Smart 3D Setup and Administration

Smart 3D 2018

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Know your instructor

- **Cherise Primm**
  - Over 7 years of experience working with Smart 3D
  - Specialization in Setup and Administration, Interference Detection Service, Codeless IFC

Prerequisites for this class

- Experience with Microsoft Windows Operating System architecture
- Experience with Microsoft SQL Server 2016 or Oracle 12c database server administration
- Knowledge of 3D Plant Design CAD Concepts

Agenda

Day 1

- Introduction to Smart 3D (concepts, terminology)
- System Setup
- Project Hardware Sizing
- Project Setup (Database Creation, permissions)

Day 2

- Backup and Restore
- Project Management (delete models, delete catalogs, hierarchy icons, create catalog)
- Model Organization (Systems hierarchy)
- Smart 3D Common Applications

Agenda (Cont'd)

Day 3

- Optimization for Roles
- Set Default Colors
- Model Data Reuse & Model Data Transform
- Synchronize Model with Catalog
- Database Maintenance
- Database Integrity

Day 4

- Error Logs and Memory monitor
- Interference Checking Service
- Point Cloud Reference
- Reference 3D (R3D) Part I

Agenda (Cont'd)

Day 5

- Reference 3D (R3D) Part II
- Intergraph Batch Services
- Database conversion wizard (SQL ⟷ ORACLE)
- Database version upgrade

Smart 3D Introduction

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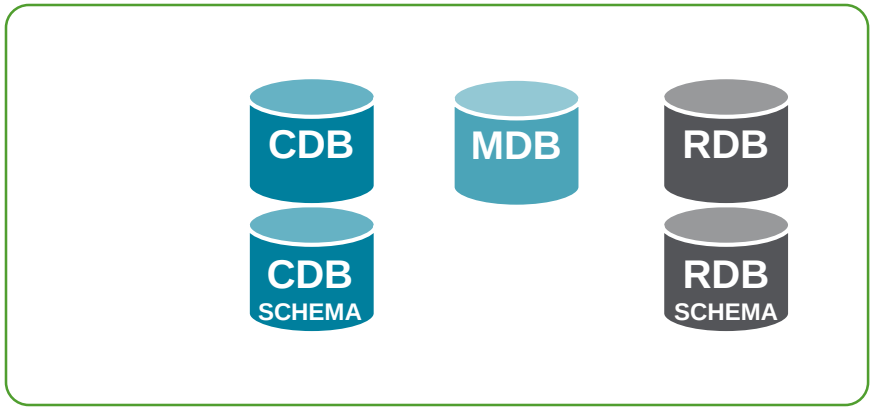
Smart 3D - Database architecture

Model Configuration



Site
Site Schema
Catalog
Catalog Schema
Model
Reports
Reports Schema

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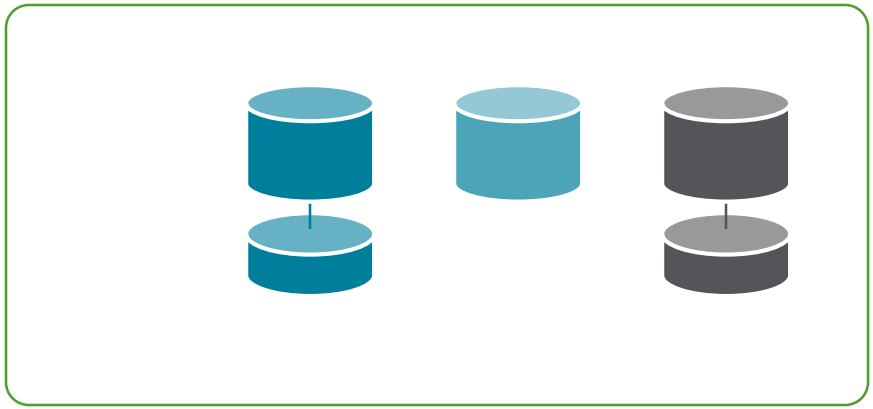
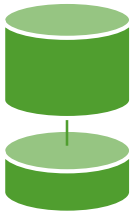
Smart 3D - Database architecture

Model Configuration





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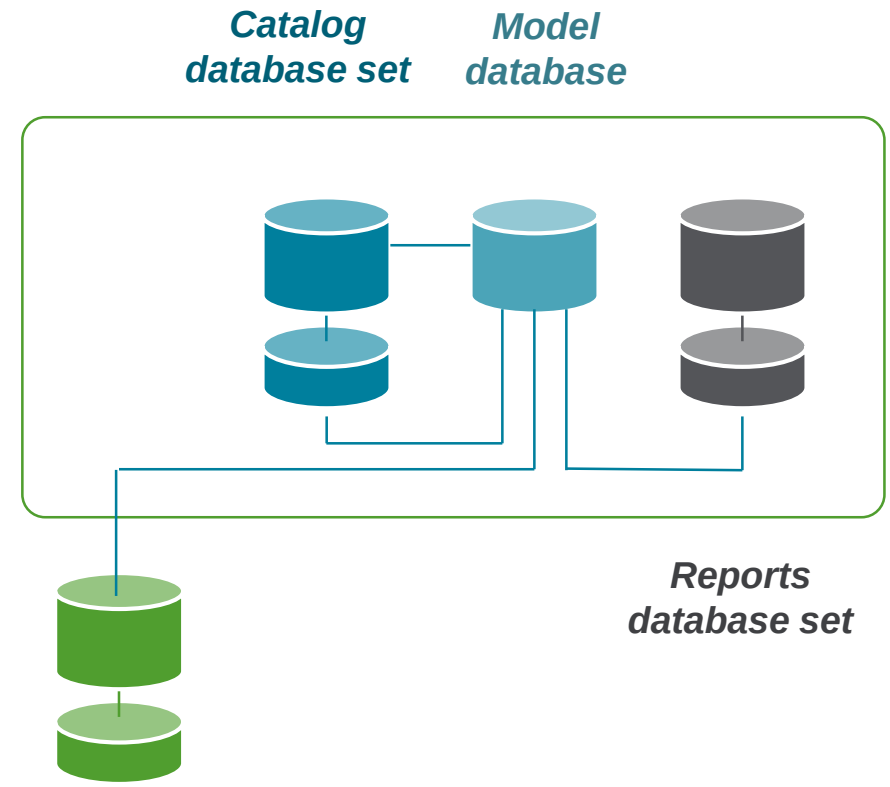
Smart 3D - Database architecture

Model Configuration



Site database set:
Contains configuration and connection information and links the rest of the databases.

Catalog database set:
Contains the Reference Data used by all disciplines.
Store Design Modules (assemblies), Catalog Filters

Model database:
Contains and organizes all of the three-dimensional objects in the model, referenced objects data.
Stores definition and content of deliverables (Drawings and Reports), Model and user's Filters, Styles, Surface Style Rules, etc.

Reports database set:
Optimize data retrieval from other five databases.

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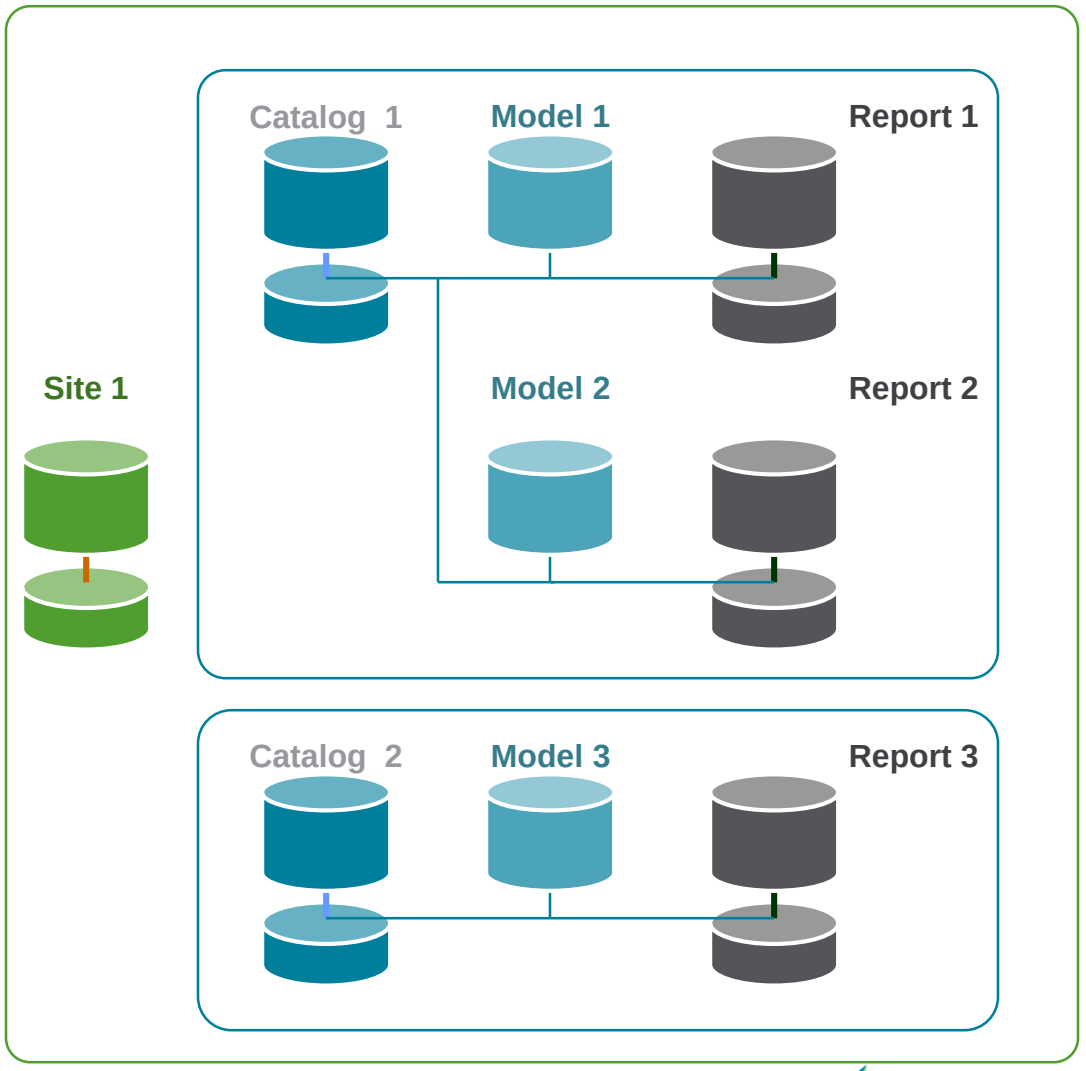
Smart 3D - Database architecture

Model Configuration options

Multiple Models can share the same Catalog …

… or exclusively use own Catalog



Smart 3D - Database architecture

Model Configuration options

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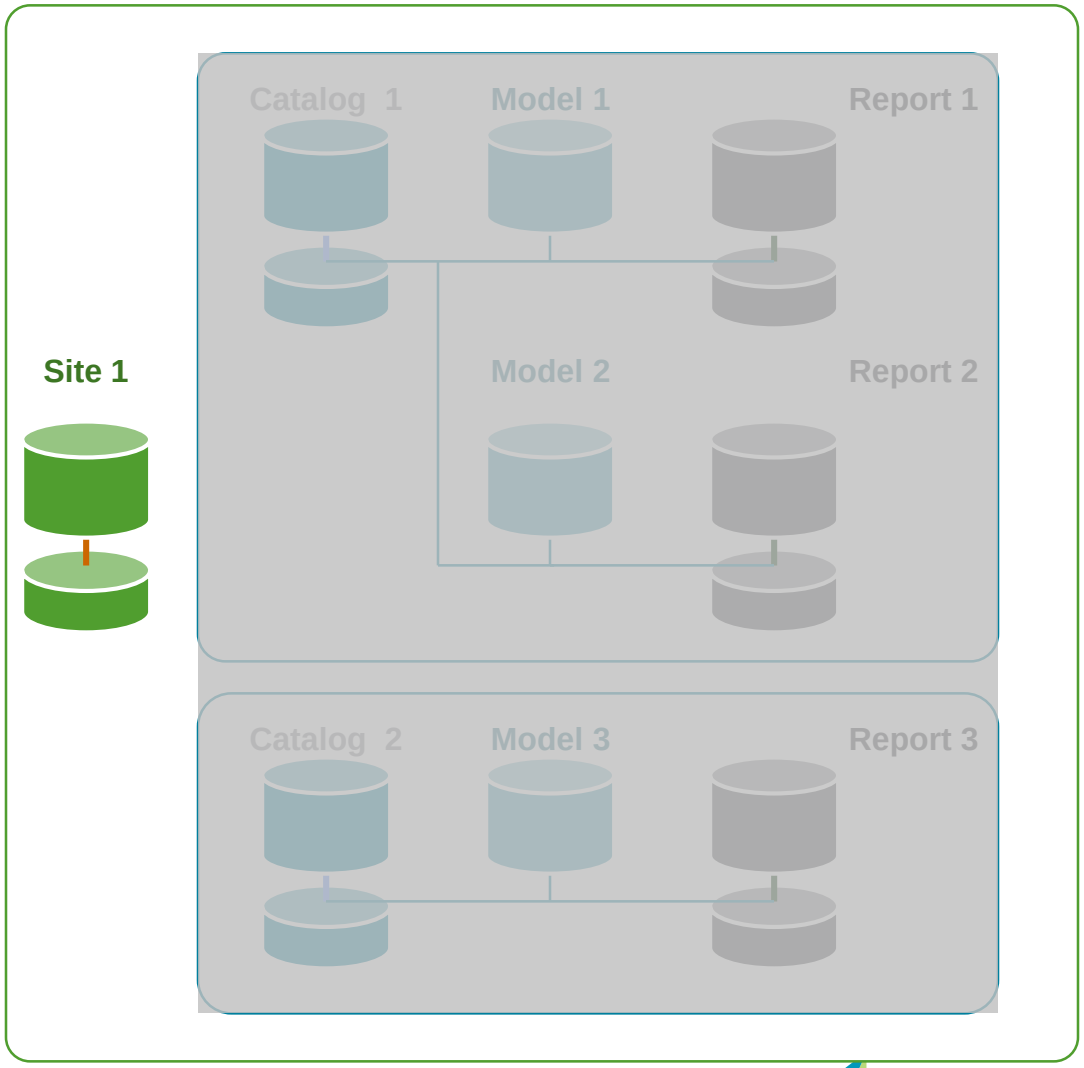
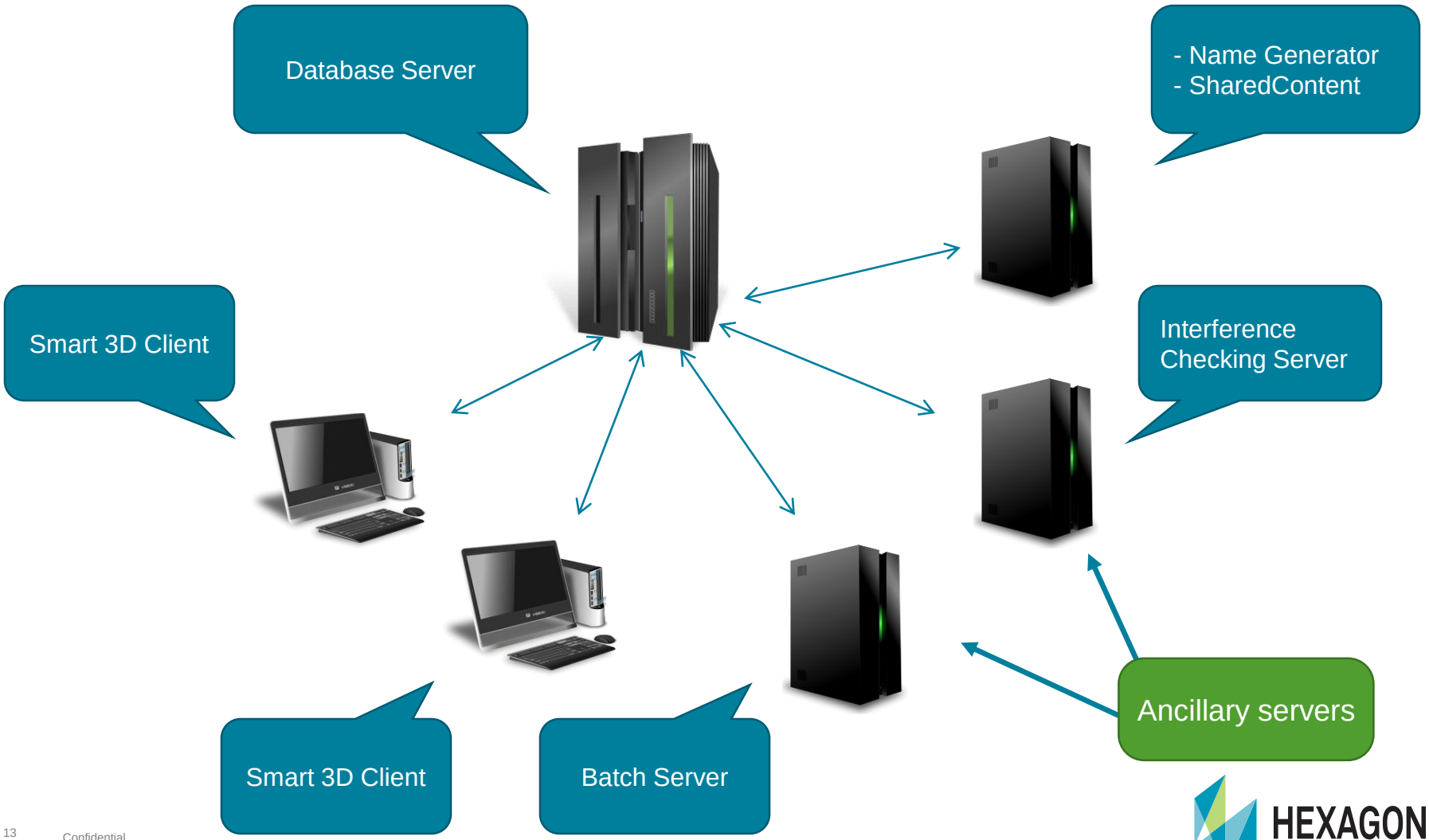
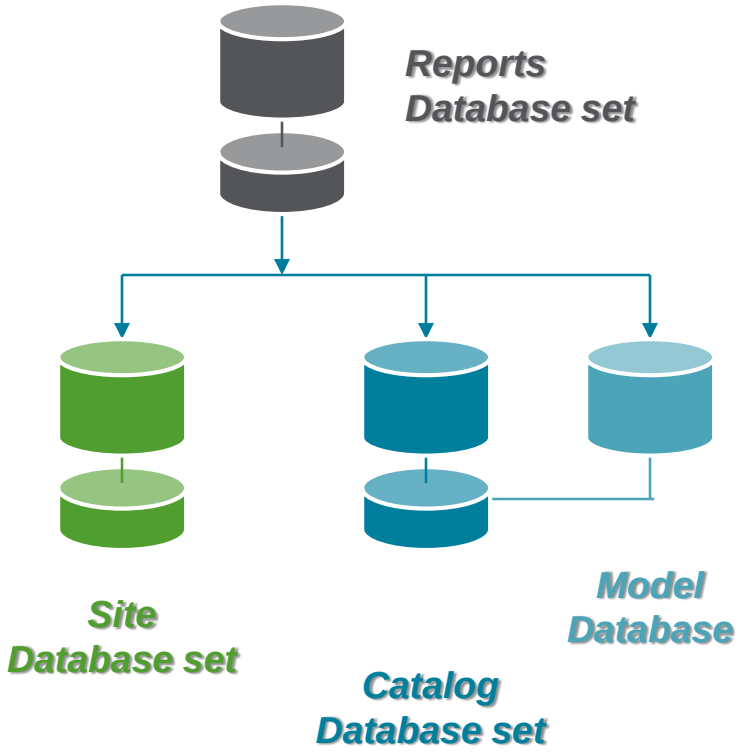


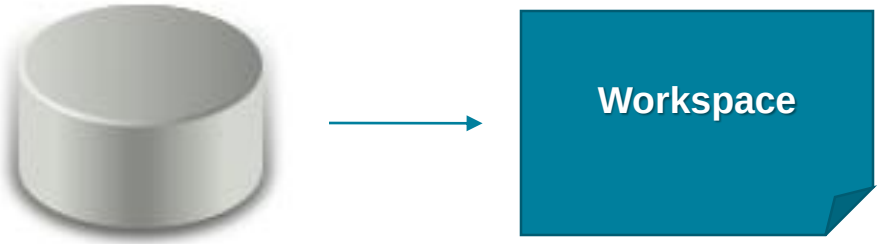
Smart 3D intro: Server - Client architecture



Smart 3D intro: Define Workspace

- **Filter on database**
- **Returns only the data you want to see and builds a logical "Working Set"**
  - System
  - Assembly
  - Spatial (Volume or Planes)
  - Logical Permission Groups
  - Object Types/Properties





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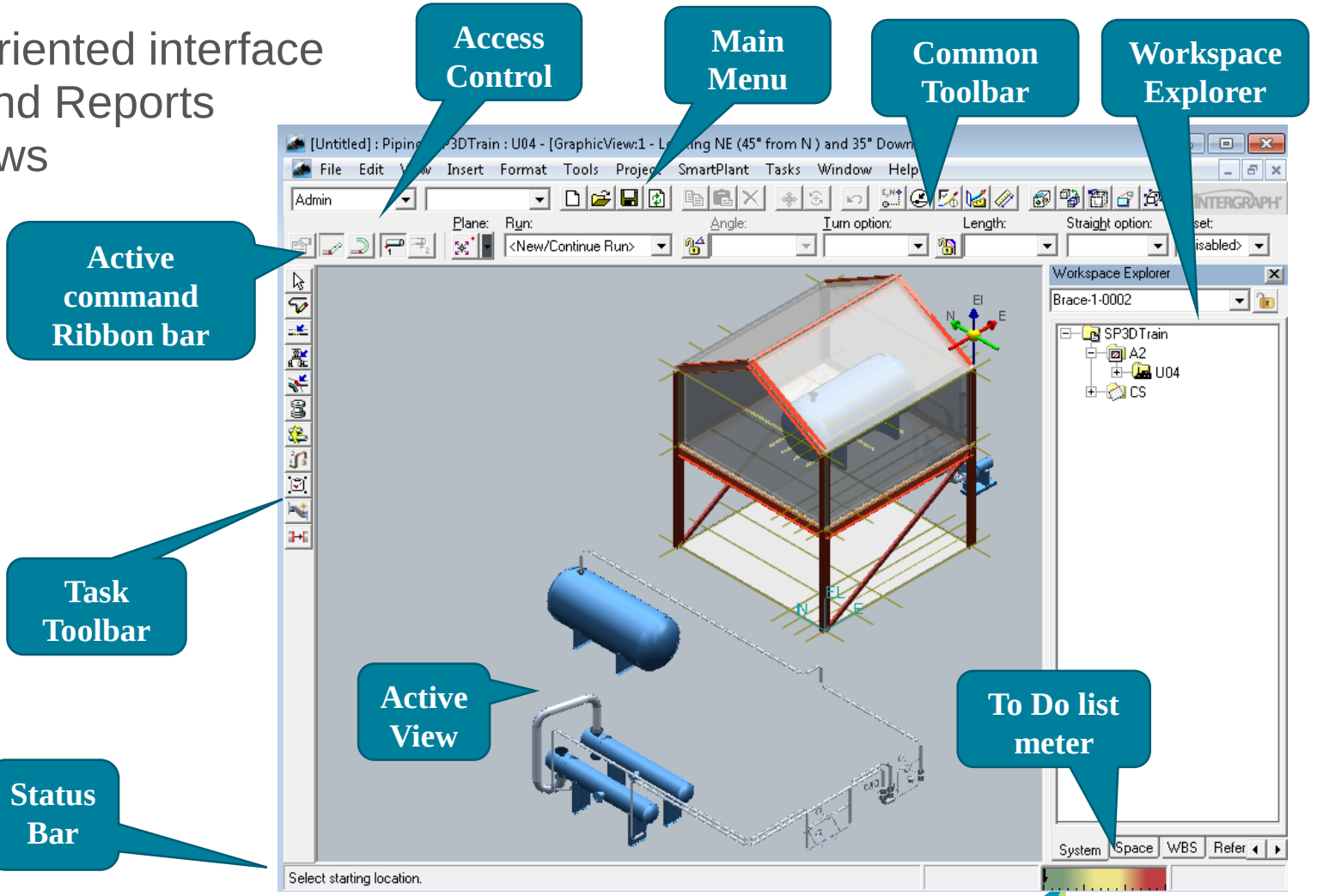
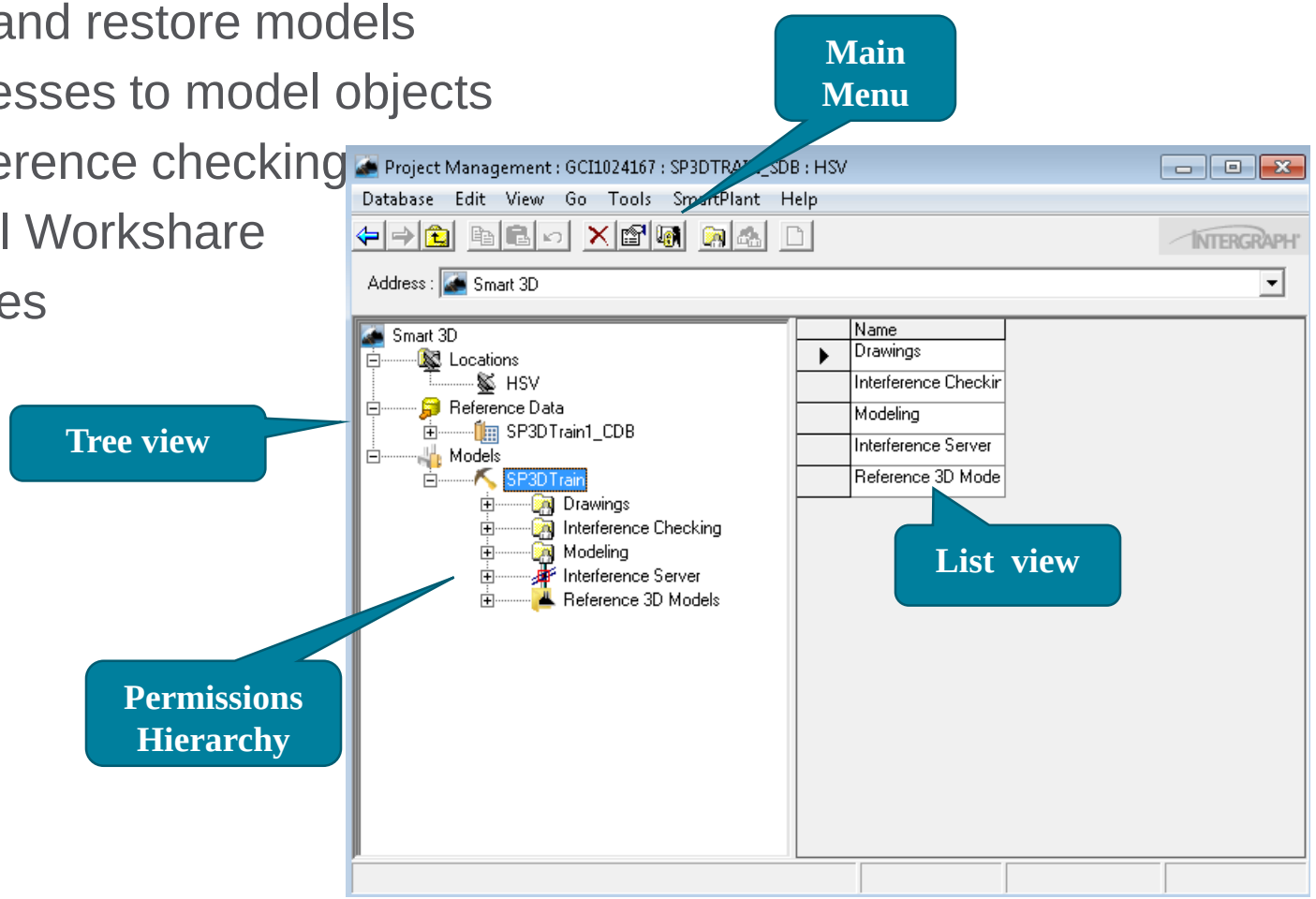
Smart 3D intro: Modeling environment

- Discipline oriented interface
- Drawings and Reports
- Graphic views



Smart 3D intro: Project Management

- Create, backup and restore models
- Modify user accesses to model objects
- Start/Stop Interference checking
- Configure Global Workshare
- Migrate databases



Smart 3D intro: Relationships and Integration

- Smart 3D synchronizes key elements of integration and relationships.
- Integration - Smart 3D allows multiple engineering disciplines to work concurrently and in real-time against relational databases.
- Relationships - Smart 3D's relationship manager controls design changes across disciplines, which in turn establishes and maintains appropriate behaviors among structures, equipment, and systems.

Smart 3D intro: Administrative guides

- *Smart 3D Release Bulletin*
- *Smart 3D Installation Guide*
- *Smart 3D Installation Checklist*
- *Smart 3D Project Management User's Guide*
- *Smart 3D Database Integrity Guide*
- *Smart 3D Global Workshare Guide*
- *Smart 3D Interference Checking Guide*
- *Smart 3D Troubleshooting Guide*
- *Smart 3D Point Cloud Guide*

System Setup

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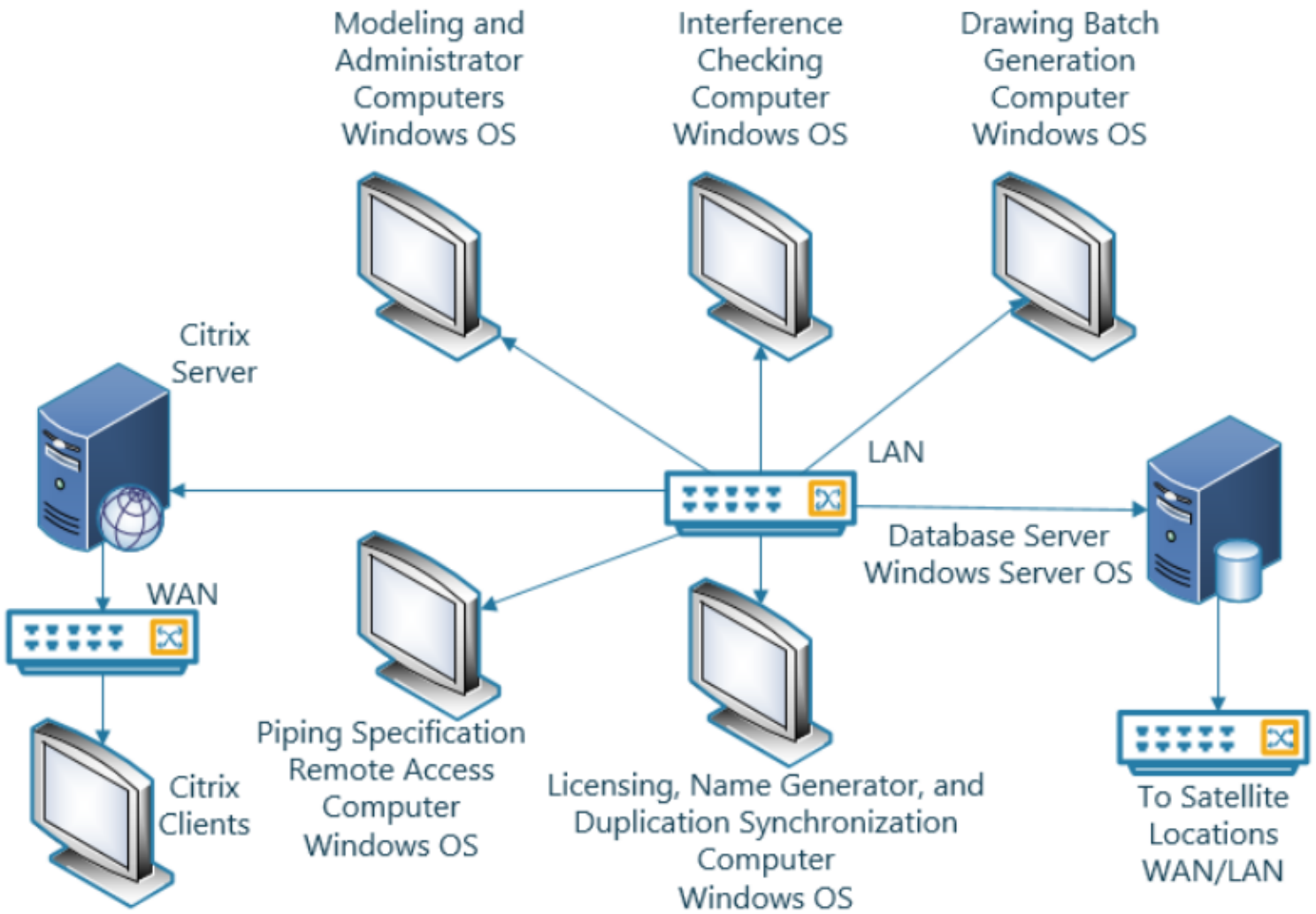
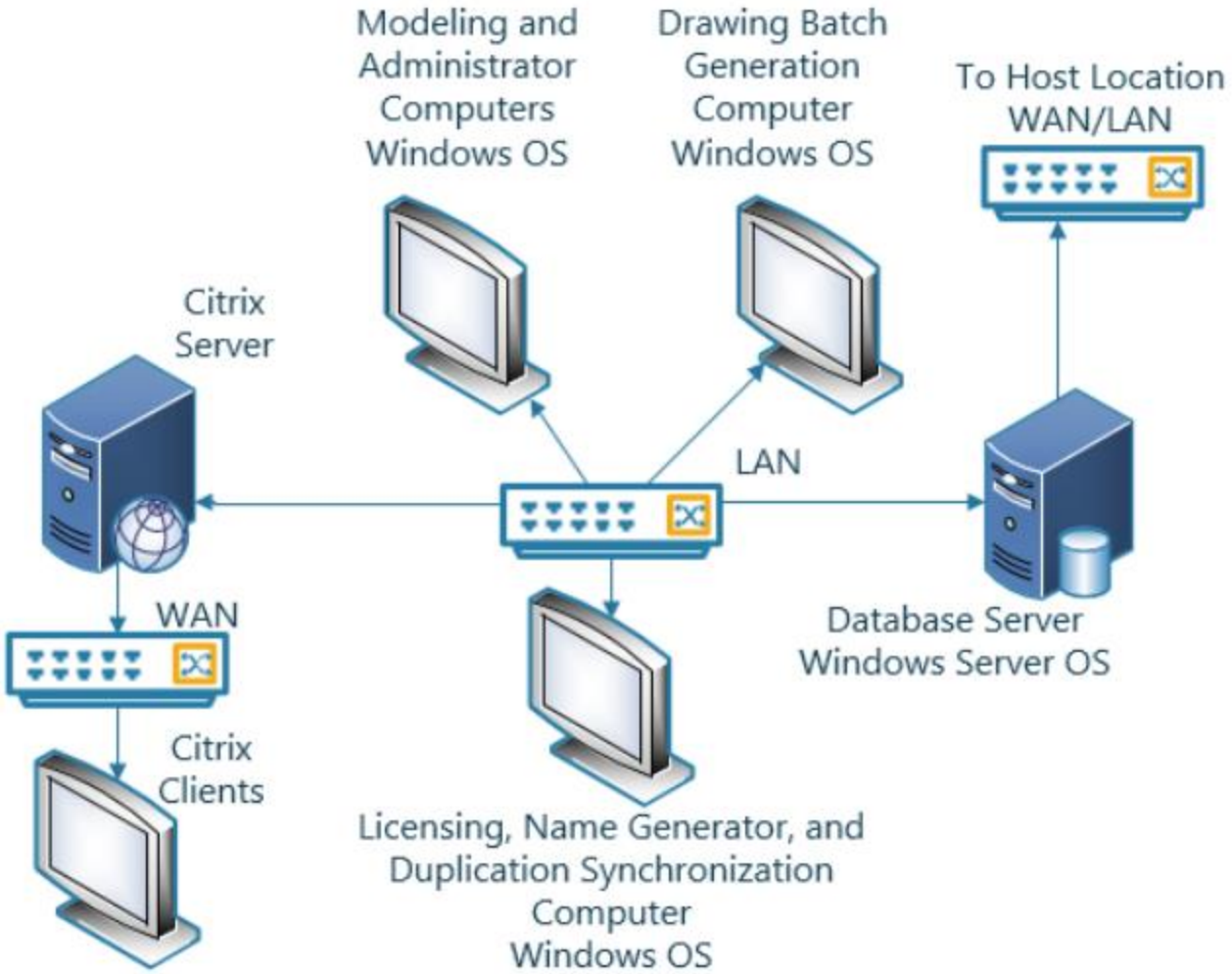
Host Location Layout



Satellite Location Layout



System Setup: Smart 3D servers

- One or multiple server machines can be used to provide the following required supporting services:
  - **Database server**
    - Provides hosting services for the Smart 3D databases
  - **Shared content file server**
    - Contains support files for the Smart 3D project, symbol definitions, drawing and reports templates, reference files, translator data, etc.
  - **Name Generator service provider**
    - Generates object names and contains naming rules for object placement and certain administrative functionality

System Setup: Smart 3D ancillary servers

- Ancillary servers are computers dedicated to perform a specific task with the purpose to offload processing from the main database server.
  - **Interference checking (IFC)**
    - Checks interferences between objects in the model
  - **Intergraph Batch services**
    - Manages scheduling and execution for commands to be processed in batch mode

System Setup: Smart 3D workstation machines

Workstations connected to the database server

- **Administrative clients**
  - Used in administrative and maintenance tasks such as backups, restores, bulkload to catalog, database maintenance and integrity checks, attaching external references, manipulations with large data (MDR/MDT)
- **Modeling clients**
  - Contains all discipline related tasks and commands to create objects in a model
- **Output clients**
  - Contains all discipline related tasks and commands to create deliverables generated from model

System Setup: Server - Workstation

- Hardware recommendations
- Supported platforms
- Software prerequisites
- Installation

System Setup: Hardware recommendations Database server

- Intel Xeon® 5600 Series or better (64-bit instruction set, not Itanium®)
- 32 GB to 128 GB or greater RAM depending on project size
- For hard drive size, see “Smart 3D Project Hardware Sizing Recommendations” in the Installation guide
- Backup system for server
- Access to DVD drive, either locally or through a network connection
- 1 GbE or higher network interface for client connections, latency be less than 1ms between client and database server

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System Setup: Supported platforms
Database server

- **Supported Operating Systems**
  - Microsoft Windows Server 2016 (Standard or Enterprise)
  - Oracle Linux 7 (Oracle database only)
- **Supported Database Servers**
  - Microsoft SQL Server 2016 (Standard edition for stand-alone environments; Enterprise edition for Global Workshare environments; 64-bit)
  - Oracle 12c Release 2 (12.2.0.1) (Enterprise or Standard Edition 2; 64-bit)
    - If you are going to use Oracle in a Global Workshare configuration, you also need Oracle GoldenGate 12.3.0.1.2, which is separately purchased from Oracle
  - Oracle Linux 7 does not support a Global Workshare configuration

System Setup: Software prerequisites
Database server

- **Software prerequisites**
  - Adobe Reader or equivalent PDF reading software
  - Microsoft XML Core Services (MSXML) 6.0 SP1 (Database server only)
  - Microsoft .NET 4.6 or later

System Setup: Installation of Smart 3D Reference Data – Name Generator

- **Reference Data**
  - Shared Content files
  - Database Templates
  - Oracle initialization scripts
- **Name Generator Service**

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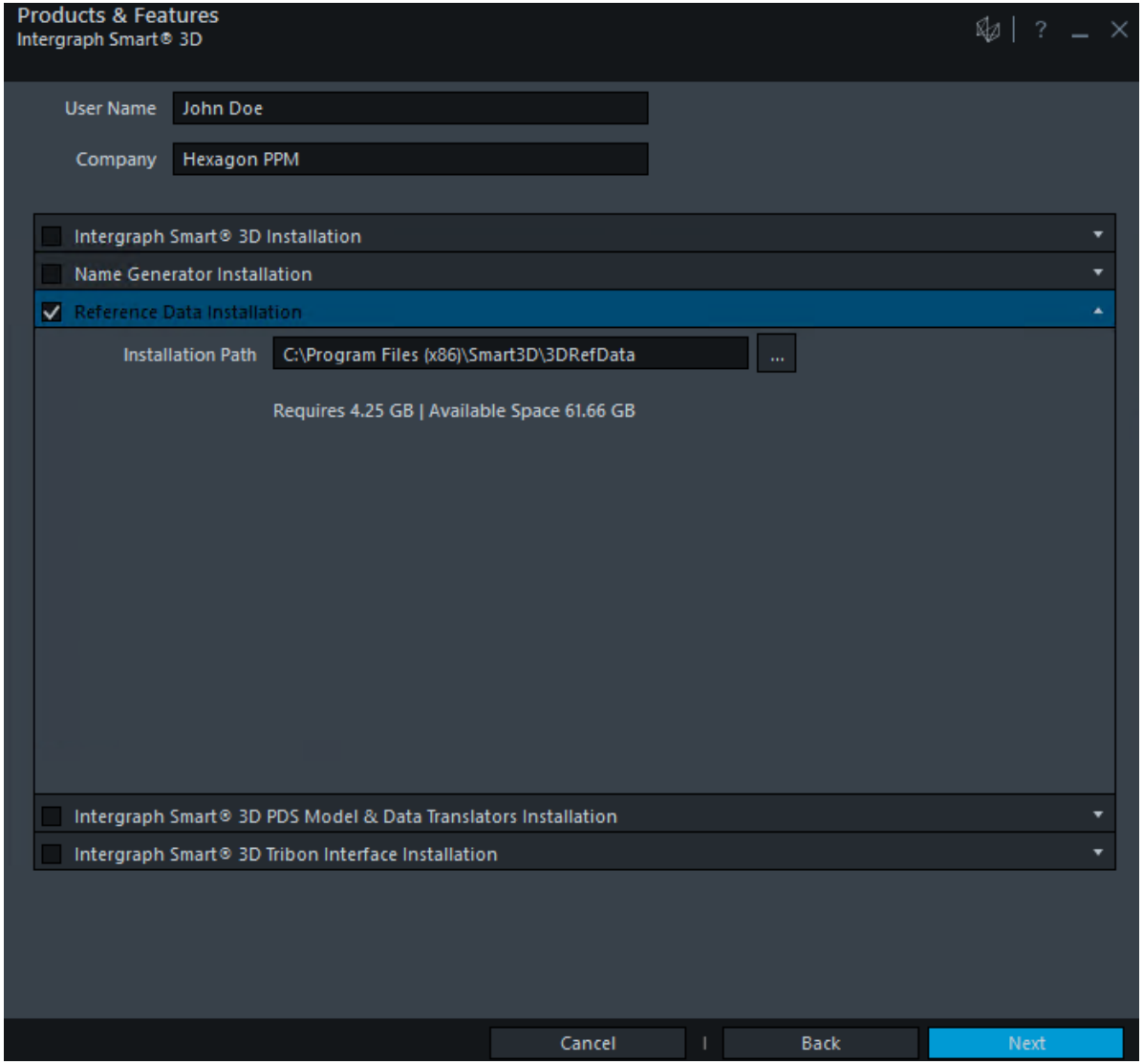
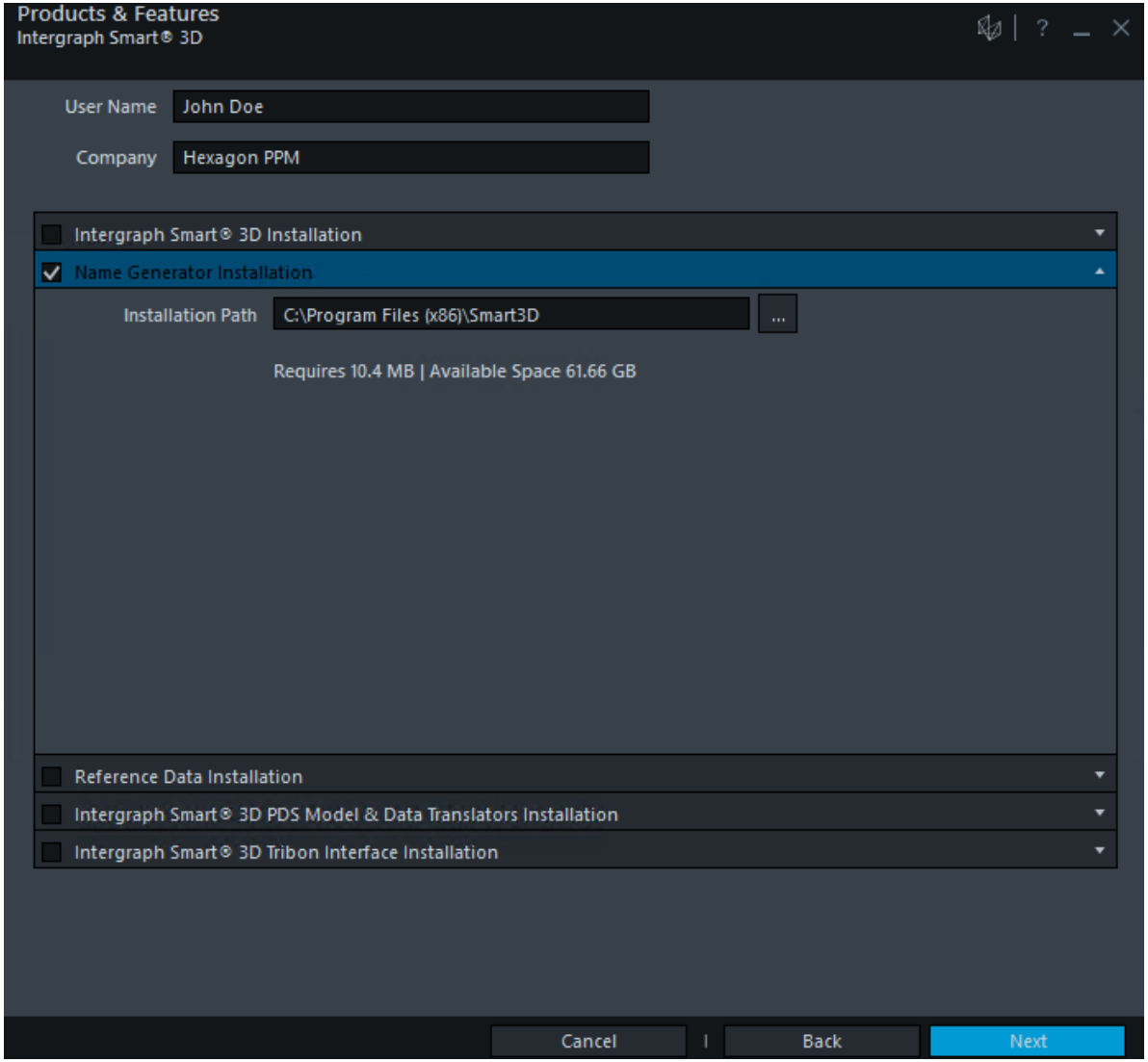
System Setup: Installation of Smart 3D Reference Data



