# USER GUIDE

# Configuration Management

Release 10.0-MP3 (October 2020)

StiboSystems
MASTER DATA MANAGEMENT

# Table of Contents

# Configuration Management

Management of System Setup configurations across multiple systems can be a complex process. In addition to standard import / export functionality, STEP provides several tools to assist in configuration management. Each of these is described in the subsequent sections.

- Change Packages
- STEPXML Comparison Tool
- Version Control System Integration
- Maintaining Partial Data Sets on Lower Level DTAP Environments

## Export Configuration Definitions as Comments

Using Advanced STEPXML, configuration definitions for workflows, Web UIs, integration endpoints (IEPs), and business rules can be exported. These exports are intended to be used for submission to external source control systems for comparison purposes. Users can import them into source code repository systems where they can be compared from version to version. Editing and/or import of these files is not supported (e.g., users may not export, edit the comments, and re-import).

Inclusion of configuration definitions as comments is accomplished by setting the DefinitionsAsComments tag to 'true' in an Advanced STEPXML template.

For example:

```
<?xml version='1.0'?>
<STEP-ProductInformation DefinitionsAsComments="true">
<STEPWorkflows ExportSize="All"/>
</STEP-ProductInformation>
```

More information on exporting configuration definitions as comments is available as follows:

- For workflow definitions, see the **Exporting Workflow Definitions** topic in the **Workflows** documentation.
- For Web UI definitions, see the **Exporting Web UI Definitions as Comments** topic of the **Web User Interfaces** documentation.
- For inbound integration endpoint definitions, see the **Exporting Inbound Integration Endpoint Definitions as Comments** topic in the **Data Exchange** documentation
- For outbound integration endpoint definitions, see the **Exporting Outbound Integration Endpoint Definitions as Comments** topic in the **Data Exchange** documentation.
- For business rule definitions, see the **Exporting Business Rule Definitions as Comments** topic of the **Business Rules** documentation.

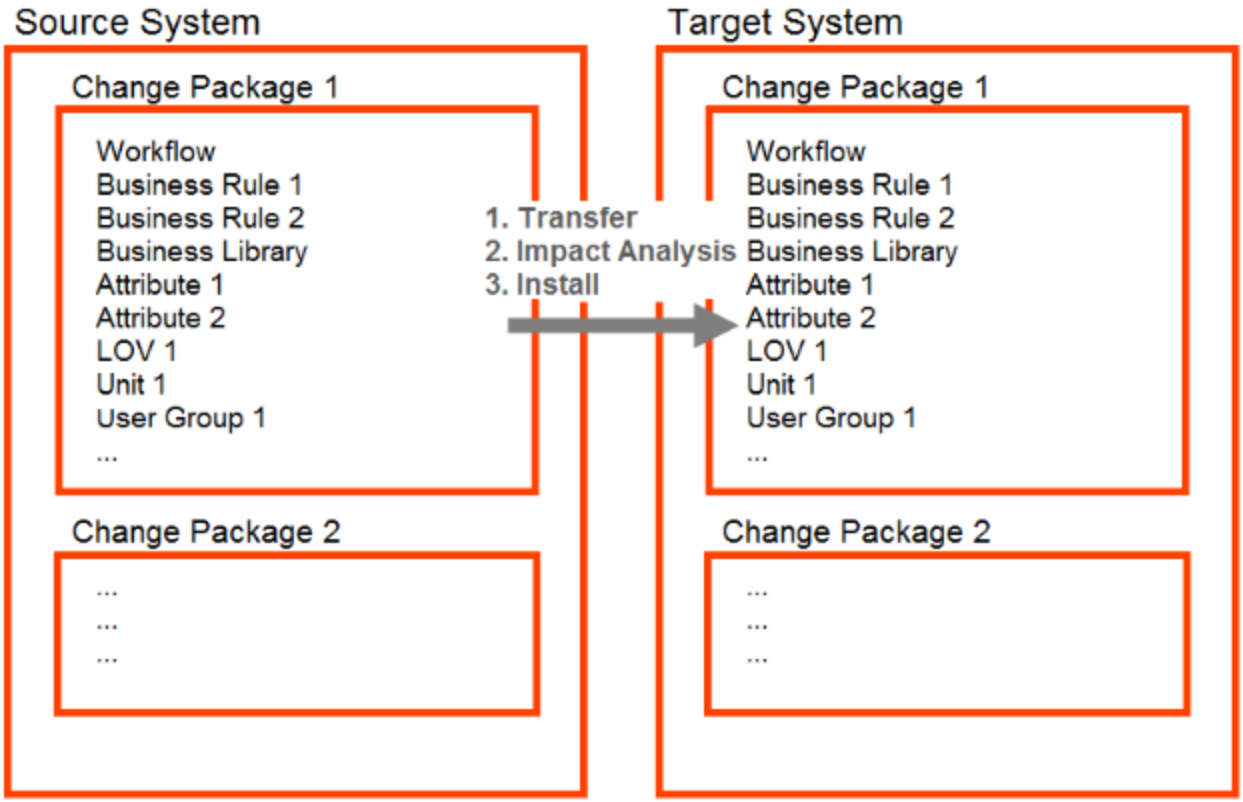
**Note:** The content of the comment field is not part of the STEPXML XSD and therefore Stibo Systems reserves the right to change the format of the output content at any time.

# Change Packages

A change package allows for an easy way to prepare, process and migrate STEP configuration changes between systems in a larger system landscape. Change packages are designed to:

- Minimize offline tracking of configuration changes
- Lessen the chance for introducing faulty configuration changes
- Assist system administrators with impact analysis to enable more informed decision making

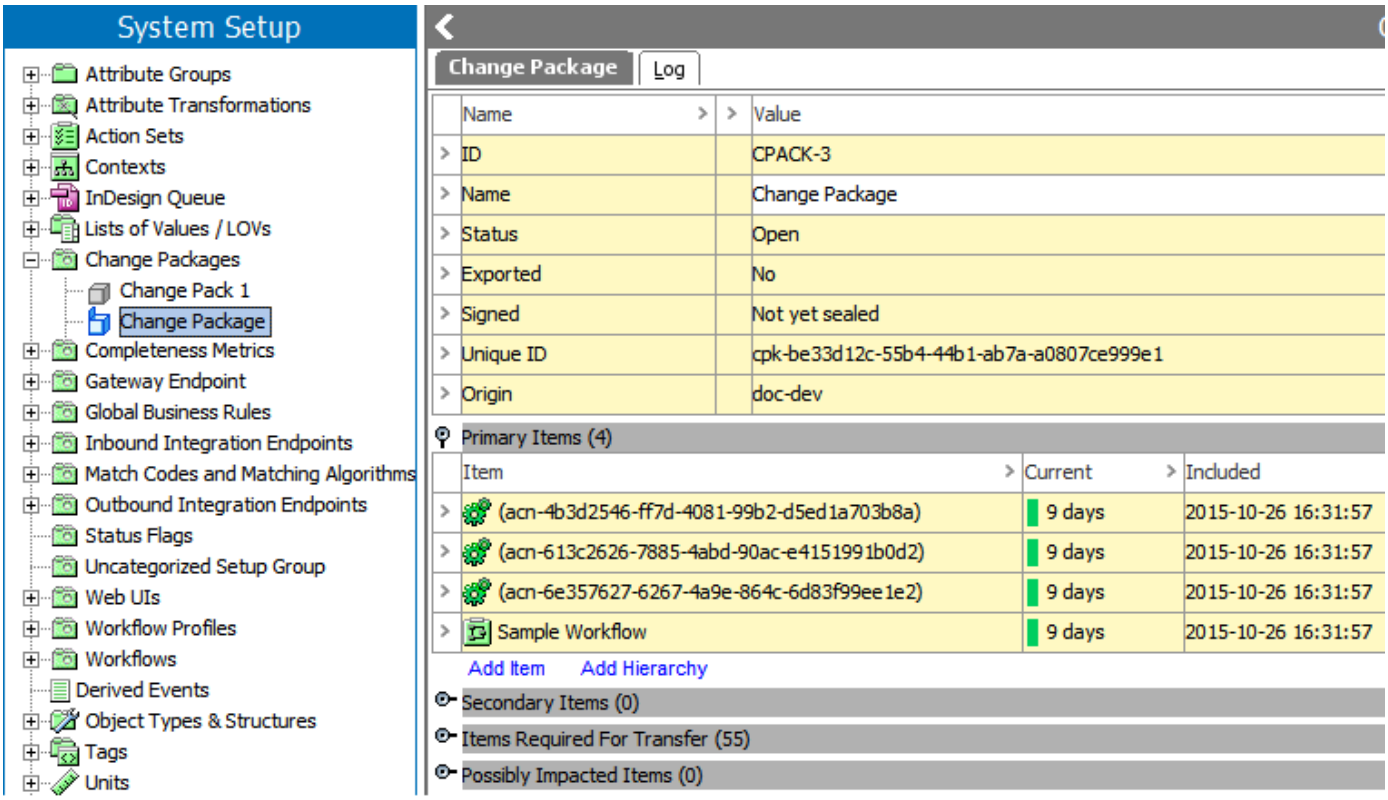
The overall flow of change packages is shown below:




Once created, a user may add or remove items from the package until they are satisfied with the contents. The change package can then be sealed and exported for loading to another system. Upon loading of the change package to the target system, an impact report can be run that helps identify areas that may need to be updated prior to installation and could be impacted upon installation. This provides an indication to the user of how successful the change package will be if applied. The user may then choose to remove or install the change package. If installed successfully, the configurations contained in the change package will be loaded to the system and available for immediate use.

## Change Package Objects

Change packages are system setup objects that act as containers to house a set of configurations.




**Note:** Change packages can include the following STEP objects: Action sets, Asset Importer, Attributes, Attribute groups, Attribute transformations, Business Rules, Classification Product Link Types, Completeness Metric, Contexts, D&B, Dimensions, Dimension Points, Derived Events, Event processors, Event Queues, Gateway Endpoints, Integration endpoints, Link Types, List of Values, Match Codes, Matching Algorithms, Object Types and Structures, PIM Tables, Reference Types, Setup Entities, Setup Groups, Status Flags, Sufficiency configurations, Unique keys, Units, Unit groups, Users and User Groups, Web UI configurations, Workflows, and XSLT Style sheets.

## Change Package Icons and Statuses

| Icon | Status | Description |
|---|---|---|
| | Open | • Change package is in an editable state, therefore not final or ready for export yet. Packages are open when created and when re-opened from a sealed state<br>• Can have an impact report run only if previously sealed<br>• Cannot be exported<br>• Items can be added and removed<br>• Packages can be deleted and the items within them are left on the system unchanged |
| | Sealed | • Change package is locked for editing and ready for export<br>• Can have an impact report run<br>• Can be exported<br>• Items cannot be added or removed<br>• Packages can be deleted and the items within them are left on the system unchanged |

| Icon | Status | Description |
|---|---|---|
|  | Dormant | • Change package has been imported from another system but not yet installed<br>• Can have an impact report run<br>• Can be exported<br>• Items cannot be added or removed<br>• Packages can be deleted and there is no impact to the items within them. If the package has been previously installed, the items within the package are left on the system unchanged. If the package has not yet been installed, the items within it are no longer available for installation. |

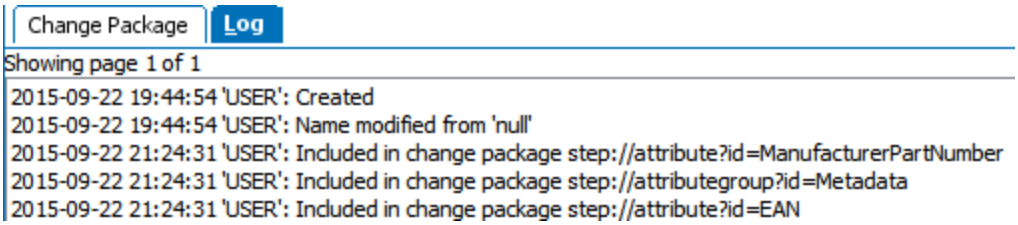
## Change Package Tab

| Flipper | Description |
|---|---|
| | Provides basic information about the change package, including the Status, whether or not the change package has been exported, whether or not the package has been sealed, and where the package is originally from (e.g., created on the current system or imported from another system). If the package has been sealed or an impact report has been run on the package, additional fields will be present with links to these processes. |
| Primary Items | Displays a list of objects that have been directly added to the change packages, as well as providing the interface for adding and removing items from the change package. Users can select to add a single object (Add Item), or an object and all of its child objects (Add Hierarchy).<br><br>Items in this list are part of the change package and will be created and/or updated on the target system when the change package is installed. |
| Secondary Items | System generated list of objects that are part of the change package due to the addition of a parent using the Add Hierarchy option. This list can only be edited by adding or removing the driving primary item.<br><br>Items in this list are part of the change package and will be created and/or updated on the target system when the change package is installed. |
| Items Required For Transfer | System generated list of objects that are required for the change package due to interactions with the selected objects. This list can only be edited by adding or removing the driving primary item.<br><br>These objects are essentially prerequisites for the transfer as the selected primary objects and/or the secondary objects have some dependency on them. The objects are included in the change package as a means of ensuring that the primary and secondary items are successfully transferred, and will be created and/or updated on the target system when the change package is installed. |
| Possibly | System generated list of items that might be affected by the transfer of the change package on |

| Flipper | Description |
|---|---|
| Impacted Items | the new system. This list can only be edited by adding or removing the driving primary item.<br><br>These objects are dependent in some way on the primary or secondary object, but are not required for configuration of those objects and are therefore not included in the change package. They will only be modified if they already exist on the target system. |

## Log Tab

The Log allows administrators to monitor modifications to change packages. This information, along with the data displayed directly on the change packages, provides detailed logging and tracking for comprehensive audit trails.

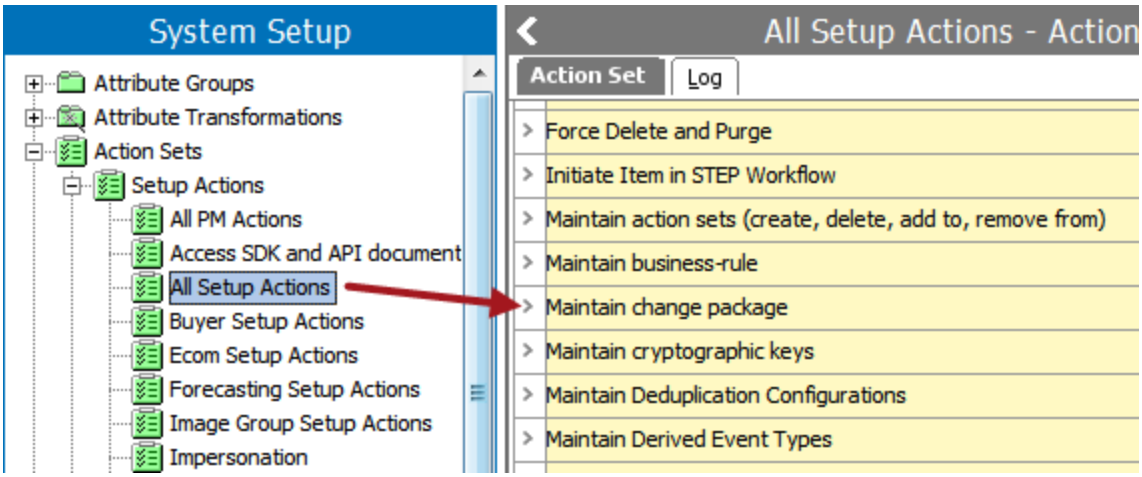



In addition, when an item is added to a change package or removed from a change package, the log of the item itself is also updated accordingly.

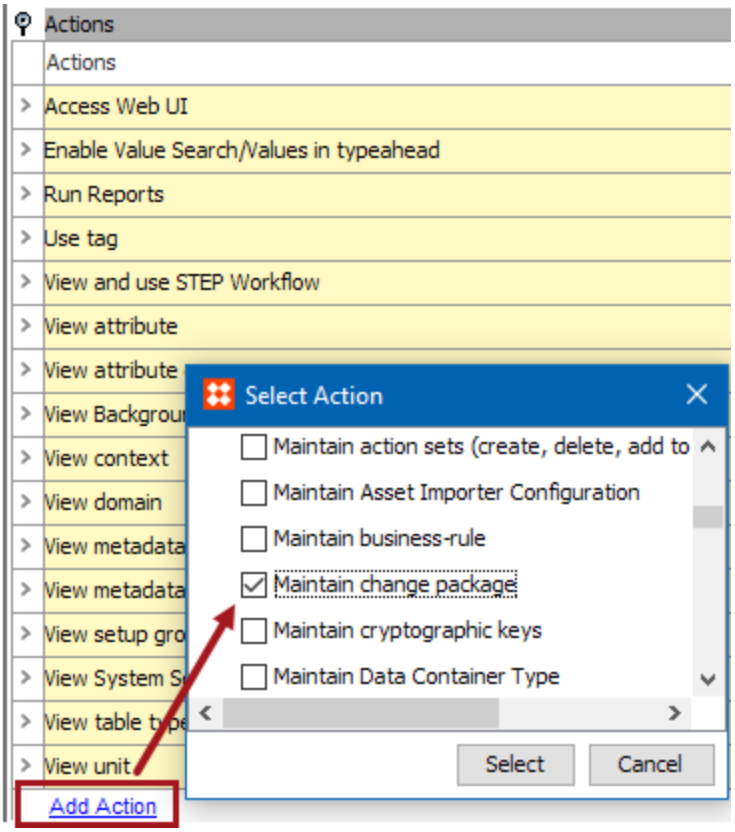
# Change Package Privileges

In order to use change packages, the user must be part of a user group that has an unrestricted setup action set applied to it (e.g., has a Setup Privilege defined that includes the 'All Setup Actions' action set. This action set must include *all* setup actions, including the 'Maintain change package' action.

As an administrator, to make sure that the All Setup Actions action set has 'Maintain change package' in it, in System Setup go to Action Sets > Setup Actions > **All Setup Actions**.

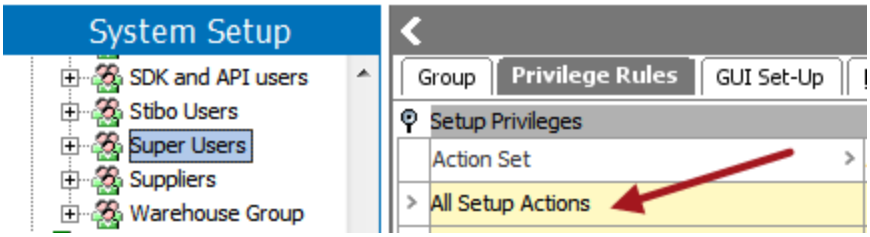



In the list to the right, if the **Maintain change package** action does not exist, scroll to the bottom of the list and select **Add Action**. This will populate a list of actions that are available to add to this set.




**Note:** In addition to the **Maintain change package** action, the **All Setup Actions** action set must contain *all* setup actions. If any actions are present in the **Add Action** pop up, these must also be added to the **All Setup Actions** action set in order to enable full use of change package functionality.

Once it has been verified that the **All Setup Actions** action set does in fact include *all* setup actions, any users requiring access to change package functionality must be part of a user group that has the **All Setup Actions** privilege applied.




For more information, see the **Users and Groups** topic or the **Action Sets** topic within the **System Setup / Super User Guide** documentation.

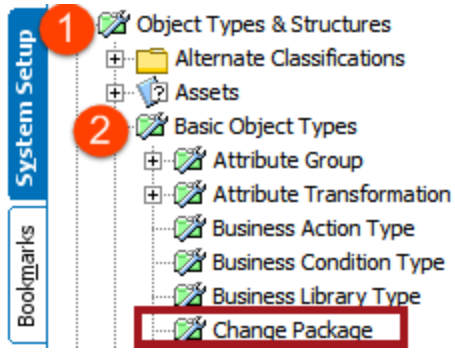
For information on including users in a change package,

# Initial Setup for Change Packages

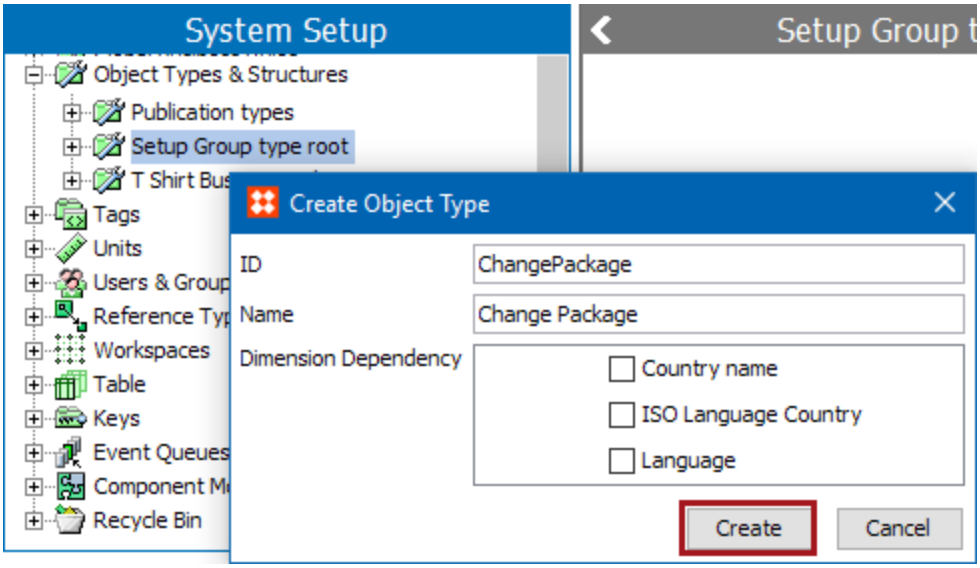
In order to create a Change Package that will process and migrate STEP configuration changes, the basic change package configuration must first be in place as defined below.

Change Packages functionality was introduced in version 7.4.

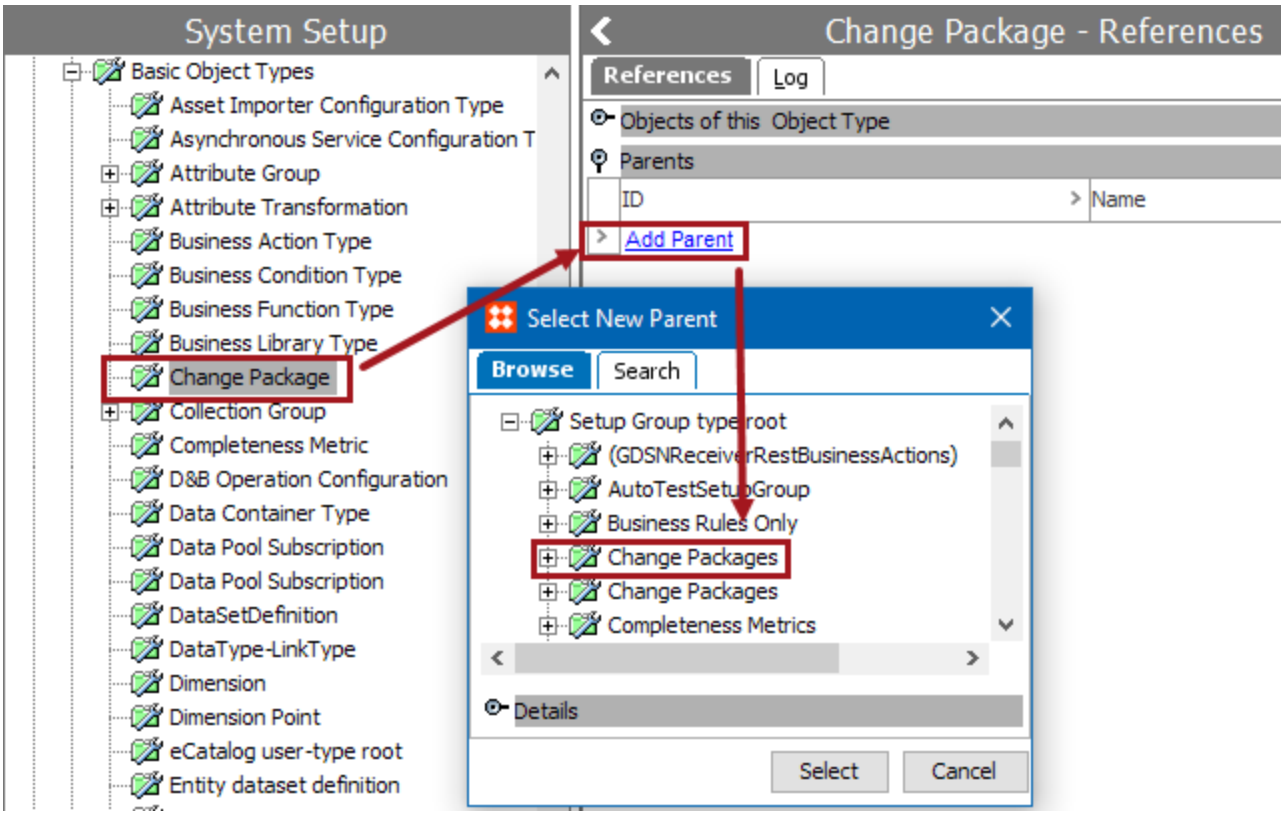
1. On System Setup, select **Object Types and Structures** > **Basic Object Types**, and verify **Change Package** exists.



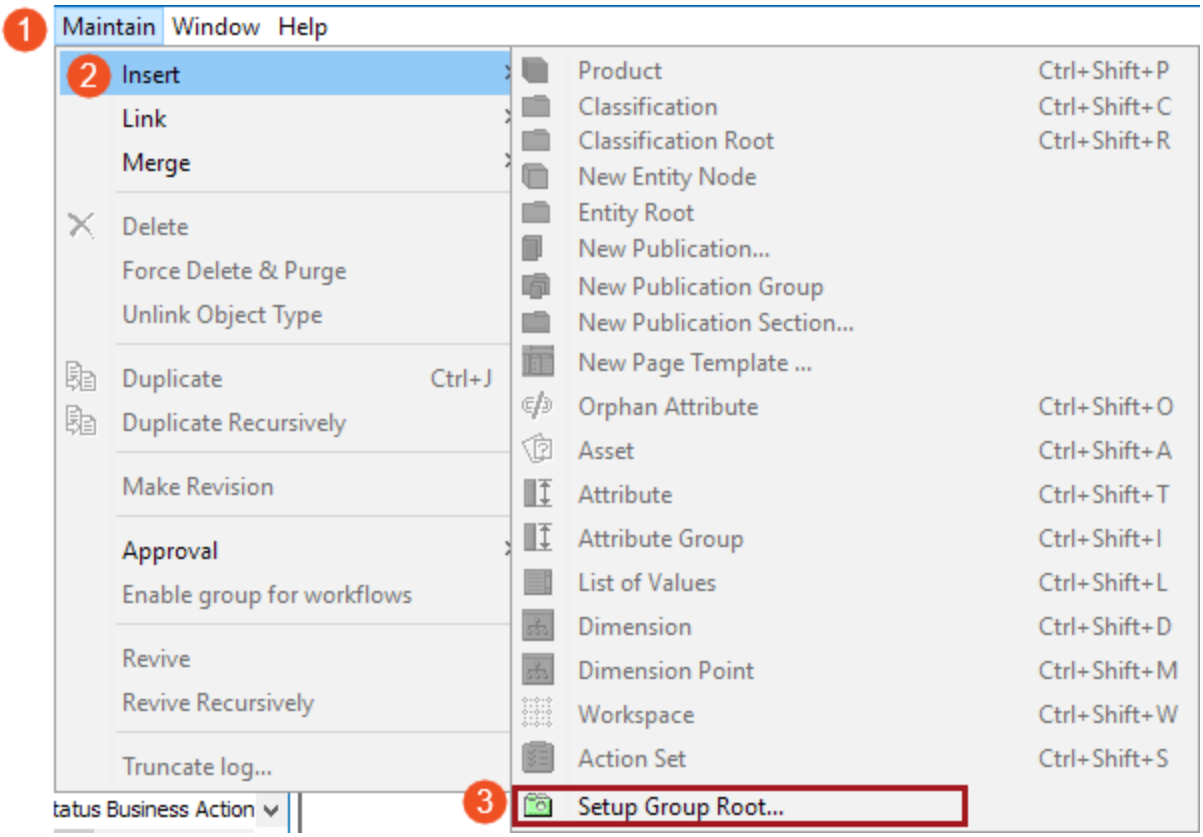

2. Under **Setup Group type root** right-click to create a **New Object Type**.



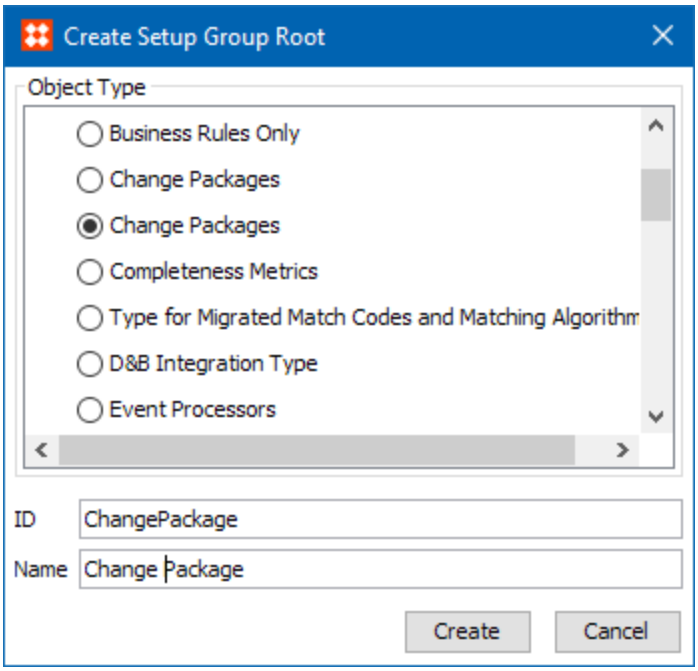

3. Under **Basic Object Types** node, return to the Change Package object.
4. On the References tab, click **Add Parent** link. Select the folder you created for change packages under **Setup Group type root** and click the Select button.




5. On the **Maintain** menu, navigate to **Insert**, and select **Setup Group Root** to open the 'Create Setup Group Root' dialog.




