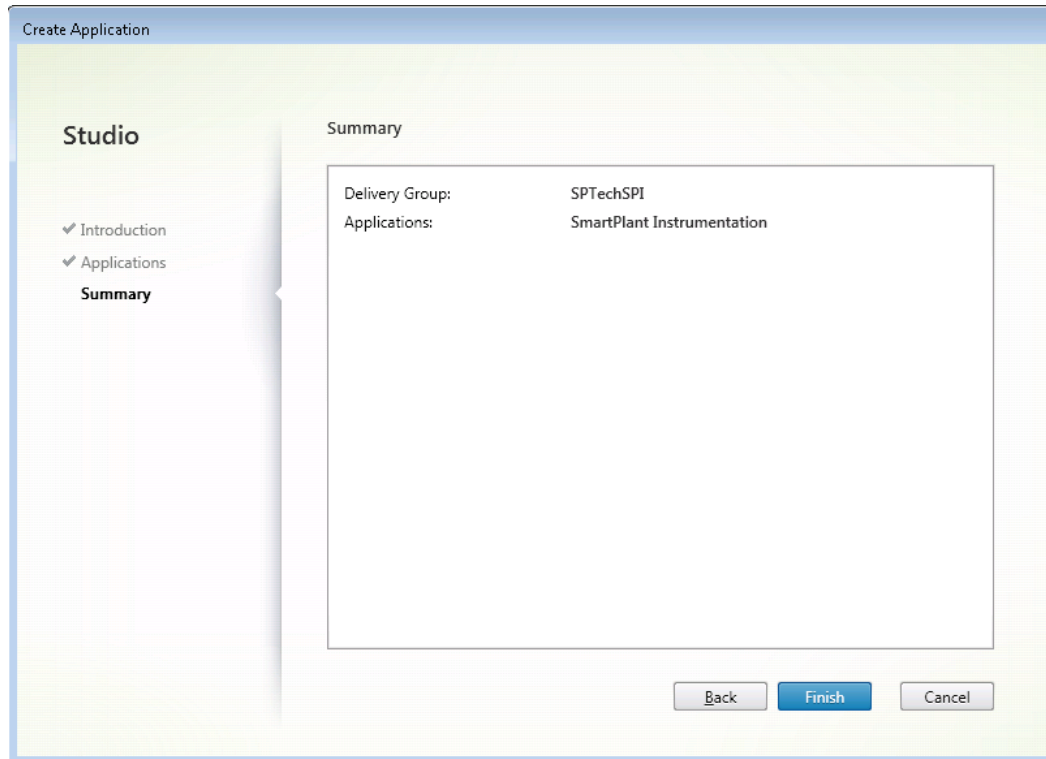
If successful, the application will appear under **Applications**.

6. Repeat the above steps for each application you want to publish.

Upgrading SmartPlant P&ID

Most of the upgrade procedures are performed using the SmartPlant Engineering Manager Upgrade Utility. This section deals with details of the procedures that apply to SmartPlant P&ID only. For full details of the upgrade process, including actions required for SmartPlant P&ID, refer to the *SmartPlant Engineering Manager Installation and Upgrade Guide*, under the section *Upgrading the Database*.

IMPORTANT SmartPlant P&ID versions 2014 and later are compatible with Oracle 11g; therefore, if you have an older version of Oracle, you must upgrade it *before* upgrading SmartPlant P&ID.

Upgrade Prerequisites

1. Identify Oracle database constraint violations using the Database Constraint Report.exe delivered with the current version of SmartPlant P&ID. If you are working on a SQL Server platform, you can skip this step.

2. If your site database is out of date, upgrade it using SmartPlant Engineering Manager, and then if the application database is out of date, upgrade it using the SmartPlant Engineering Manager Upgrade Utility. If you are using Workshare and have a satellite plant, upgrade that plant too.

3. Open and then close SmartPlant P&ID Options Manager without running any commands. This action updates the RAD version for the ProjectStyles.spp file and as a result, changes the status of the Symbology for the drawings to 'Out-of-Date'.

4. Update drawings as needed using SmartPlant P&ID Drawing Manager.

Correcting Database Constraint Violations for SmartPlant P&ID

The **Database Constraint Report.exe** reporting utility delivered with your current version of SmartPlant P&ID is used to help you identify whether the SmartPlant P&ID data stored in your Oracle database is compliant with the database constraints. You must run this utility before you begin upgrading SmartPlant P&ID.

NOTE If you are working on a Microsoft SQL Server platform, you do not need to check for database constraint violations.

Tasks for correcting constraint violations

1. Make a complete backup of the data you are upgrading.

2. Generate a Database Constraint Exceptions Report. For more information, see *Generate a Database Constraint Exceptions Report* (on page 52).

3. Clean up the database by removing orphan model items. For more information, see *Clean Data Utility (DelOrpModItems.dll)* in the *SmartPlant P&ID Utilities Guide*.

4. Resolve constraint violations. For more information, see *Using Constraint Utilities* (on page 53).

5. Generate a database constraint exceptions report again.

6. Run the appropriate constraint utilities again if any exceptions still exist.

7. Continue running the database constraint report and the constraint utilities until no exceptions are reported.

8. Make a complete backup of the now compliant data.

NOTE For additional information on resolving discrepancies listed in the database constraint report, contact your Customer Service representative.

Generate a Database Constraint Exceptions Report

Use SmartPlant P&ID or one of its manager applications to connect to the plant on which you want to run the Database Constraint Exception Report utility.

IMPORTANT

- If you use SmartPlant P&ID to connect to the plant, be sure to close all drawings before proceeding.

- Microsoft Excel must be installed on any workstation from which you run the Database Constraint Exception Report utility.

1. In the ..\SmartPlant\P&ID Workstation\bin folder, double-click the **Database Constraint Report.exe** file.

2. On the **Database Constraint Exception Report Utility** dialog box, click **Connect to Active Plant**.

   IMPORTANT The utility runs the report on the active plant that you are connected to at the time. To run a report on another plant, connect to that plant using SmartPlant P&ID or one of its manager applications.

3. After connecting to the database, click the **Create Database Constraint Report** button. This process may take several minutes, depending on the amount of data you have in your plant.

4. When complete, the utility automatically saves a copy of the report in the temp directory under your user profile and displays the file name (**plant name - ConstraintExceptions.xls**) in the list box on the right side of the **Database Constraint Exception Report Utility** dialog box.

5. Exit the Database Constraint Exception Report utility.

6. Open the report using Microsoft Excel and save a copy of the report to another location other than the Temp folder.

7. Review the completed report for discrepancies that must be resolved before you can upgrade to the new version of SmartPlant P&ID. We recommend running this utility again until no discrepancies are reported.

Database Constraint Report Results

The Database Constraint Report file is a Microsoft Excel file containing several worksheets.

The first sheet in the report is the **Report Progress Messages**, which contains a list of the constraint checks made and the number of violations detected for each constraint check. Each violation type appears on its own worksheet, with the name of the constraint violation displayed on the worksheet tab.

Each worksheet also contains a list of drawings containing constraint exceptions, along with the name of the recommended constraint utility (usually in cell B1) to use in resolving the violation.

NOTE   All constraint utilities, including the Clean Data utility (DelOrphModItem.dll), are run on an open drawing inside SmartPlant P&ID. However, unlike all the other constraint utilities that run on a drawing-by-drawing basis, the Clean Data utility runs on the entire plant data set. If Clean Data is used to resolve any particular constraint violation, a particular drawing will not be specified in the report for this constraint violation nor will a utility name be listed at the top of the worksheet.

Using Constraint Utilities

Before running any of the constraint utilities recommended by the database constraint report, run the Clean Data utility inside a blank drawing, then run the **Database Constraint Report.exe** again. Running Clean Data first decreases the number of exceptions listed in the report and lessens the amount of further manual data cleanup required. For more information about running the Clean Data utility, see *Clean Data (Delete Orphan Model Items)* in the *SmartPlant P&ID Utilities Guide*.

The remaining constraint utilities must be run from within specific drawings. These utilities are located in the ..\SmartPlant\P&ID Workstation\bin folder, along with the Clean Data (DelOrphModItems.dll) utility.

Each plant may require a different set of utilities. Open each drawing listed in the database constraint report and run the recommended macros on the drawing. You need to run only the macros listed in the report for that particular drawing.

Constraint Utilities

Delivered with SmartPlant P&ID, the following constraint utilities help you correct any database constraint exceptions reported in the database constraint exception report.

In general, each utility attempts to repair the constrain violation. However, in some cases the violation cannot be cleaned up by the utility and the item is band-aided in the drawing. This situation is noted and logged in each utility's corresponding log file. For more information, see *Constraint Utilities Log Files* (on page 55).