System Setup: Installation of Smart 3D Name Generator

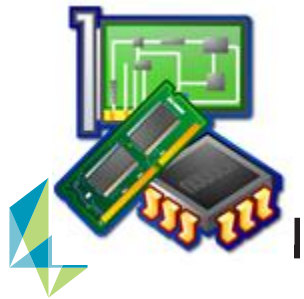


System Setup: Installation of Smart 3D Workstation

- Applicable Hardware configurations
  - Administrative Client workstation
  - Modeling Client workstation
  - Interference Detection computer/server
  - Drawing Batch computer/server
  - Name Generator computer
  - Duplication and Synchronization computer
  - Smart 3D Piping Specification Remote computer

System Setup: Hardware recommendations Workstation

- Intel Core i7, Quad Core
- 6+ GB RAM
- Access to a DVD drive, either locally or through a network connection
- Monitor capable of a minimum of 1280 x 1024 resolution
- 1 GbE or higher network interface
- Graphics card designed for 3D intensive applications that meet the following requirements:
  - 32-bit main RGBA pixel buffer
  - Hardware OpenGL 2.1 support
  - Hardware Z buffer: 24 bit or higher
  - 256 MB RAM
  - 8-bit stencil buffer
  - Hardware Alpha blending support
  - Graphics acceleration set to full
  - Hardware Anti-aliasing support recommended
  - Latest available drivers should be installed



System Setup: Supported platforms Workstation

- **Supported Operating Systems and required service packs**
  - Microsoft Windows 7 - Professional or Enterprise SP1 (64-bit)
  - Microsoft Windows 10 (64-bit)
  - Microsoft Windows Server 2016 (64-bit) Standard or Enterprise only as a client for Citrix XENApp 7.11
- **Supported database clients and required versions**
  - Microsoft SQL Server Management Studio 2016 or 2017 (64-bit)
  - Microsoft SQL Server Native Client 2012 64-bit (11.3.6538.0 or later) (Required for all client computers when using Microsoft SQL Server databases)
  - Oracle 12c R2 (12.2.0.1); 32-bit Oracle client only (Required for all client computers when using Oracle databases)
    - NOTE: Oracle Instant client will not work

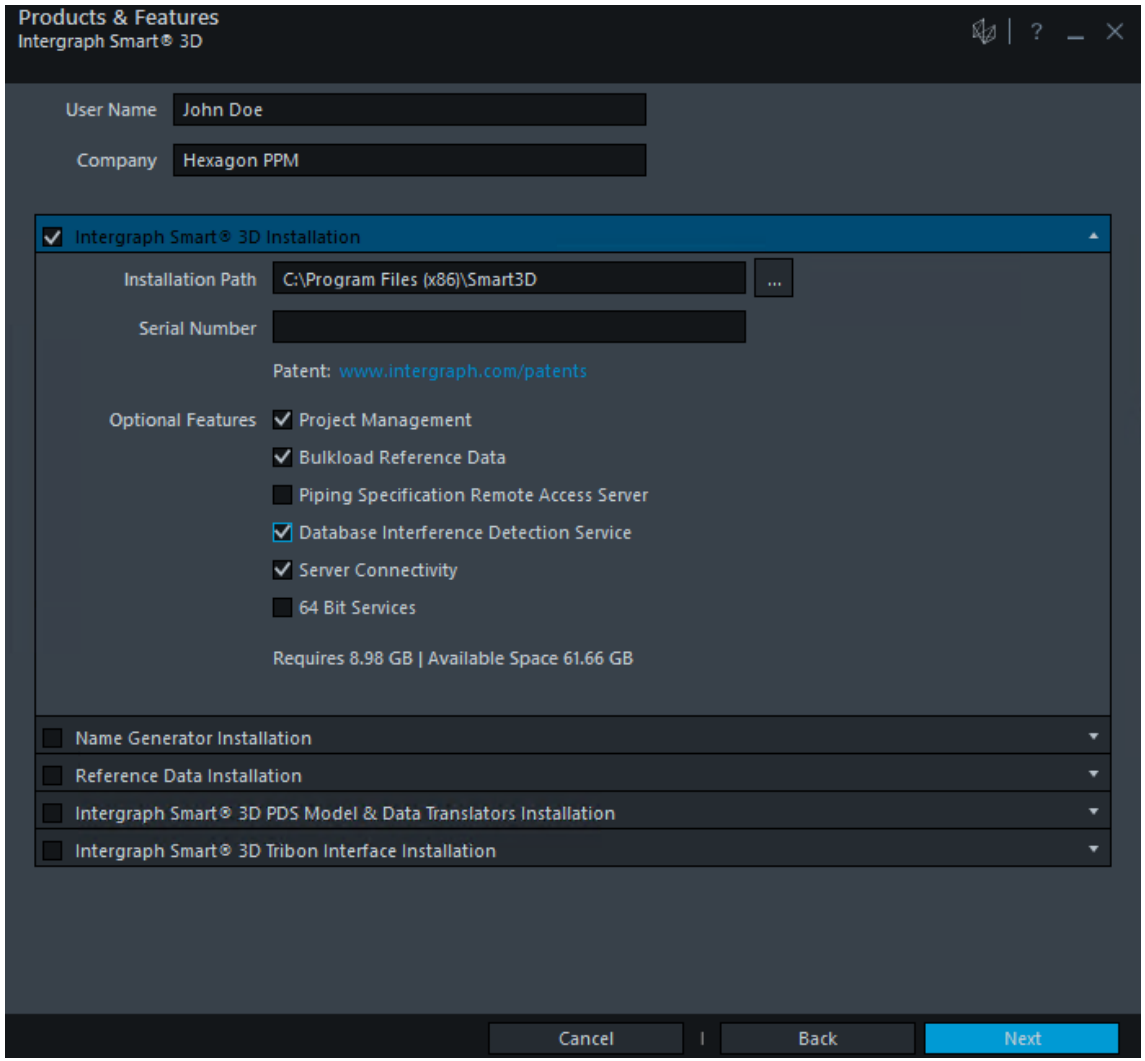
System Setup: Software prerequisites Workstation

- **Software prerequisites**
  - Microsoft Edge Browser or Internet Explorer 11 or later
  - Adobe Reader 11 or later (or equivalent PDF reader software)
  - Microsoft XML Core Services (MSXML) 6.0 SP1
  - Microsoft .NET Framework 4.6 or later
  - Microsoft Office 2016
  - SmartPlant License Manager 2012 (12.0.9) or later

System Setup: Optional software Workstation

- **Intergraph SmartPlant Schema Component 2018**
  - Allows publishing to SPF or 3D Model generation
- **Intergraph Batch Services 2010 SP1 (6.01.10.00)**
  - Allows scheduling commands for batch and/or remote processing
- **PDS Data Access components**
  - Allows referencing or export of PDS Projects
- **Solid Edge Version ST5 and ST10**
  - May be used for creating equipment symbols
- **Visual Basic 6.0 (Visual Studio 2013 or higher for .NET API)**
  - Allows creation of graphic visual basic symbols, macros, custom rules, etc.
- **Point Cloud vendor software**
  - Allows referencing Point Cloud projects in Smart 3D

System Setup: Installation of Smart 3D Design /Admin Client Installation



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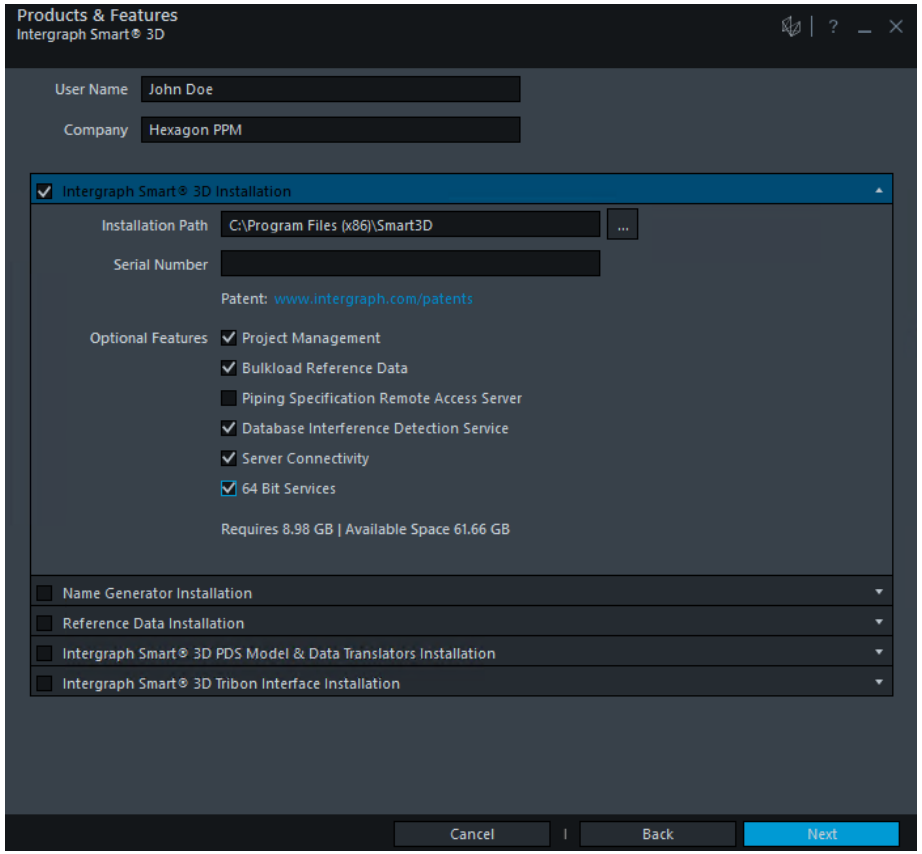
System Setup: Installation of Smart 3D 64-bit Services

- 64-bit Services can be used for IFC service and/or Drawing Batch Services



- These cannot be uninstalled individually. Need to uninstall Smart 3D software.

Setup and Administration Lab

Lab 1

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Smart 3D Setup

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Smart 3D Setup

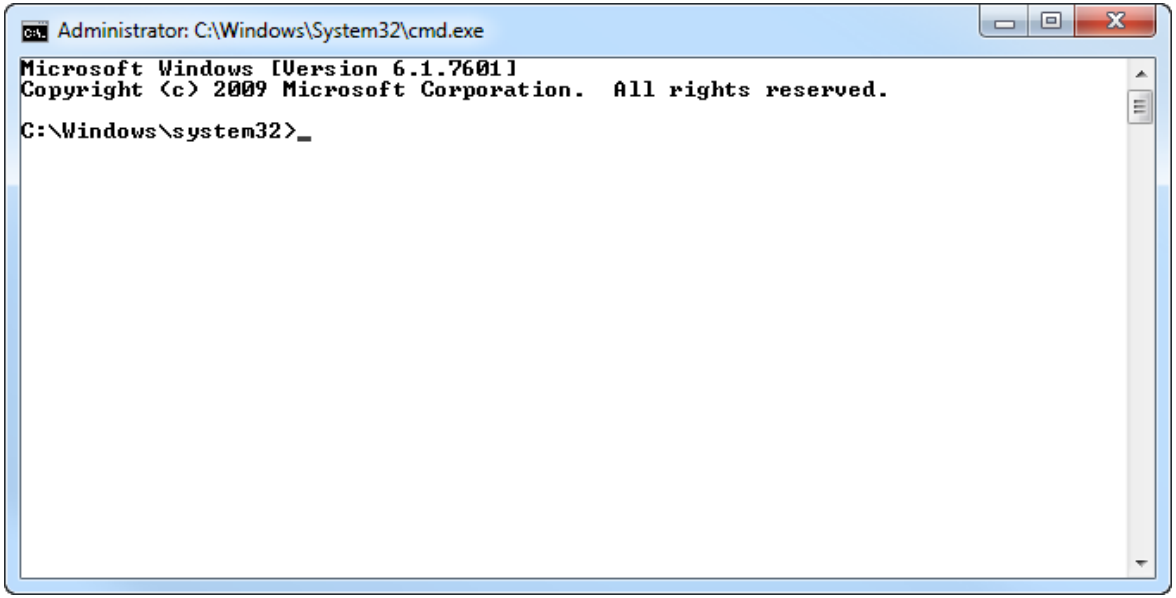
Software versioning is based on the different releases.

- RTM - Release To Manufacturing (CD/DVD)
- Service Packs or Schema Changes
- HotFixes

Current version: Smart 3D 2018 (12.00.25.0004)

Smart 3D Setup: Silent Install

- Smart 3D can be installed through command line
- Ideal to reduce deployment and maintenance impact
- Service Packs or Hotfixes support silent install



Smart 3D Setup: Silent Install

- S3DInstallation.exe **SERIALNUMBER**=### **SLAACCEPT**=YES [INSTALLDIR=<Path>] [X64SERVICES=Yes] [ADDLOCAL=Feature1,Feature2] [REMOVE=Feature1,Feature2]

Smart 3D Setup

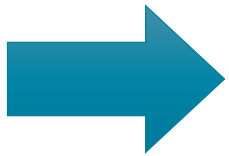
- Three different ways to configure Smart 3D.

Server

Name Generator
Shared Content

Workstation

Project Management
Bulkload
IFC…



Standalone

Global Workshare Configuration

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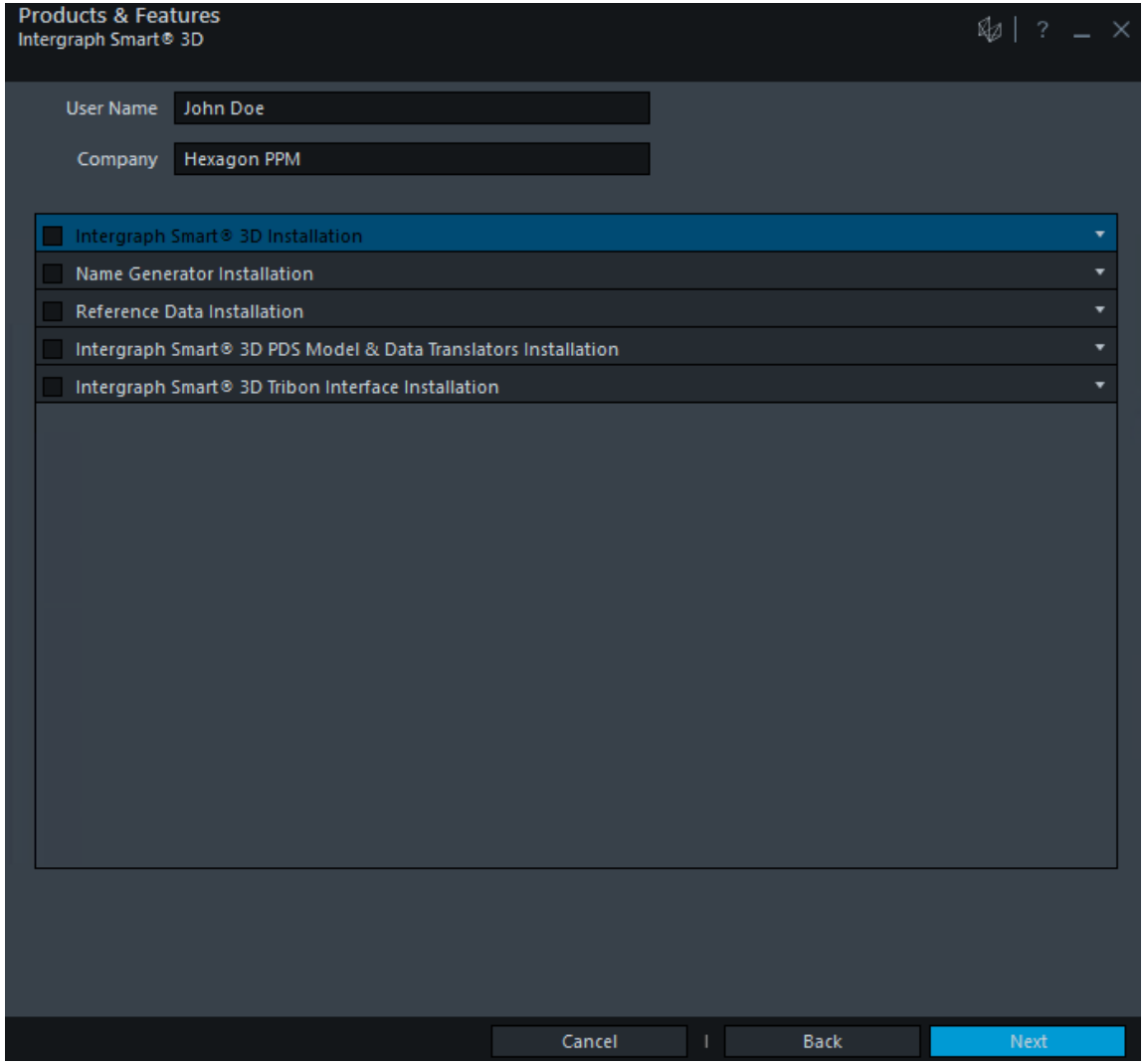
Smart 3D Setup

Before Installing…

- Use an account with administrative privileges
- If installing under Windows 7, Windows 10 or Windows Server 2016, execute setup.exe with the option “Run as Administrator”
- Verify that all prerequisite software was installed
- Don't skip any restart recommended by the software

Smart 3D Setup: Splash screen



Reference Data installation

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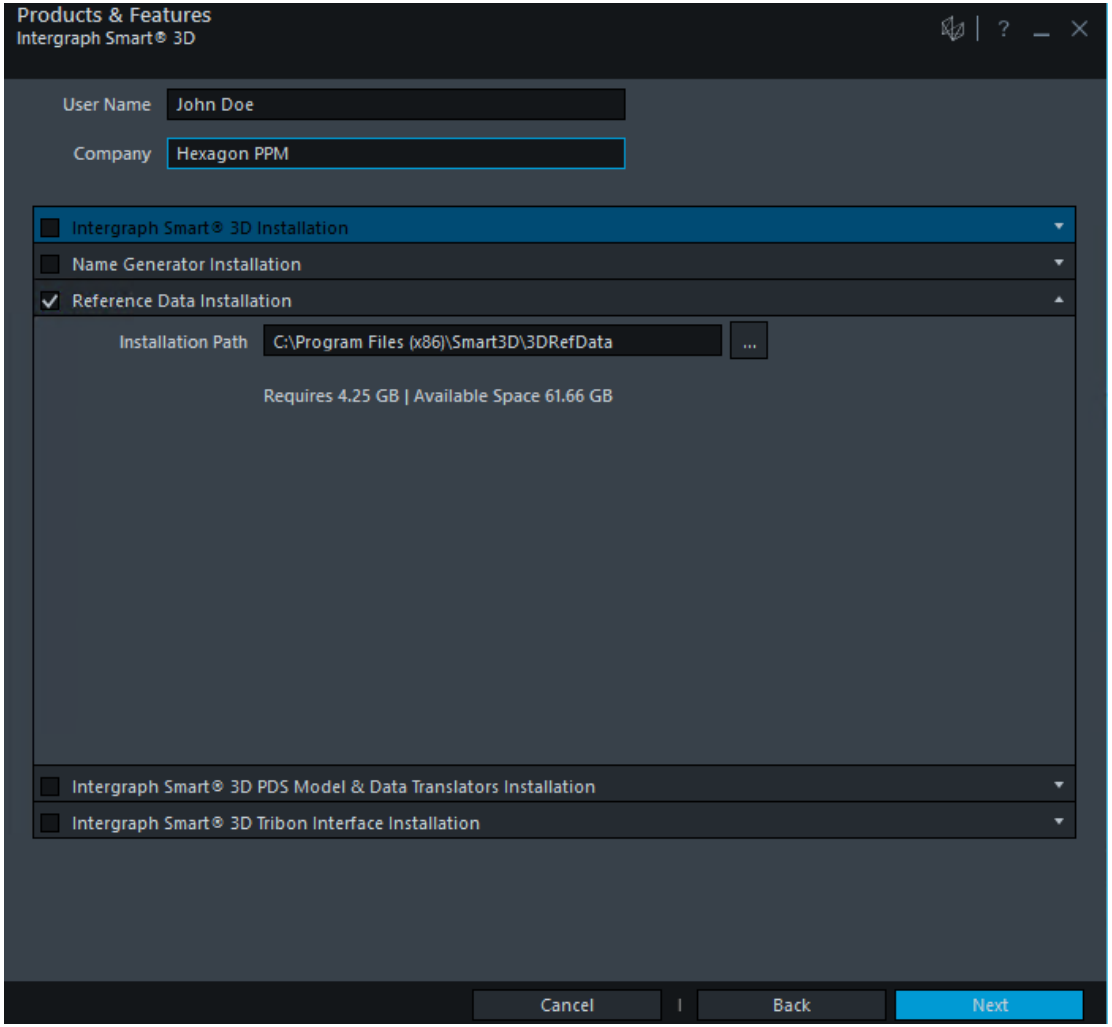
System Setup: Installation of Smart 3D Reference Data



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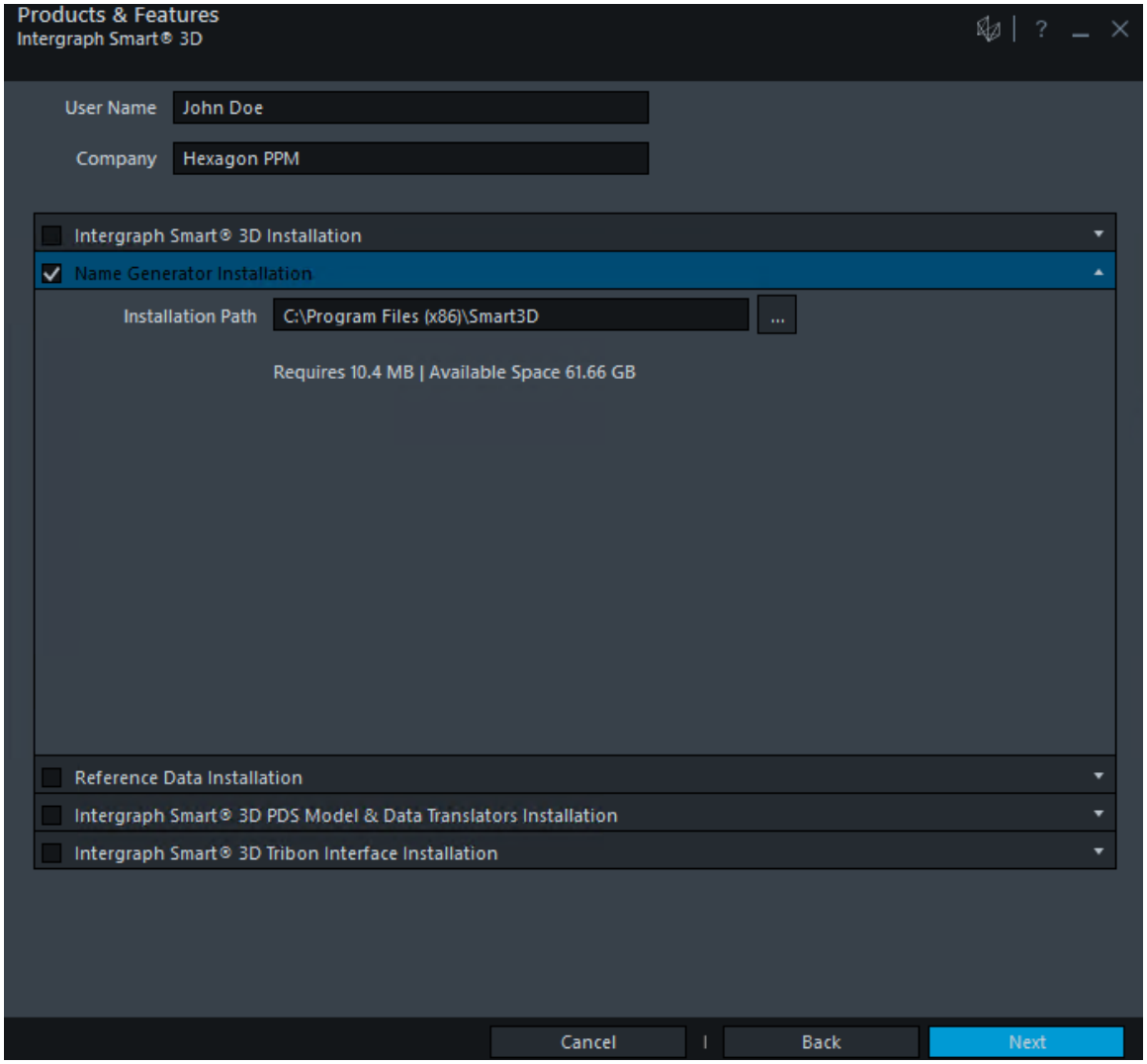
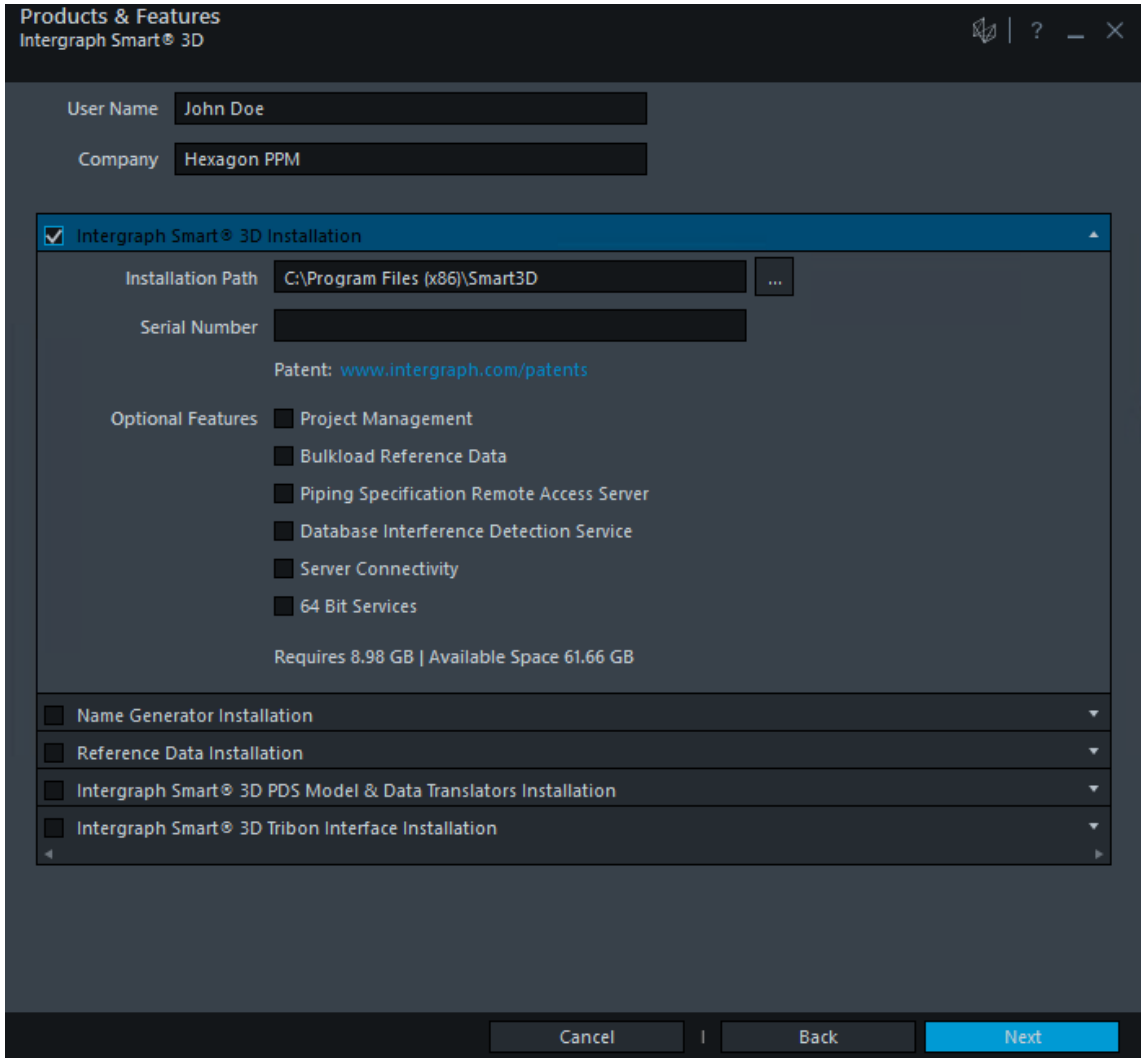
Name Generator installation

System Setup: Installation of Smart 3D Name Generator



Workstation Installation (Design and/or Admin Client)

System Setup: Installation of Smart 3D Design Client Installation



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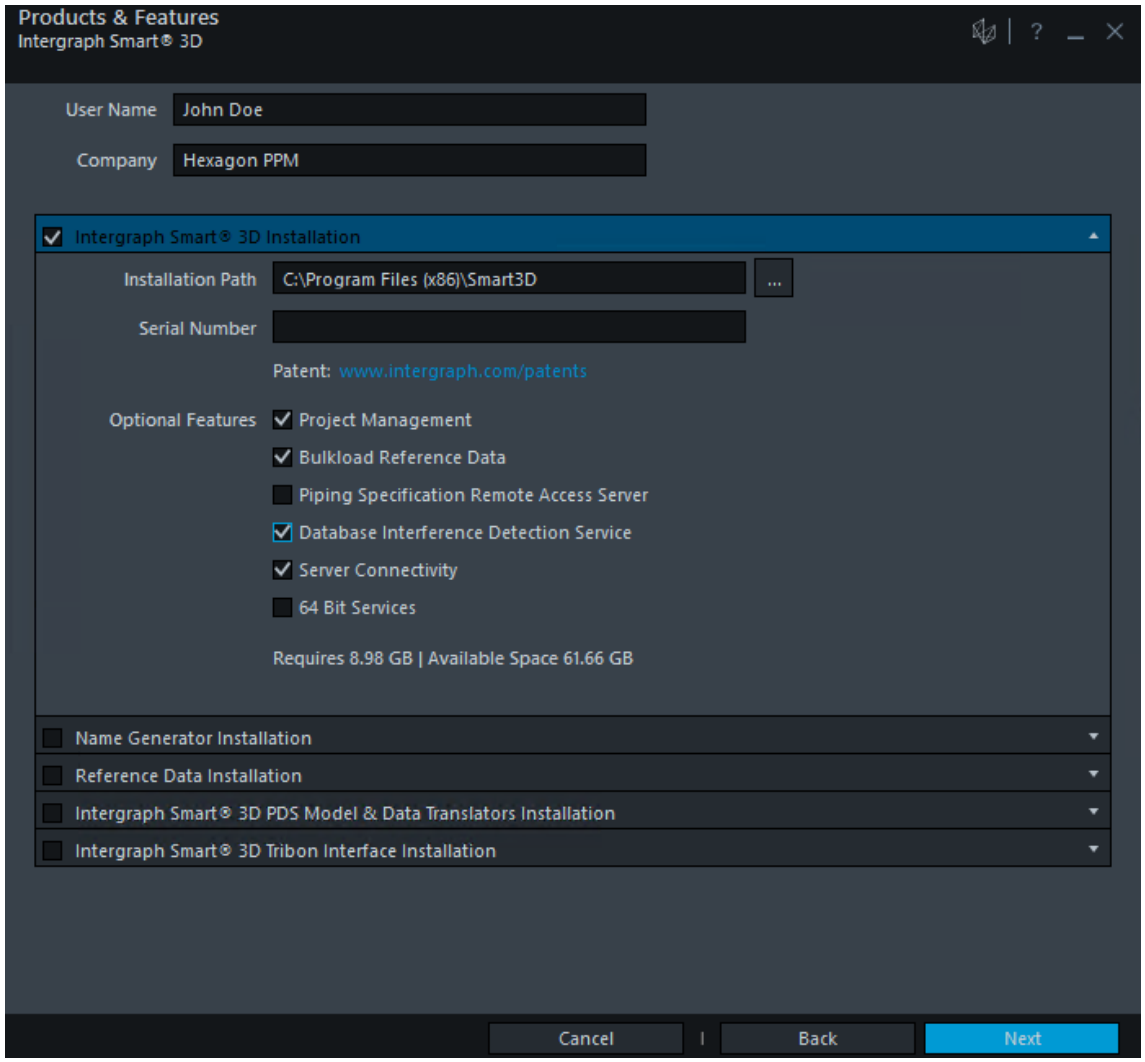
System Setup: Installation of Smart 3D Design /Admin Client Installation



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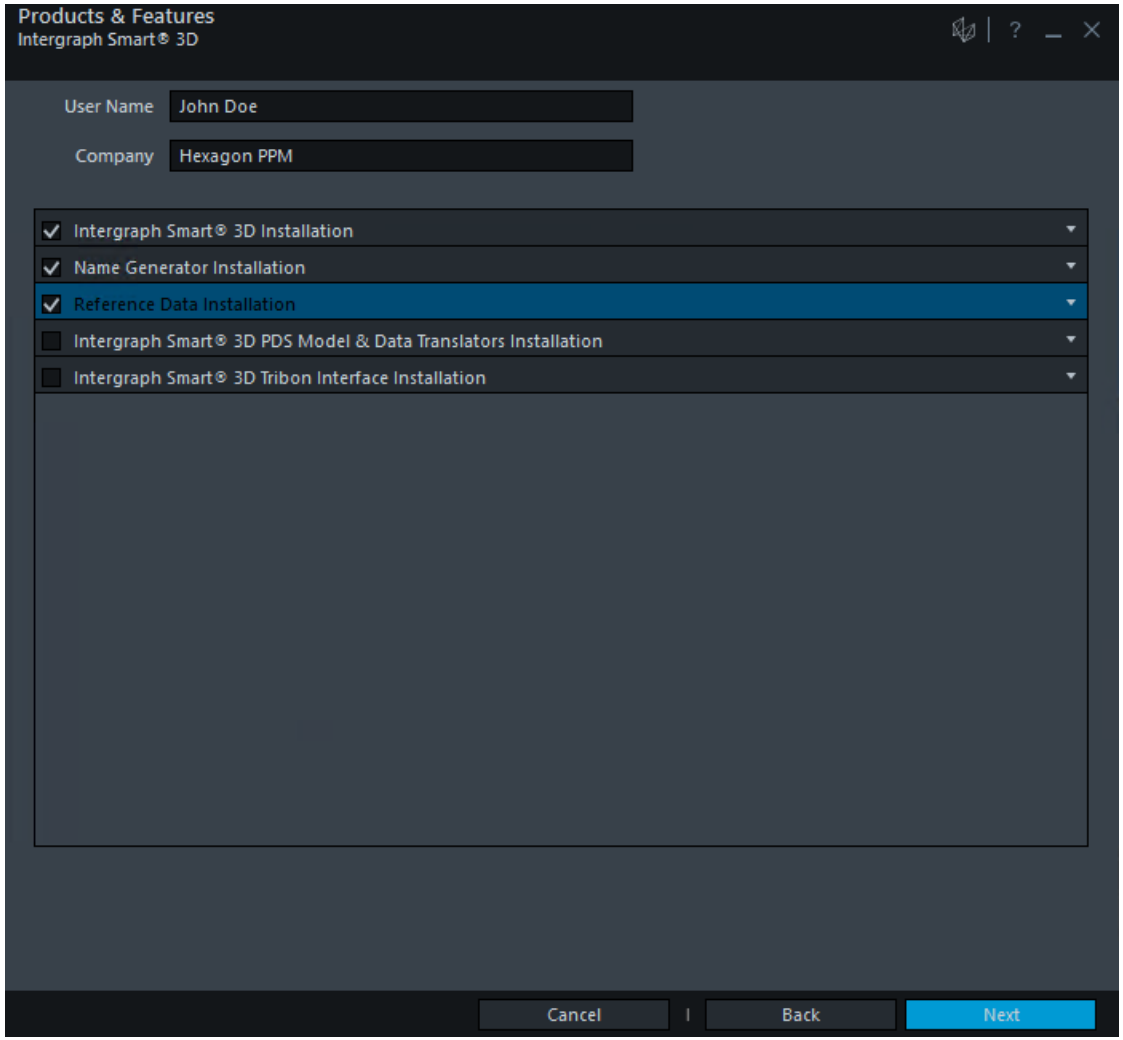
System Setup: Installation of Smart 3D
Full Installation



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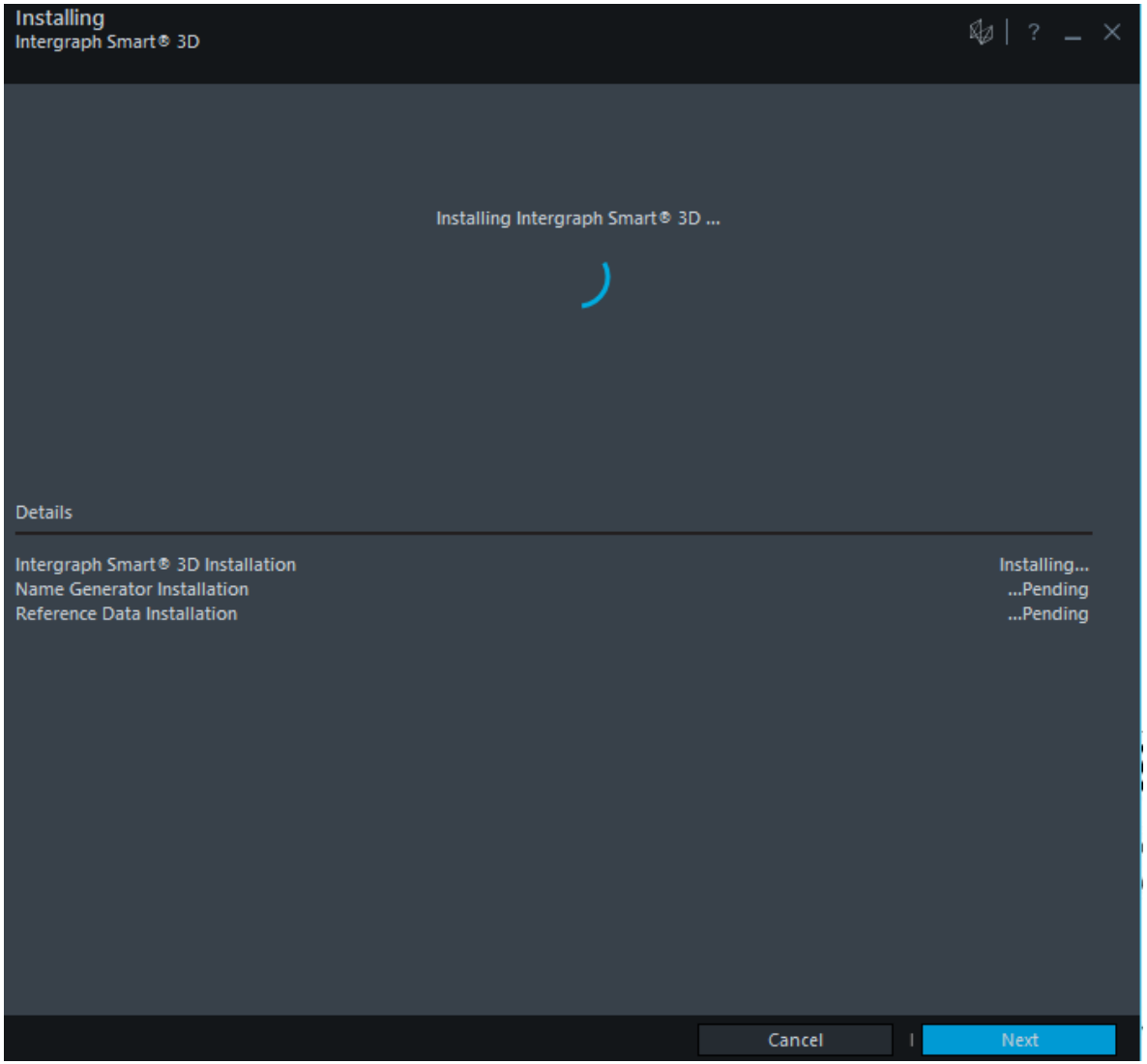
System Setup: Installation of Smart 3D
Full Installation



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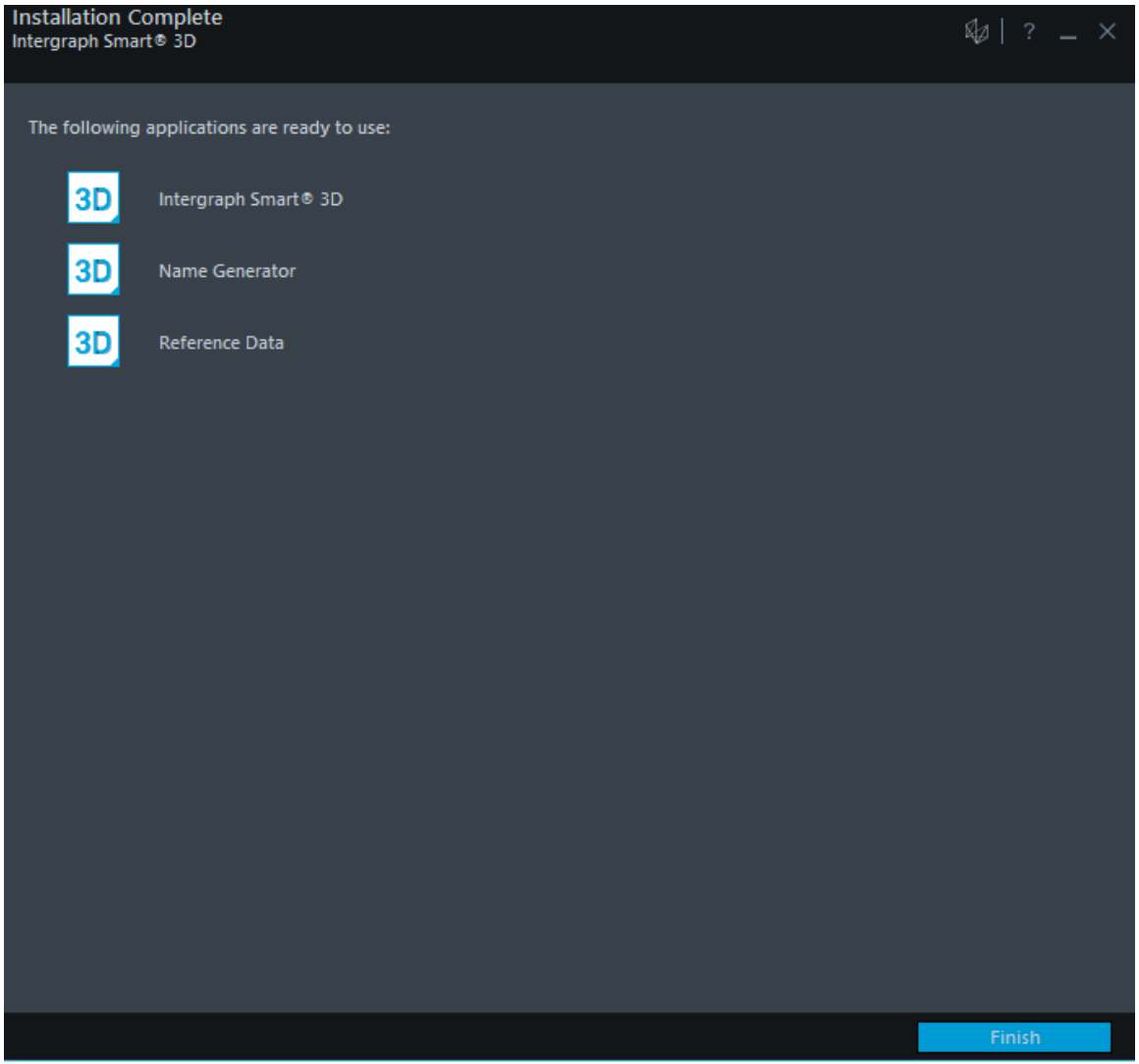
System Setup: Installation of Smart 3D
Full Installation



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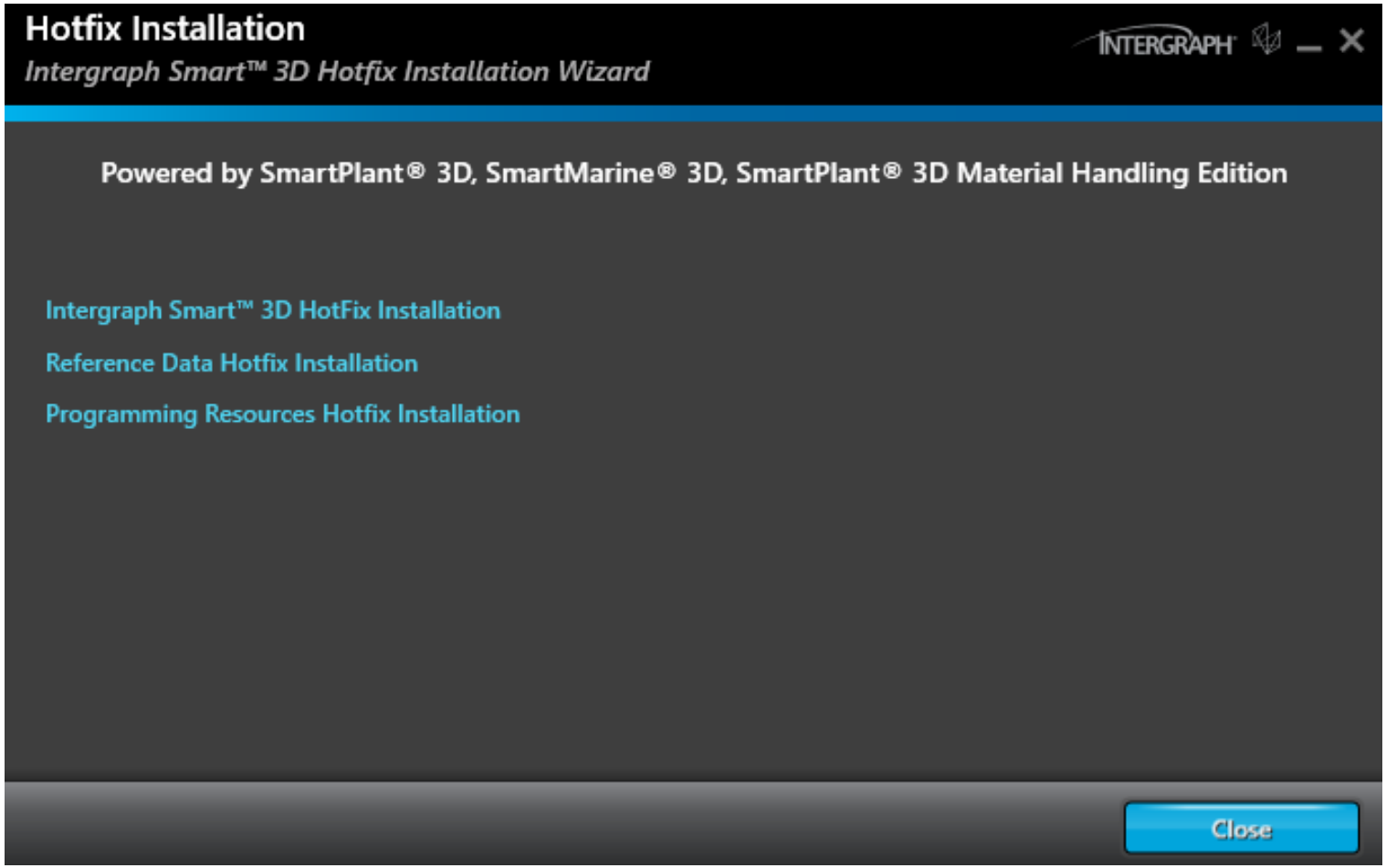
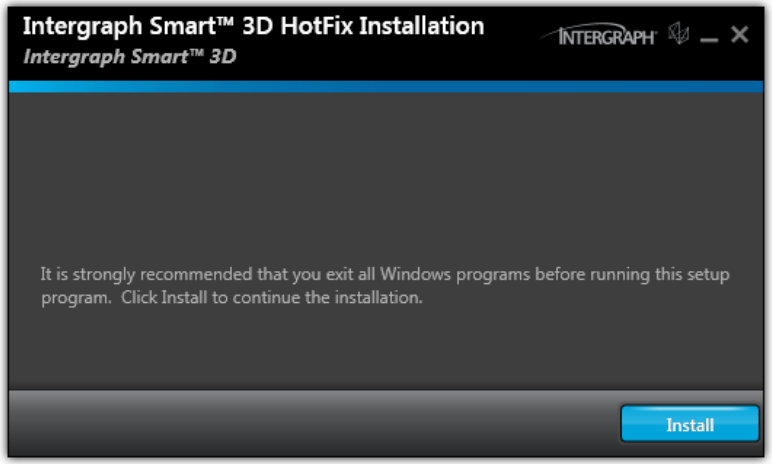
Smart 3D Setup: HotFix installation

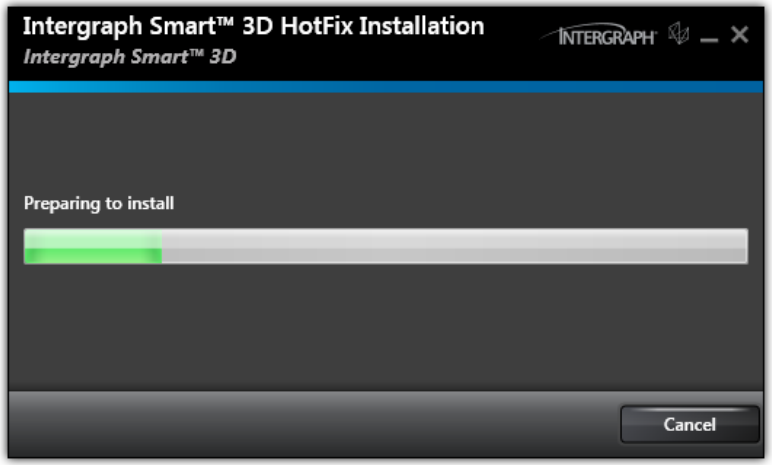
- Installed through a GUI with similar options to base installation.
- Can be installed silently with a script.
- HotFixes are listed as updates to Smart 3D in the list of programs.