6. Select the Change Packages object type that you created above, enter an ID and Name, and click the **Create** button. This creates a folder in System Setup where you can then create individual change packages.

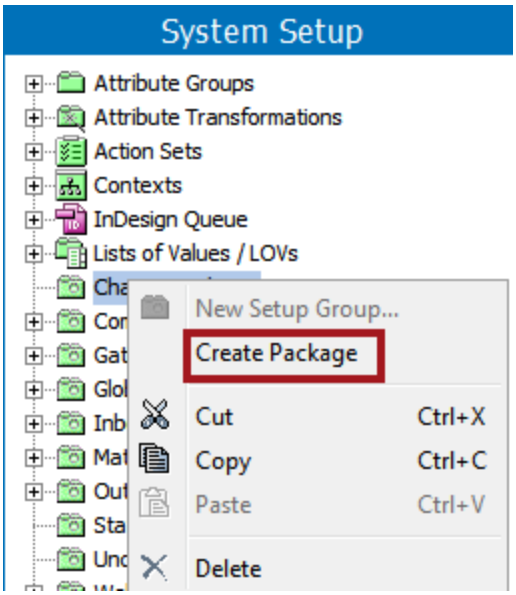



See the **Creating a Change Package** topic for details on the next step.

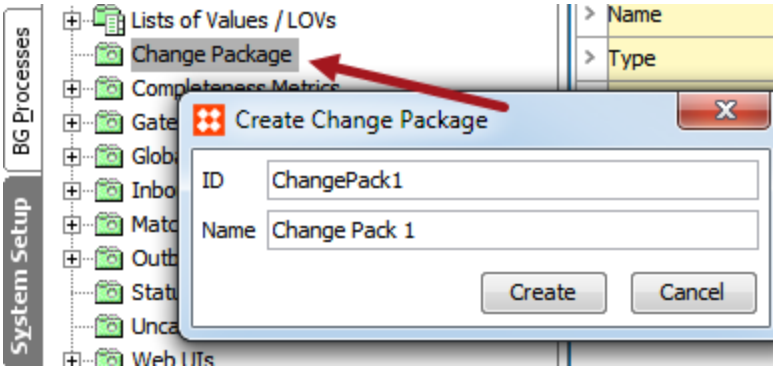
# Creating a Change Package

To create a Change Package, you must complete the **Initial Setup for Change Packages** topic of this documentation.

1. On the System Setup tab, locate the folder established for holding Change Packages.
2. Right-click the folder and select **Create Package**.




3. In the Create Change Package dialog, assign an ID and a name to the package and click the **Create** button.




For details on adding items and working with change packages, see the **Editing a Change Package** topic of this guide.

# Editing a Change Package

A change package serves as a container to store a set of system configurations for migration to another system. Therefore, once a change package has been created, it is considered empty until one or more items have been added to it. When objects have been added, the system then tracks whether or not subsequent changes occur on those items. Information on the change package informs the user of whether or not an item in the change package is up to date when compared to the current system configurations. Users then have the option to resolve discrepancies. Details for working with open change packages are described below.

After editing a change package, before exporting, you must finalize the package as defined in the **Finalizing a Change Package** topic.

### Users in Change Packages

When users and/or user groups are added to a change package, passwords for the users are not included. Since creating a new user requires a password, new users cannot be created via STEPXML import. However, changes to existing users can be imported.

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**Note:** When changing a user from one assigned group to another, the user is added to the new group, but must be manually removed from the original group.

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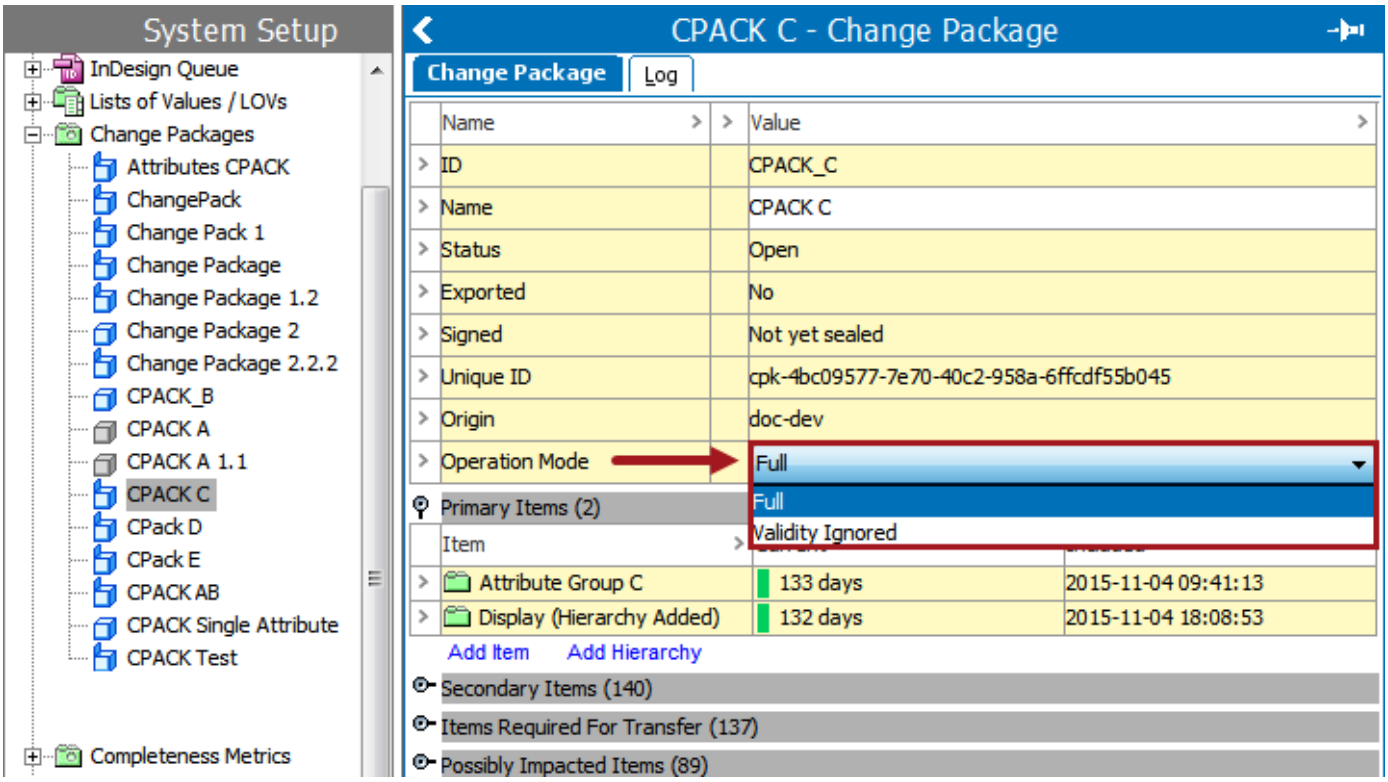
Importing a change package that includes users is only successful for users that already exist in the target (receiving) system. Importing users that do not already exist results in the message: 'The tag <user> requires the attribute Password. The user with ID <id> was skipped.'

## Set the Operation Mode

The Operation Mode determines how the dependency analysis will function for a given change package.




Set the Operation Mode as follows:

- **Full**: This default setting means all objects that are manually added to the change package will, in turn, have all of their associated items included in the change package. This automated inclusion pulls in not only items that the object touches (references, workflows, etc.), but also objects touched by those items. For example, if an attribute is valid on two object types, each of those two object types is also added to the package.
- **Validity Ignored**: This option means the change package ignores associations made as a result of valid attributes, object types, and reference types when the dependency analysis is made. For example, when the user adds an attribute in this mode, the object types and references on which the attribute is valid are *not* automatically added, whereas they would be in 'Full' mode.

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**Important:** Use caution when running a change package in **Validity Ignored** operation mode. With this mode, installing the change package on a target can have an uncertain outcome. For example, if business rules are being moved from one system to another via the change package, any binds associated with those business rules are ignored, which can result in the business rules having a larger effect than intended on the receiving system. The same holds true for attribute validations.

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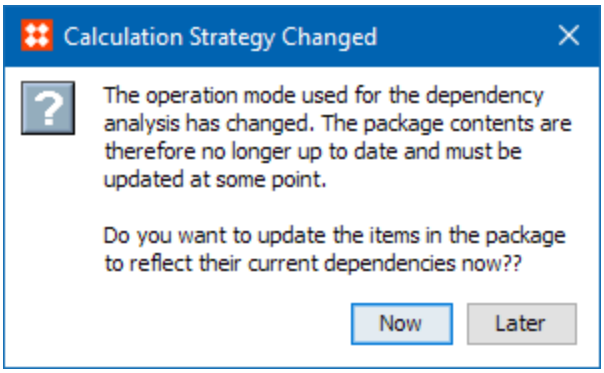
Changing the operation mode displays a prompt to run the dependency analysis. The analysis can be run at the time of the prompt or at a later stage in the change package.

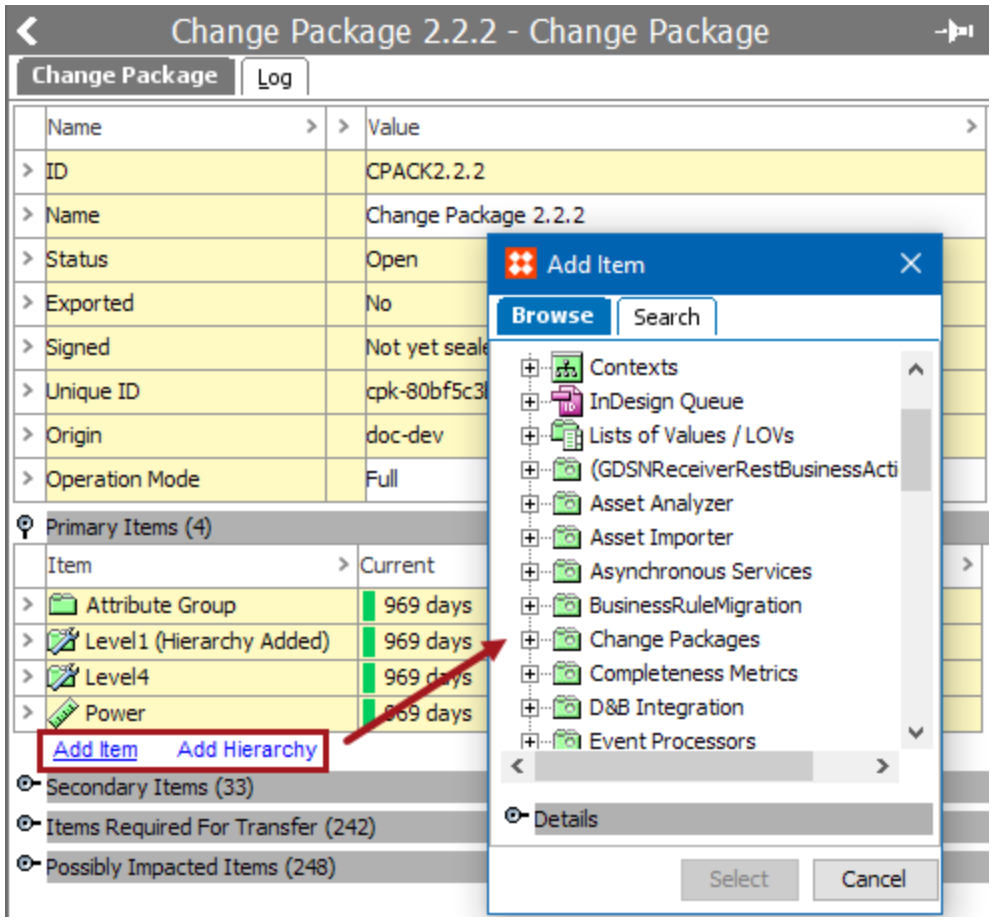



## Add Items to a Change Package

You can select any number of objects to be added to the package using the **Add Item** and **Add Hierarchy** links under the Primary Items flipper as defined below.

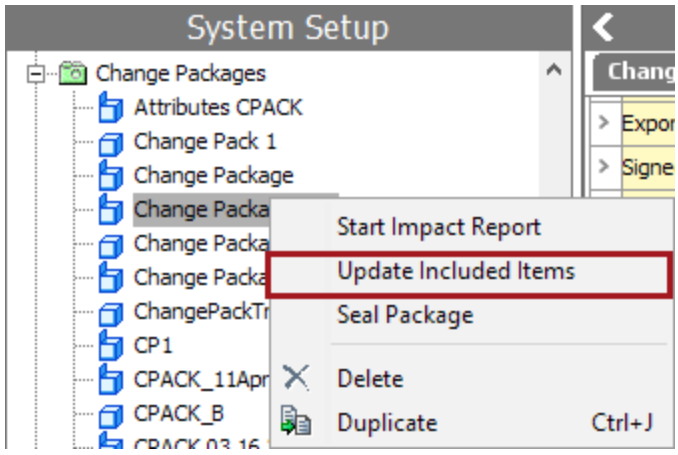
1. On the Add Item dialog, select an item and click the **Select** button.
   - **Add Item** adds a single primary item to a change package. For example, selection of an attribute group will add the attribute group only and no child attributes of the group.
   - **Add Hierarchy** adds an object and *all* children of that object (direct children and beyond). The selected object is added as a primary object, and all children are added as secondary objects. For example, selection of an attribute group will add the attribute group as a primary item, and all children of the group as secondary items. If the group includes other attribute groups, those groups and their attributes will also be included as secondary items.

**Note:** Selecting an invalid object type reports the issue in red text at the bottom of the Add dialog and the Select button is not enabled.




Added items are displayed in the Primary Items list.

2. Right-click on the change package and select 'Update Included Items' to ensure an accurate report of the package dependencies.

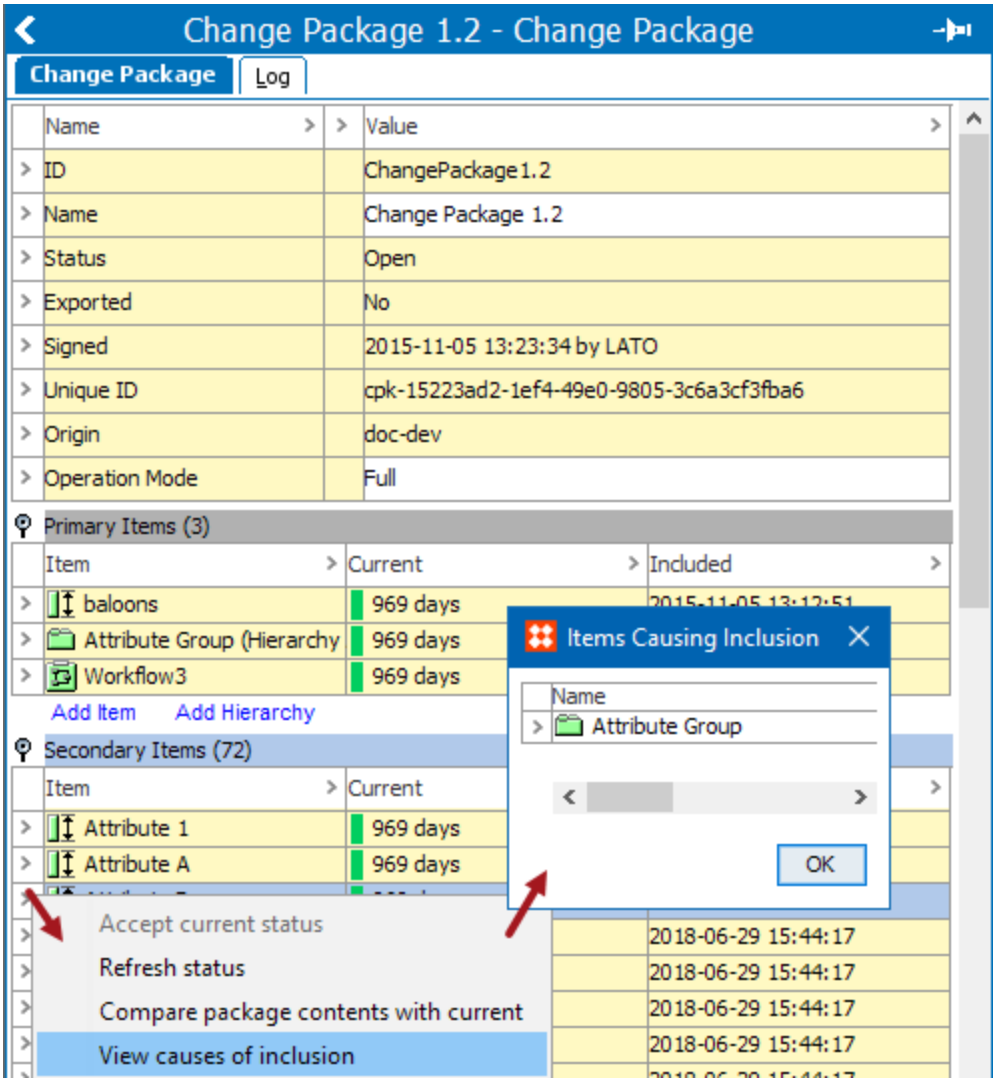


**Note:** In order to allow for easy addition of primary objects, full dependency calculations are only applied on demand rather than running a potentially complex analysis for each individual addition or removal of an object.

3. For more information on the items in the Primary Items flipper, see the **Status and Discrepancies in Change Package Items** topic.

## Reasons for Included Items

To understand the reason an item is included in a change package, right-click on the arrow next to the item and select the 'View cause of inclusion' option.




## Ignore Auto-selected Objects

Users can ignore items listed in the **Items Required For Transfer** and **Possibly Impacted Items** sections.

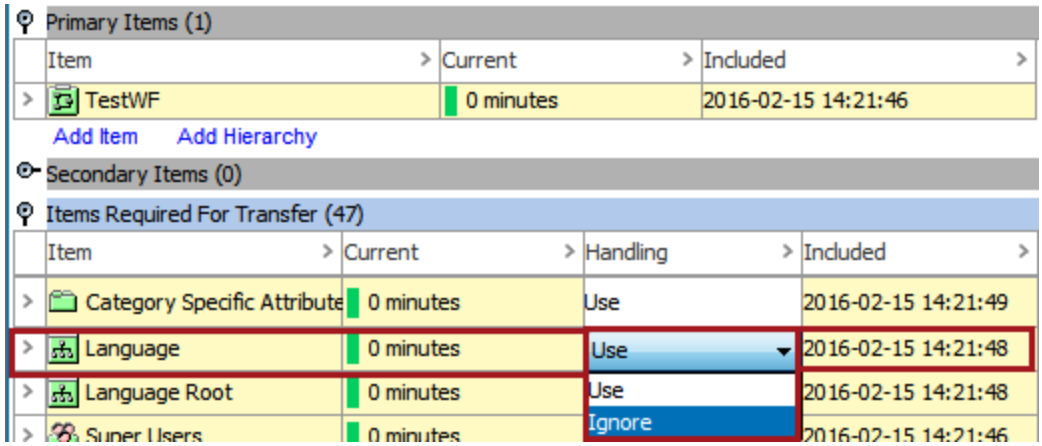
**Note:** Ignoring an item does not necessarily mean that the number of included items in the change package will diminish.

For either section, in the **Handling** column for the unneeded item select Ignore. However, the results of ignoring items are different based on the section, as defined below:

- In the **Items Required For Transfer** section:

  The **Ignore** setting means that while the items are still part of the package, when the package is transferred over to the receiving system, these items will not be installed on the target system. In addition, these items are not evaluated or included in the impact report. This is especially useful if a user knows that a particular item is set up correctly on the receiving system and / or wants to isolate a particular set of objects for transfer without accounting for the full dependency analysis.

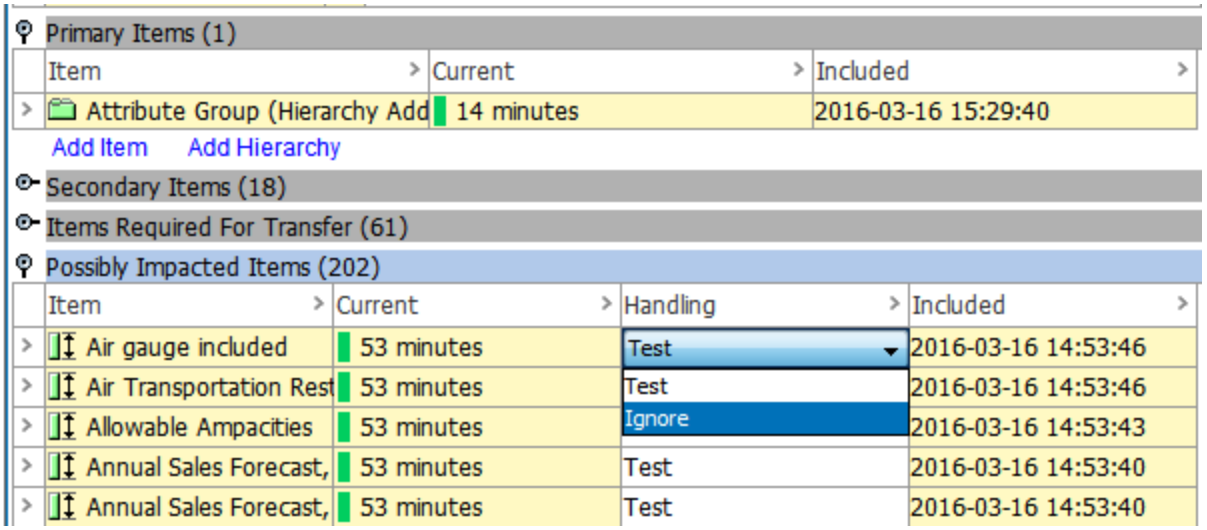
  The **Use** setting means the object transfers over to the receiving system.




- In the **Possibly Impacted Items** section the **Test** and **Ignore** settings provide communication between administrators creating change packages and those that are deploying them on target systems.

  The **Test** setting tells the installer that there are potential impacts to this object and it should be tested accordingly.

  The **Ignore** setting indicates that the package creator is confident in the outcome of the deployment and additional testing on the specified object is not needed. The user will not see them reported on the impact report when it is run. For more information on impact reports, see **Analyzing and Installing Change Packages** in the **Configuration Management** documentation.

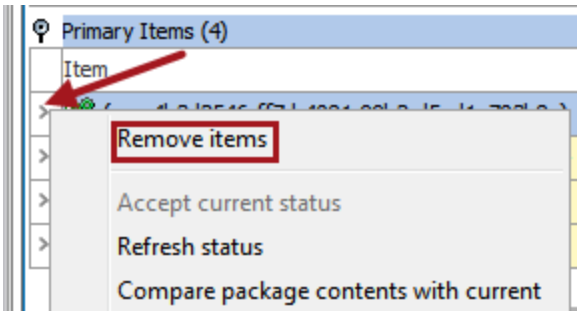



**Important:** When an item is deleted from the 'Primary Items' folder and then added back, the system does not retain items initially Ignored in either the 'Items Required for Transfer' or 'Possibly Impacted Items' sections. The items are added back with the re-added **Primary Item**, and must be manually set to Ignore again.

## Remove Items from a Change Package

Only 'Primary Items' may be removed from a change package.

1. Verify the change package is open. Items may only be removed from an open package.
2. In the Primary Items flipper, click the row arrow on the item(s) and selecting **Remove items**.

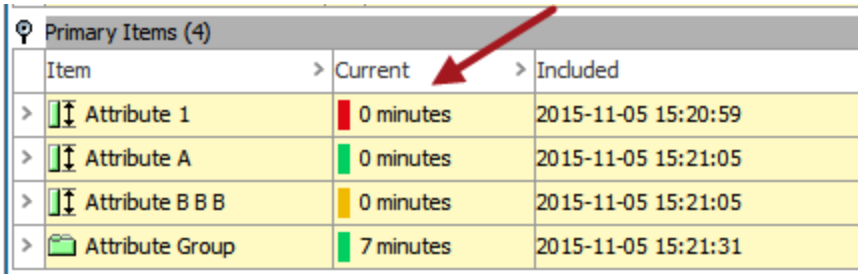



3. Right-click the change package and select the ‘Update Included Items’ option. This ensures an accurate report of the dependencies in the package. Full dependency calculations are only applied on demand rather than running a potentially complex analysis for each individual removal of an object.

# Status and Discrepancies in Change Package Items

When an item is placed into a change package, the system tracks the details of the object from that point forward. If the selected object is changed, the change package notes a discrepancy between the stored version and the current version.

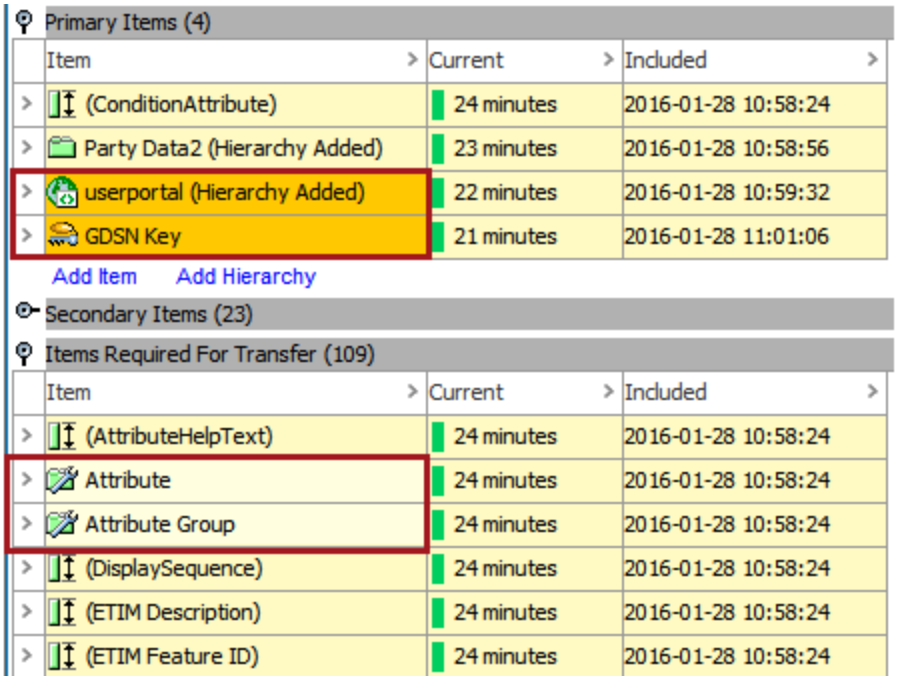
Each item in a change package has a color indicator and a notation of how long it has been since the object in the change package has been compared to the current system state.




- A **Green** indicator means the object reflected current status when it was last compared to the system.
- A **Yellow** indicator means that the object has been changed since it was added to the package, but that the change has been accepted.
- A **Red** indicator means that the object has changed since addition to the change pack and changes to this object have not yet been accepted.

Additionally, some objects are treated differently in regards to how they are tracked. This is indicated by the background color of the objects in the Items column.

- A **Dark Yellow** highlight indicates that the objects needs to be verified manually. These are objects that cannot have their contents or details tracked, such as a Web UI, and are not reported on in the impact report.
- A **Light Yellow** highlight indicates that the object is part of the system's base configuration, and cannot be moved from one system to another via a change package.

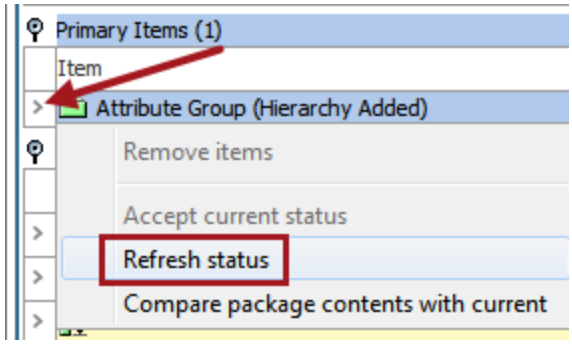



**Important:** At the time of sealing, the change package pulls the current system version of all objects included in the change package. Therefore, all objects will have a green indicator upon sealing of the package. Following sealing, objects can still be refreshed and if a subsequent discrepancy arises, the object will have a red indicator. However, the option to accept the change will not be available as the package has been sealed and an export of the change package will include all objects as they were at the time the package was sealed.

## Refresh Status

Refreshing an item sets the counter back to zero and updates the color indicator on the object.

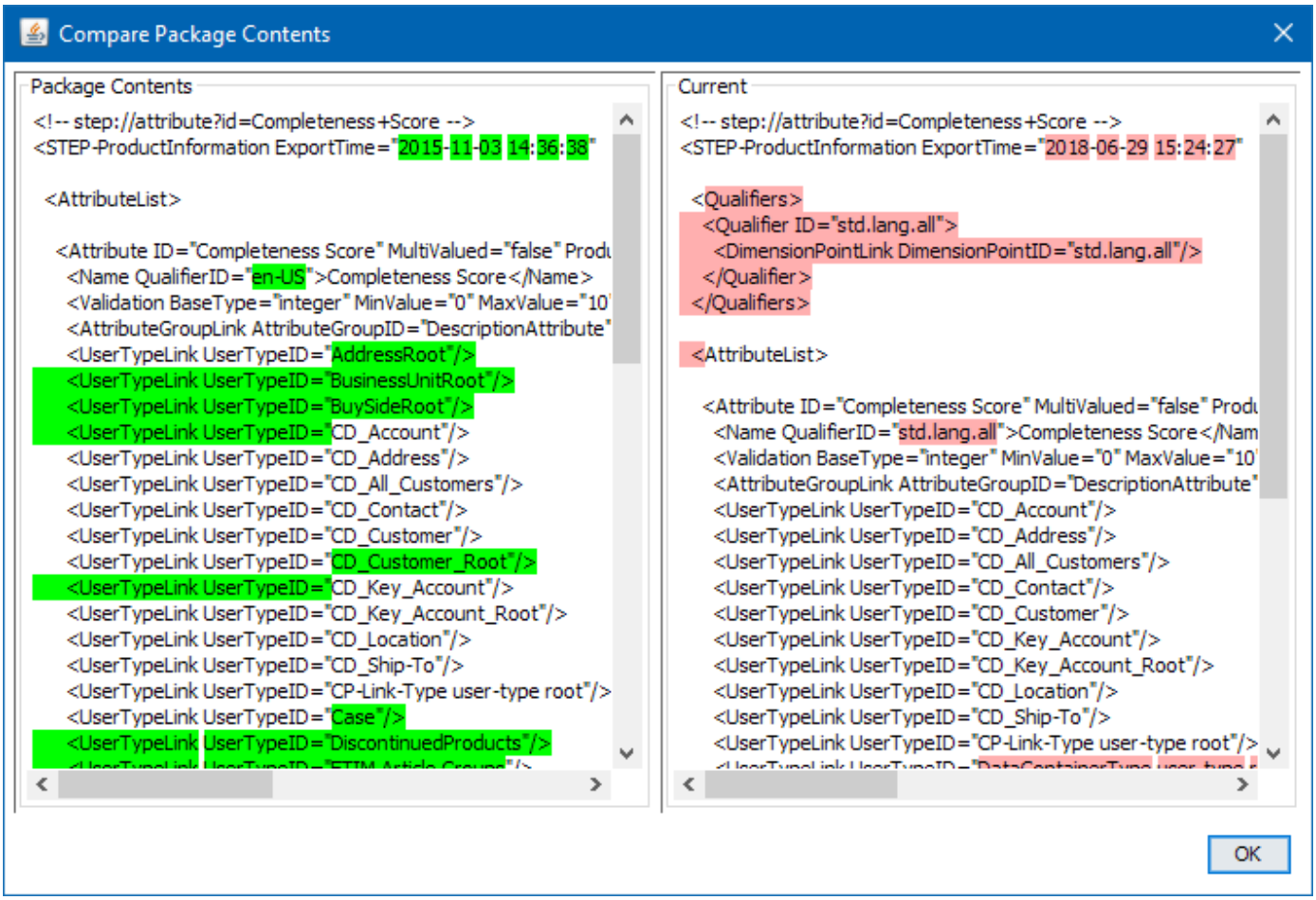
To check the status of items in the change package, click on the row arrow in the item(s) and select **Refresh Status**.