IMPORTANT   You must manually fix any band-aided item in a drawing by deleting the item and replacing it. If you have difficulty finding the band-aided items, click **Tools** > **Options** in SmartPlant P&ID, then select the **Display as Printed** option on the **Options** > **General** tab.

cmdnotconnectedcomps.dll — Repairs items that have a relationship to a PipeRun or SignalRun (sp_piperunid or sp_signalrunid are not null), but are not referenced by a corresponding connector. If the relationship cannot be repaired, you must delete it and replace it.

cmdLPCheck.dll — Checks for LabelPersist records pointing to a representation that does not exist. If the graphical label is watching a graphic, the database is updated to match, thus repairing the LabelPersist. If the label cannot be repaired, the utility band aids it. You should delete and replace these band-aided items.

cmdRepOIDCheck.dll — Checks for symbol records with a null graphic OID. If the graphical symbol exists, the utility repairs the item by updating the database with its graphic OID value. If the graphical symbol does not exist, the utility sets the InStockpile flag = True to repair the item.

ConnectorItem12.dll — Checks for connector records pointing to a symbol that does not exist. If the graphical connector is connected to a symbol, the utility repairs the connector by updating the database to match. If the connector cannot be repaired, the utility band aids it. You should delete and replace these band-aided items.

OPCFK.dll — Checks for OPC records with a partner that does not exist. If the graphical OPC exists, fix it. You should delete these items.

PointIndexCheck.dll — Checks for PipingPoint records and SignalPoint records with non-unique indices or point numbers, then repairs the item by deleting from the database whichever one of the duplicate points is not loaded into the cache.

RelationshipOIDMacro.dll — Checks for relationship records with a null graphic OID. If the graphical relationship indicator exists, the utility repairs the item by updating the database with its graphic OID value. If the graphical relationship indicator does not exist, the utility deletes the relationship from the database.

RepairBadConnector.dll — Checks for connectors with the same start and end objects and connectors with the wrong number of vertices. The utility band aids the graphical connector, which you should delete.

RepairNullFileNameCmd.dll — Checks for LabelPersist records with a null file name value.

- If the number of LabelPersist records equals the number of SmartLabel objects locked to the watched symbol, the utility repairs the LabelPersist record by updating the filename value for the LabelPersist.

- If the number of LabelPersist records does not equal the number of SmartLabel objects locked to the watched symbol, then the utility band aids the watched symbol. You should delete band-aided items.

- For the remaining LabelPersist records with a null filename, if the graphic exists, the utility band aids it. You should delete band-aided items. If the graphic does not exist, the utility deletes the representation from the database.

RepairOrphanedNozzleCmd.dll — Checks for the following situations.

- **Nozzle records without a Parent** — If the Nozzle graphic is not in the drawing, the utility repairs the nozzle by setting the Instockpile flag = True. If the Nozzle graphic is in the drawing, the utility tries to set either the SP_EquipmentID or SP_PartOfID based on the graphic relationship. The graphic parent must be an equipment or equipment component for the relationship to be re-established. If the relationship cannot be re-established, the utility band aids it. You should delete band-aided items.

- **Nozzles associated via SP_EquipmentID to a Parent in the stockpile** — If the Nozzle graphic is not in the drawing, the utility repairs the Nozzle by setting the Instockpile flag = True. If the Nozzle graphic is in the drawing, the utility band aids it. You should delete band-aided items.

- **Nozzles associated via SP_PartOfID to a Parent in the stockpile** — If the Nozzle graphic is not in the drawing, the utility repairs the Nozzle by setting Instockpile flag = True. If the Nozzle graphic is in the drawing, the utility band aids it. You should delete band-aided items.

- **Nozzles that are a Part of a Run** — The utility clears the SP_PartOfID attribute. If the Nozzle graphic is not in the drawing, the utility repairs the Nozzle by setting the Instockpile flag = True. If the Nozzle graphic is in the drawing, the utility band aids it. You should delete band-aided items.

Constraint Utilities Log Files

Each constraint utility generates a log file, which records each action taken to correct the constraint violation.

NOTE Log files are located at the path specified in your TEMP environment variable.

Constraint Utility	Log File
cmdnotconnectedcomps.dll	RepairNotConnectedComps.log
cmdLPCheck.dll	RepairBadEmbLabelCmd.log
cmdRepOIDCheck.dll	RepresentationOIDChecks.log
ConnectorItem12.dll	ConnectorItem12_Check.log
DelOrpModItems.dll (CleanDB)	SPDelOrpModItems.log DBCleanup.txt
OPCFK.dll	OPC_OPC_FK.log
PointIndexCheck.dll	PointIndexConstraint_check.log
RelationshipOIDMacro.dll	RelationshipOID_Checks.log
RepairBadConnector.dll	RepairBadConnector.log
RepairOrphanedNozzleCmd.dll	RepairOrphanedNozzles_.pid.log
RepairNullFileNameCmd.dll	RepairNullFileNameCmd.log

Post-Upgrade Tasks

After you complete all of the upgrade tasks for a plant, make a full backup of the upgraded databases. You should also use the Oracle analyzer scripts to optimize your databases.

Some or all of the following post-upgrade tasks may also be required:

- *Backup Each Upgraded Plant* (on page 56)
- *Use Oracle Analyzer Scripts* (on page 56)
- *Preserve Software Customizations* (on page 56)
- *Update Symbology Definitions* (on page 57)
- *Make Additional Changes for SmartPlant P&ID* (on page 57)

Backup Each Upgraded Plant

After you have completed the upgrade process for each plant, you should do the following:

1. Set the backup location for the plant in SmartPlant Engineering Manager and perform a full backup. For more information about backing up a plant, see the *Backup and Restore* section of the *SmartPlant Engineering Manager Help*.

2. Perform a complete database backup.

3. Perform a file system backup to archive the drawings, reference data, and other files.

Use Oracle Analyzer Scripts

The Oracle performance tuning documentation recommends analyzing the database objects after a large number of records have been added.   These analyzer scripts collect statistics and store them internally in the database to determine potential execution paths so that the one with the lowest cost can be selected for use.   After the upgrade, you should add these scripts to your nightly backup routine.

Preserve Software Customizations

The Upgrade Utility does not make changes that might overwrite user customization of display names, property formats, calculation programs, validation programs, or layouts.

IMPORTANT A data dictionary change made during an upgrade can cause layouts that use PipingPoint properties to have an incorrect caption or column heading.   None of the default layouts delivered during installation include PipingPoint properties.   However, if you added these properties to one of the default layouts or created a new layout with PipingPoint properties, you can manually revise the captions for any layouts that use PipingPoint properties after you upgrade by doing the following:

1. Open SmartPlant P&ID.

2. In the list on the **Engineering Data Editor** toolbar, select the saved view that contains PipingPoint properties.

3. In the **Engineering Data Editor**, click the **View** 🖽 menu and select **Edit View**.

4. On the **Table Properties** dialog box, click **Advanced**.

5. Click the **Layout** tab.

6. In the **Display Property** list, select the **PipingPoint** property.

   `TIP` PipingPoint properties start with the word *End*, such as **End**, **End 2**, **End 3**, and **End 4**.

7. Confirm that the caption is appropriate for the property.

8. If you need to modify the caption, make changes in the **Caption** box at the bottom of the **Advanced Table Properties** dialog box.

Update Symbology Definitions

In an upgraded plant, the new Ducting Symbology options appear at the bottom of the list and are assigned default color, width, and line pattern properties. The following procedure ensures that the new item types will receive the correct symbology properties.

1. Click **Start** > **Programs** > **SmartPlant P&ID** > **Options Manager**.

2. Select the site and plant for which you want to update the symbology definitions.

3. Move the symbology definitions of the 3 ducting nozzle entries above the general nozzle symbology definitions.

4. Assign color, width, and line pattern properties as desired to all new ducting and room symbology definitions.

Make Additional Changes for SmartPlant P&ID

After running the Upgrade Utility, you must still perform the following changes manually for the current version of SmartPlant P&ID:

- Open and save the rules file so that the new rule options are added to the Rules.rul file.

- Copy any new or modified symbols from ..\SmartPlant\P&ID Reference Data to the plant's reference data, making sure that you do not overwrite any customizations.

Upgrading Reference Data

Reference data often changes between versions of the software. These changes can include deletions and additions to reference data, as well as modifications to existing data formats and locations. After you upgrade your plant data using the SmartPlant Engineering Upgrade Utility, you can use the **Upgrade Reference Data** command in SmartPlant P&ID Options Manager to upgrade styles, template files, symbols, and assemblies.