Smart 3D Setup: HotFix installation



Smart 3D Setup: HotFix installation





Smart 3D Setup: Configurations

- **Final Configurations for a Workstation**
  - Verify firewall is either turned off or proper exceptions have been set
  - Register SQL Server on administrative computers or configure the Oracle Net service

Smart 3D Setup: Configurations

- **Final Configurations for a Reference Data server**
  - Share to the network and adjust proper permissions on the Shared Content folder
- **Final Configurations for a Name Generator server**
  - Set proper exceptions in the Windows Firewall to allow inbound requests on port 8081

Project Setup

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Project Setup: Hardware sizing recommendations

- Hardware sizing, especially for servers, depends on many factors such as:

- The number of concurrent users per server
- The number of locations (Global Workshare)
- The size of the project (which translates into the size of the databases)
- Other software that is running on the machine

Project Setup: Hardware sizing recommendations

- The users per server that define the different project sizes (small, medium, and large) need to be taken as an effective number. The effective number of users should be calculated by taking into consideration the following:

- Drawing Batch server - add 3 users
- Remote IFC - add 1 user
- Global Workshare Setup - For each server add 25% of the total concurrent users of all the other servers.

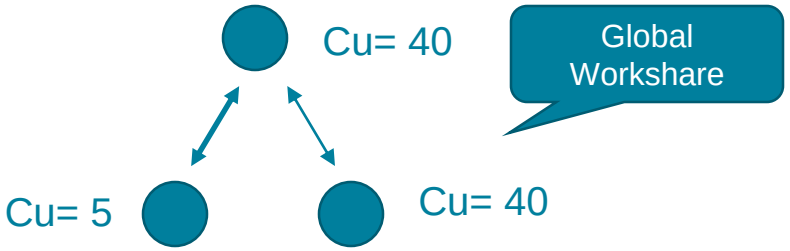
  Ef = Cu + (0.25 * (Ct))

  Where:
  Ef = effective concurrent users for one server
  Cu = concurrent users for this server
  Ct = total concurrent users for all other servers

Project Setup: Hardware sizing recommendations

Example:

- In a Global Workshare project with 3 servers (locations), 40 users will connect to two servers, and 5 users will connect to one server:



Ef = Cu + (0.25 (Ct))

When all 3 servers are working concurrently, the equivalent number of users at each server is:

The equivalent number of users at each one of the 40-user servers are:

40 + (0.25 * (45)) = 51.25 users

The equivalent number of users at the 5-user server is:

5 + (0.25 * (80)) = 25 users.

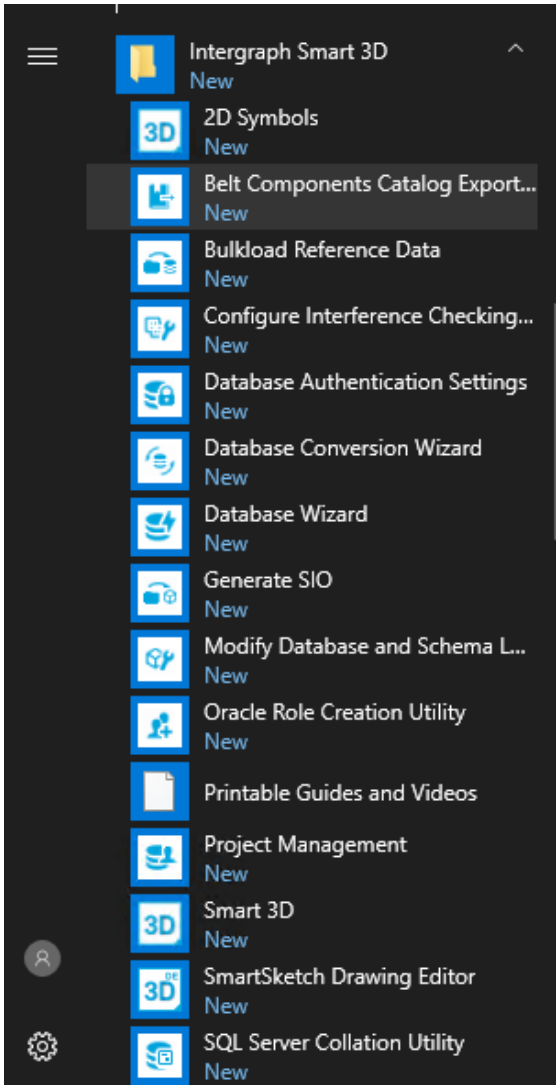
Project Setup: Hardware sizing recommendations

Project Size	Effective users on one server	Model database size	IFC Server	Batch Server
Small project	1 to 15	Up to 20 GB	Separate server or workstation	Separate server or workstation
Medium project	16 to 50	20 - 50 GB	Separate server or workstation	One or more separate server or workstation
Large project	51 to 100	50 GB or more	Separate server or workstation	Multiple separate servers or workstation

Project Setup: Hardware sizing recommendations

Project Size	Small	Medium	Large
Number of processor cores (one Core 2 Duo counts as two)	4	4 - 8	8 or more
Memory for SQL Server 2014 and Oracle 12c	32 GB	64 GB	128+ GB
Bus Size, OS, and Database	64 bit	64 bit	64 bit

Project Setup: Familiarize with the software



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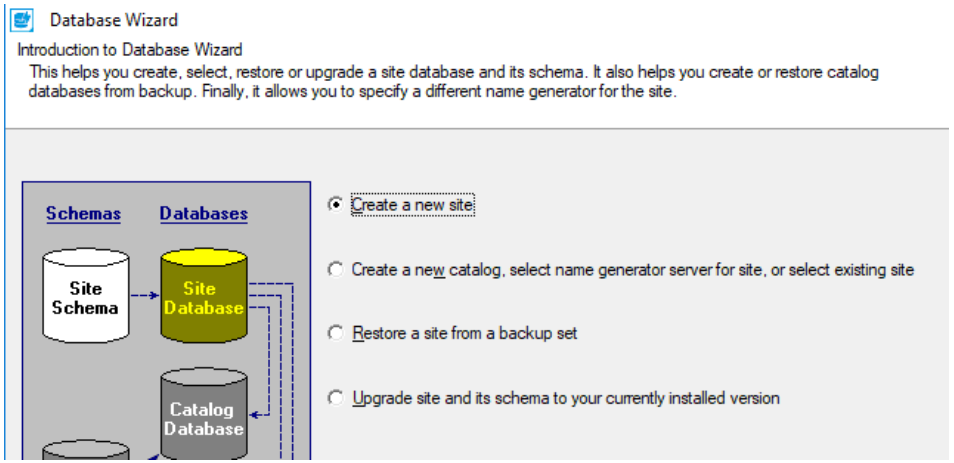
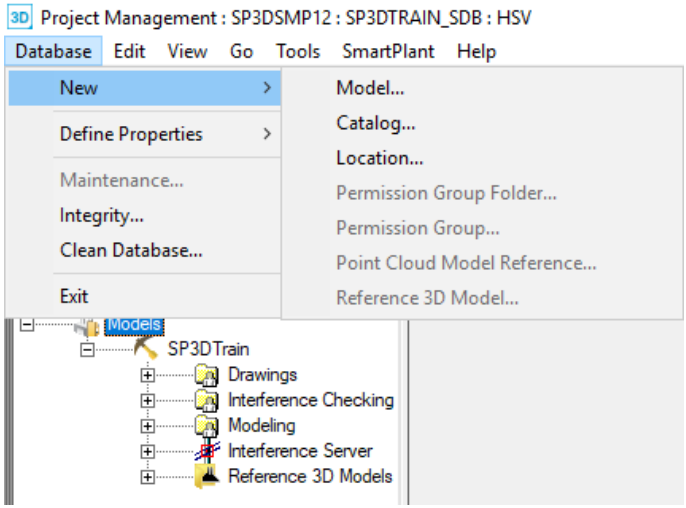
Project Setup: Database creation

- **Site and Catalog database creation**
  - Database Wizard
- **Model creation**
  - Project Management





Project Setup: Create a model from scratch

- Site
- Site Schema

→ Database Wizard → AppRepos.dat/dmp

- Catalog
- Catalog Schema

→ Project Management
Database Wizard → AppRepos.dat/dmp
CatalogDB.dat/dmp

- Model
- Reports
- Reports Schema

→ Project Management

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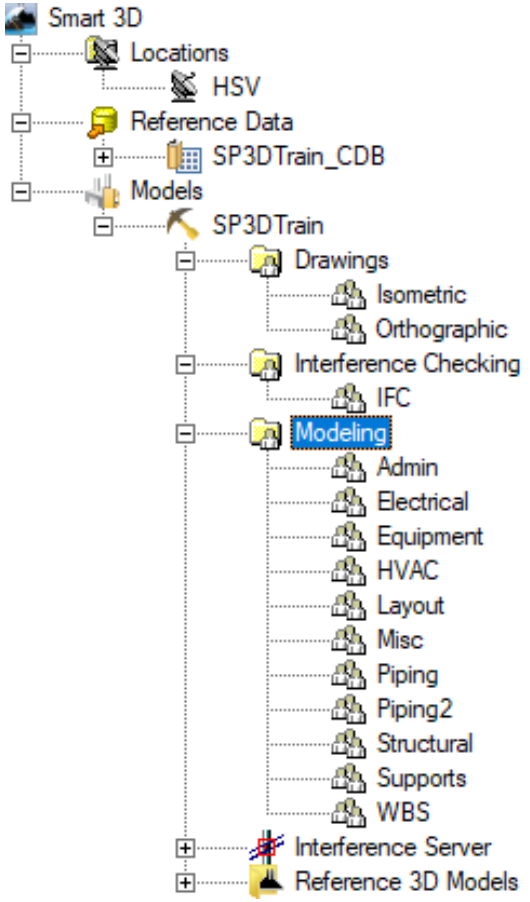
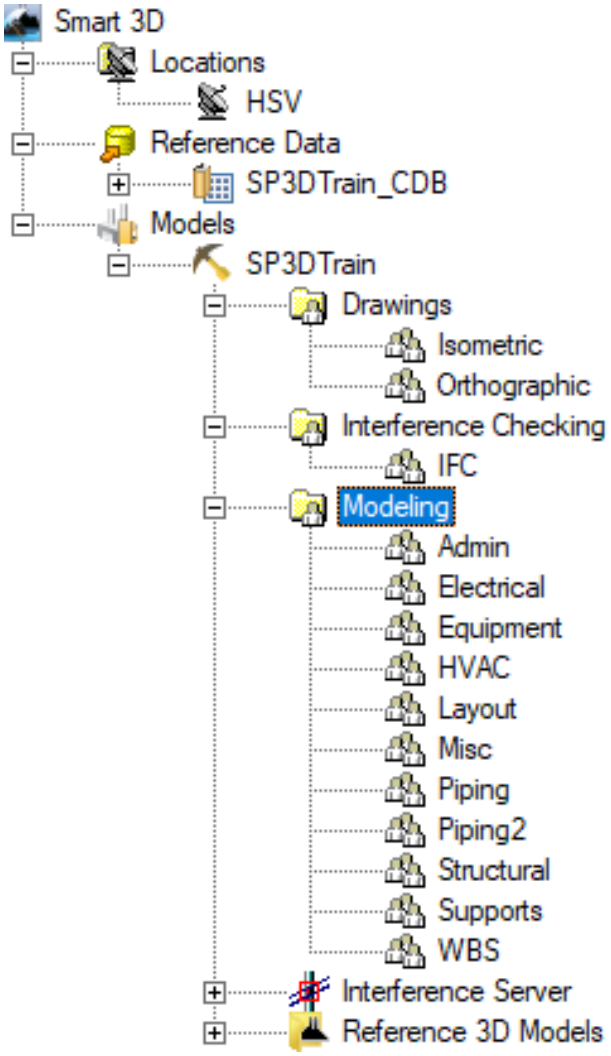
Project Setup: Permissions hierarchy

- Model/Catalog root
  - Top level item in the hierarchy
- Permission Group Folder
  - A set used to organize permission groups
- Permission Group
  - Portion of model/catalog over which various people have various levels of access and responsibility

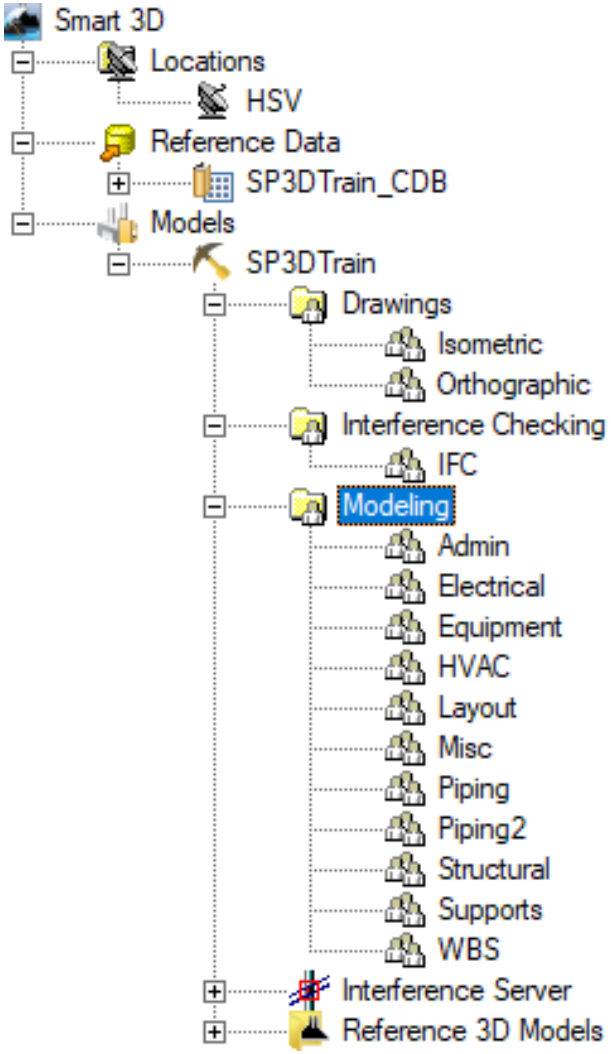


Project Setup: Permissions hierarchy

- This hierarchy is seen only in Project Management
- Can have unlimited number of levels of folders
- Cannot have permission groups and permission group folders at the same level
- Permission Groups are the last leaf in a branch
- Copy/Paste permission groups available



Project Setup: Sample Permission Objects hierarchy



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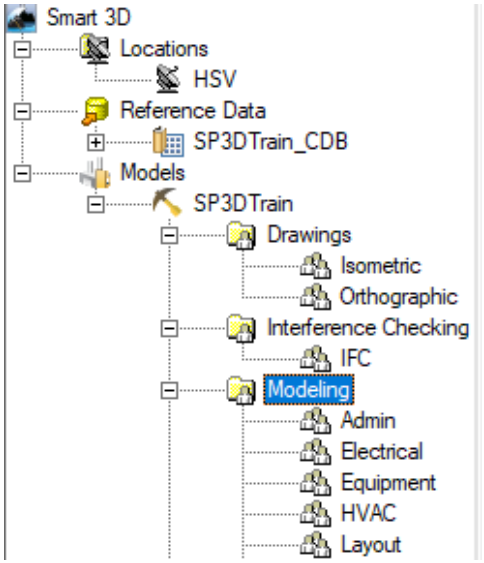
Project Setup: Modify Permission Objects hierarchy

- Rename command
- Folders cannot be deleted if there are Permission Groups under them
- Permission Groups containing objects cannot be deleted
- Copy/Paste of Permission Groups and Folders copies just the Permission Objects, not model items contained within. Name has to be unique within container (catalog or model).
- Move command allow to relocate Permission Objects within container

Project Setup: Root vs Permission Group assignment

- Permissions can be granted for Windows Security Object (Groups and/or Users) at the Model/Catalog Root and Permission Group level
- Permissions granted at Model/Catalog Root level allow access to modify permissions hierarchy within the model and perform various administrative tasks.
  - Permissions granted at Permission Group level affect access to objects within that permission group. These are used for general modeling purposes.

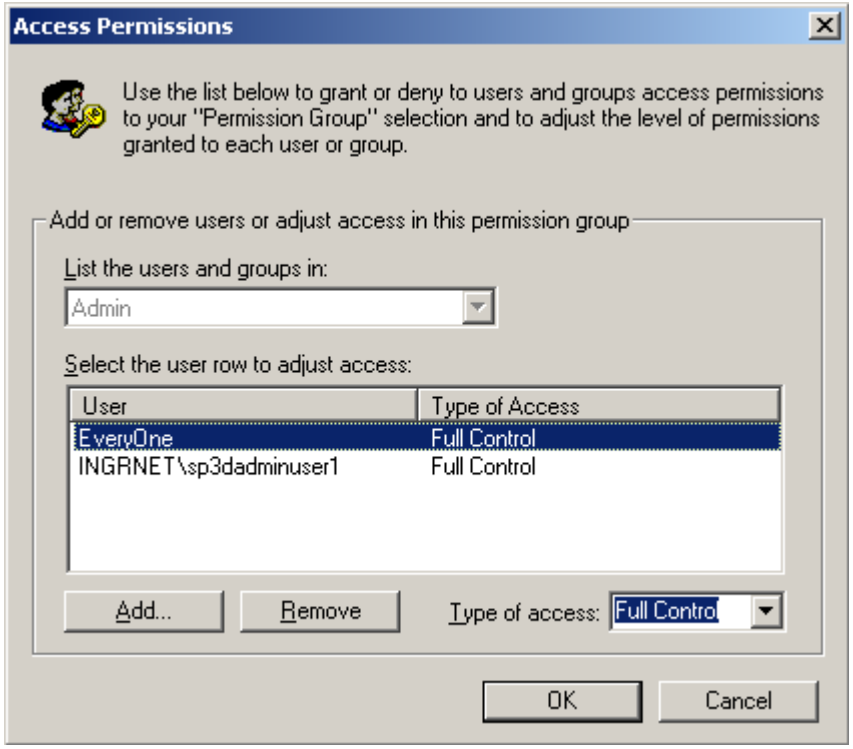


Project Setup: Association concept

- When objects are placed, they will be automatically assigned to a permission group.
- Objects can be associated to systems belonging to permission group where user has access
- Objects can only be modified or deleted if user has access to permission group assigned to the object.
- You can associate objects to those Work Breakdown Structure (WBS) items to which you have access based on the permission group they belong to.

Project Setup: Permission access levels

- **Read** = view objects
- **Write** = create/modify/delete objects
- **Full Control** = create/modify/delete + approve or reject objects



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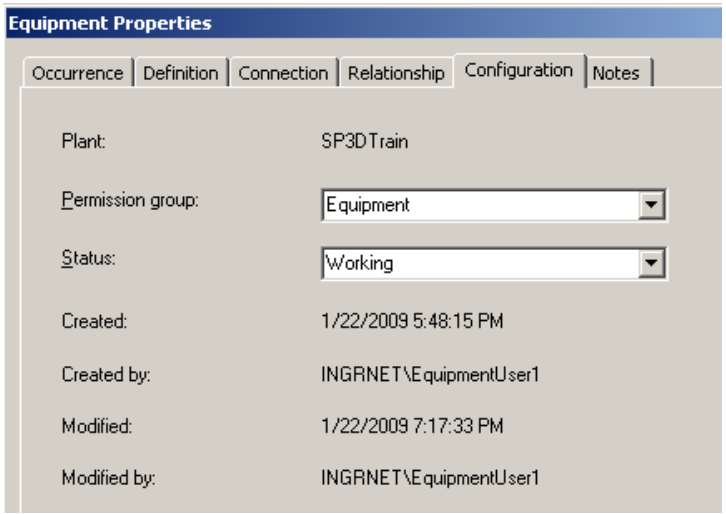
Project Setup: Object status

- **Working**
  - Initial status of all objects; Objects can be edited/deleted while in this status
- **In Review**
  - Object is in read-only mode and waiting for approval/rejection
- **Rejected**
  - If an object is found to be incorrect, reviewer can send object to this status
- **Approved**
  - If an object is found to be correct, reviewer can send object to this status



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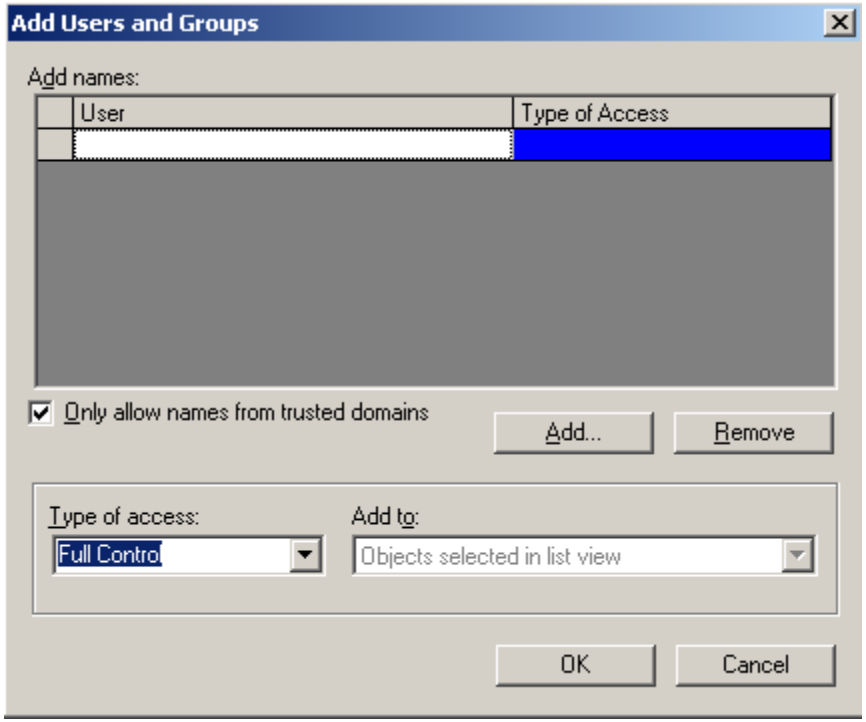
Project Setup: Status change based on permissions

- **Read**
  - can’t change status
- **Write**
  - can change from Working to InReview
  - can change from InReview to Working
  - can change from Rejected to Working
- **Full Control**
  - can change from any status to any status

Project Setup: Permissions logical model

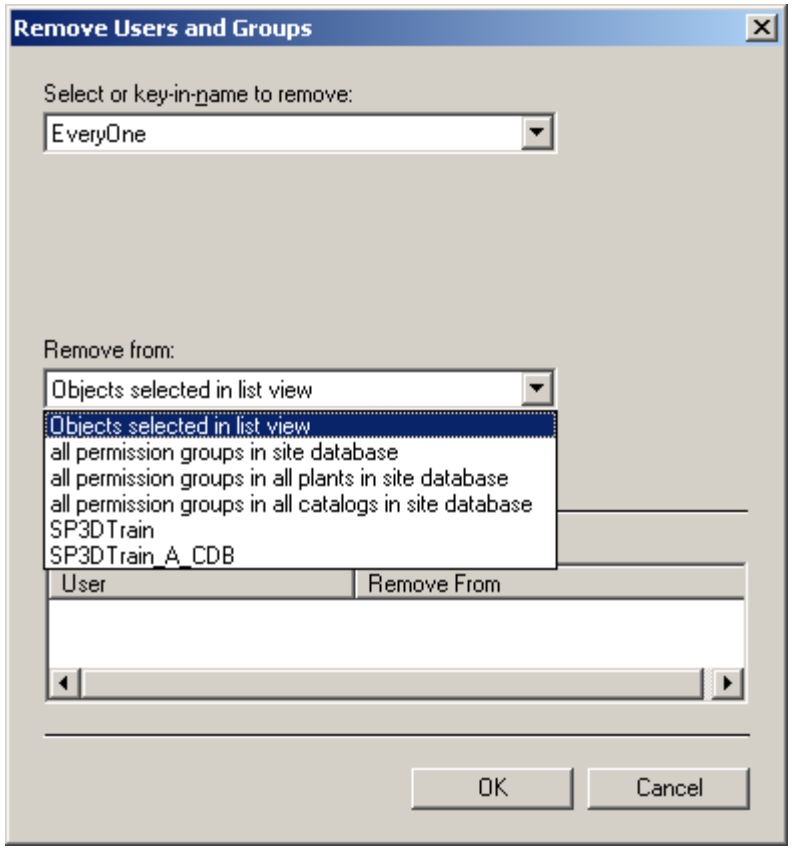
	View	Create/Modify/ Delete	Send to review/ bring back	Approve/ reject
Read	√			
Write	√	√	√	
Full Control	√	√	√	√

Project Setup: Add users to permission groups



Project Setup: Remove users from permission groups

- Select the users to be removed
- Pick the places they need to be removed from



Project Setup: Access Permissions for SQL

- **Administrator**
  - Sysadmin & Public (Server Roles)
  - No user mapping

- **Designers**
  - Public (Server Roles)
  - User Mapping: db_datareader, db_datawriter & mapping to all 7 Smart 3D databases for a project. The users will also need Execute permission to each database.

Project Setup: Access Permissions for Oracle

- Scripts delivered with Smart 3D Reference Data are located at ***[Product Folder]\ProjectMgmt\Tools\OracleScriptsToInitDB.***

- Scripts need to run in this order:
  - Create Roles for Smart 3D Users
    - **SP3DUser_ROLES.SQL**
    - **SP3DProjectAdministrator_ROLES.SQL**

  - Create Users for Smart 3D
    - **SP3DUser.SQL (for Oracle)** or
    - **Linux_SP3DUser.SQL (for Linux)**

  - Create Administrative Users
    - **SP3DProjectAdministrator.SQL (for Oracle)** or
    - **Linux_SP3DProjectAdministrator.SQL (for Linux)**

Project Setup: Minimum Access Privileges for Oracle

- These script files create the necessary schemas, users, and roles that are used to run the software on Oracle with minimum access privileges

- Scripts delivered with Smart 3D Reference Data are located at ***[Product Folder]\3DRefData\Tools\OracleScriptsToInitDB\MinimumAccessPrivileges***

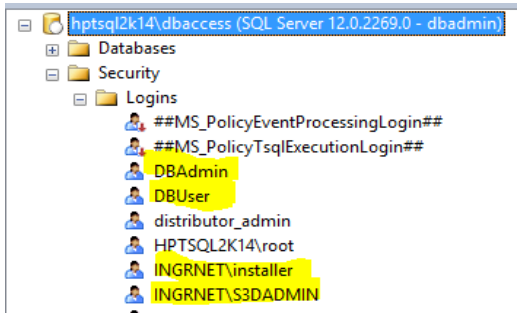
- Scripts need to run in this order:
  - Create Roles for Smart 3D Users
    - **SP3DUser_ROLES.SQL**
    - **SP3DProjectAdministrator_ROLES.SQL**

  - Create Users for Smart 3D
    - **SP3DUser.SQL (for Oracle)** or
    - **Linux_SP3DUser.SQL (for Linux)**

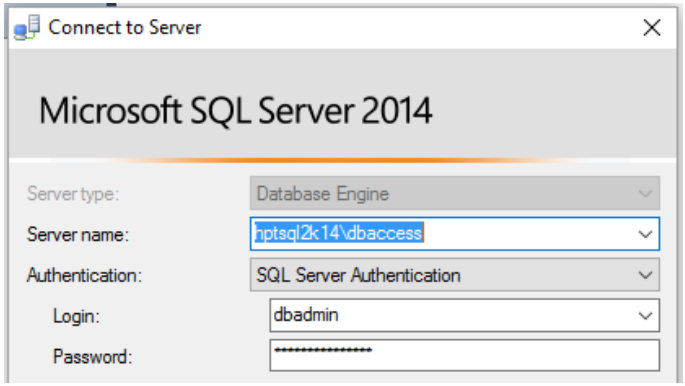
  - Create Administrative Users
    - **SP3DProjectAdministrator.SQL (for Oracle)** or
    - **Linux_SP3DProjectAdministrator.SQL (for Linux)**

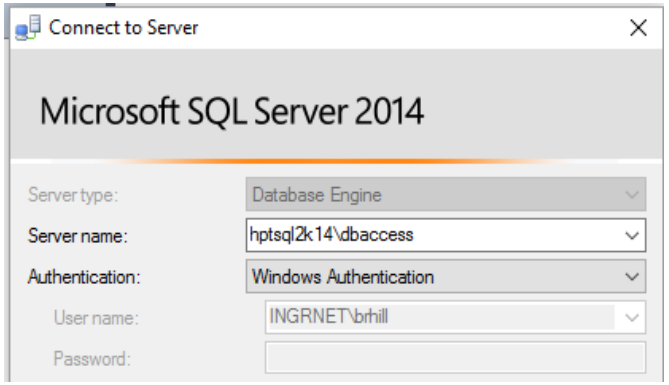
Database User Authentication

- Database logins are accounts created in the database management system (i.e. SSMS). These accounts are separate from the login account you use to connect to the operating system



- To open a connection to the database, a windows user has to type the user name and password every time.





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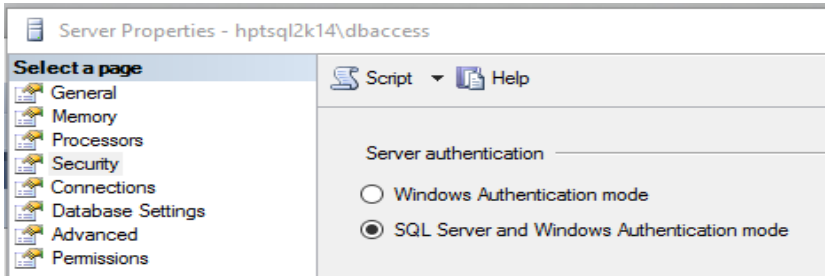
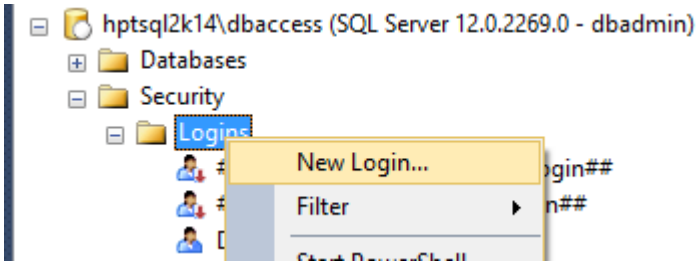
Database user login on SQL server

- Make SQL server use mixed mode authentication (it is NOT set by default) using SQL server management studio "*Server/Properties*" page.



- Create a database user login



- Grant permission to that user on each database. Required roles for S3d standard user are:
  - **public**,
  - **db_datareader**,
  - **db_datawriter**
  - User must also have "**Execute**" (any stored procedure) permission on each database.

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Database user login on Oracle

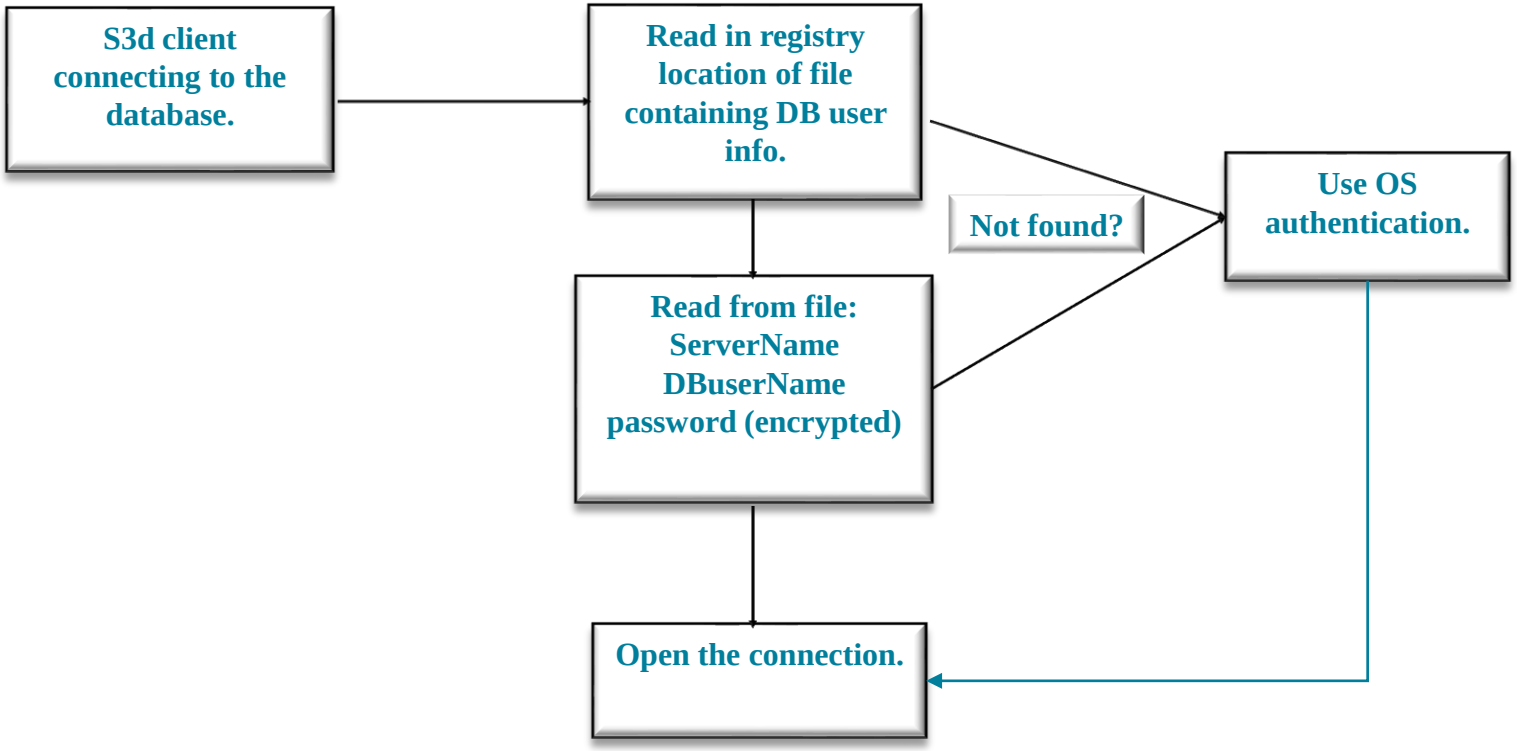
- Look for scripts under *[INSTALLDIR]\ProjectMgmt\Tools\OracleScriptsToInitDB*
- For a standard user, open the script SP3DUser.sql
  - replace “DOMAIN\USERNAME” with “TheUserName” (not case sensitive).
  - Replace IDENTIFIED EXTERNALLY with IDENTIFIED BY [TheUserPassword]
- Example:

```
DROP USER S3dStandardUser CASCADE;
CREATE USER S3dStandardUser PROFILE DEFAULT IDENTIFIED BY S3dUserPassword
 DEFAULT
   TABLESPACE USERS TEMPORARY
   TABLESPACE TEMP ACCOUNT UNLOCK;
GRANT UNLIMITED TABLESPACE TO S3dStandardUser;
GRANT SP3DUSER TO S3dStandardUser;
COMMIT;
```

Database authentication and S3D user Access control

- Database User or OS authentication are **not impacting** S3D user access control.
- S3D Permission groups are NOT based on database users.
  - Permission group access are based on OS user logged on the workstation.
- For an S3D object, “user creator” or “last user modifier” are the id of OS user logged on the workstation.
  - On S3D V2014R1 or earlier, those columns were based on the **database** user login.
  - To support Oracle Linux, a CR was implemented early on S3D V2016 to be based on user logged on the workstation.

How S3D decides to use OS or DB authentication



Database Admin Setup for Database User Authentication

- **The database administrator creates a database user login.**

- **That database user login is granted permission on the databases for a model database.**
  - Site,Site_Schema,Catalog,Catalog_Schema,Model,Report,Report_Schema

- **The database administrator creates a DBAuthentication.ini file on a shared folder.**
  - DBA uses [InstallDir]\ProjectMgmt\Tools\bin***ConfigureDBLoginFile.exe*** to create that file.
  - <DBAuthentication.ini> contains: *ServerName, databaseUserName, encryptedDatabasePassword.*
  - Multiple servers can be in DBAuthentication.ini.
  - A server name must be unique on a DBAuthentication.ini.

Setup and Administration Lab

Labs 2 - 4

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Backup and Restore

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Backup and Restore: Overview

Backup

- Project Management Backup
- Manual backup of the Shared Content folder

Restore options

- Restore one or more model databases from backup
- Restore model for selective recovery of model objects
- Restore model as a copy

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Backup and Restore: Project Management Backup

- Model, Catalog and Site databases are backed up, reports databases are excluded.
- A backup configuration file (bcf) containing information about the backup set is created in the location specified for the backup
- Backup files will be saved to database server by default
- Backups may be saved to a network location, additional configurations are required for this

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Backup and Restore: Project Management Backup

- There are no individual files to be backed up – only complete databases
- To complete the backup set, user needs to manually backup the Shared Content folder for the model
- Multi-model backup available
- User running the backup as well as account used as logon for Oracle Windows NT Service need to have write permissions on the folder under which backup files will be created.

