INTEGRITY MODELER 8.3 WINDCHILL INTEGRATION – OVERVIEW AND USE CASES

Patrick Ollerton

December 2016

INTEGRITY MODELER 8.3 – WINDCHILL INTEGRATION

1. Introduction
2. Modeler to Windchill Productivity
3. Modeler to Windchill Traceability
4. Detailed Use Cases

INTEGRITY MODELER 8.3 - WINDCHILL INTEGRATION INTRODUCTION

INTEGRITY MODELER - WINDCHILL INTEGRATION INTRODUCTION

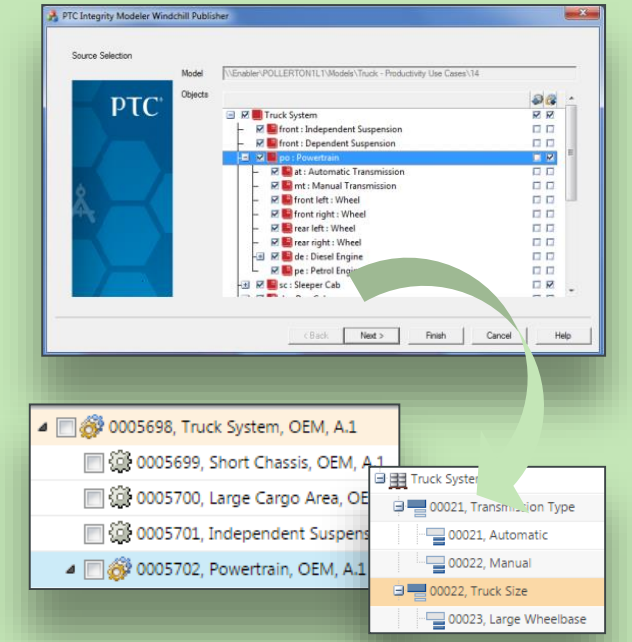
- Integrity Modeler to Windchill PDMLink Productivity
  - Auto-generation of Windchill PDMLink Parts from Model System Blocks
  - Auto-generation of Windchill PDMLink Options & Variants from Model Variation Points & Variants
- Integrity Modeler and Windchill PDMLink Bi-directional Traceability
  - Manage Traceability Links between Windchill Parts and Model System Blocks

Business Value
- Increase productivity by:
  - accelerating PLM product/project start-up using pre-populated BoMs & Options
- Improve product quality by:
  - Avoiding the re-entry of data throughout the system & product lifecycle
  - enabling early impact analysis of system design changes and product part changes
- Reduce costs by;
  - Increasing reuse, considering product lines and product variation early system & product lifecycle

INTEGRITY MODELER - WINDCHILL INTEGRATION INTRODUCTION

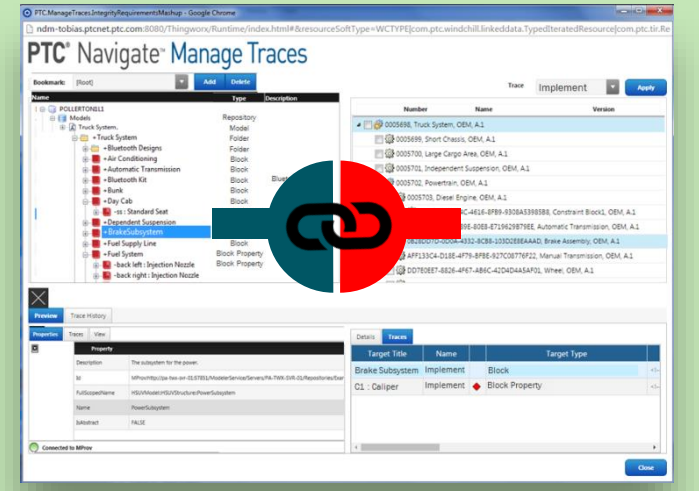
Productivity

Modeler Windchill Exporter



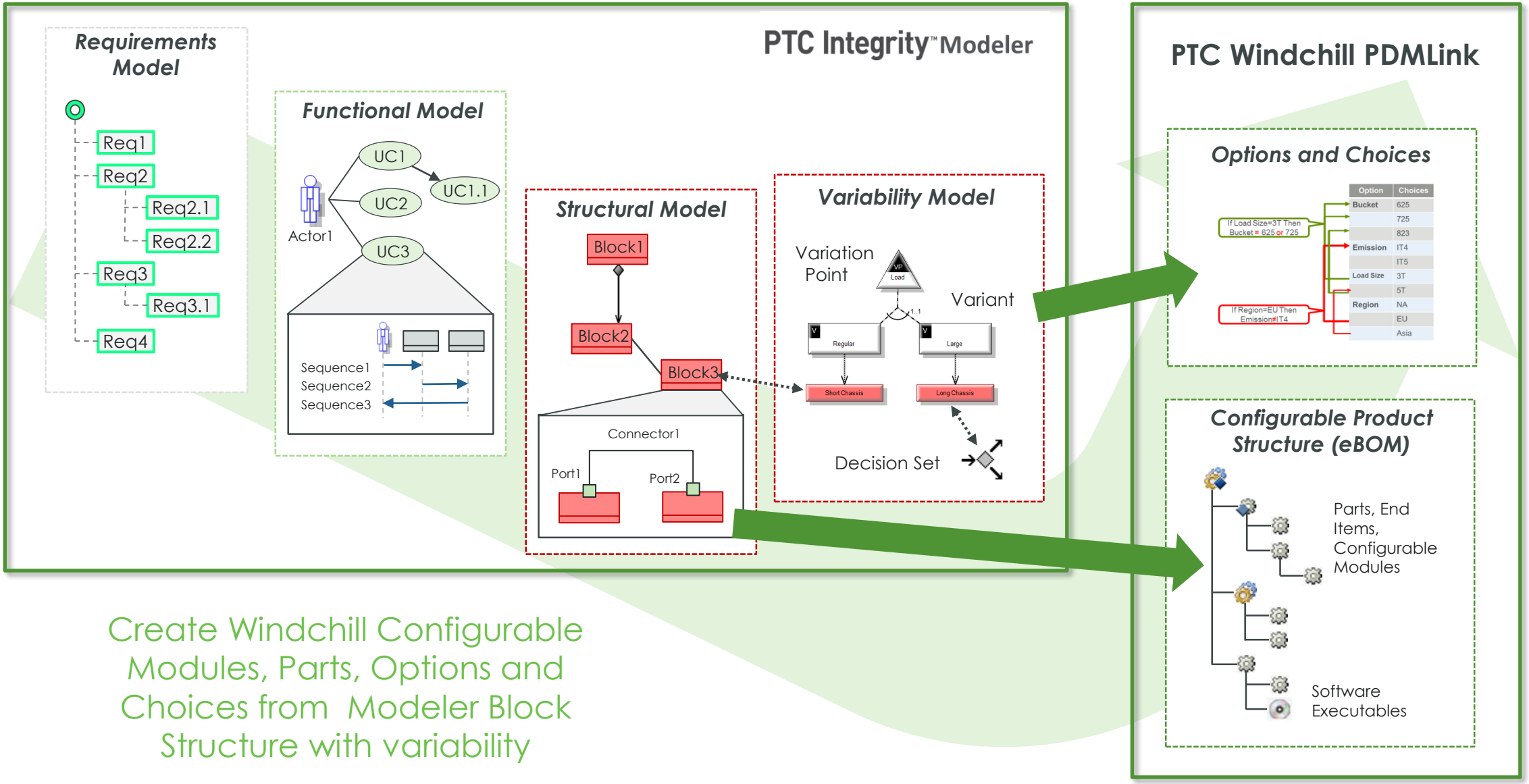
Traceability

PTC Navigate Manage Traces App



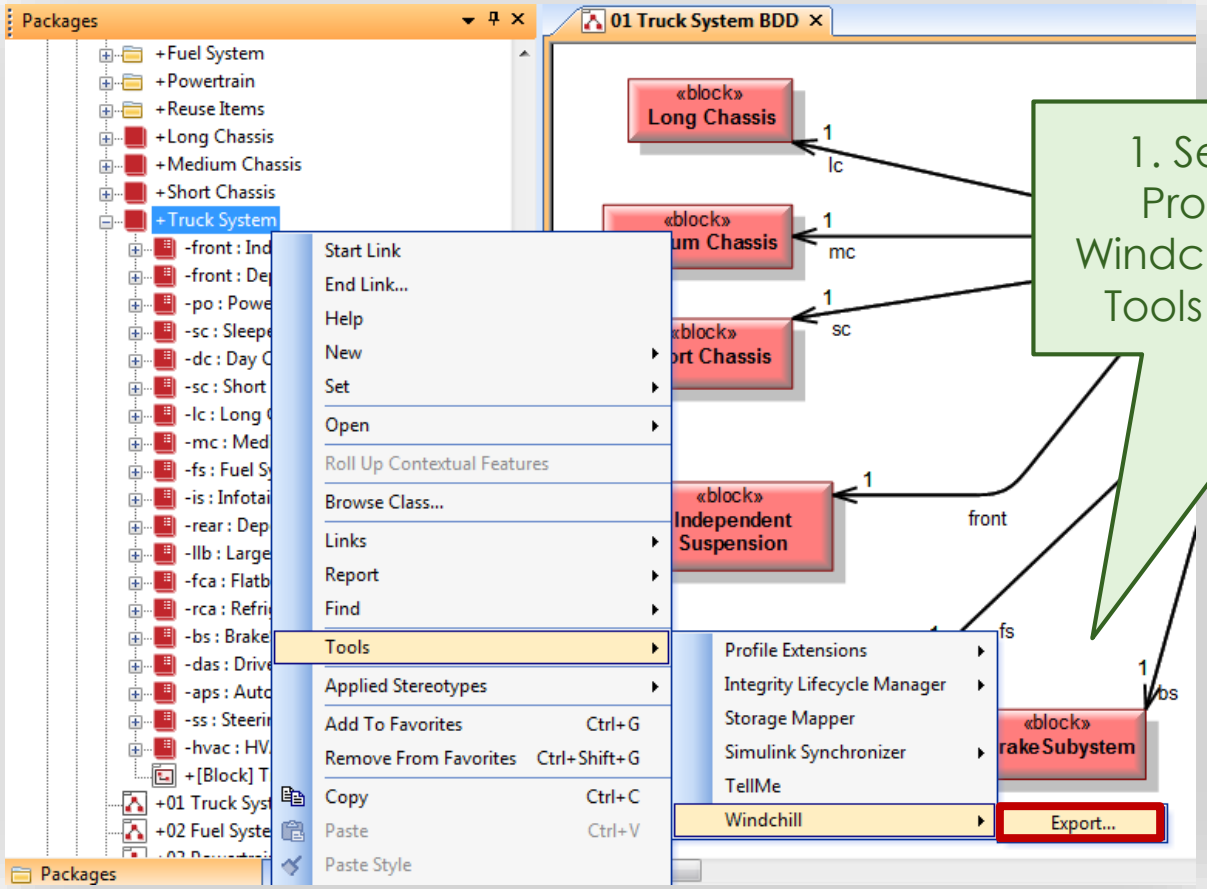
MODELER TO WINDCHILL PRODUCTIVITY

MODELER TO WINDCHILL PRODUCTIVITY



Create Windchill Configurable Modules, Parts, Options and Choices from Modeler Block Structure with variability

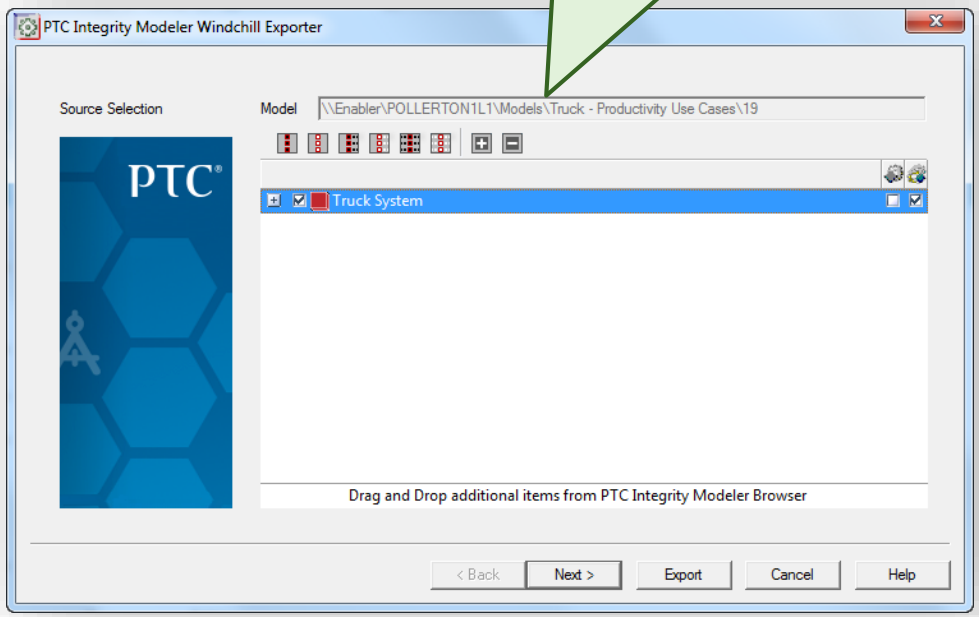
MODELER TO WINDCHILL PRODUCTIVITY – STEP 1



1. Select a Block/Block Property for export to Windchill PDMLink and click Tools > Windchill > Export

2. Export tool will launch with the selected item and it's Block Properties

The Exporter can also be initiated from a Variation Point



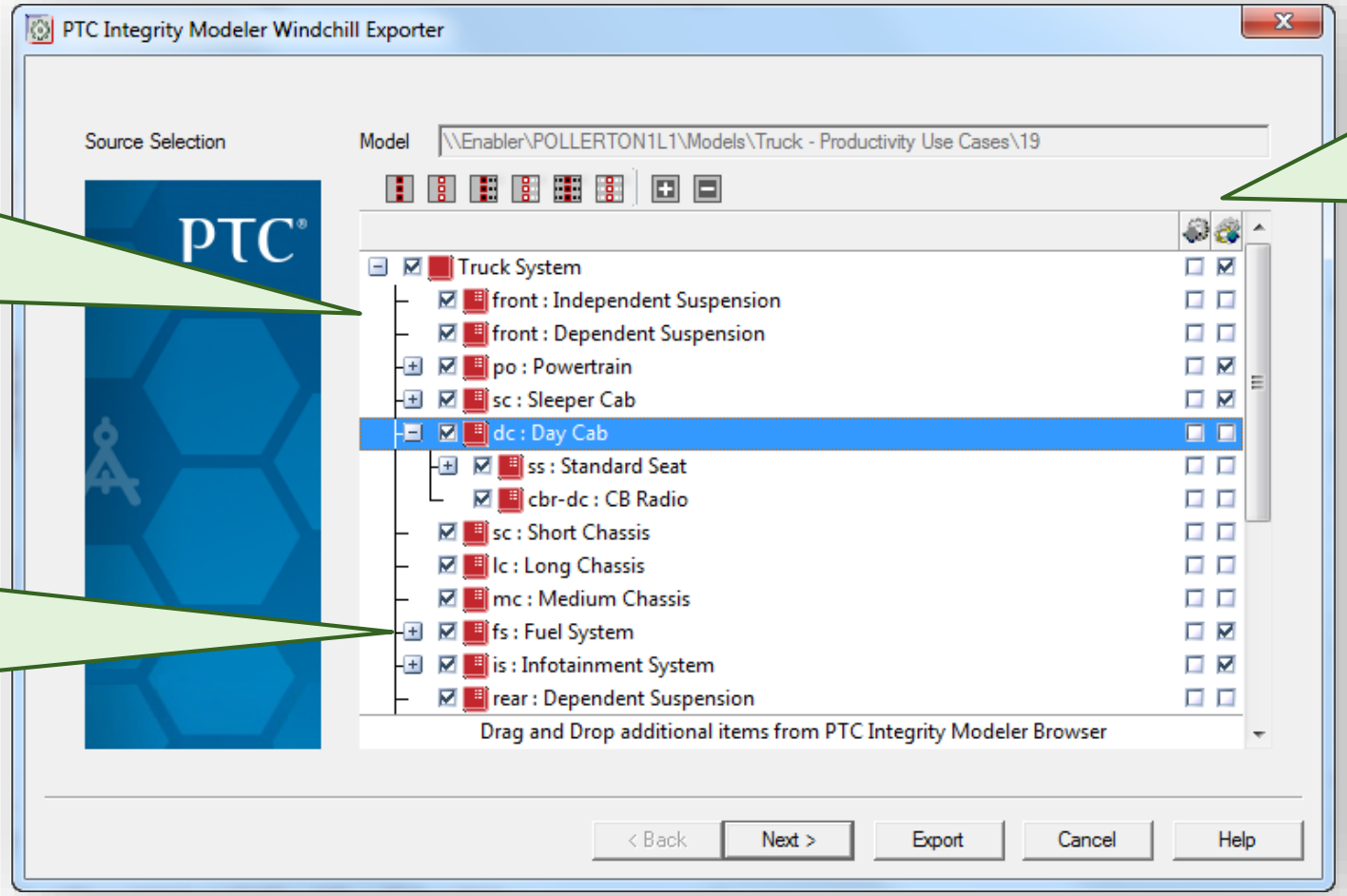
MODELER TO WINDCHILL PRODUCTIVITY – STEP 2

1. Review and confirm the items selected for export

Drag and drop additional items from standard Modeler Browsers

2. Structure can be expanded/collapsed

Items can be marked as included/excluded for export



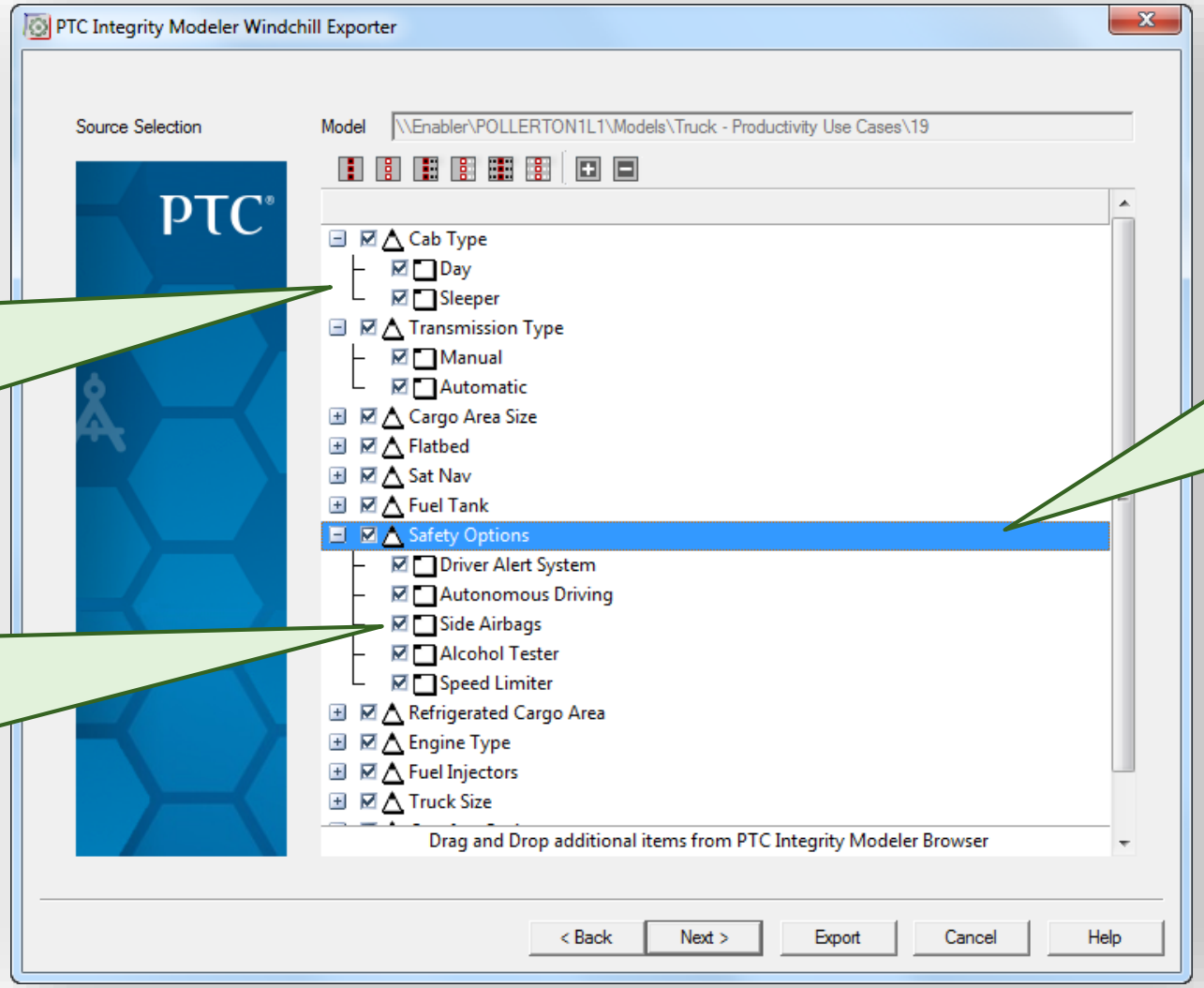
3. Items can be defined as Windchill PDMLink End Items or Configurable Modules