User Access

Before you can upgrade the reference data and drawings for an upgraded plant, you must define user access for the plant in SmartPlant Engineering Manager. For more information about defining user access, see the *SmartPlant Engineering Manager User's Guide*.

`NOTES`

- After you upgrade reference data, you cannot view it in earlier versions of the software.

- For information about changes made during the reference data upgrade, see the **V4RefDataUpgrade.log** file. This log file is saved in the folder where the symbols are

stored. For more information about upgrading reference data, see the *SmartPlant P&ID Options Manager User's Guide.*

Upgrade Reference Data

1. Click **Start** > **Programs** > **SmartPlant P&ID** > **Options Manager**.

2. Select the site and plant for which you want to upgrade reference data.

3. Click **Tools** > **Upgrade Reference Data**.   A splash screen displays, then a message box informs you when the upgrade operation successfully completes.
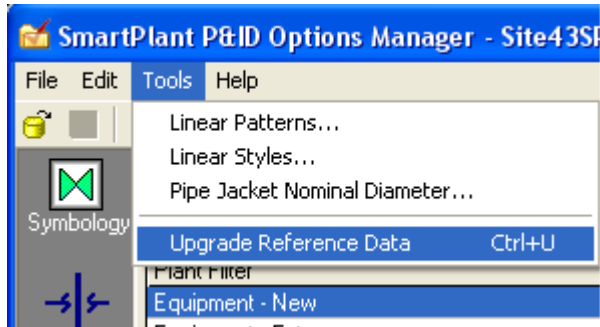
4. Click **OK**.

NOTES

▪ After you upgrade reference data, you should not view it in earlier versions of the software.

▪ For information about changes made during the reference data upgrade, see the **V4RefDataUpgrade.log** file.   This log file is saved in the folder where the symbols are stored.

▪ For more information about upgrading reference data, see *SmartPlant P&ID Options Manager Help.*

Updating Drawings

Changes are often made to the SmartPlant P&ID reference data while work is being managed on the P&IDs. When these changes are made, they apply to all drawings items after the time of change, but do not apply to existing drawing items. The Update Drawings functionality (provided by the set of **Out-of-Date Drawings** commands in Drawing Manager) allows you to manage which drawings are updated with the latest reference data changes by defining values that define out-of-date drawings criteria and by resolving any symbols that have been deleted, moved, or renamed.

You can also schedule these update operations and create reports. For more information about this functionality, see the *Drawing Manager User's Guide.*

IMPORTANT

- Using the Update Drawings functionality is not required as part of the upgrade process, but it is strongly recommended.

- After upgrading to the latest version of SmartPlant P&ID, opening Options Manager for the first time updates the RAD version for the ProjectStyles.spp file and as a result, changes the status of the Symbology for the drawings to 'Out-of-Date'.   For this reason, after upgrading SmartPlant P&ID, you should open and close Options Manager once **before** updating your drawings using SmartPlant P&ID Drawing Manager.

- After upgrading SmartPlant P&ID from a version earlier than 2014, you should open and close Rule Manager once **before** updating your drawings using SmartPlant P&ID Drawing Manager. This ensures that the Rules.rul file is updated with the new rules. The following rules were added in SmartPlant P&ID 2014:

    - Connect To Process To Duct Run

    - Duct Run

    - Duct Run Label

    - Duct Run OPC To Duct Run

    - Duct Run To Duct Run

    - Duct Run To Nozzle

    - Ducting Components

    - Ducting Component Label

    - Ducting Comp To Duct Run

    - Ducting Comp To Ducting Comp

    - Ducting Comp To Instrument Inline

    - Ducting Comp To Nozzle

    - Ducting Comp To Signal Pipe Run

    - Instrument Inline To Duct Run

    - Internal Nozzle To Room

    - Nozzle To Room

    - Process Pipe Run to Ducting Comp

    - Room

    - Room Component

    - Room Component Label

    - Room Comp to Room

    - Room Comp to Room Comp

    - Room Label

    If an existing rule has the same name as one of the new rules, a numeric suffix is added to the name of the new rule, for example: 'Duct Run_1'

When you submit a selection of P&IDs to the **Out-of-Date Drawings** > **Update** command, Drawing Manager analyzes the drawing for changes to the following:

- Data Dictionary (select lists)

- Formats

- Symbols (moved and missing symbols, and changes to the .sym file)

- Rules Manager

- Options Manager (heat tracing, gapping, and symbology)

- Model Items (via Llama)

- OPCs (moved)

- Drawings in a **Re-create** state

- Drawing Properties

After this analysis process, a summary displays, listing the number of drawings selected, the number of out-of-date drawings, and the number of drawings with missing symbols. You must manually resolve the missing symbols using the **Resolve Missing Symbols** dialog box, which lists the symbols in question and allows you to define the new location of each symbol.

In addition to the interactive approach of updating drawings, you can schedule the entire update process, except for the resolution of missing symbols, which is a manual process as described above.

Reporting capability provides a summary of the selected drawings and the out-of-date criteria detected during the analyze step. This report format is non-configurable.

Update Command

Displays the **Update Drawings** dialog box. When you select this command, the selected drawings are analyzed based on the out-of-date criteria and the results display on the **Update Drawings** dialog box.

NOTES

- **Update** does not update any symbol whose definition has been changed into a break component. This situation occurs when you have a catalog item that has been placed in a drawing and then you change its definition to be a break component. The SmartPlant P&ID **Replace** command does not allow a non-breaking component to be replaced with a break component. The **Update** command relies on the SmartPlant P&ID **Replace** command to replace symbols that are out-of-date.

- If an item type property has **Write P&ID** or **Write Both** permissions in Data Dictionary Manager and a symbol belonging to the item type is changed in Catalog Manager, running the **Update** command on a drawing in Drawing Manager will NOT overwrite values assigned to this property with any defaults that may have been pre-defined in Catalog Manager. If the property permissions are **Write Catalog** in Data Dictionary Manager, **Update** will restore any default property values defined in Catalog Manager.

IMPORTANT Intergraph recommends that you backup your work or create a version of your work prior to using this command.
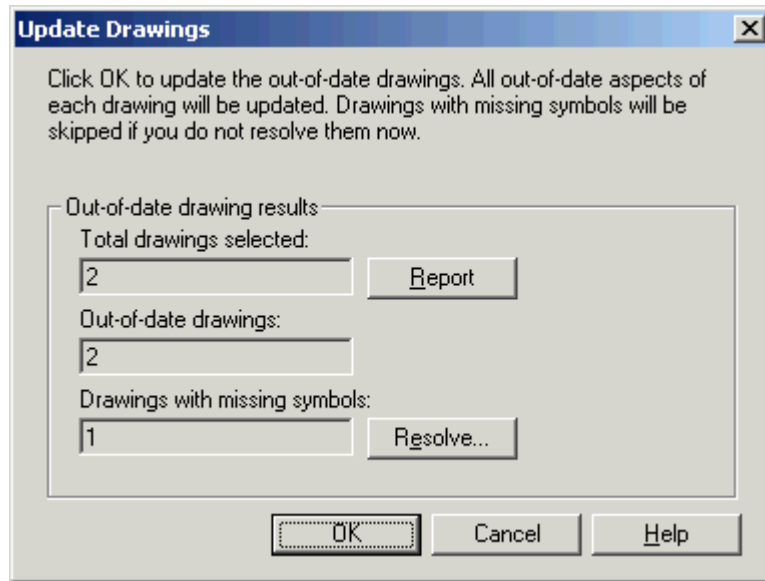
Total drawings selected — Displays the number of drawings selected.

Report — Generates a Microsoft Excel report describing the details of out-of-date drawing(s).

Out-of-date drawings — Displays the number of drawings that are out-of-date based on the criteria selected using the **Out-of-Date Drawing Criteria** dialog box.

Resolve — Displays the **Resolve Missing Symbols** dialog box. Use this button to resolve any missing symbols.

Drawings with missing symbols — Displays the number of out-of-date drawings containing symbols that do not exist in the catalog.

NOTE If the path to your Rules file is set incorrectly in SmartPlant P&ID Options Manager, then the **Update Drawings** command will not work. For example, if the path is invalid, then all drawings in the project are in an out-of-date state but the software cannot update them. This error also occurs if the **Catalog Explorer Root Path** specified in SmartPlant P&ID Options Manager is invalid. An error message displays and the report displays **Drawings with a ? in the criteria column have missing or incorrect reference data**.

Resolve Command (File > Out-of-Date Drawings > Update Drawings Menu)

Displays the **Resolve Missing Symbols** dialog box which provides a way for you to define any symbols that have been deleted, moved, or renamed.