The refresh option is available on all change package objects, regardless of their current status or the status of the change package.

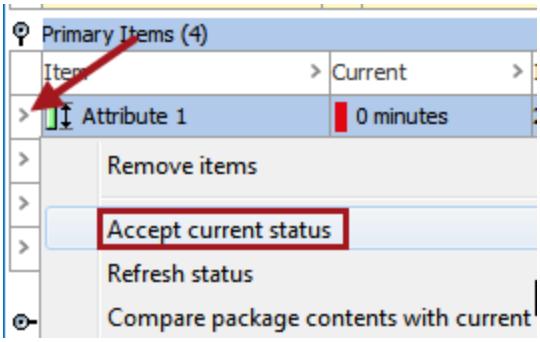
# Compare Package Contents with Current

For a detailed comparison of a change package object (or objects) and the current system, right-click the package and select the 'Compare package contents with current' option.




# Accept Current Status

If an object has changed since addition to the package, it has a red color indicator and the **Accept Current Status** action is available on the row arrow right-click menu.



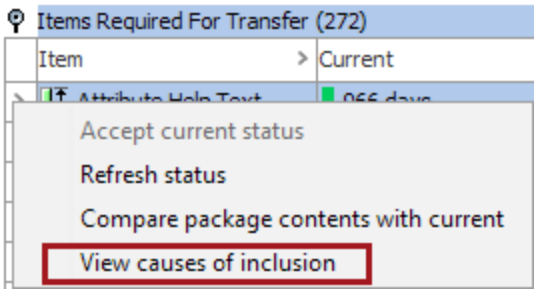
Accepting the current status of an item turns the color indicator yellow. This informs the user that the object has changed since addition to the package, but that the change has been verified and the current object is accepted as part of the package.

**Note:** This option is only available for objects that are *not* up to date and are part of an open change package. If the package has been sealed this option is not available, regardless of object status.

## View Causes of Inclusion

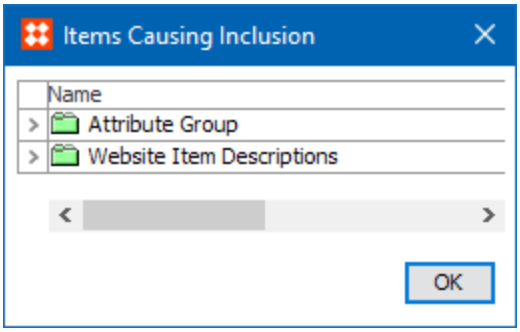
The 'View causes for inclusion' option is visible on items for the following flippers:

- Secondary Items
- Items Required for Transfer
- Possibly Impacted Items




**Note:** You can multi-select items in the change package and run the 'View cause for inclusion.'

Select the 'View causes for inclusion' action to launch the 'Items Causing Inclusion' dialog. This shows the item(s) that is / are the cause for inclusion on the given item selected in the change package.




**Note:** You cannot click the object in the dialog to view the object itself.

# Finalizing a Change Package

When the contents of a change package have been confirmed, it is sealed to indicate that no further edits will be made and the package is ready for export.

## Seal a Change Package

Once a change package has been determined as ready for export, it must be sealed.

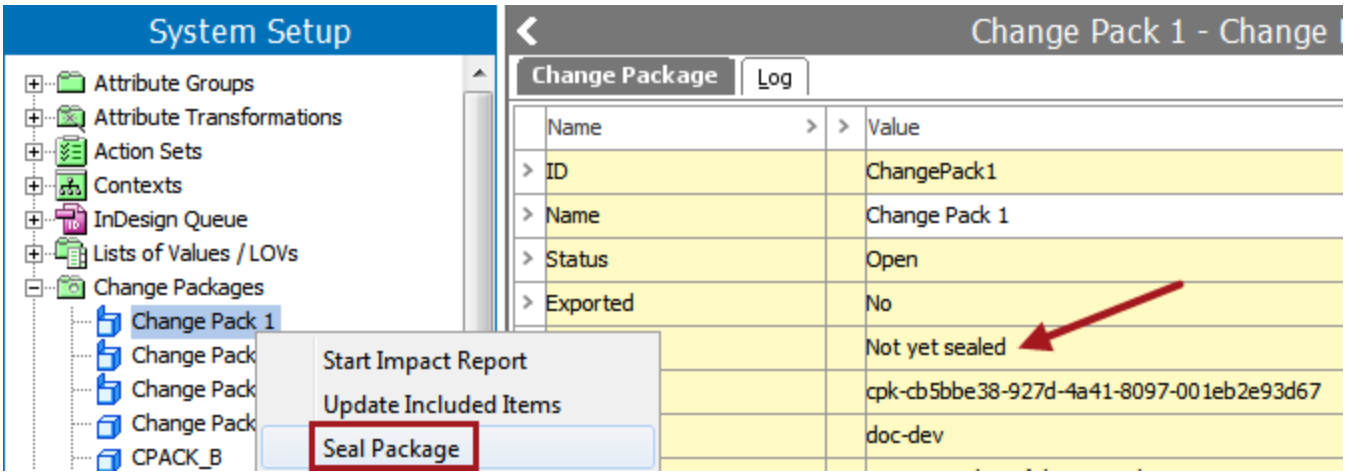
---

**Important:** Sealing a change package pulls the current system version of all objects included in the change package.

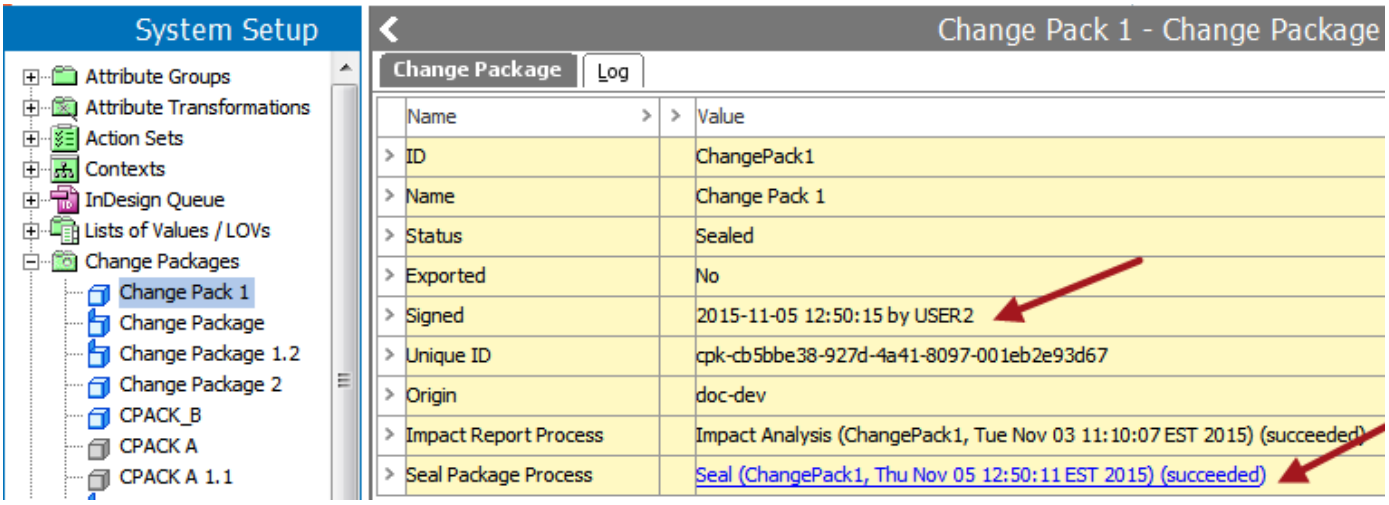
---

Prior to a change package being sealed, it has a blue open box icon ( ) and the 'Signed' field is populated with 'Not yet sealed.'

1. Right-click the package and select the **Seal Package** option.



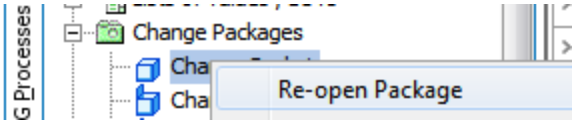

The sealed package displays a closed box icon ( ) and the Signed field indicates the date, time, and user responsible for the sealing. In addition, a link to the sealing background process is provided.




## Modify a Sealed Change Package

Re-opening a sealed change package allows the user to edit the change package.

1. Right-click the change package and select the **Re-open Package** option.



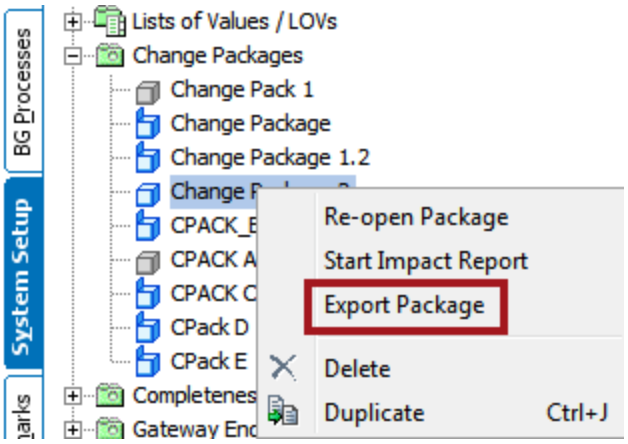

2. Follow the steps in the **Editing a Change Package** topic to modify the change package.

For more information on the items in the Primary Items flipper, see the **Status and Discrepancies in Change Package Items** topic.

## Export a Change Package

Change packages are exported using the standard Export Manager functionality, and can be imported to target systems using the Import Manager.

1. Verify the change package is sealed or dormant as defined in the **Change Packages** topic.
2. Right-click the package and select the **Export Package** option.




3. On the Export Manager dialog, select a delivery method and finish the export, as defined in the **Export Manager - Select Delivery Method** topic of the **Data Exchange** documentation.

# Analyzing and Installing Change Packages

As the main purpose of a change package is to transfer configurations between systems, once a change package has been sealed and exported from a source system, it is expected that it will then be imported to a target system. Upon import, the change package can be analyzed against the target system data set, and subsequently installed if desired.

## Importing a Change Package

Change packages are exported as encoded STEPXML files and are therefore easily imported using the Import Manager. For more information on the Import Manager, see the Import Manager documentation.

---

**Note:** It is required to create the setup group for change packages manually on the target system before you can import a change package. For more on creating the setup group, see the 'Initial Setup for Change Packages' section of the Configuration Management documentation.

---

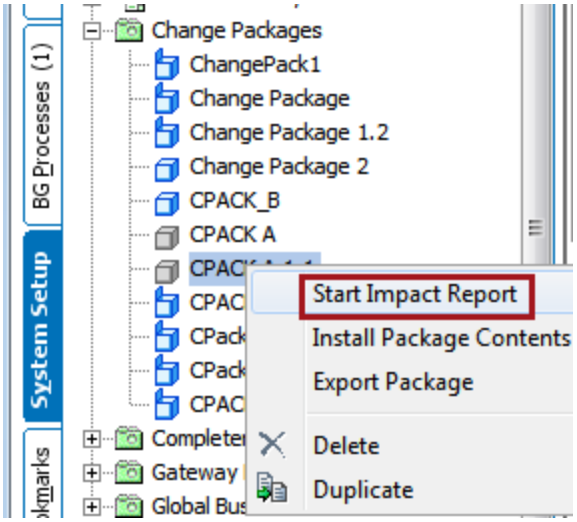
Upon import, the new change package is found in the same location on the System Setup tab as it existed on the source system. Imported change packages have a status of 'Dormant' and a gray icon: 

Note that the *contents* of the change package have not yet been applied at this point. Only the change package itself has been imported, and no system configurations will be updated unless the change package is installed.

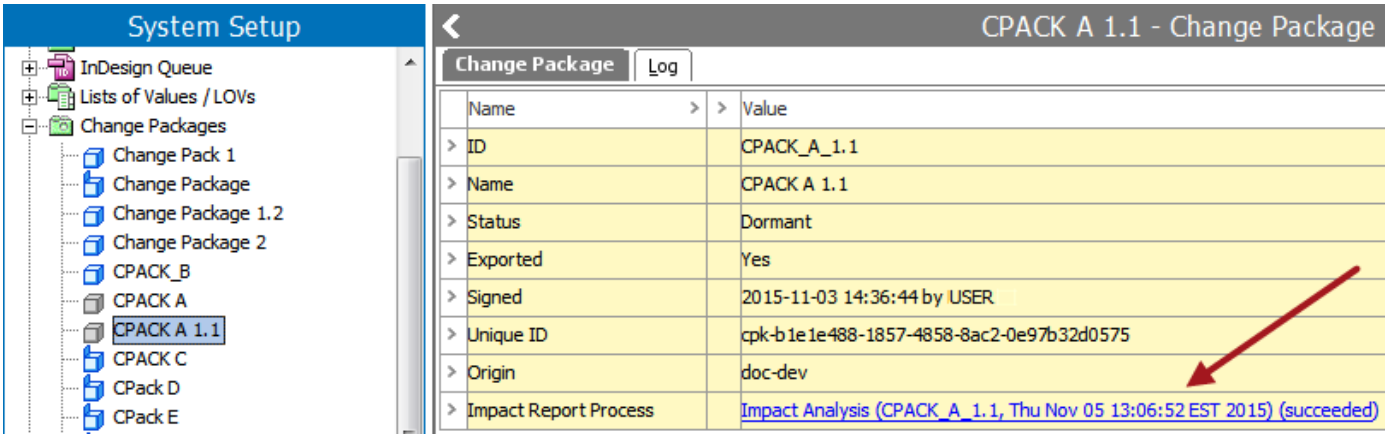
## Analyzing a Change Package

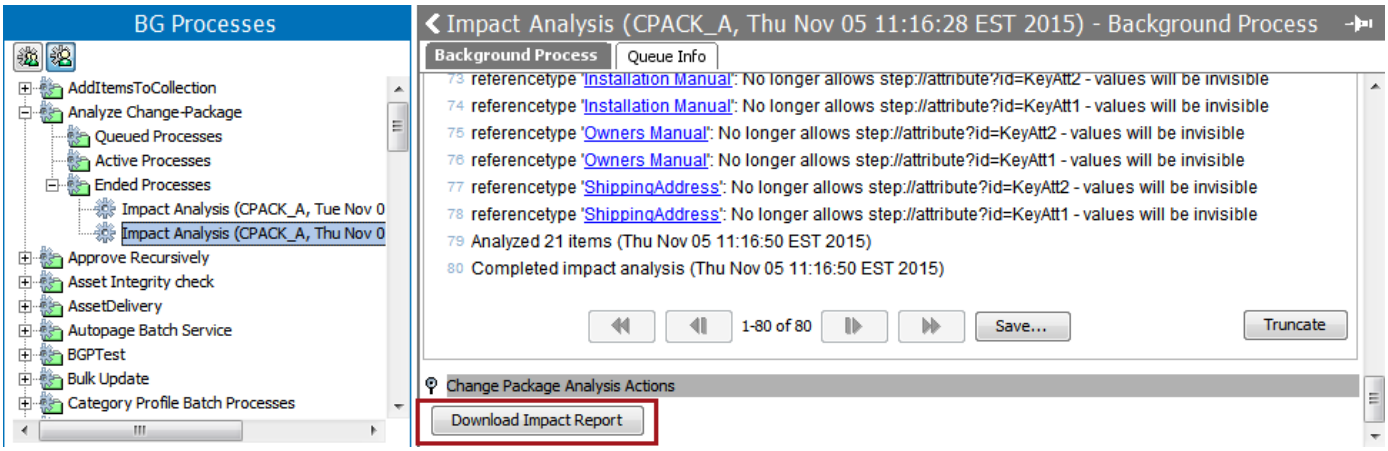
Once a change package has been imported, an impact report can be run. The impact report provides the user with a variety of information they can use to assess whether or not the change package should be installed, and what the system impacts are likely to be upon installation.

To run an impact Report, right-click on the Change Package and select **Start Impact Report**.



The impact report is run as a background process, which is then accessible on the **BG Processes** tab under **Analyze Change Package**. The contents of the report can be viewed directly in the execution report, or can be downloaded for viewing offline (e.g., in Excel). A link to the background process is also provided on the change package object.




| Origin | Message Type | Inclusion Type | URL | Object Type | Object ID | Message | Current Status | Status Time |
|---|---|---|---|---|---|---|---|---|
| Detection | IdentifiedChangedItem | Precondition | step://cplinktype?id=WebsiteLink | cplinktype | WebsiteLink | Identified changed item | Out of sync | 11/5/2015 11:16 |
| Detection | IdentifiedChangedItem | Precondition | step://cplinktype?id=SupplierLink | cplinktype | SupplierLink | Identified changed item | Out of sync | 11/5/2015 11:16 |
| Detection | IdentifiedNewItem | Derived | step://attribute?id=Size | attribute | Size | Identified new item | Out of sync | 11/3/2015 14:39 |
| Detection | IdentifiedChangedItem | Precondition | step://referencetype?id=MSDS | referencetype | MSDS | Identified changed item | Out of sync | 11/5/2015 11:16 |
| Impact | MissingAttribute | Precondition | step://cplinktype?id=MerchandisingLink | cplinktype | MerchandisingLink | No longer allows step://attribute?id=KeyAtt2 - values will be invisible | Out of sync | 11/5/2015 11:16 |
| Impact | MissingAttribute | Precondition | step://cplinktype?id=MerchandisingLink | cplinktype | MerchandisingLink | No longer allows step://attribute?id=KeyAtt1 - values will be invisible | Out of sync | 11/5/2015 11:16 |
| Impact | MissingAttribute | Precondition | step://referencetype?id=PrimaryProductImage | referencetype | PrimaryProductImage | No longer allows step://attribute?id=KeyAtt2 - values will be invisible | Out of sync | 11/5/2015 11:16 |
| Impact | PropertyMismatch | Precondition | step://cplinktype?id=Classifications | cplinktype | Classifications | Changed from externally maintained to internally md. - may enter single | Out of sync | 11/5/2015 11:16 |

The impact report should be analyzed to determine whether or not the change package should be installed, and if any changes should be carried out on the target system prior to installation. If system changes occur, it may be useful to re-run the impact report.

If it is determined that the change package should not be installed, it can be removed from the system by right-clicking on the change package and selecting **Delete**.

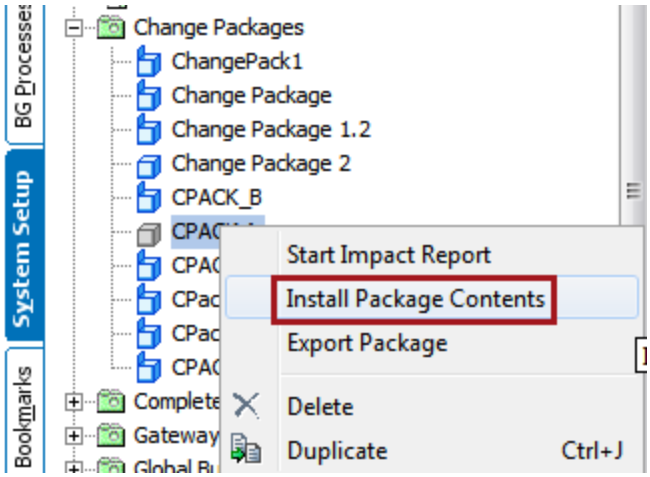
---

**Note:** Deleting a change package removes it from the system entirely. It is not available in the Recycle Bin and can only be accessed again via re-import of the package.

---

# Installing a Change Package

When the impact report has been reviewed and the change package determined acceptable, it is installed by right-clicking and selecting **Install Package Contents**.




Installation of the change package means that all objects within the change package are added to the system. If objects in the change package existed previously on the system, they will be updated to reflect the contents of the package.

## Considerations

- The deletion of system configurations is not supported. Import of change packages supports configuration additions only.
- Event queues and IEPs are imported as disabled and must be manually enabled.

# STEPXML Comparison Tool

**Important:** The STEPXML Comparison Tool has been superseded by the change packages functionality available in STEP Workbench and therefore may be removed in a future release. It is recommended that users transition to using change packages, which are described in the **Change Packages** section of the **Configuration Management** documentation.

STEP has a tool for comparing system setup on different instances of STEP. The comparison tool requires an XML file to be exported from the source system and the target system.

This can be used to identify:

- Configuration that is different
- Compare collections, bulk update configurations and export / import configurations
- Configuration that only exists on the source system
- Configuration that only exists on the target system to identify what needs to be deleted
- Configuration that is identical

Once the differences have been identified the system compare tool can then be used to do the following:

- Generate an XML file of just the differences they wish to add to another STEP system.
  This data can then be imported to the target system
- Generate an XML of all the differences and import onto the target system

The comparison tool should not be used to migrate assets, products, classifications and entities from one system to another. It should only be used to compare two STEP systems and from this comparison generate STEPXML to move this configuration from a source system to a target system

The tool will only add / modify configuration on target systems it will not delete what should not exist on the target system. It will not make updates that require user input; this is explained in the document in more detail later in the document.

See the following topics for more information:

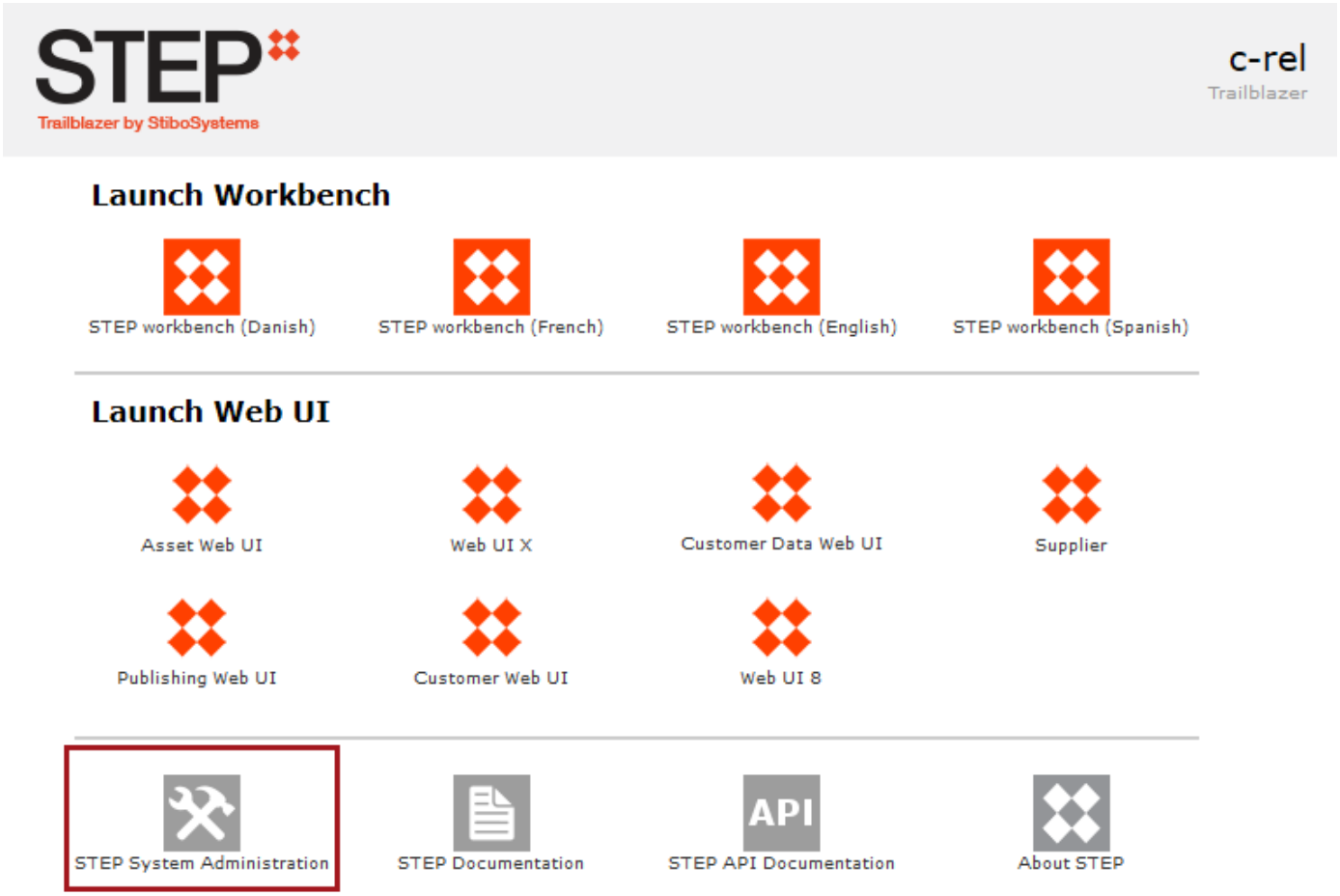
- STEPXML Comparison Tool Prerequisites
- STEPXML Comparison Tool Limitations
- STEPXML Comparison Tool Scenarios
- Using the STEPXML Comparison Tool

# STEPXML Comparison Tool Prerequisites

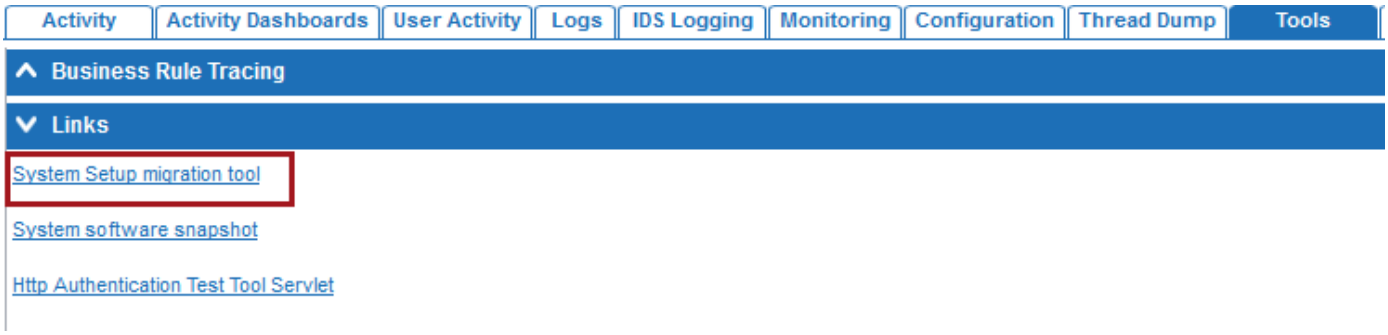
Typically this type of work requires a STEP Super User to carry out the task. The user would require in depth knowledge of STEPXML, System Setup, and how to use export and import manager.

## Accessing the System Compare Tool

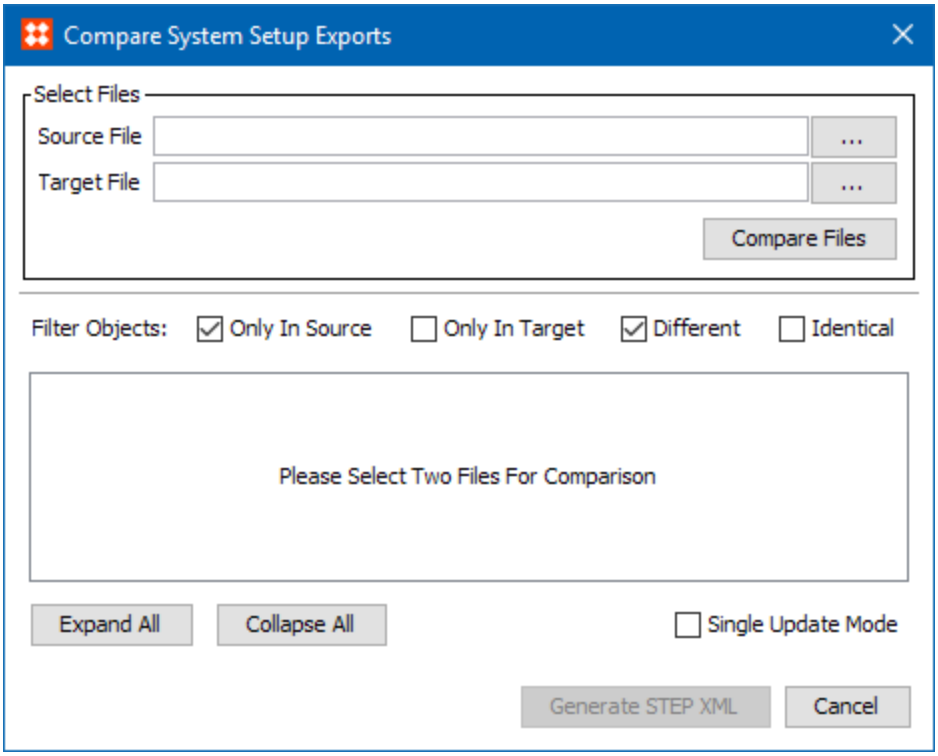
The system compare tool can be accessed through the workbench but due to the amount of memory required to run this tool it should be accessed via the STEP System Administration link on the Start Page.