MODELER TO WINDCHILL PRODUCTIVITY – STEP 3

1. If the included Blocks/Block Properties have related variability items, they are automatically included in step 2 of the Exporter

3. Review and confirm the variability items selected for export

Drag and drop additional items from standard Modeler Browsers



2. Structure can be expanded/collapsed

Items can be marked as included/excluded for export

MODELER TO WINDCHILL PRODUCTIVITY – STEP 4

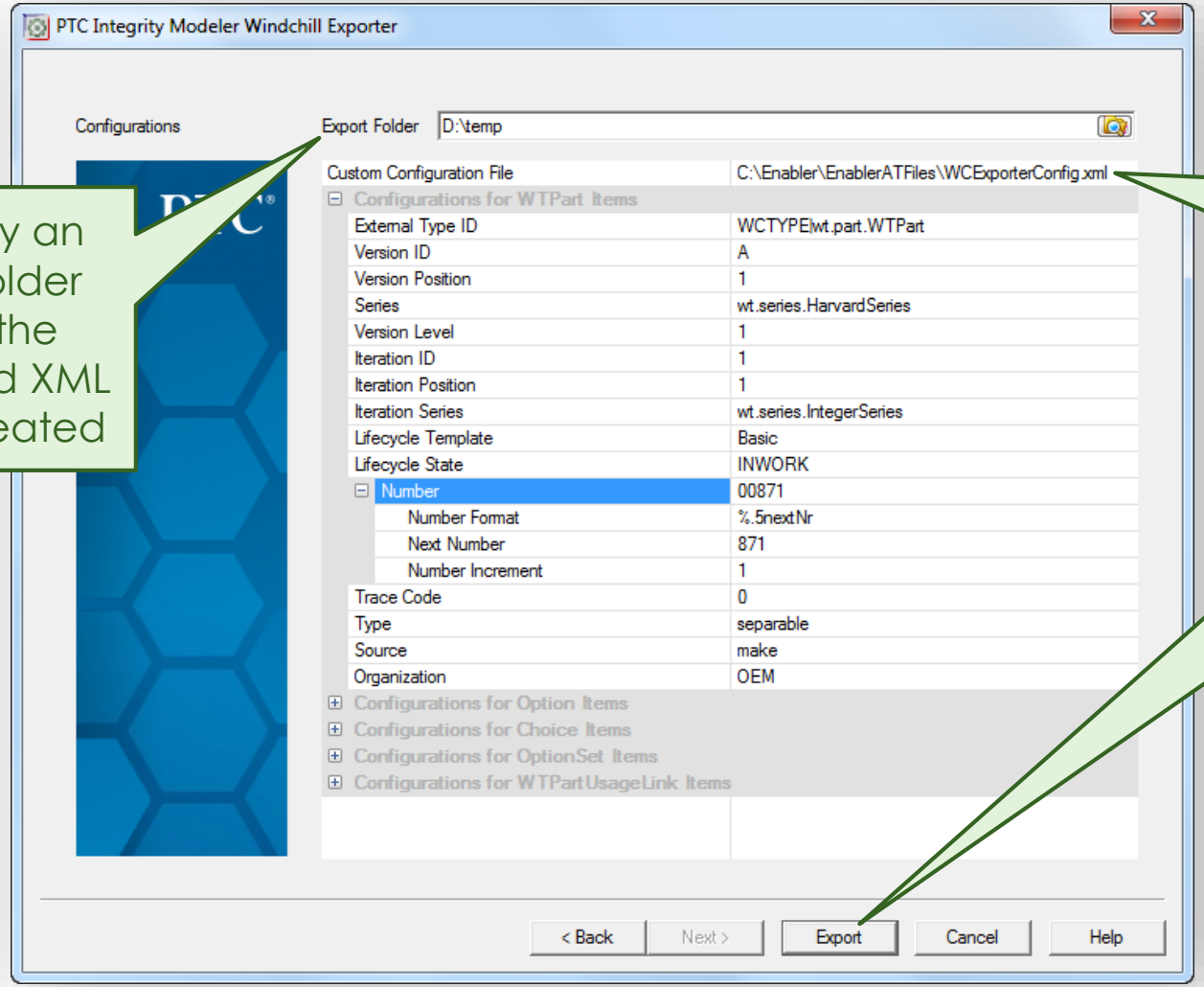
1. Specify an Export folder where the generated XML will be created

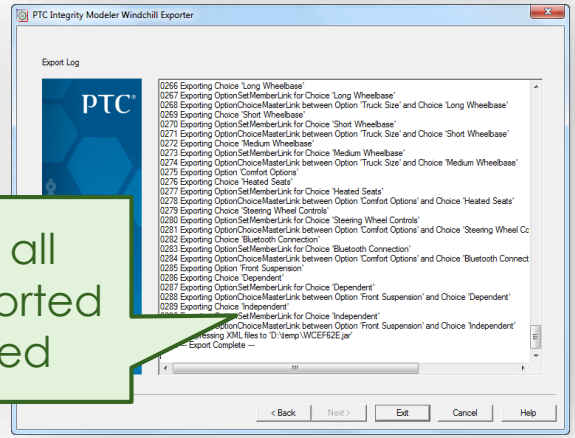
2. Optionally specify Windchill PDMLink object creation parameters

Values can be read from a configuration file or entered into the user interface

3. Once complete, click Export to generate XML

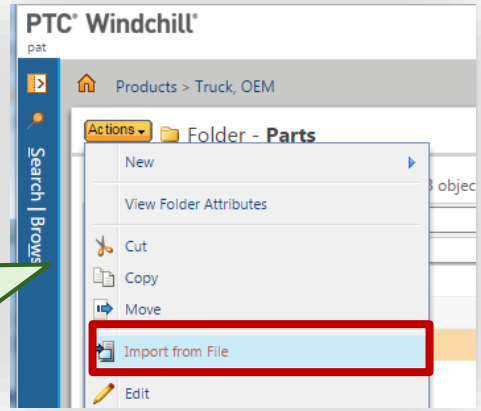
4. A log all items exported is created

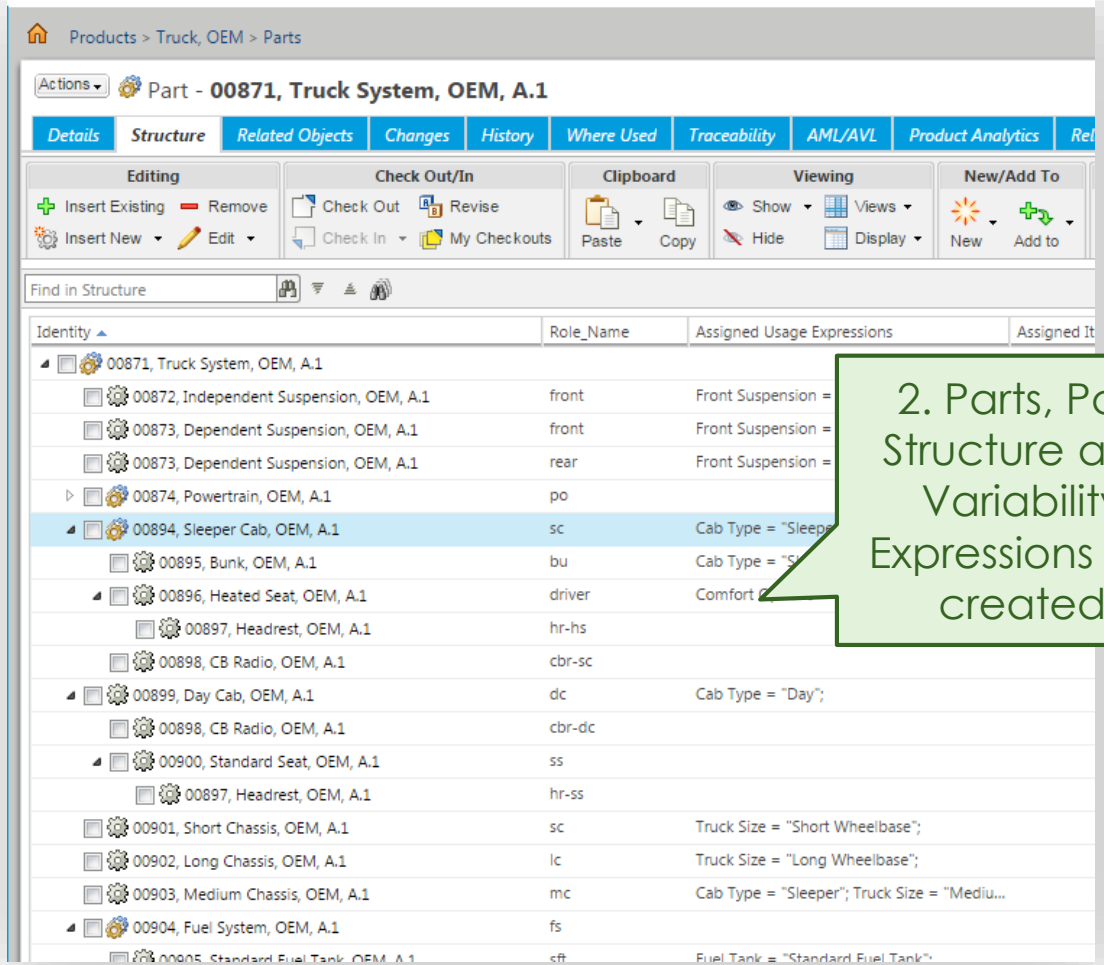




MODELER TO WINDCHILL PDMLINK PRODUCTIVITY – STEP 5

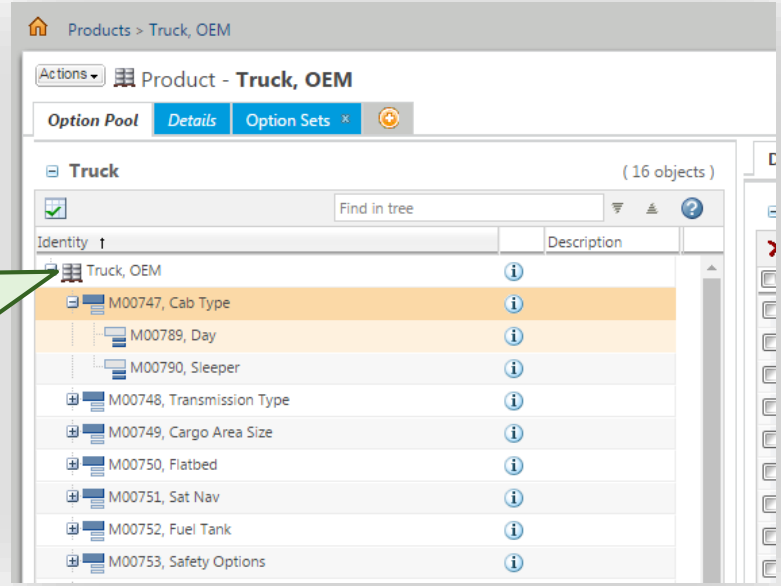
1. Import generated XML into Windchill PDMLink using standard import function





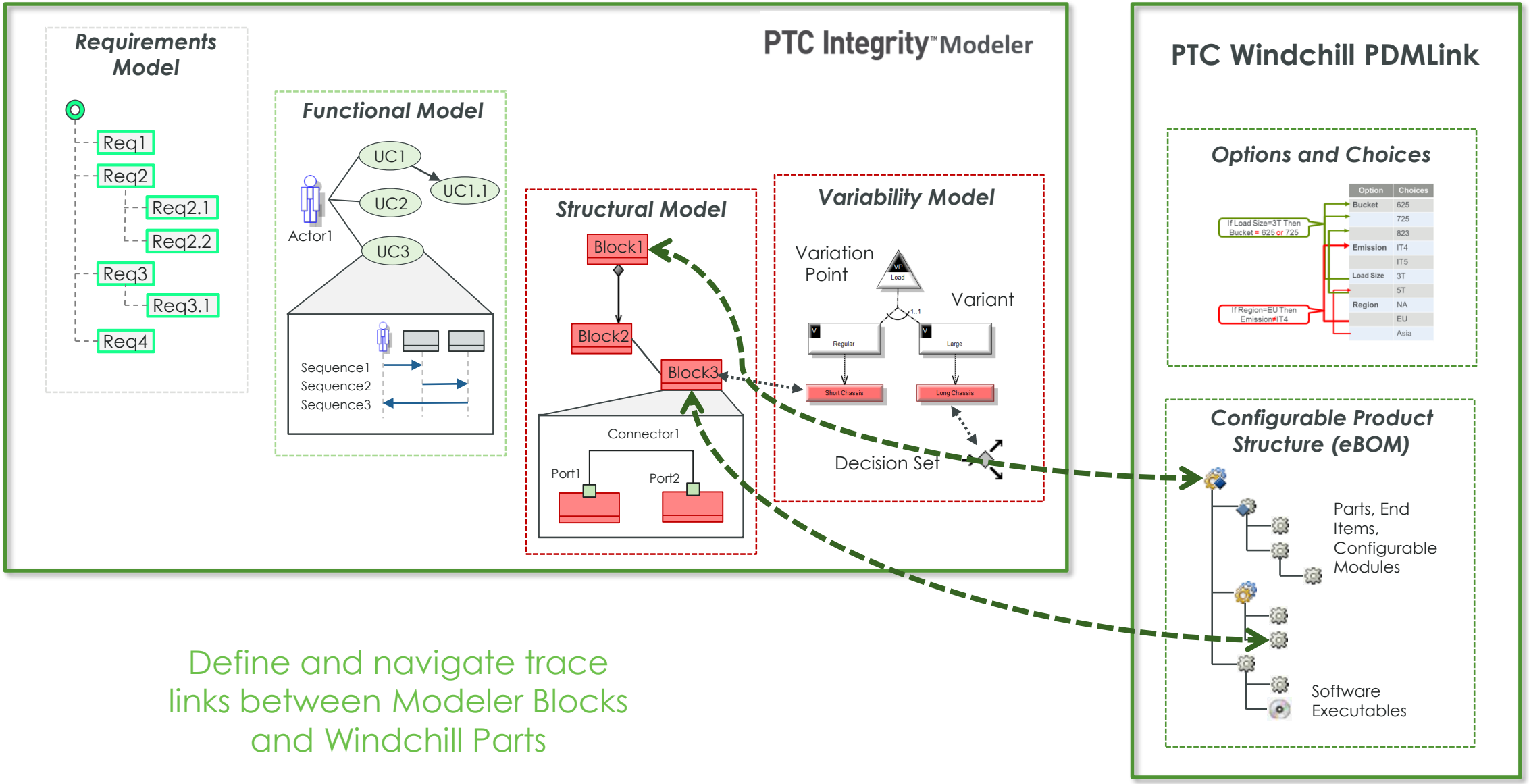
2. Parts, Part Structure and Variability Expressions are created