NOTES

- In order to resolve any missing symbols, you must have an existing symbol in the catalog to define as the replacement for the missing symbol.

- You cannot resolve missing symbols for offline instruments of a different class using this command.

Old Path - Displays the relative path of the missing symbol.

New Path - Displays possible options for defining correct locations for the missing symbol(s).

Drawings - Displays the list of drawings that contain the missing symbol(s).
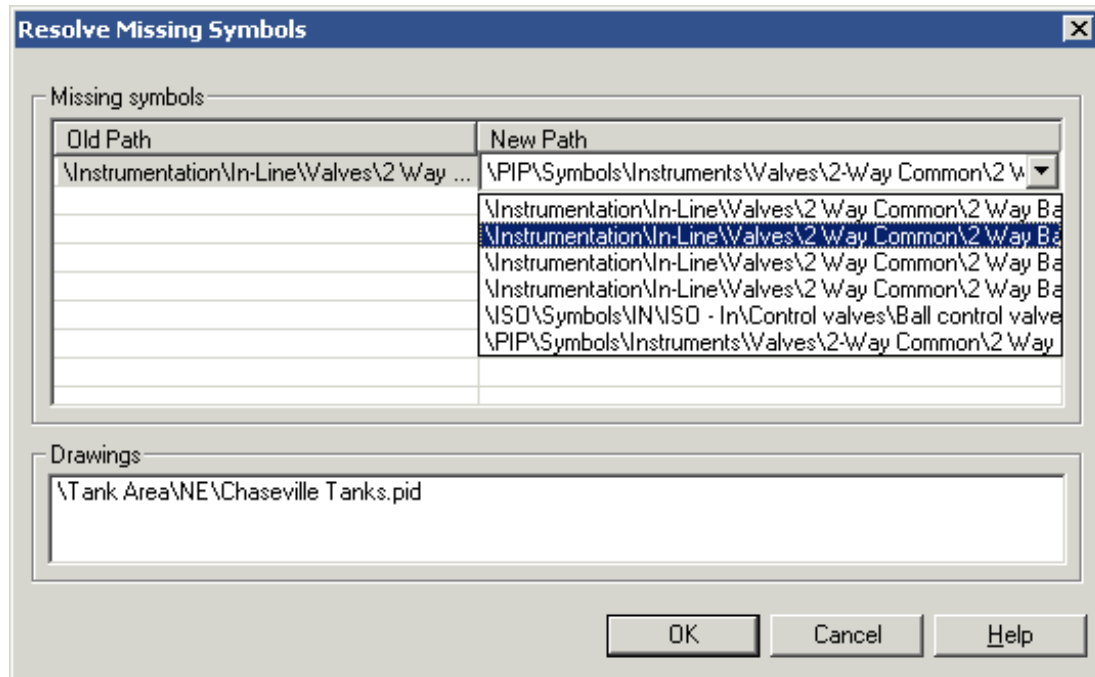
See Also
Update Command (on page 60)

Out-of-Date Drawing Criteria Command (Tools Menu)

Displays the **Out-of-Date Drawing Criteria** dialog box, from which you can define the criteria used to search for out-of-date values when you use the **File** > **Out-of-Date Drawings** commands.

Out-of-Date Drawing Criteria Dialog Box

Allows you to define the criteria used to search for out-of-date values when you use the **File** > **Out-of-Date Drawings** commands.

Select out-of-date drawing criteria

Select List Changes

- Data Dictionary Select List GUID on the drawing item is not equivalent to select list GUID in Data Dictionary.
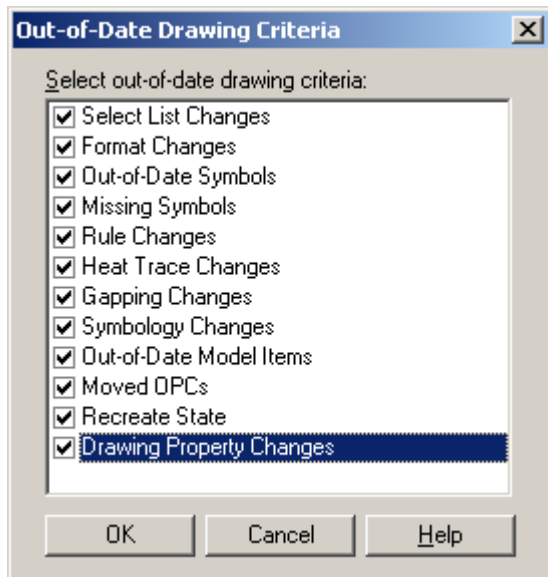
- PID Select List GUID on the drawing item is not equivalent to the select list GUID in PID schema.

Format Changes

- Formats GUID on the drawing item is not equivalent to Formats GUID from the Database.

- Default Formats GUID on the drawing item is not equivalent to Default Formats GUID in Option Manager setting.

Out-of-Date Symbols — File Last Modified Time Stamp on at least one representation in the drawing is not equivalent to the File Last Modified Time Stamp on the corresponding symbol definition file.

Missing Symbols — Filename specified for at least one representation in the drawing does not have the corresponding symbol definition file available in the current catalog.

Rule Changes — Rules GUID on the drawing item is not equivalent to the GUID from the Rules file.

Heat Trace Changes — Heat Trace GUID on the drawing is not equivalent to the Heat Trace GUID in Option Manager Setting.

Gapping Changes — Gapping GUID on the drawing item is not equivalent to the Gapping GUID in Option Manager Setting.

Symbology Changes — Symbology GUID on the drawing item is not equivalent to the Symbology GUID in Option Manager Setting.

Out-of-Date Model Items — SP_ModelItemTimeStamp for at least one representation in the drawing is not equivalent to the TimeStamp on the History Item of its Model Item.   This criteria covers model items updated via Llama (Outside the drawing).

Moved OPCs — MatingOPCPath (will have Drawing ID of its mate) on the OPC is not equivalent to the SP_DrawingId of its mate OPC.   The OPC label is in a to-be-updated state as its mate has been moved.

Recreate State — The drawing is in a re-create state.

Drawing Property Changes — Property Changes GUID on the drawing item is not equivalent to Drawing Property Changes GUID on the drawing item. Drawing Property Changes GUID is set when drawing properties are modified from Drawing Manager.

S ECTION 10

User Access

User access identifies the users allowed to work at specified access levels within the site and related plant structures.   With user access, administrators can control access to data and thereby ensure the security of their project data.

TIPS

- To see the roles currently defined for a plant, click the **Roles** node under the plant node in the **Tree** view.

- To view the rights settings for a particular role, right-click the role in the **List** view and click **Properties**.

Mutually-Exclusive Rights

User rights can vary from one plant to another in the same site.   These rights are defined by categories.   Categories with radio button options indicate that the rights contained within are mutually exclusive, meaning you can choose only one right in that category to apply to the role. In other categories, you can choose multiple rights, as denoted by check boxes.

- **None** — The user is not allowed to execute the application or utility for this plant structure.

- **Read-Only** — The user can execute the application or utility for this plant structure to view the data held within it.

- **Modify Settings** — The user can execute the application or utility for this plant structure to view the data held within it and to modify any custom settings.

- **Full Control** — The user can execute the application or utility for this plant structure and perform all commands and modifications.   This right is not available to a satellite site when operating in the Workshare mode because the reference data must be controlled by the host site.

SmartPlant P&ID User Rights

Category	Options	Description
Catalog	None	**None** prevents users from accessing Catalog Manager.
	Read-Only	**Read-Only** allows users to view symbols in Catalog Manager, but not make changes.
	Full Control	**Full Control** allows users to create new symbols and edit existing symbols. **Full Control** is disabled for Workshare satellites and projects.

Category	Options	Description
Plant Filters	None	**None** prevents users from accessing Filter Manager.
	Read-Only	**Read-Only** allows users to view existing filter definitions, but not make changes.
	Full Control	**Full Control** allows users to create new filters and edit existing filters. **Full Control** is disabled for Workshare satellites and projects.
Display Sets	None Read-Only Full Control	Controls the ability to view, edit, and define display sets. **Full Control** is disabled for Workshare satellites.
Default Views	None Read-Only Full Control	Controls the ability to specify default filters and layouts for item types. Also controls setting the Brief/Bulk Lists associated with item types. **Full Control** is disabled for Workshare satellites and projects.
Plant Reports	None	**None** prevents users from accessing the plant reports.
	Read-Only	**Read-Only** allows users to view existing report definitions, but not make changes.
	Full Control	**Full Control** allows users to create new plant reports and edit existing reports. **Full Control** is disabled for Workshare satellites and projects.
Rules	None	**None** prevents users from accessing Rule Manager.
	Read-Only	**Read-Only** allows users to view existing rule definitions, but not make changes.
	Full Control	**Full Control** allows users to create new rules and edit existing rule definitions. **Full Control** is disabled for Workshare satellites and projects.