To access the STEP System Administration data, the user will require Super Users privileges i.e., administrator of the system. The user will require all the privileges necessary to make the updates the imported XML requires. Once on the system admin page, select the Tools tab, and select the 'System Setup migration tool' link.




Log in as normal to display the **Compare System Setup Exports** dialog.




## Moving configuration without using the STEP comparison tool

It is possible to move configuration from one STEP instance to another without using the comparison tool. This process will only add / modify configuration loaded onto a target system. If you then need to identify what is different from the source and target machines the comparison tool will need to be used.

## Move all configurations from one STEP system to another

- Back-up target system
- Export XML from Source system excluding assets, classifications, products, and entities
- Run a Cross Context export if configuration is stored in more dimension points i.e., LOVs, attribute names etc

- Import onto target system
- Check execution report for errors and resolve

## What configuration can be moved from one system to another?

Before a user can use the comparison tool the STEP export manager needs to be used to export STEPXML from the source and target systems.

When configuring the export the following will need to be selected:

- Add the parent node for configuration files being which need to be moved from the source to the target
  If this is not done the import will fail on import the configuration files as the folder it resides in will not exist
- Select the STEP configurations that need to be exported

Below is a list of different types of configuration that can be exported from STEP. For details on each parameter, see the **STEPXML Outbound Parameters** topic in the **Data Exchange** documentation.

| STEPXML Configuration Parameter | Can these be exported? |
|---|---|
| Global Settings > Include Schema Reference | No |
| Data Objects > Include Keys as IDs | Yes – Keys on target system will be inactive |
| Data Objects > Include Entities | Comparison tool not used to export data |
| Data Objects > Include Products | Comparison tool not used to export data |
| Data Objects > Include Product Attribute Values | Comparison tool not used to export data |
| Data Objects > Include Classifications | Comparison tool not used to export data |
| Data Objects > Include Tables | No |
| Data Objects > Include Assets | Comparison tool not used to export data |
| Configuration > Include Action Sets | Yes |
| Configuration > Include Attributes | Yes |
| Configuration > Include Attribute Groups | Yes |
| Configuration > Include Attribute Transformations | Yes |
| Configuration > Include Bulk Update Configurations | Yes - Reliant on the classification to exist |
| Configuration > Include Business Rules (Global) and | Yes |

| STEPXML Configuration Parameter | Can these be exported? |
|---|---|
| Libraries | |
| Configuration > Include Collection Definitions | Yes |
| Configuration > Include Contexts | Yes |
| Configuration > Include Context Qualifiers | Yes |
| Configuration > Include eCatalogs | Yes – Product Selection based on a collection will exist, but search would need to be run to add products on target<br><br>Any other type of Product Selection will not exist |
| Configuration > Include Event Queues | Yes – Event Queues and Consumers will not be active |
| Configuration > Include Export Configurations | Yes - Reliant on the classification to exist |
| Configuration > Include Import Configurations | Yes – Reliant on the classification to exist |
| Configuration > Include Integration Endpoints (Receivers: hotfolders, REST, API, JMS ) | Yes |
| Configuration > Include Link, Reference and Object Types | Yes |
| Configuration > Include List of Values | Yes |
| Configuration > Include Setup Groups | Yes |
| Configuration > Include System Settings | Yes |
| Configuration > Include Table Types | No |
| Configuration > Include Tags | Yes |
| Configuration > Include Transformation Lookup Tables | Yes - Reliant on the classification to exist |
| Configuration > Include Units | Yes |
| Configuration > Include Users and User Groups | Yes – Cannot migrate new users as you require a password when creating a new user |

| STEPXML Configuration Parameter | Can these be exported? |
|---|---|
| Configuration > Include Web UI Configurations | Yes - Reliant on the classification to exist |
| Configuration > Include Websites | Yes |
| Configuration > Include Workflows | Yes |

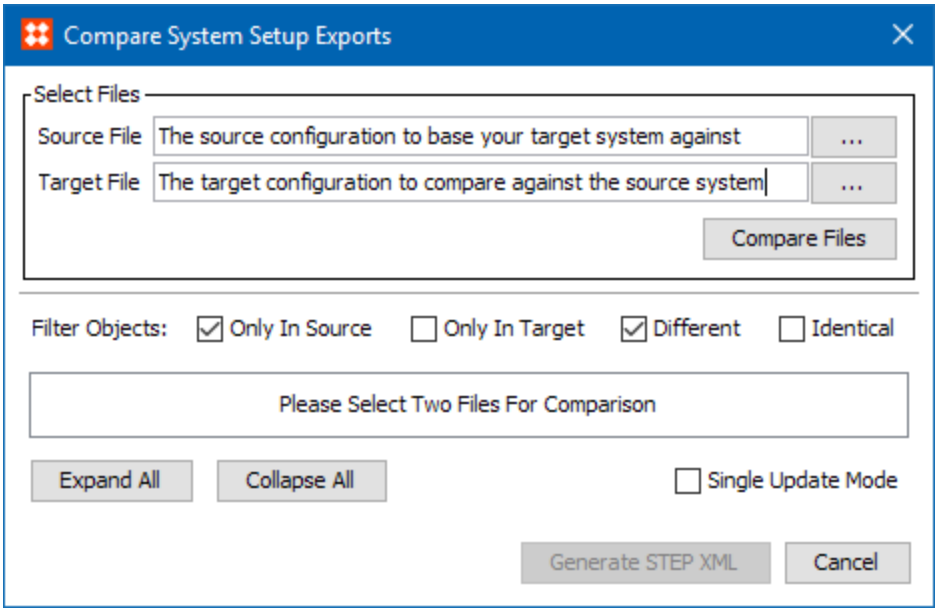
# Using the STEPXML Comparison Tool

The information below outlines how you can use the comparison tool to compare a source and target system.

## Select Source and Target configuration file

Once a user has logged into the comparison tool they will firstly need to select XML exported from the source system and XML exported from the target system as illustrated below:

1. Select the exported XML file from the source system
2. Select the exported XML file from the target system




## Select how you want to filter the configurations

Once the XML files have been selected the user will need to select how the comparison tool should filter the differences.

- Only in Source – Filter on configurations that only exist on the source system
- Only in Target – Filter on configurations that only exist on the target system
- Different – Filter on what is different between the source and target system
- Identical – Filter on what is identical between the source and target system
- Compare Files – Once selected the relevant configuration will be highlighted depending on the filter options selected above

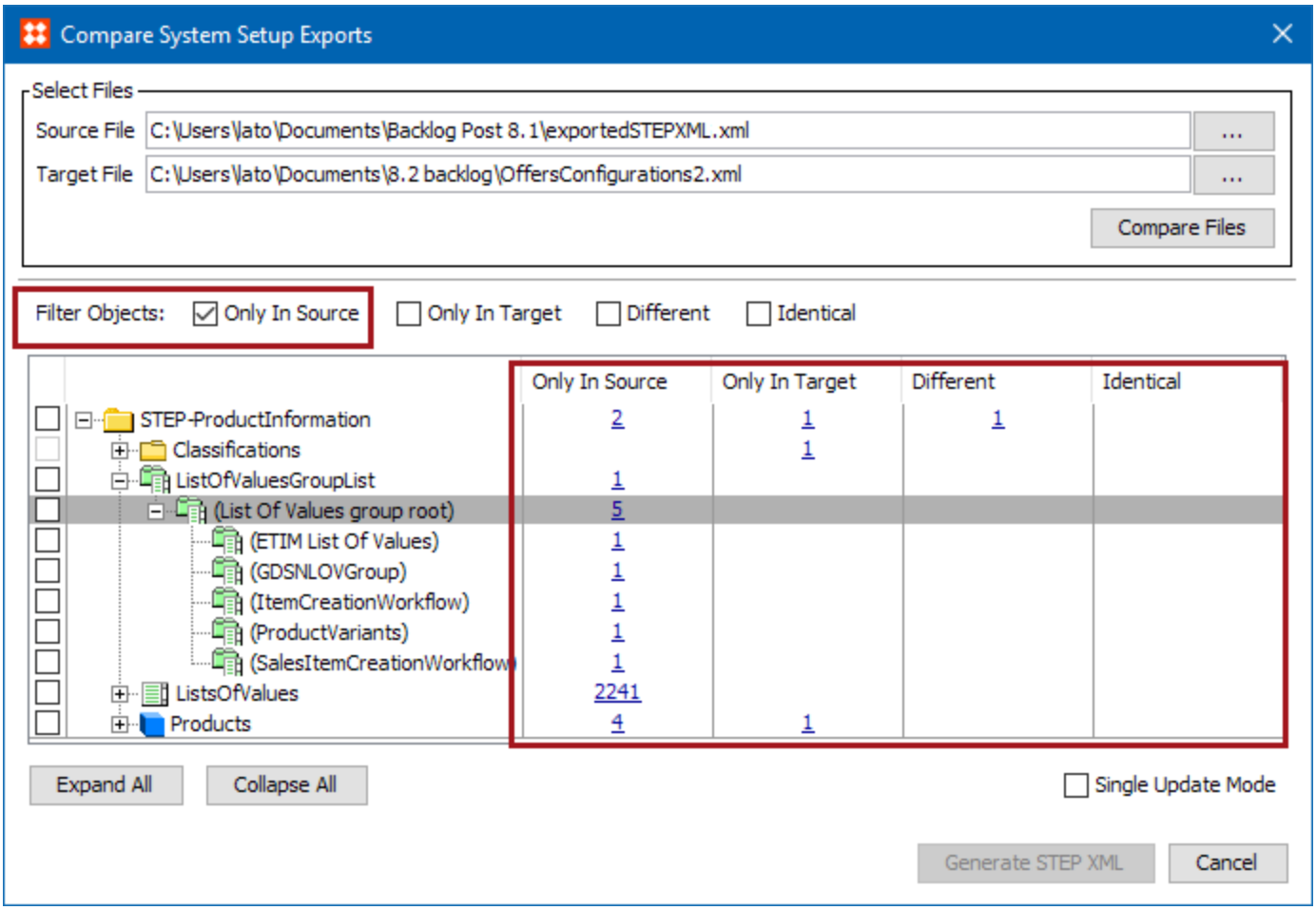
If you need to change the filter options selected, change them and click Compare Files to update

## Viewing configuration differences when 'Only In Source' is selected for example

Outlined below is an example of how to filter what is only in the source XML file.

The comparison tool will give an overview of the following:

- Only In Source
- Only in Target
- Different
- Identical




In this example the user has selected to filter on 'Only In Source', when the user opens the attribute list configuration which indicates one attribute the user is shown the attributes that appear in the source system only.

---

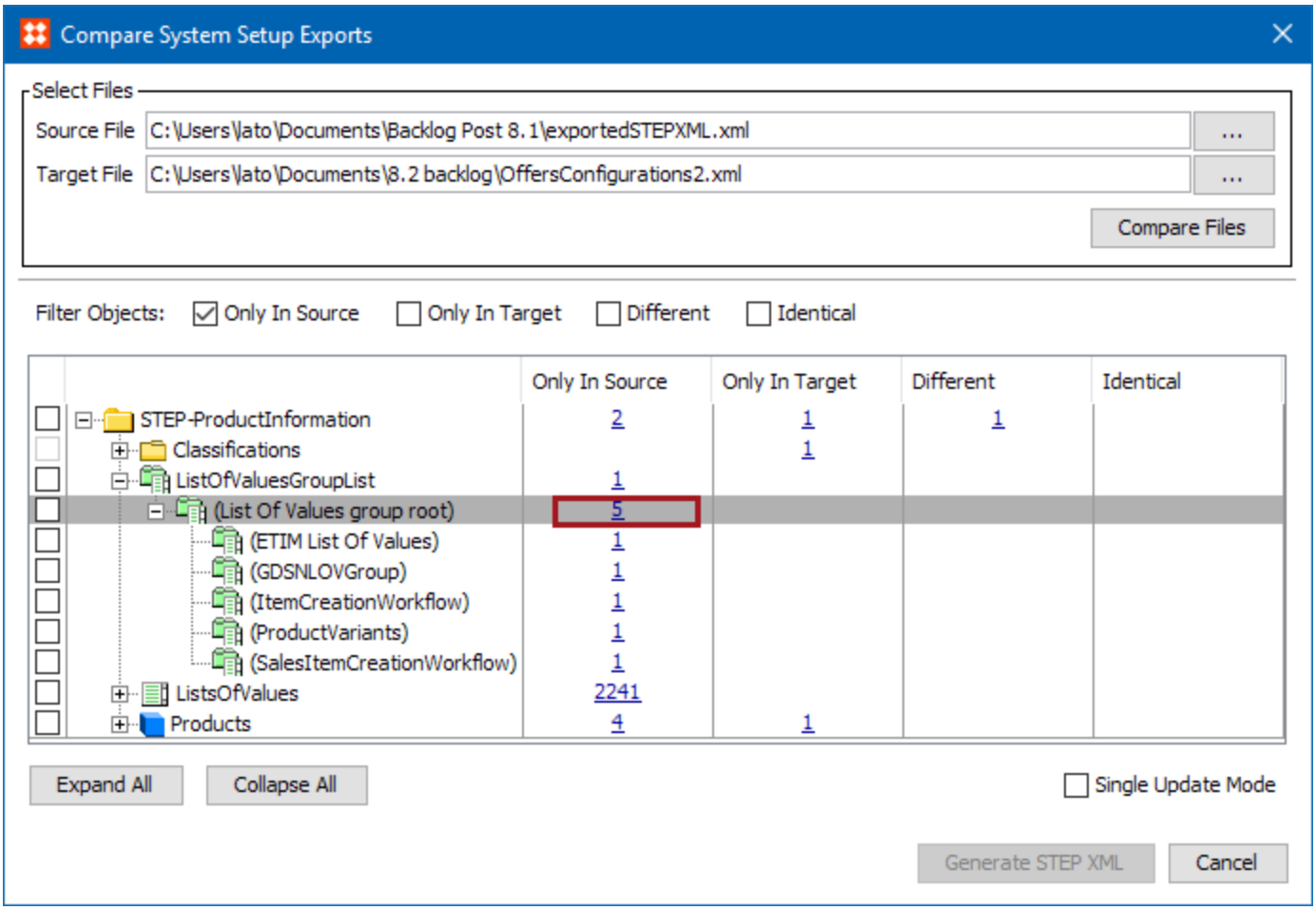
**Note:** If you select the Expand All option the user is shown all configurations related to the filter selected i.e., Only In Source.

---

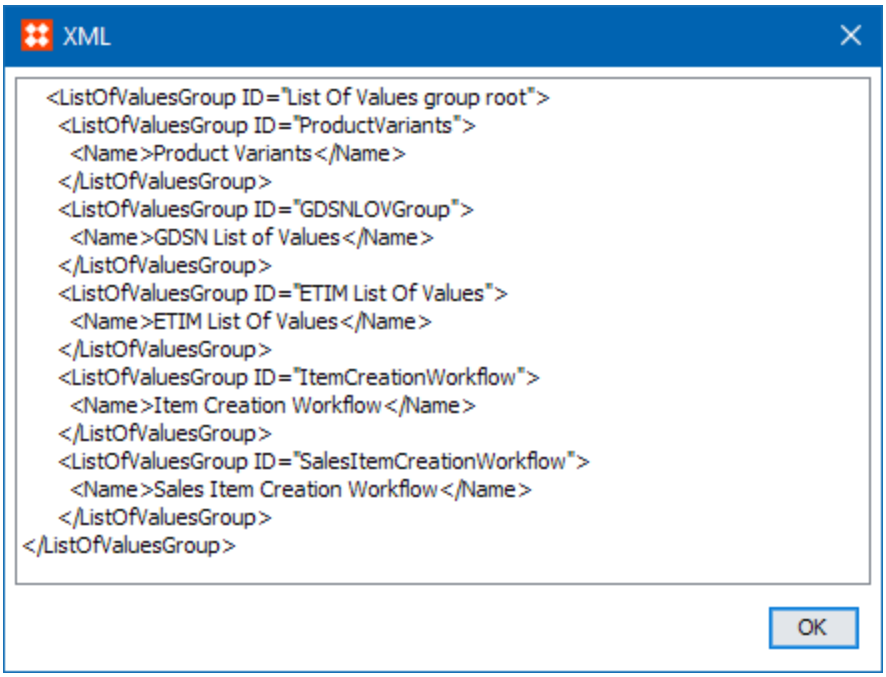
## Viewing the differences in the comparison tool

Within the comparison tool users are able to view what the difference is between the XML files from source and target systems.

If there are differences for each of the filters between the source and target systems users are able to view these differences by selecting the hyperlink for each difference



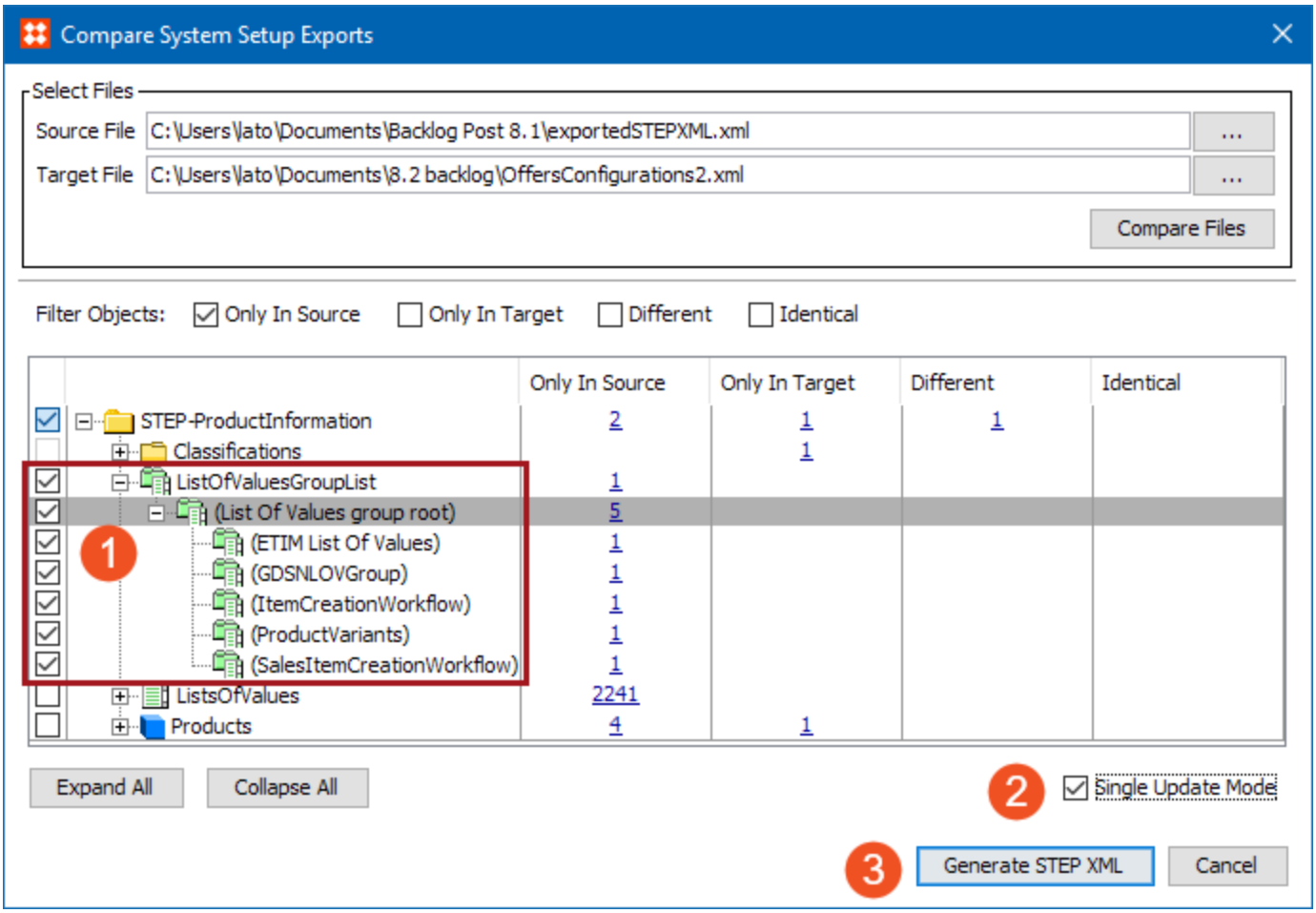

If you select the hyperlink highlighted in screenshot above you will be shown the STEPXML for the List Of Values group that only exists in the source system as follows:




## Generate STEPXML with the configuration differences

Finally the user will need to select the check boxes to identify the configuration required to be exported and then generated an XML file based on this selection.

1. Select the configuration that needs to be moved to the target system. In this case it is the List Of Values Group List.
2. Check Single Update Mode option
3. If STEPXML generated needs to make updates that require single update mode this option must be checked. Examples of what puts a system into Single Update Mode are given later in the document
4. Generate STEPXML by hitting the Generate STEPXML button




5. Save XML file and name appropriately

# STEPXML Comparison Tool Scenarios

The following examples highlight how the STEPXML Comparison Tool can be used.

## Running and loading STEPXML generated via the comparison tool

It is advisable to run the STEP comparison tool when no-one is using the system. The reason for this the XML being loaded may require 'Single-Update Mode' and if the process loading the XML is allowed to enter Single-Update Mode users will only have read-only access to the system.

If you load XML which requires Single-Update Mode and it cannot enter this state due the fact that there is an active process on the server. The import will enter a 'wait' state and will enter 'Single-Update Mode' when there are no active processes on the server.

If the XML being loaded is not set to go in to Single-Update Mode when imported the process will highlight it required to go into Single-Update Mode but was not able to.

## Create Export configurations for exporting the data

When doing the first export where you select the configurations you required to be exported it is advisable to save a configuration file. The reason for this is there are a number of configurations and it could be very easy to miss a vital configuration if a user sets this every time they do a configuration export.

- **Scenario 1** - In this scenario we need to identify what is different between our source and target systems and update the target with the necessary updates.

  Checking what is different between system to generate STEPXML to update target system :

  - Back-up target system
  - Export XML from Source system excluding Assets, Classifications, Entities and Products
  - Run a Cross Context export if configuration is stored in more dimension points i.e., LOVs, attribute names etc.
  - Export XML from Target system as above
  - The compare tool will highlight what is on the Source system only and what is different
  - Generate STEPXML tool
  - Load into target system
  - Check execution report for errors and resolve
  - Use compare tool to see what is different or only on the target system to remove or update
- **Scenario 2** - In this scenario we need to identify what only exists on the target system which will have to be manually removed or updated.

  Removing configuration from a target system :

  - Back-up target system
  - Export XML from Source system excluding Assets, Classifications, Entities and Products
  - Export XML from Target system as above

- The compare tool will highlight what is on the Target system only
- STEP user will need to manually remove the specific configurations from the target system

- **Scenario 3** - In this scenario we need to compare the system only.

  Compare configurations to see if the source and target systems match each other:

  - Export XML from Source system excluding Assets, Classifications, Entities and Products
  - Run a Cross Context export if configuration is stored in more dimension points i.e., LOVs, attribute names etc
  - Export XML from Target system as above
  - The compare tool will highlight what is not identical
- **Scenario 4** - In this scenario, use the compare tool to generate XML for specific object types. For example, to move two product types from source system to the target, choose to compare the same file and decide the objects to generate XML for.

  Generating valid STEPXML:

  - Export XML from Source system excluding Assets, Classifications, Entities and Products
  - Run a Cross Context export if configuration is stored in more dimension points i.e., LOVs, attribute names etc
  - Re-use the source XML in the target
  - The compare tool will highlight what is identical and you can choose to view the XML via the hyperlinks for the appropriate objects

## Considerations for STEPXML imports

When using the STEPXML Comparison Tool, review the following considerations.

### Single-Update Mode

- Configuration updates can require STEP to go into 'Single-Update Mode'. The updates that require Single-Update Mode via the comparison tool are listed the **STEPXML Comparison Tool Limitations** section
- Change attribute to / from being free text searchable - Yes
- Change attribute to / from being multi valued - Yes
- Activate / Deactivate unique keys - Yes but only the configuration
- Change reference type to / from being multi valued
- Modify or Move classification-product link types
  (e.g., move from one type to another type)
- Change classification-product link type to / from being multi valued
- Remove child object type in product, classification, entity, or publication object type hierarchy

### Removing valid object types from an attribute

If object types are being removed as being valid for an attribute which contains data for products this will not be removed. A warning within the execution report will highlight the

Users have to manually insert the XML tag OnlyAllowValidUserTypes='true' in the STEP-ProductInformation tag

Issues that could occur when during STEPXML import :

- If attribute changes from Text to Number validation this may not be allowed as there is data within the system for products that do not conform to Number validation
- If the configuration being loaded is reliant on another object that does not exist within STEP, a warning will be displayed in the execution report to highlight this.

  For example:

  - Loading attributes requires the object types they are valid for to exist
  - Loading contexts requires the dimension points they are linked to exist
  - Loading privilege rules requires the objects they refer too to exist
  - Loading Stateflows requires the user groups they refer too to exist

# STEPXML Comparison Tool Limitations

The comparison tool can be used to create STEPXML to modify and add relevant configuration. It will not delete or modify configuration that is already in use within STEP. It will also not make updates that require user input.

Listed below are the configurations within STEP that cannot be updated using this tool:

- Cannot change a list of value unless it has a non auto-generated ID
- If attributes have been merging on the source system the redundant attribute on the target system will need to be manually removed
- If List of values have been merged on the source system these redundant values will need to be removed / merged on the target system
- Swapping attribute ids
- Cannot change an attribute from internal to externally maintained as this requires user input –i.e., where to take the values from Main / Approved workspace
- Cannot remove dimension dependencies as this requires user input to determine which values to keep after removing the dependency
- Remove Workspaces – manual task
- Cannot change an attribute to have LOV validation or not to use LOV validation
- Cannot change reference types to / from being externally maintained as this requires user input
- Cannot change classification-product link type to / from being externally maintained as this requires user input
- Cannot change "Owns Product Links" setting on classification object type
- Cannot change Revisability of an entity object type

# Version Control System Integration

Via a set of outbound integration endpoint plugins, it is possible to configure STEP to publish the system configuration to a branch in Git, an external Version Control System (VCS) (see:https://git-scm.com). Using inbound integration endpoint plugins, files from a Git branch can be combined, enriched with processing instructions, and imported on a target system as a STEPXML file.

This functionality allows for easy comparison of configurations across systems in a Development, Test, Acceptance, and Production (DTAP) environment and is meant to aid customers who need to transfer configuration changes between different systems and/or ensure systems are in sync configuration-wise.

**Note:** The 'configuration-management' add-on component must be activated to enable VCS.

## Configuration / Data

In STEP, the distinction between configuration and data is not always clear. While most of the objects and settings that can be found in the STEP Workbench System Setup tab clearly are configuration, the Tree tab holds both data and configuration. For example, objects like import, export, and bulk update configurations are obviously configuration, but in addition, classification hierarchies, upper levels in the product and entity hierarchies, and entity structures used for modeling reference data are widely regarded as configuration.

For the functionality presented in the plugin topics / sections of the **Version Control System Integration** documentation, there is no preconceived notion of what is configuration and what is data. Instead, as described in the **Outbound Endpoint Configuration** topic, this can be configured. However, it should be stressed that the functionality is not designed to handle vast amounts of data objects (e.g., SKUs).

## Information about VCS Integration

Additional information can be found in the following sections / topics:

- **Integration Endpoint Plugins**
- **Outbound Endpoint Configuration**
- **Inbound Endpoint Configuration**
- **Editable Business Rules Format**
- **VCS: Example Setups**
- **VCS: Considerations and Limitations**

# Integration Endpoint Plugins

The plugin suite for VCS integrations consists of four plugins:

- Outbound Integration Endpoint 'STEPXML Splitter' Post-processor Plugin
- Outbound Integration Endpoint 'Git Delivery' Plugin
- Inbound Integration Endpoint 'STEPXML Joiner' Pre-processor Plugin
- Inbound Integration Endpoint 'Invoke OIEP' Post-processor Plugin

Each is described in their own section below.

Additionally, within this topic, you will also find information regarding an editable business rule format. JavaScript-based business rules can be created, maintained, and (unit) tested outside STEP. This allows customers and partners to govern the lifecycle of business rules in a standard source code control system such as GIT, and from there, be able to deploy appropriate versions of the business rules to the various STEP systems that are part of a Development, Testing, Acceptance and Production (DTAP) environment.