3. Options, Choices and Option Set are created



MODELER TO WINDCHILL TRACEABILITY

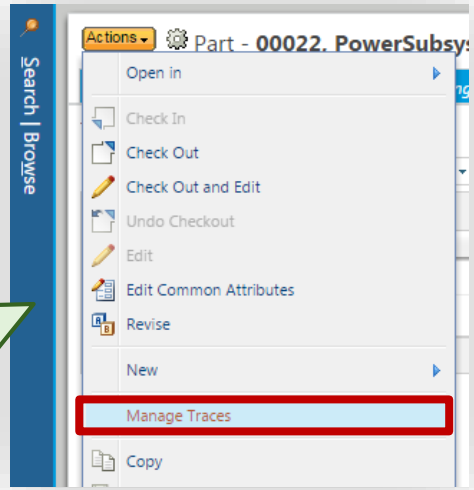
MODELER - WINDCHILL TRACEABILITY - INTRODUCTION



Define and navigate trace links between Modeler Blocks and Windchill Parts

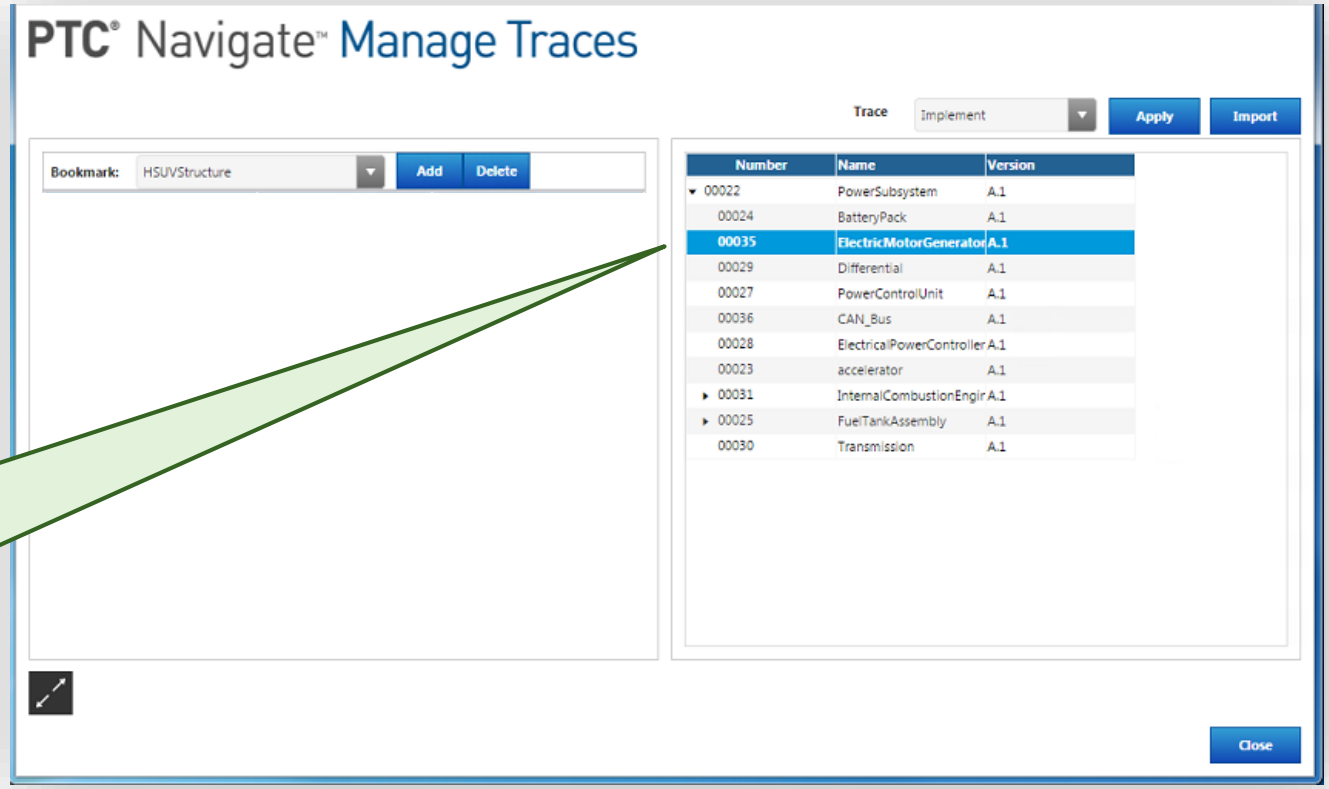
MODELER AND WINDCHILL TRACEABILITY – STEP 1

1. Navigate to Windchill PDMLink Part and select Actions > Manage Traces



2. Manage Traces app is launched

Part used to launch app is shown, with it's structure

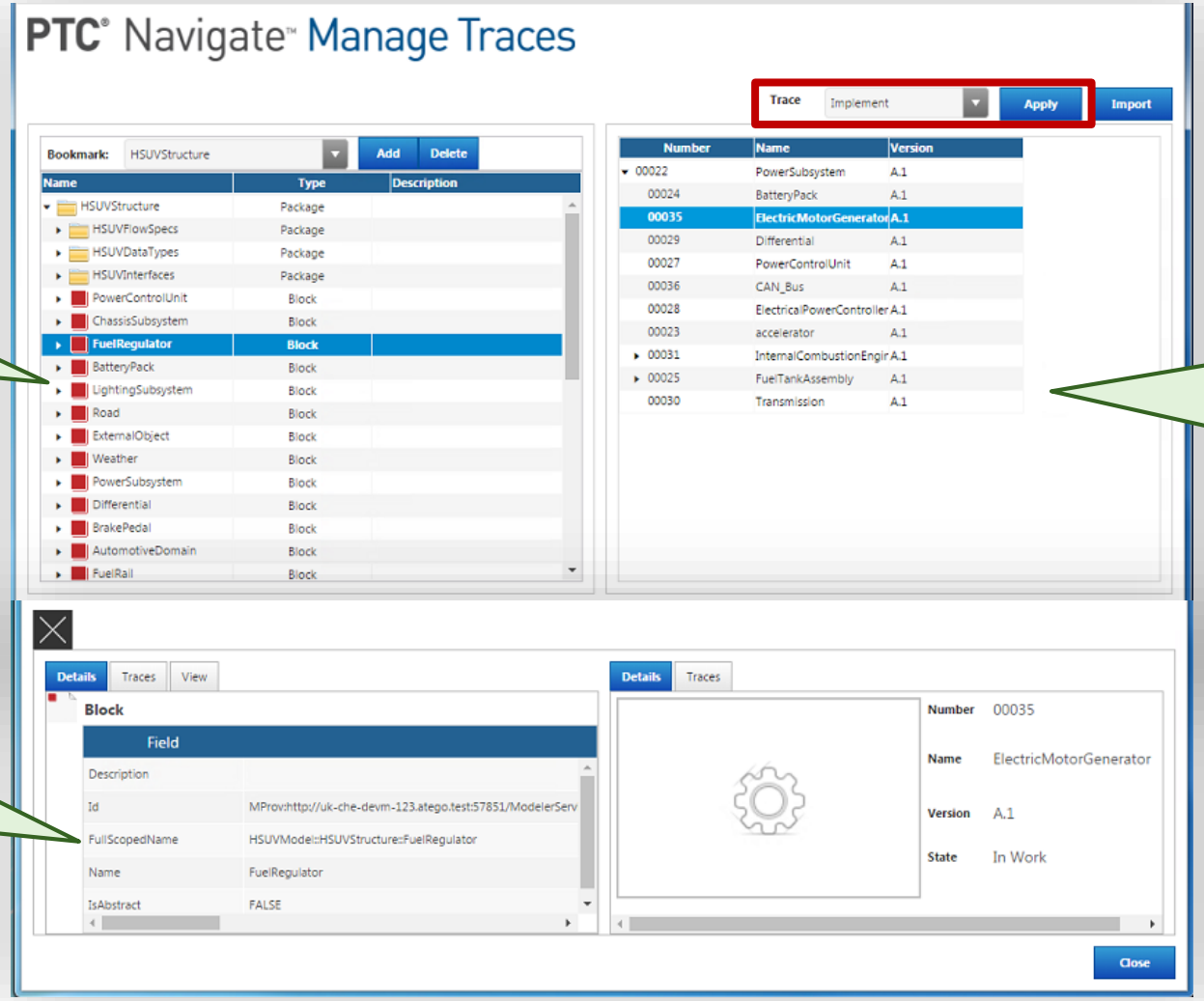


MODELER AND WINDCHILL TRACEABILITY – STEP 2

1. Browse Modeler data and select items

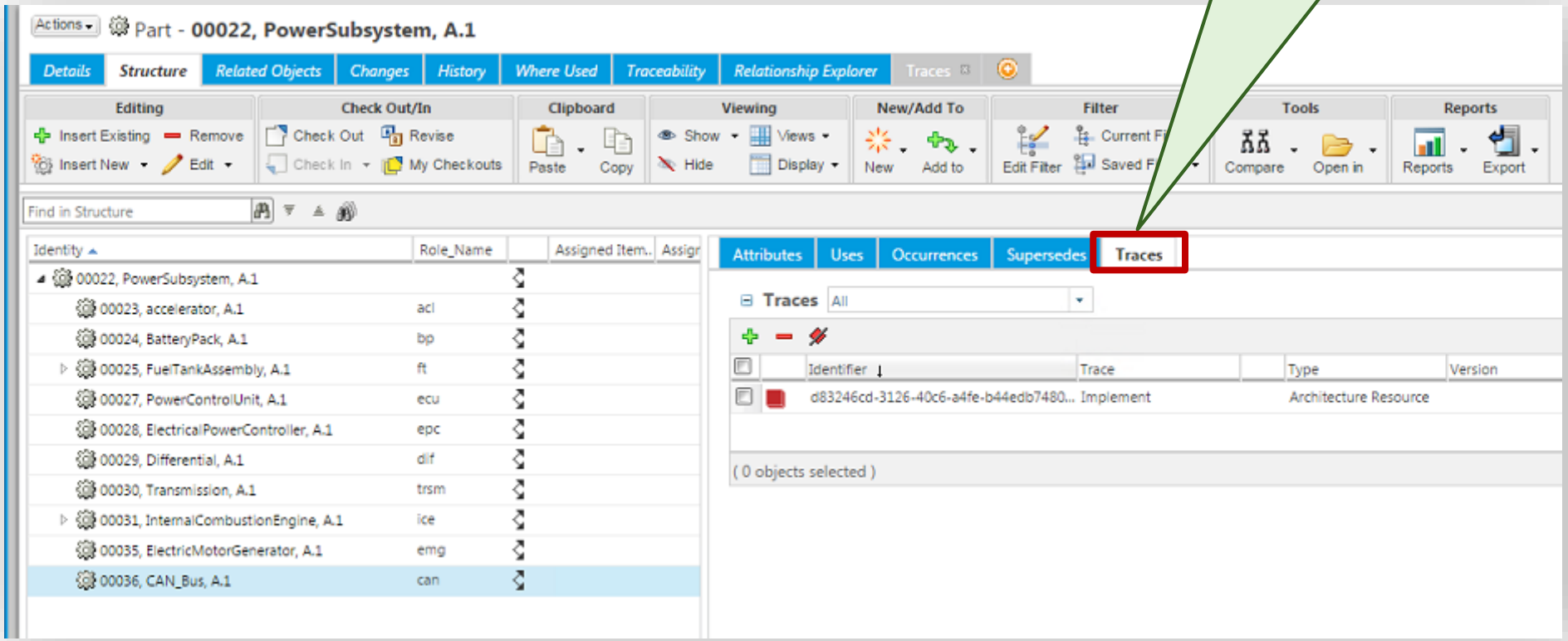
2. Select items on both sides and click Apply to create new trace links

3. View details and existing traces for selected item



VIEWING TRACE LINKS IN WINDCHILL

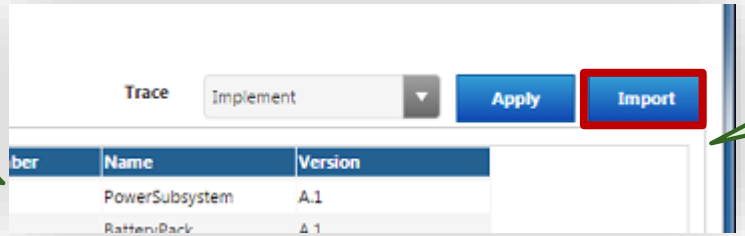
Trace Links can be viewed in Windchill PDMLink Traces tables



MODELER AND WINDCHILL TRACEABILITY – BULK

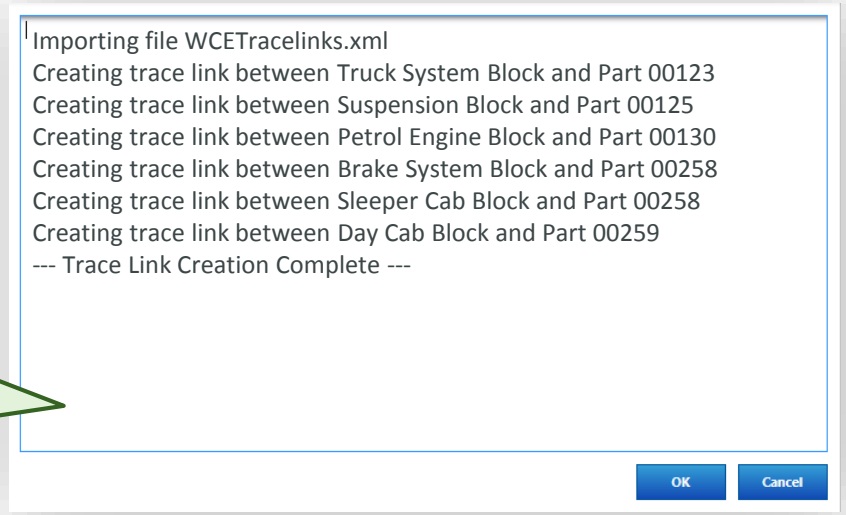
1. Trace Links can also be created in bulk using XML

This should be used after executing the Windchill Exporter to create trace links between the exported Modeler items and the imported Windchill items



2. Launch Trace App and select Import

3. Select XML file and click OK to import and create trace links



WORKING WITH TRACE LINKS

Trace Link Types

PTC Navigate Manage Traces Modeler Extension provides the following trace link type:

- **Implement** — Links a Windchill PDMLink part to a Modeler system block. The link indicates Windchill PDMLink objects that are an implementation (mechanical, electrical or software design) of system design entities, such as blocks.

Suspect Flags

Suspect flags on trace links indicate to users who are working with downstream objects, such as parts, that modifications have been made to the linked upstream objects, such as system blocks. Marking links as suspect provides an easy way to notify other users that the link may be invalid, and should be reviewed.

A trace link is automatically considered suspect if an update has occurred to the traced item after the trace link was created, or since the last time the suspect flag was cleared. Trace links can also be marked as suspect manually within the Traces table in Windchill PDMLink. Once a suspect trace link has been reviewed, the suspect flag can be manually cleared, or if required, the trace link can be removed.

WORKING WITH TRACE LINKS

Version Behavior

- Implement trace links are version specific, meaning they link a specific version of a Windchill PDMLink item (e.g. part) with a specific model version of a Modeler item (e.g. block).
- When a Windchill item is iterated or revised, trace links are copied forward to the new iteration or version of the Windchill PDMLink item. When a Modeler model is revised, trace links are not updated to link to the new version of the Modeler item.

Save As Behavior

- When a Windchill PDMLink item (e.g. part) with an Implement trace link is used for a Save As operation, the trace link is copied forward to the new item.

Clone Behavior

- When a Modeler item (e.g. block) that has an Implement trace link to it is cloned, the trace link is not copied to the new cloned item.

DETAILED USE CASES - TRACEABILITY

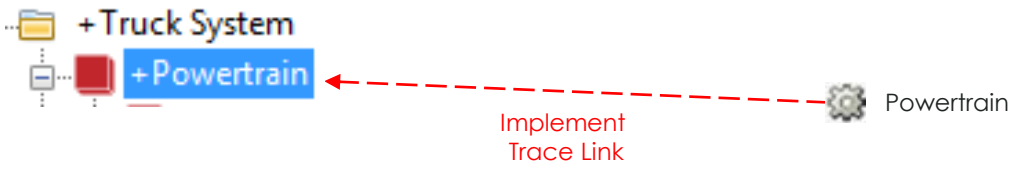
TUC 1 - LINK WINDCHILL PART TO MODELER BLOCK (ONE TO ONE)

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Blocks (Part Browser View)

Windchill Part



Scenario:

- The user launches the Manage Traces app
- The user selects a single Modeler Block and a single Windchill Part
- The user is able to create an "Implement" traceability link between the selected items (This is an example of a one to one trace link)
- The user is able to view and delete the link depending on permissions

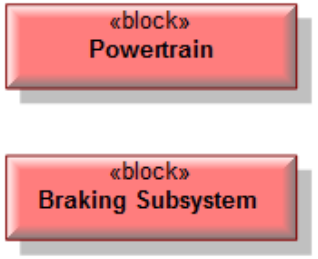
Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

TUC 2 - LINK WINDCHILL PART TO MODELER BLOCK (MANY TO MANY)

Modeler Item Types

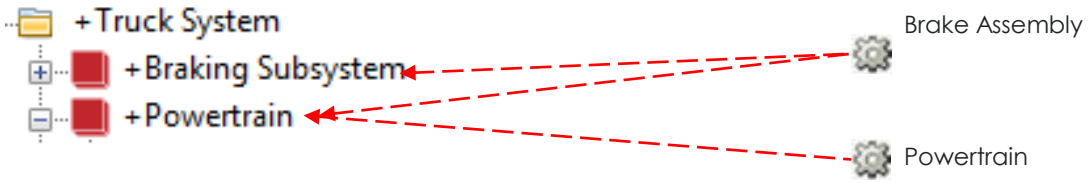
- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set



Block Definition Diagram

Modeler Blocks (Part Browser View)

Windchill Parts



Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

An extension on TUC 1, except with many to many trace links.

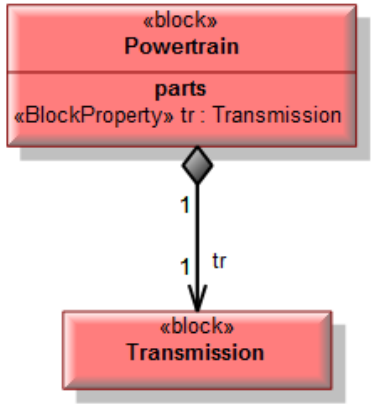
Scenario:

- The user launches the Manage Traces app
- The user is able to create trace links from a single Part to multiple Blocks
- The user is able to create trace links from multiple Parts to the same Block
- The user is able to view and delete the link depending on permissions

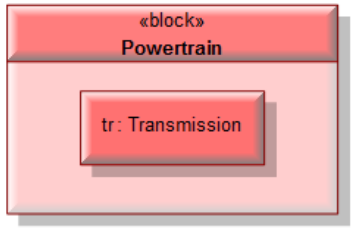
TUC 3 - LINK WINDCHILL PART STRUCTURE TO MODELER BLOCK STRUCTURE

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set



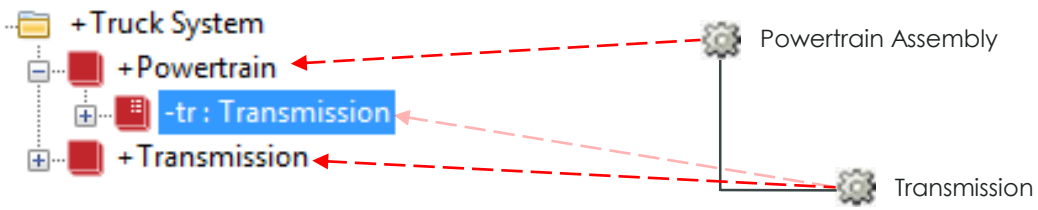
Block Definition Diagram



Internal Block Diagram

Modeler Block Structure (Part Browser View)

Windchill Part Structure



Scenario:

- The user launches the Manage Traces app
- The user is able to expand the structures and select Parts, Blocks and Block Property items
- The user is able to create "Implement" traceability links between items at different levels in the structure hierarchy
  - **If the user select a Block Property, the link is created to the Block that types that Block Property**
  - The Block Property does effectively also have the link, as it is an instance of the Block
- The user is able to view and delete the links depending on permissions

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

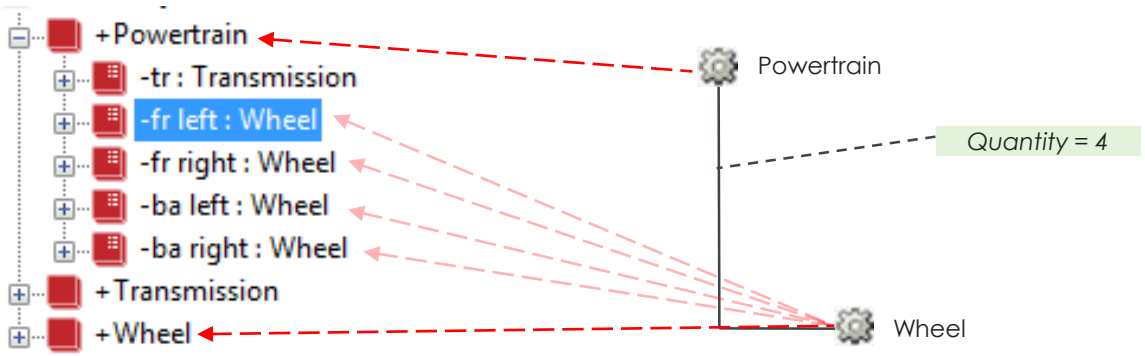
TUC 4 - LINK WINDCHILL PART STRUCTURE TO MODELER BLOCK STRUCTURE WITH BLOCK PROPERTY MULTIPLICITY > 1

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Block Structure (Part Browser View)

Windchill Part Structure



Scenario:

- The user launches the Manage Traces app
- The user selects a Block Property typed by the Wheel Block or the Wheel Block itself and a Windchill Part
- The user is able to create "Implement" traceability links between the selected items
- The user is able to view and delete the links depending on permissions

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

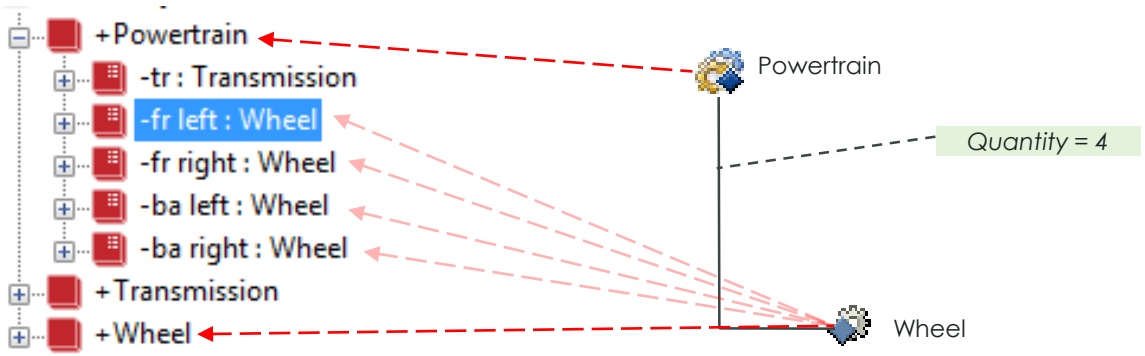
TUC 5 - LINK WINDCHILL PART STRUCTURE TO MODELER BLOCK STRUCTURE WITH BLOCK PROPERTY MULTIPLICITY > 1

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Block Structure (Part Browser View)

Windchill Part Structure



Scenario:

- Same as UC 4 except:
- The user is able to create Implement links from End Item Parts, Configurable Module Parts or Configurable End Item Parts

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

TRACE LINKING BETWEEN VARIABILITY OBJECTS

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Variability WC objects are not exposed via ThingWorx currently.
This capability is planned for a future release

Windchill Item Types

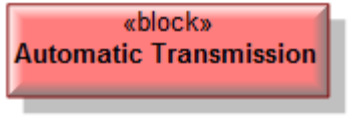
- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