Category	Options	Description
Data Dictionary	None	**None** prevents users from accessing Data Dictionary Manager. **Modify Select Entry** and **Full Control** are disabled for Workshare satellites and for projects.
	Read-Only	**Read-Only** allows users to view settings in the data dictionary, but not make any changes.
	Modify Select Entry	**Modify Select Entry** allows users to edit select lists.
	Full Control	**Full Control** allows users to add items and edit existing items in the data dictionary. **Modify Select Entry** and **Full Control** are disabled for Workshare satellites and for projects.
Options	None	**None** prevents users from accessing Options Manager.
	Read-Only	**Read-Only** allows users to view option settings, but not make any changes.
	Modify Settings	**Modify Settings** allows users to change reference data pointers.
	Full Control	**Full Control** allows users to add options and edit existing options. **Full Control** is disabled for Workshare satellites and for projects, but users must have at least Modify Settings level privileges to use Workshare.
Insulation Specifications	None	**None** prevents users from accessing Insulation Specification Manager.
	Read-Only	**Read-Only** allows users to view insulation settings, but not make any changes.
	Full Control	**Full Control**, disabled for Workshare satellites and projects, allows users to add settings and edit existing insulation settings.

Category	Options	Description
Drawing Management	Create P&ID	**Create P&ID** allows users to execute the **New Drawing** command in Drawing Manager.
	Delete P&ID	**Delete P&ID** allows users to execute the **Delete** command in Drawing Manager.
	Refresh P&ID	**Refresh P&ID** allows users to execute the **Compare and Refresh** and **Validate** commands in SmartPlant P&ID. Users must also have Full Control permission for P&ID Objects before they can refresh a drawing.
	Create Version	**Create Version** allows users to execute the **Create Version** command in Drawing Manager.
	Delete Version	**Delete Version** allows users to execute the **Delete Version** command in Drawing Manager.
	Fetch Version	**Fetch Version** allows users to execute the **Fetch Version** command in Drawing Manager.
	Edit Import Map	**Edit Import Map** allows users to execute the **Edit Import Map** command in Drawing Manager.
	Update P&ID	**Update P&ID** allows users to execute the **Update P&ID** command in Drawing Manager to update existing drawings.
	Create Revision	**Create Revision** allows the user to create revision properties, modify revision properties, and associate revision properties with the revised drawing.
	Delete Revision	**Delete Revision** allows the user to delete a revision and its associated version.
P&ID Objects	None	**None** prevents users from accessing objects in the SmartPlant P&ID Modeler environment.
	Read-Only	**Read-Only** allows users to view objects in the SmartPlant P&ID Modeler environment, but not make any changes.
	Modify Properties	To import, user needs at least the **Modify Properties** right.
	Full Control	To refresh drawings in SmartPlant P&ID, users must have **Full Control** permission on P&ID Objects.

Category	Options	Description
Workshare	Publish	**Publish** allows users to publish drawings to other satellites or back to the host.
	Get Latest Version	Get Latest Version allows users to obtain the latest published drawing from the host or satellite site.
	Assign Drawing Ownership	**Assign Drawing Ownership** allows users to specify which Workshare sites have read/write permission for published drawings.
	Synchronize Reference Data	**Synchronize Reference Data** allows users to update their reference data with the reference data at the host.
	Synchronize Shared Items	**Synchronize Shared Items** allows users to update their shared items with the shared items at the host.
Projects	Check Out	**Check Out** allows users to execute the **Check Out** and **Undo Check Out** commands in Drawing Manager.
	Check In	**Check In** allows users to execute the **Check In** command in Drawing Manager.
	Fetch	**Fetch** allows users to execute the **Fetch** command in Drawing Manager.
	Change Status	**Change Status** allows users to interact with the **Project Status** dialog box in Drawing Manager. If you are not granted this right, you can only view the project status, but cannot modify it.
	Claim	**Claim** allows users to execute the **Claim** and **Release Claim** commands in SmartPlant P&ID.
SmartPlant	Publish Retrieve	Enables or disables the ability to publish to or retrieve documents. Select the check box to enable an option; clear to disable.

SmartPlant P&ID User Rights Examples

The following examples are suggestions for granting rights to common groups of users.   These examples are a great starting place for defining custom SmartPlant P&ID role templates.

Plant Administrators

This user group has full control over all aspects of the plant structure for drawings, administrative tasks, and reference data.   The users should have the capability to create plant groups, add applications and roles, create projects, enable Workshare, and create satellites, but should not see the hierarchy templates or plant group types.

Plant Users

This group has full control on all drawings, can set personal filters, set up personal display sets, set up My Reports, create drawings, and archive drawings (needed for personal use in case there are big changes to the drawing design).

Engineers

This group has access to drawings to view and modify data reports but not graphics. They can set up personal filters, set up personal display sets, and create My Reports. They should not be able to modify any project reference data or perform any administrative tasks with respect to drawing management, projects, or Workshare activities.

Managers

This group needs only view data access. They can set up personal filters, set up personal display sets, and create My Reports. They should not be able to modify any project reference data or perform any administrative tasks with respect to drawing management or Workshare activities.

Category	Administrators	Users	Engineers	Managers
SPEM Plant Structure Access	Full Control	Read-Only	Read-Only	Read-Only
Catalog	Full Control	None	None	None
Plant Filters	Full Control	Read-Only	Read-Only	Read-Only
Display Sets	Full Control	Full Control	Full Control	Full Control
Default Views	Full Control	Read-Only	Read-Only	None
Formats	Full Control	None	None	None
Plant Reports	Full Control	Read-Only	Read-Only	None
Rules	Full Control	None	None	None

Category	Administrators	Users	Engineers	Managers
Data Dictionary	Full Control	None	None	None
Options	Full Control	None	None	None
Insulation Specifications	Full Control	None	None	None
Drawing Management	Create P&ID, Delete P&ID	Create P&ID	Undefined (do not choose anything)	Undefined (do not choose anything)
P&ID Objects	Full Control	Full Control	Modify Properties	Read-Only
Workshare	Publish, Get Latest Version, Assign Drawing Ownership, Synchronize Reference Data, Synchronize Shared Items	Undefined (do not choose anything)	Undefined (do not choose anything)	Undefined (do not choose anything)
SmartPlant	Publish, Retrieve	Undefined (do not choose anything)	Undefined (do not choose anything)	Undefined (do not choose anything)

Customizing Your Reference Data

Several tools are delivered during installation that allow you to customize your reference data.

Customize Reference Data Options

Reference data options control the look and feel of the product and controls much of the data used throughout the life of a project.

Use SmartPlant P&ID Options Manager to define how you want particular P&ID items to appear in drawings by selecting colors, line styles, gapping styles, and heat tracing styles for the project.

1. Click **Start** > **Programs** > **SmartPlant P&ID** > **Options Manager**.

2. Define the symbology, gapping, heat tracing, formatting, and distances as needed.

3. Click **Settings**.

4. Verify that all \\node\share entries are set to the shares defined during ref*erenc*e data installation.

5. Click **File** > **Save**.

For more information about working with reference data options, see the *SmartPlant P&ID Options Manager User's Guide*.

Establishing Design Rules

By defining typical or standard design rules, you can quickly and easily place required equipment, interconnecting piping, instrumentation, and other accessories on a drawing. These rules define the placement characteristics of items and how items interact with each other.   Using rules, you also confirm that you meet proper design criteria.

The Rule Manager provides the tools for creating and editing rules. For more information, see the *SmartPlant P&ID Rule Manager User's Guide*.

Working with Filters

SmartPlant Filter Manager, delivered with SmartPlant Engineering Manager, allows you to select the items to display in the engineering application. You can use this feature to clear the view of other items to display one class of items.

For more information about working with filters, see the *SmartPlant Filter Manager User's Guide*.

Working with Formats

SmartPlant Format Manager, delivered with SmartPlant Engineering Manager, allows you to define the characteristics and formats for labels, report data and formatted properties. You can also create and edit formats.

For more information about working with formats, see the *SmartPlant Format Manager User's Guide*.

Working with Symbols and Labels

Symbols include a graphic representation of the item as well as the properties associated with that item. SmartPlant Catalog Manager, delivered with SmartPlant Engineering Manager, allows you to create and edit these symbols.