## Outbound Integration Endpoint 'STEPXML Splitter' Post-processor Plugin

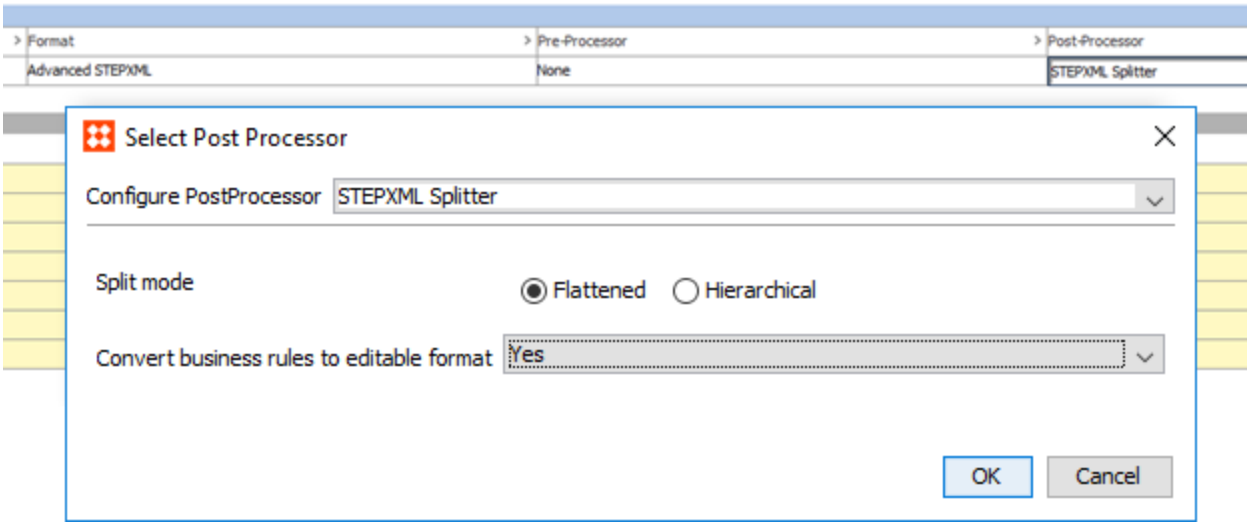
The 'STEPXML Splitter' post-processor can take any STEPXML file produced by the 'STEP Exporter' processing engine as input and will split the file into multiple valid STEPXML files / editable business rule format files that are then passed to the configured delivery plugin. Generally, the splitter produces one file per STEP object and further normalizes the content so that elements for which the sequence has no significance in STEP are output in the same order every time. Non-object configurations (e.g., derived events) and system settings are output in a single file.

The reasoning behind splitting and normalizing is that it makes it easier to compare configurations outside of STEP in a VCS like Git. Further, it makes it easy to selectively choose specific configuration items to be imported on another system.

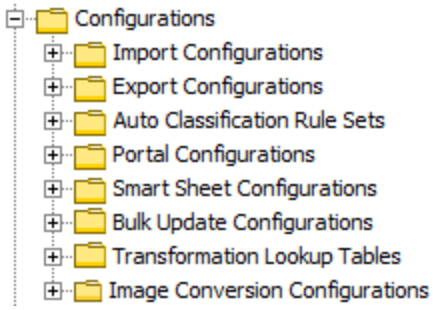
The ‘STEPXML Splitter’ plugin has two configuration options explained below.

### Split mode

Split mode, that defaults to ‘Flattened’, with the other option being hierarchical, affects how STEP objects that normally are exported in a nested fashion are represented in the produced split files.




To illustrate the difference, in the example shown below, the classification hierarchy is being exported.




In both modes, one file will be created per classification object, but in 'Hierarchical' mode each of the leaf classifications, like e.g., 'Import Configurations', will be nested inside the element representing the 'Configurations' classification (this element will be stripped of all but ID, object type ID, and parent ID information) as shown below.

```
(…)
<Classifications>
  <Classification ID='ConfigurationsRoot' UserTypeID='ConfigurationsRoot'
ParentID='Classification 1 root'>
    <Classification ID='stibo.IMConfigFolder'
UserTypeID='ImportConfigurationsRoot'>
      <Name>Import Configurations</Name>
      <MetaData>
        <Value AttributeID='Purpose' QualifierID='en-US'>Storage for
import configurations</Value>
      </MetaData>
    </Classification>
  </Classification>
</Classifications>
(…)
```

In 'Flattened' mode, upper levels will be omitted, and each file will contain exactly one 'Classification' element with parent identifier information as shown below.

```
(…)
<Classifications>
  <Classification ID='stibo.IMConfigFolder'
UserTypeID='ImportConfigurationsRoot' ParentID='ConfigurationsRoot'>
    <Name>Import Configurations</Name>
    <MetaData>
      <Value AttributeID='Purpose' QualifierID='en-US'>Storage for import
configurations</Value>
    </MetaData>
  </Classification>
</Classifications>
(…)
```

Generally, it is recommended to use the default 'Flattened' mode while the 'Hierarchical' mode only should be used if the full hierarchy path must be present in each file. Obviously, the 'Hierarchical' example from above can be imported on a system where the classification with ID 'ConfigurationsRoot' is not present (it will be created during import). Importing the 'Flattened' example on such a system will, on the other hand, result in an error.

### Convert business rules to editable format

This option determines how business rules (conditions, actions, functions and libraries) are exported. If set to 'No', the business rules are exported as STEPXML files. If set to 'Yes', the rules are exported in the editable *.js format described in this topic.

When exporting editable business rules, the parameter 'Convert business rules to editable format' option should be set to 'Yes.' The business rules in the STEPXML that are fed to the post-processor will be converted to the editable format and represented in a single *.js file instead of being represented in a STEPXML file. For details, see the **Editable Business Rules Format** topic.

## Outbound Integration Endpoint 'Git Delivery' Plugin

The 'Git Delivery' plugin delivers files produced by the outbound integration endpoint processing engine / a configured post-processor to a branch in a remote Git repository via a local directory on the application server or a directory accessible from all application servers within a clustered setup (see https://git-scm.com for more information about Git). Specifically, the plugin first checks if the local delivery directory is Git enabled. If this is the case, the following operations are performed:

1. Git fetch
2. Git checkout (of configured branch)
3. Git hard reset
4. Git pull (if branch exists in remote)

If the local directory is not Git enabled, the following operations are performed:

1. Git clone
2. Git checkout (of configured branch)

---

**Note:** The remote repository cannot be empty. At least one branch with one file must exist.

---

After this, the locally checked-out branch will be in sync with the remote branch, and the following operations are performed:

1. Files produced by the outbound integration endpoint are written to the local directory
2. Files in local directory but not in delivery are deleted
3. Git stage
4. Git commit
5. Git push

If the configured branch does not exist in the remote repository in advance, it will be created.

It is important to understand the implications of this functionality, namely that:

- The outbound integration endpoint must with each invocation produce files for all the configuration objects / settings to be represented in the configured Git branch. Exporting only a file for a single object will cause all other files in the Git branch to be deleted. See the **Outbound Endpoint Configuration** topic for more information on how to configure an outbound integration endpoint using this delivery plugin.
- Only STEP should make changes in the configured Git branch. All other changes will be overwritten with the next STEP delivery.

The 'Git Delivery' plugin has the following parameters:

### *Local git repository URI*

URI for the local directory via which configuration files will be synchronized. Possible values for this parameter are read from 'GitDelivery.LocalRepoUri.[integer]' configuration property entries.

Having, for example, the following entries in sharedconfig.properties:

```
GitDelivery.LocalRepoUri.1=/workarea/conf-attributes
GitDelivery.LocalRepoUri.2=/workarea/conf-all
```

will make it possible to select between the values '/workarea/conf-attributes' and '/workarea/conf-all' for the parameter in the workbench.

---

**Note:** For this property and the ones mentioned below, the sequence of the variable integers in the property names must be complete. E.g., 1, 2, 3. Property values will not be read correctly if the sequence is, for instance 1, 3, 4.

---

### *Remote git repository URI*

URI for the remote repository. As with the 'Local git repository URI' values that can be selected in the workbench are read from 'GitDelivery.RemoteRepoUri.[integer]' configuration property entries.

Examples:

```
GitDelivery.RemoteRepoUri.1=https://bitbucket.org/john-smith/step-conf.git
GitDelivery.RemoteRepoUri.2=ssh://gituser@192.168.56.102/home/gituser/git/repo.git
```

### *Git branch*

Name of the branch to which the delivery is published. Values for this parameter are read from 'GitDelivery.Branch.[integer]' configuration property entries. Examples:

```
GitDelivery.Branch.1=step-dev-1
GitDelivery.Branch.1=step-qa
```

### *Author name*

Author name for the Git commit. Values for this parameter are read from 'GitDelivery.AuthorName.[integer]' configuration property entries. Example:

```
GitDelivery.AuthorName.1=John Smith - STEP Dev1
```

### *Author email*

Author email for the Git commit. Values for this parameter are read from 'GitDelivery.AuthorEmail.[integer]' configuration property entries. Example:

```
GitDelivery.AuthorEmail.1=john.smith@gmail.com
```

### *Repository username*

The remote repository username. Values for this parameter are read from 'GitDelivery. RemoteRepoUsername. [integer]' configuration property entries. Example:

```
GitDelivery.RemoteRepoUsername.1=john.smith@gmail.com
```

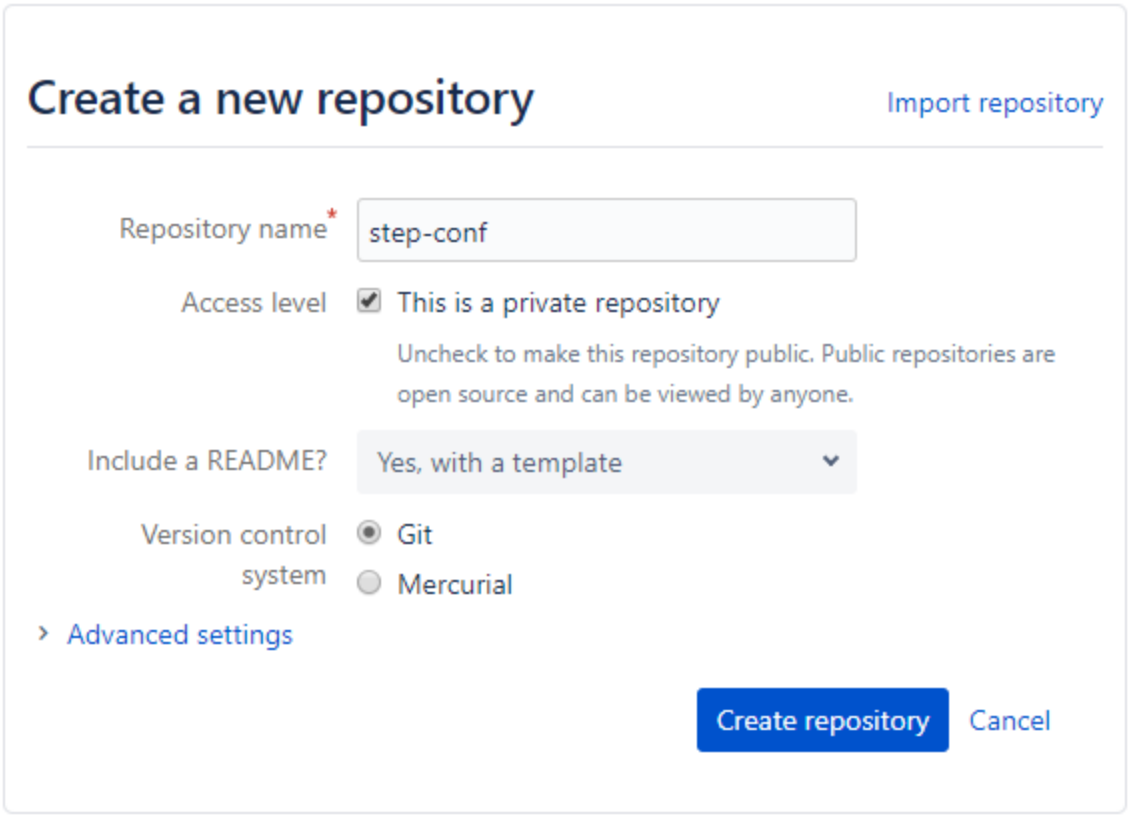
### *Repository user password*

The remote repository password. Password must be entered directly when configuring the plugin.

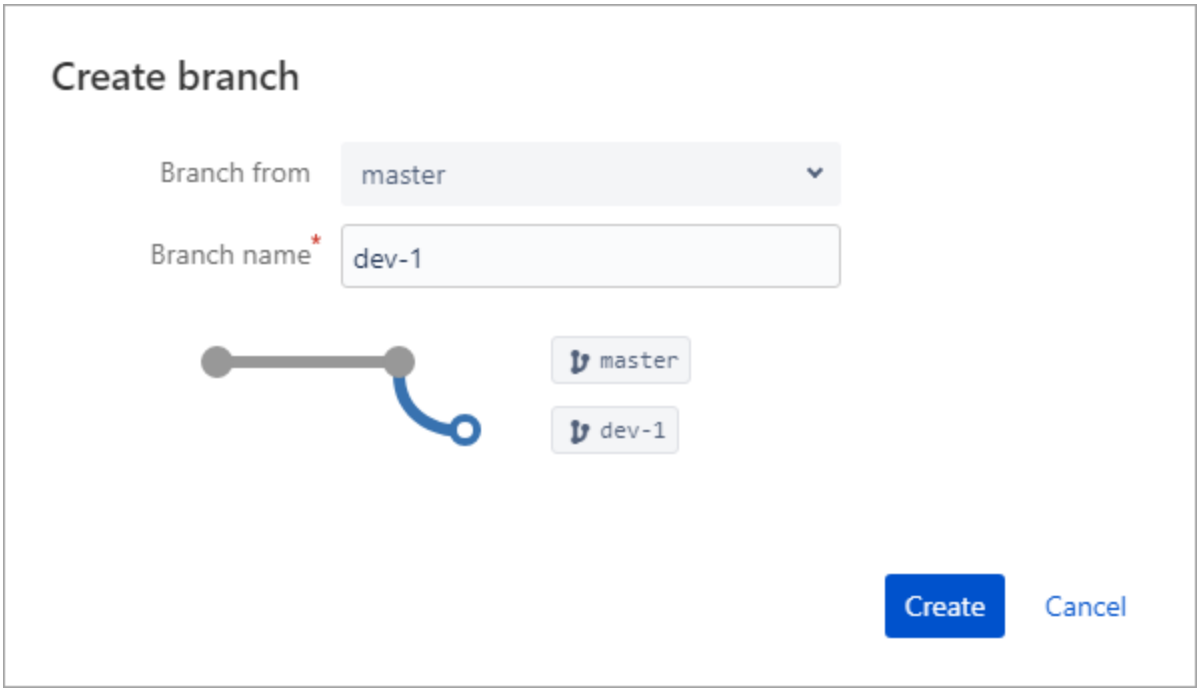
## Remote Setup Example

This section contains an example of how a remote Git repository using Bitbucket (https://bitbucket.org) (https://bitbucket.org) can be configured from scratch to work with the Git delivery plugin.

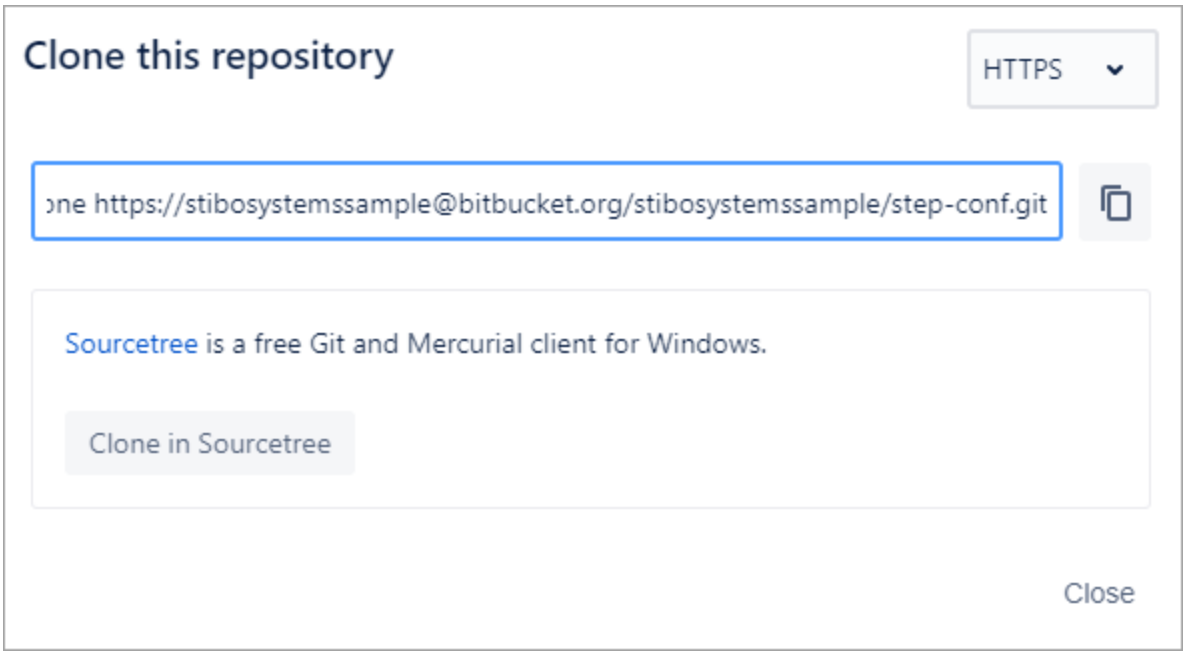
1. Create a new repository with a 'README' file via the Bitbucket web interface.




2. Create a system specific branch in the repository.




3. Get the 'Remote git repository URI' from, for example, the Bitbucket 'Clone' option.



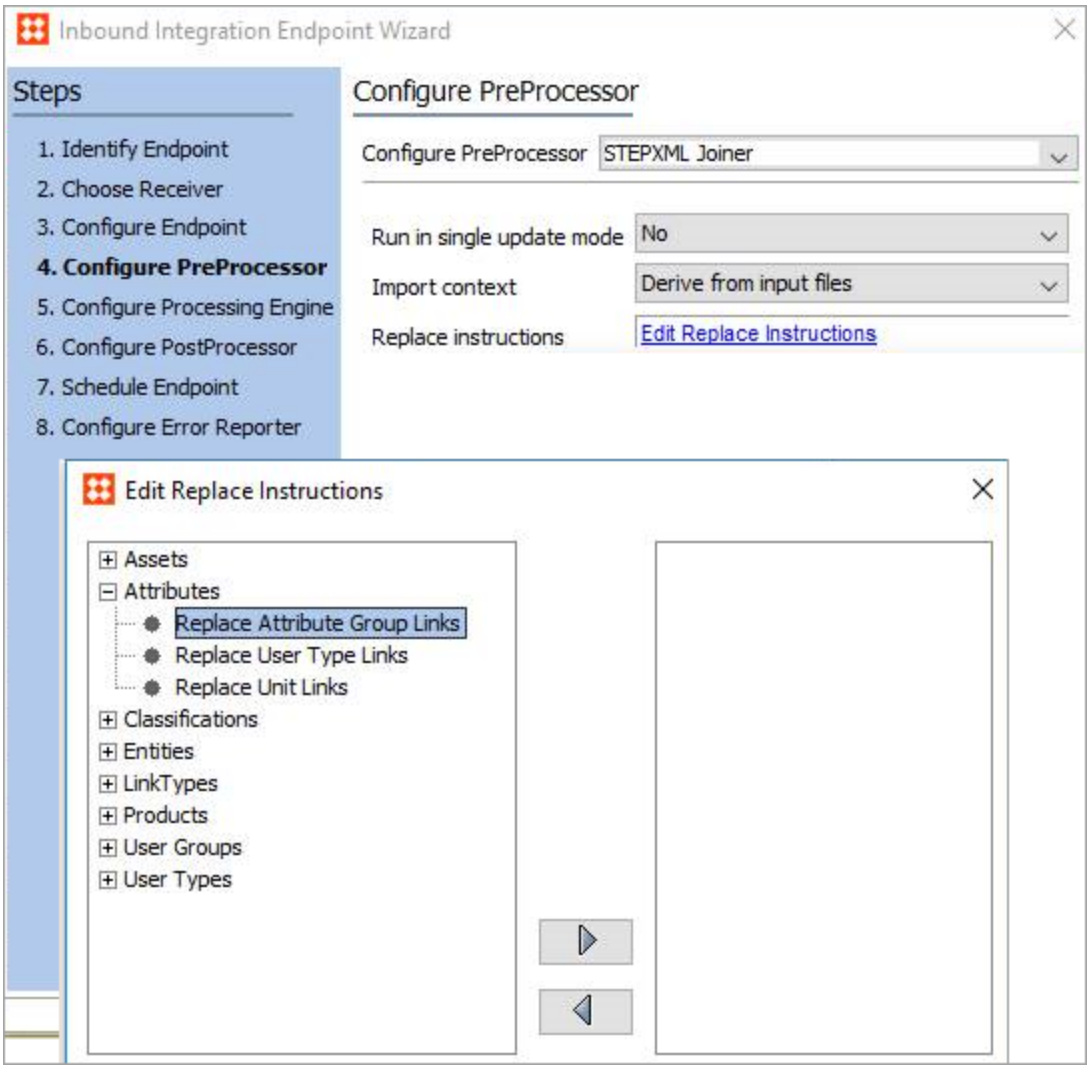

## Inbound Integration Endpoint 'STEPXML Joiner' Pre-processor Plugin

The 'STEPXML Joiner' inbound pre-processor plugin has been designed to be used for getting configurations and settings exported via the outbound functionality, described above, imported on a system. The outbound functionality produces STEPXML files and potentially*.js files representing business rules. The 'STEPXML Joiner' plugin can take a .ZIP file containing any number of such files as input and will then combine these to a single STEPXML file with objects and settings appearing in the most sensible order and pass the combined file to the inbound integration endpoint processing engine.

The pre-processor plugin can add various processing instructions to the combined STEPXML file, and there are two options for specifying these instructions. Users can either use the UI to configure the processing instructions (see screenshot below) or users can include a template STEPXML file in the .ZIP file fed to the endpoint.

To configure the UI:

1. Make a single update mode selection.
2. Make an import context selection. This is the context that will receive the imported data
3. For 'list properties' (multiple instances of the same XML element at the same level) such as 'Value' elements inside the 'Values' element for a product or 'TargetUserTypeLink' elements for a reference type definition, this means that special processing instructions must be used to express that properties not present in the import file must be removed from the system as part of the import. Add these replacement instructions by clicking 'Edit Replace Instructions'.
4. Within the 'Edit Replace Instructions' dialog, build the rules by selecting options on the left and using the arrow to move the rule over to the right box. Save changes before moving to the next step within the Inbound Integration Endpoint Wizard.

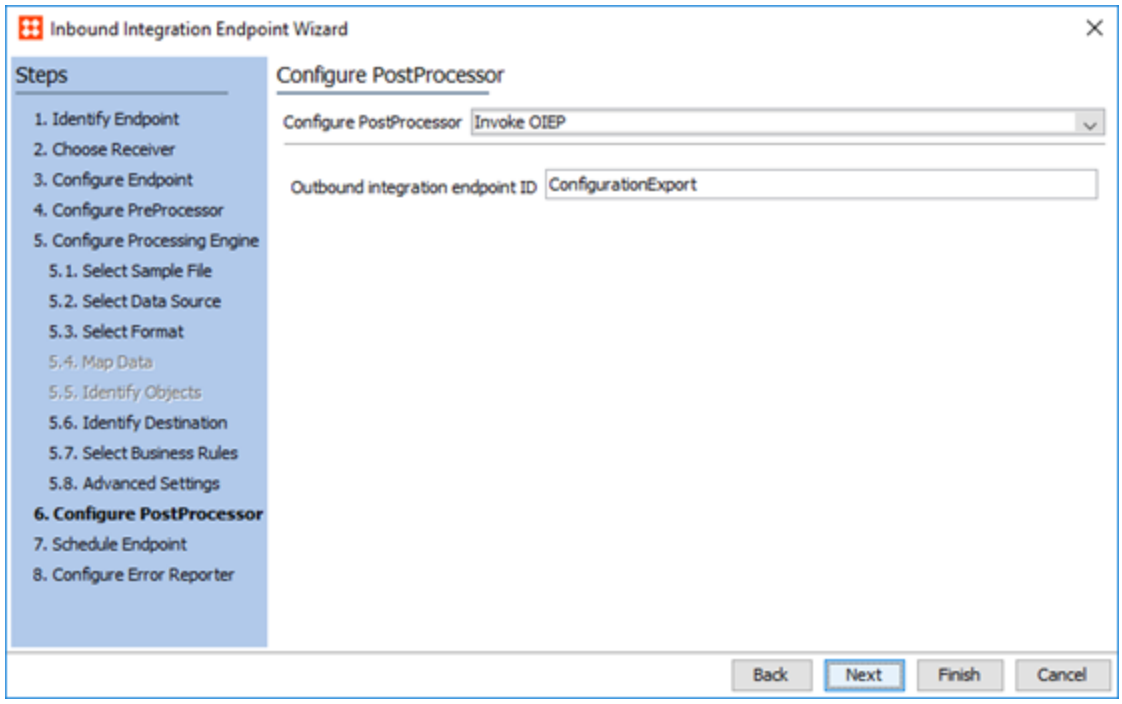



If a template file is provided in the .ZIP, the settings from this file overrule any UI configurations made in the UI. The template file must be named 'ProcessingInstructions.xml' and should, inside the STEP-ProductInformation element, only include the ReplacementRules element.

For more information regarding ReplacementRules, see the **ReplacementRules Tag in STEPXML** topic in the **STEPXML Tags and Examples** section of the **Data Exchange** documentation.

## Inbound Integration Endpoint 'Invoke OIEP' Post-processor Plugin

The 'Invoke OIEP' post-processor plugin allows for an outbound integration endpoint to be invoked once the inbound import process has completed. This makes it possible to update the representation of the system configuration in a remote Git branch immediately after the configuration has been imported. As can be seen below, the plugin only has a single configuration parameter: the ID of the outbound integration endpoint to invoke.




For more information, see these topics in the **Version Control System Integration** section:

- **Editable Business Rules Format**
- **VCS: Example Setups**
- **VCS: Considerations and Limitations**

# Outbound Endpoint Configuration

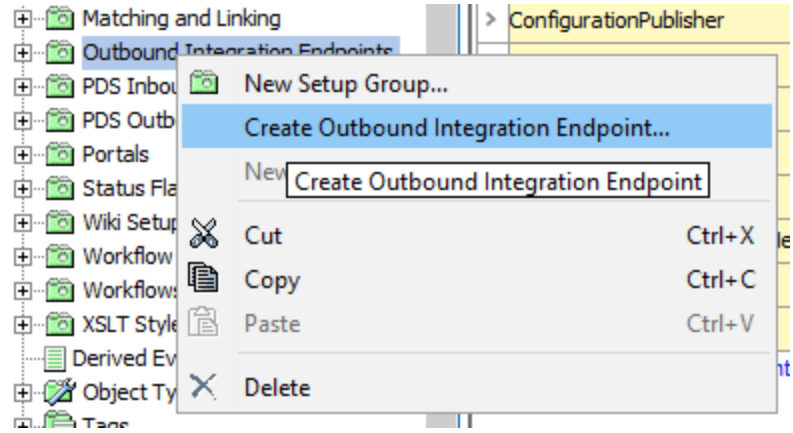
This section describes step-by-step how an outbound integration endpoint can be configured to be used for publishing the system configuration to a remote Git repository.

---

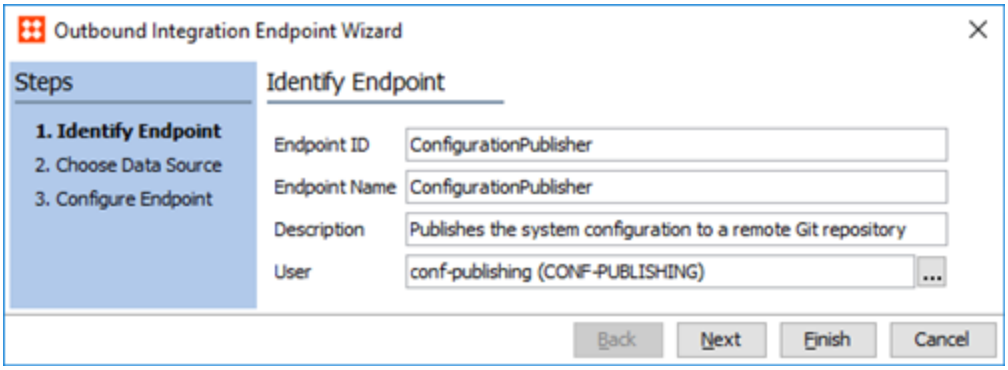
**Note:** If you want to compare the configurations from multiple systems, the endpoint configuration on the systems should be identical (except for the Git branch 'Git Delivery' plugin information).

---

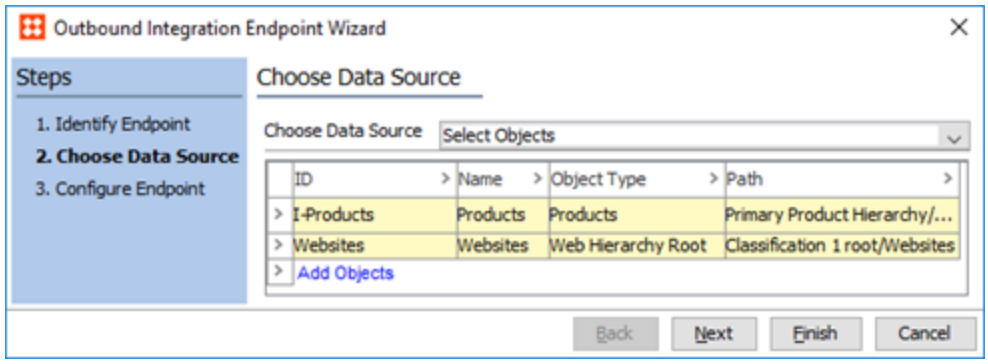
1. Launch the 'Outbound Integration Endpoint Wizard' by selecting 'Create Outbound Integration Endpoint…' in the context menu for a setup group configured to hold outbound integration endpoints.