DETAILED USE CASES - PRODUCTIVITY

PUC 1: CREATE WINDCHILL PART FROM A MODELER BLOCK

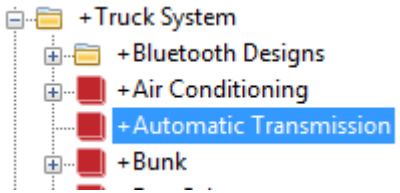
Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set



Block Definition Diagram

Modeler Block (Part Browser View)



Windchill Part

Scenario:

- Assume no data has been previously exported/imported
- The user selects a single Modeler Block (Automatic Transmission) that has no Block Property items (no child items) and launches the Windchill Exporter function
- Export files are created and the user then imports into Windchill
- The system creates a Windchill Part based on the Block, with matching Name
- The system will optionally create an "Implement" trace link from the Automatic Transmission Part to the Automatic Transmission Block (this is done using the Manage Traces app)

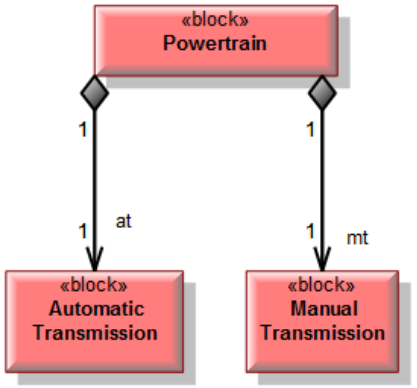
Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

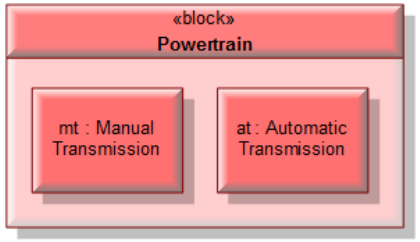
PUC 2: CREATE WINDCHILL PART FROM A MODELER BLOCK PROPERTY

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

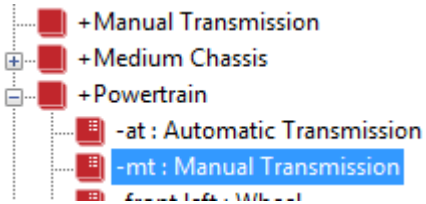


Block Definition Diagram



Internal Block Diagram

Modeler Block Structure (Part Browser View)



Windchill Part

Manual Transmission

Scenario:

- Assume no data has been previously exported/imported
- The user selects a single Modeler Block Property (mt : Manual Transmission), does not select its parent item (Powertrain) and launches the Windchill Exporter
- Export files are created and the user then imports into Windchill
- The system creates a Windchill Part called Manual Transmission based on the Block that types the selected Block Property
    - Because the Powertrain Block was not included in the export, the system will not create a Powertrain Part or Part Usage link
- The system will optionally create an "Implement" trace link from the Manual Transmission Part to the Manual Transmission Block (using the Manage Traces app)
- If the user selected the Manual Transmission Block for export the result would be the same

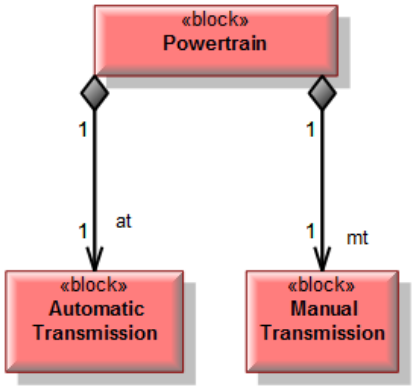
Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

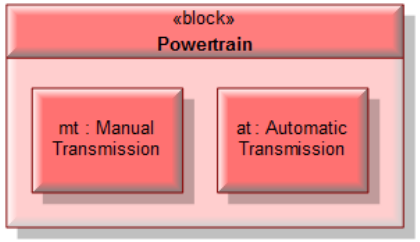
PUC 3: CREATE WINDCHILL PART STRUCTURE FROM A MODELER BLOCK STRUCTURE

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

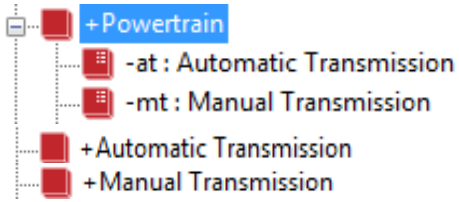


Block Definition Diagram



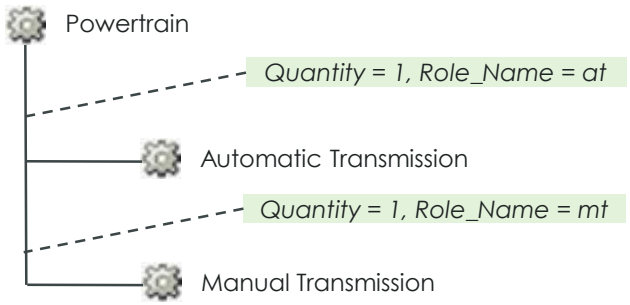
Internal Block Diagram

Modeler Block Structure (Part Browser View)



Export

Windchill Parts



Scenario:

- Assume no data has been previously exported/imported
- The user selects a Block (Powertrain) and launches the Windchill Exporter
  - The system automatically selects the child Block Property items
- Export files are created and the user then imports into Windchill
- The system creates Windchill Parts called Powertrain, Automatic Transmission and Manual Transmission
- The system creates Part Usage links based on Modeler Composite Aggregation relationship
  - May be displayed as a Block Property on an Internal Block Diagram (same link in the underlying data)
  - For each Block Property, the system will create one Part Usage link (with Quantity=1)
  - The Block Property name (if one exists) is copied to a soft attribute on the Part Usage link. By default this soft attribute is called Role_Name
- The system will optionally create "Implement" trace links from the Parts to the corresponding Blocks

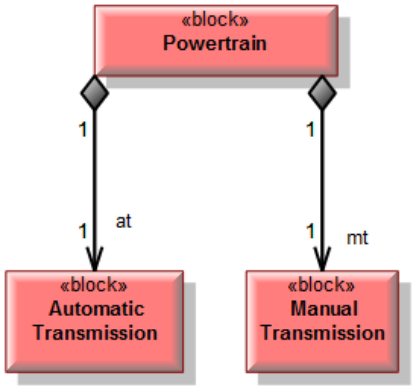
Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

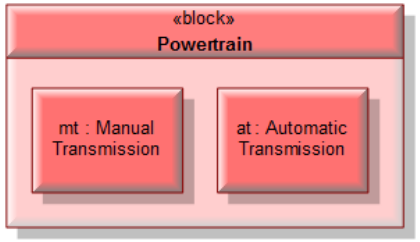
PUC 4: CREATE WINDCHILL PART STRUCTURE FROM A MODELER BLOCK STRUCTURE

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

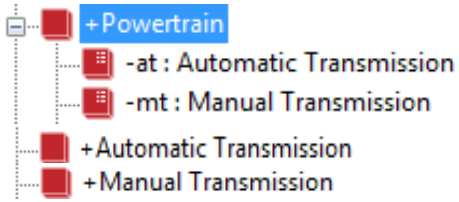


Block Definition Diagram



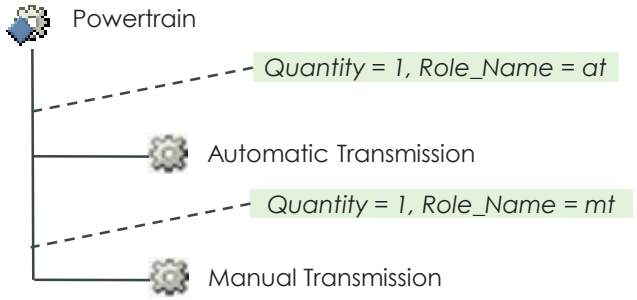
Internal Block Diagram

Modeler Block Structure (Part Browser View)



Export

Windchill Parts



Scenario:

- Extension of UC 3, except this provides the ability to create Parts as End Item Parts

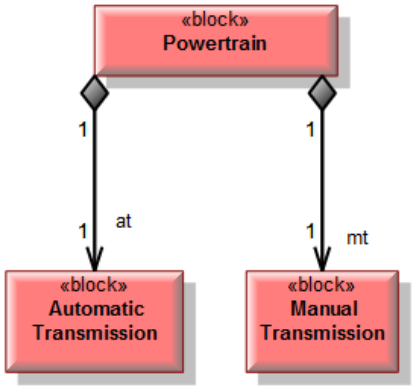
Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

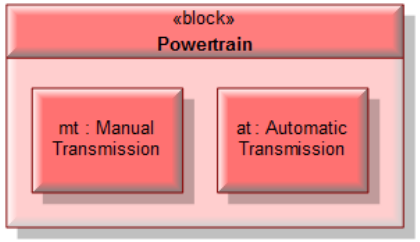
PUC 5: CREATE WINDCHILL PART STRUCTURE FROM A MODELER BLOCK STRUCTURE

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

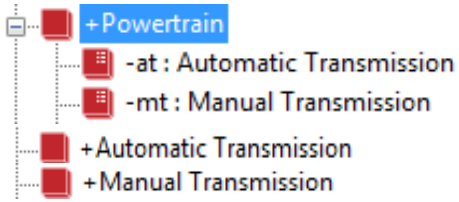


Block Definition Diagram



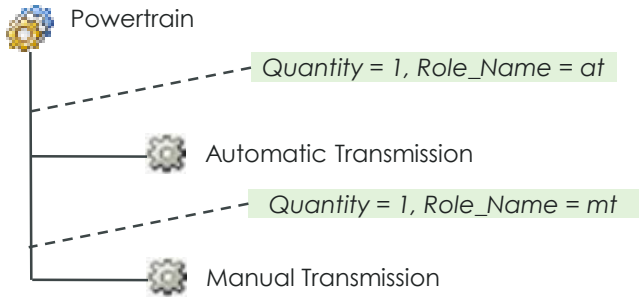
Internal Block Diagram

Modeler Block Structure (Part Browser View)



Export

Windchill Parts



Scenario:

- Extension of UC 3, except this provides the ability to create Parts as Configurable Module Parts

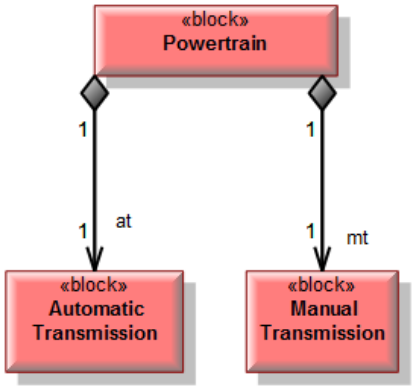
Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

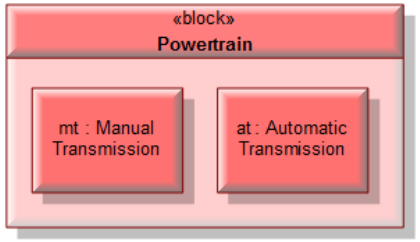
PUC 6: CREATE WINDCHILL PART STRUCTURE FROM A MODELER BLOCK STRUCTURE

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

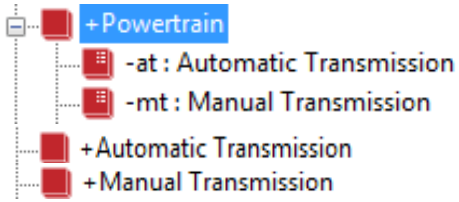


Block Definition Diagram

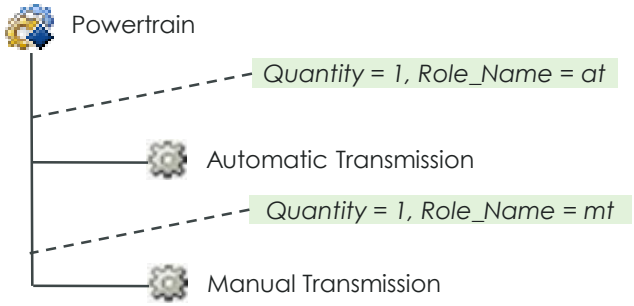


Internal Block Diagram

Modeler Block Structure (Part Browser View)



Windchill Parts



Scenario:

- Extension of UC 3, except this provides the ability to create Parts as Configurable End Item Parts

Windchill Item Types

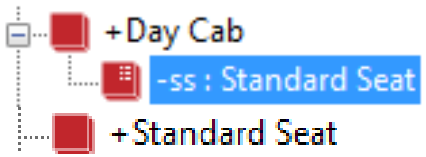
- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 7: CREATE WINDCHILL PART FROM A MODELER BLOCK PROPERTY (WITH EXISTING ITEMS)

Modeler Item Types

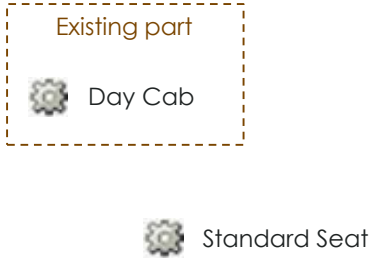
- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Block Structure (Part Browser View)



Export

Windchill Parts



Scenario:

- Assume the Day Cab Block was previously exported/imported and the Day Cab Part exists in Windchill
- The user selects the ss : Standard Seat Block Property and launches the Windchill Exporter
- Export files are created and the user then imports into Windchill
- The system creates the Standard Seat Part
    - **Part Usage link is not created (system will not create links to existing Windchill items)**
- The system will optionally create an "Implement" trace link from the Standard Seat Part to the Standard Seat Block

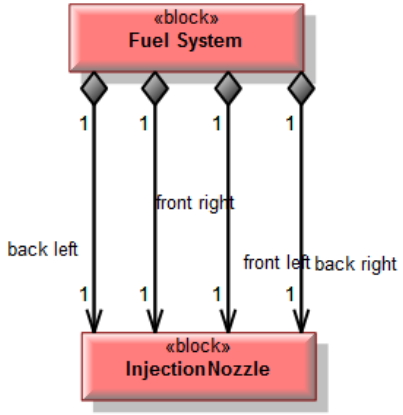
Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 8: CREATE WINDCHILL PART STRUCTURE FROM A MODELER BLOCK STRUCTURE WITH BLOCK PROPERTY MULTIPLICITY > 1

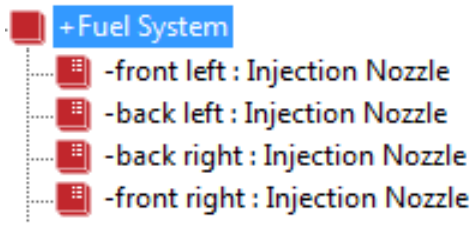
Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

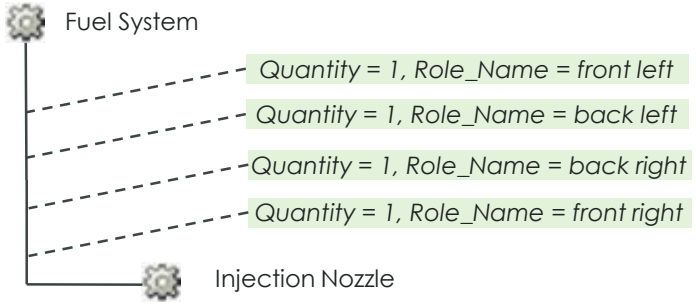


Block Definition Diagram

Modeler Block Structure (Part Browser View)



Windchill Part Structure



Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

Scenario:

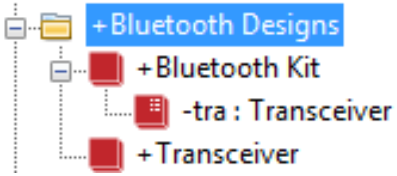
- Assume no data has been previously exported/imported
- The user selects the Fuel System Block and launches the Windchill Exporter
- The system automatically selects the child Block Property items
- Export files are created and the user then imports into Windchill
- The system creates 2 Windchill Parts: Fuel System and Injection Nozzle
- The system creates 4 Part Usage links based on Composite Aggregation relationships and the multiplicity
    - All 4 Part Usage links are to the same Injection Nozzle Part
- The system will optionally create an "Implement" trace links from the Parts to the corresponding Blocks

PUC 9 – CREATE WINDCHILL PART STRUCTURE FROM MODELER BLOCK STRUCTURE USING PACKAGES

Modeler Item Types

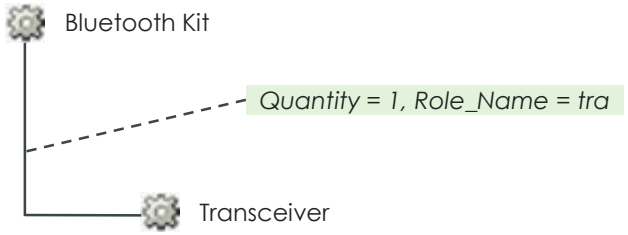
- Block
- Block Property
- Implement Link
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Block Structure (Part Browser View)



Export

Windchill Part Structure



Windchill Item Types

- Part
- Implement Link
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

Scenario:

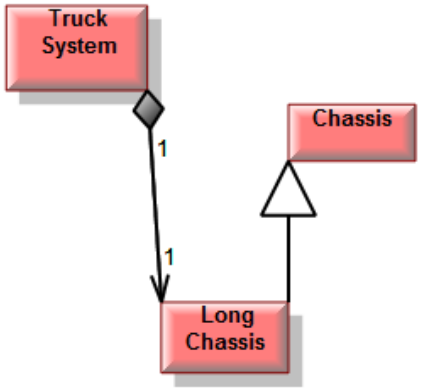
- Assume no data has been previously exported/imported
- The user selects the Bluetooth Designs Package and launches the Windchill Exporter
    - All items and items in sub-packages are selected for export
- Export files are created and the user then imports into Windchill
- The system will optionally create an "Implement" trace links from the Parts to the corresponding Blocks

PUC 10 - CREATE WINDCHILL PART STRUCTURE BASED ON MODELER BLOCK STRUCTURE WITH GENERALIZATION LINK

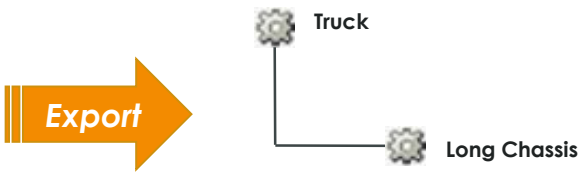
Modeler Item Types

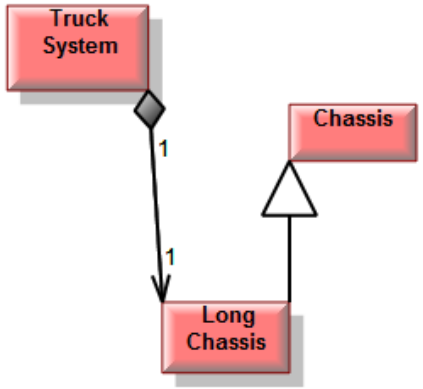
- Block
- Block Property
- Implement Link
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

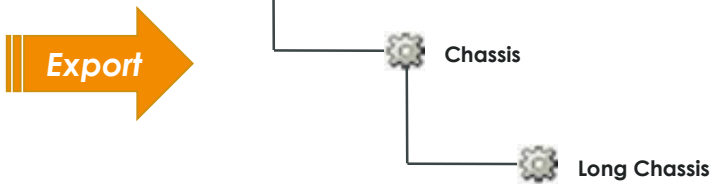
Modeler Block Structure (Part Browser View)



Windchill Part Structure







Scenario:

- The user selects the Truck System Block and launches the Windchill Exporter
- Export files are created and the user then imports into Windchill
- The system will optionally create an "Implement" trace links from the Parts to the corresponding Blocks
- <u>The "super block" (Chassis) and generalization association are ignored</u>

This is not a logical mapping, the Chassis items are not equivalent so the hierarchical links do not correspond.