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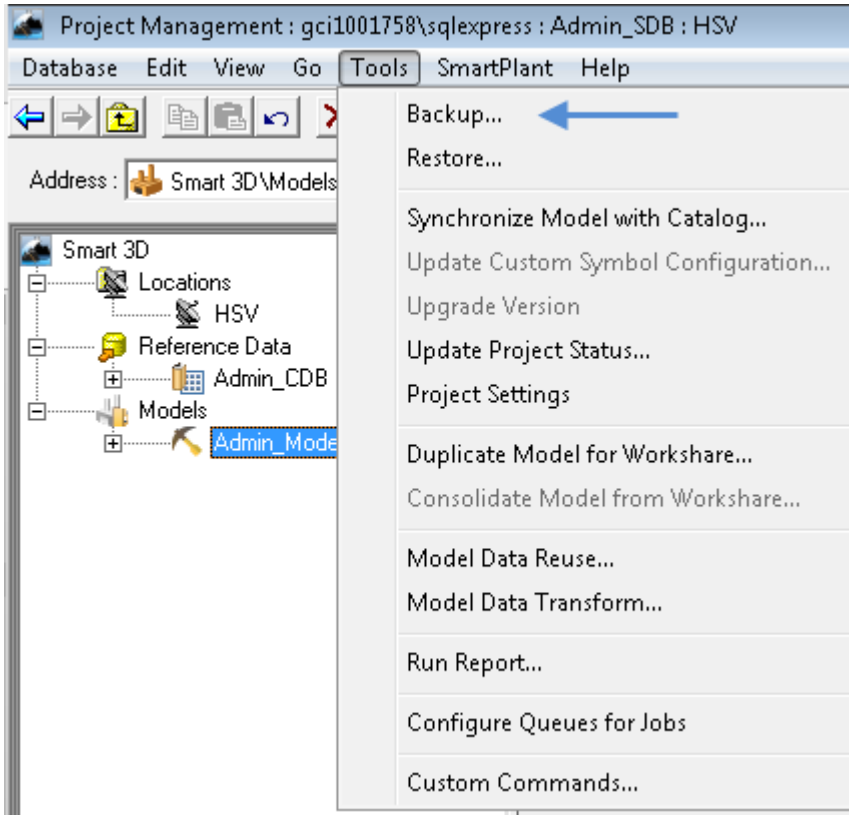
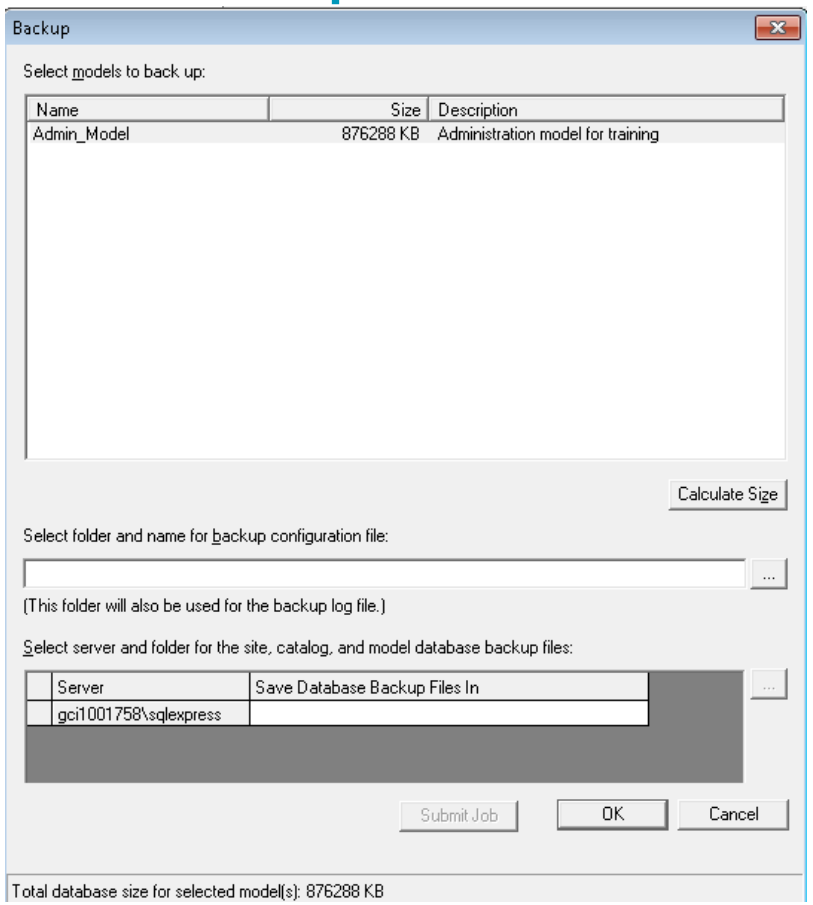
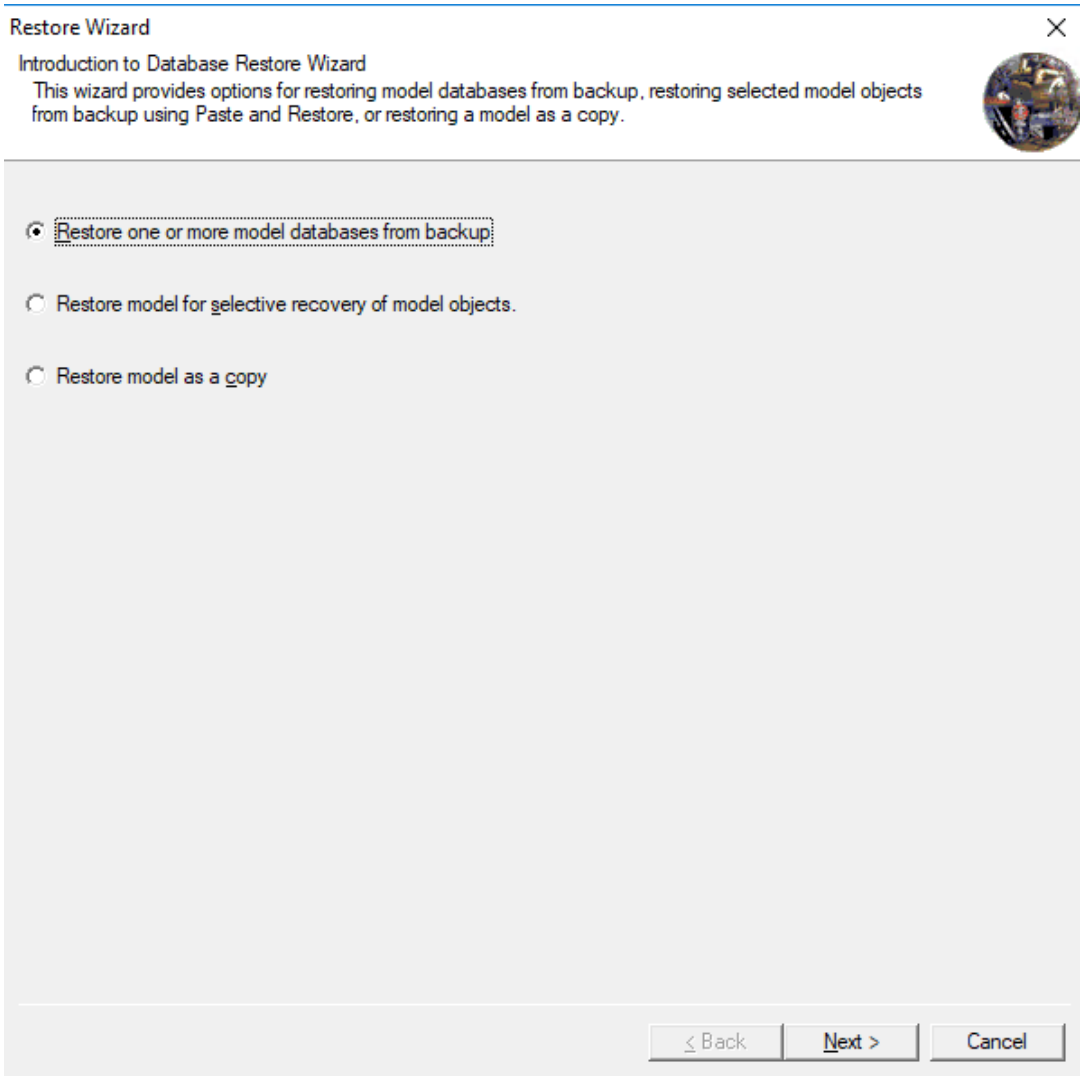
Backup and Restore: Project Management Backup





Backup and Restore: Restore options



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Backup and Restore: Restore one or more model databases from backup

- Restores previously backed up models overwriting the existing one.
- You can only restore a complete model (no partial restore)
- Catalog can be overwritten or not depending on user selection to prompts
- Items that were manually backed up (Shared Content folder) need to be manually restored as well

Backup and Restore: Restore model for selective recovery of model objects

- Restores a model from a previous backup, without overwriting the existing model.
- Allows for selective recovery of objects from previous versions of the same model without losing object identity or relationships
- The restored project will exist in the Site database in parallel to the current project and would share the same catalog.

Backup and Restore: Restore model as a copy

- Allows the restore of models that were backed up from a different site database.
- Allows to create a replica but independent model from the production model backup (test models).
- Ability to change the name of the model and the restored model and catalog databases.
- When the selected model to restore is registered with SmartPlant Foundation, the registration is removed from the copy during the restore.

Backup and Restore: Off-site Restore

•May be used to restore entire project on a new location, it can be due to a change in database servers, or to restore a backup received from a third party company.

- Using database wizard, restore site from backup set
- Using project management, restore model from backup (this brings in catalog associated with the model)
- Regenerate report databases
- Manually copy all the Shared Content files and outputs to the remote site
- Custom symbol dlls need to be registered on each client workstation at the remote site if required

Setup and Administration Lab

Lab 5 – 8

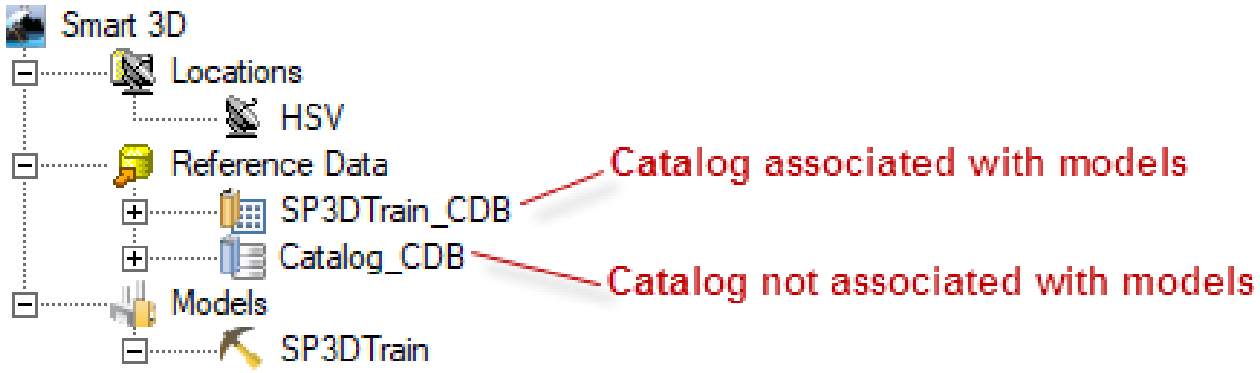
HEXAGON

Project Management: Delete a Model

- Full Control permission at the root level.
- Option to drop or leave the physical database files in place.
- For models in Oracle, the software may not delete all of the associated database objects. To delete schema information after deleting an Oracle model, you must use the **Oracle Database Tools Wizard for Smart 3D** located at [*Product Directory*]\ProjectMgmt\Tools\bin\SP3DOracleDBToolsWizard.exe.

Project Management: Delete a Catalog

- Catalogs can only be deleted if they are not associated with any model.
- In Oracle servers, Catalog must also be deleted using the **Oracle Database Tools Wizard for Smart 3D**



Project Management: Hierarchy Icons

 - Top level of the hierarchy

 - Reference data

 - Catalog associated with a model

 - Catalog associated with a model. Missing database

 - Catalog associated with a model. Needs to be upgraded

 - Catalog not associated with a model

 - Catalog not associated with a model. Missing database

 - Catalog not associated with a model. Needs to be upgraded

 - Model

 - Model missing database

 - Model needs to be upgraded

 - Permission group folder

 - Permission group

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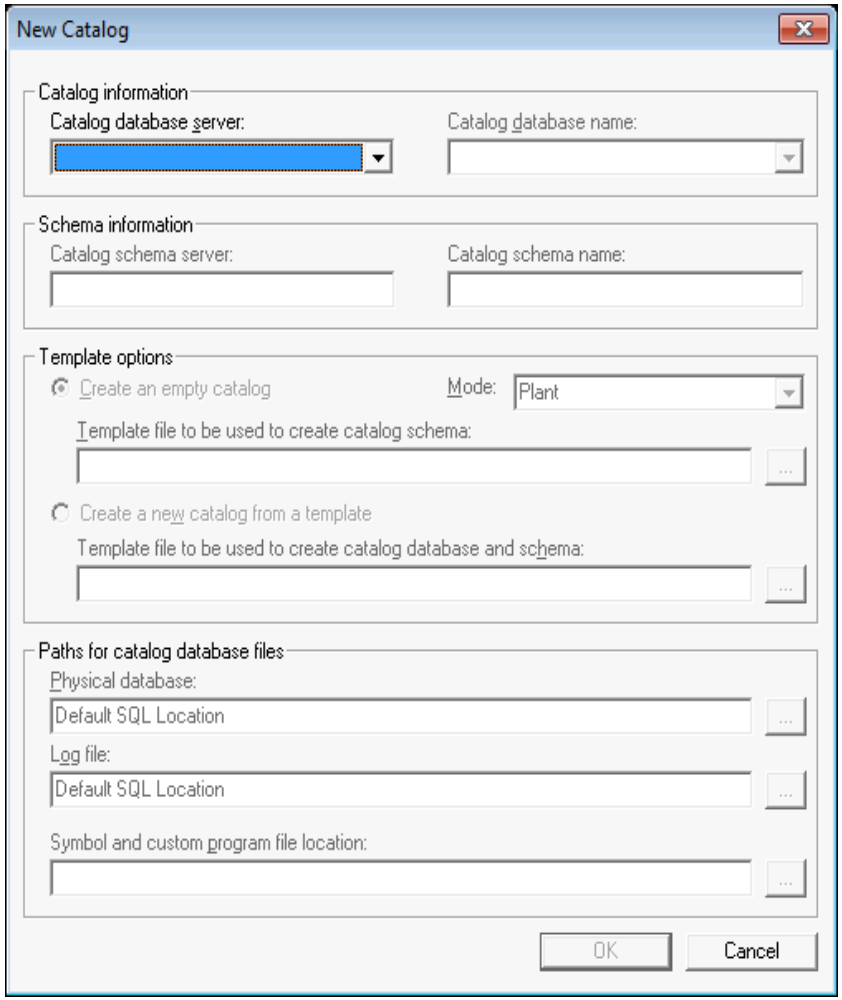
Project Management: New Catalog Command

- Create a new empty catalog or create a catalog from a template.
- Default permission groups and access rules are created.
- In a Global Workshare configuration, the **Database > New > Catalog** command is available at the Host location, but not at the Satellite locations.
- Every catalog must be associated to a Shared Content folder

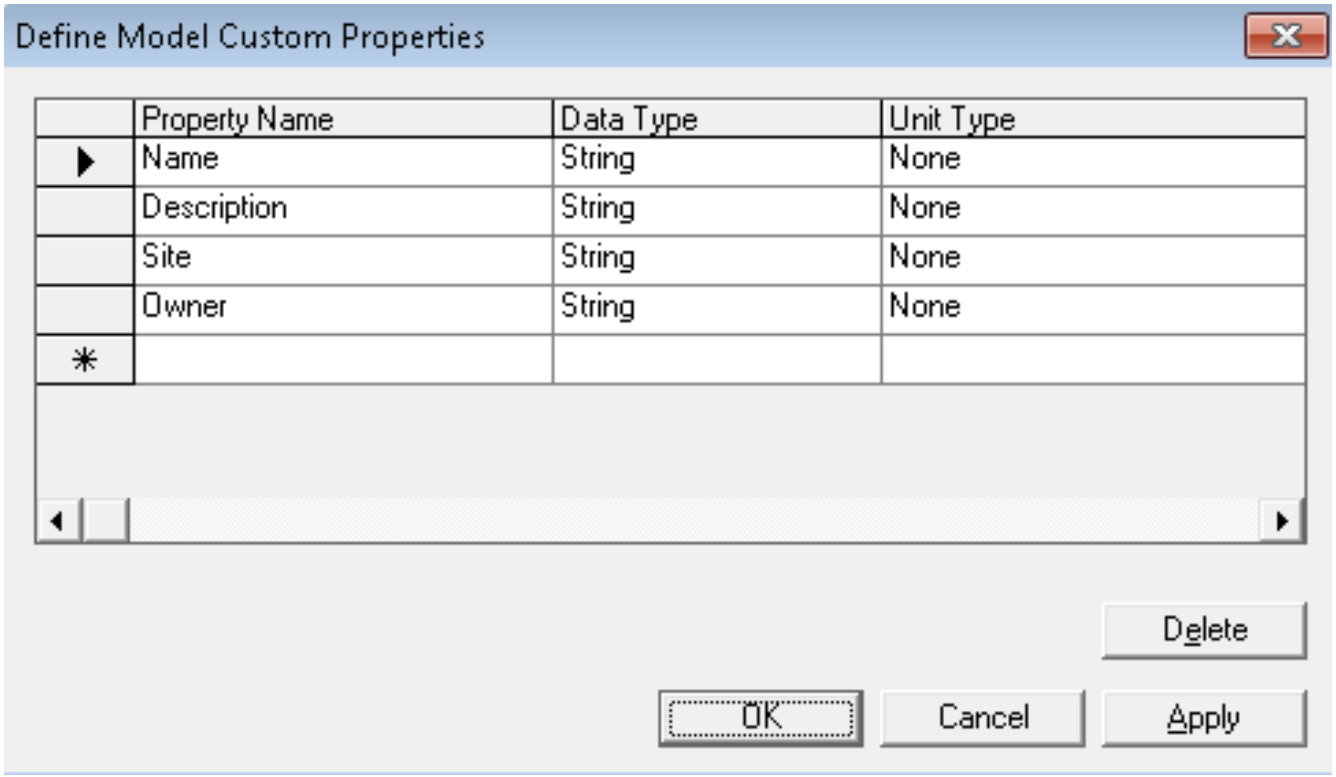
Project Management: New Catalog Command



Custom Properties: Define Property Schema

- Additional properties for models, permission group folders and permission groups can be added
- Properties can be viewed in project management environment but are also reportable
- Property information for models is stored in the site database to which they belong
- Property information for permission folders and permission groups is stored in the model to which they belong

Custom Properties: Define model property



Setup and Administration Lab

Lab 9 – 11

HEXAGON

Model Organization (Systems)

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Systems and Specs: Contents

- System hierarchy
- Create and modify Systems hierarchy
- Assign allowed specifications

Systems and Specs: Systems overview

- A system is a container that group objects logically
- Systems have other systems as children creating a hierarchy with unlimited levels
- Subsystems can belong to a different permission group from their parent
- Many different types of systems are supplied (discipline specific and generic)
- Every object must belong to a system
- Different types of objects can be associated with different system types

Systems and Specs: System types

- Generic system
- HVAC system
- Equipment system
- Pipeline system
- Unit system

- Conduit system
- Electrical system
- Piping system
- Structural system
- Area system

Systems and Specs: Create and modify Systems hierarchy

- Create new System commands
- Copy and paste of Systems
- Importing from excel

Systems and Specs: Create new System commands

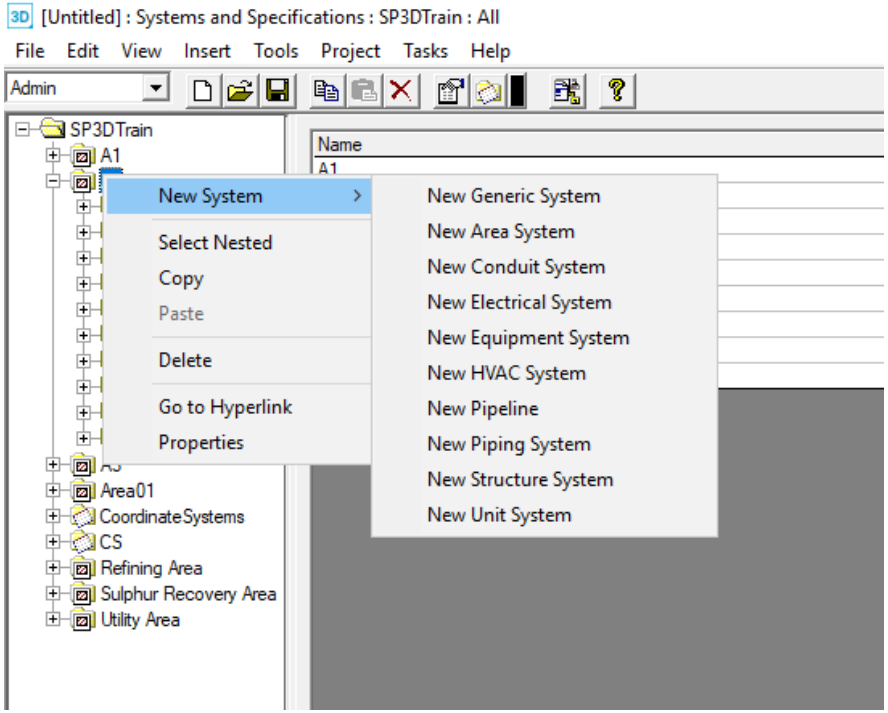
Systems and specifications task – Dedicated function

- Creates a system as a child of the currently selected system
- Currently active name rule for the system type being created is used to generate the name
- If currently active name rule is ‘User-defined’, you can enter the name during creation

Systems and Specs: Create new System commands

Systems and specifications task - Contextual menu

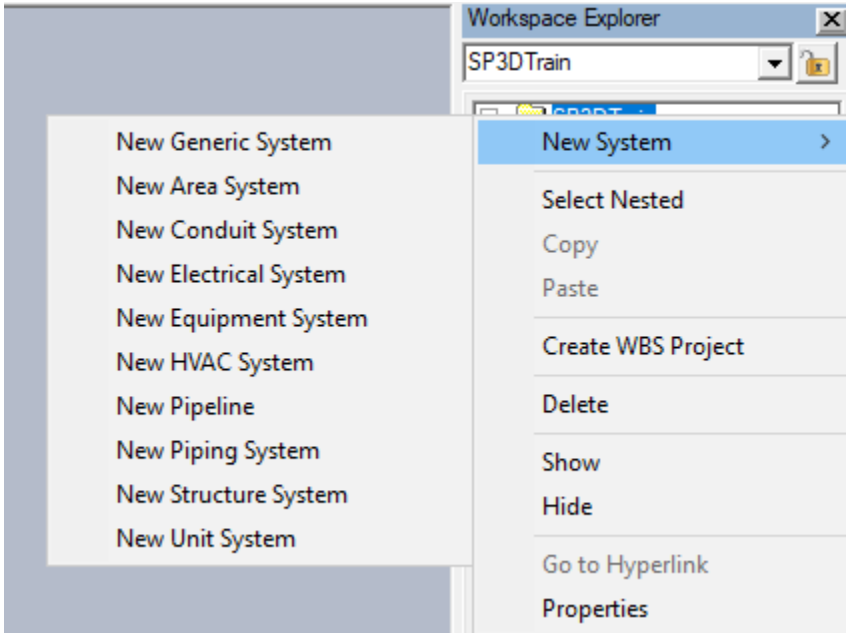
- Systems can be created from workspace explorer hierarchy.



Systems and Specs: Create new System commands

Graphical tasks

- Systems can be created from workspace explorer hierarchy.

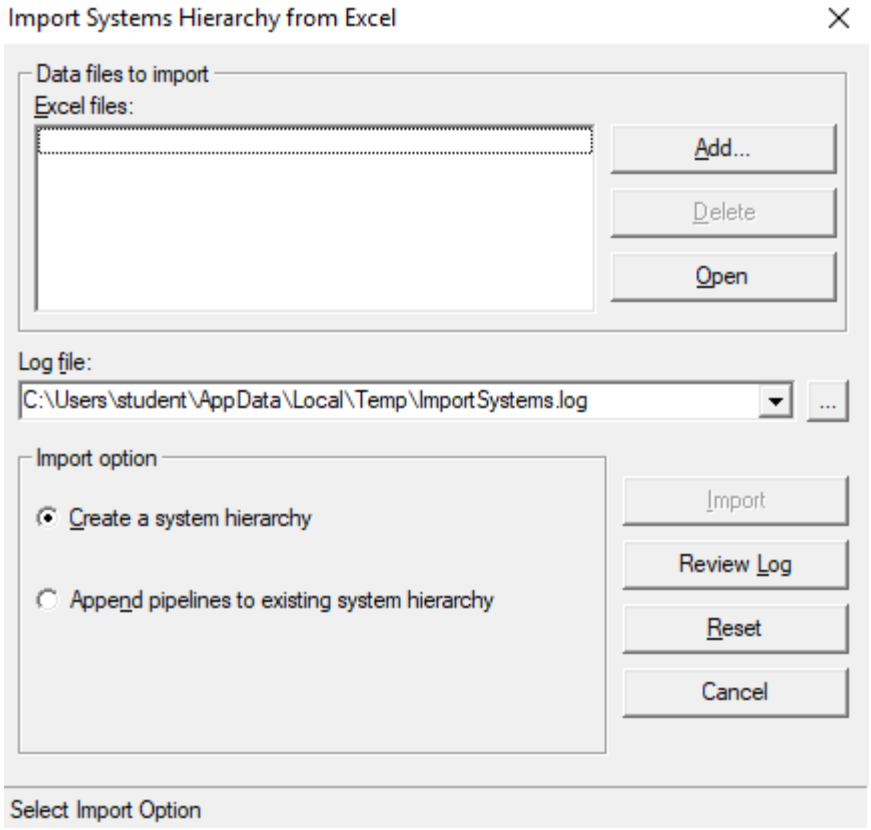


Systems and Specs: Copy and paste of Systems

- Systems can be copied in Systems and Specification task or in the Workspace Explorer
- To select the entire hierarchy under a system, right-click the system then choose option “select nested”
- Paste the hierarchy where desired (paste dialog box may appear)
- You can copy and paste system hierarchies between two models that exists in the same site database

Systems and Specs: Importing from excel

- You can create an entire systems hierarchy or add pipelines to an existing hierarchy using an Excel workbook
- Allowed specifications for pipelines can also be set in the workbook.
- If specifications are allowed to pipelines in the workbook, these pipelines will not automatically inherit specifications allowed at parent levels including the root.



Systems and Specs: Editing Systems

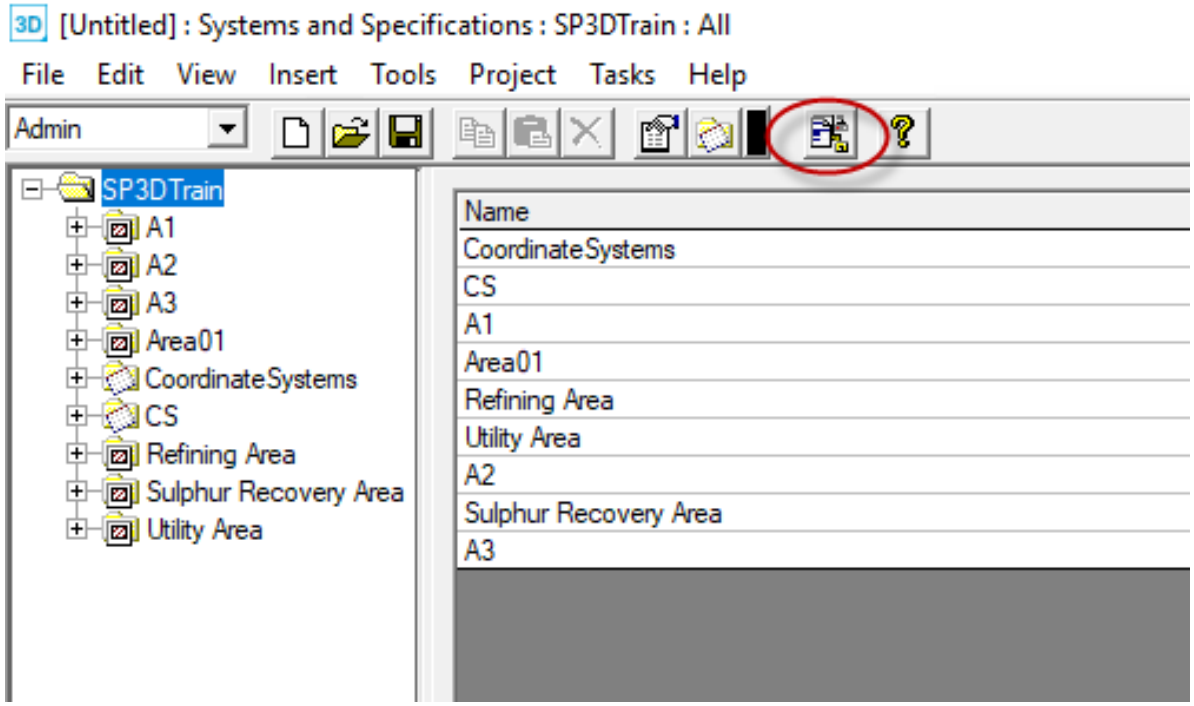
- Deleting Systems
- Renaming Systems
  - User defined
  - Default naming rule
- Moving Systems
  - Move using system’s properties page
  - Move using drag and drop in the Systems and Specification task

Systems and Specs: Allow specifications

- Specifications limit part selection and placement based on rules.
- By default, specifications are defined in the Catalog and must first be allowed to the Model
- All systems inherit the specifications allowed at the Model root node, unless specifications were allowed from import command.
- Each system must be allowed at least one specification

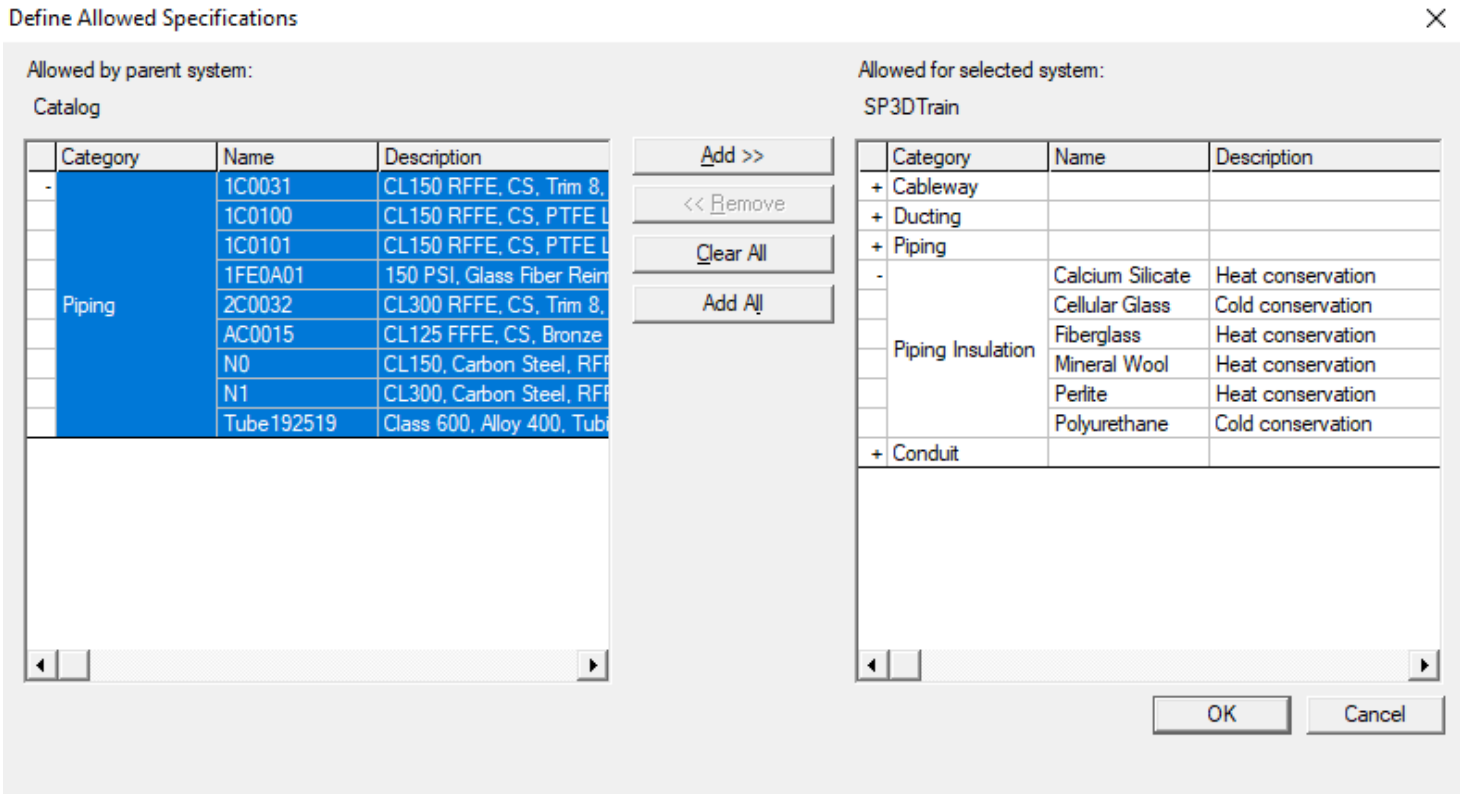
Systems and Specs: Define allowed specifications

- Systems and Specifications task



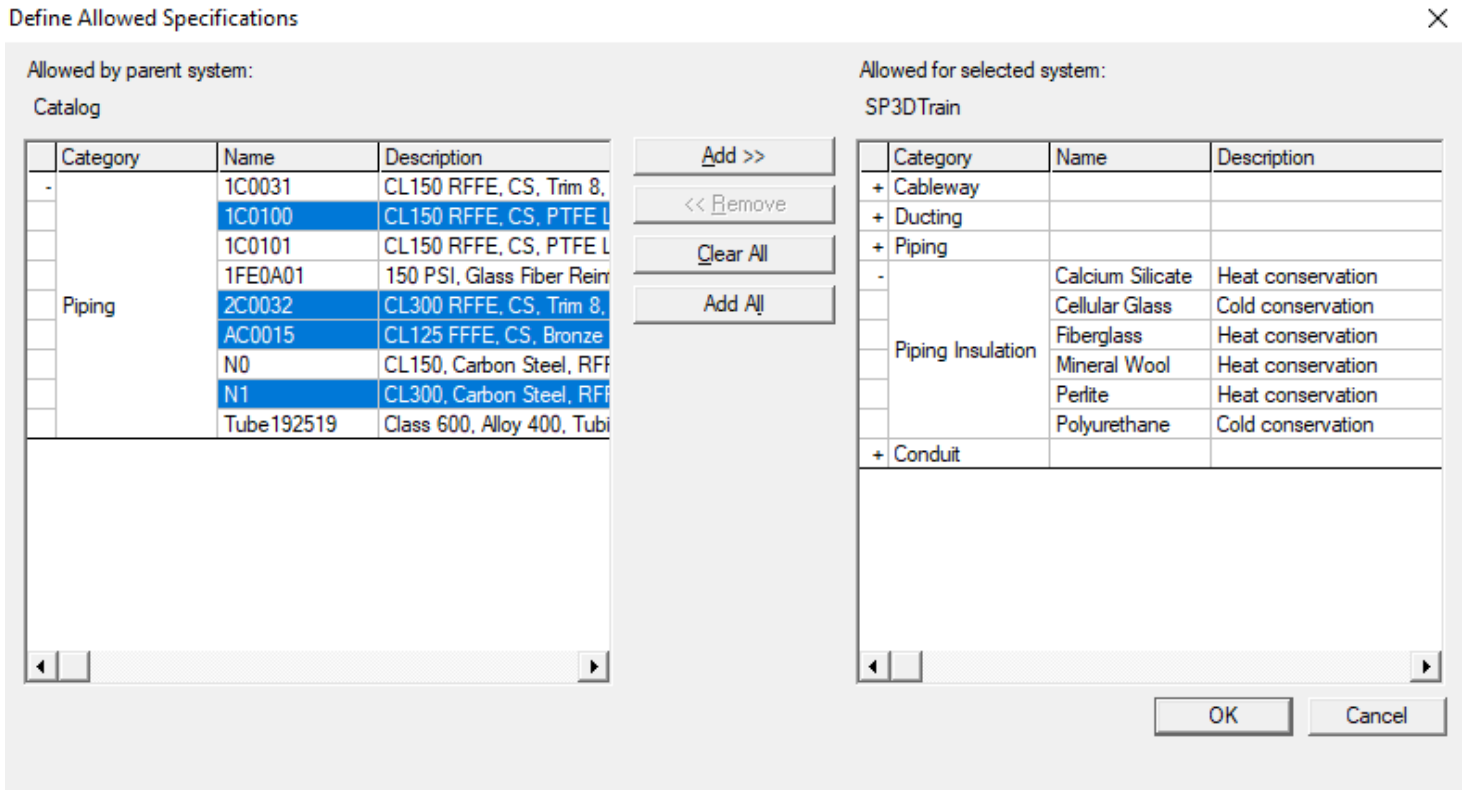
Systems and Specs: Define allowed specifications

Whole categories can be selected with a single click



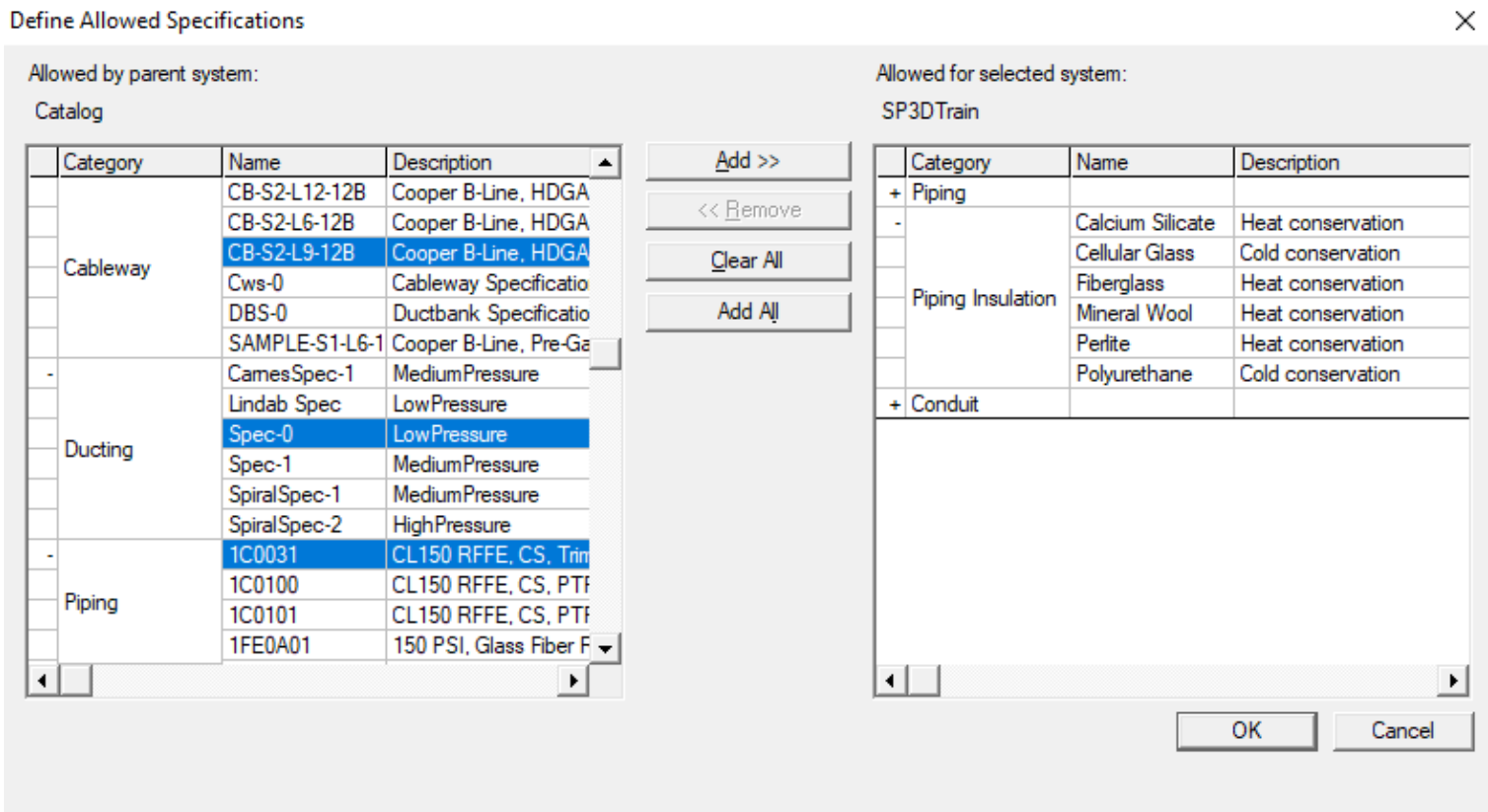
Systems and Specs: Define allowed specifications

Multi-selection of specifications and/or categories



Systems and Specs: Define allowed specifications

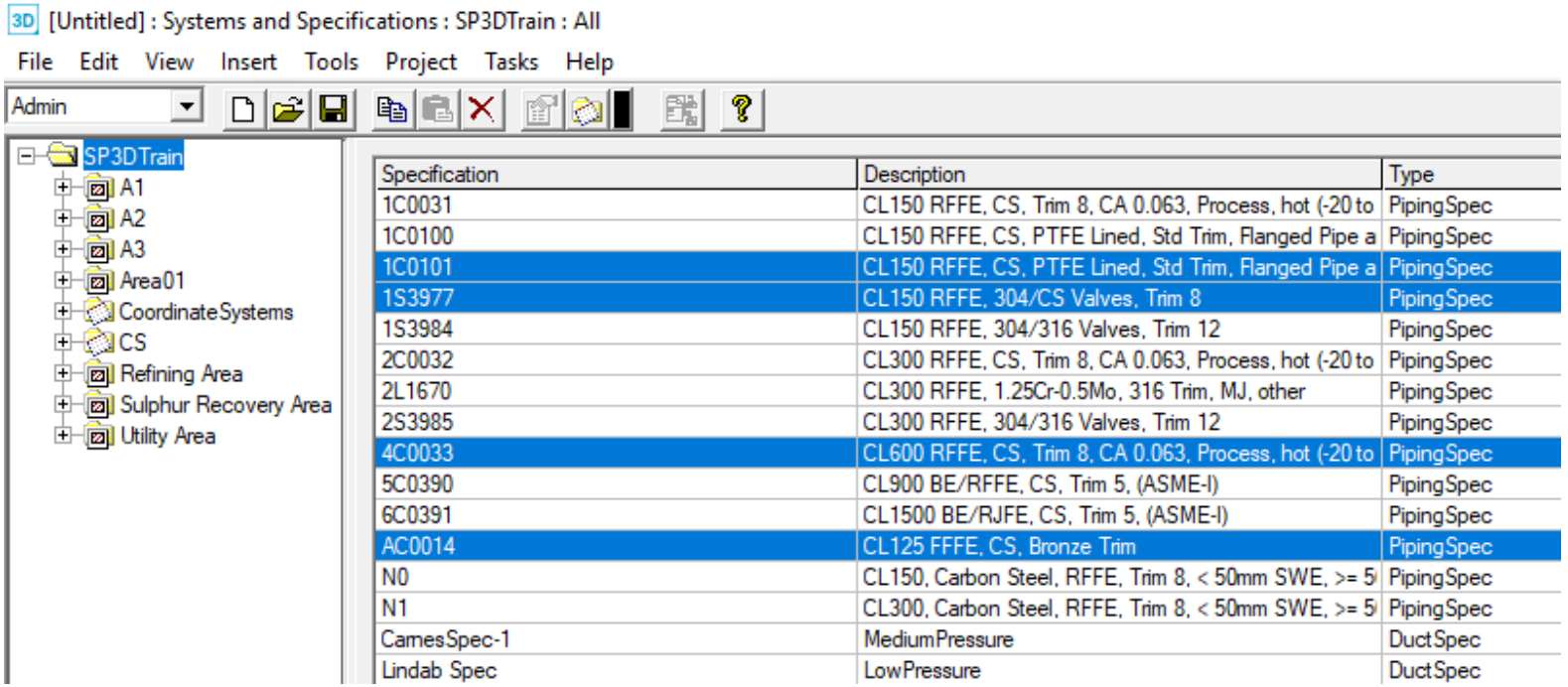
Multi-select of specifications from different categories



Systems and Specs: Define allowed specifications

Easier method to remove allowable specifications from a system

- Switch to the specifications tab while browsing the systems hierarchy
- Multi-select specifications and press delete button from ribbon bar



Setup and Administration Lab

Lab 12 - 15

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Common Applications

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Optimization for Roles

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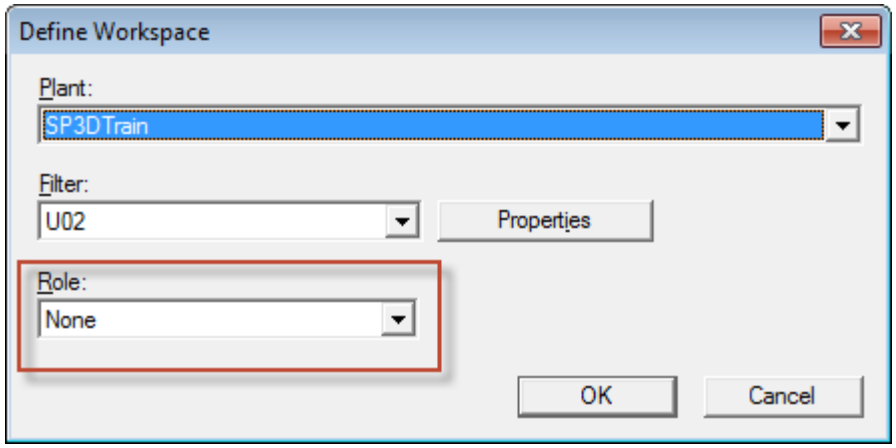
Optimization for Roles

- Used to refine Workspace definition filter
- Roles are defined in delivered OptimizationforRole.xml
- Location: \\Server\SharedContent\Xml
- Each role is defined with a set of disciplines and subclass object types



Default Color Configuration

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Default Color Configuration – The basics

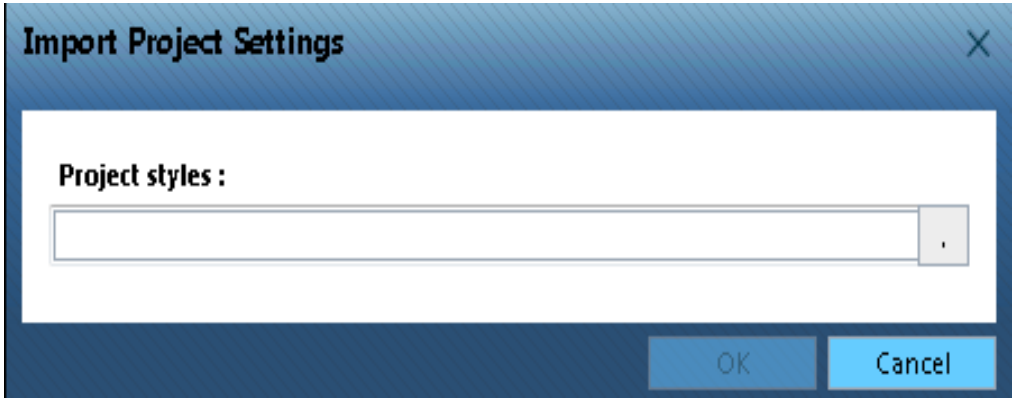
Project Management command

- Import
- Export
- Configure Default Colors
- Apply Default Colors

Default Color Configuration

Import

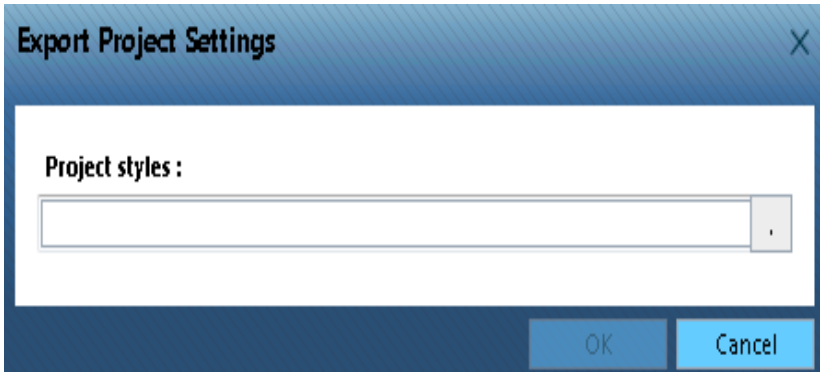
- Aids in importing a set of “Default Style” rules into a model database
- Used for porting rules from one model to another
- Intergraph Defaults are available in SharedContent/XML folder



Default Color Configuration

Export

- Aids in exporting the “Default Style” rules from a model to be ported to another model



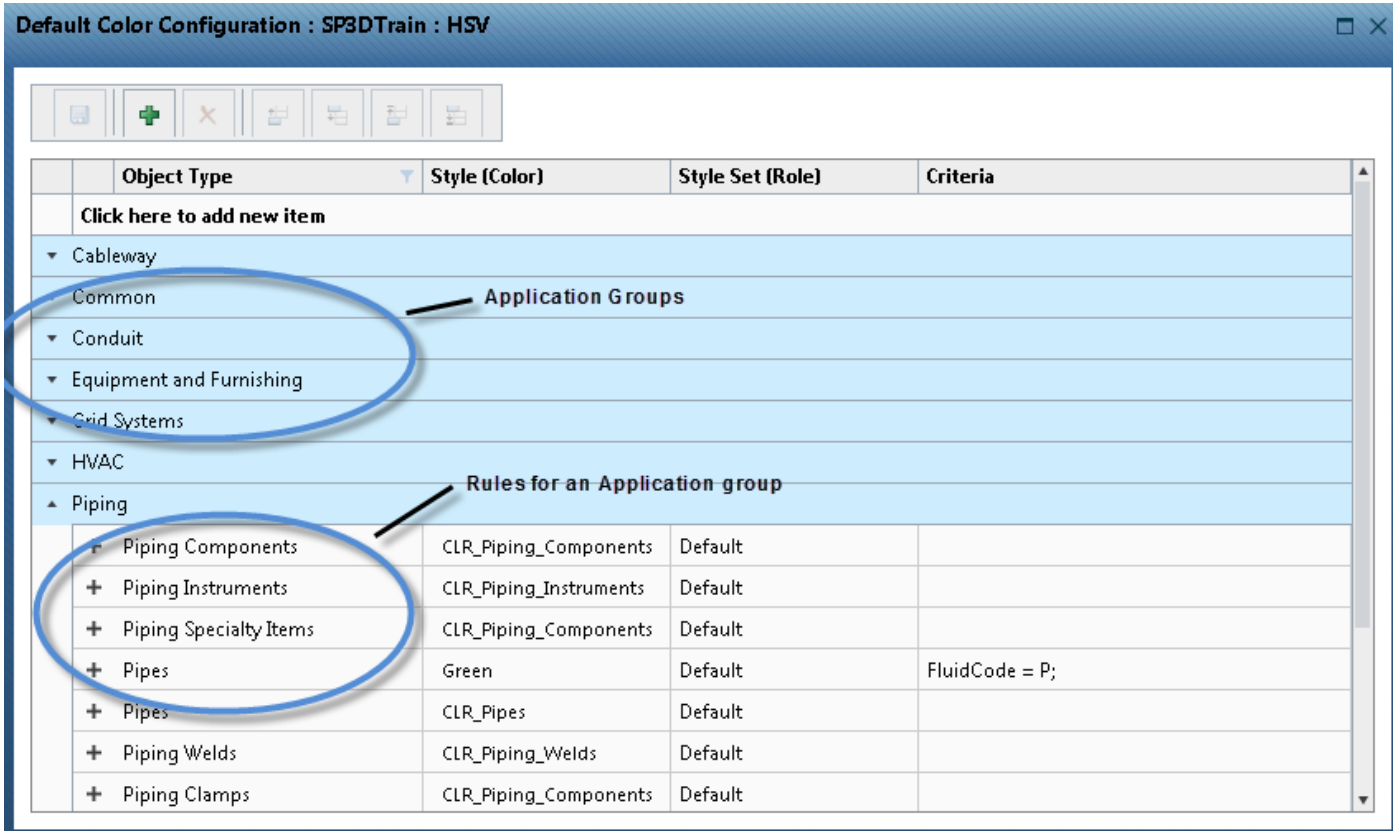
Default Color Configuration

Configure Default Colors

- Styles (colors) are applied per object type
- Rules define the style applied to object types
- Granular level of coloring based on object properties
- Color by Role makes it possible to define different colors for same object type based on role (workspace simplification role) of the person using it.