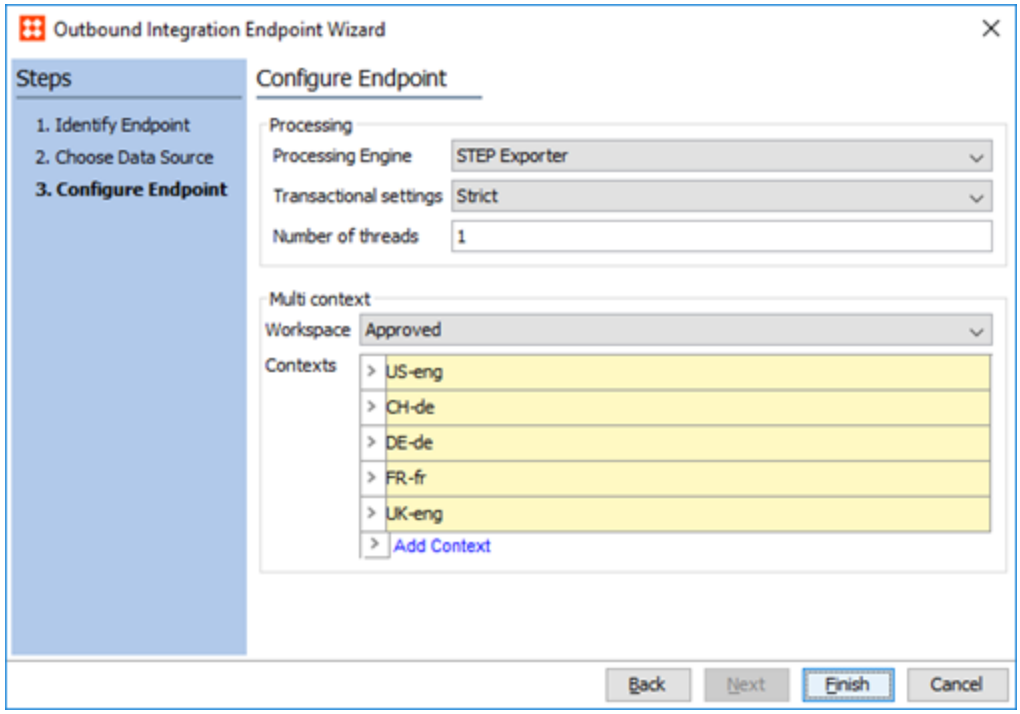

2. In the 'Identify Endpoint' step of the wizard, enter basic information. Make sure the endpoint is configured to run as a system user who has view privileges to the configuration objects to be exported.



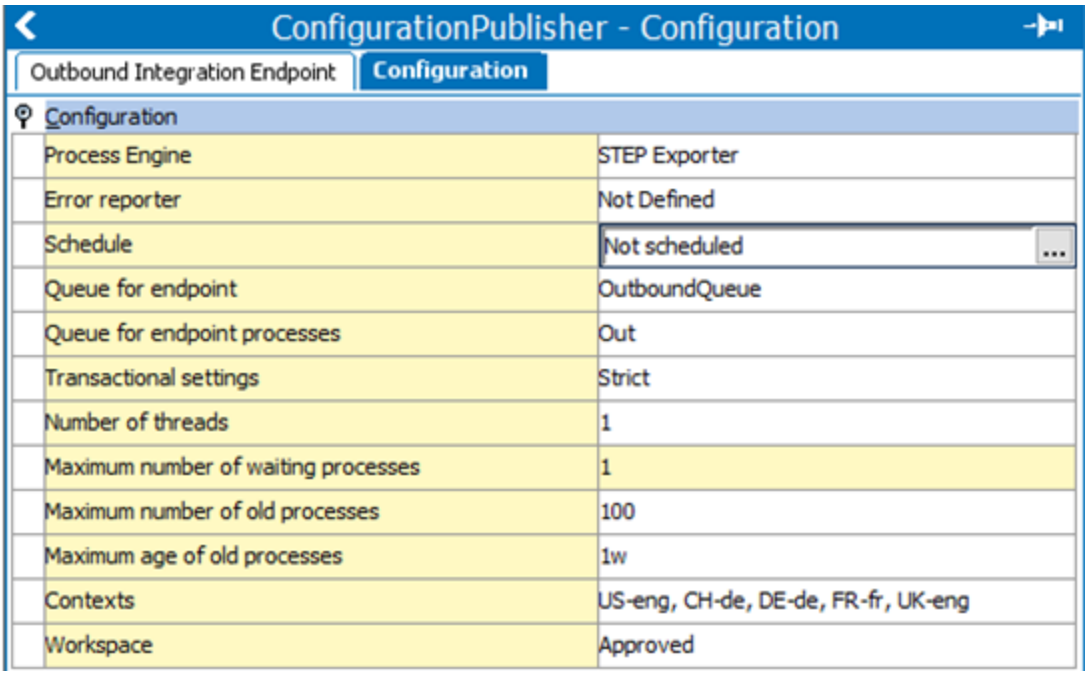

3. As stated in **Integration Endpoint Plugins** > **Outbound Integration Endpoint 'Git Delivery' Plugin** , all configurations and settings to be held in Git must be published each time the outbound integration endpoint is invoked. Therefore, the endpoint must in step 2 of the wizard be configured to use the 'Select Objects' data source option. **Even if no product, entity or classification objects are to be published, a 'dummy' selection must be made.** If such data objects are to be published, the relevant root nodes should be selected.




4. In the 'Configure Endpoint' step, select 'STEP Exporter' as the processing engine. As for the 'Workspace' parameter, most configuration objects are not workspace revised; if data objects like products, entities and classifications are to be published, in most cases it is the approved version of these objects that should be exported and for this, the 'Approved' workspace should be selected. If configuration data that is to be published is dimension dependent, all relevant contexts should be selected.

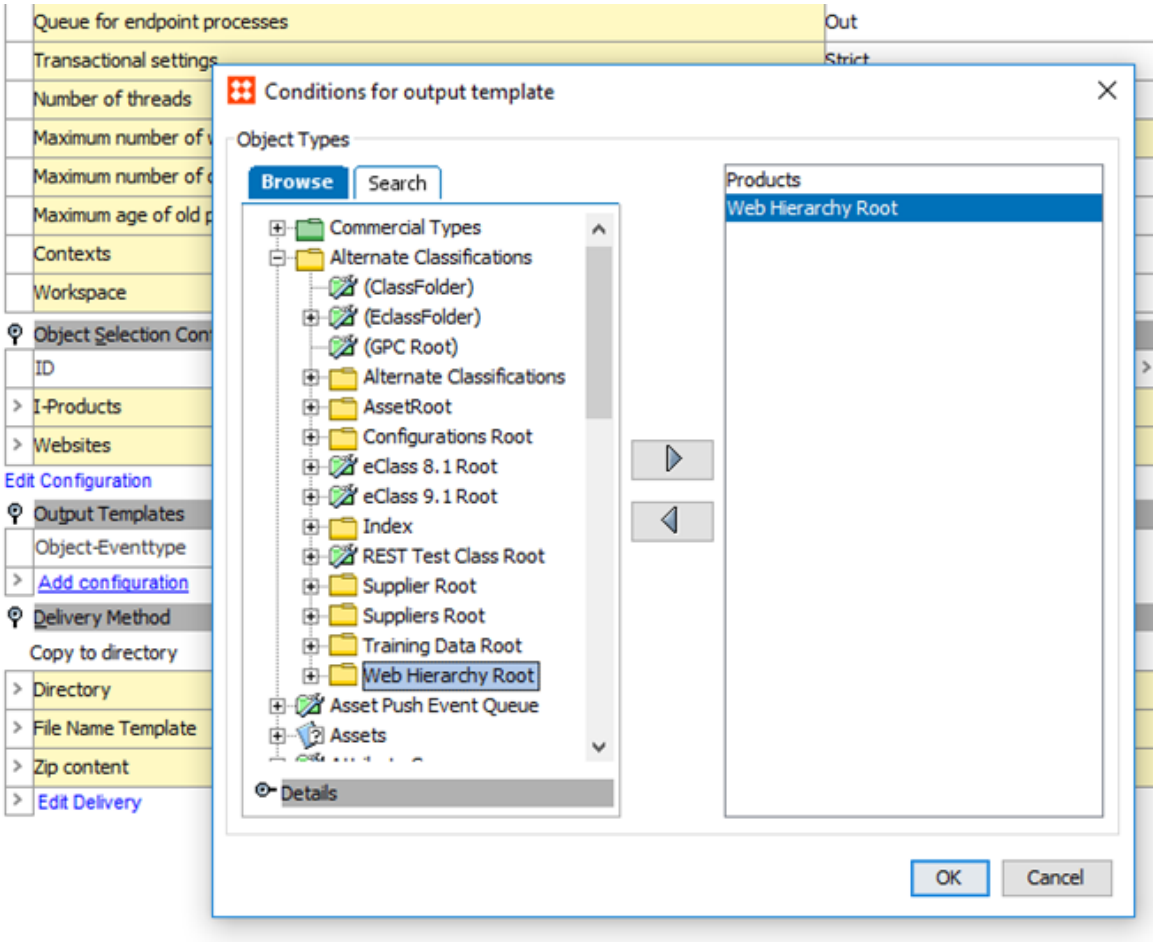



5. Once the wizard has been completed, on the 'Configuration' tab of the newly created endpoint, configure the schedule, queue, and process retention settings as desired.



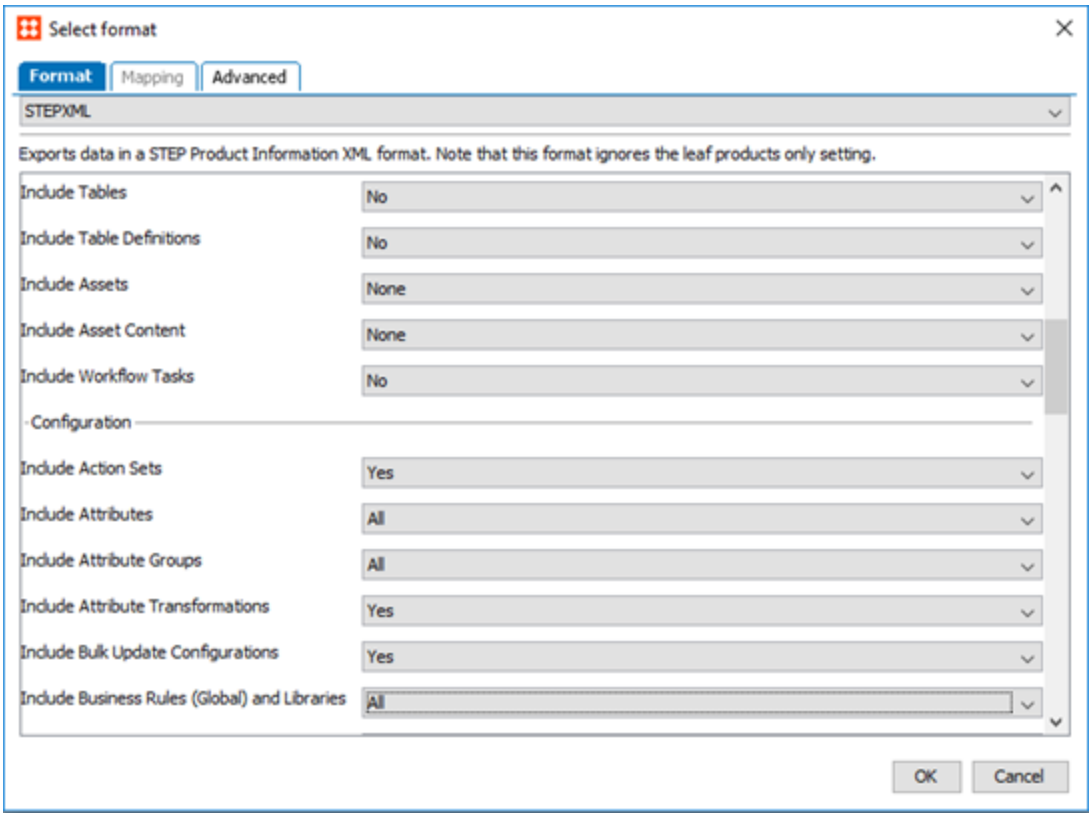

6. In the 'Output Templates' section, add a single configuration and select the object types of the nodes selected for publishing (must also be done for 'dummy' selections).

**Note:** The Git delivery plugin will only work with a single output template.

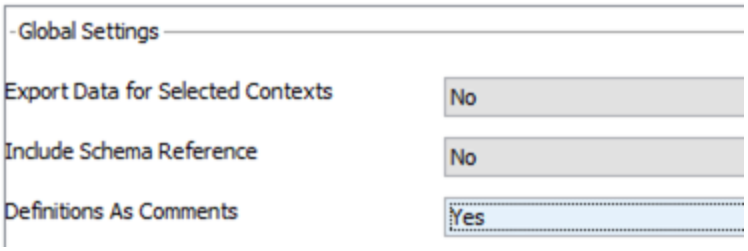



7. For 'Format', the Version Control System (VCS) integration plugins will work with either the 'STEPXML' or the 'Advanced STEPXML' format plugins. However, if data objects are to be published and the exported objects are to be filtered according to their object types, the 'Advanced STEPXML' option must be selected.

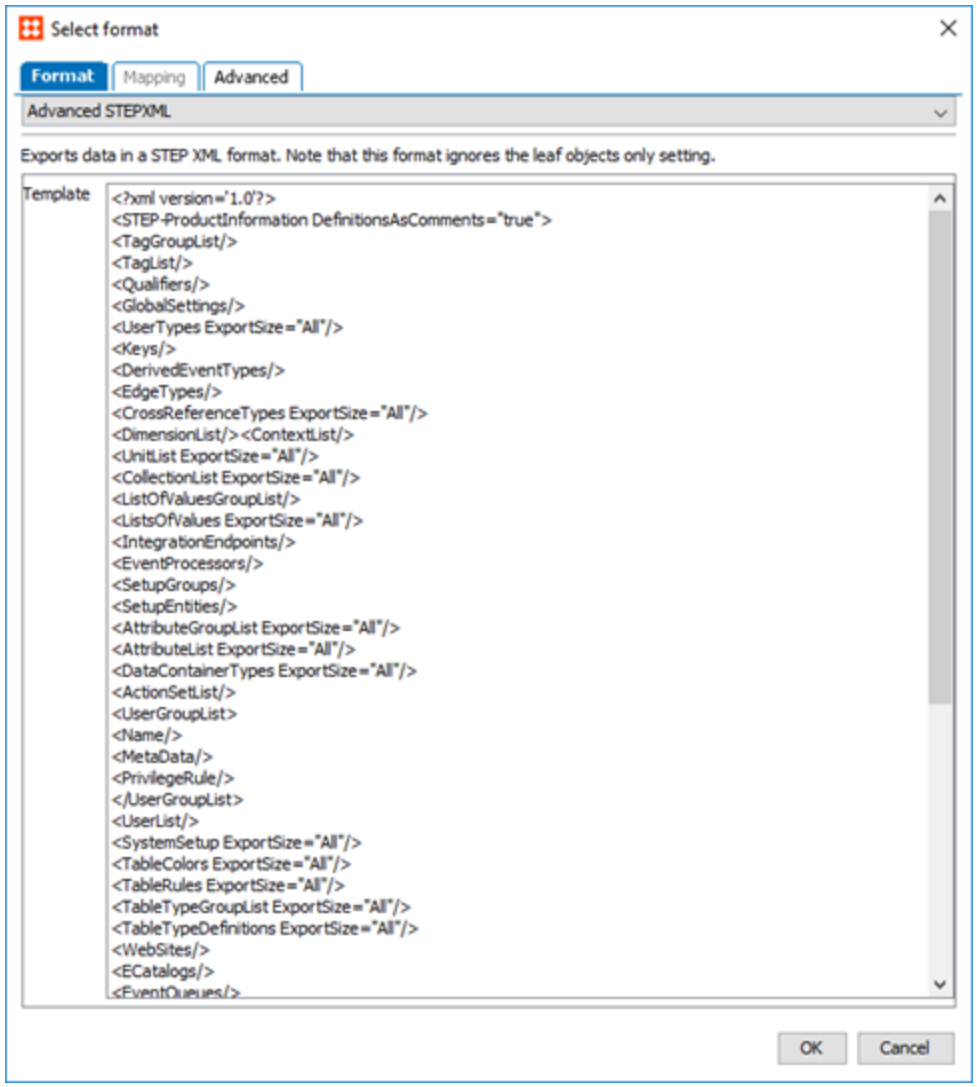
   If 'STEPXML' is selected, select 'Yes' / 'All' for the configuration types to export, 'Minimum' for products, entities, and classifications, if these are to be exported and 'No' / 'None' for all types that should not be published.




Further, to make obfuscated configurations (e.g., business rules) comparable outside STEP, select 'Yes' to export 'Definitions As Comments'.




If the 'Advanced STEPXML' option is selected, enter the appropriate template and make sure to set the STEP-ProductInformattion 'DefinitionsAsComments' attribute to 'true'.

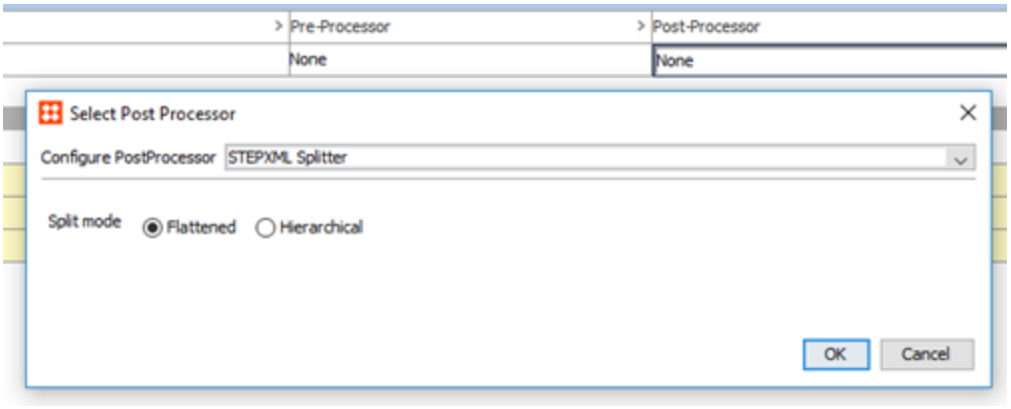



Full example configuration with product object type filtering is shown below:

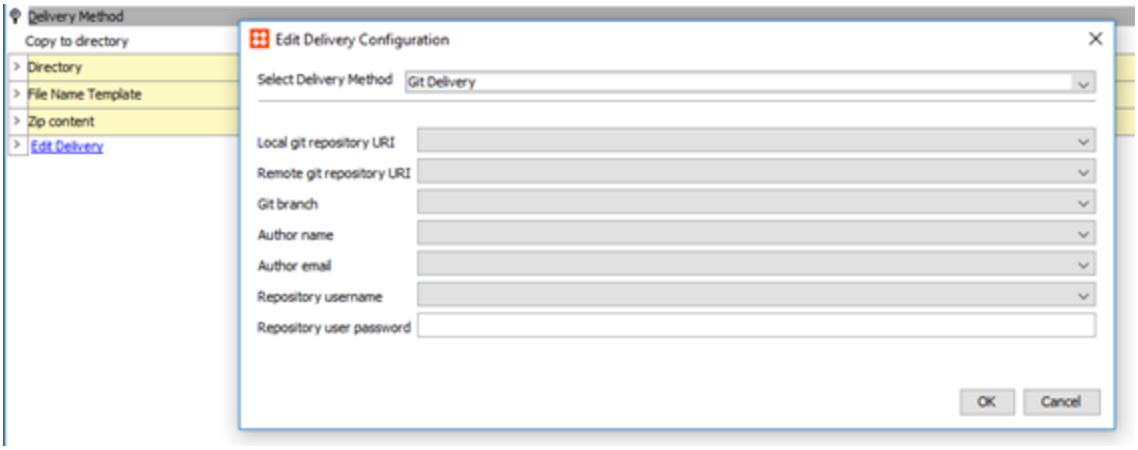
```
<?xml version='1.0'?>
<STEP-ProductInformation DefinitionsAsComments='true'>
  <TagGroupList/>
  <TagList/>
  <Qualifiers/>
  <GlobalSettings/>
  <UserTypes ExportSize='All'/>
  <Keys/>
  <DerivedEventTypes/>
  <EdgeTypes/>
  <CrossReferenceTypes ExportSize='All'/>
  <DimensionList/>
  <ContextList/>
  <UnitList ExportSize='All'/>
  <CollectionList ExportSize='All'/>
  <ListOfValuesGroupList/>
```

```
  <ListsOfValues ExportSize='All'/>
  <IntegrationEndpoints/>
  <EventProcessors/>
  <SetupGroups/>
  <SetupEntities/>
  <AttributeGroupList ExportSize='All'/>
  <AttributeList ExportSize='All'/>
  <DataContainerTypes ExportSize='All'/>
  <ActionSetList/>
  <UserGroupList/>
  <UserList/>
  <SystemSetup ExportSize='All'/>
  <TableColors ExportSize='All'/>
  <TableRules ExportSize='All'/>
  <TableTypeGroupList ExportSize='All'/>
  <TableTypeDefinitions ExportSize='All'/>
  <ECatalogs/>
  <EventQueues/>
  <STEPWorkflows ExportSize='All'/>
  <BusinessLibraries ExportSize='All'/>
  <BusinessRules ExportSize='All'/>
  <MatchCodes/>
  <MatchingAlgorithms/>
  <PortalConfigurations ExportSize='All'/>
  <AttributeTransformationGroups/>
  <ImportConfigurations ExportSize='All'/>
  <ExportConfigurations ExportSize='All'/>
  <BulkUpdateConfigurations ExportSize='All'/>
  <TransformationLookupTableConfigurations ExportSize='All'/>
  <ComponentModels/>
  <Products ExportSize='Minimum'>
    <FilterUserType ID='Level1'/>
    <FilterUserType ID='Level2'/>
    <FilterUserType ID='Level3'/>
    <Product/>
  </Products>
  <Classifications ExportSize='Minimum'/>
</STEP-ProductInformation>
```

8. Configure the 'STEPXML Splitter' post-processor. For more information, see **Integration Endpoint Plugins > Outbound Integration Endpoint 'STEPXML Splitter' Post-processor Plugin** for details.




9. Configure the 'Git Delivery' delivery plugin. See section **Integration Endpoint Plugins** > **Outbound Integration Endpoint 'Git Delivery' Plugin** for details.

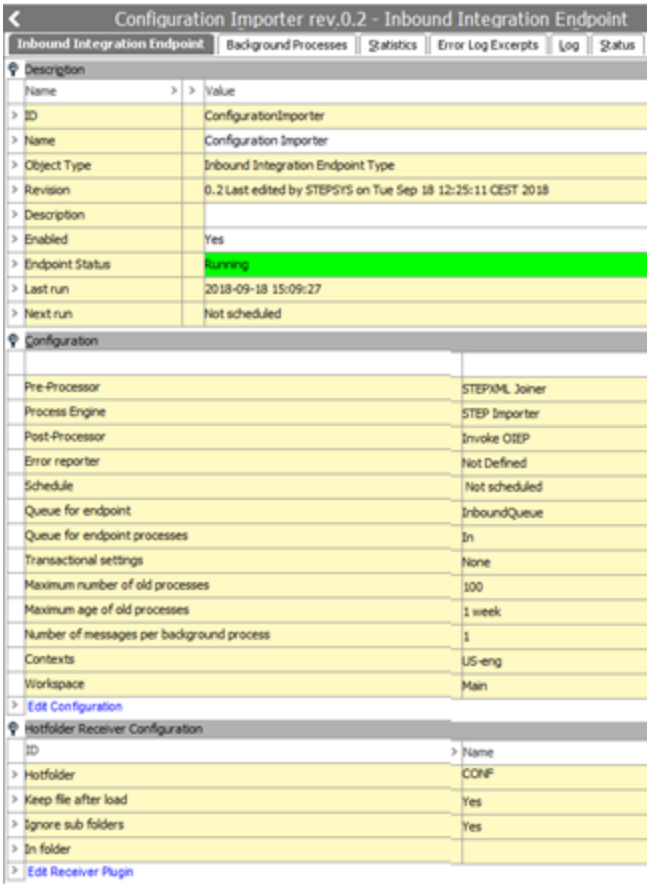


# Inbound Endpoint Configuration

The inbound 'STEPXML Joiner' pre-processor plugin and the 'Invoke OIEP' post-processor plugin are configured via the 'Inbound Integration Endpoint Wizard' opened by selecting 'Create Inbound Integration Endpoint…' in the context menu for a setup group configured to hold inbound integration endpoints. For details, see the **Inbound Integration Endpoint 'STEPXML Joiner' Pre-processor Plugin** and the **Inbound Integration Endpoint 'Invoke OIEP' Post-processor Plugin** sections of the **Integration Endpoint Plugins** topic.

The endpoint must be configured to import STEPXML (provide any valid STEPXML file as a sample file) and can be configured with any receiver plugin capable of handling .ZIP files, for example, the 'Hotfolder Receiver' or the 'REST Receiver'. If workspace revisable objects like products and classifications are imported, it must be decided whether or not import changes automatically should be approved.

Example configuration shown below:



# Editable Business Rules Format

JavaScript-based business rules can be created, maintained, and tested outside STEP. This allows customers and partners to govern the lifecycle of business rules in a standard source code control system such as Git, and from there, be able to deploy appropriate versions of the business rules to the various STEP systems that are part of a Development, Testing, Acceptance and Production (DTAP) environment.

This topic describes the following in detail:

- Editable Business Rule Format
- Options for Export
- Options for Import
- REST Resources for Testing and Validation

---

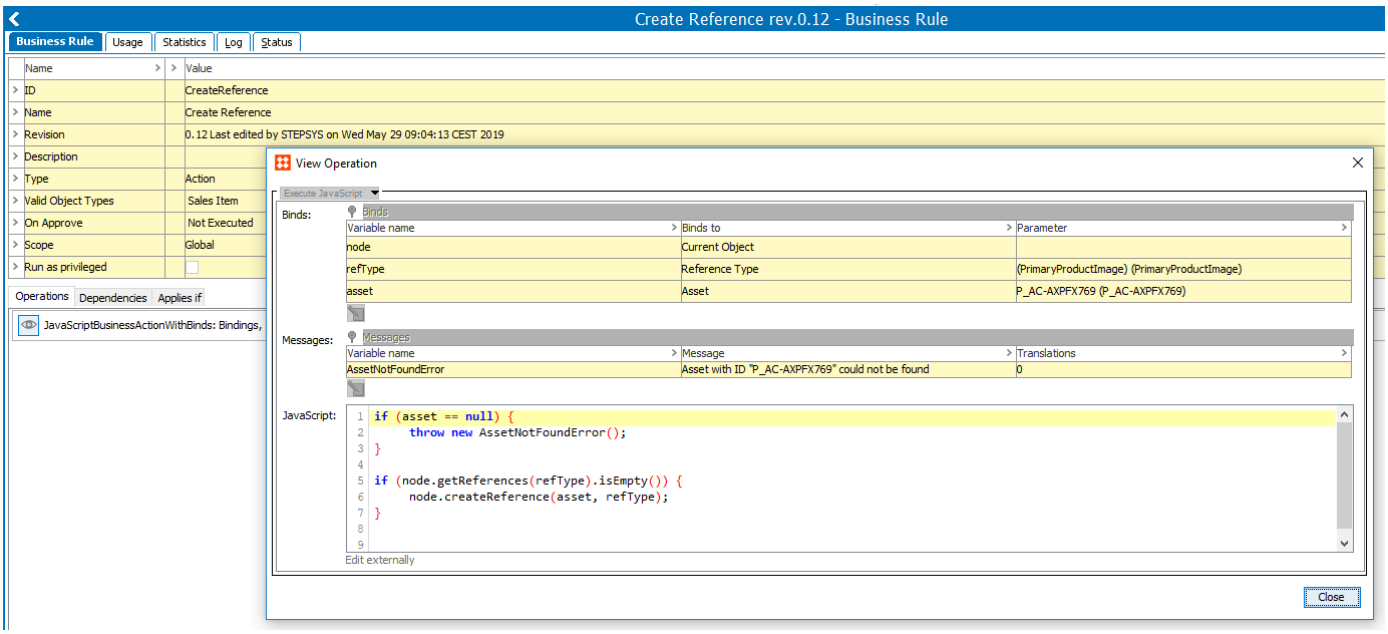
**Note:** The 'configuration-management' add-on component must be activated to enable the functionality described below.

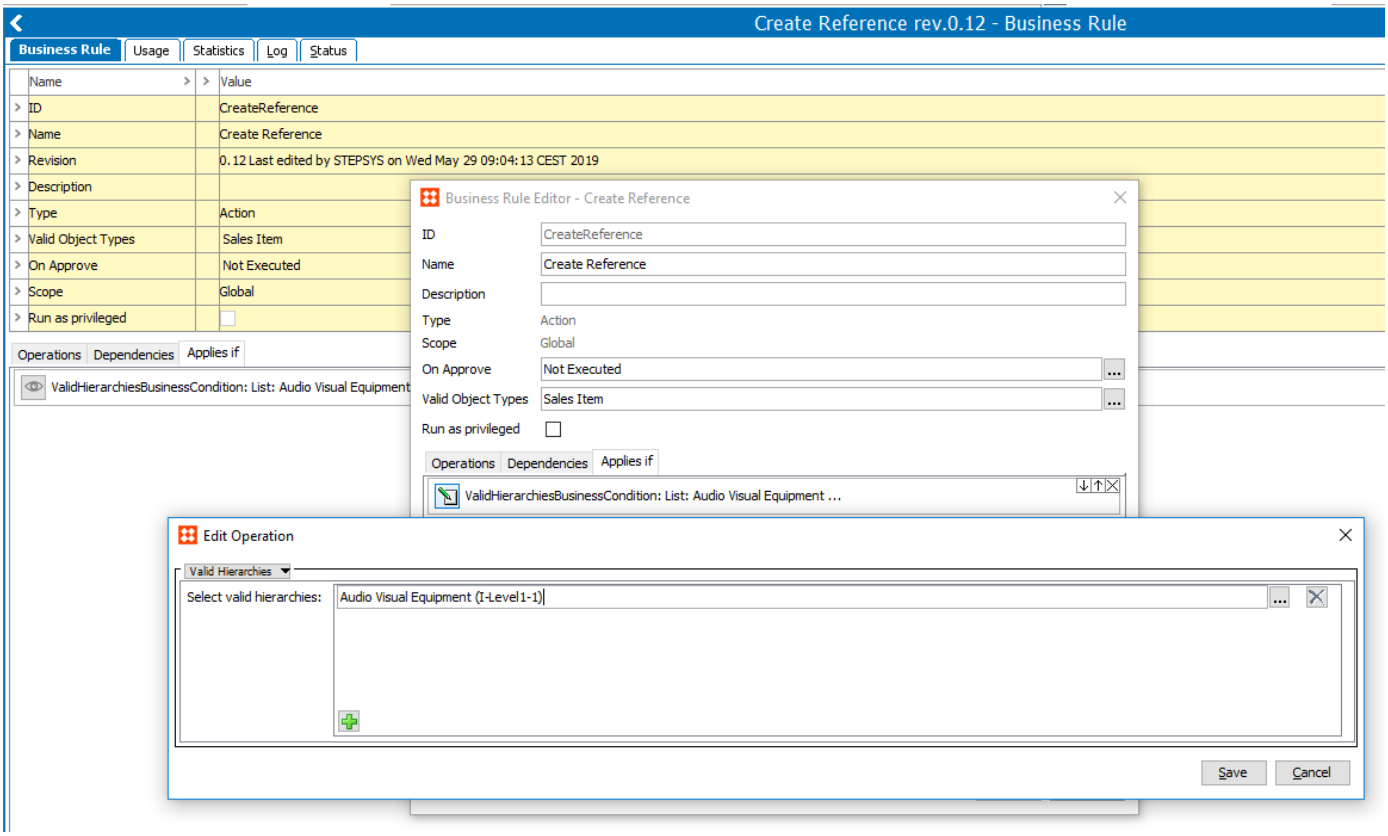
---

Business rules can be exported as *.js files that can be edited outside STEP and imported back into a STEP system, creating or updating a business rule. This format is available for business conditions, actions, functions, and libraries of 'Global' scope created using the business rule format introduced with STEP 7.0. Each file represents a single business rule and contains all information necessary to create / update the rule on import.