<u>This scenario is not supported</u>

Windchill Item Types

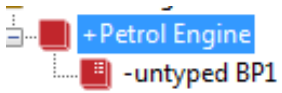
- Part
- Implement Link
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 11 – CREATE WINDCHILL PART BASED ON MODELER UNTYPED BLOCK PROPERTY

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Block Structure (Part Browser View)



Export

Windchill Part Structure

Scenario

- Assume no data has been previously exported/imported
- Exporting Block Properties that are untyped is not supported

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 12 – CREATE WINDCHILL PART BASED ON MODELER INTERFACE BLOCK OR BLOCK PROPERTY

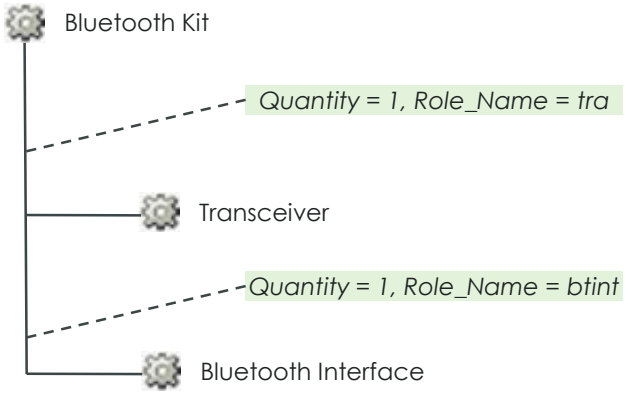
Modeler Item Types

- Block
- Block Property
- Implement Link
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Block Structure (Part Browser View)

Export

Windchill Part Structure



Windchill Item Types

- Part
- Implement Link
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

Scenario:

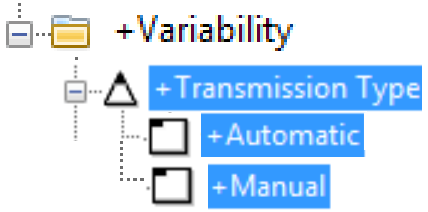
- Assume no data has been previously exported/imported
- The user select the Bluetooth Kit Block for export
- The system automatically selects the child Block Property items
- Export files are created and the user then imports into Windchill
- The system will optionally create "Implement" trace links from the Parts to the corresponding Blocks

PUC 13 – CREATE WINDCHILL OPTION/CHOICE BASED ON MODELER VARIATION POINT/VARIANT

Modeler Item Types

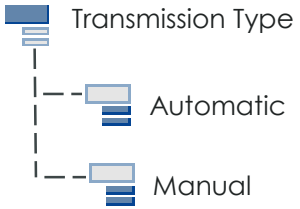
- Block
- Block Property
- Implement Link
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

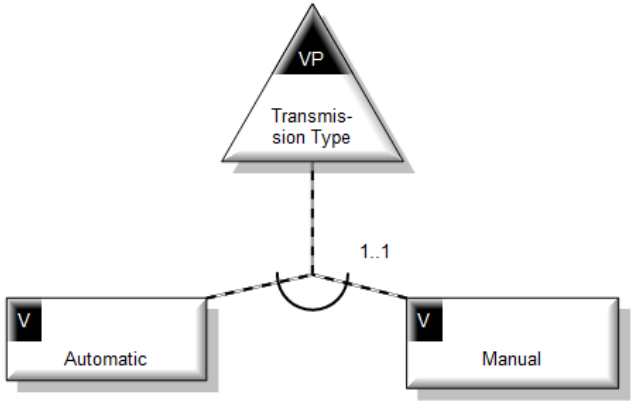
Modeler Variability Items



Export

Windchill Option and Choices





Variant Diagram

Scenario:

- Assume no data has been previously exported/imported
- User selects Variation Point for export
- System should automatically select all dependent Variants
  - Do not allow variants to be de-selected
  - Alternative Choice between items not displayed
- The system will generate XML to create:
  - Options based on Variation Points
    - If Variation Point set to Mandatory the Option is "Required"
  - Choices based on Variants
  - OptionChoiceMasterLink based on Optional Dependency (between Variant and VP)
  - Alternative Choice items drives Option attributes
- The system will create Implement trace links (planned for future release)

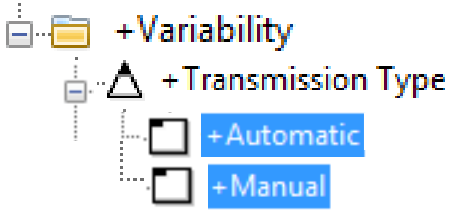
Windchill Item Types

- Part
- Implement Link
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 14 – CREATE WINDCHILL CHOICE BASED ON MODELER VARIANT

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set



Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

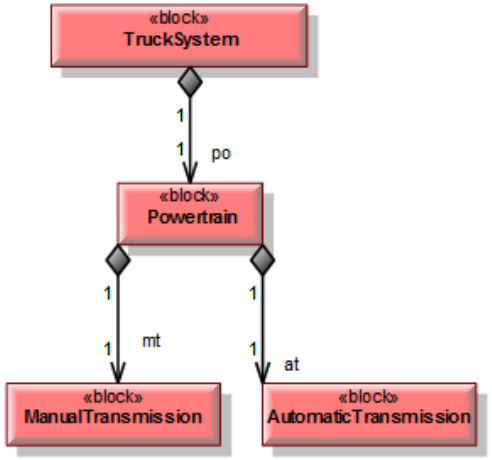
Scenario

- User selects one or more Variants, without including the owning Variation Point
- This use case is not supported
  - Variants on their own can not be exported, they must be exported with a related Variation Point
  - Will not be possible to de-select a Variation Point without also de-selecting it's Variants

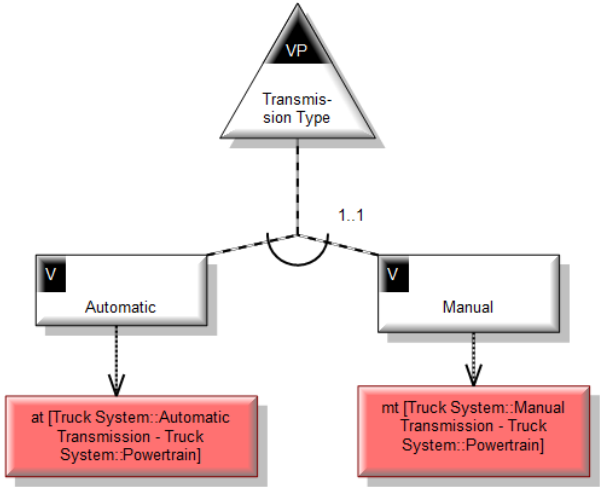
PUC 15 – CREATE WINDCHILL CONFIGURABLE PART STRUCTURE BASED ON MODELER BLOCK OR BLOCK PROPERTY WITH VARIABILITY

Modeler Item Types

- Block
- Block Property
- Implement Link
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

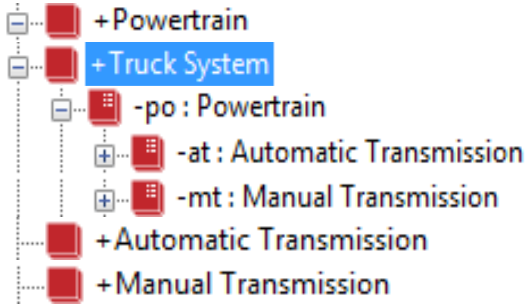


Block Definition Diagram



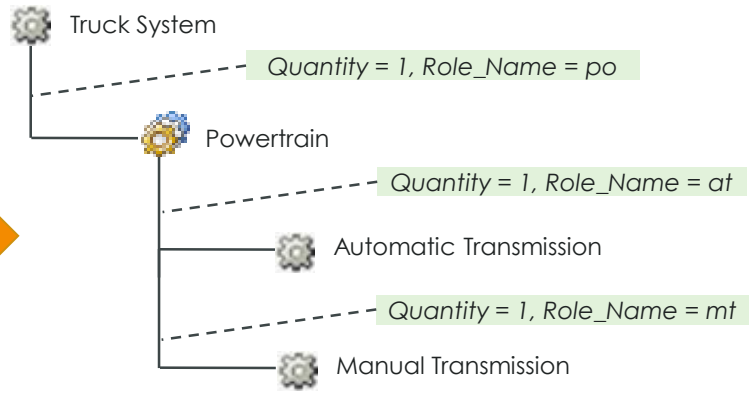
Variant Diagram

Modeler Block Structure (Part Browser View)



Export

Windchill Part Structure



Windchill Item Types

- Part
- Implement Link
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

Scenario:

- Assume no data has been previously exported/imported
- The user selects the Truck System Block initiates the Modeler Exporter
- The system will automatically determine items that should be created as Configurable Modules
  - If an item has an artefact dependency link to a variant as shown, the parent of this item will be created as a Configurable Module Part
- The user can also manually select the checkbox for any selected item to specify that it should be created as a Configurable Module Part
- The user chooses to <u>not</u> create variability items in Windchill (by de-selecting the items)
- Export files are created and the user then imports into Windchill
- The system will optionally create "Implement" trace links from the Parts to the corresponding Blocks

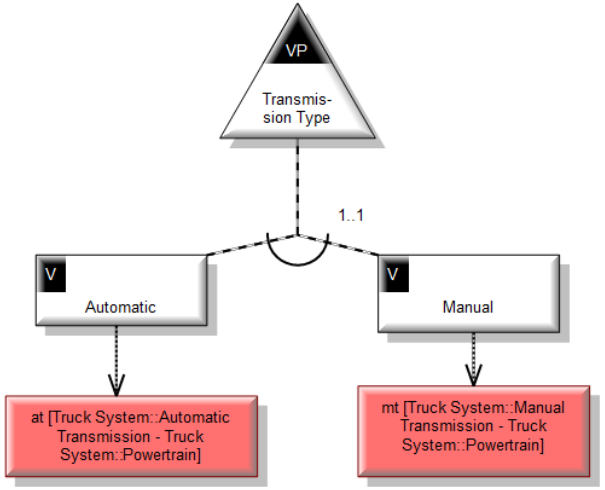
PUC 16 – CREATE WINDCHILL CONFIGURABLE PART STRUCTURE, OPTIONS, CHOICES AND ASSIGNED EXPRESSIONS BASED ON MODELER BLOCK STRUCTURE, VARIATION POINTS, VARIANTS AND ARTEFACT DEPENDENCIES LINKED TO BLOCK PROPERTIES

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

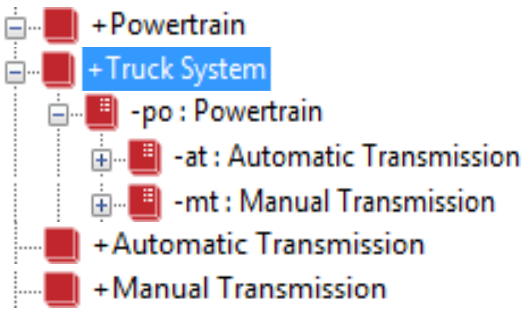
Scenario:

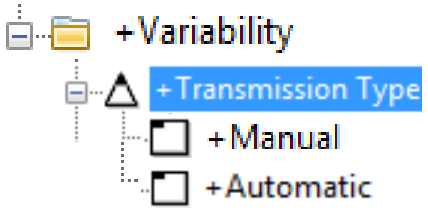
- An extension of Use Case 15
- User selects Truck System Block and chooses to include related variability items for export
- Part structure with Configurable Module part will be created
- Options and Choices are created based on Variation Point and Variants
- Assigned Expressions created based on Modeler Artefact Dependency
  - Expression associates Choice and Part Usage link in this use case
- The system will optionally create "Implement" trace links from the Parts to



Variant Diagram

Modeler Block Structure (Part Browser View)

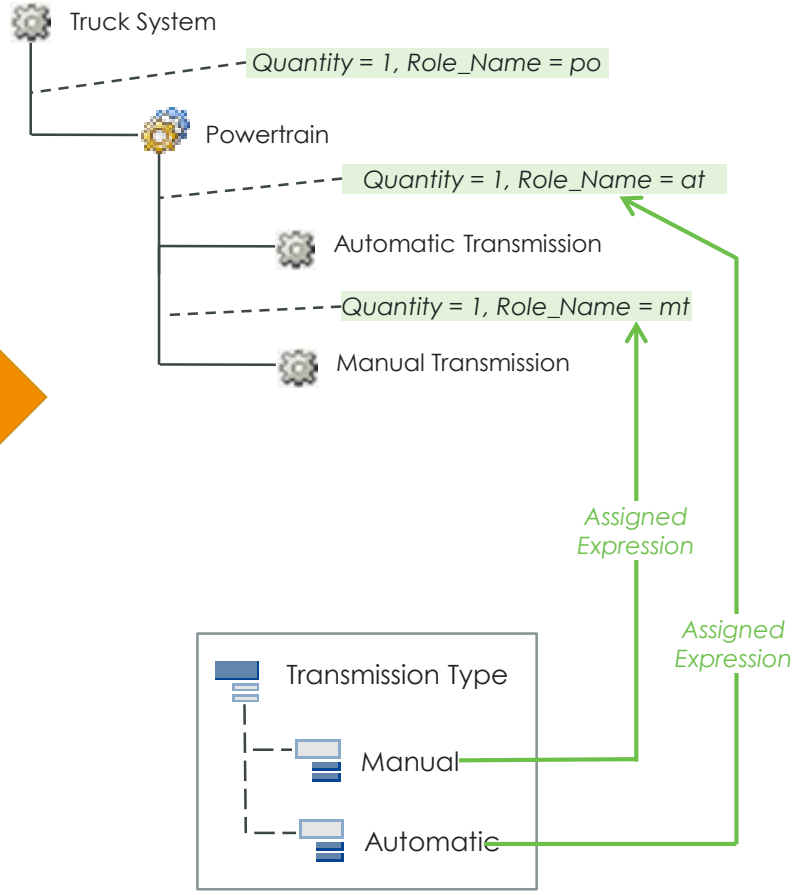




Modeler Variability Items

Export

Windchill Part Structure



Windchill Options and Choices

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

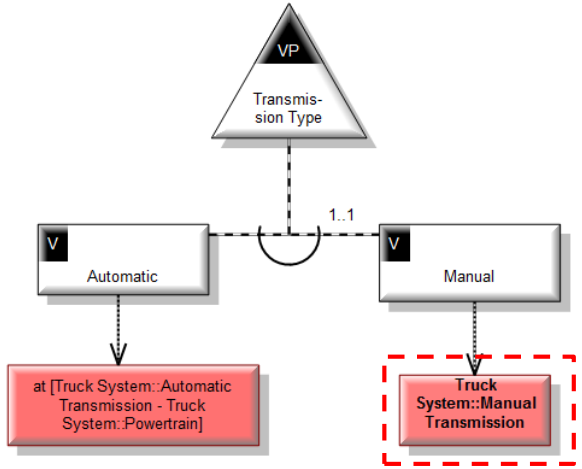
PUC 17 – CREATE WINDCHILL CONFIGURABLE PART STRUCTURE, OPTIONS, CHOICES AND ASSIGNED EXPRESSIONS BASED ON MODELER BLOCK STRUCTURE, VARIATION POINTS, VARIANTS AND ARTEFACT DEPENDENCIES LINKED TO BLOCKS

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

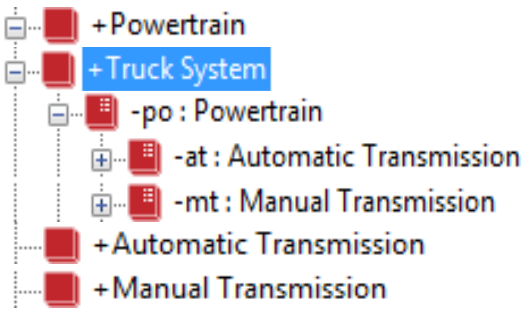
Scenario

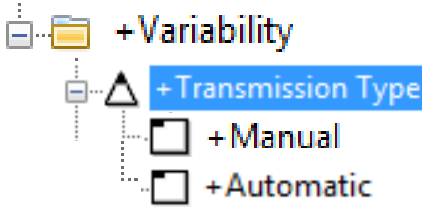
- Extension of use case 16, except that the Modeler Artifact Dependency links to a Block, not a Block Property
- In this case, the Assigned Expression in Windchill will be created between the Choice and Part
  - If Modeler Artifact Dependency links to a Block Property, the WC Expression is assigned to the corresponding Part Usage link
  - If the Artifact Dependency links to a Block, the Expression is assigned to the corresponding Part
- The system will optionally create "Implement" trace links from the Parts to the corresponding Blocks



Variant Diagram

Modeler Block Structure (Part Browser View)

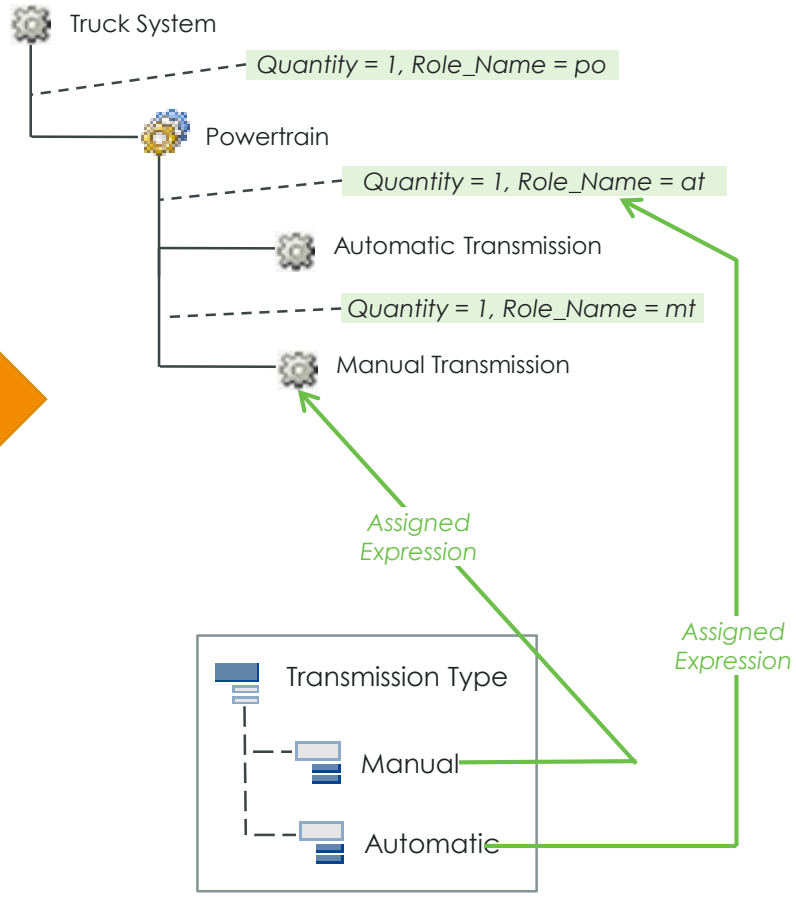




Modeler Variability Items

Export

Windchill Part Structure



Windchill Options and Choices

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 18 – CREATE WINDCHILL CONFIGURABLE PART STRUCTURE, OPTIONS, CHOICES AND ASSIGNED EXPRESSIONS BASED ON MODELER BLOCK STRUCTURE, VARIATION POINTS, VARIANTS AND MULTIPLE ARTEFACT DEPENDENCIES

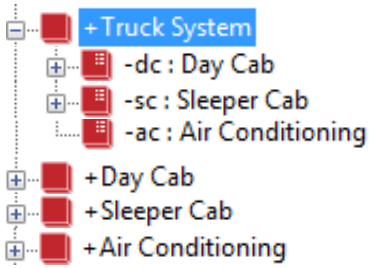
Modeler Item Types

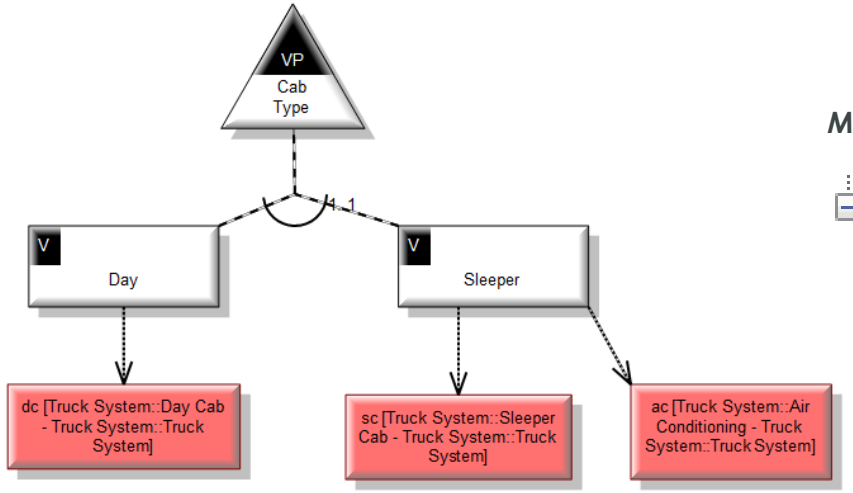
- Block
- Block Property
- Implement Link
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Scenario:

- Variant (Sleeper) has 2 Artifact Dependencies
- Windchill Choice (Sleeper) will be created with 2 Assigned Expressions

Modeler Blocks (Part Browser View)

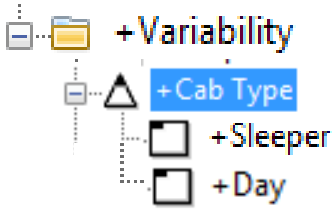




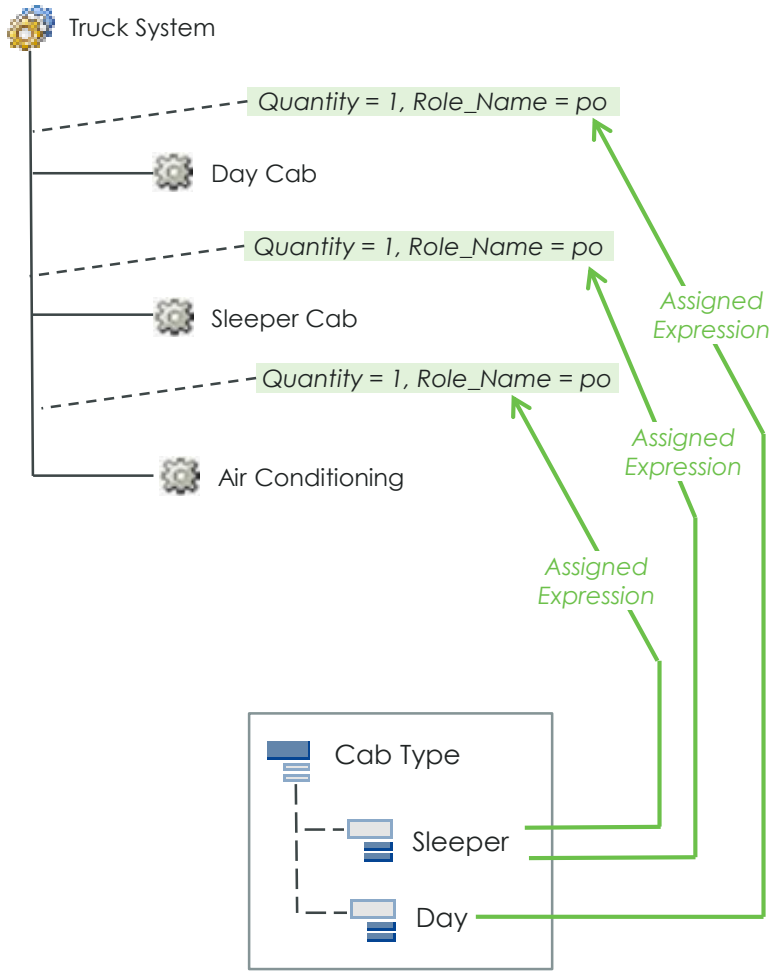
Variant Diagram

Export

Modeler Variability Items



Windchill Part Structure



Windchill Options and Choices

Windchill Item Types

- Part
- Implement Link
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

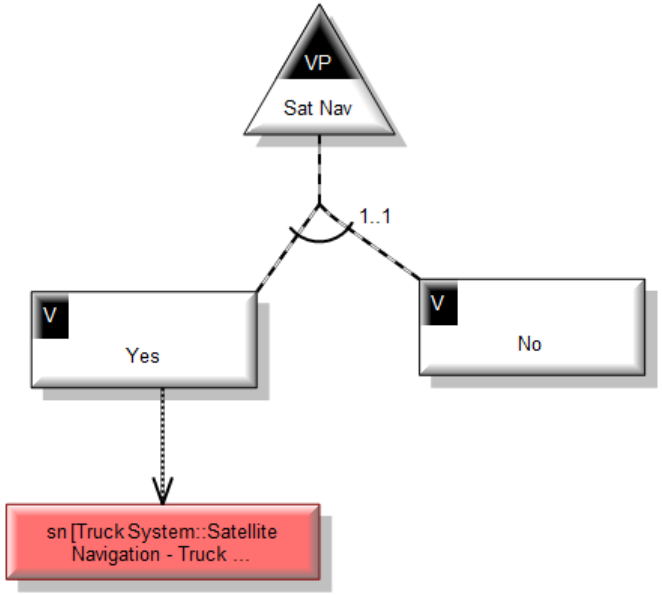
PUC 19 – CREATE WINDCHILL CONFIGURABLE PART STRUCTURE, OPTIONS, CHOICES AND ASSIGNED EXPRESSIONS BASED ON MODELER BLOCK STRUCTURE, VARIATION POINTS, VARIANTS AND ARTEFACT DEPENDENCIES (SINGLE CHOICE)

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

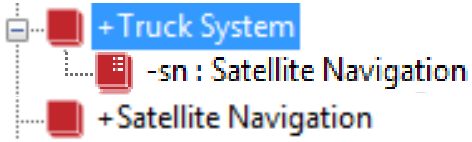
Scenario:

- Variation Point with 2 Variants but only one has an Artefact Dependency, therefore only one Assigned Expression will be created

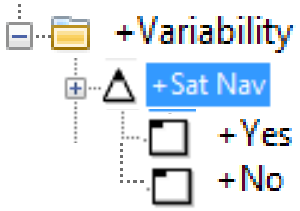


Variant Diagram

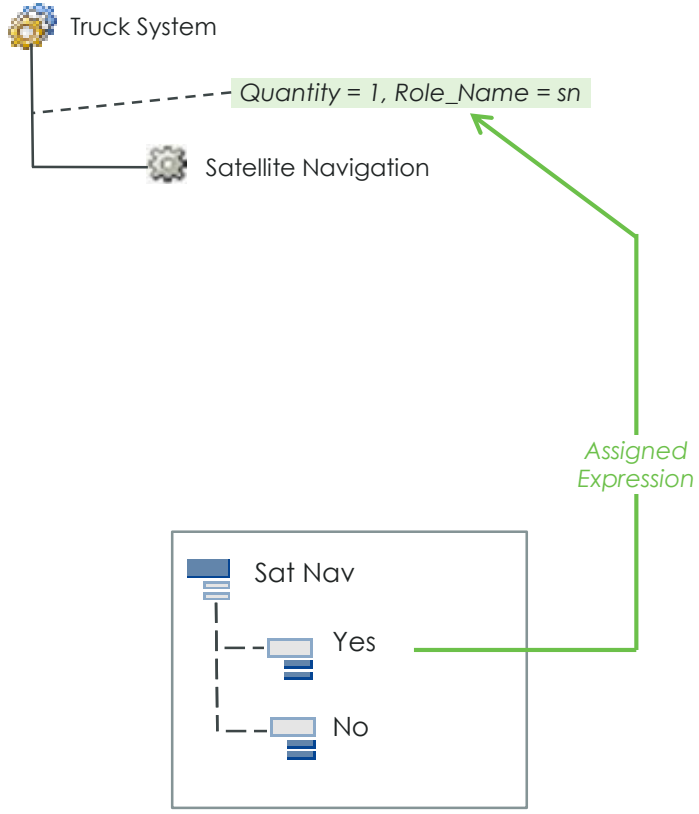
Modeler Blocks (Part Browser View)



Export



Windchill Part Structure



Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

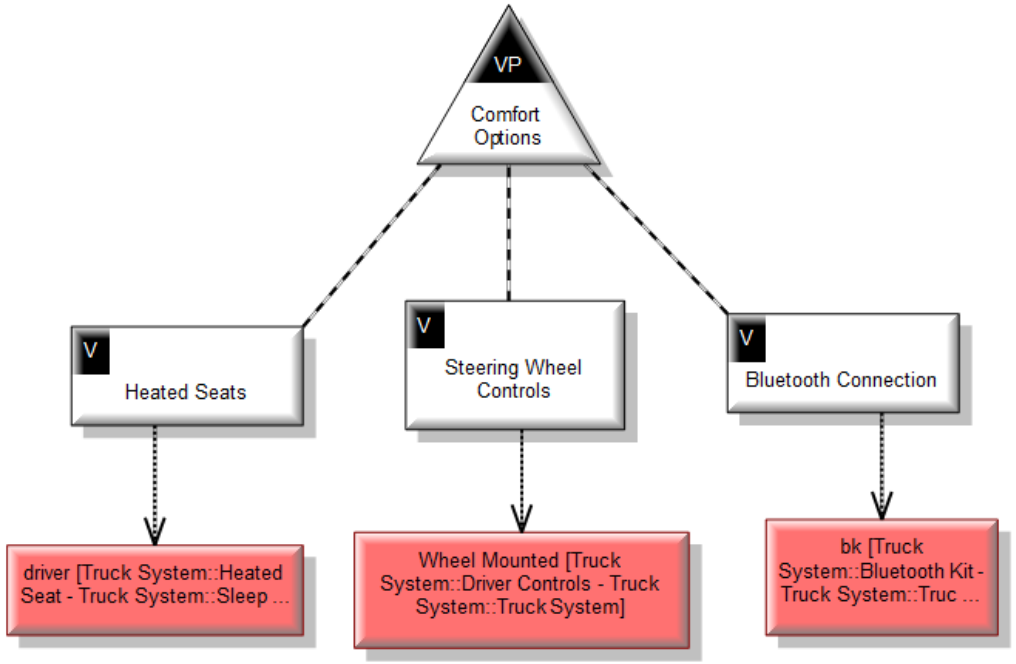
PUC 20 – CREATE WINDCHILL OPTION BASED ON MODELER VARIATION POINT WITH MULTIPLE SELECTION

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

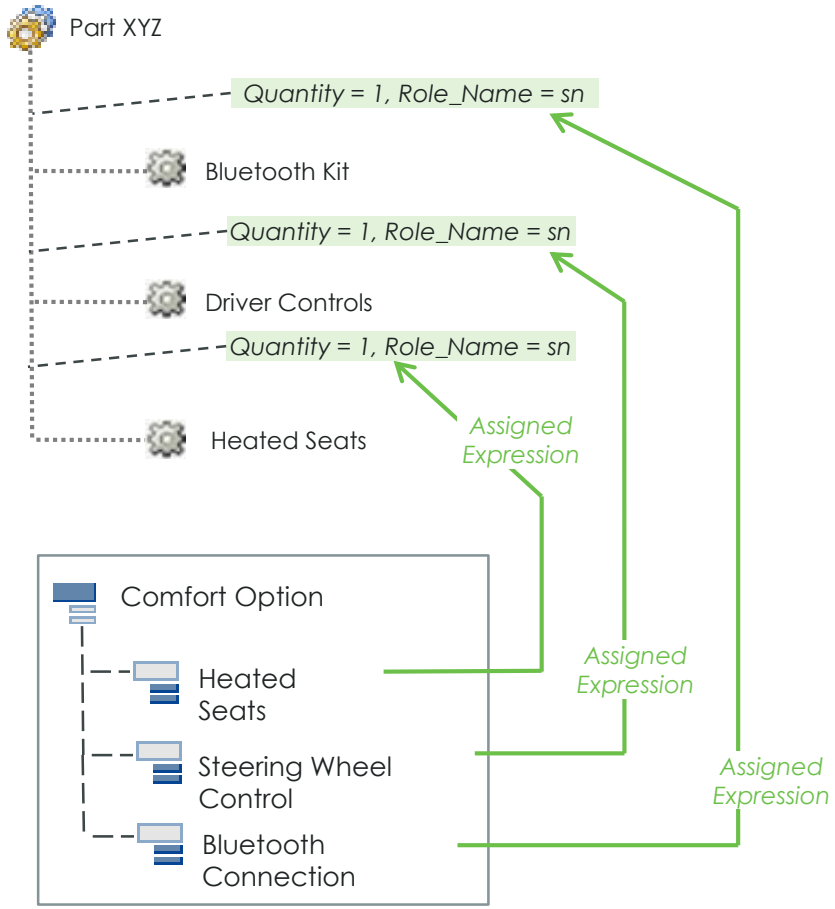
Scenario:

- Model with mandatory Variation Point and 3 Optional Variability dependencies
- The system will create the Windchill Option
  - With Required set to Yes
  - With Single Selection set to No



Variant Diagram

Export



Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

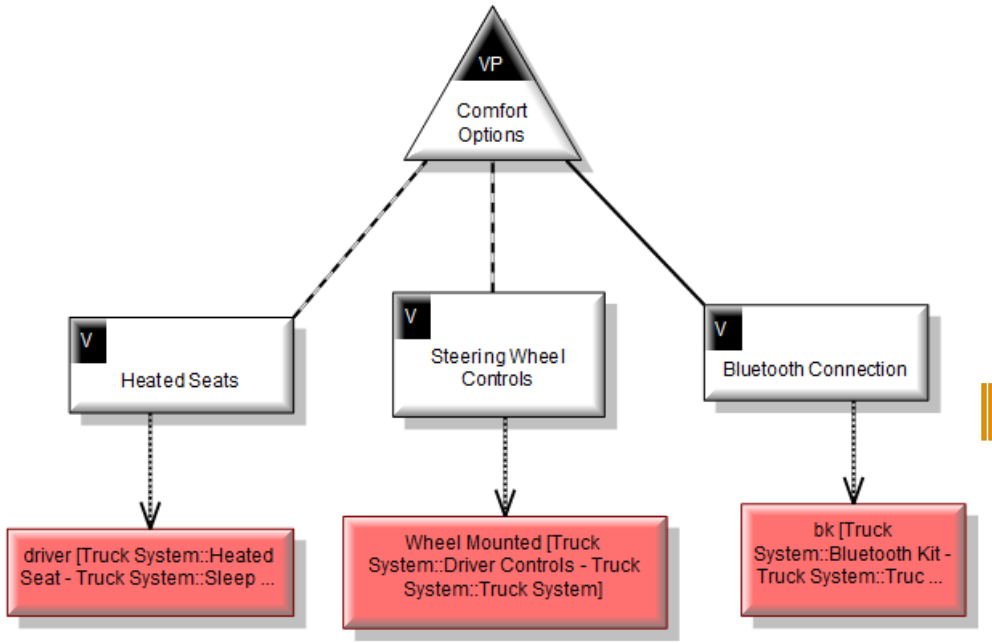
PUC 21 – CREATE WINDCHILL OPTIONS AND CHOICES BASED ON MODELER VARIATION POINTS WITH MANDATORY DEPENDENCY

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

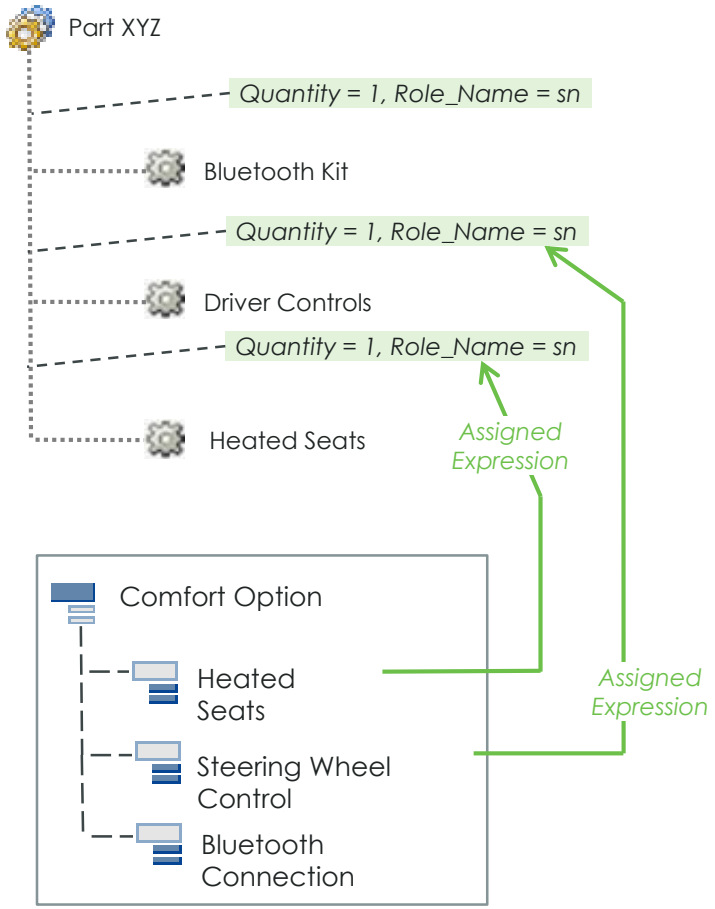
Scenario:

- Extension of previous use case but with Mandatory Dependency between Variation Point and Variant
  - The system will create the Windchill Option with Required set to Yes and Single Selection set to No
  - The system will create the Choice, but no Assigned Expressions.
    - Bluetooth Kit will be a non-variable Part and implicitly included regardless of choices selected



Variant Diagram

Export



Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

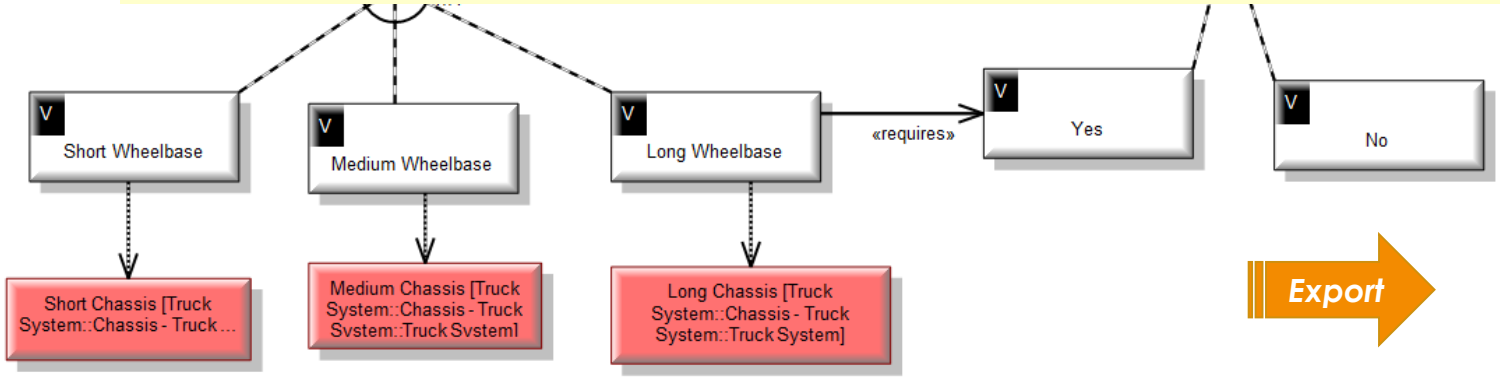
PUC 22 – CREATE WINDCHILL INCLUDE RULE BASED ON MODELER REQUIRES DEPENDENCY BETWEEN VARIANTS