Some of the characteristics of a SmartPlant symbol include the graphic representation of the item, labels, heat tracing, the icon that represents the item in the Catalog Explorer, and the properties associated with the item.

Two types of labels display important information about drawing items:

- **Driving** — Sets the property in the model, for example, a dimension that changes the size of the object.

- **Driven** — Reports the property in the model, for example, a pressure label that takes its pressure value from the associated pump.

NOTE For more information about working with symbols and labels, see the *SmartPlant Catalog Manager User's Guide*.

Modifying Data Model Properties

SmartPlant Data Dictionary Manager, delivered with SmartPlant Engineering Manager, allows you to modify the data model properties, including the database entries, select lists, and item types that form the underlying data structure.

With Data Dictionary Manager, you can perform the following tasks:

- Add and change properties for specific database tables

- Create select lists and add entries to them

- Associate validation programs with various item types

Because your changes can affect the database for the entire project, only system administrators and project managers typically customize the database with Data Dictionary Manager.

For more information about using Data Dictionary Manager, see the *SmartPlant Data Dictionary Manager User's Guide*.

Configuring Border Templates

The delivered borders are embedded in the delivered template files. Before you can see modifications made to the drawing border during the course of a project, you must edit the delivered templates. If you do not modify the delivered template files, the borders of the drawings created with these templates will not be modifiable on a global level. In other words, changes to border files do not show up in drawings that are using the embedded border template files, which means that you can change the border of drawings only on a drawing-by-drawing basis.

SmartPlant P&ID Delivered Templates

SmartPlant P&ID delivers the following border templates.

Metric Templates

Template File	Border File	Page Size
A0-Size.pid	A0border.igr	A0 Wide (1189mm x 841mm)
A1-Size.pid	A1border.igr	A1 Wide (841mm x 594mm)
A1-Wide(Metric).pid	A1-Wide(Metric).igr	A1 Wide (841mm x 594mm)
A1-Wide Note Area.pid	A1-Wide Note Area.igr	A1 Wide (841mm x 594mm)
A2-Size.pid	A2border.igr	A2 Wide (594mm x 420mm)
A2-Wide(Metric).pid	A2-Wide(Metric).igr	A2 Wide (594mm x 420mm)
A2-Wide Note Area.pid	A2-Wide Note Area.igr	A2 Wide (594mm x 420mm)
A3-Size.pid	A3border.igr	A3 Wide (420mm x 297mm)
A3-Wide (Metric).pid	A3-Wide (Metric).igr	A3 Wide (420mm x 297mm)
A4-Size.pid	A4border.igr	A4 Wide (297mm x 210mm)
A4-Wide (Metric).pid	A4-Wide (Metric).igr	A4 Wide (297mm x 210mm)
A5-Size.pid	A5border.igr	A5 Wide (210mm x 148mm)

English Templates

Template File	Border File	Page Size
A-Size.pid	A-Wide.igr	A Wide (11in x 8.5in)
A-Wide (Imperial).pid	A-Wide (Imperial).igr	A Wide (11in x 8.5in)
B-Size.pid	B-Wide.igr	B Wide (17in x 11in)
B-Wide (Imperial).pid	B-Wide (Imperial).igr	B Wide (17in x 11in)
C-Size.pid	C-Wide.igr	C Wide (22in x 17in)
C-Wide (Imperial).pid	C-Wide (Imperial).igr	C Wide (22in x 17in)
C-Wide Note Area (Imperial).pid	C-Wide Note Area (Imperial).igr	C Wide (22in x 17in)
D-Size.pid	D-Wide.igr	D Wide (34in x 22in)
D-Wide (Imperial).pid	D-Wide (Imperial).igr	D Wide (34in x 22in)
D-Wide Note Area (Imperial).pid	D-Wide Note Area (Imperial).igr	D Wide (34in x 22in)
E-Size.pid	E-Wide.igr	E Wide (44in x 34in)

Edit Delivered Templates

Before editing the delivered templates, verify that the correct plant structure has been selected and that no drawings are open.

1. In Windows Explorer, browse to the default templates location defined in Options Manager or the location of the reference data of your plant.

2. Select the template that matches the system of units and page size requirements for the drawing and double-click the template file to open it in SmartPlant P&ID.   Refer to the previous chart to determine the appropriate template and border files.

   TIP You also can drag the template file into the application window to open the template file.

3. Select the existing border file, and press **Delete**.

4. Click **Edit** > **Insert** > **Object**.

5. Clear the **Link** check box to be sure the item will be embedded.

6. Click **Browse**.

7. Click the border file to use. You can use the delivered border or choose another border.

8. Click **Open**.

9. Click **OK** on the **Insert Object** dialog box.

10. Position the border file in the template.

11. Click **File** > **Exit**.

Create a Border Template

1. Start SmartPlant P&ID.

2. Verify that the correct plant structure has been selected.

3. Click **File** > **New Template**.

4. Click **File** > **Page Setup**.

5. Select the sheet size in the **Standard** option and then click **OK**.

6. Click **File** > **Properties**.

7. On the **Units** tab select a unit in the **Length**, **Angle**, and/or **Area Readout** boxes to specify the default units of measure, and then click **OK**.

8. Click **Edit** > **Insert** > **Object**.

9. Verify that **Link** is selected if you want the border file linked, or clear the **Link** check box if you want to embed the file.

10. Select the border to use and click **Open**, and then click **OK**.

11. Click **File** > **Save**.

12. Type the name for the template in the **File Name** box.

13. Save the template border in the default templates location defined in Options Manager.

14. Click **Save**.

15. Click **File** > **Exit**.

Working with SmartPlant Integration

Integration standardizes and improves the communication among the various authoring tools you use in the course of designing, constructing, and operating a plant.   SmartPlant integration manages data exchange among these authoring tools, which enables sharing and re-use of plant information throughout the plant life-cycle.   SmartPlant Foundation acts as a repository for data and a medium through which information is shared among other tools, such as Aspen Basic Engineering, SmartPlant Instrumentation, SmartPlant Electrical, and Smart 3D.

Most of the commands that provide access to SmartPlant integration functionality exist in the common user interface available on the SmartPlant menu in Engineering Manager, SmartPlant Instrumentation, SmartPlant Electrical, SmartPlant P&ID, and Drawing Manager.

The following graphic displays what SmartPlant P&ID publishes and retrieves and shows the flow of data and the different types of data.
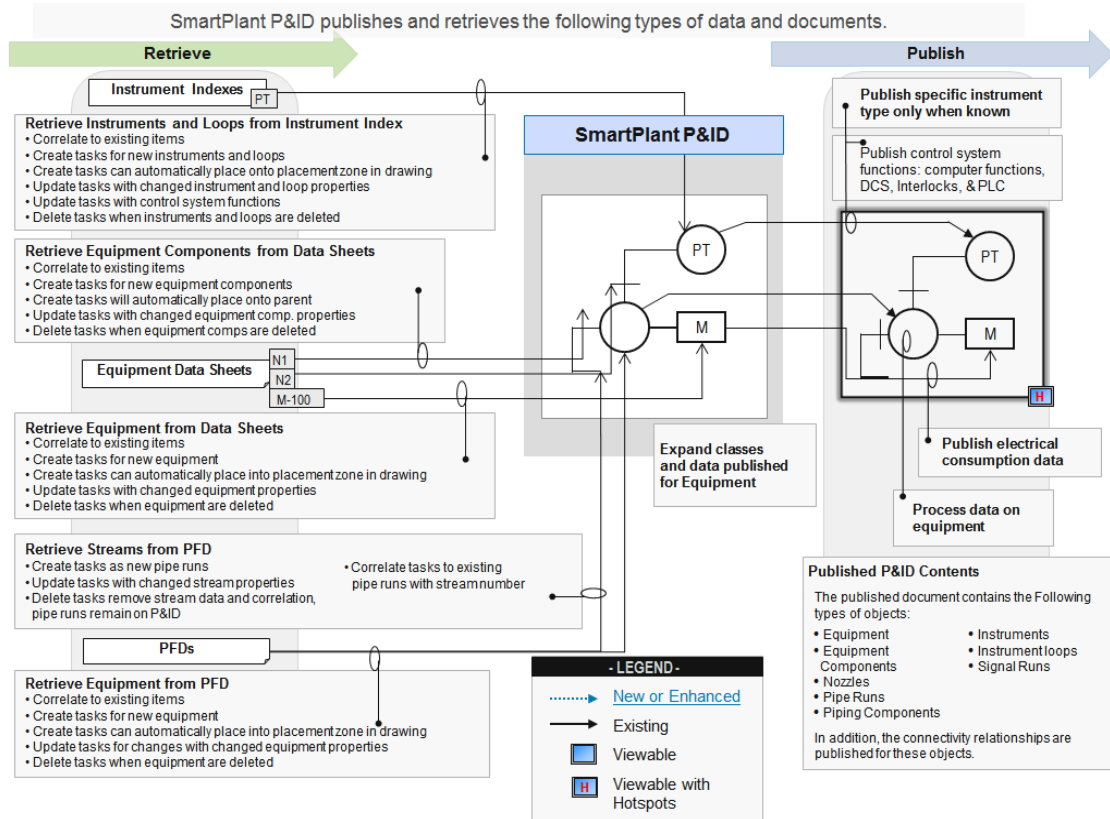
SmartPlant P&ID interacts with SmartPlant Foundation by correlating items between the plant database and the SmartPlant Foundation database, retrieving documents from SmartPlant Foundation. Also, SmartPlant P&ID creates a set of tasks in the To Do List that you can run to update the plant database. In SmartPlant P&ID, you can also use the commands on the

SmartPlant menu to publish documents and retrieve data, access the SmartPlant Foundation Web Portal in order to browse in SmartPlant Foundation, and subscribe to change notifications and compare documents.