In the *.js files, metadata and definitions of non-JavaScript operations and preconditions ('Applies if') is output in comment sections, while the JavaScript for the individual operations and preconditions are wrapped in functions with objects provided by the execution context as parameters (binds, messages, function input parameters, and referenced libraries).

**Example:** Assume there is a simple business action with one JavaScript operation and a non-JavaScript precondition as shown below:




When exported using the default settings, the business action will be represented as follows in the generated file:

```
/*===== export metadata =====
{
```

```
  "contextId" : "Context1",
  "workspaceId" : "Main"
}
*/
/*===== business rule definition =====
{
  "id" : "CreateReference",
  "type" : "BusinessAction",
  "setupGroups" : [ "Actions" ],
  "name" : "Create Reference",
  "description" : null,
  "scope" : "Global",
  "validObjectTypes" : [ "SalesItem" ],
  "allObjectTypesValid" : false,
  "runPrivileged" : false,
  "onApprove" : "Never",
  "dependencies" : [ ]
}
*/
/*===== business rule plugin definition =====
{
  "pluginId" : "JavaScriptBusinessActionWithBinds",
  "binds" : [ {
    "contract" : "CurrentObjectBindContract",
    "alias" : "node",
    "parameterClass" : "null",
    "value" : null,
    "description" : null
  }, {
    "contract" : "ReferenceTypeBindContract",
    "alias" : "refType",
    "parameterClass" : "com.stibo.core.domain.impl.ReferenceTypeImpl",
    "value" : "PrimaryProductImage",
    "description" : null
  }, {
    "contract" : "AssetBindContract",
    "alias" : "asset",
    "parameterClass" : "com.stibo.core.domain.impl.FrontAssetImpl$$Generated$$7",
    "value" : "P_AC-AXPFX769",
    "description" : null
  } ],
  "messages" : [ {
    "variable" : "AssetNotFoundError",
```

```
    "message" : "Asset with ID \"P_AC-AXPFX769\" could not be found",
    "translations" : [ ]
  } ],
  "pluginType" : "Operation"
}
*/
exports.operation1 = function (node, refType, asset, AssetNotFoundError) {
  if (asset == null) {
         throw new AssetNotFoundError();
  }

  if (node.getReferences(refType).isEmpty()) {
         node.createReference(asset, refType);
  }
}
/*===== business rule plugin definition =====
{
  "pluginId" : "ValidHierarchiesBusinessCondition",
  "parameters" : [ {
    "id" : "HierarchyRoots",
    "type" : "java.util.List",
    "values" : [ "step://product?id=I-Level1-1" ]
  } ],
  "pluginType" : "Precondition"
}
*/
```

As mentioned above, the logic of the JavaScript operation is wrapped in a function. This function is, in the example, exported in line with the Node.js module system convention. A configuration property 'ConfigurationManagement.BusinessRuleConverter.ExportFormat' can be used to change this. The possible values of this property can be 'NodeExport' (default; Node.js module system), 'EcmaScriptExport' (ECMAScript module system compliant format), and 'NoExport' (functions not exported).

The format for business libraries differs somewhat as a library in STEP already holds a number of JavaScript functions that can be called from other business rules. To make these functions available to other modules, the functions are exported when the 'NodeExport' or 'EcmaScriptExport' settings are used.

**Example:** Assume a library has the following content:

```
function isProductBelow(prod, checkProdID) {
       if(!isProduct(prod)) throw "Function only works with Products";
       if(checkProdID == "Product hierarchy root") return true;
       if(prod.getID() == "Product hierarchy root") throw "The top level Product is never
below another Product.";
       var currentParentId;
       var currentProd = prod;
```

```
        while (true) {
                currentParentId = currentProd.getParent().getID();
                if(currentParentId == "Product hierarchy root") return false;
                else if (currentParentId == checkProdID) return true;
                else currentProd = currentProd.getParent();
        }
}

function isProduct(obj) {
        return obj instanceof com.stibo.core.domain.Product;
}
```

When exported with 'ConfigurationManagement.BusinessRuleConverter.ExportFormat' set to the default 'NodeExport' value, the following is appended to the file making it possible to require / import the functions from another Node.js module. Notice that, as stated in the comment, everything below and including the comment will be ignored when the library file is imported in STEP.

```
/*===== business library exports - this part will not be imported to STEP =====*/
exports.isProductBelow = isProductBelow
exports.isProduct = isProduct
```

**Important:** While it is possible in STEP to call functions in other business libraries from within a library function, this functionality is not supported when calling the exported library functions from another module.

To have library functions that call functions in other referenced libraries be executable outside STEP, these can be modified so that it is possible to pass the library as a parameter. For example, assume that there is a library function like the one that follows:

```
//"lib" is alias for a referenced library with a function getUpc()
function setUpc(node, attributeId) {
  node.getValue(attributeId).setSimpleValue(lib.getUpc());
}
```

This function could be modified as shown below, making it possible to pass the library as a parameter when invoking the function outside STEP.

```
function setUpc(node, attributeId, passedLib) {
  if (lib == null) {
    lib = passedLib;
  }
  node.getValue(attributeId).setSimpleValue(lib.getUpc());
```

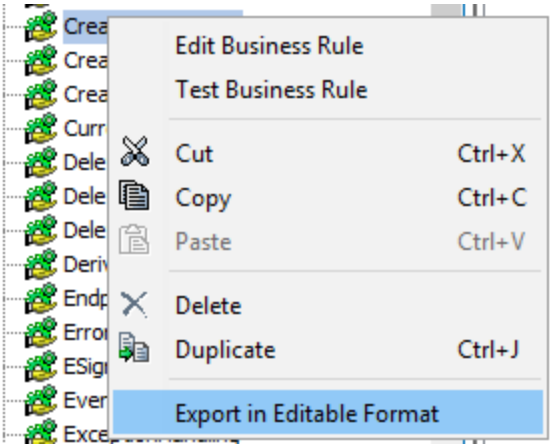
**Note:** Adding an extra optional parameter will not require that the JavaScript calling the function be modified.

# Options for Export

Business rules can be exported to the editable format in two different ways:

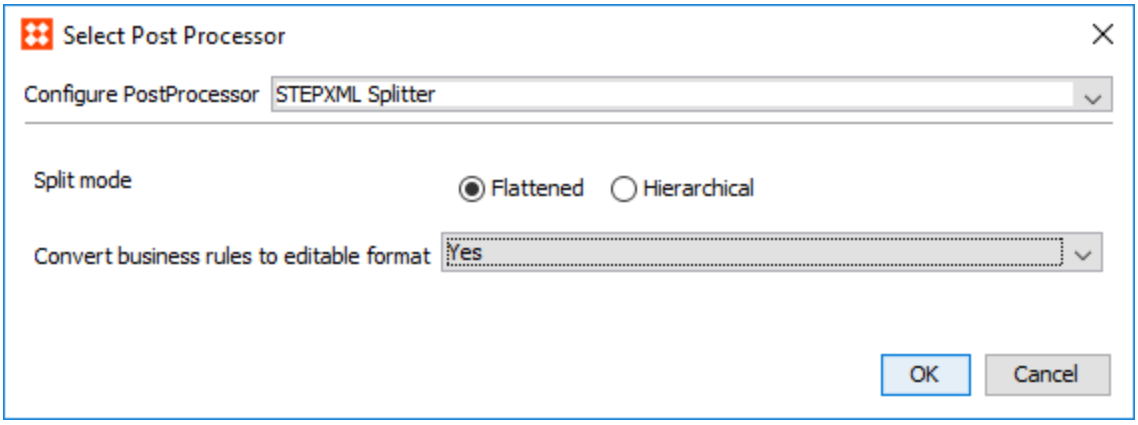
## Manual export

To manually export business rules individually, use the 'Export in Editable Format' context menu option for business rules as shown below:




## Outbound Integration Endpoint

When using the configuration management 'STEPXML Splitter' post-processor plugin for outbound integration endpoints, the parameter 'Convert business rules to editable format' option (shown in the next image) will be used.




When this option is selected, any business rule in the STEPXML that is fed to the postprocessor will be converted to the editable format and represented in a single *.js file instead of being represented in a STEPXML file.

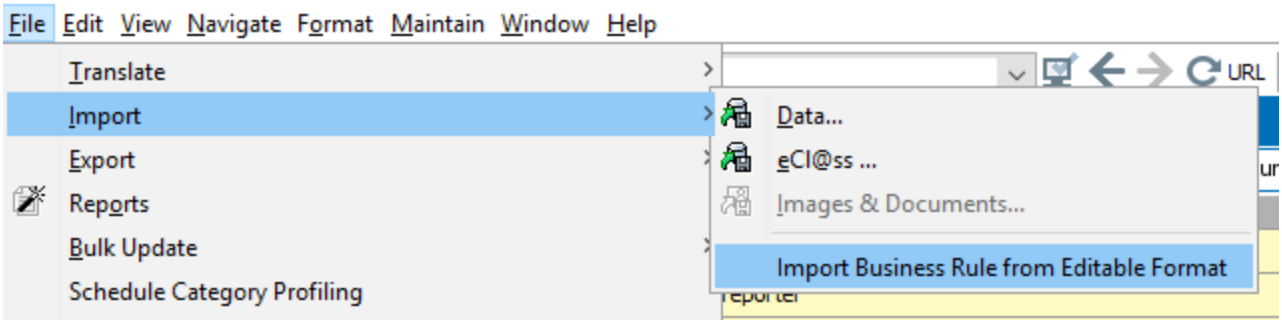
For details, see the **Outbound Integration Endpoint 'STEPXML Splitter' Post-processor Plugin** sections of the **Integration Endpoint Plugins** topic.

# Options for Import

Import-wise there are also two options:

**Manual import**

To import a single business rule manually, use the File > Import > Import Business Rule from Editable Format menu option as shown below.




## Inbound Integration Endpoint

For importing multiple business rules via an inbound integration endpoint, the configuration management 'STEPXML Joiner' preprocessor can be used. The preprocesser accepts a .ZIP file containing STEPXML files as input as well as business rule *.js files that the preprocessor will convert to STEPXML and merge into the STEPXML file delivered to the import part of the processing.

For details, see the **Inbound Integration Endpoint 'STEPXML Joiner' Pre-processor Plugin** section of the **Integration Endpoint Plugins** topic.

# REST Resources for Testing and Validation

Two REST resource operations are available:

- One for testing JavaScript on a running STEP server.
- One for validating the syntax of a business rule in the editable format on a STEP server.

The REST resource for testing JavaScript is available at http(s)://[step-hostname]:[step-port]/configuration-management/test-javascript?context=[context-id]&workspace=[workspace-id] and lets clients execute ECMAScript 5 compliant JavaScript on a running STEP server in a non-committing mode with access to a STEP Manager that again gives access to the standard STEP Scripting API.

As an example, POST'ing the function shown below to https://[step server]/configuration-management/test-javascript?context=Context1&workspace=Main would return "Context1":

```
function getContextId(manager) {
        return manager.getCurrentContext().getID();
}
getContextId(manager);
```

The resource for validating a business rule definition in the editable format is available at http(s)://[step-hostname]:[step-port]/configuration-management/validate-business-rule. The resource lets clients POST a complete business rule definition and will validate the business rule in three steps:

1. Model validation - validates the overall structure and determines if the business rule metadata is correct (syntax check only).
2. Domain validation - validates existence of the operation and precondition plugin and checks to see if the correct parameters have been supplied (values are not checked).
3. Conversion validation - validates if the business rule definition can successfully be converted to STEPXML.

The resource returns a boolean indicating whether or not the business rule is valid and includes a list of errors, if any were encountered.

Example response:

```
{
    "valid": false,
    "errors": [
        "'businessRuleDefinition.id': may not be null"
    ]
}
```

Both REST resources use basic authentication and the user invoking the resources must have a privilege that includes the 'Test JavaScript' setup action. Further, the configuration property 'ConfigurationManagement.TestJavascript.Enabled' must be set to 'true' on systems to be used for tests and validation (defaults to 'false').

---

**Note:** There is an example step.js Node.js module that wraps the REST resources available from the STEP API Documentation page that can be used together with the documentation and examples provided.

---

Additional VCS information can be found in the following sections / topics:

- **Outbound Endpoint Configuration**
- **Inbound Endpoint Configuration**
- **VCS: Example Setups**
- **VCS: Considerations and Limitations**

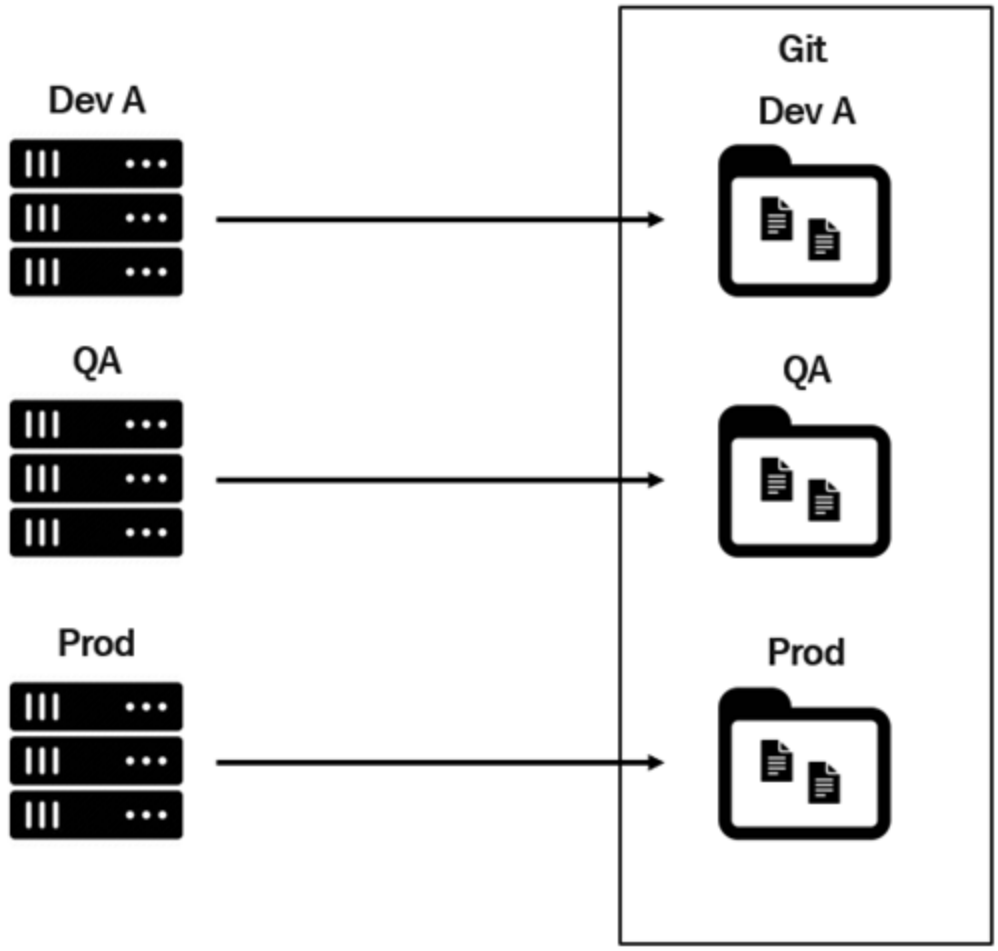
# VCS: Example Setups

The plugins described in the **Integration Endpoint Plugins** topic can be used in several different scenarios and do not necessarily have to be used together. This section describes two different possible setups.

## System Comparison

It is possible to use just the outbound integration endpoint plugins to have the configuration from each system in a DTAP environment published to different branches in a remote Git repository allowing for easy (manual) comparison of configurations using the 'diff' tools Git offers.

Systems can publish their configurations with scheduled intervals or on demand either via workbench or by invoking the outbound integration endpoints remotely via REST (resource operation available in the STEP REST API V1).



Such a setup can be used to ensure systems are in sync or only have expected differences. If differences are found, STEPXML files held in the Git branches can manually be imported one by one on a system that needs to be updated, or alternately, multiple files can be zipped and supplied to an inbound integration endpoint configured to use the 'STEPXML Joiner' pre-processor described in **Integration Endpoint Plugins** > **Inbound Integration Endpoint 'STEPXML Joiner' Pre-processor Plugin**.

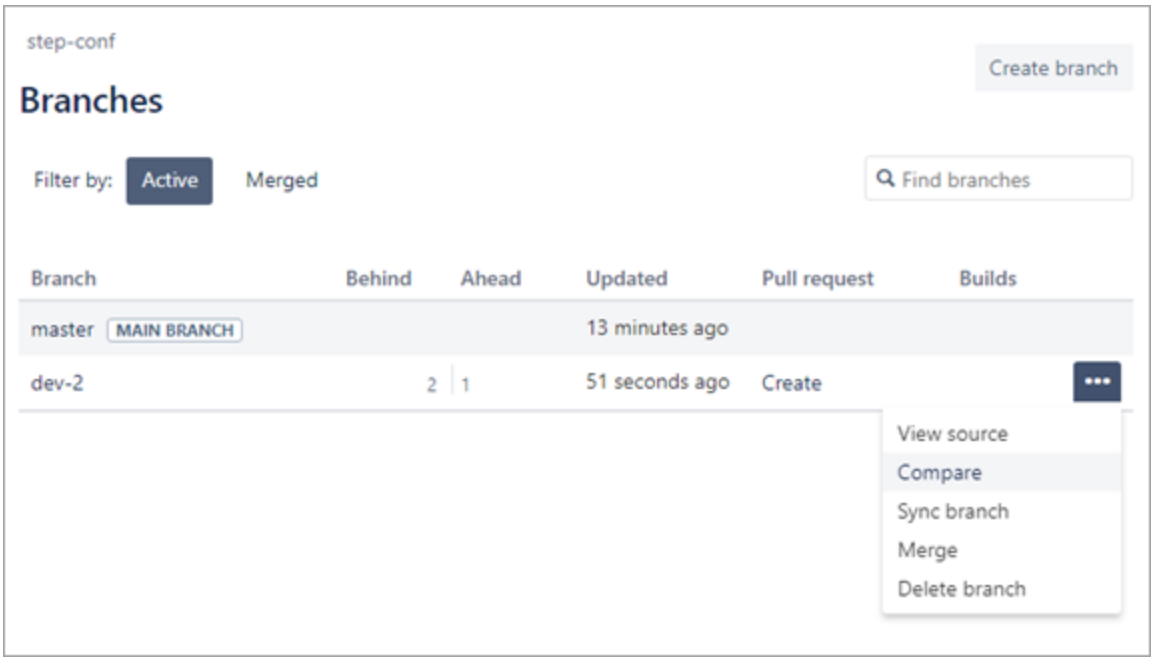
---

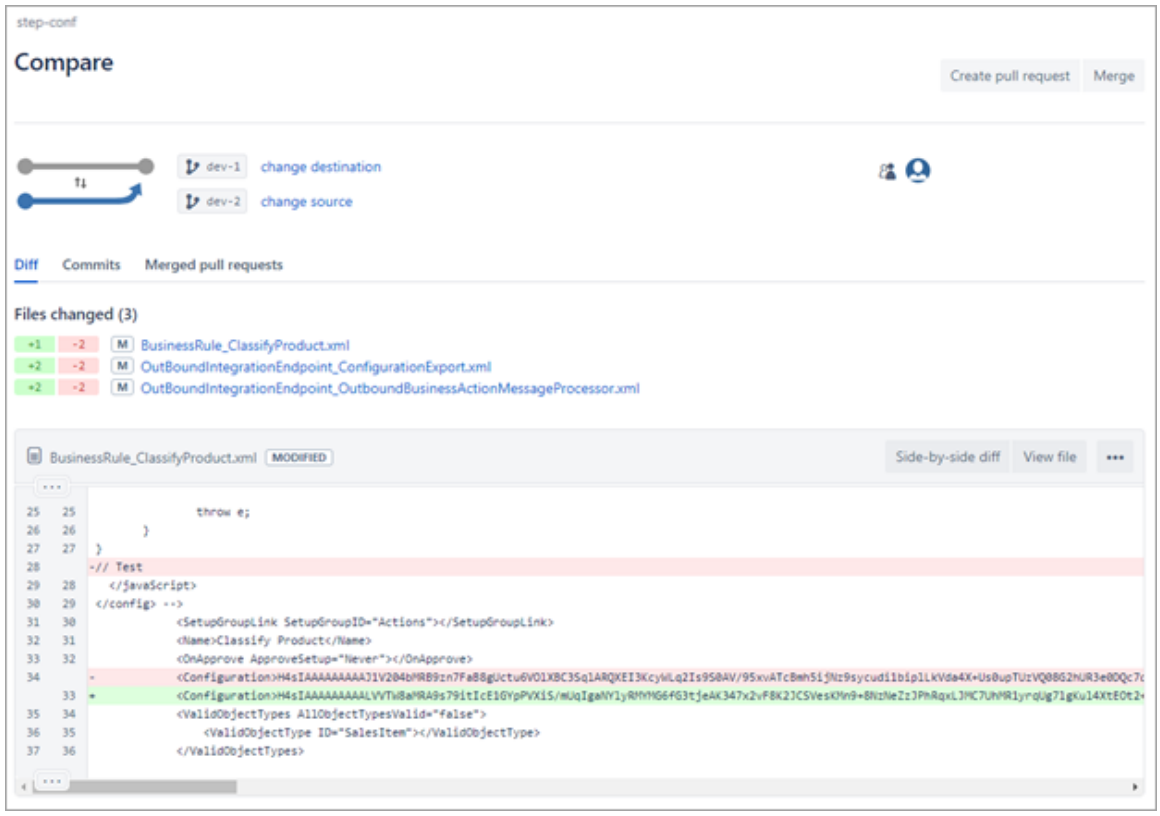
**Note:** The VCS integration functionality offers no automatic dependency handling meaning that it is the responsibility of the user transferring files to ensure that all files necessary to create / update configuration objects are included and, given that the 'STEPXML Joiner' pre-processor is not used, that files are imported in the correct order.

---

A tool like Jenkins https://jenkins.io/https://jenkins.io/ could, with this setup, be used to monitor the branches for changes. With a monitoring tool, diff reports can be sent to users via mail.

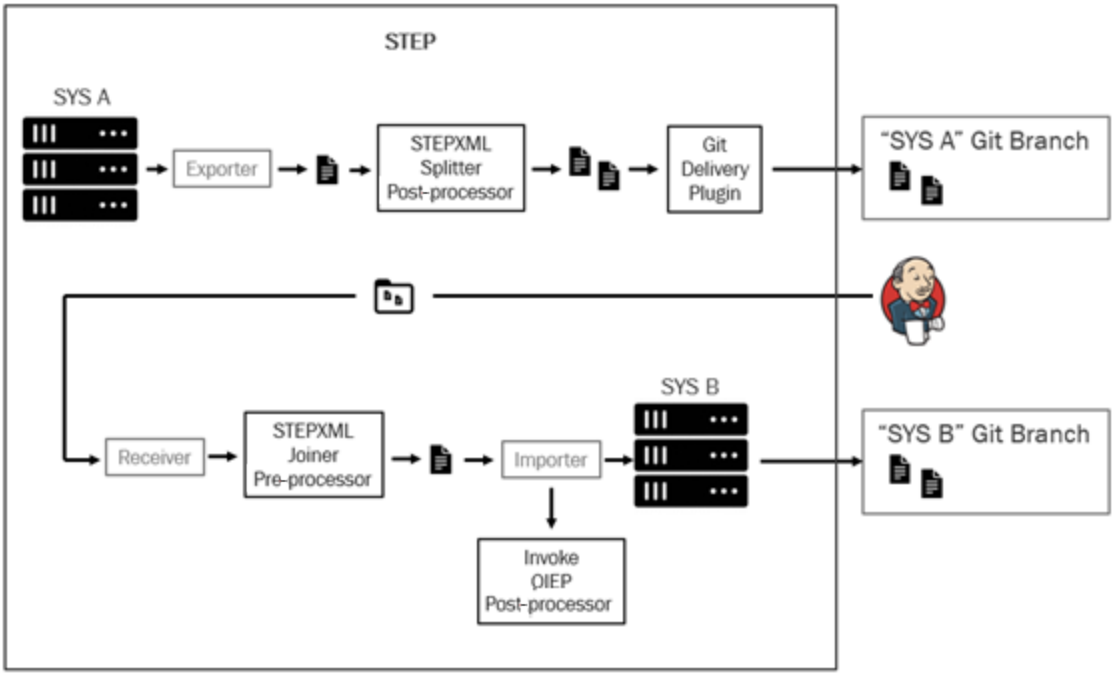
Branch comparisons can be made using the Git command line tool (see, for example, https://git-scm.com/docs/git-diffhttps://git-scm.com/docs/git-diff), or if a tool like Bitbucket is used, via a web interface as shown below.






## Semi-automated System Synchronization

With a tool like Jenkins configured to monitor branches for changes, instead of just sending diff reports to users, a Jenkins job could be used to automatically keep systems in sync. The diagram below illustrates a setup where changes on STEP system 'SYS A' automatically are deployed on another STEP system 'SYS B'.




For this to work, a Jenkins job must monitor the 'SYS A' branch for changes, and when such changes are identified, compare the branch with the 'SYS B' branch, produce a .ZIP file containing files from the 'SYS A' branch that differ, and then pass the .ZIP file to an inbound integration endpoint on 'SYS B' configured to use the 'STEPXML Joiner' and 'Invoke OIEP' plugins.

Example Jenkins job 'Build' shell script ($gituser, $gitpassword and $sysbpassword, $sysbuser defined via 'Username and password (separated)' bindings):

```
#!/bin/bash
timestamp=$(date +%s)
gitserver='bitbucket.org/john-smith/step-conf.git'

sysbstepserver='sys-b.domain.com'
hotfolder='/upload/hotfolders/ConfigurationManagement/in'


git clone https://$gituser:$gitpassword@$gitserver checkout_$timestamp
cd checkout_$timestamp
git checkout $sys-b
git checkout $sys-a
git pull
git diff -z $sys-b..sys-a --name-only --diff-filter=ACMRT | xargs -0 zip
cpg_diff_$timestamp.zip
sshpass -p $sysbuserpassword scp cpg_diff_$timestamp.zip
$sysbuser@$sysbstepserver:$hotfolder
```

The Jenkins job could further, via REST, invoke the inbound integration endpoint on 'SYS B' and monitor the import process, notifying human users if errors should occur. Alternately, the inbound integration endpoint could be scheduled to run frequently, and an error reporter plugin could be used to notify users about errors.

For a setup like this, it is important to be aware that the 'STEP Importer' processing engine cannot handle all updates. See the **VCS: Considerations and Limitations** topic for more information.

# VCS: Considerations and Limitations

The Version Control System (VCS) integration functionality is only limited per standard STEP functionality, meaning that not all configurations can be exported / expressed in STEPXML, and not all changes can be applied via the STEP Importer processing engine. The functionality works for settings stored in the STEP database rather than files in the application server file system.

Known configurations / settings that cannot be exported / expressed in STEPXML:

- Web UI user configurable views
- Web UI user defined searches
- Web UI custom icons
- Scheduled background processes
- Workbench bookmarks

Known import limitations:

- Deletions can only be performed for products, entities, classifications, and assets. STEPXML for deleting such objects in a target system would, with the current solution, have to be produced by a configured Jenkins job, or a job in a similar tool, upon identifying objects present in the target system not present in the source system.
- A number of update operations for configuration objects cannot be carried out if there is data in the system conflicting with the change.
- A number of updates require single update mode.
- Workflow definitions can, in some cases, not be updated if there are tasks for objects in the flow.