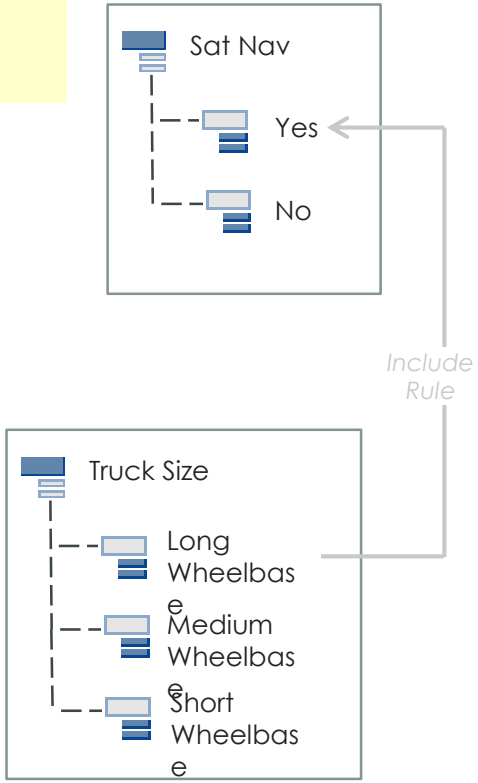
Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

For Modeler 8.3, export of the following items to Windchill will not be supported:

Requires Dependency
Excludes Dependency





Scenario:

- For each Requires dependency between Variants the system will create a Windchill Include Rule
  - Windchill Include Rule created using *ChoiceMapping* XML doctype
  - Source Choice option is specified
- Each Include Rule is then mapped to the target Choice(s) that are linked by the rule
  - Mapping defined using *ChoiceMappableChoiceLink* doctype
  - ChoiceMapping and target Choice specified
- Requires dependencies and Include Rules are both unidirectional in this scenario
  - Select Long Wheelbase Choice and Yes Choice automatically selected and can't be de-selected
  - Select Yes Choice, and Long Wheelbase Choice is not automatically selected

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

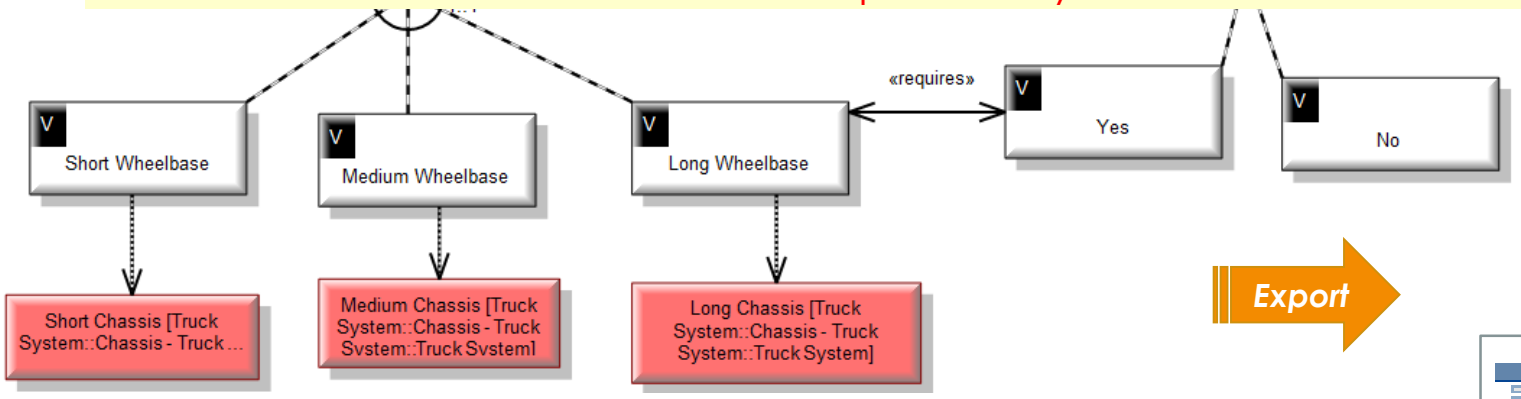
PUC 23 – CREATE WINDCHILL INCLUDE RULE BASED ON MODELER REQUIRES DEPENDENCY BETWEEN VARIANTS

Modeler Item Types

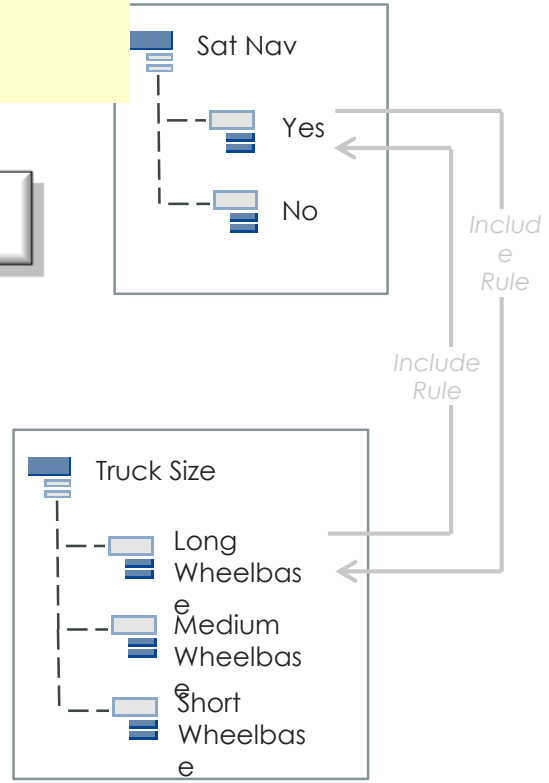
- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

For Modeler 8.3, export of the following items to Windchill will not be supported:

Requires Dependency
Excludes Dependency



Export



Scenario:

- Same as previous use case, but the Requires dependency is now bi-directional
- The system will create 2 Include Rules, one in each direction

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 24 – CREATE WINDCHILL INCLUDE RULE BASED ON MODELER REQUIRES DEPENDENCY BETWEEN VARIANT AND VARIATION POINT

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

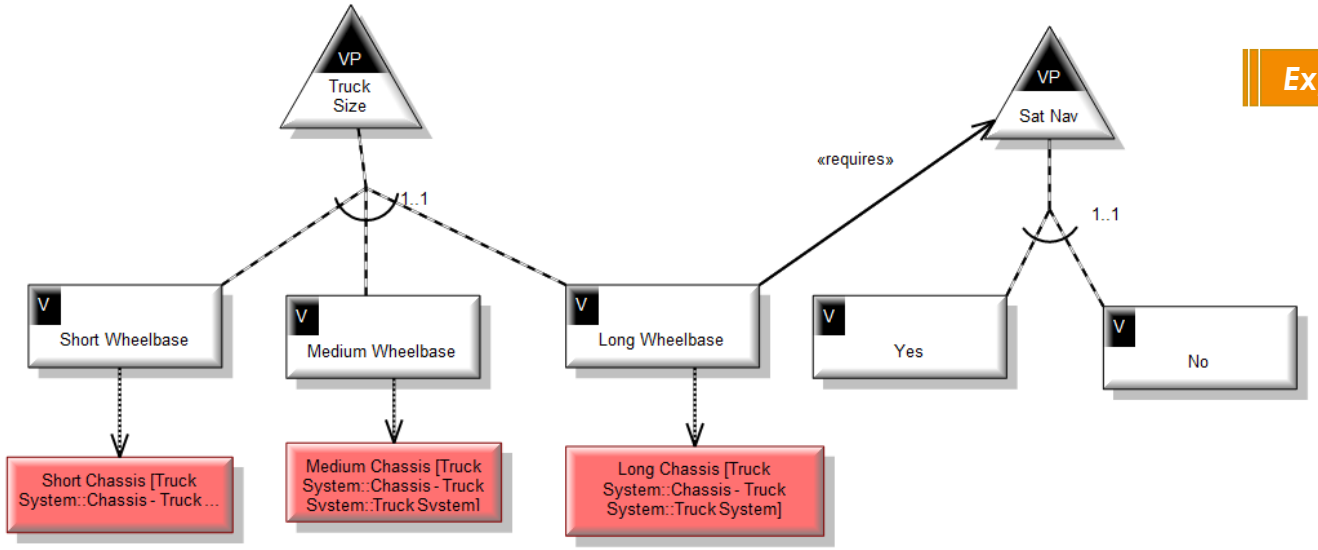
Sce

- M
  c
- S

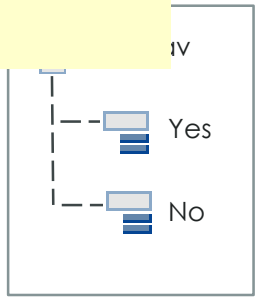
For Modeler 8.3, export of the following items to Windchill will not be supported:

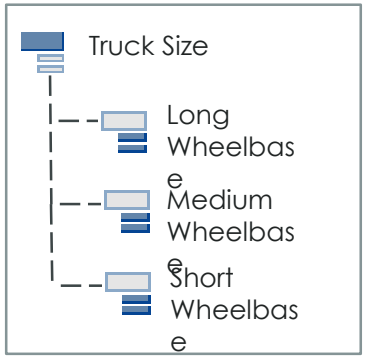
Requires Dependency
Excludes Dependency

- Maybe be possible to achieve something similar with Conditional rules



Export





PUC 25 – CREATE WINDCHILL INCLUDE RULE BASED ON MODELER REQUIRES DEPENDENCY BETWEEN VARIANT AND VARIATION POINT

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

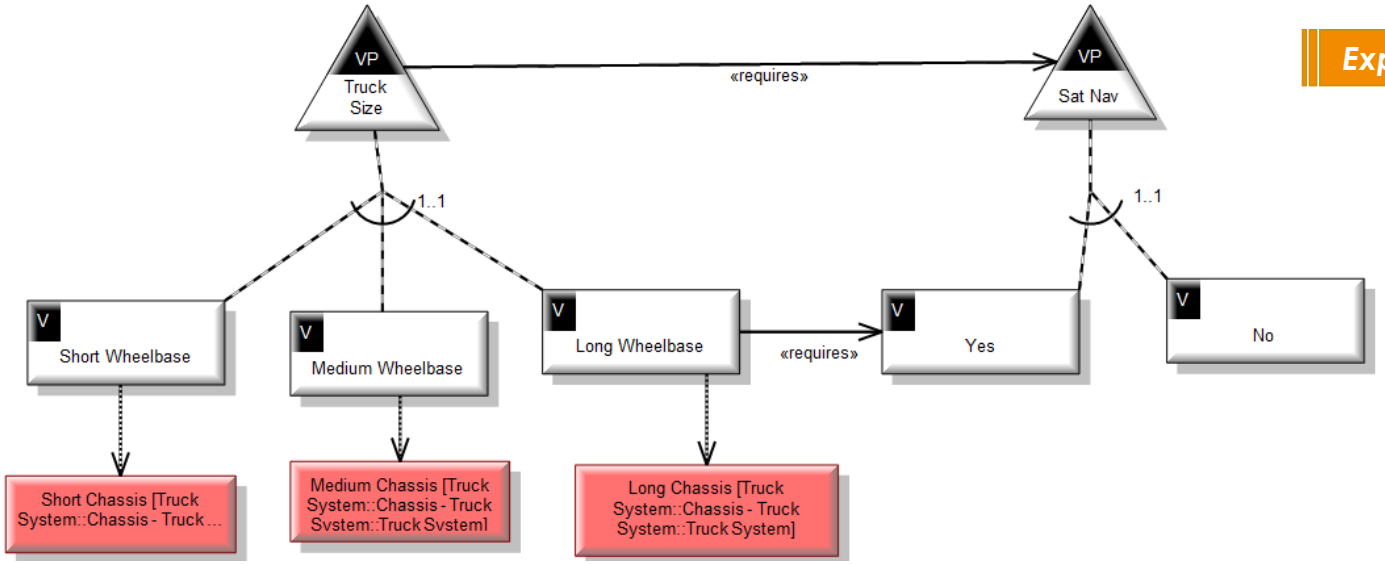
Sce

- M
  P
- S

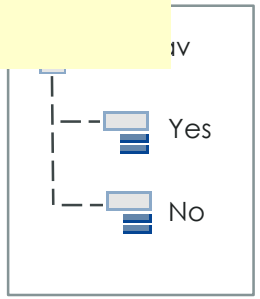
For Modeler 8.3, export of the following items to Windchill will not be supported:

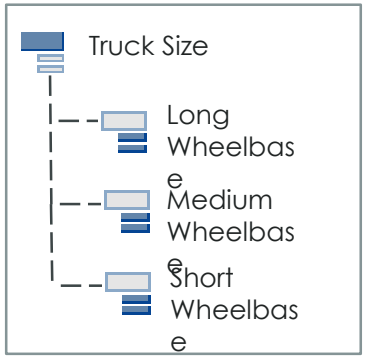
Requires Dependency
Excludes Dependency

- Maybe be possible to achieve something similar with Conditional rules



Export





Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 26 – CREATE WINDCHILL CHOICE BASED ON MODELER VARIANT NOT LINKED TO A VARIATION POINT

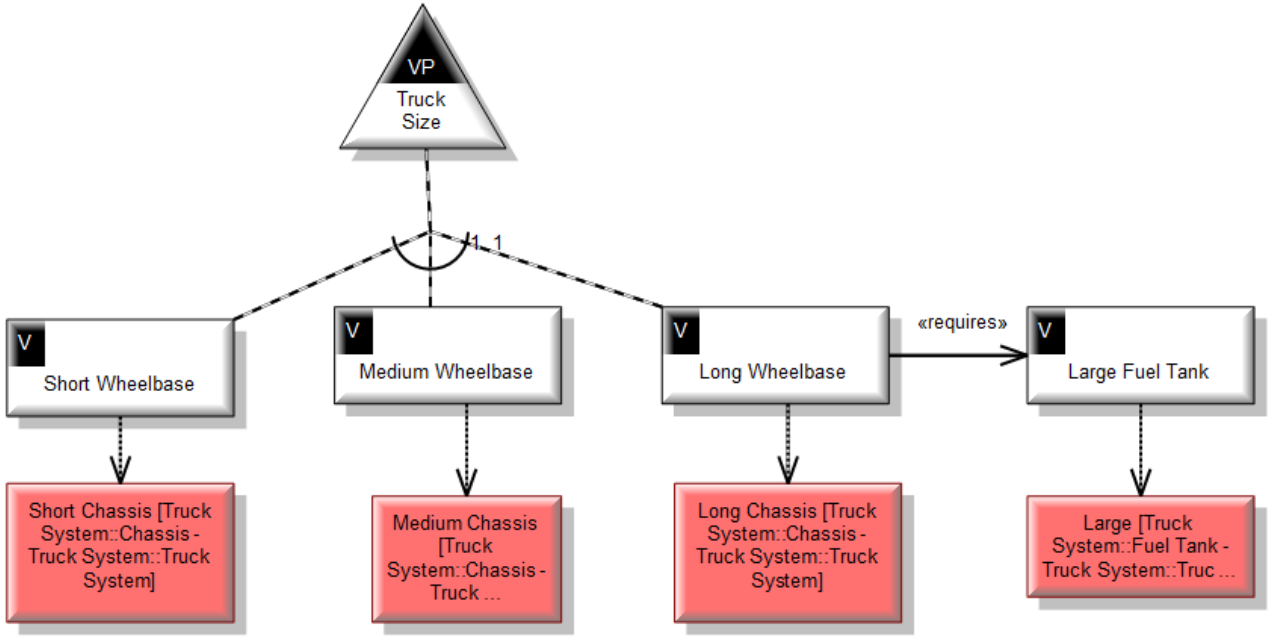
Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

For Modeler 8.3, export of the following items to Windchill will not be supported:

Requires Dependency
Excludes Dependency

- N
- M ey are not exported to Windchill
- Before export, the system should check that Modeler variability models are valid



Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 27 – CREATE WINDCHILL EXCLUDE RULE BASED ON MODELER EXCLUDES DEPENDENCY BETWEEN VARIANTS

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Windchill Item Types

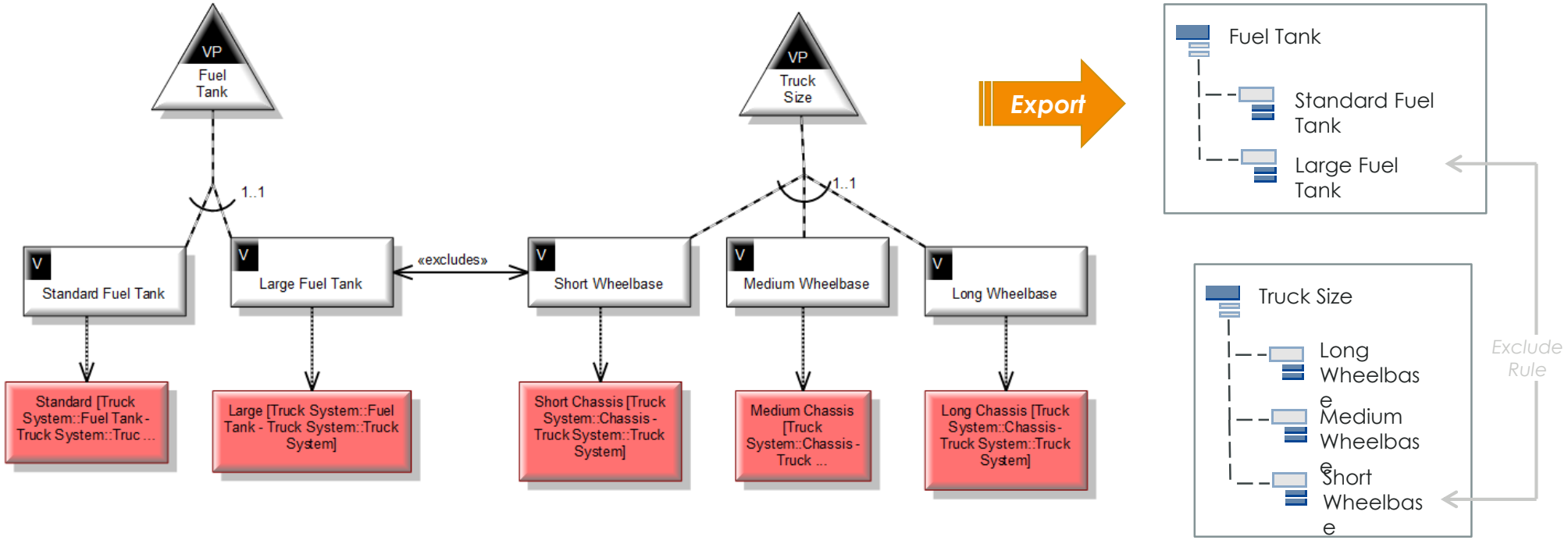
- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

Scer

- Fo ... cludes Rule
- Ea
- Ex ... ce (once in each direction)
  - Select Standard Fuel Tank Choice and Medium Wheelbase and Long Wheelbase Choices are automatically de-selected and can't be selected (and vice versa)

For Modeler 8.3, export of the following items to Windchill will not be supported:

Requires Dependency
Excludes Dependency



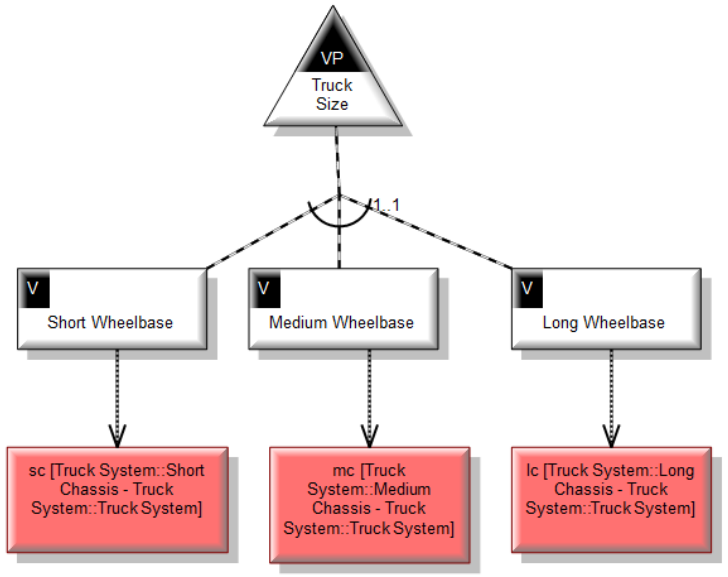
PUC 28 – CREATE WINDCHILL OPTION SET FROM MODELER VARIABILITY ITEMS

Modeler Item Types

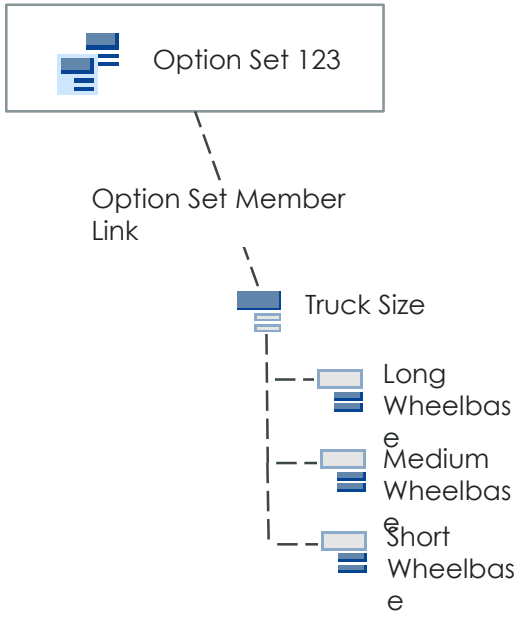
- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Scenario:

- The user has chosen as least one Variation Point to export
- The system will create a new Option Set in Windchill whenever variability items are exported
- All of the exported Options/Choices are added to the new Option Set
  - Using OptionSetMemberLink
- Option Set name can be specified in the Export UI
- Option Set is not assigned to any Product context – this needs to be done through the Windchill UI



Variant Diagram



Windchill Item Types

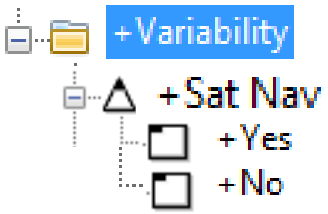
- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 29 – CREATE WINDCHILL VARIABILITY ITEMS BASED ON MODELER VARIABILITY ITEMS USING PACKAGES

Modeler Item Types

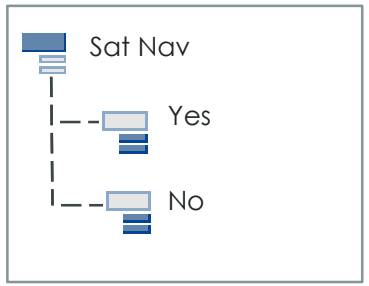
- Block
- Block Property
- Implement Link
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Variability Items



Export

Windchill Part Structure



Scenario:

- User chooses a Package to export
- The system will export all eligible items inside the Package and sub-packages

Windchill Item Types

- Part
- Implement Link
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

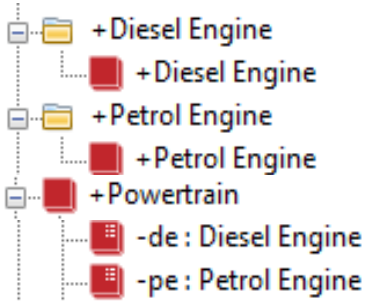
PUC 30 – CREATE WINDCHILL VARIABILITY ITEMS BASED ON MODELER VARIABILITY ITEMS USING ARTIFACT DEPENDENCIES TO PACKAGES

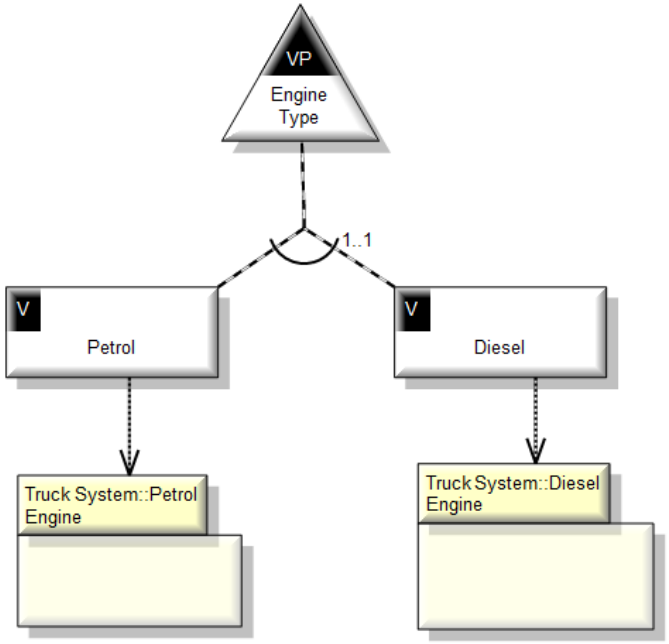
Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Scenario:

- When an Artefact Dependency links to a Package





Not supported in Modeler 8.3

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 31 – NOTIFY USER WHEN EXPORTING ITEMS WITH EXISTING TRACE LINKS

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

We will not support this Use Case for Modeler 8.3

If the user attempts to exports a Modeler item that already has trace links pointing to it from Windchill objects, the system could:

- Inform the user as part of the export process that Block ABC has existing trace link(s). The linked items should be listed.
- Could provide an option to allow the user to set the existing trace link to Suspect
- Create the Windchill object and trace link as requested without warnings.
- Running a lookup on Windchill to identify existing links will be costly in terms of performance

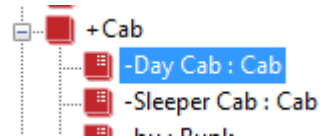
Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

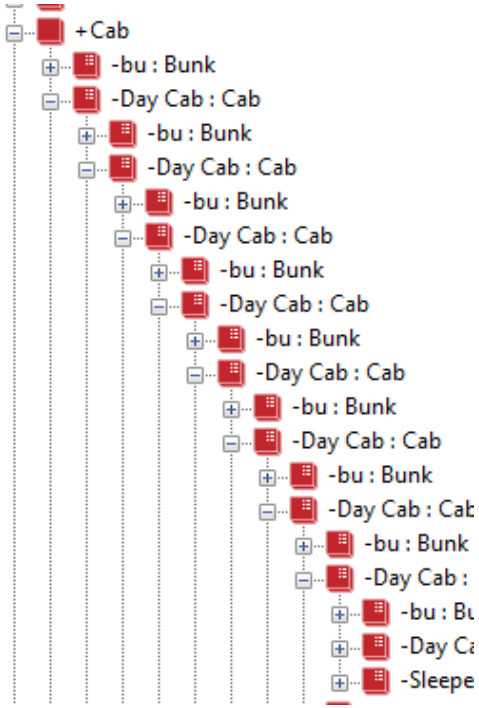
PUC 32 – CREATE WINDCHILL PART STRUCTURE FROM RECURSIVE MODELER BLOCK STRUCTURE

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set



Package Browser View



Part Browser View

If a branch of a structure has items of the same Block type at different levels, this is a recursive structure

- Recursive part structures are not possible in Windchill

The Windchill Exporter creates just one level of the structure and does not repeat

Windchill Item Types

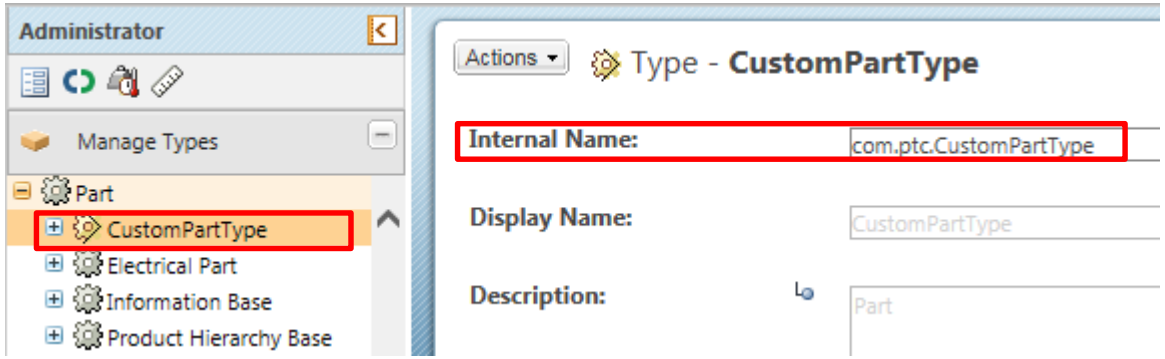
- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 33 - CREATE WINDCHILL SOFT TYPE PARTS BASED ON MODELER BLOCK/BLOCK PROPERTY ITEMS

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Windchill Type Administration



```
<WCExporterOptions Version="1.0">
    <General>
        <EXPFOLDER ID="D:\temp"/>
        <DOCTYPE ID="standardX26.dtd"/>
        <TRACELINKS ID="1"/>
        <authoringLanguage ID=""/>
    </General>
    <WTPart>
        <lifecycleTemplateName ID="Basic"/>
        <lifecycleState ID="INWORK"/>
        <versionId ID="A"/>
        <versionPosition ID="1"/>
        <series ID="wt.series.HarvardSeries"/>
        <versionLevel ID="1"/>
        <iterationId ID="1"/>
        <iterationPosition ID="1"/>
        <iterationSeries ID="wt.series.IntegerSeries"/>
        <number ID="%nextNr%"/>
        <nextNr ID="166"/>
        <numberInc ID="1"/>
        <defaultTraceCode ID="0"/>
        <partType ID="separable"/>
        <partSource ID="make"/>
        <organizationName ID="OEM"/>
        <externalTypeId ID="WCTYPE|wt.part.WTPart|com.ptc.CustomPartType"/>
    </WTPart>
    <Option>
```

Scenario:

- A pre-requisite for this use case is that the part type has been defined within the target Windchill system
- The user updates the Windchill Exporter configuration file to define the part type that should be created
- The user initiates the Windchill Exporter
- The Windchill Exporter generates XML files that create parts using a specific part soft type
- The system will optionally create "Implement" trace links from the Parts to the corresponding Blocks

Modeler Block Structure (Part Browser View)

Windchill Part Structure

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 34 - CREATE WINDCHILL DATA USING NON-DEFAULT PARAMETER VALUES

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Scenario:

- Allow the Modeler user to modify the Windchill Configuration parameters
  - Lifecycle
  - State
  - Version
  - Windchill Version
- Parameter values can be set using the configuration file, or using the Windchill Exporter UI

C:\Enabler\EnablerATFiles\WCExporterConfig.xml - Notepad++

File Edit Search View Encoding Language Settings Macro Run Plugins Window ?

WCExporterConfig.xml

```xml
<WCExporterOptions Version="1.0">
    <General>
        <EXPFOLDER ID="D:\temp"/>
        <DOCTYPE ID="standardX26.dtd"/>
        <TRACELINKS ID="1"/>
        <authoringLanguage ID=""/>
    </General>
    <WTPart>
        <lifecycleTemplateName ID="Basic"/>
        <lifecycleState ID="INWORK"/>
        <versionId ID="A"/>
        <versionPosition ID="1"/>
        <series ID="wt.series.HarvardSeries"/>
        <versionLevel ID="1"/>
        <iterationId ID="1"/>
        <iterationPosition ID="1"/>
        <iterationSeries ID="wt.series.IntegerSeries"/>
        <number ID="%nextNr%"/>
        <nextNr ID="166"/>
        <numberInc ID="1"/>
        <defaultTraceCode ID="0"/>
        <partType ID="separable"/>
        <partSource ID="make"/>
        <organizationName ID="OEM"/>
        <externalTypeId ID="WCTYPE|wt.part.WTPart"/>
    </WTPart>
    <Option>
        <lifecycleTemplateName ID="Basic"/>
        <lifecycleState ID="INWORK"/>
        <versionId ID="A"/>
        <versionPosition ID="1"/>
        <series ID="wt.series.HarvardSeries"/>
        <versionLevel ID="1"/>
        <iterationId ID="1"/>
        <iterationPosition ID="1"/>
```

Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 35 - CREATE WINDCHILL DATA USING CUSTOM PARAMETERS

Modeler Item Types

- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

This will not be supported in Modeler 8.3 but will be considered for future releases.

The Windchill Export tool will generate XML that creates Windchill objects with only the minimum attributes specified.

In the future -

- The system could support the use of other standard attributes (E.g. View).
- The system could support the use of custom soft attributes (E.g. CustomerAttribute1).

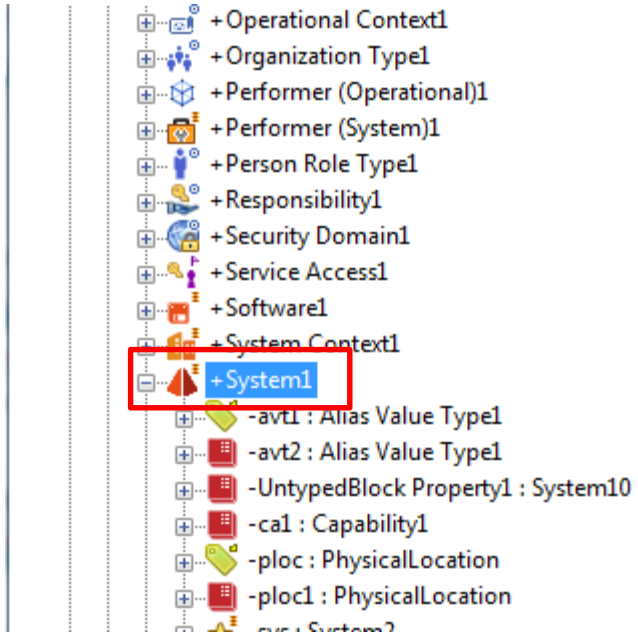
Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 36 - CREATE WINDCHILL PART STRUCTURE BASED ON MODELER BLOCK/BLOCK PROPERTY TYPE EXTENSIONS (E.G. UPDM)

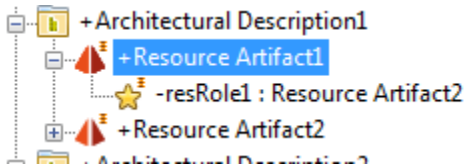
Modeler Item Types

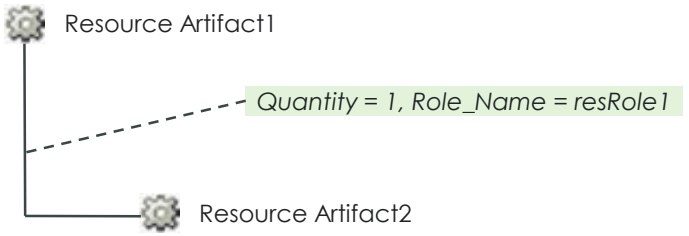
- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set



Scenario:

- The user selects a UPDM item and initiates the Windchill Exporter
  - Extensions of Block and Block Property types are eligible for export (E.g. ResourceArtifact. System, ResourceRole types)
- Export files are created and the user then imports into Windchill
- The system will optionally create "Implement" trace links from the Parts to the corresponding Modeler items





Windchill Item Types

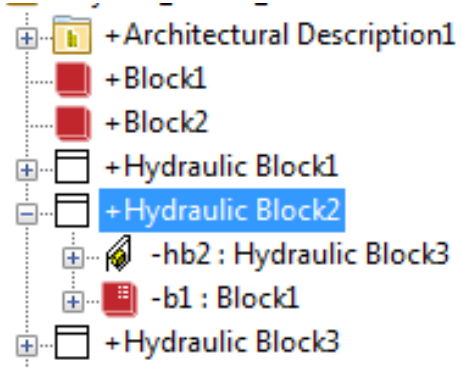
- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

PUC 37 - CREATE WINDCHILL PART STRUCTURE BASED ON MODELER LIGHTWEIGHT EXTENSIONS FOR BLOCK/BLOCK PROPERTY TYPES

Modeler Item Types

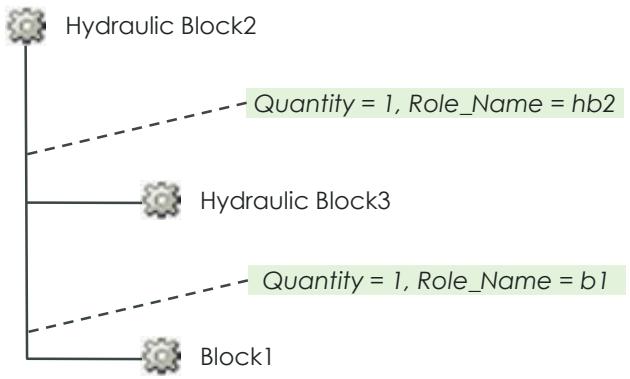
- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Blocks (Part Browser View)



Export

Windchill Part Structure



Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

Scenario:

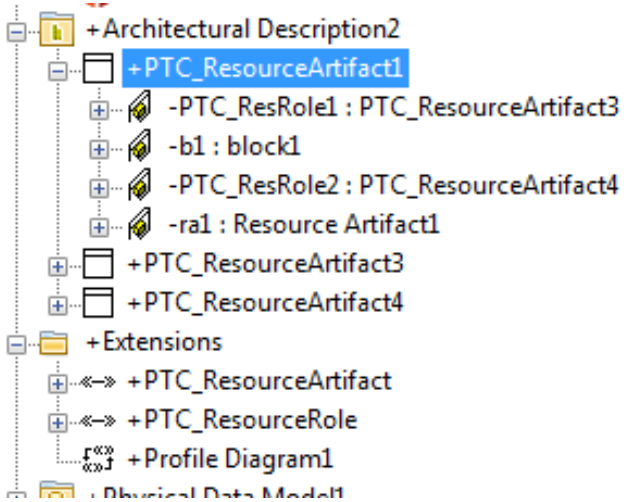
- The user selects an item that is typed by a lightweight extension of Block or Block Property types
- The user initiates the Windchill Exporter
- Export files are created and the user then imports into Windchill
- The system will optionally create "Implement" trace links from the Parts to the corresponding Modeler items

PUC 41 - CREATE WINDCHILL PART STRUCTURE BASED ON MODELER LIGHTWEIGHT EXTENSIONS FOR UPDM TYPES

Modeler Item Types

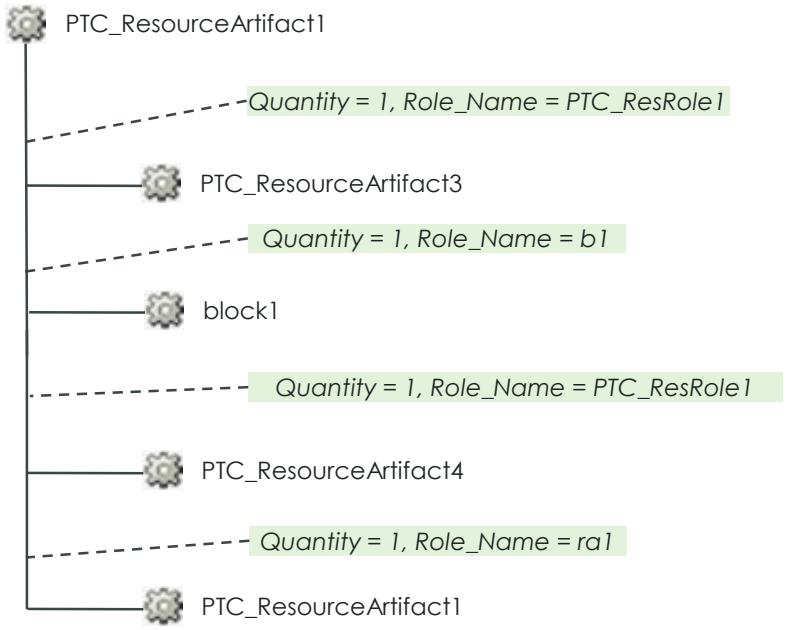
- Block
- Block Property
- *Implement Link*
- Composite Aggregation
- Variation Point
- Variant
- Artifact Dependency
- Generalization
- Decision Set

Modeler Block Structure (Part Browser View)



Export

Windchill Part Structure



Windchill Item Types

- Part
- *Implement Link*
- Part Usage Link
- End Item Part
- Configurable End Item Part
- Configurable Module
- Option
- Choice
- Variant Specification

Scenario:

- The user selects a item that is typed by a lightweight extension of any eligible UPDM types
- Any type which is an extension of Block or Block Property is eligible ((e.g. ResourceArtifact)
- The user initiates the Windchill Exporter
- Export files are created and the user then imports into Windchill
- The system will optionally create "Implement" trace links from the Parts to the corresponding Modeler items

ptc