`NOTE` You can only use the **SmartPlant** menu commands after your plant is registered. For more information, see *SmartPlant Engineering Manager Online Help*.

Registering Tools

Before you can publish and retrieve documents from any of the other authoring tools, such as SmartPlant Electrical or SmartPlant Instrumentation, you must register each plant in SmartPlant P&ID with a SmartPlant Foundation database. The connection allows SmartPlant P&ID to use the commands on the SmartPlant menu. A SmartPlant Engineering Manager administrator typically registers a plant.

The software maps a plant and all its projects to a single SmartPlant Foundation URL, which points to one, and only one, SmartPlant Foundation plant database and its projects. When you use the Register command in any of the authoring tools, you are registering an authoring tool plant with a SmartPlant Foundation URL and plant that you specify.

The system administrator must register each plant in the authoring tool once; this action takes place in SmartPlant Engineering Manager. After the plant is registered, you can publish and retrieve documents.

Preparing the Integrated Environment

To enable SmartPlant P&ID to work in an integrated environment, you must do the following:

1. Install the Schema Component and the SmartPlant Client, delivered with SmartPlant Foundation, on each SmartPlant Engineering Manager and SmartPlant P&ID workstation. For more information about installing these components, see the *SmartPlant Enterprise Installation and Setup Guide*.

    `NOTE` Before you install the Schema Component and the SmartPlant Client, be sure to install the software prerequisites described in the *SmartPlant Client Workstations* section of the *SmartPlant Enterprise Installation and Setup Guide*.

2. Use a hierarchy that contains a minimum of three levels when you create your plant in SmartPlant Engineering Manager.

    `NOTE` In addition to requiring a minimum of three-levels in hierarchies, SmartPlant configurations also require that the names of hierarchy items cannot be changed after they are created and that the hierarchy structure cannot be modified after you create the project. For more information, see the *SmartPlant Enterprise Installation and Setup Guide* or the *Using Custom Hierarchies in an Integrated Environment* (on page 85) topic in *SmartPlant Engineering Manager Help*.

3. Associate applications with and assign user access rights to your plant.

    `NOTE` When SmartPlant P&ID and SmartPlant Electrical are both enabled for a plant, they are both enabled for all projects in that plant. If a project requires only one of these applications, create separate plants for each application, then enable SmartPlant P&ID for one plant and SmartPlant Electrical for the other.

4. Edit the **SmartPlant Resource Path** setting in Options Manager to point to the SmartPlant Resources folder installed with the SmartPlant P&ID reference data.

IMPORTANT The path specified in Options Manager must contain the tool schema (for example, SPIDDataMap.xml) for publish and retrieve operations between the tool and SmartPlant to work properly.   For more information, see the *SmartPlant P&ID User's Guide*.

5. Register your SmartPlant plant with SmartPlant Foundation, as described in the *SmartPlant Engineering Manager Help*.

NOTES

- When you register your plant, you must specify the location of the SmartPlant Engineering Manager schema map file (SPEMDataMap.xml).   For more information, see the *Specify Map File Dialog Box* topic in *SmartPlant Engineering Manager Help*.

- If only one application is associated with the plant at the time it is registered, only that application is registered. If another application is later associated with the plant, the **Register** command is enabled so that you can register the new application with the plant.

Tool Requirements for Integrating SmartPlant P&ID

This topic describes rules and settings that allow SmartPlant P&ID data to be shared correctly with Aspen Basic Engineering, Smart 3D, SmartPlant Instrumentation, and the other tools that are part of an integrated environment.   Other tools that are not listed here have no known SmartPlant P&ID/SmartPlant integration issues.

General Integration Requirements

The following is a list of *best practice* scenarios for using SmartPlant P&ID so that data will migrate correctly to other SmartPlant tools:

To enable publishing from a project, you must create a project in SmartPlant Foundation with the same name (case-sensitive) as the P&ID project.

- When creating formats for use with SmartPlant P&ID publishing, the formats must be added and mapped in SPPIDDataMap.xml using Schema Editor. The UID string of the custom SPMapUOMDef map file must be of the form *SPMU_<NN>_FormatName>*, where 'NN' represents the SPMapUOMListDef ID for the format type (for example Temperature = 5; Pressure = 27). Since spaces or restricted characters are not allowed in the UID string, custom format names must not include spaces or restricted characters.

- If you intend to publish select lists (enum lists) to SmartPlant Foundation, make sure that you review the *SmartPlant Adapter for SmartPlant P&ID Guide* to understand the requirements (see under *Data Transformation Logic > Publish/Retrieve*).

- If the SmartPlant P&ID item tag validation allows for duplicate tags, this may have an impact on downstream tools such as SmartPlant Instrumentation, which does not allow duplicates. In such cases, allowing duplicates in SmartPlant P&ID can cause problems in the retrieving tool.

NOTE By default, SmartPlant P&ID item tag validation does not allow duplicate item tags for loops or instruments.

Integration with SmartPlant Instrumentation

Retrieving Documents

- If a SmartPlant P&ID drawing that includes items with a flow direction is to be retrieved by SmartPlant Instrumentation, a flow direction of **End 1 Upstream** or **End 1 Downstream** must be defined in SmartPlant P&ID. Bi-directional flow is not supported.

Connect to Process Lines

- **Connect to Process** lines are required for connecting instruments to equipment nozzles and pipe runs in SmartPlant P&ID.

- All non-piped offline equipment instruments must be connected to vessels through non-electric signal lines and nozzles in SmartPlant P&ID.   This enables SmartPlant Instrumentation to recognize that instruments are connected to vessels.

- If SmartPlant P&ID assigns an object to an intermediate level in the hierarchy and publishes, SmartPlant Instrumentation will assign the object to the level in the hierarchy in SmartPlant Instrumentation determined by their logic.   Because instruments belong to units in SmartPlant Instrumentation, an instrument assigned to the intermediate level in SmartPlant P&ID will be assigned to the unit in SmartPlant Instrumentation. Panels will be assigned to the plant. SmartPlant P&ID may get an update on retrieve to move the object to another level in their hierarchy than where it was published based on the move done automatically by SmartPlant Instrumentation. Panels will move to the top level; instruments will move to the bottom.

Instrument Expansion

- A SmartPlant P&ID instrument or loop tag does not always have a 1:1 relationship with instruments in SmartPlant Instrumentation.   In some cases, a single item tag in a P&ID corresponding to an instrument or loop needs to be expanded to create several instruments when publishing the data for SmartPlant Instrumentation.   For this purpose, the **Expansion Type** property in SmartPlant P&ID specifies the expansion behavior when publishing an instrument or loop.   Each value of the property corresponds to a SmartPlant Instrumentation rule that determines which instrument types and numbers are to be created in SmartPlant Instrumentation when the SmartPlant P&ID tag is expanded and retrieved.

  NOTE When retrieving data back to SmartPlant P&ID, the behavior of a particular instrument created by expansion is determined by SmartPlant Instrumentation parameters. For an expanded instrument, the state of the IRetrievableExpansion interface determines whether that instrument will be retrieved by SmartPlant P&ID: if the IRetrievableExpansion interface is realized, the instrument is retrieved, whereas if the IRetrievableExpansion interface is *not* realized, the instrument is not retrieved.   The 'parent' item tag is *always* retrieved, regardless of the realization state of the IRetrievableExpansion interface.