Default Color Configuration

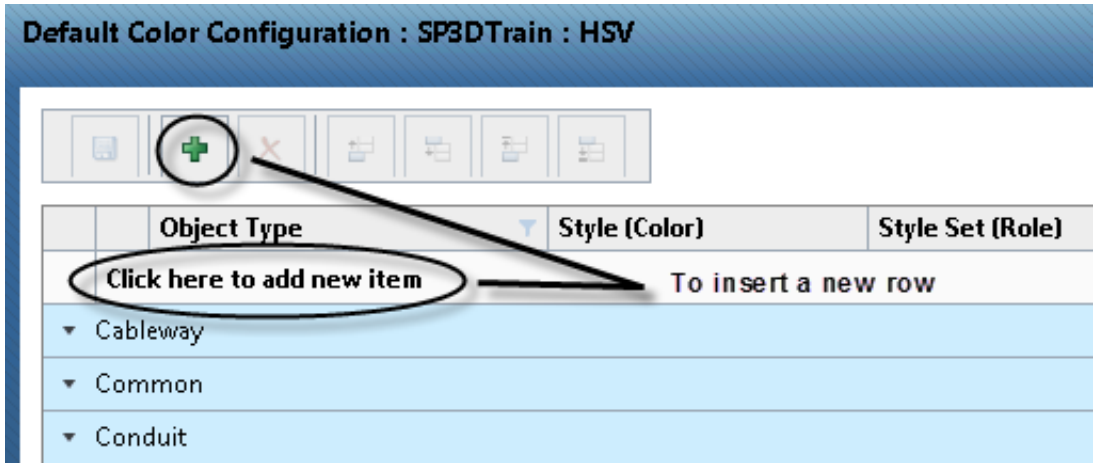
Configure Default Colors



Default Color Configuration

Configure Default Colors

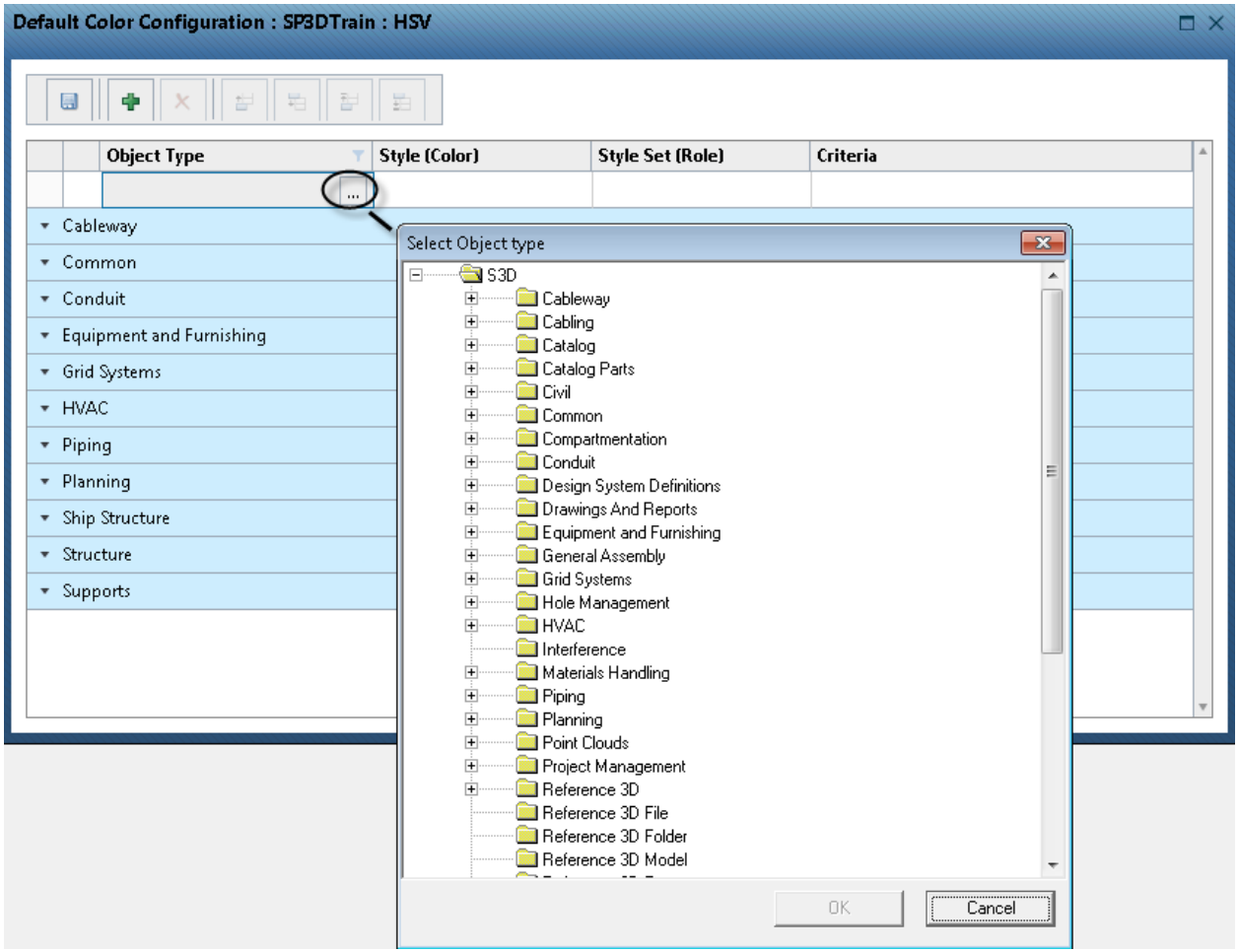
- Create a rule



Default Color Configuration

Configure Default Colors

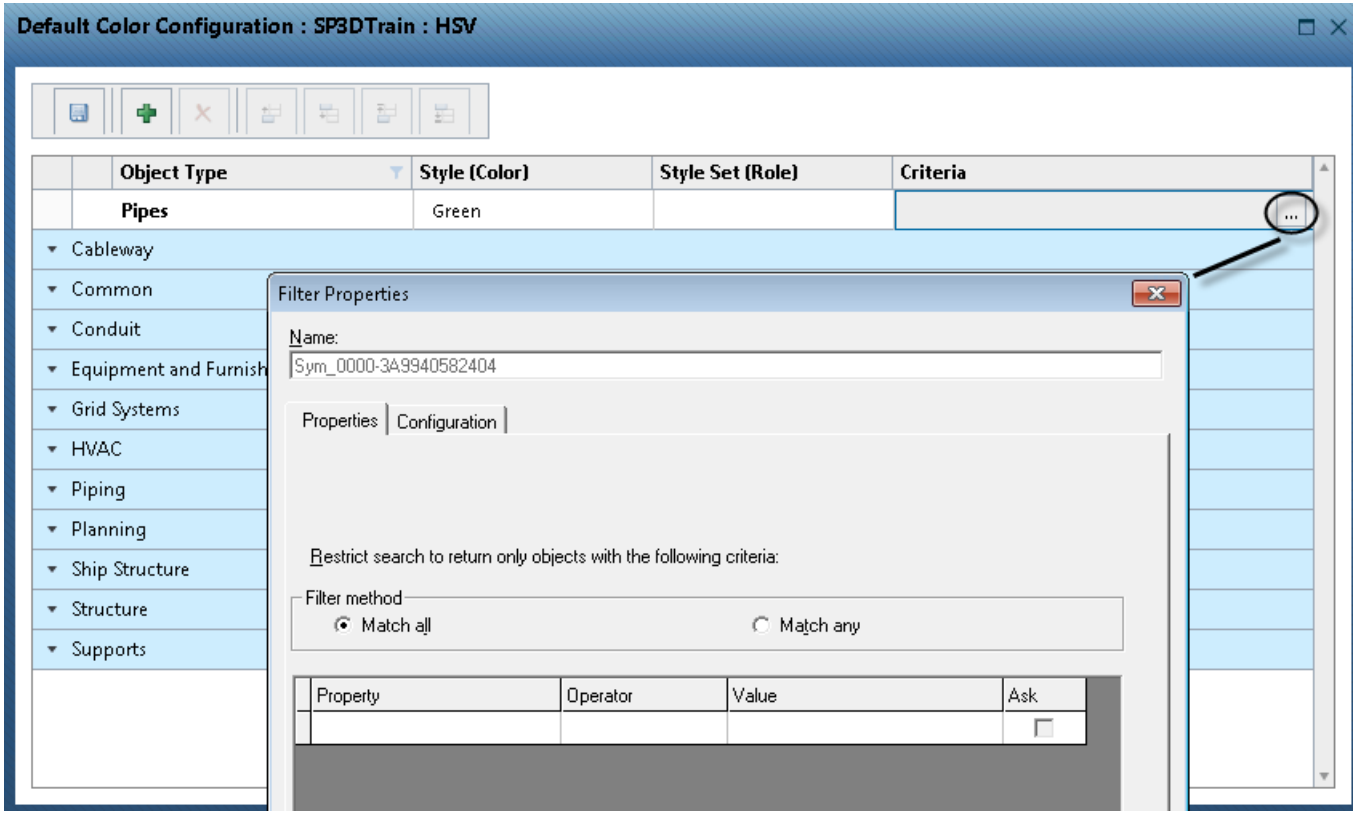
- Create a rule



Default Color Configuration

Configure Default Colors

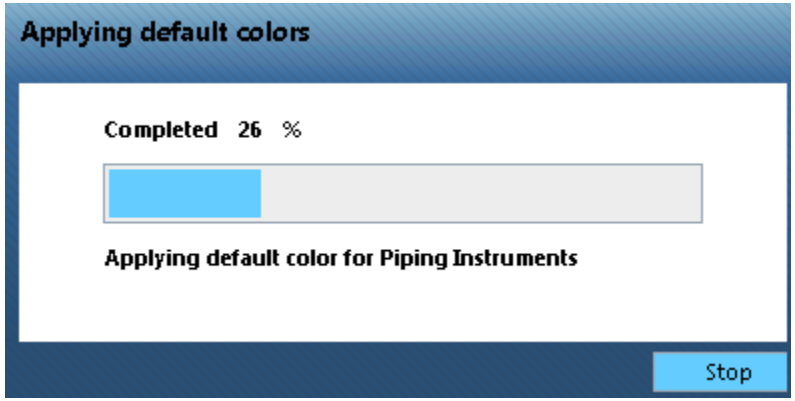
- Define criteria



Default Color Configuration

Apply Default Colors

- New Default Color Rules are applied to new or modified objects automatically
- Apply Default Colors to change appearance of existing objects in the model
- This is a time consuming process and shall be sparsely used



Default Color Configuration

Considerations

- New rules are automatically applied only to new or modified objects
- Colors by default symbology rules are applied only to the simple physical aspect
- Default colors may be used for colors such as object type or fluid code which are not expected to change through the life of the project, SSRs should be used for setting colors based on properties which change as project progresses such as approval status
- Default colors are applied by default to insulation (translucent white), maintenance and operation aspects (translucent red) but SSRs may be used to apply other colors to aspects
- Avoid testing on production models, time to apply default colors can impact testing time - use a model which has one occurrence of each object type for ease of testing

Default Color Configuration

Considerations

- Colors are not consistently applied on session files created prior to applying changes. New session files are recommended after making new rules.
- When using default colors by Role, the colors will not be dynamically updated for saved sessions. New session files need to be created.
- Colors will not change automatically to Intergraph's new color scheme after a version upgrade of existing models before V2014 R1, however new models created with 2018 will automatically apply the DefaultSymbologyRules.xml file from SharedContent/Xml folder.
- Coloring equipment by classification will take care of equipment, components and shapes but for nozzles, edges available on Smart Support may need to be used to select nozzles with specific classification and apply default colors to them.

Default Color Configuration

Considerations

- Colors with the ‘Default’ role are automatically applied to SPR session exported from the S3D session, further overrides may be applied using property page for 3D Model Data or ReportSettings.txt for SPR Direct

Setup and Administration Lab

Lab 16 - 18

HEXAGON

Model Data Reuse (MDR)

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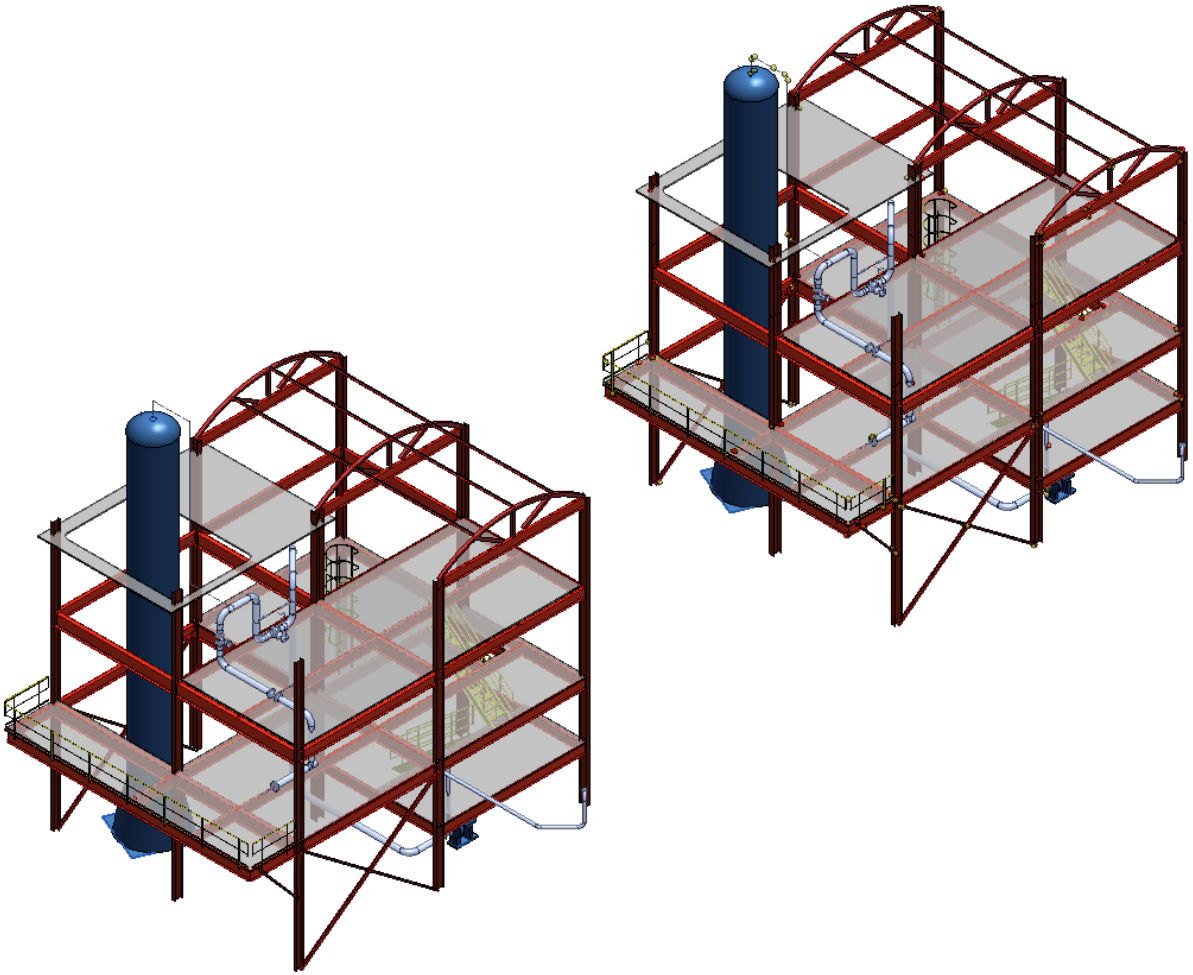
Model Data Reuse: Introduction

- Model Data Reuse (MDR) is a way to copy large amounts of 3D model data in a robust, scalable and intelligent way
- MDR supplements the current copy/paste process – the existing process remains in place for smaller sets of data

Model Data Reuse: Results



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Model Data Reuse: Advantages

- **MDR runs from Project Management environment as a wizard**
  - Interaction with objects is not required
- **Does not require objects to be loaded into memory**
  - process is scalable and can copy much larger sets of data
- **Software breaks down copy set into multiple transactions**
  - Process is robust and can tolerate a failure; it will continue to copy the rest of the remaining objects

Model Data Reuse: Advantages

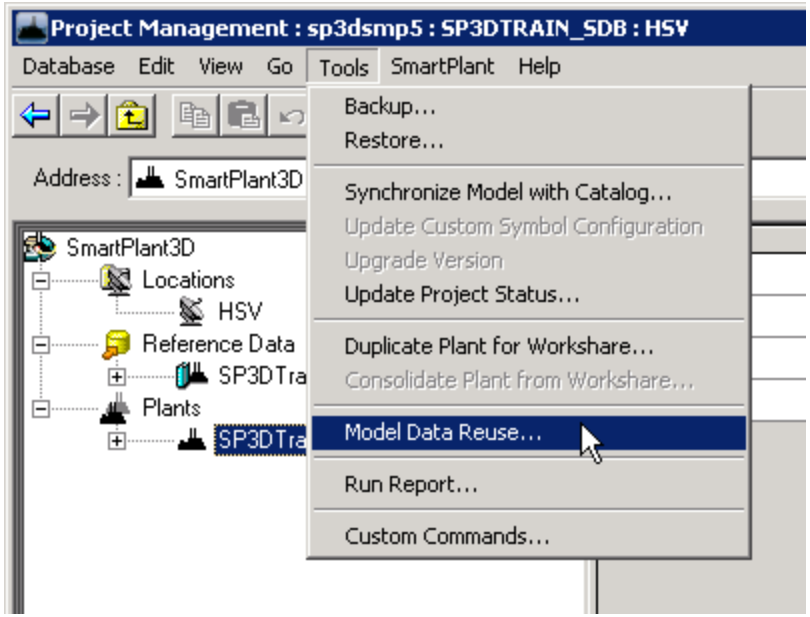
- Software determines the sequence in which to copy objects
- Permission group mapping to existing or default permission group
- Transformation can be chosen using coordinate systems
- Very good logging of process (including failures)
- Copy of model objects between models is supported
- Target locations in different servers is supported
- Re-startable process

Model Data Reuse: Recommended Practices

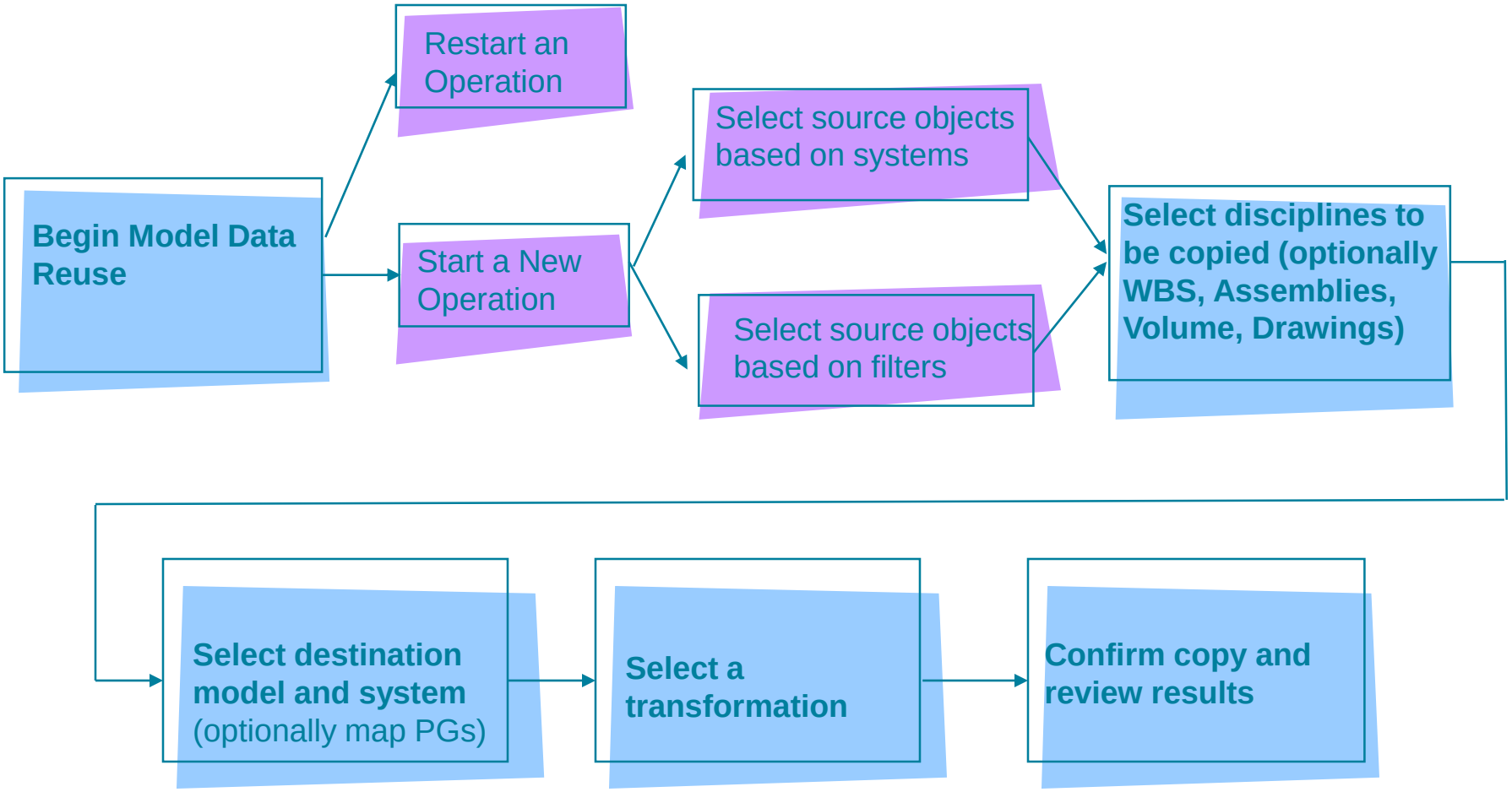
- In **Plant models,** copying an entire unit system or area system. A unit or area typically includes many structural members, slabs, walls, equipment, foundations, pipe runs, ducts, cable trays, conduits, and hangers.
- In **Marine models**, copying major sections of marine structure and outfitting. The sections may be organized into assemblies or blocks.
- In **Material Handling models**, copying an entire conveyor system, including belts, equipment, modules, chutes, trusses, and trestles.

Model Data Reuse

- MDR command exists only in Project Management

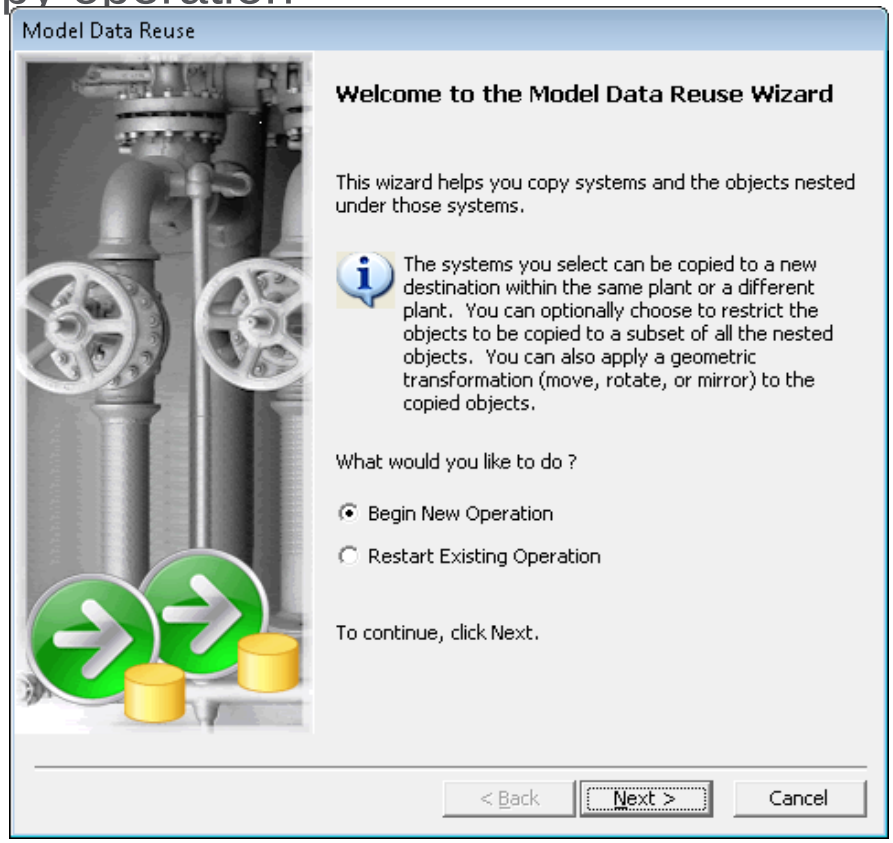


Model Data Reuse Workflow



Model Data Reuse

- The Model Data Reuse command invokes a wizard which allows you to complete the copy operation



Model Data Reuse: Restart Operation

- If the restart operation is selected then the user gets a list of all operations and their status.
- **Possible statuses:**
  - **Stopped:** Process terminated in an orderly way (User clicked stop on the progress button).
  - **Incomplete:** Process terminated abnormally (Hardware/Software failure on client machine).
  - **In Progress:** Operation is restarted on a different client machine.
  - **Completed:** Operation completed successfully.

Setup and Administration Lab

Lab 19 - 21

HEXAGON

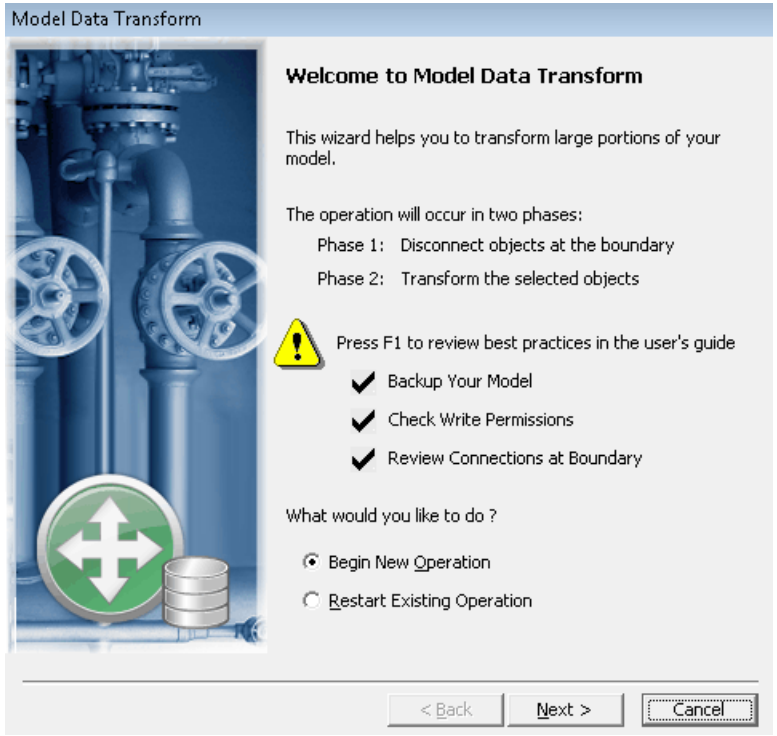
Model Data Transform

- Model Data Transform (MDT) command allows you to move and/or rotate a large portion of the design objects in a model from one location in the model to another.
- The processing is done in two phases:
  - The first phase, the objects in each partition are disconnected from the surrounding objects.
  - The second phase, the disconnected objects in each partition are transformed to their new location.
- The set of objects can include read-only objects. If a read-only object prevents disconnection or transformation, MDT allows you to correct the situation and restart the operation.

Model Data Transform : Best Practices

- Create a backup
- Disconnect objects at the boundary
- Have write permission
- Avoid concurrent editing
- Model Data Reuse (MDR) and Model Data Transform (MDT) workflow using delete optional

Model Data Transform : Best Practices



Setup and Administration Lab

Lab 22

HEXAGON

Synchronization

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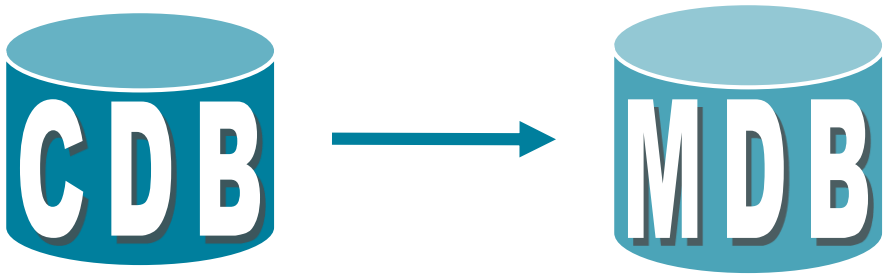
Synchronize Model with Catalog

- Used to propagate changes from the catalog to the model (including property, specification, and symbol changes)



Synchronize Model with Catalog

The model database is updated to include the following changes:

- Modifications to properties that have been bulkloaded into the catalog.
- Modifications to name rules.
- Parts that have been deleted from the Catalog are added to the **To Do List.**
- Does not automatically synchronize Reference 3D models. You can choose to synchronize the Smart 3D model with the Reference 3D model when you update the Reference 3D project.

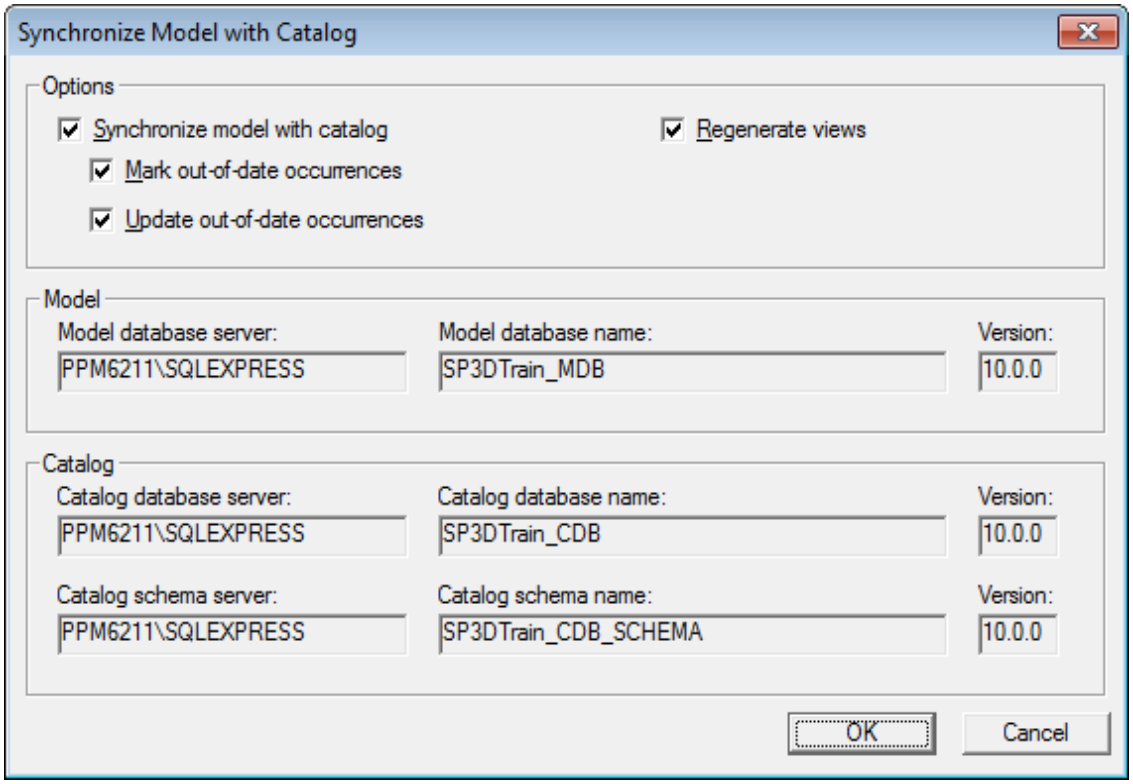
Synchronize Model with Catalog

- Actions performed by the Synchronization command will depend on the level of access of the user running the command from Project Management:

- User with write access to model objects:
  - Extended execution time
  - Model objects will be updated automatically with no user interaction

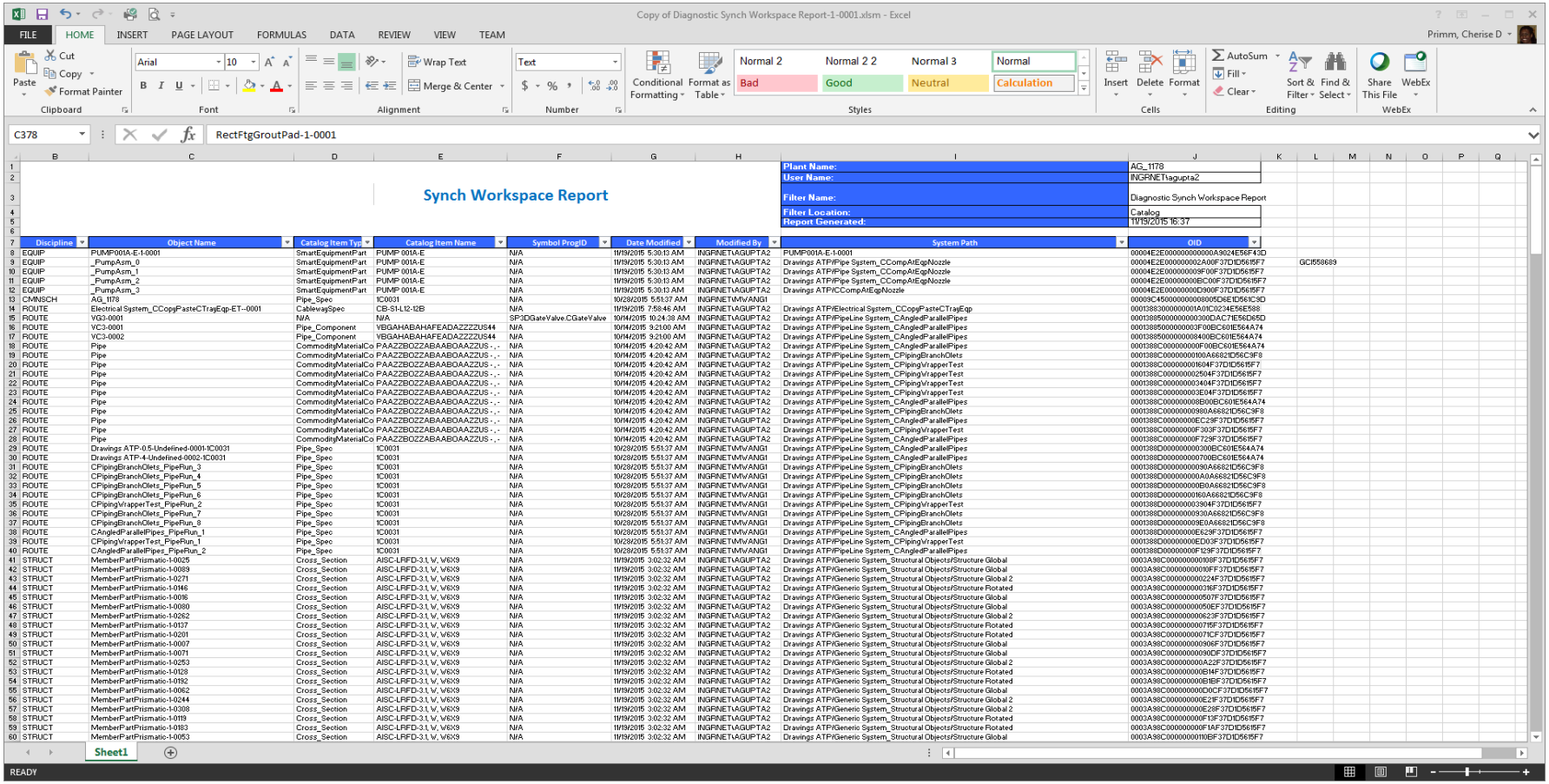
- User with read access to model objects:
  - Reduced execution time
  - Objects will not be updated automatically

Synchronize Model with Catalog



Synchronize Model with Catalog

- To list all objects that have been flagged for interactive update in the model workspace, run **Diagnostic Synch Workspace Report**



Copy of Diagnostic Synch Workspace Report-1-0001.xlsm - Excel

C378: RectFtgGroutPad-1-0001

Synch Workspace Report

Plant Name:	AG_1178
User Name:	INGPNET\agupta2
Filter Name:	Diagnostic Synch Workspace Report
Filter Location:	Catalog
Report Generated:	11/19/2015 16:37

Discipline	Object Name	Catalog Item Type	Catalog Item Name	Symbol ProgID	Date Modified	Modified By	System Path	OID
EQUIP	PUMP001A-E-1-0001	SmartEquipmentPart	PUMP 001A-E	N/A	11/19/2015 5:30:13 AM	INGPNET\AGUPTA2	PUMP001A-E-1-0001	00004E2E000000000000A9024E56F43D
EQUIP	_PumpAsm_0	SmartEquipmentPart	PUMP 001A-E	N/A	11/19/2015 5:30:13 AM	INGPNET\AGUPTA2	Drawings ATP/Pipe System_CCompAtEqpNozzle	00004E2E000000002A00F37D1D5615F7 GCI559689
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EQUIP	_PumpAsm_2	SmartEquipmentPart	PUMP 001A-E	N/A	11/19/2015 5:30:13 AM	INGPNET\AGUPTA2	Drawings ATP/Pipe System_CCompAtEqpNozzle	00004E2E000000008EC00F37D1D5615F7
EQUIP	_PumpAsm_3	SmartEquipmentPart	PUMP 001A-E	N/A	11/19/2015 5:30:13 AM	INGPNET\AGUPTA2	Drawings ATP/CCompAtEqpNozzle	00004E2E000000003900F37D1D5615F7
CMNSCH	AG_1178	Pipe_Spec	1C0031	N/A	10/28/2015 5:51:37 AM	INGPNET\MVANG1		00009C4500000000008005D6E1D561C9D
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ROUTE	VG3-0001	N/A	N/A	SP3DGateValve.CGateValve	10/14/2015 10:24:39 AM	INGPNET\AGUPTA2	Drawings ATP/PipeLine System_CAngledParallelPipes	0001388500000000300DAC71E56D65D
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ROUTE	Pipe	CommodityMaterialCo	PAAZZBOZZABAABOAAZZUS-,-	N/A	10/14/2015 4:20:42 AM	INGPNET\AGUPTA2	Drawings ATP/PipeLine System_CPipingVrapperTest	0001388C000000001604F37D1D5615F7
ROUTE	Pipe	CommodityMaterialCo	PAAZZBOZZABAABOAAZZUS-,-	N/A	10/14/2015 4:20:42 AM	INGPNET\AGUPTA2	Drawings ATP/PipeLine System_CPipingVrapperTest	0001388C000000002504F37D1D5615F7
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ROUTE	Pipe	CommodityMaterialCo	PAAZZBOZZABAABOAAZZUS-,-	N/A	10/14/2015 4:20:42 AM	INGPNET\AGUPTA2	Drawings ATP/PipeLine System_CPipingBranchOlets	0001388C000000009980A66821D56C9F8
ROUTE	Pipe	CommodityMaterialCo	PAAZZBOZZABAABOAAZZUS-,-	N/A	10/14/2015 4:20:42 AM	INGPNET\AGUPTA2	Drawings ATP/PipeLine System_CAngledParallelPipes	0001388C000000000EC29F37D1D5615F7
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ROUTE	Drawings ATP-0.5-Undefined-0001-1C0031	Pipe_Spec	1C0031	N/A	10/28/2015 5:51:37 AM	INGPNET\MVANG1	Drawings ATP/PipeLine System_CAngledParallelPipes	0001388D000000000300BC601E564A74
ROUTE	Drawings ATP-4-Undefined-0002-1C0031	Pipe_Spec	1C0031	N/A	10/28/2015 5:51:37 AM	INGPNET\MVANG1	Drawings ATP/PipeLine System_CAngledParallelPipes	0001388D000000000700BC601E564A74
ROUTE	CPipingBranchOlets_PipeRun_3	Pipe_Spec	1C0031	N/A	10/28/2015 5:51:37 AM	INGPNET\MVANG1	Drawings ATP/PipeLine System_CPipingBranchOlets	0001388D000000000A0A66821D56C9F8
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ROUTE	CPipingVrapperTest_PipeRun_1	Pipe_Spec	1C0031	N/A	10/28/2015 5:51:37 AM	INGPNET\MVANG1	Drawings ATP/PipeLine System_CPipingVrapperTest	0001388D000000000ED03F37D1D5615F7
ROUTE	CAngledParallelPipes_PipeRun_2	Pipe_Spec	1C0031	N/A	10/28/2015 5:51:37 AM	INGPNET\MVANG1	Drawings ATP/PipeLine System_CAngledParallelPipes	0001388D000000000F729F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0025	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global	0003A98C000000000108F37D1D5615F7
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STRUCT	MemberPartPrismatic-1-0271	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global 2	0003A98C000000000224F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0146	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Rotated	0003A98C000000000316F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0016	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global	0003A98C000000000507F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0080	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global	0003A98C000000000506EF37D1D5615F7
STRUCT	MemberPartPrismatic-1-0262	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global 2	0003A98C000000000623F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0137	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Rotated	0003A98C000000000715F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0201	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Rotated	0003A98C000000000717CF37D1D5615F7
STRUCT	MemberPartPrismatic-1-0007	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global	0003A98C000000000906F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0071	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global	0003A98C000000000908DF37D1D5615F7
STRUCT	MemberPartPrismatic-1-0253	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global 2	0003A98C000000000A22F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0128	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Rotated	0003A98C000000000B14F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0192	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Rotated	0003A98C000000000B1BF37D1D5615F7
STRUCT	MemberPartPrismatic-1-0062	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global	0003A98C000000000C0CF37D1D5615F7
STRUCT	MemberPartPrismatic-1-0244	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global 2	0003A98C000000000E21F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0308	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global 2	0003A98C000000000E28F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0119	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Rotated	0003A98C000000000F13F37D1D5615F7
STRUCT	MemberPartPrismatic-1-0183	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Rotated	0003A98C000000000F1AF37D1D5615F7
STRUCT	MemberPartPrismatic-1-0053	Cross_Section	AISC-LRFD-3.1, W, W6X9	N/A	11/19/2015 3:02:32 AM	INGPNET\AGUPTA2	Drawings ATP/Generic System_Structural Objects/Structure Global	0003A98C000000000110BF37D1D5615F7

Sheet1

READY

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Database Maintenance Command

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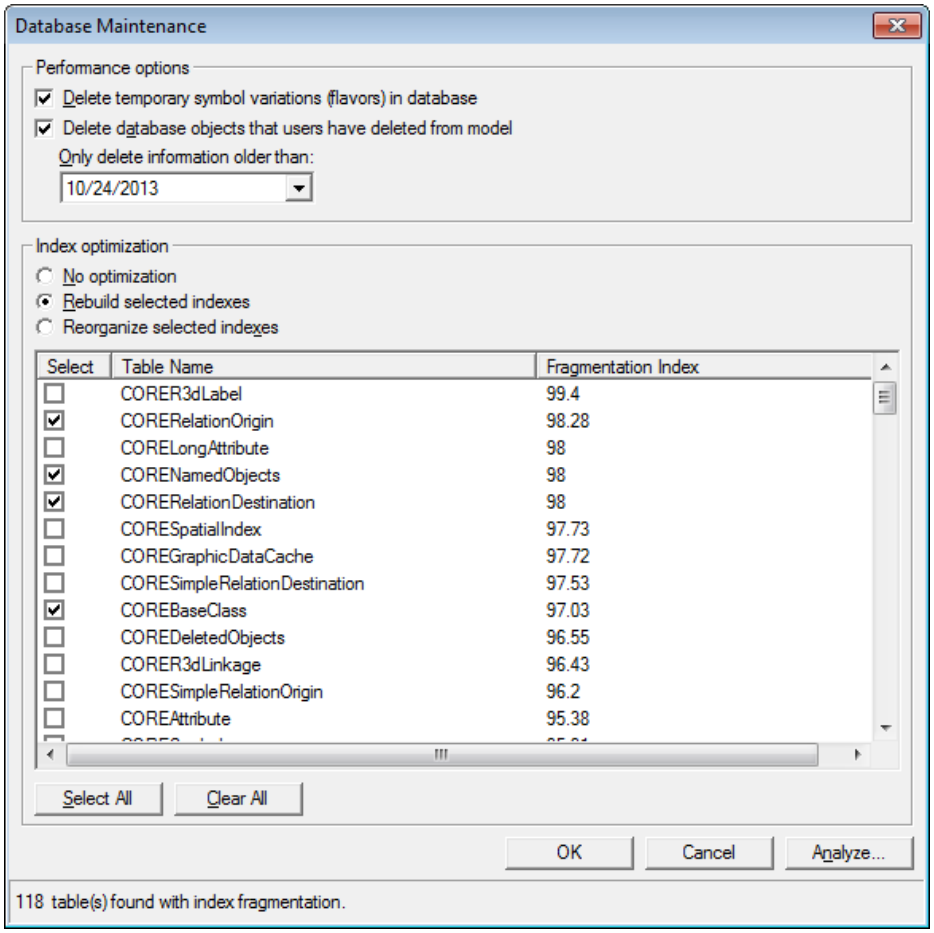
Database Maintenance Command

- Provides a tool to purge temporary data that may cause performance issues.