# Maintaining Partial Data Sets on Lower Level DTAP Environments

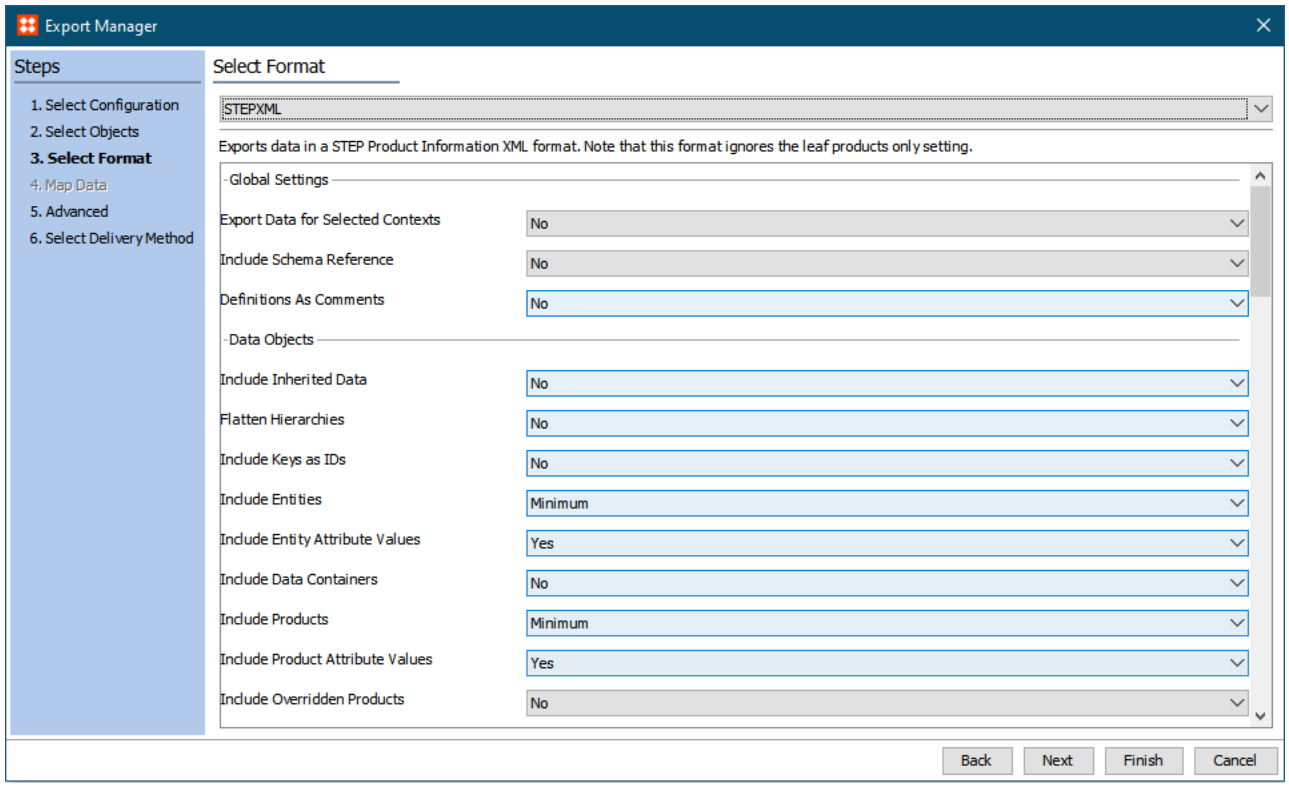
This section explains how you can keep Dev / QA / Sandbox systems up-to-date since these systems typically need all of the System Setup but only a small representative subset of the data from your production environment. Since you only transfer a subset of the data, this will make it much faster and easier to keep these systems up to date and also reduce the hardware requirements for these systems.

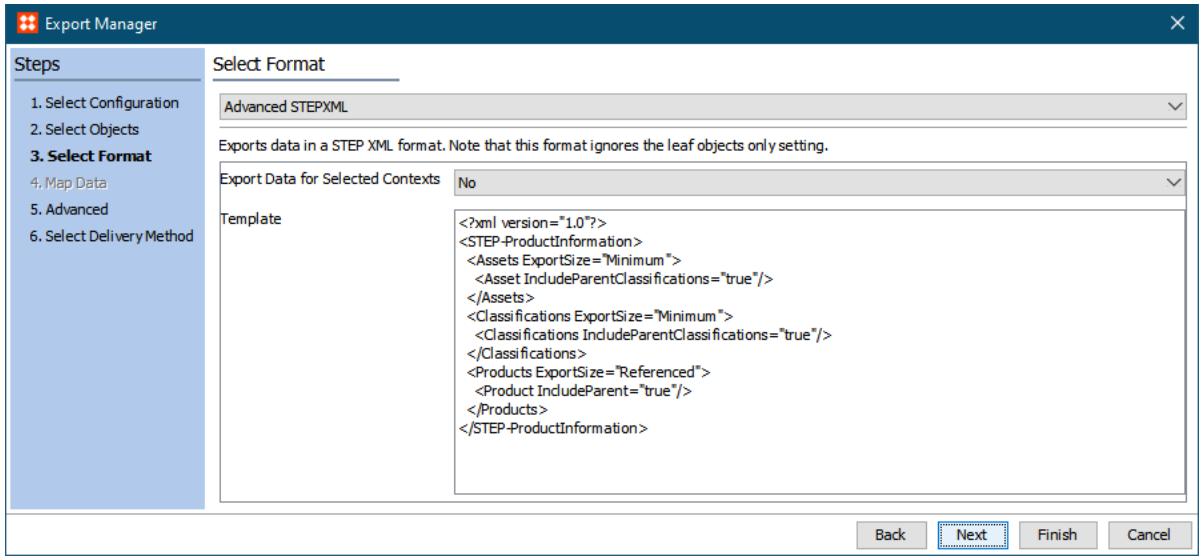
For such cases, Oracle Data Pump exports and imports cannot be used as it is not possible, with this technology, to do such things as only export certain hierarchies or data from certain STEP contexts. Further, Oracle Data Pump imports will overwrite any data created or modified in the target environment, which is often not desirable. Instead, the recommendation is to use STEPXML for transferring the data.

## STEPXML Export Basics

STEPXML can be exported from a STEP system via the Export Manager using either the 'STEPXML' or the 'Advanced STEPXML' format plugin. Both options produce the same format but differ in how you configure the export, i.e., how you decide what data should be included in the exported file. The Advanced STEPXML format plugin makes use of an XML 'output template' sometimes also referred to as a 'recorder file' while the STEPXML format plugin allows for the export to be configured via a UI with a large number of drop-down menus with the selections that allow for behind-the-scenes mapping to an output template. The Advanced STEPXML option is generally harder to work with but offers greater flexibility in configuring the export.

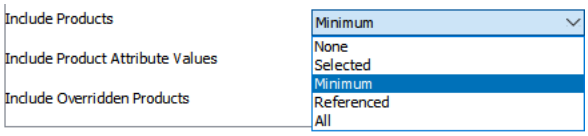
Export Manager examples shown below: STEPXML and Advanced STEPXML




Regardless of which STEPXML format plugin is used, a key concept to understand when exporting STEPXML is 'export size.' When exporting data, it is typically not feasible to individually select all the objects that should be exported. Instead, a few objects are selected and the export size then determines which objects should be included in addition to the selected objects.

With the STEPXML format plugin, the export size is specified per super type via a dropdown as shown below:




With Advanced STEPXML, the export size is set via a super type-specific attribute as shown below:

```
<Products ExportSize="Minimum">
   <Product IncludeParent="true"/>
 </Products>
```

The export sizes relevant in this context are described below.

## Export Size: Selected

The 'Selected' export size, as the name suggests, indicates to the system that the data for the objects selected is to be included in the export.

When using the STEPXML format plugin and selecting the option for products, classifications, and entities, additional objects will be included. Namely, all descendants of the selected object, and for classifications, all classification objects above the selected ones in the hierarchy. This is because choosing 'Selected' for products, classifications, and entities causes the output template shown below to be used for the export. For classifications, this template specifies that ancestors should be included (IncludeParent="true"), and since no detailed specification is given for the 'Classification' element (no nested elements specifying exactly what should be exported for a classification), descendants are also included. For products and entities, the presence of 'Product' and 'Entity' elements inside the outer 'Product' and 'Entity' elements similarly causes descendants to be included in the export.

```
<?xml version="1.0" encoding="utf-8"?>
<STEP-ProductInformation ResolveInlineRefs="true">
  <Classifications ExportSize="Selected">
    <Classification IncludeParent="true"/>
  </Classifications>
  <Products ExportSize="Selected">
    <Product>
      <Name/>
      <AttributeLink/>
      <DataContainerTypeLink/>
      <ClassificationReference/>
      <Product/>
      <ProductCrossReference/>
      <AssetCrossReference/>
      <EntityCrossReference/>
      <ClassificationCrossReference/>
      <Values/>
      <OverrideSubProduct/>
    </Product>
```

```
  </Products>
  <Entities ExportSize="Selected">
    <Entity>
      <Name/>
      <AttributeLink/>
      <ClassificationCrossReference/>
      <Entity/>
      <ProductCrossReference/>
      <AssetCrossReference/>
      <EntityCrossReference/>
      <ContextCrossReference/>
      <Values/>
    </Entity>
  </Entities>
</STEP-ProductInformation>
```

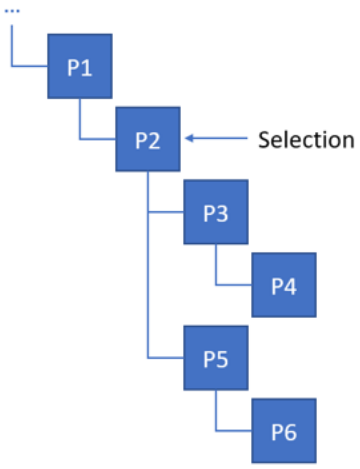
## Export Size: All

The 'All' export size is straightforward in that it disregards the export selection and indicates to the system that all objects of a given super type are to be included in the export.

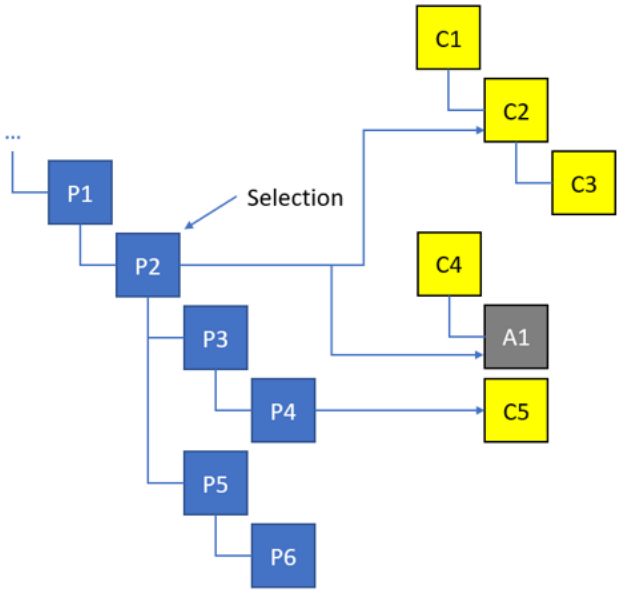
## Export Size: Minimum

When focusing on a single super type (like products), the 'Minimum' export size works similarly to 'Selected' in that it indicates that the selected objects are to be exported, and dependent on the output template, includes descendants and ancestors.

For instance, with the example product hierarchy shown below, if P2 is selected for export and the export size 'Minimum' is used for products with the default output template, the exported file will contain data for P2, P3, P4, P5, and P6.



The difference between 'Selected' and 'Minimum' is that the 'Minimum' option works across super types. Assume you are working from a product product hierarchy like the one above, but this time the selected product P2 is linked into a classification (C2) and further has a reference to an asset (A1) while the descendant product P4 is linked into the classification C5.




Running an export with just P2 selected and the 'Minimum' option specified only for products will cause the same product objects to be exported as in the example above. However, if 'Minimum' is also specified for classifications and assets and the default output template is used, the export will include asset A1 and classifications C1, C2, and C5, as well as the products. To summarize: the objects directly referenced / linked from the selection and its descendants will be included. In addition, the default template for classifications specifies that ancestors should be included; therefore, C1 is also included. The template is not applied recursively for non-selected objects when it comes to descendants, so C3 is not exported.

The 'Minimum' option can also be used to include configuration objects used by exported data in the exported file. As an example, the output template shown below will cause attributes, attribute groups, units, and lists of values (LOVs) relevant for the product selection to be included in the exported file.

```
<?xml version='1.0'?>
<STEP-ProductInformation>
  <AttributeList ExportSize="Minimum"/>
  <AttributeGroupList ExportSize='Minimum'/>
  <UnitList ExportSize='Minimum'/>
  <ListsOfValues ExportSize='Minimum'/>
  <Assets ExportSize="Minimum"/>
  <Classifications ExportSize="Minimum"/>
  <Products ExportSize="Minimum"/>
</STEP-ProductInformation>
```

To be more precise, if an export is run with P2 (from the example above) as the selection and the output template is used, in addition to data objects, the following configuration objects will be exported:

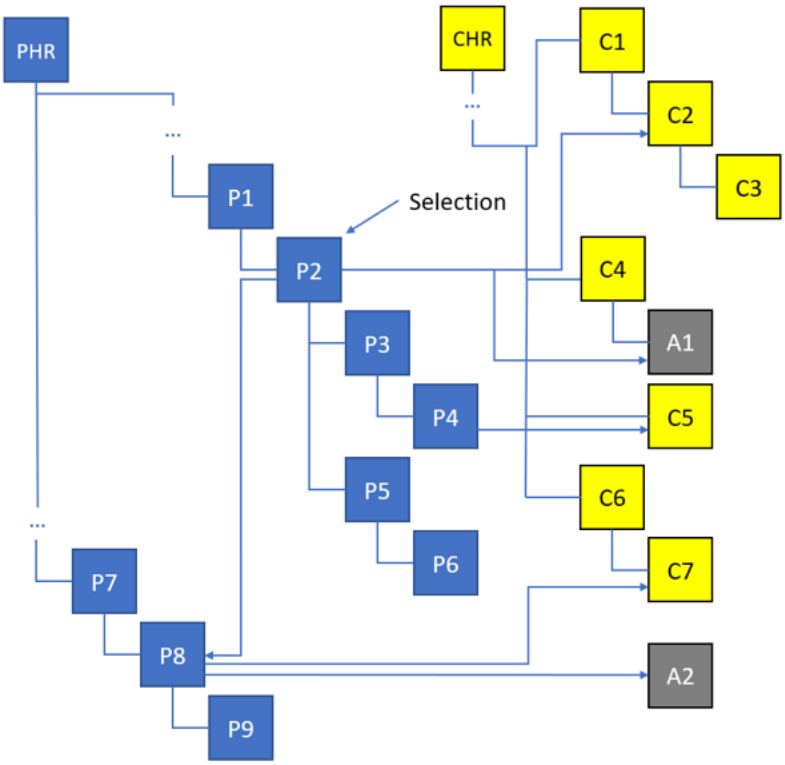
- All attributes used on the exported data objects
- All units used by the exported attributes
- All attribute groups that exported attributes are present in (and by default, all attribute groups up to the 'Attribute group root')
- All LOVs used by exported attributes

**Note:** The logic for including configuration objects is applied recursively. For instance, you will get definitions exported for attributes that are used for metadata on other configuration objects.

## Export Size: Referenced

The 'Referenced' option is similar to 'Minimum,' but the option further prompts objects referenced from the selection or descendants to be exported.

Consider the following setup where the selection only contains product P2, which has a reference to product P8:




With this data, an export with the following output template:

```
<?xml version = "1.0" encoding = "utf-8"?>
<STEP-ProductInformation ResolveInlineRefs="true">
  <Assets ExportSize="Minimum"/>
  <Classifications ExportSize="Minimum"/>
```

```
  <Products ExportSize="Referenced"/>
</STEP-ProductInformation>
```

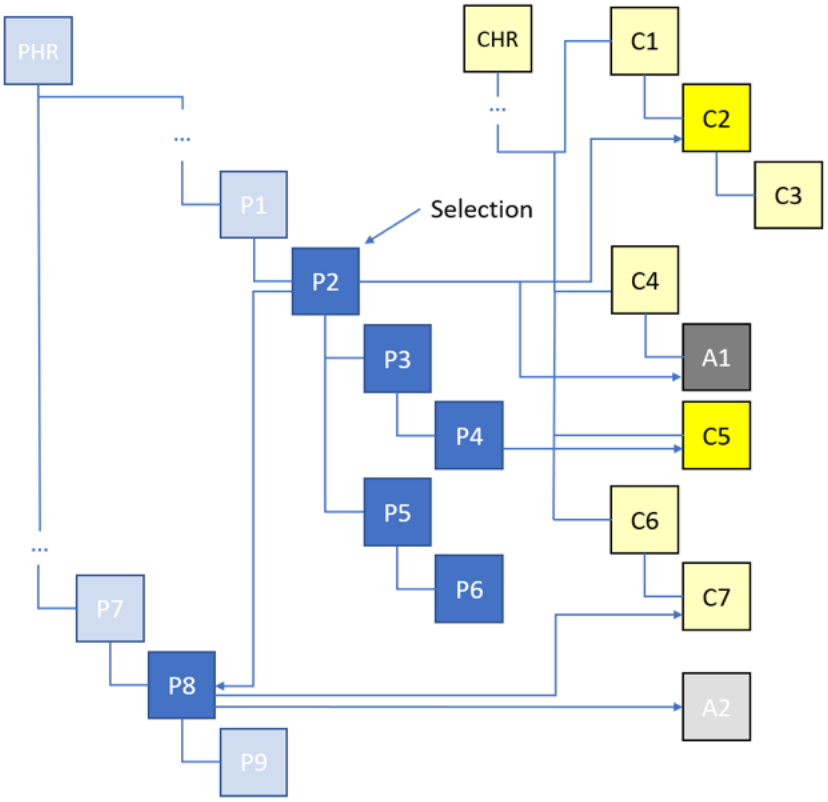
…will produce the following objects in the export:

Products: P2, P3, P4, P5, P6, P8

Classifications: C2, C5

Assets: A1

To illustrate, in the diagram below, nodes that are not exported have been dimmed:




Notice again that the logic is not applied recursively. I.e., the classification C7 that P8 is linked into and the asset A2 that the product references are not included in the export. Also P9, which is a child of P8, is not included.

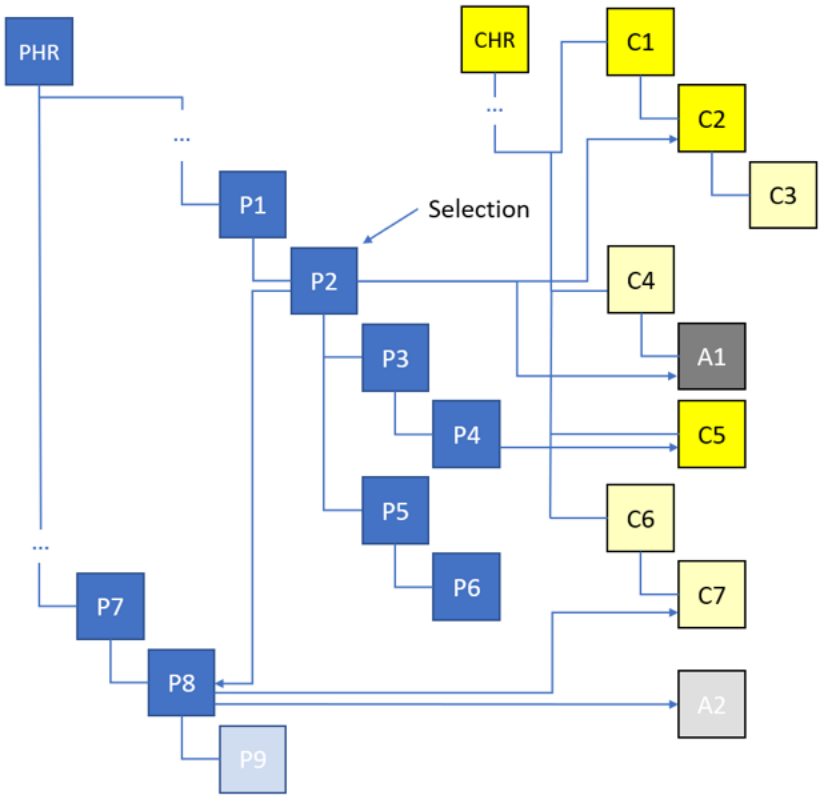
## Including Ancestors

Reusing the last data example, it will not be possible to import files exported with the settings described above without errors on a system that does not have ancestors like P1, P7, C1 and C4 existing in the system in advance. However, when using the Advanced STEPXML format plugin, it is possible to specify that the exporter should include ancestor objects up to the hierarchy roots ('PHR' and 'CHR' in the diagrams).

For products, classifications, and entities, this is done using the 'IncludeParent' attribute as shown in the output template example below:

```
<?xml version='1.0'?>
<STEP-ProductInformation>
  <Assets ExportSize="Minimum">
    <Asset/>
  </Assets>
  <Classifications ExportSize="Minimum">
    <Classification IncludeParent="true"/>
  </Classifications>
  <Products ExportSize="Referenced">
    <Product IncludeParent="true"/>
  </Products>
</STEP-ProductInformation>
```

With this output template, P1, P7, C1, and C4 and all ancestor nodes up to 'Product hierarchy root' ('PHR' in the diagram) and 'Classification 1 root' ('CHR' in the diagram), that both always exist on a STEP system, will be included in the exported file. This makes it possible to import the file on a system where the ancestor nodes do not exist in advance. This is illustrated below with non-exported nodes dimmed:




From release 9.2, a similar attribute called 'IncludeParentClassifications' exists for assets. Setting this attribute to 'true' in an output template for the 'Asset' element will, when using the domain exporter (automatically enabled for In-Memory systems), cause classifications that a selected or referenced asset is linked into to be included in the exported file. For example, using the heirarchy above, C4 and all ancestor classifications up to CHR will be included.

## Asset Content

Asset content, i.e., the actual image and document files referenced from asset objects, is not represented in STEPXML per default. It is, however, possible to get the data included both when using the STEPXML and Advanced STEPXML format plugins. From STEP version 9.2, it is also possible to import the data again, creating or updating asset content.

With the STEPXML format plugin, asset content can be included in the exported file as shown below:


With Advanced STEPXML, binary data can be included via the 'AssetContent' element as shown below:

```
<?xml version='1.0'?>
<STEP-ProductInformation>
  <Assets ExportSize="Minimum">
    <Asset>
      <AssetContent ExportType="Binary">
        <ImageConversionConfiguration ID="Source"/>
      </AssetContent>
      <!-- other asset specific instructions omitted ->
    </Asset>
  </Assets>
  <!-- other instructions omitted ->
</STEP-ProductInformation>
```

Notice that, with Advanced STEPXML, once you start specifying sub elements for the super type specific elements like 'Asset' and 'Product,' you only get the data you have specified exported. For example, with the template above, you would not get asset names or values out.

To get name, values, references and classification links exported, the template for assets should look as follows:

```
<Assets ExportSize="Minimum">
  <Asset>
    <Name/>
    <ClassificationReference/>
    <EntityCrossReference/>
    <Values/>
    <AssetContent ExportType="Binary">
      <ImageConversionConfiguration ID="Source"/>
    </AssetContent>
```

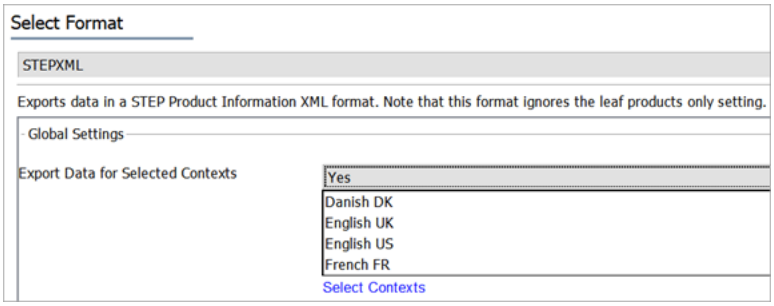
```
    </Asset>
  </Assets>
```

When exporting asset content, be aware that converted versions of the content cannot be imported – only the unconverted source (in the exported file, data for the unconverted source will be in an 'AssetBinaryContent' element for which the value of the 'ImageConversionConfiguration' 'ID' attribute is blank/empty string). Also, since including asset content can lead to very large files being created, please seriously consider if asset content is strictly required in the systems that the data is being moved to.

### Cross Context Exports

A STEPXML file can contain data from multiple contexts, and while the ability to manually export data for multiple contexts has been available for the STEPXML format plugin for a number of years, it has also been made available when using the Advanced STEPXML format plugin from STEP version 9.2.

The context selection using the STEPXML format plugin is shown below:




The context selection using the Advanced STEPXML format plugin is shown below:


## Transferring Configuration and Data Between Systems

With the STEPXML export functionality described above, it is possible to select specific category nodes and have all descendant nodes plus referenced and linked nodes across multiple contexts included in a single STEPXML file. If Advanced STEPXML is used, it is further possible to have ancestors to the exported nodes included, thereby allowing for the data to be imported on an empty system.

**Important:** For the import to succeed, it is crucial that required configuration objects like object types, attributes, units, etc. are either included in the file or present in the target system prior to importing the data.

If the target system is empty, it will often make sense to include configuration objects in the data export file. The most straightforward approach is to use the export size 'All' for all configuration objects so that all attributes, units, object types, integration endpoints, Web UI configurations, etc. are included in the exported file.

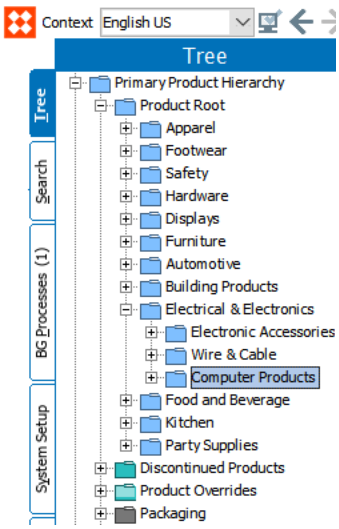
For configuration objects like attributes, it is also possible to use the 'Minimum' setting to avoid getting large amounts of attributes included that are not needed. If doing so, however, there is a high probability that attributes that are not directly used by the exported data but required for some other functionality, e.g., a business rule or a Web UI configuration, will be missing.

If the target system is not empty, it will make sense to use the Version Control System (VCS) integration functionality introduced with STEP version 9.1 to manage the configuration. For details about this functionality, please refer to the **Version Control System Integration** section of the **Configuration Management** documentation in the STEP Online Help. In brief, the functionality allows for system configurations to be pushed to a branch in a Git repository, thereby making it possible to easily compare the configuration across systems. The files present in Git will be valid STEPXML files that can be imported using the standard import manager or via inbound integration endpoint functionality also described in the Version Control System Integration section mentioned above.

With the desired configuration in place, data can be moved ad-hoc using the functionality described above.

## Example

This section illustrates how the export logic described can be used to export a sub section of a product hierarchy and have classification and asset dependencies included while ensuring that the exported file can be imported on a, data-wise, empty system.




Consider the data hierarchy shown above. For this example, the goal is to export the 'Computer Products' category of products. And, in the exported file, include data for:

- All products below and including ‘Computer Products’
- All product ancestors for ‘Computer Products’ up to and including ‘Primary Product Hierarchy’
- All classifications that products below ‘Computer Products’ are linked into
- The ancestors for these classifications up to and including ‘Classification 1 root’ (hidden classification hierarchy root node)
- All assets referenced from products below ‘Computer Products’ including the binary asset content
- All classifications that these assets are placed in
- The ancestors for these classifications up to and including ‘Classification 1 root’

This goal can be achieved by selecting the ‘Computer Products’ product for export and using the following output template:

```
<?xml version='1.0'?>
<STEP-ProductInformation>
<Assets ExportSize="Minimum">
  <Asset IncludeParentClassifications="true">
    <Name/>
    <ClassificationReference/>
    <EntityCrossReference/>
    <Values/>
    <AssetContent ExportType="Binary">
      <ImageConversionConfiguration ID="Source"/>
    </AssetContent>
  </Asset>
</Assets>
<Classifications ExportSize="Minimum">
  <Classification IncludeParent="true"/>
</Classifications>
<Products ExportSize="Selected">
  <Product IncludeParent="true"/>
</Products>
</STEP-ProductInformation>
```

As described above, the exported file can be made to include data from multiple contexts by selecting the desired context in the export manager as shown below:

The export could further be modified to also include product objects from other categories referenced from products below 'Computer Products,' and their ancestors. This can be achieved by replacing '<Products ExportSize="Selected">' with '<Products ExportSize="Referenced">'.

**Note:** The objects referenced from the reference targets will not be included in the export.

For it to be possible to import the generated file, definitions of attributes, object types, units, LOVs, etc. must either exist in the target system in advance or be included in the file. As mentioned above, the configuration can either be managed separately using the VCS integration functionality or the configuration objects can be included in the file by using the export size 'All' for all desired types. 'Minimum' can potentially also be used, e.g., for attributes, but as previously mentioned, the safest choice is to include all.

If you want to export a subset of data as described above and include all of the System Setup configurations, your output template would look similar to this one:

```
<?xml version='1.0'?>
<STEP-ProductInformation>
  <Assets ExportSize="Minimum">
    <Asset IncludeParentClassifications="true">
      <Name/>
      <ClassificationReference/>
      <EntityCrossReference/>
      <Values/>
      <AssetContent ExportType="Binary">
        <ImageConversionConfiguration ID="Source"/>
      </AssetContent>
    </Asset>
  </Assets>
  <Classifications ExportSize="Minimum">
    <Classification IncludeParent="true"/>
  </Classifications>
  <Products ExportSize="Selected">
    <Product IncludeParent="true"/>
  </Products>
  <TagGroupList/>
  <TagList/>
  <Qualifiers/>
  <GlobalSettings/>
  <UserTypes ExportSize="All"/>
  <Keys/>
  <DerivedEventTypes/>
  <EdgeTypes/>
  <CrossReferenceTypes ExportSize="All"/>
  <DimensionList/>
  <ContextList/>
```

```
  <UnitList ExportSize="All"/>
  <CollectionList ExportSize="All"/>
  <ListOfValuesGroupList/>
  <ListsOfValues ExportSize="All"/>
  <IntegrationEndpoints/>
  <EventProcessors/>
  <SetupGroups/>
  <SetupEntities/>
  <AttributeGroupList ExportSize="All"/>
  <AttributeList ExportSize="All"/>
  <DataContainerTypes ExportSize="All"/>
  <ActionSetList/>
  <UserGroupList/>
  <UserList/>
  <SystemSetup ExportSize="All"/>
  <TableColors ExportSize="All"/>
  <TableRules ExportSize="All"/>
  <TableTypeGroupList ExportSize="All"/>
  <TableTypeDefinitions ExportSize="All"/>
  <ECatalogs/>
  <EventQueues/>
  <STEPWorkflows ExportSize="All"/>
  <StatusFlags ExportSize="All"/>
  <BusinessLibraries ExportSize="All"/>
  <BusinessRules ExportSize="All"/>
  <MatchCodes/>
  <MatchingAlgorithms/>
  <PortalConfigurations ExportSize="All"/>
  <AttributeTransformationGroups/>
  <ImportConfigurations ExportSize="All"/>
  <ExportConfigurations ExportSize="All"/>
  <BulkUpdateConfigurations ExportSize="All"/>
  <TransformationLookupTableConfigurations ExportSize="All"/>
  <ComponentModels/>
</STEP-ProductInformation>
```