Ports

- SmartPlant Instrumentation uses physical ports, while SmartPlant P&ID uses logical ports. SmartPlant Instrumentation publishes the physical ports with the Dimensional Data Sheets and not the Instrument Index.   SmartPlant P&ID retrieves the Instrument Index and does not retrieve the Dimensional Data Sheets.
  When the workflow goes from SmartPlant P&ID to SmartPlant Instrumentation, followed by SmartPlant Instrumentation publishing the Dimensional Datasheet, a Same As relationship

is created between the ports in the SmartPlant Foundation database.   That Same As relationship is required by Smart 3D to correctly match the design basis ports to the 3D representation of the ports.

When the workflow goes from SmartPlant Instrumentation to SmartPlant P&ID, however, a Same As relationship is not created in the SmartPlant Foundation database. Without the Same As relationship created in the SmartPlant Foundation database, the result may be additional ports in Smart 3D.   To obtain the Same As relationship on the ports requires that SmartPlant P&ID publish the P&ID with the instrument, this P&ID be retrieved by SmartPlant Instrumentation and then having SmartPlant Instrumentation publish the Dimensional Data Sheet.

Integration with Smart 3D

General

- In Options Manager, ensure that under **Settings**, the **Use Piping Specification** setting value is **Smart 3D** even if the P&ID plant is not validating piping specifications. This is to ensure that the required Piping Component Select List entries are properly set to match the PIP short codes expected by Smart 3D.   For details, see *Configure Piping Specification Settings* in *SmartPlant P&ID Options Manager User's Guide*.

Drawing Items

- For Smart 3D to properly determine flow direction in a process run, that process run must be connected to at least 2 items.

- Some items that can be represented as single objects in SmartPlant P&ID, such as Vent Detail, are modeled in Smart 3D as a set of separate objects.   For full correlation to be established between the two tools, ensure that these objects are modeled in SmartPlant P&ID with the same configuration used to represent them in Smart 3D.

Properties

- Smart 3D handles temperature and pressure properties in pairs and does not support having a temperature (for example, Normal Operating Temperature) without defining the matching pressure (in this case, Normal Operating Pressure). While this is a valid condition for SmartPlant P&ID, it should be a consideration when publishing for retrieval into Smart 3D. Without the Pressure / Temperature pair of values defined, the Smart 3D user will be required to enter a value that was not defined in SmartPlant P&ID.

Integration with Aspen Basic Engineering

Retrieving Documents

- Basic Engineering data sheets can contain multiple objects and may be formatted in a traditional data sheet view or list view (for example, as an equipment list).   Data sheets retrieved from Basic Engineering may include stream data, specialty piping data, or relief valve data as required by business practices.

Using Workshare in an Integrated Environment

The following rules apply to using the Workshare functionality within an integrated SmartPlant environment:

- You can enable and disable Workshare before or after registering a Greenfield plant.

- You can create satellites and connect to them after registering.

- You cannot register a satellite.

- You cannot retrieve a WBS document when Workshare is enabled.

Using the Integration Commands Within a Workshare Collaboration

The Workshare host can perform the following actions from within SmartPlant P&ID when registered. For more information about these commands, see the *SmartPlant P&ID User's Guide*.

- **Publish** — Any drawing can be published.

- **Retrieve** — Any SmartPlant document can be retrieved.

- **Correlate** — Reviewing correlation is available if the drawing is in a read-only state. It is not possible to assign correlation in a read- only drawing.

- **To Do List** — Only available at the Workshare Host. To Do List tasks may be reviewed on drawings for which the host does not have ownership, but these tasks may not be executed unless ownership is assigned to the Host.   The To Do List is not available at the Satellite.

Using the Catalog Index in SmartPlant P&ID and SmartPlant Integration

When you select the **Retrieve** command, the software accesses the CatalogIndex.mdb and the system performs the following actions:

1. Using the retrieved document, the object type and classification of the retrieved item is determined.

2. Using the SmartPlant P&ID Map file, the ItemTypeName (Equipment, PipeRun, PipingComp, Loops, and so forth), and codelist indices for Class, Sub-Class, and Type is determined.

Catalog Index Lookup

The Catalog Index file is used to find a symbol in the catalog with type properties that match the given values. The lookup is performed using the most specific information first. If a match is found, that symbol is used. However, if there is no match, the more generic type information is used for additional searches. In this way, a generic symbol will be returned if no specific symbol is available in the catalog.

Search Based on Type Value — Searches the catalog index for all rows with matching ItemTypeName and Type values and IsDefaultForType = True. If one or more rows are found, the software uses the CatalogItemName from the first one. If no match is found, the software performs the search based on Subclass.

Search Based on Subclass Value — Searches the catalog index for all rows with matching ItemTypeName and SubClass values and IsDefaultForSubclass = true. If one or more rows are

found, the software uses the CatalogItemName from the first one.   If no match is found, the software performs the search based on Class.

Search Based on Class Value — Searches the catalog index for all rows with matching ItemTypeName and Class values and IsDefaultForClass = True.   If one or more rows are found, the software uses the CatalogItemName from the first one.   If no match is found, the software returns an empty string.

Mapping for SmartPlant Integration

If you customize the plant database items or attributes in your SmartPlant Engineering Manager plant, you must define the mapping between these customized plant attributes and the properties in the SmartPlant schema.

1. Open the plant data dictionary by right-clicking the plant in the Tree view in SmartPlant Engineering Manager and selecting the **Data Dictionary Manager** command.   For more information, see Data Dictionary Manager Command (Tools Menu).

2. Add or modify the attributes in Data Dictionary Manager for each level in your hierarchy. For more information, see the *Add a Property to Database Tables* topic in the *Data Dictionary Manager User's Guide*.

3. Open the plant SPEMDataMap.xml schema map file in the Schema Editor and map the plant database items between the tool schema (SPEMDataMap.xml) and the SmartPlant schema.   For more information, see the *Schema Editor User's Guide.*

IMPORTANT

- If you add an enumerated list attribute to the plant data dictionary, see the *Hierarchical Enumerated Lists* topic in the *SmartPlant P&ID User's Guide* for information about mapping these complex data types.

- The default SPEMdatamap.xml file contains the EF_SPAPlant attributes (CompanyName, SiteName, SiteLocation, DivisionName, and DivisionLocation).   This file is delivered to the ..\Engineering Manager\SmartPlant Resources folder.

Using Custom Hierarchies in an Integrated Environment

SmartPlant integration supports custom hierarchies, as long as they contain a minimum of three levels. By default, the delivered SPEMdatamap.xml file is compatible with the standard SmartPlant Plant > Area > Unit hierarchy.

IMPORTANT

- After registering, SmartPlant Engineering Manager cannot retrieve the PBS document if the plant and SmartPlant hierarchies are not compatible. To be compatible with the SmartPlant hierarchy, your plant hierarchy can contain less than or equal, but not more than the number of levels in the SmartPlant hierarchy.

- SmartPlant Engineering Manager retrieves from the SmartPlant hierarchy only the hierarchy levels it needs. For example, if your plant hierarchy contains 4 levels and the SmartPlant hierarchy contains 8 levels, only the top 4 levels of the SmartPlant hierarchy are retrieved.

- All SmartPlant Engineering Manager hierarchy item names (plant group names) below the plant (top level) must match the names in the SmartPlant Foundation plant hierarchy that are at the same level. The names are case-sensitive and therefore the cases must also match. The plant names do not have to match.

- In addition to requiring a minimum of three-levels in hierarchies, SmartPlant integration also requires that the names of hierarchy items cannot be changed after they are created and that the hierarchy structure cannot be modified after you create the project. For more information, see the *SmartPlant Enterprise Installation and Setup Guide*.

Register Command (SmartPlant Menu)

Allows you to register a plant database, along with its associated applications, with an instance of SmartPlant Foundation.   Each database must be registered before you can connect to SmartPlant Foundation to perform any specific tasks, such as publishing or retrieving files.   You can register each plant database only once.

During registration, the software maps the plant database, all of its projects, and all of its associated applications to a single SmartPlant Foundation URL, which points to one SmartPlant Foundation plant database, and returns a unique signature for the tool/plant combination being registered.

IMPORTANT

- You must install the Schema Component and the SmartPlant Client, delivered with SmartPlant Foundation, on your SmartPlant Engineering Manager workstation before you can register your plant.

- If only one application is associated with the plant at the time it is registered, only that application is registered.   If another application is later associated with the plant, you must also register the new application with the plant.

After the plant is registered, the **SmartPlant** tab is added to the **Plant Structure Properties** dialog box.   The **SmartPlant** tab displays the SmartPlant Foundation URL, the SmartPlant Foundation plant database, and the unique application identifiers returned by the registration process.

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