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Database Maintenance Command

- Delete temporary symbol variations (flavors) in database
  - These are temporary symbol variations that the software used during creation or placement of certain symbols.
- Delete records of objects that users have deleted from model
- Rebuild selected indexes
- Reorganize selected indexes

Setup and Administration Lab

Lab 23 - 25

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Database Integrity

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Database Integrity: Overview

- Database integrity problems are issues of the modeled objects that can in some circumstances prevent modeling activities or impact the accuracy of deliverables such as drawings or reports.

- A typical example of a database integrity issue is an object that exists without a mandatory relation to another object in the model.

Database Integrity: Overview

Important

- These errors are not expected. However, in the event that they occur, you can correct them by perfoming the database integrity workflow in which objects will be addressed
- We strongly recommend that you check the databases from time to time and promptly report any unknown problems to Intergraph.
- If you receive a database integrity error that is not listed in documentation, contact Intergraph Process, Power & Marine Support.

Database Integrity: Workflow

- The workflow to address database integrity issues have three overall steps:
  1. Execute database integrity from Project Management.
  2. Generate a report to review issues found.
  3. Run Clean database command to address problems.

Database Integrity: Execute Database Integrity

- Execute database integrity from Project Management

Check Database Integrity runs directly on a database (Site, Catalog, or Model), and creates records for the objects that need to be cleaned. Once the database has been scanned for errors, you can generate a report to review the errors that the Check Database Integrity command generated.

You can run this command multiple times:

- To check the database for objects with integrity problems
- To confirm that objects have been deleted or cleaned (second pass)

Database Integrity: Generate reports

- Generate a report to review issues found

The software includes various report templates intended for diagnosing database integrity issues. You can run these report templates by opening a session in the software and clicking **Run Report** command from the **Tools** menu. Report templates are located in the **Catalog Reports** tab then under **Report** > **Types of Reports** > **Diagnostics** node. Select any of the four following reports:

Diagnostic clean database issues
Diagnostic clean database issues grouped by problem description
Diagnostic clean database issues grouped by status
Diagnostic clean database issues with column filters

Database Integrity: Generate reports

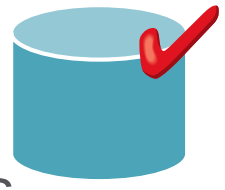
Diagnostic Clean Database Issues

Note: In normal operation, this report should not return any value.

D	Date Created	Date Deleted	Application	Status	Date Created
n Group	Date Modified	Deleted by	Owner	Severity	Date Updated

- **DataStore** Displays whether the problem exists in the model or Catalog database.
- **Problem Description** Provides a brief explanation of the issue. Use it to search more details in DBIntegrity.pdf guide
- **Status** Determines if the issue is new, existing or resolved
- **Severity** Fatal, Crucial, High, or Normal
- **Action to Take** Describes what to do to fix the problem. Possible values include No Action, To Be Removed or To Be Repaired.
  - If the action is To Be Repaired, you should run **Clean Database** custom command.

Database Integrity: Run clean database command



Run Clean database command to address problems.

- Consult latest DBIntegrity.pdf document for the correct workflow to fix the problem.
- Most workflows involve use of the Clean Database custom command
  - Action to take = To Be Repaired

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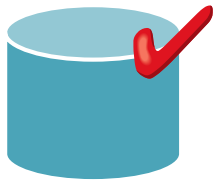
Database Integrity: Run clean database command



- Clean Database Custom Command

SP3DCleanDatabaseCmd.CCheckObj

Setup and Administration Lab

Lab 25

HEXAGON

Error Log and Memory Monitor

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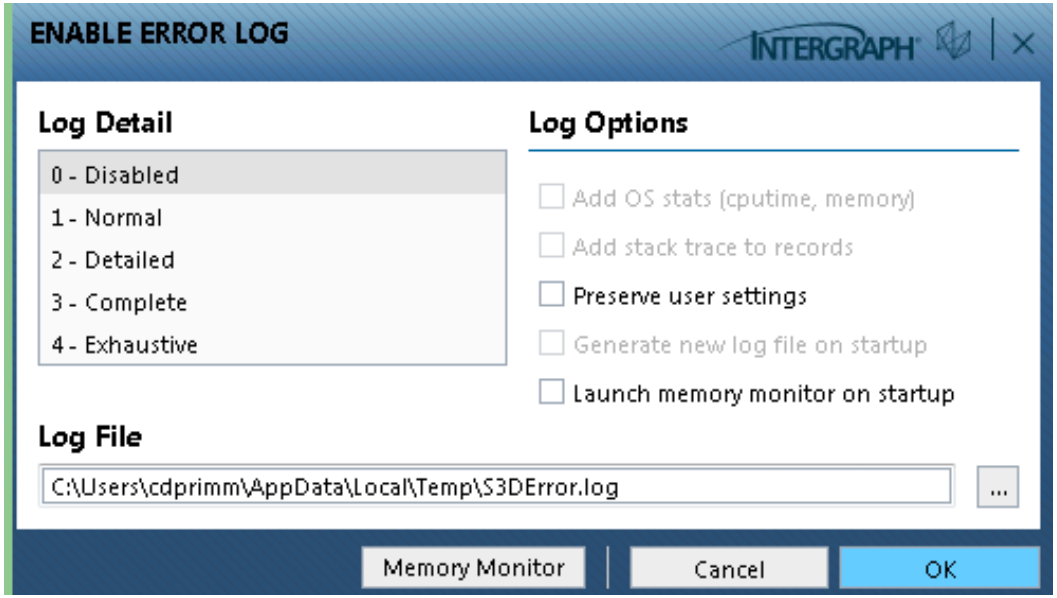
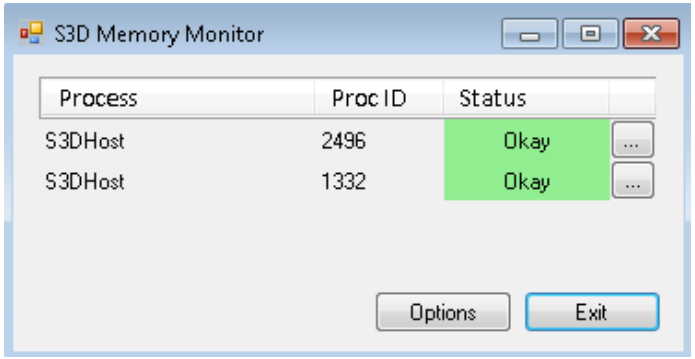
Error Log & Memory Monitor

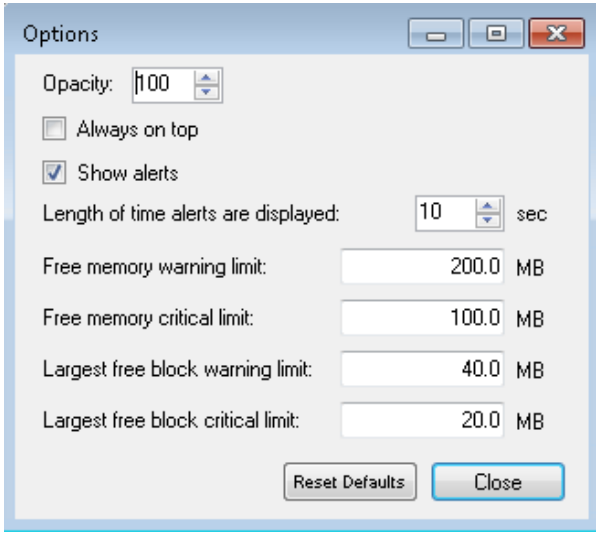
- Error Log
  - On by default, but needs to be set for persistence (cleared when session closes)
  - .Activate using …\Core\Tools\Administrator\Bin\ErrorLogEnable.exe
  - 4 Severity levels
  - Time-based log file names
  - Error log created per session or instance
- Memory monitor
  - Reports memory usage for all active Smart 3D sessions
  - Different reporting states (Warning, Critical)

Error Log & Memory Monitor



Error Log & Memory Monitor





Troubleshooting Assistant

- Consolidates error logging across all S3D tasks
- Includes general S3D error logging (S3D error log, Assoc log)
- Easy-to-use GUI
- Ability to collect relevant files in zipped folder
- Links to troubleshooting reference guide and Smart Support website
- Download from Smart Support (smartsupport.intergraph.com)
  - **View Downloads > Smart 3D > Freeware Tools and Utilities > Uncertified Tools**

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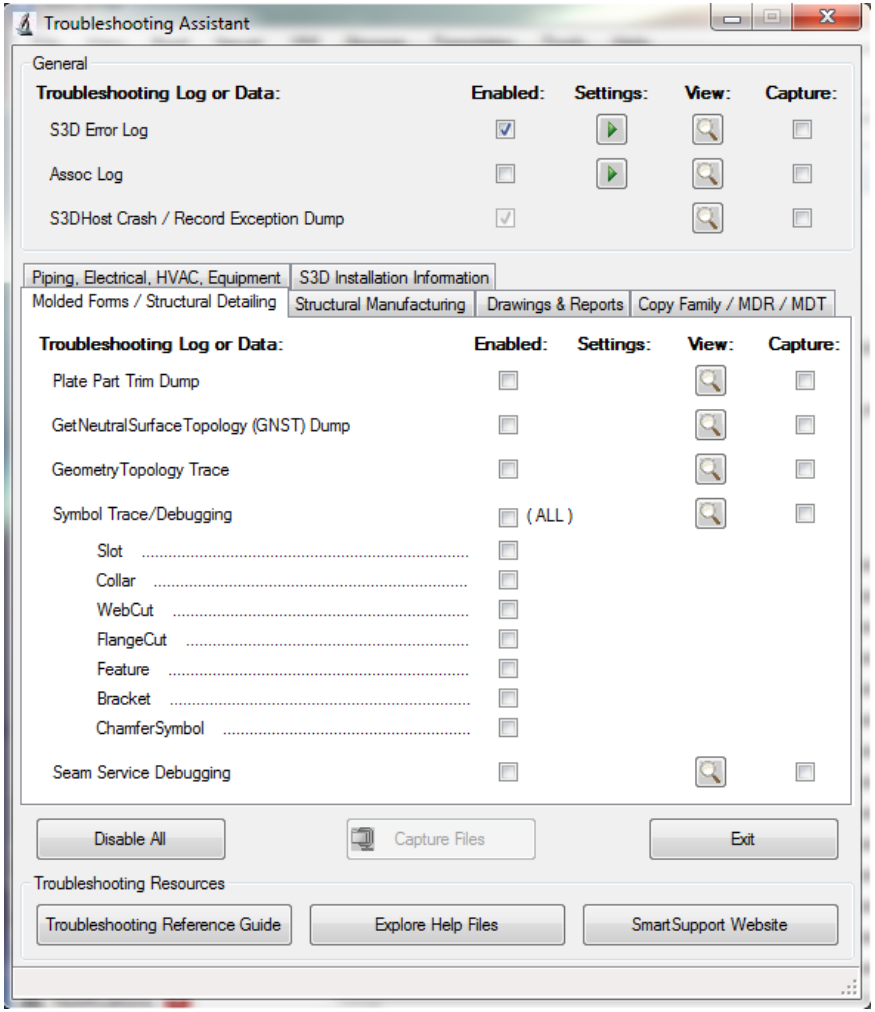
Troubleshooting Assistant



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Setup and Administration Lab

Lab 26

HEXAGON

Interference Checking (IFC)

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Interference Checking Detection (IFC): Overview

Smart 3D provides two methods for IFC operation:

Server-based Interference checking (database detection).

- Runs on a separate server as a Windows NT Service
- Looks for all interferences in the model

Interactive interference checking (local detection).

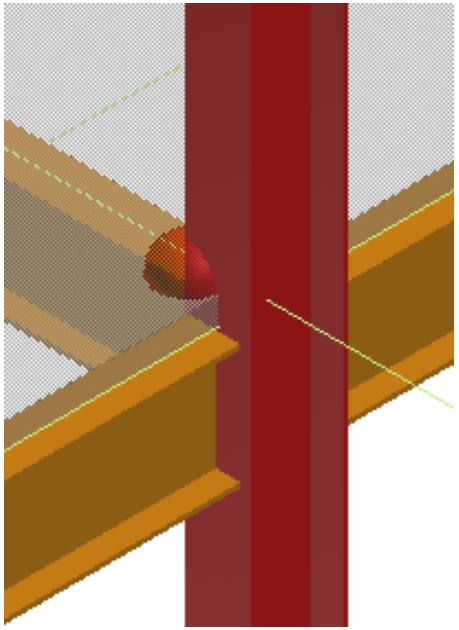
- Helps the designer in real time
- Results are scoped to objects in a session (what you see in your workspace)

IFC: Characteristics

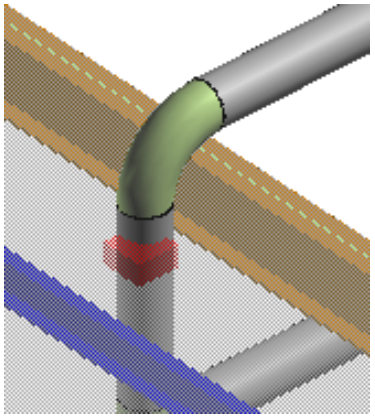
Database Detect	Local Detect
Runs continuously (System Administrator choice)	Works only within the current session
Dedicated server minimizes impact on users and improves performance	Provides immediate graphical feedback (works immediately after commit)
Creates persistent interferences that are stored in the model database	Creates temporary interference markers in a user session
Based on administrator settings (controlled by permission groups)	Based on individual user settings
Provides feed back on how much has been checked	Checks only created and modified items

IFC: Visual differences

Any interference detected by the server based detection method appear as a sphere



Interferences detected by local based detection method appear as a box



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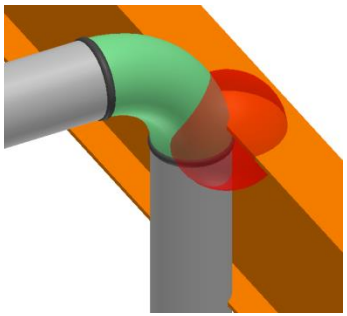
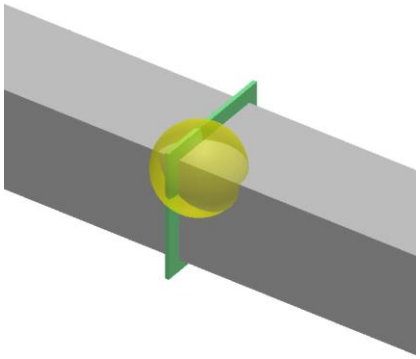
IFC: Visual differences

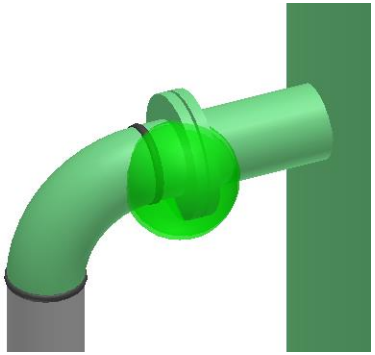
Hard clash



Soft clash



Clearance clash



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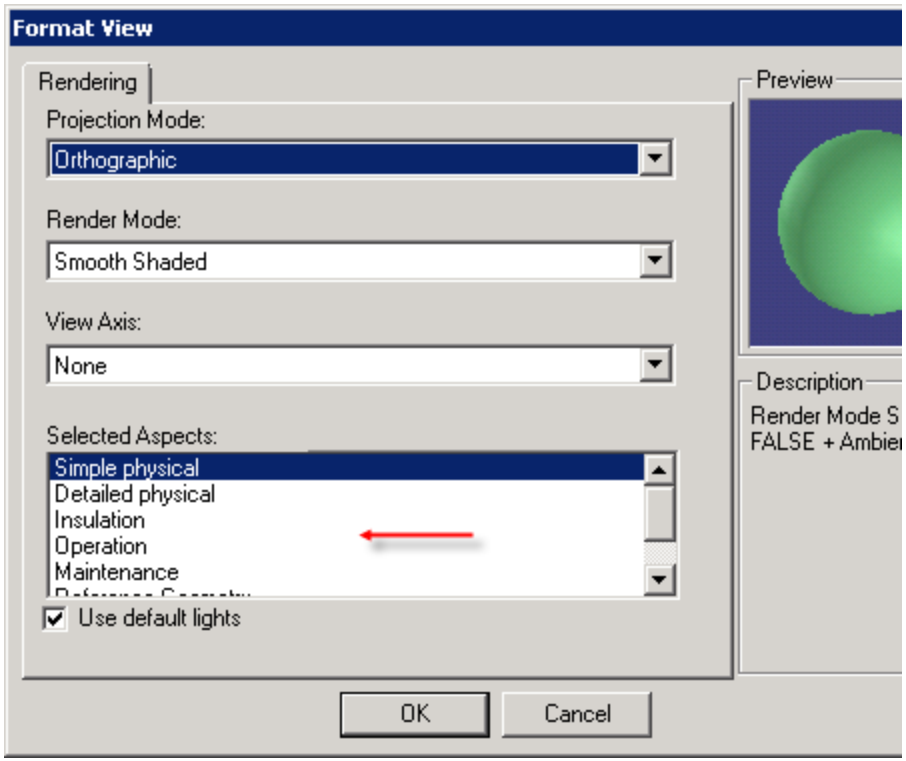
IFC: Aspects

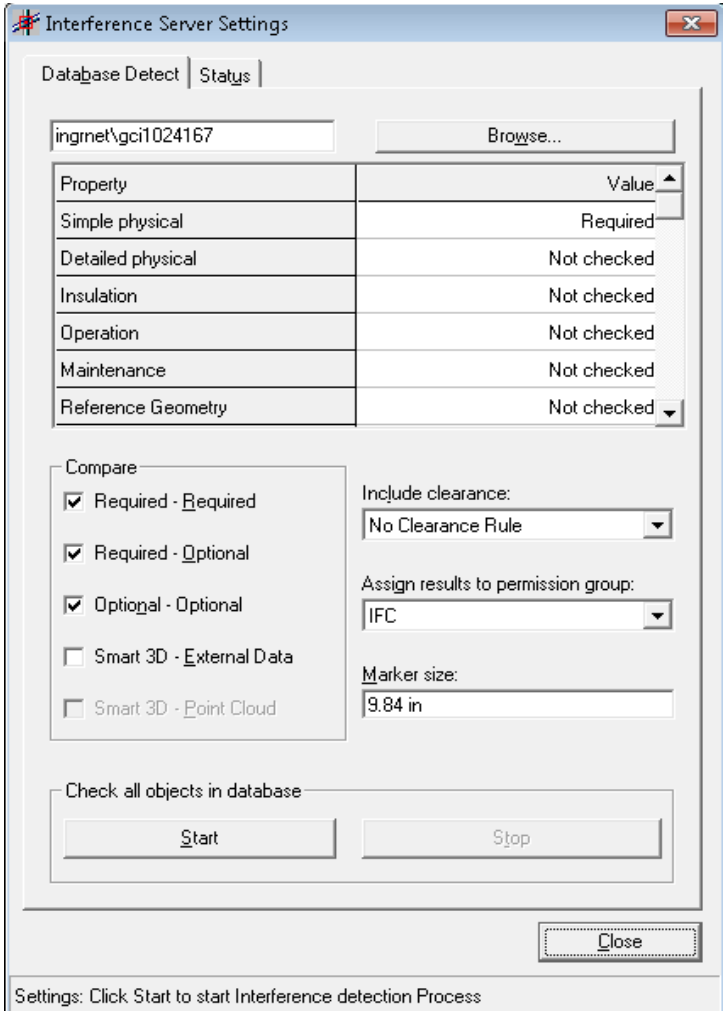
- Aspect: Geometric area or space related to an object, such as its physical shape or the space required around the object.
- Aspects are defined when a part class is created for the reference data.
- Aspects can represent clearances for safety or maintenance areas.

IFC: Aspects

- Simple Physical
- Detailed Physical
- Insulation
- Operation
- Maintenance
- Reference Geometry
- Centerline



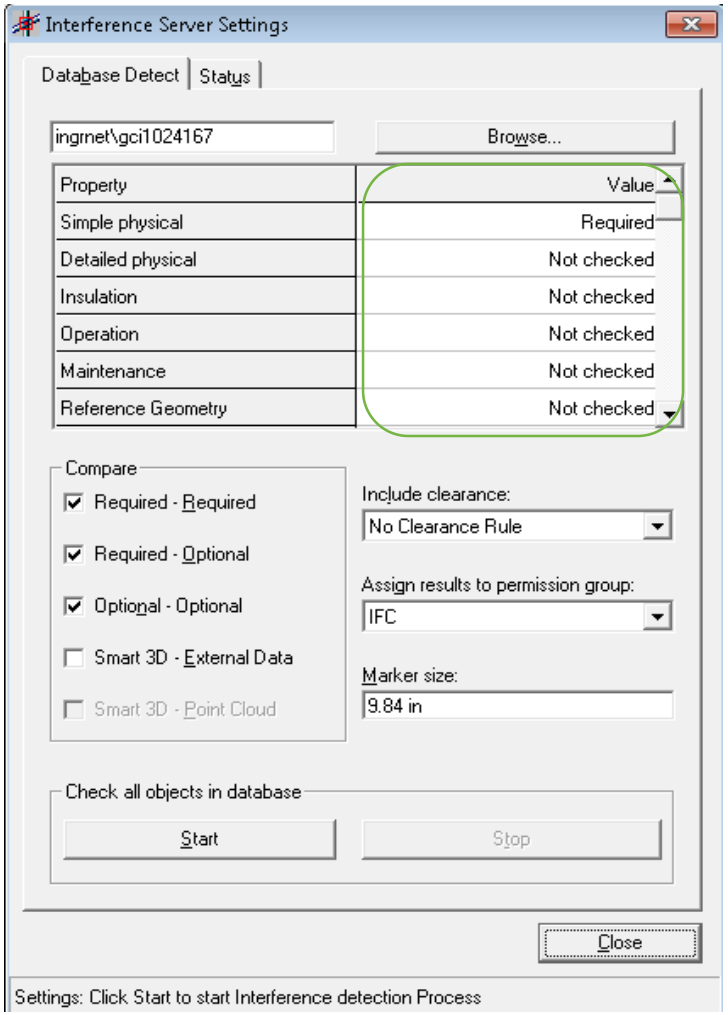
IFC: Configuration



IFC: Configuration – checking priority

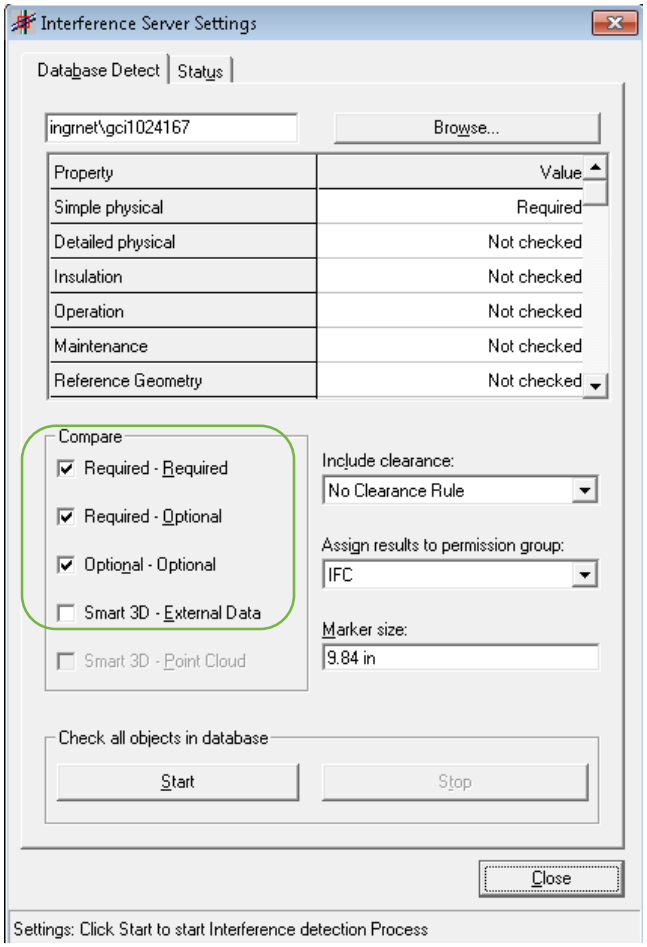
- Three types of checking priorities (based on object aspects):

- Required - Produces a Hard type of clash
- Optional - Produces a Soft type of clash
- Not Checked - Elements currently displayed in this aspect will not be checked for interferences



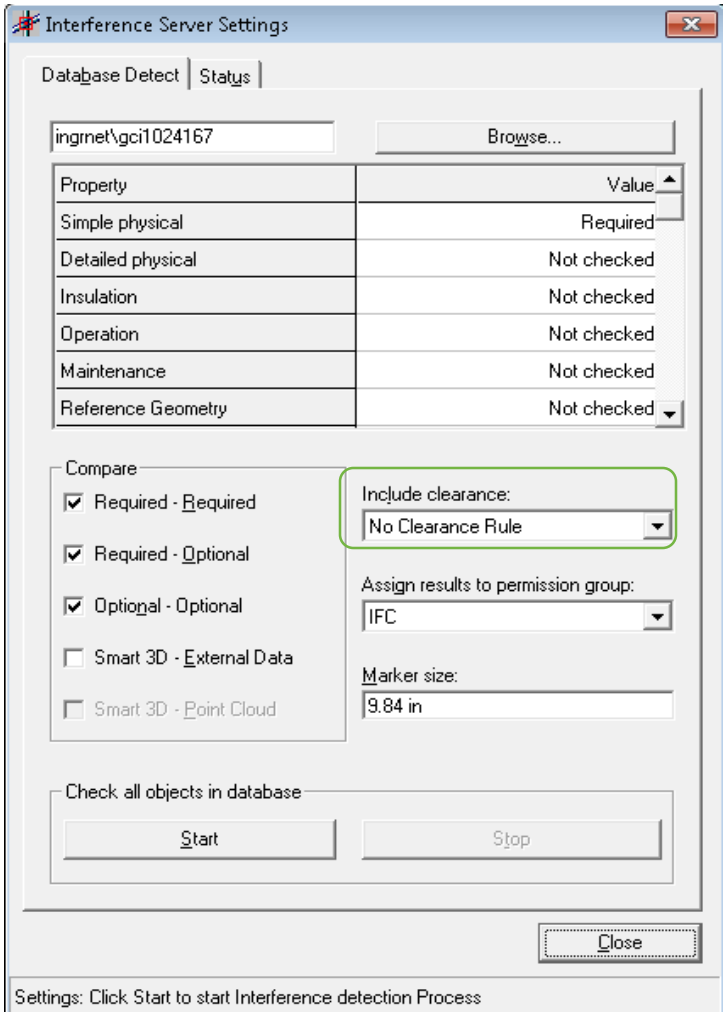
IFC: Configuration – comparison criteria

- IFC can process the following combination of objects based on their checking priorities:
  - Required – Required (Hard – Hard)
  - Required – Optional (Hard – Soft)
  - Optional – Optional (Soft – Soft)



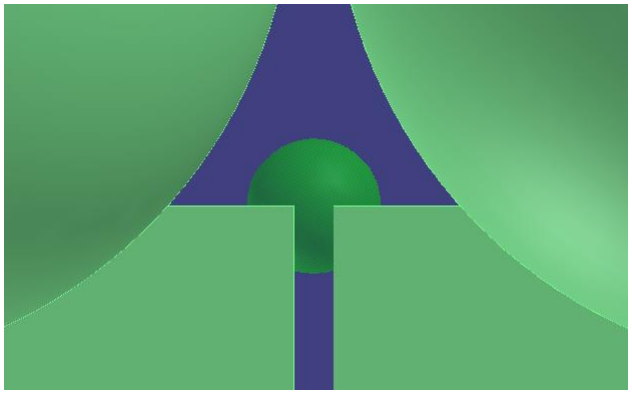
IFC: Configuration – Clearance rule

- Clearance rules define the minimum distance between any two objects



IFC: Configuration – Clearance rule

Equipment		Equipment(s)		
Equipment	Simple physical	Legacy Equipment	Simple physical	100
Equipment	Simple physical	Legacy Designed Equipment	Simple physical	100
Equipment	Simple physical	Equipment	Simple physical	100
		Cableways(S)		
Equipment	Simple physical	Cableway Turn	Simple physical	0



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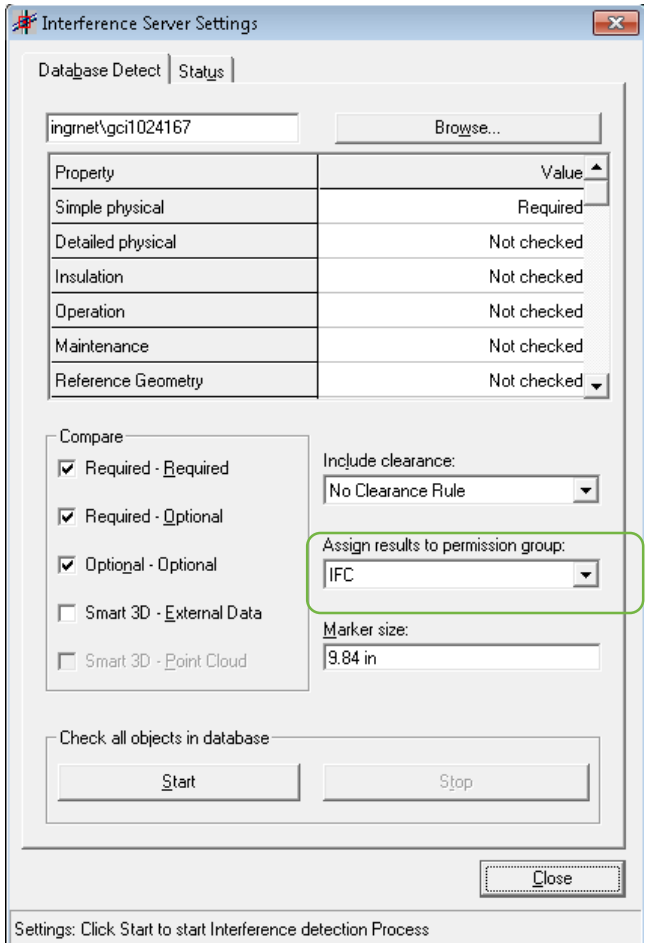
IFC: Configuration – Permission group

- All markers representing clashes or clearances will be assigned to a permission group



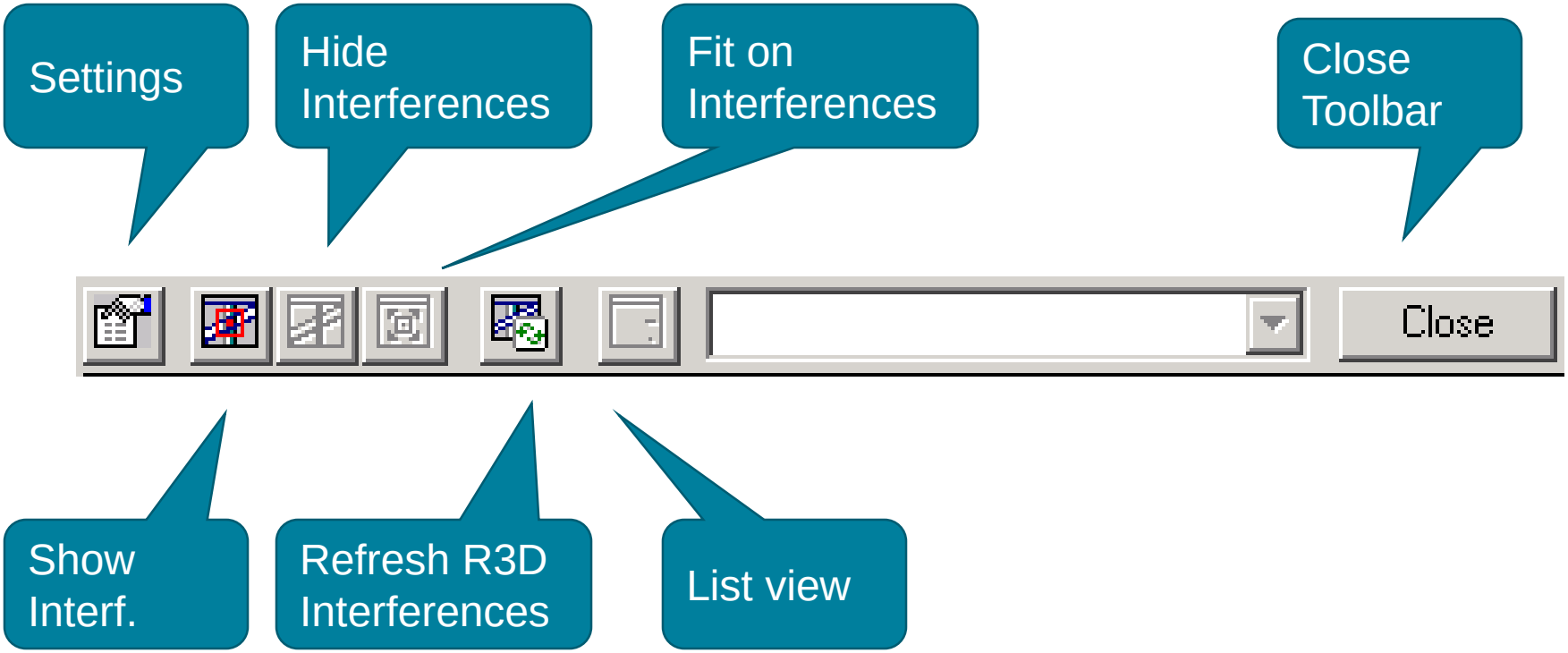
IFC: Local detection

- IFC local detection is available from all tasks in a session (Tools → Check Interference)

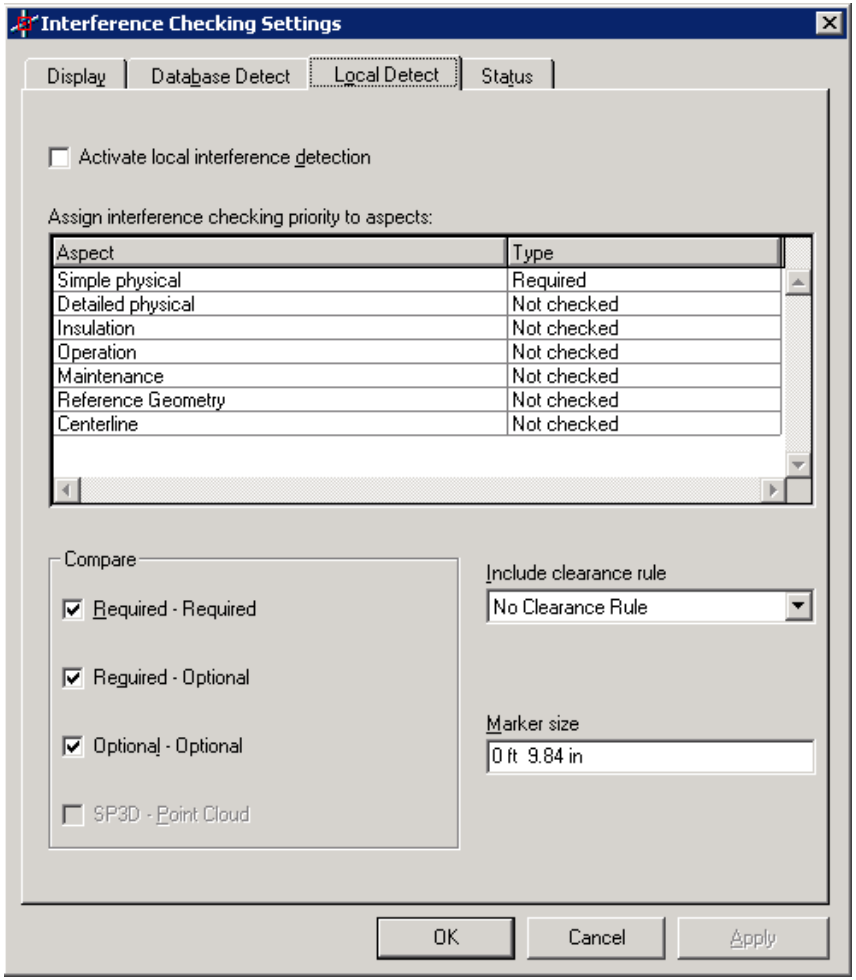
- Very simple and intuitive GUI
- Ribbon bar includes:
  - Settings
  - Visualization
  - Review & approval commands

IFC: Local detection

- Local detection toolbar

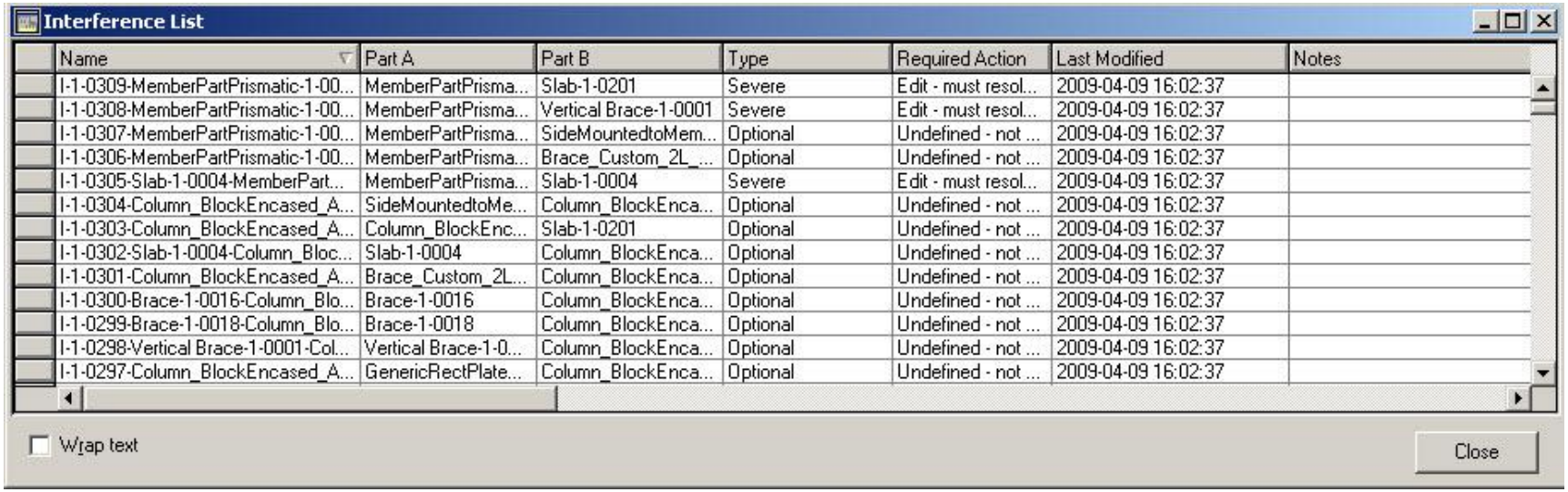


IFC: Local detection



IFC: Local detection – List view

- Show interferences currently displayed in the workspace
- Updates automatically
- Sort by any column



IFC: Database detection

- Verify permission requirements (one time)
- Configure interference service properties
- Start interference detection Windows NT Service
- Create IFC permission group folder and permission group (one time)
- Start database interference detection process

IFC: Database detection

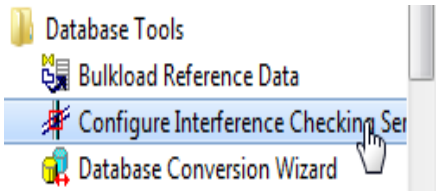
Verify permission requirements (one time)

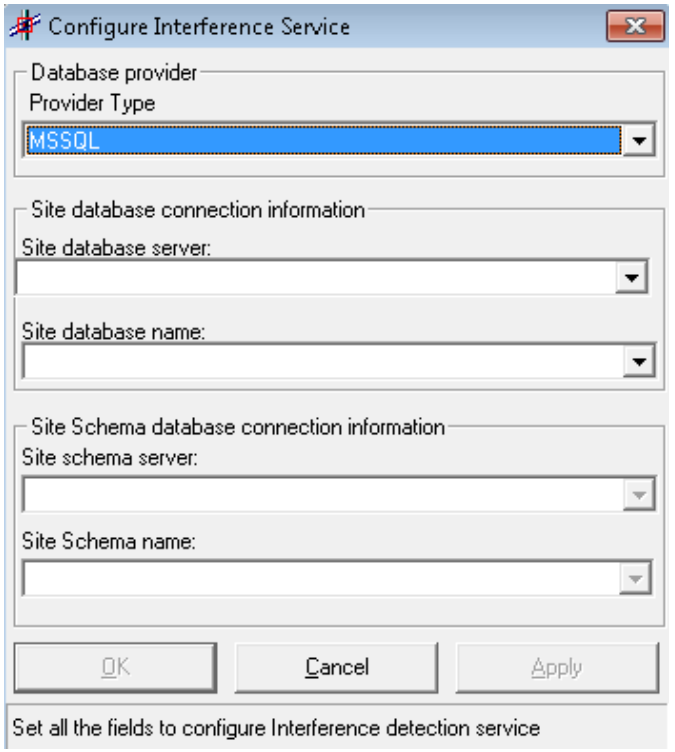
For the interference database detection process to run correctly, user setting up IFC must meet permission requirements according to the following guidelines:

- **Smart 3D user permissions:**
  - Full Control access at the root of the model is required to start/stop IFC Process
  - Write access or higher to the designated IFC permission group
- **IFC Windows NT Service login permissions:**
  - Identity for the service must be a domain account that has Write or higher level of access to the designated permission group for IFC. If possible use login with a password not required to change as often as a corporate user account.
  - User needs at least Read access on SharedContent folder
  - User needs database access and permissions as a regular user to SQL or Oracle

IFC: Database detection

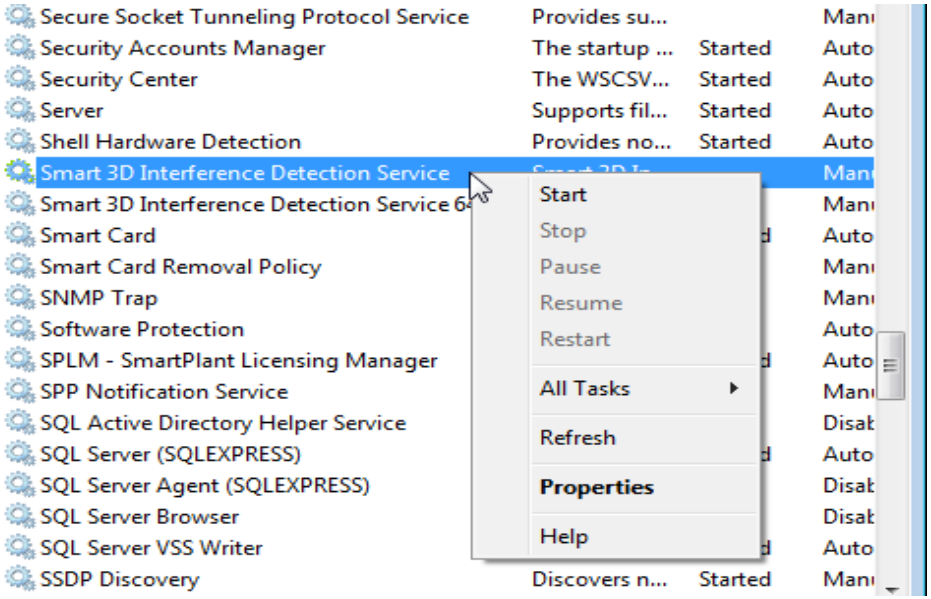
- **Configure interference service properties**

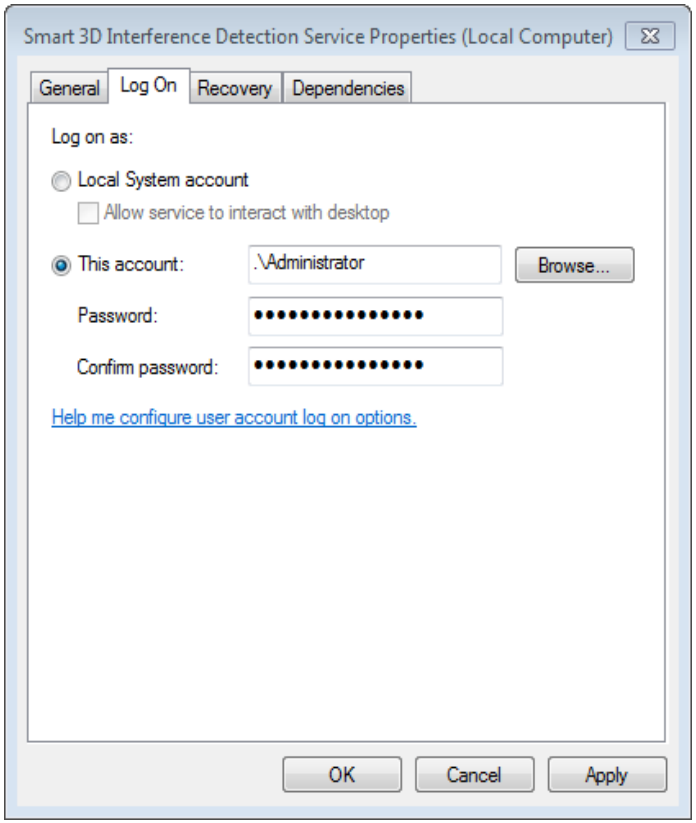




IFC: Database detection

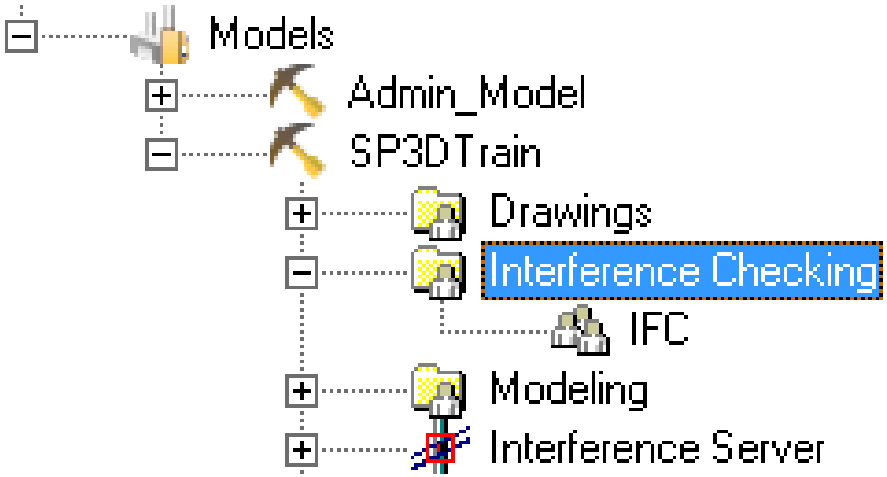
- Start interference detection Windows Service





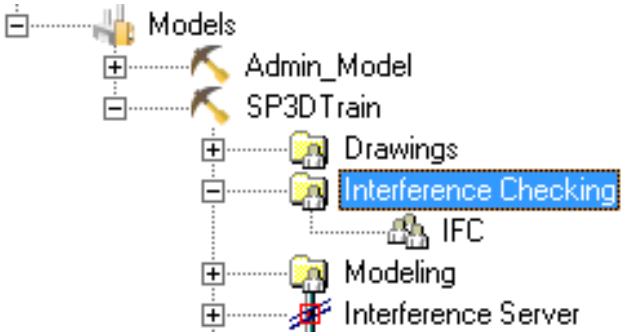
IFC: Database detection

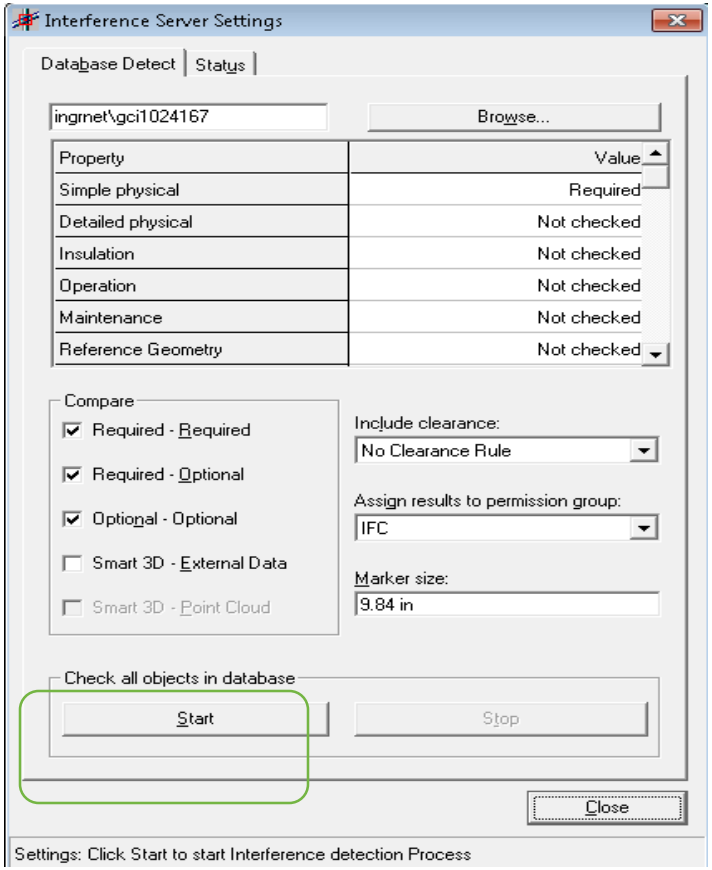
- **Create IFC permission group folder and permission group** (one time)



IFC: Database detection

- **Start database interference detection process**

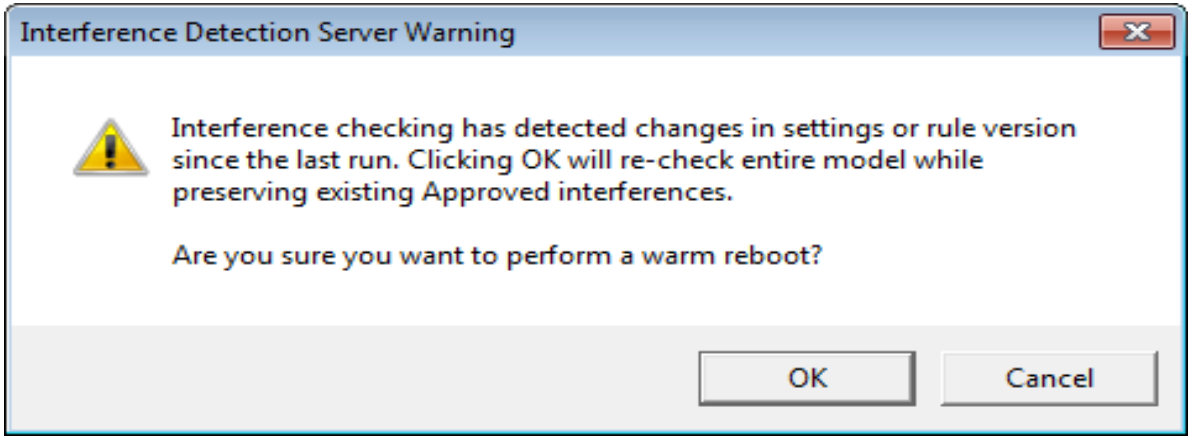




IFC: Database detect

Modifications to Database Interference properties

- If any change to settings on IFC properties form is to be done at any time during the life of the project, all objects in the model need to be reprocessed from the beginning (0% to 100%).



IFC: Codeless IFC

- Codeless IFC is an Interference rule which is customizable using an XML configuration file, instead of code changes.
- This functionality allows, using simple text based rules, to:
  - Ignore objects for clash checking
  - Ignore clashes between objects
  - Set clash properties
- With S3D 2016, it is delivered with the product.

Setup and Administration Lab

Lab 27

HEXAGON

Point Cloud Model Reference

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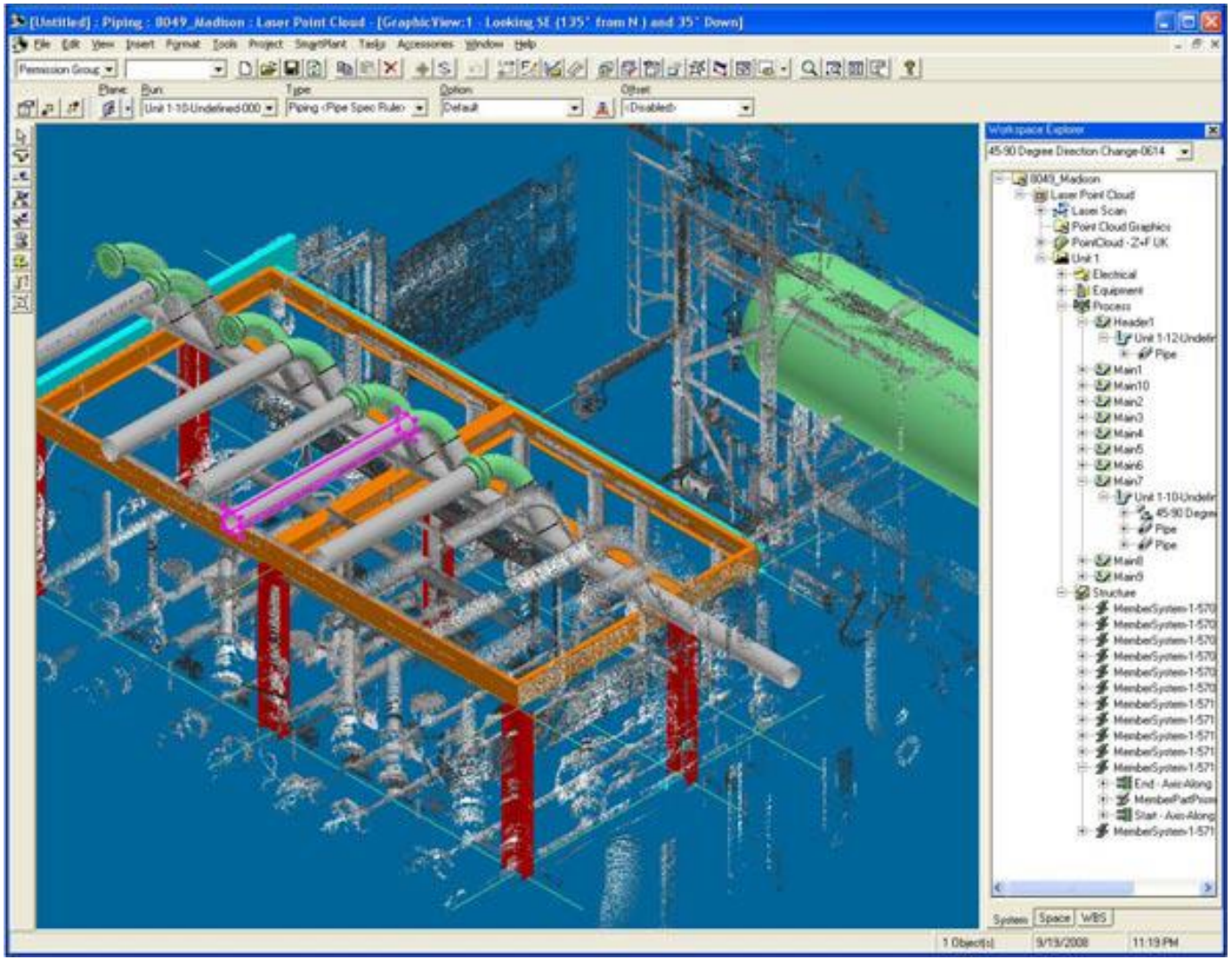
Point Cloud Reference



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Point Cloud Reference

- Smart 3D provides vendor-neutral point cloud data integration within the Model modeling software environment.
- Saves redrawing an object, while still being able to add to it or build on top of it.
- Point cloud models can be registered (attached) at the satellite location.
- You can now move or rotate the attached point cloud in Project Management.

Point Cloud Reference: Supported point cloud vendors

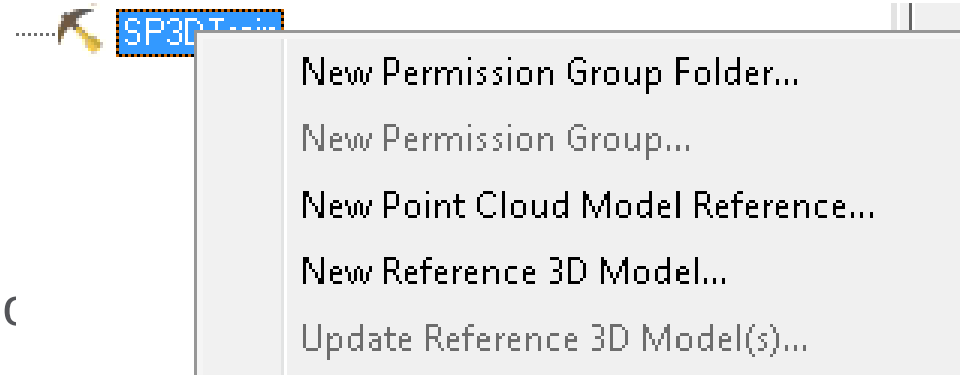
- Leica Geosystems
- Quantapoint
- Trimble
- Z+F UK

Point cloud reference: Possible actions

- Accessing Point Cloud (Accessories menu, filters)
- Selecting a Data Point
- Measuring
- Interference Checking (IFC)

Point cloud reference: Attach Point Cloud to model

- Right click the model in Project Management
- Select New Point Cloud Model Reference.



- Select a vendo use list.

Point cloud reference: Detach Point Cloud from model

- Right click the model in Project Management
- Select New Point Cloud Model Reference
- Select None from the list of vendors to use

Reference 3D (R3D)

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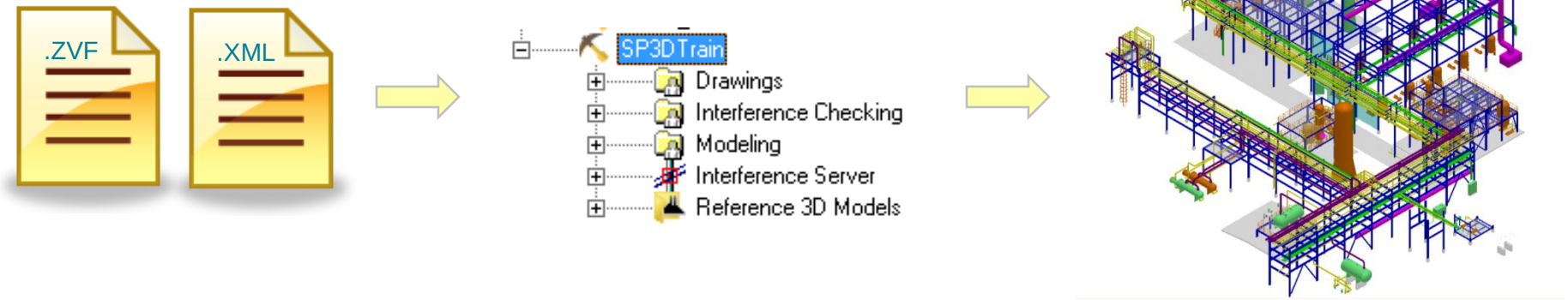
Reference 3D: Overview

- Reference 3D (R3D) functionality facilitates the attachment of external 3D data as a reference model.
- Such external data might have been published from another Smart 3D model or from a third-party model such as PDMS.
- The data from external models is expected as a set of graphic (.zvf) and data (.xml or .drv) files.

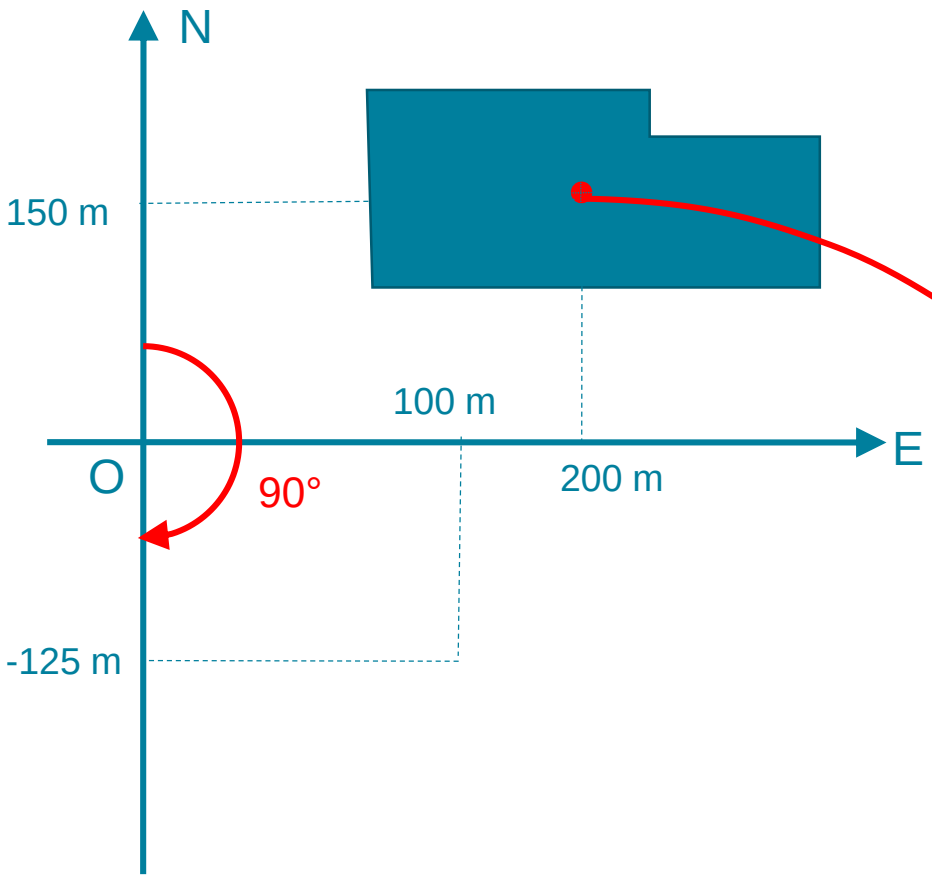
Reference 3D: Concept

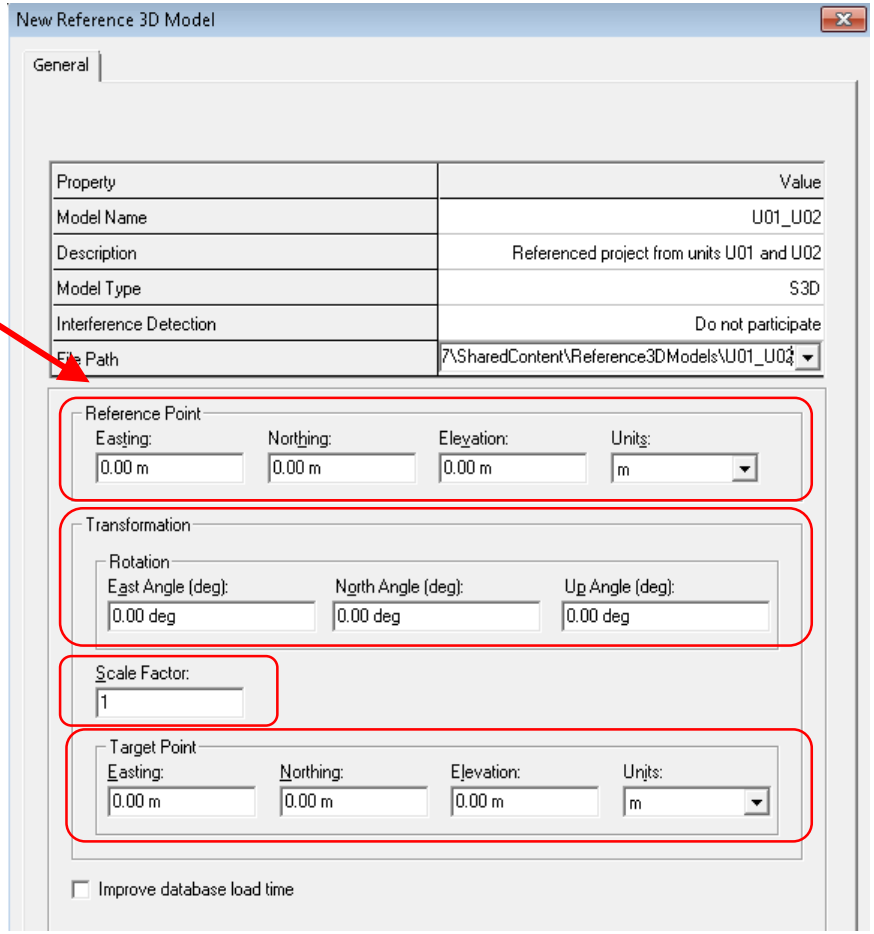


Reference 3D: Functionality

- With Reference 3D you can do the following:
  - Attach and orient (position, rotate, and scale) the reference model relative to the active model so that you can view the R3D data graphically and model against it.
  - Control (add) R3D objects, hierarchy, and properties with user-defined schema and mapping files to extend the delivered R3D schema.
  - Inspect the R3D model objects' properties and view their names through ToolTips.
  - Use a powerful Smart 3D filtering mechanism on R3D Objects to filter objects from Reference 3D Models based on their type—regardless of the authoring tool used for creation (SP3D, SM3D PDMS, and so on).
  - Extract simple General Arrangement drawings showing relative positioning of objects from R3D models, with limited annotation.

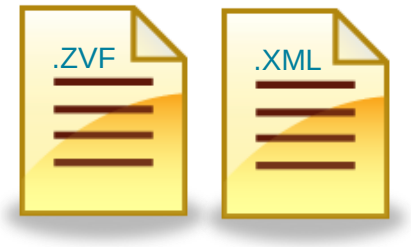
Reference 3D: Transformation overview



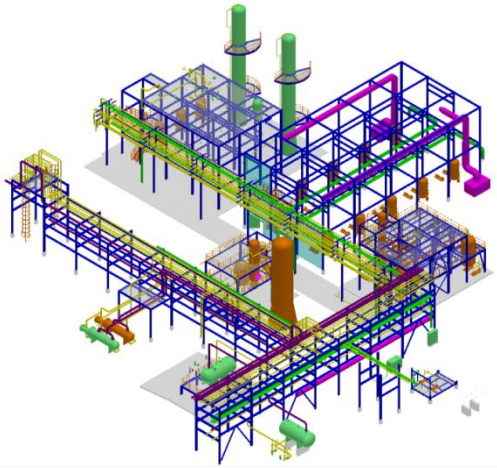


Reference 3D: Attaching Smart3D Models

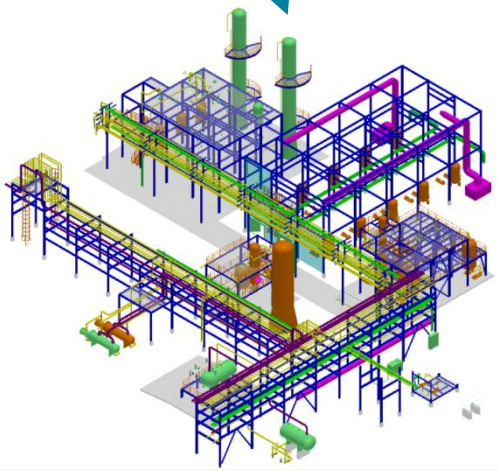
Publish Data



Attach as R3D Model



Source Model



Target Model

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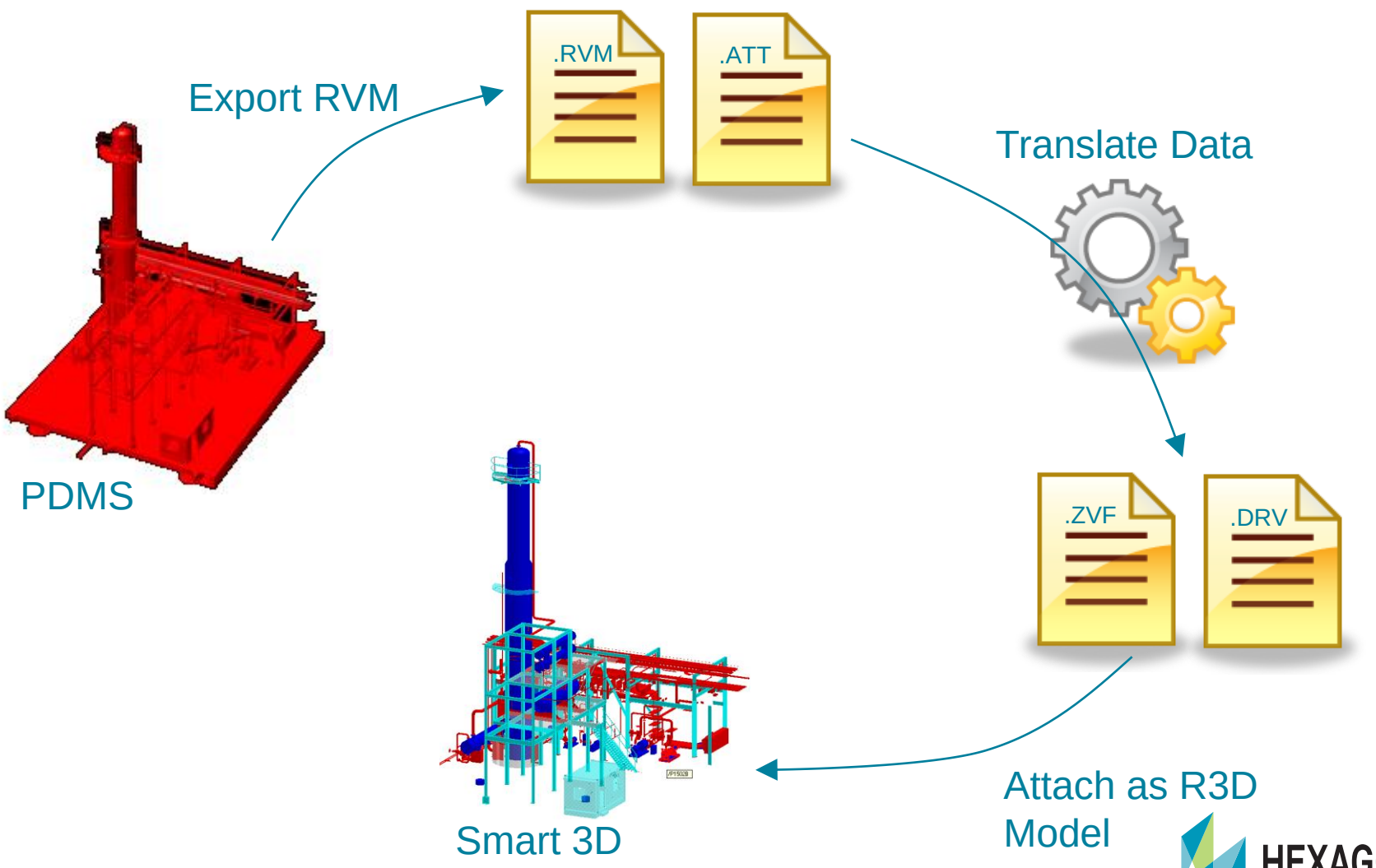
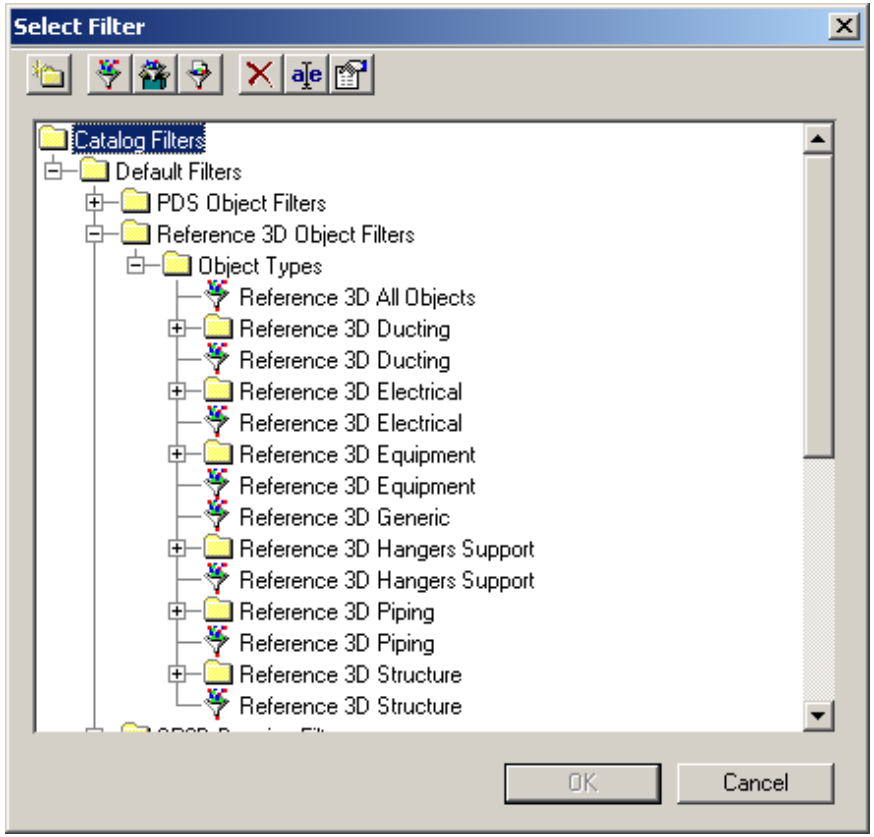
Reference 3D: Attaching PDMS Models



Reference 3D: Filters

- R3D includes a very powerful filtering mechanism that allows you to filter objects from references based on their type, regardless of the authoring tool used for creation (Smart 3D, PDMS, and so on).



Reference 3D: Business cases

- Some of the business cases provided by this functionality include:
  - Supporting disconnected workshare
  - Preserving intellectual property in joint venture projects
  - Allowing for better security in joint venture projects
  - Compatibility between datasets from different S3D versions
  - Bridging differences between Smart 3D datasets on disparate databases (Oracle vs SQL)
  - Ability to work with datasets from external tools such as PDMS, XMpLant
  - Support parallel design for increased productivity

Reference 3D: Business cases

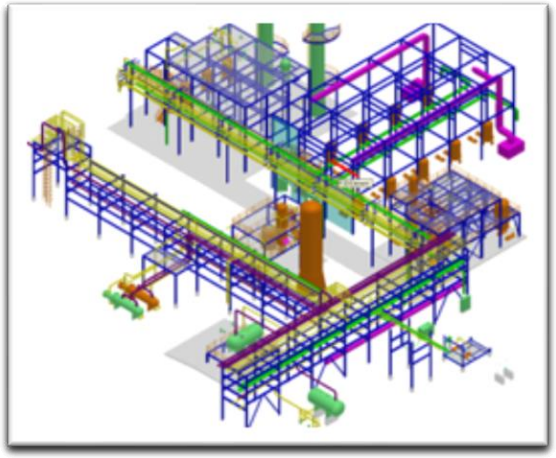
- Some of the business cases provided by this functionality include:

Supporting Disconnected Workshare

Since the data is published to files at the source location(s) and attached as a reference at the target location, live connection between the databases is not required.

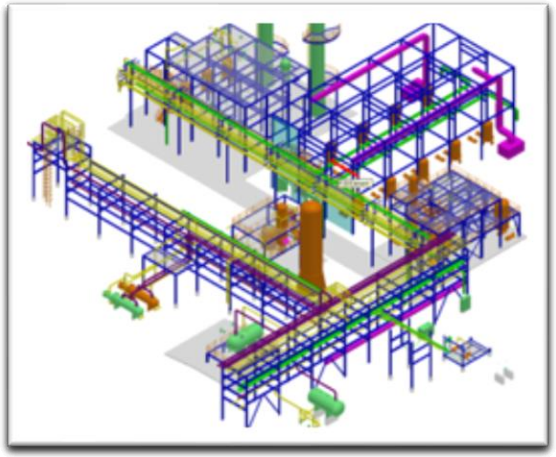
Periodic publish and update of the R3D models would allow multiple partners to work on a joint venture product in a disconnected manner.

Reference 3D: Business cases – disconnected workshare



Publish

Update



Sub Contractor
(Source Model)

Prime Contractor
(Target Model)

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Reference 3D: Business cases

- Some of the business cases provided by this functionality include:

  Supporting Parallel Design for Increased Productivity

If a project has many similar units, only one unit may be modeled and published. This published unit can then be attached multiple times with the required positioning.

Additional modeling such as civil work can be performed simultaneously

Model Data Reuse functionality can be used to actually replicate unit across to obtain real S3D objects

Setup and Administration Lab

Lab 28 - 31

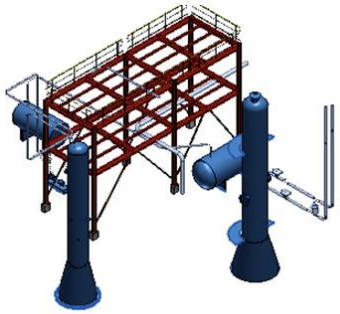
HEXAGON

Reference 3D: SPRDirect Output

- Allows to publish Smart 3D reference objects (DGN/DWG, PDS) to Graphic (VUE) and label data (MDB2) files
- Files can be opened in SmartPlant Review or using Reference 3D.
- Easier and Faster way to get Smart 3D project to SPR where you can interactively review and analyze 3D model data.

Reference 3D: Attaching SPRDirect Data

SPRDirect Output



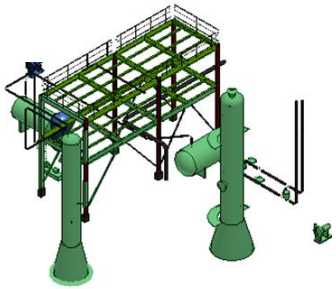
.VUE

.MDB2

Translate Data

.ZVF

.MDB2



Attach as R3D Model

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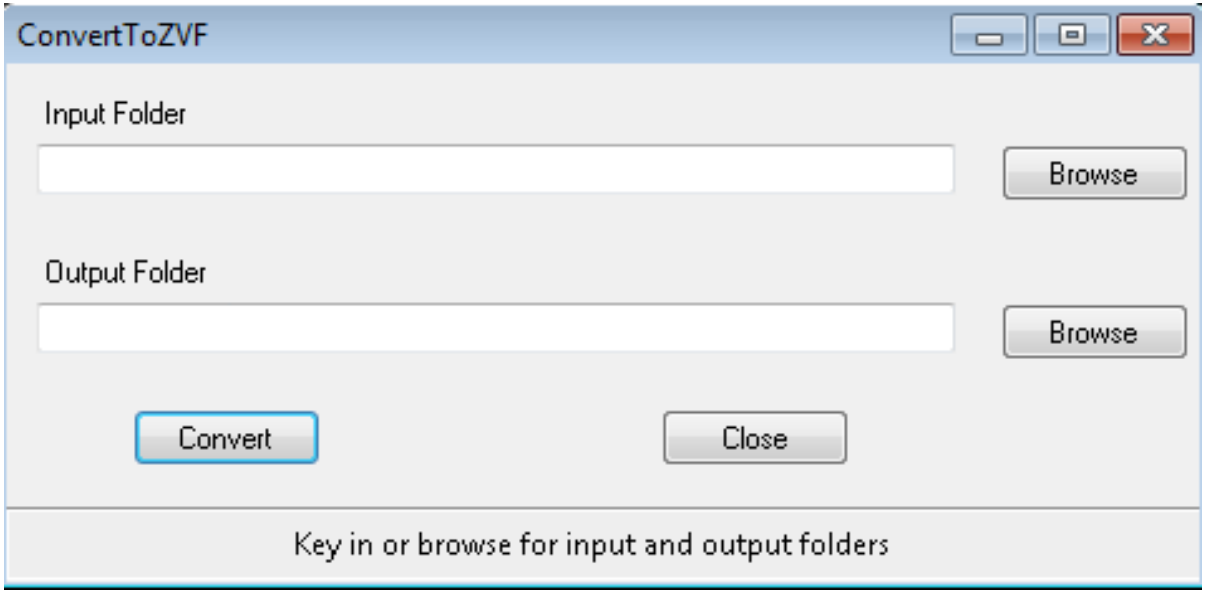
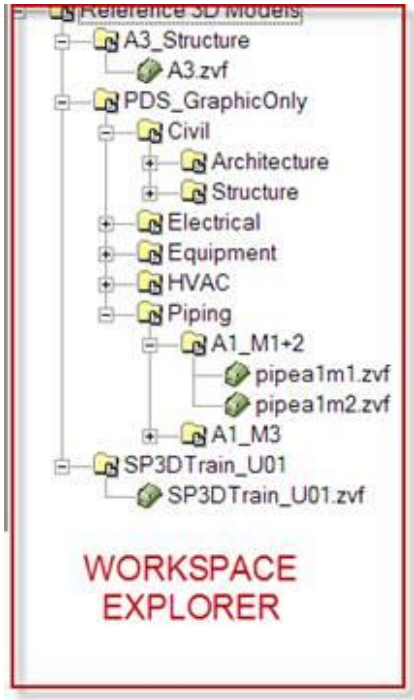
Reference 3D: Convert to ZVF

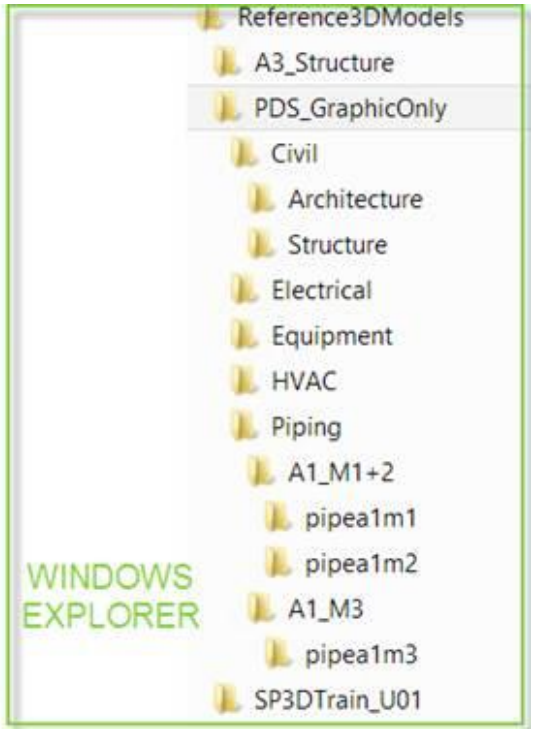
- **ConvertToZVF.exe** utility is delivered out of the box and can be found at the following location;
  ..\Core\Tools\Administrator\Bin

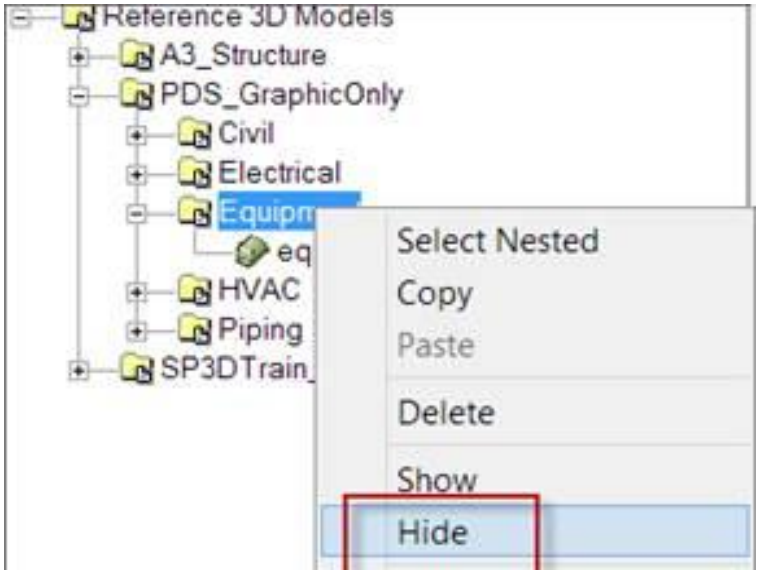


Reference 3D: Create Folder Hierarchy

- If there is folder hierarchy on disk below the root folder of the R3D attachment, this folder hierarchy is automatically reflected in the WSE without having to do anything extra in S3D







- Hide and show command works at any level in this hierarchy in WSE to quickly hide and show the graphics in that branch

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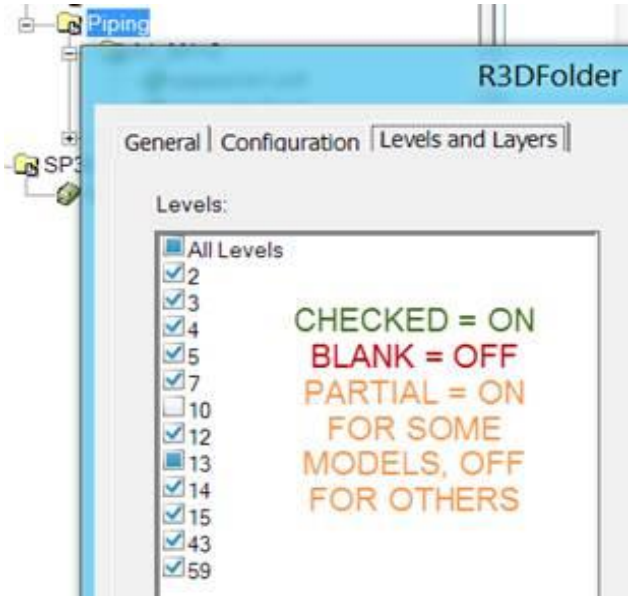
Reference 3D: Levels and Layers



- The properties page of the R3D model, folder or file shows the levels or layers and display can be turned on or off using check boxes.
- Surface style rules can be created based on Levels and Layers in the R3D model which can be exported to SP Review.

- Filters can be defined based on Levels and Layers.
- Surface style rules can be created based on these filters which can be exported to SP Review.

Setup and Administration Lab

Lab 32

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Intergraph Batch Services

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Batch Services

- This functionality allows scheduling of regular, time consuming tasks through the Intergraph Batch Services application.
  - Database Integrity Command
  - Backup Command
  - Restore Command
  - Structural import
  - Structural export
  - Drawings and Reports update
  - Printing drawings
  - Updating multiple R3D models

Setup and Administration Lab

Lab 35 - 37

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Database conversion (SQL ←→ ORACLE)

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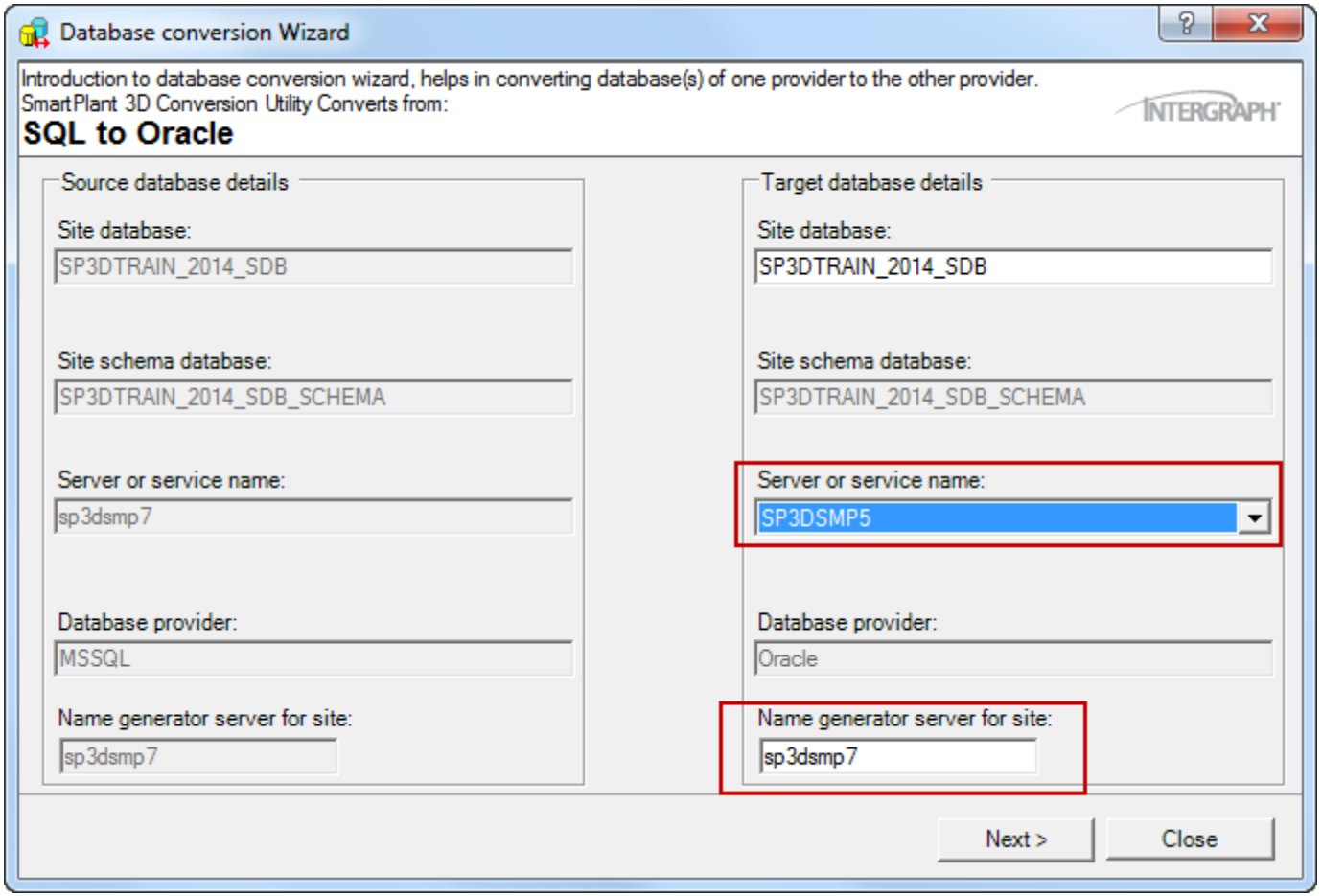
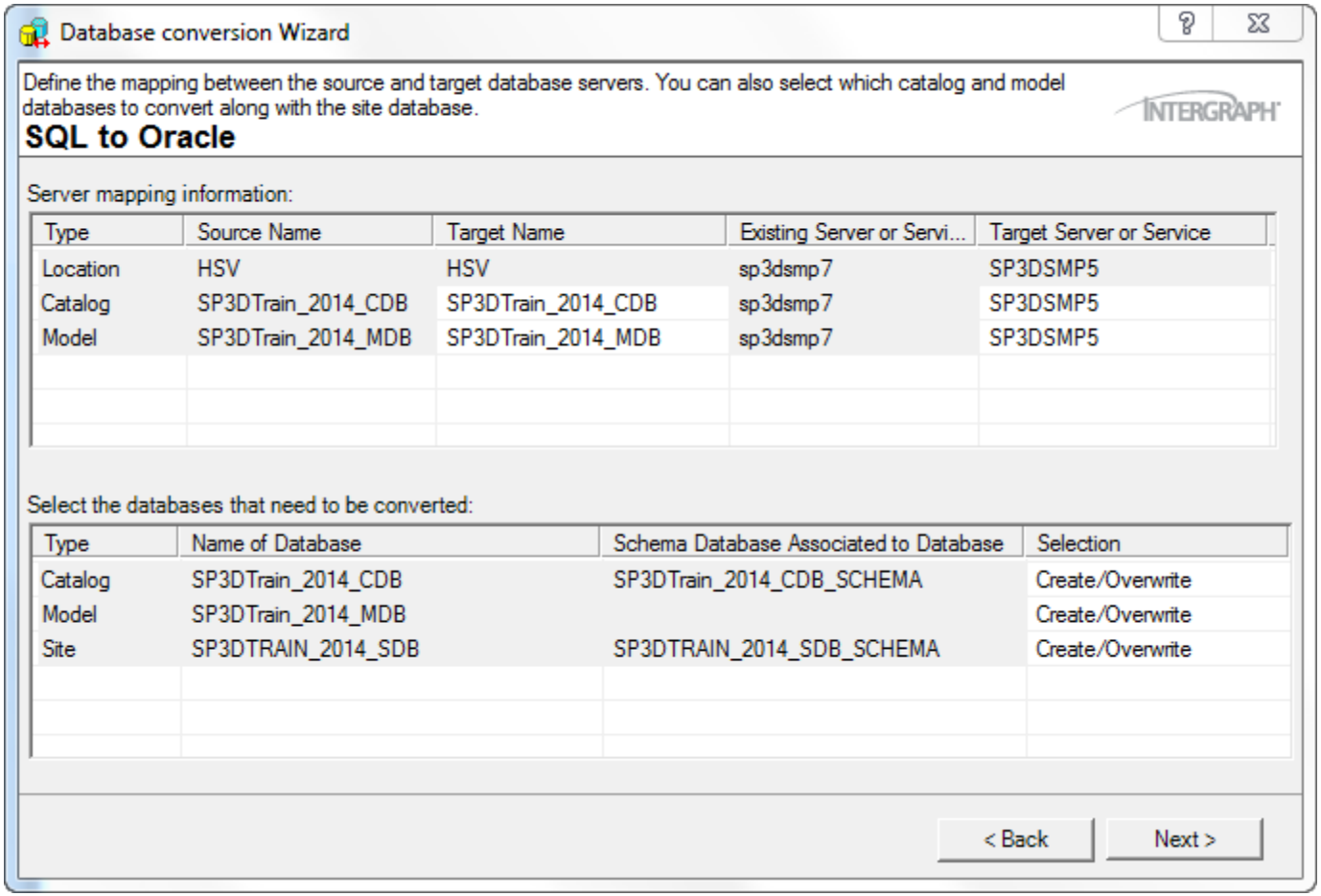
Database Conversion Wizard : Overview

- Used to convert databases from SQL⟷ Oracle
- Prerequisites:
  - SQL and Oracle databases should be running.
  - Client machine needs SQL server registered and TNSNames entry for Oracle instance.
  - Non-replicated databases.

Database Conversion Wizard



Database Conversion Wizard



Schema Name Validator : Overview

- The Schema Name Validator tool identifies names which are prone to fail due to Oracle 30 character limitation from site, catalog and model databases and dumps the data into an excel work book with type of data as work sheets.
- This utility identifies part classes, custom interfaces, and custom interface attributes that violate the Oracle character limitation. This allows you to bulk load the data into an Oracle database, as long as the changes are updated in the bulkload data files.
- This is particularly useful when converting MSSQL databases to Oracle databases.
- This utility is delivered by default to the **SchemaNameValidator.exe** file in the <*Product Folder*>\Core\Container\Bin\Assemblies\Release\ folder.

Schema Name Validator

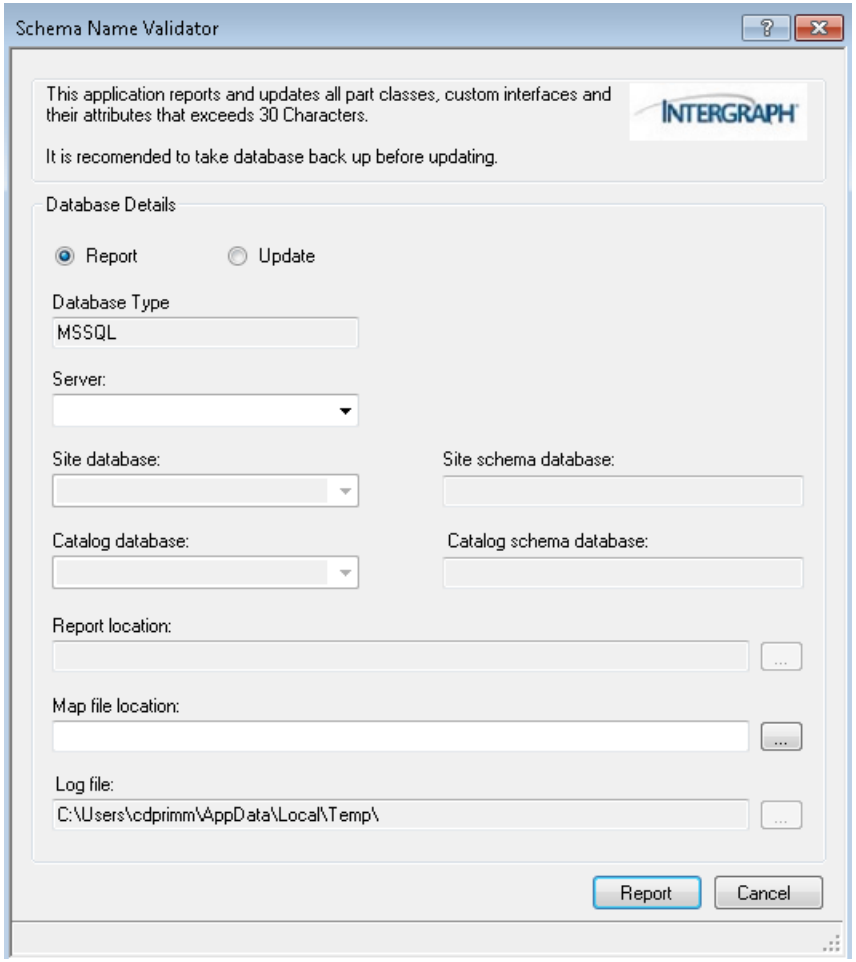
Impacts

- You must update any custom code such as shared content or reports so that they use the truncated part class, custom interface, and attribute names.
- You must update the changed names in the code for custom symbols, if they are used.
- You must update all data files (such as Excel workbooks) so that they use the new names. The names in GUIDs sheets must be replaced to ensure that the GUID values associated with the old and new names are identical. You must update the GUID sheets to avoid errors in future bulk loads.

After Updating

- Update all data files, reports, and shared content code with the truncated names.
- Regenerate views on all of the model databases.
- Run **Synchronize model with catalog** with the **Regenerate views** option selected on all of the projects. Regenerate the reports database for each model database.

Schema Name Validator



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Adding User Defined Attribute To S3D Database

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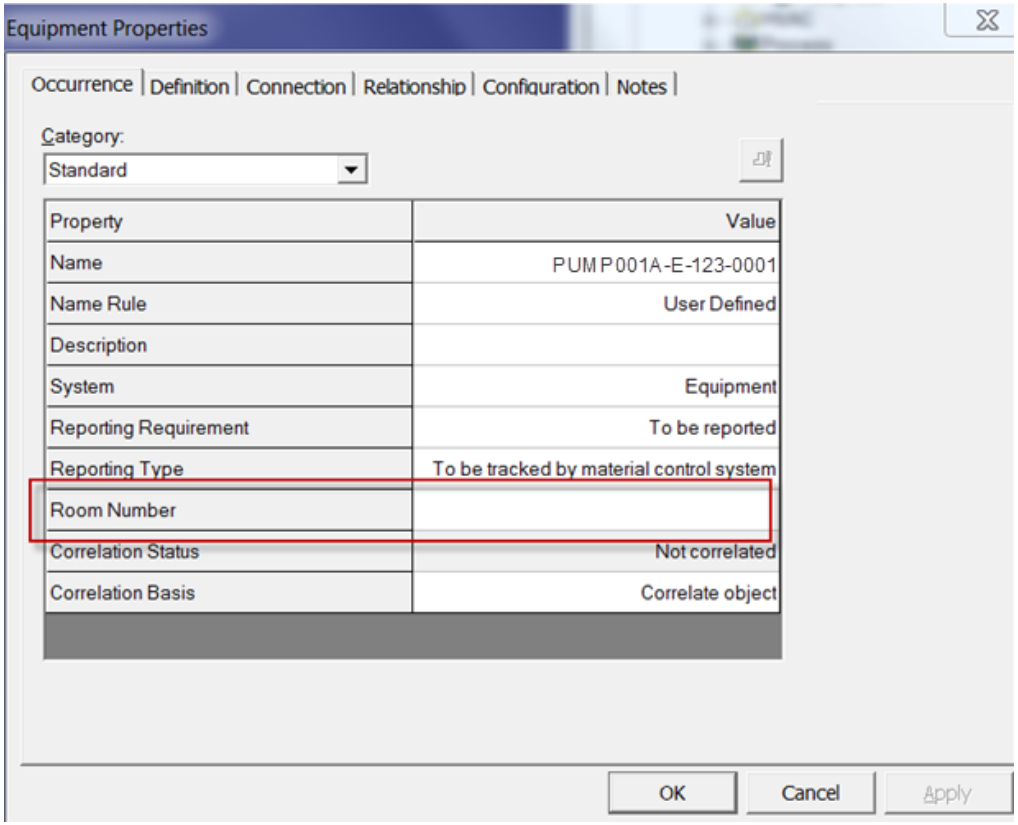
Adding User Defined Attribute to S3D Objects

- A typical project requirement can be to have a common user attribute to S3D objects. This attribute needs to be bulkloaded into the S3D catalog.

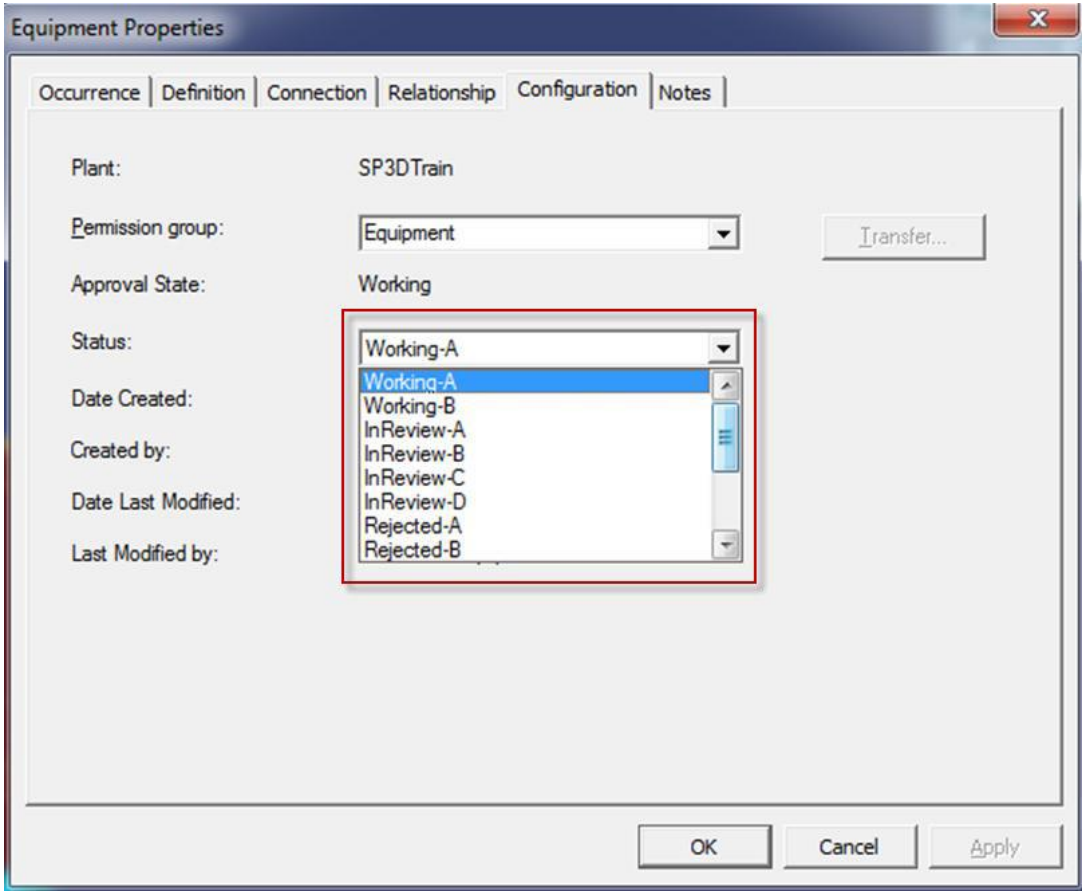


Adding Approval Status In S3D

HEXAGON

Adding Approval Status in S3D

- Project administrators would like to add new approval reasons for S3D objects. These could be bulkloaded to the catalog using a codelist.



Setup and Administration Lab

Lab 38 - 39

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Model Version Upgrade

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Database Version Upgrade: Overview

- Database upgrades are required whenever there is a major change of software version
- Smart 3D 2016 supports upgrade from following versions:
    - 2014
    - 2014 R1
- It is only possible to upgrade a model configuration using the **same** database type (Oracle to Oracle or SQL to SQL).

Database Version Upgrade : Prepare for the Upgrade

- Backup all databases and symbols
- Verify integrity of data
  - Verify/clean specifications
  - Synchronize model with catalog
  - Resolve To-Do list
  - Verify access to reference files
  - Run database integrity and clean corrupted elements
- Final backup with old version
- Prepare the workstation and servers for the upgrade. Make sure all previous versions of Smart 3D are uninstalled and install prerequisites for V2016.

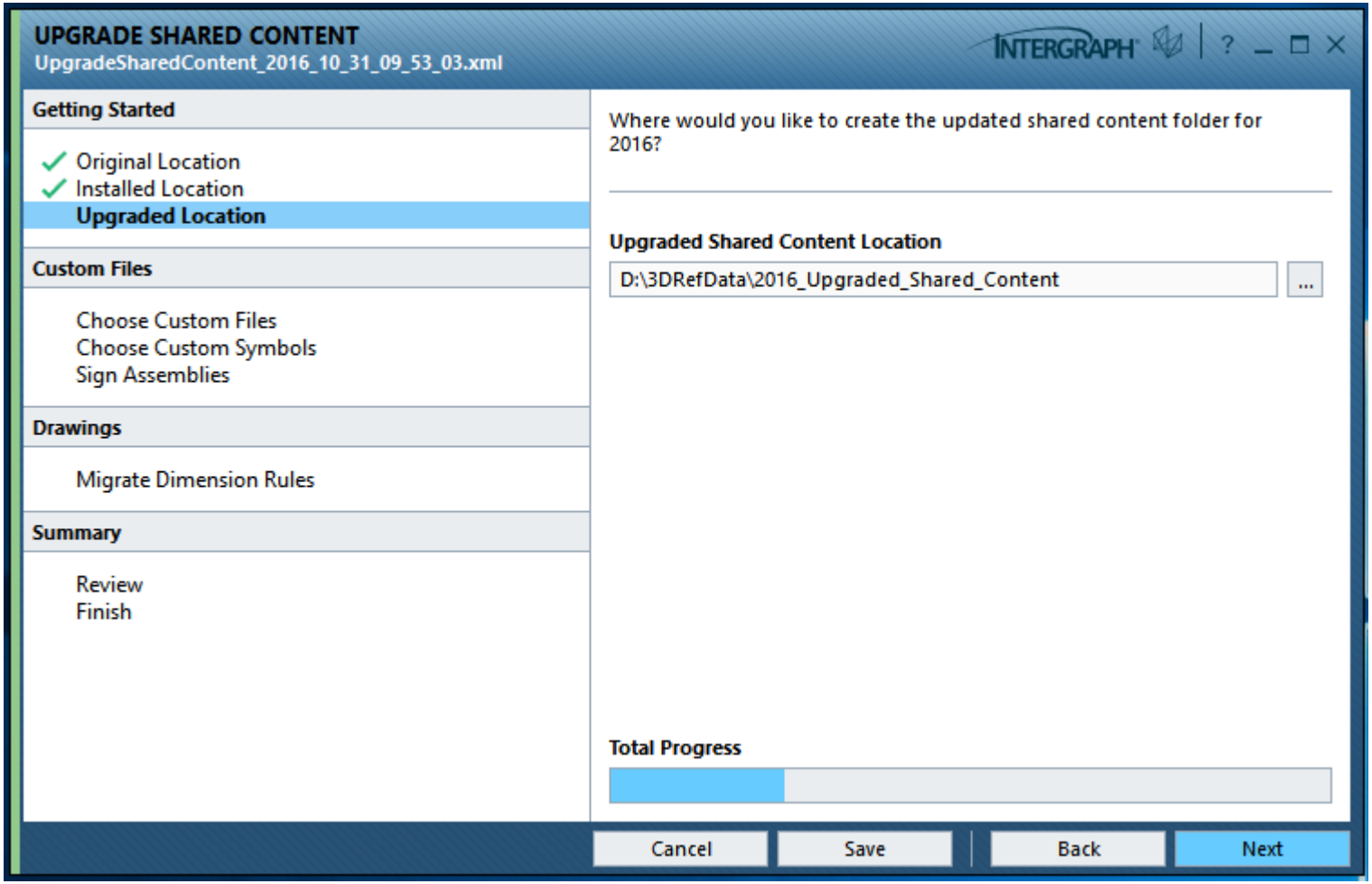
Database Version Upgrade : Performing the Upgrade

- Upgrade your files in the SharedContent share
- Manage custom symbols, naming rules and report template files (if necessary)
- Restore Site database and upgrade through Database Wizard.
- Restore Catalog and Model databases and upgrade through Project Management
- Synchronize the Model with the Catalog
- Run database integrity and correct possible issues
- Regenerate the Reports database
- Upgrade Reference Data

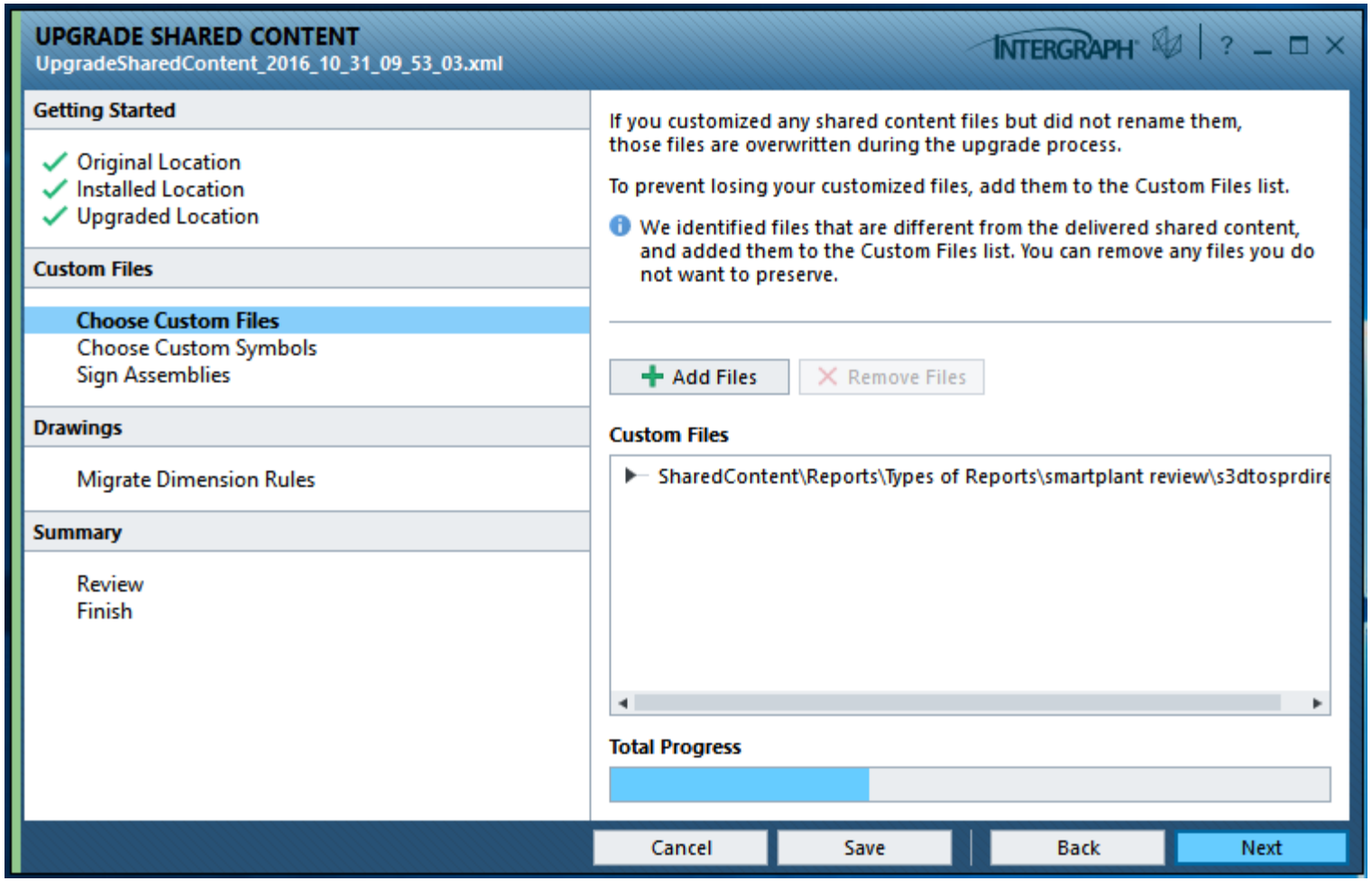
Upgrade SharedContent Wizard

- The Upgrade Shared Content wizard will copy your original 2014 or 2014 R1 SharedContent to a new location and then apply appropriate new files from the delivered 2016 SharedContent.
- Located on Smart Support under: ***View Downloads > Smart 3D > Freeware Tools and Utilities > Certified Tools.***
- The upgrade to the SharedContent must be done BEFORE upgrading the databases to V2016.

Upgrade SharedContent Wizard



Upgrade SharedContent Wizard



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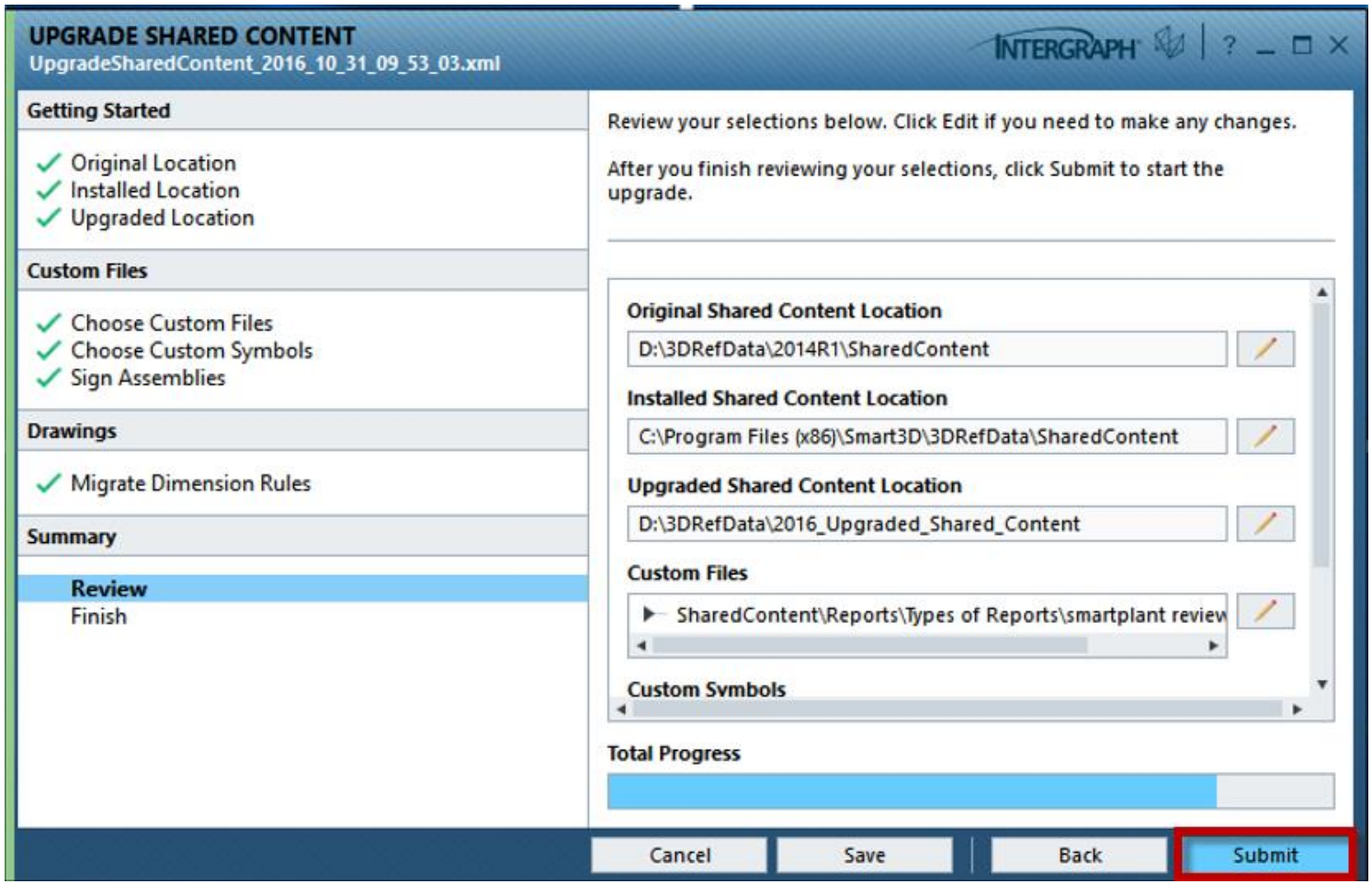
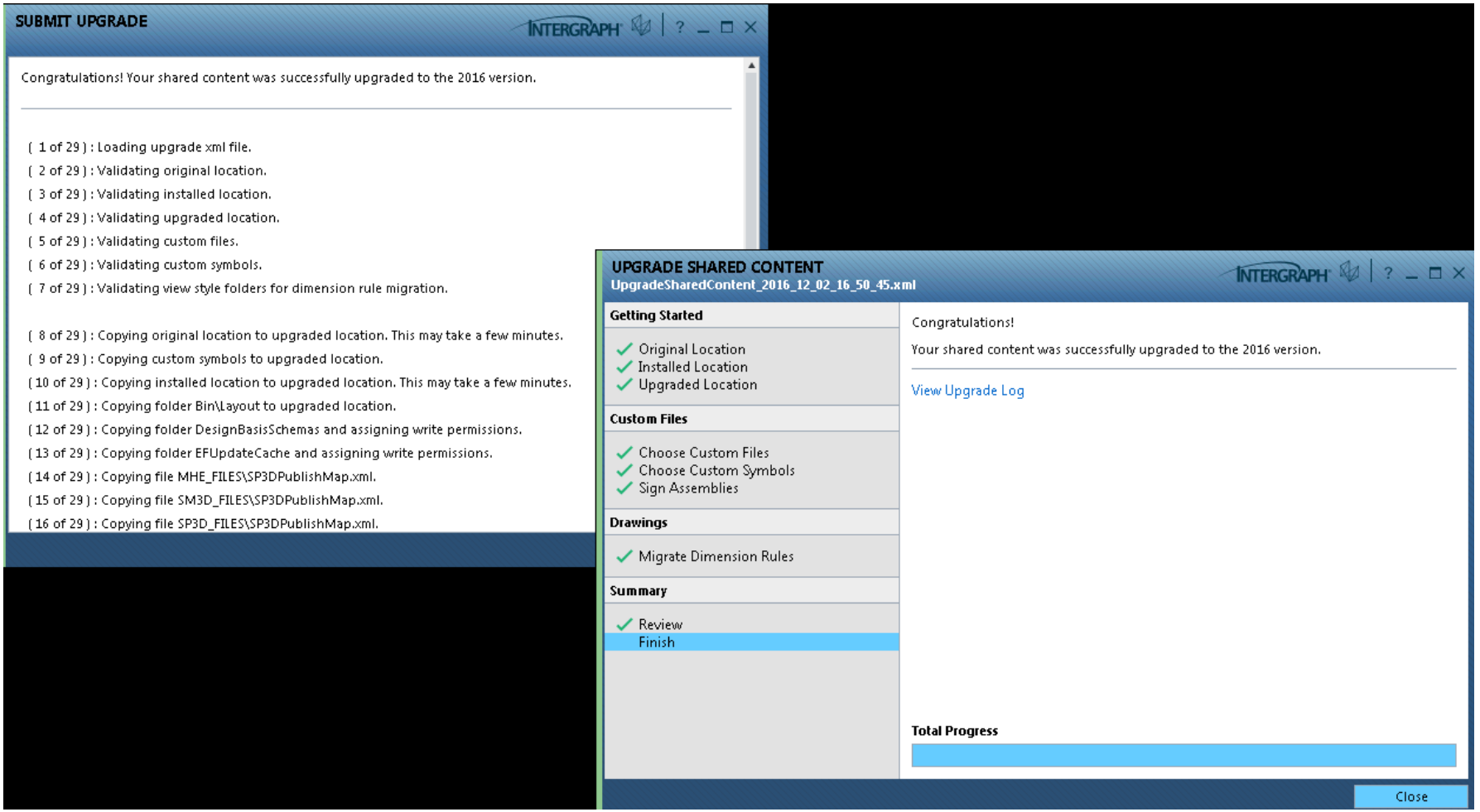
Upgrade SharedContent Wizard



Upgrade SharedContent Wizard



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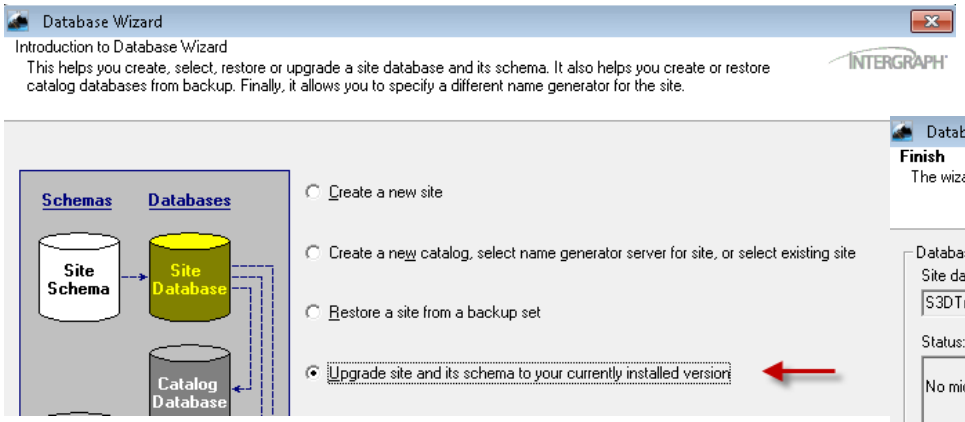
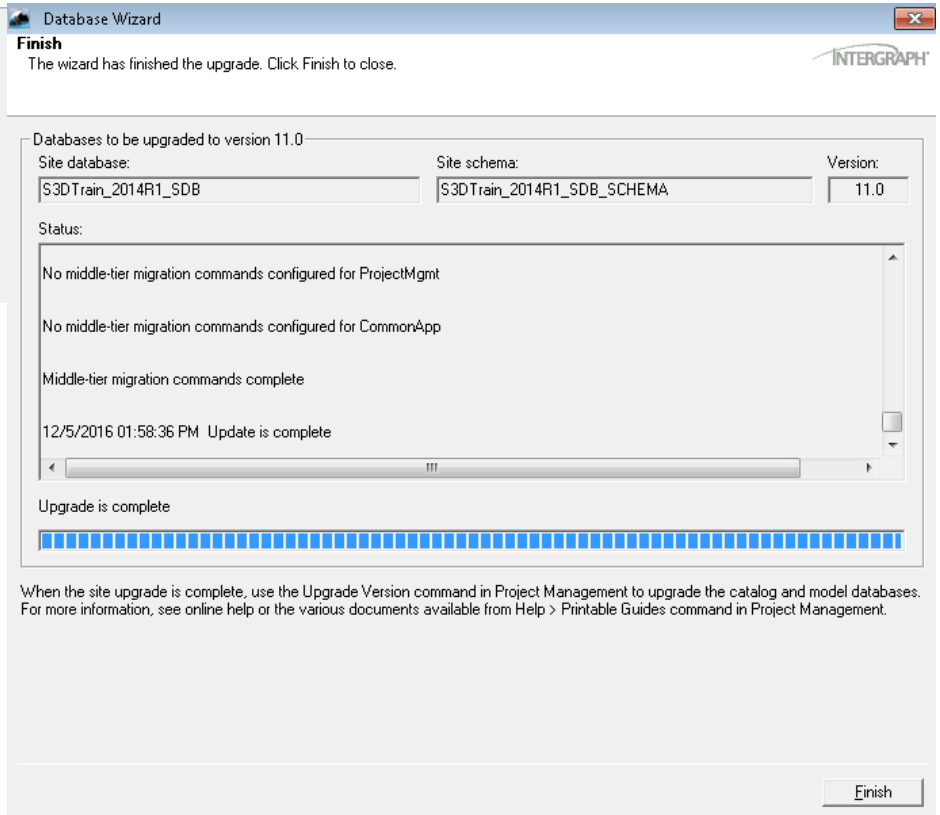
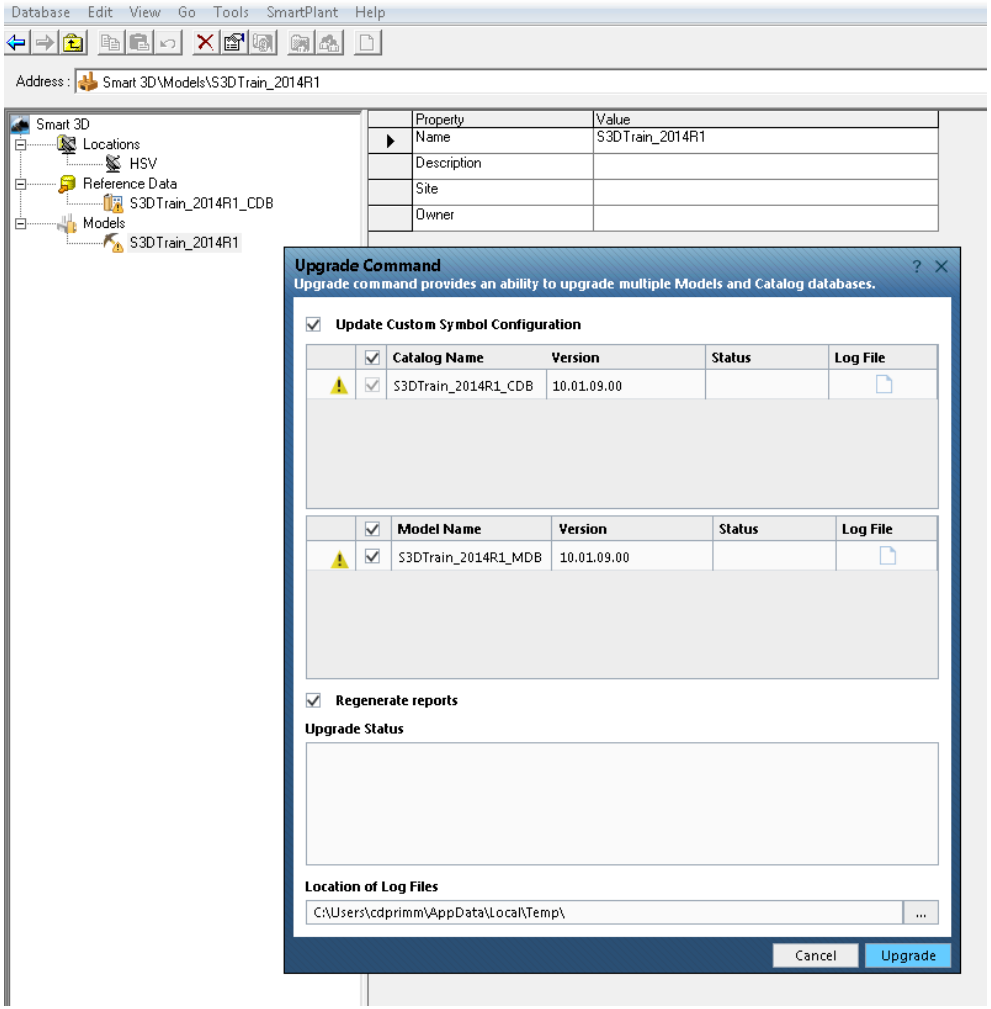
Upgrade Version – Database Wizard

- Upgrade the Site Database (after restoring)

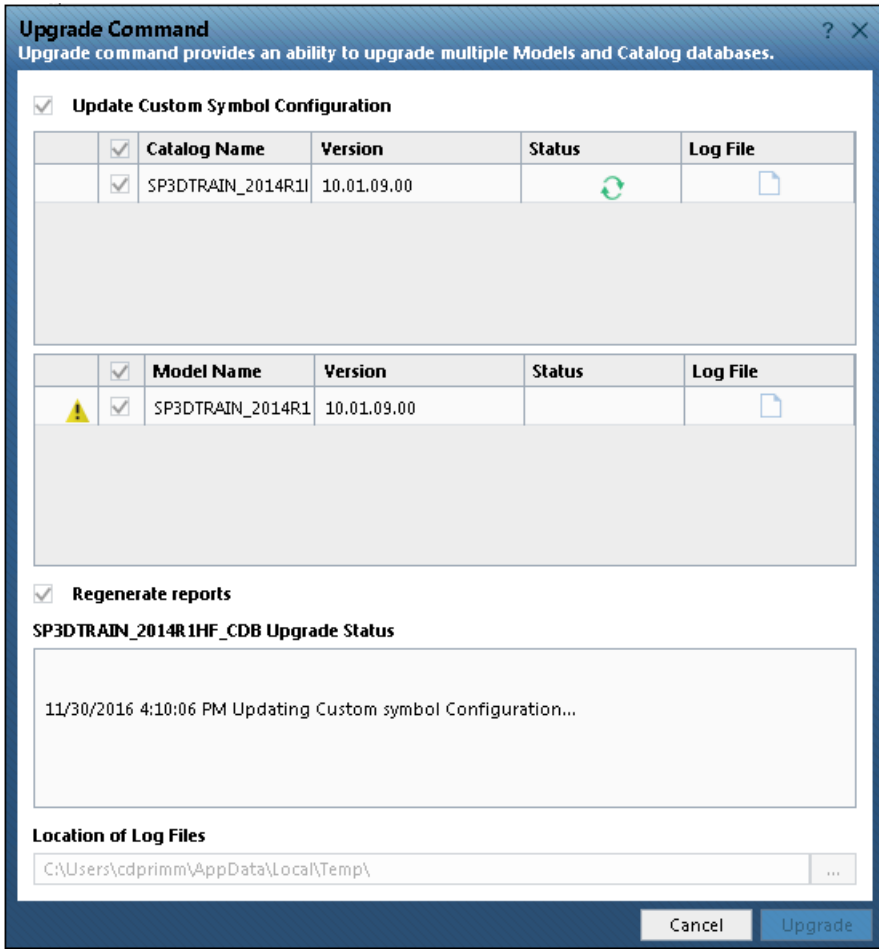




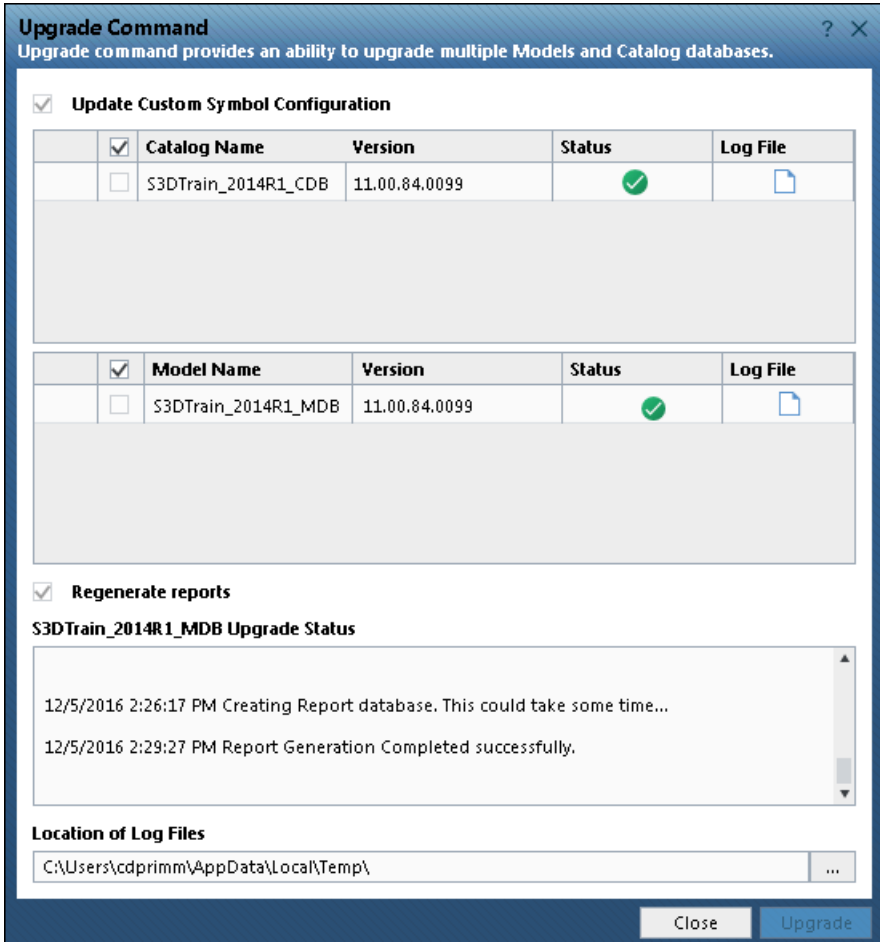
Upgrade Version Command – Project Management



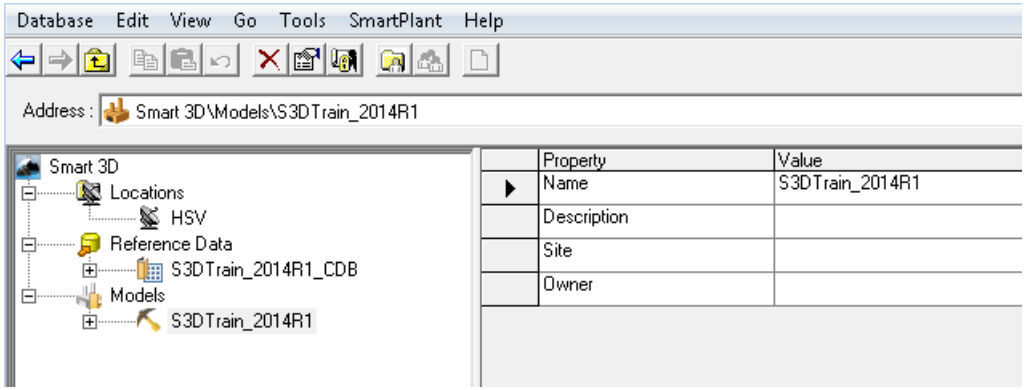
Upgrade Version Command – Project Management



Upgrade Version Command – Project Management



Upgrade Version Command – Project Management



Smart 3D Automation Toolkit

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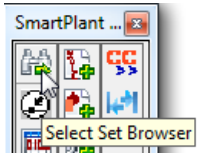
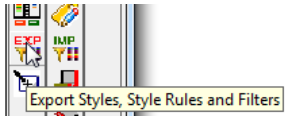
Smart 3D Automation Toolkit

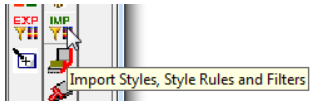
- Tool is available on Intergraph® Smart Support site (Previously known as eCustomer site)
- Tutorial and Videos are available to download on the same site
- Installation is easy and is compatible with all Smart 3D versions
- Toolbar can be accessed by tapping Shift key thrice (Shift-Shift-Shift)

Smart 3D Automation Toolkit

- Commands used for administrative workflows:

- Select Set browser 

- Export styles, Style Rules and filters 

- Import styles, Style Rules and filters 

- Filter options