



TEAMCENTER

Part Planner

Teamcenter 2412

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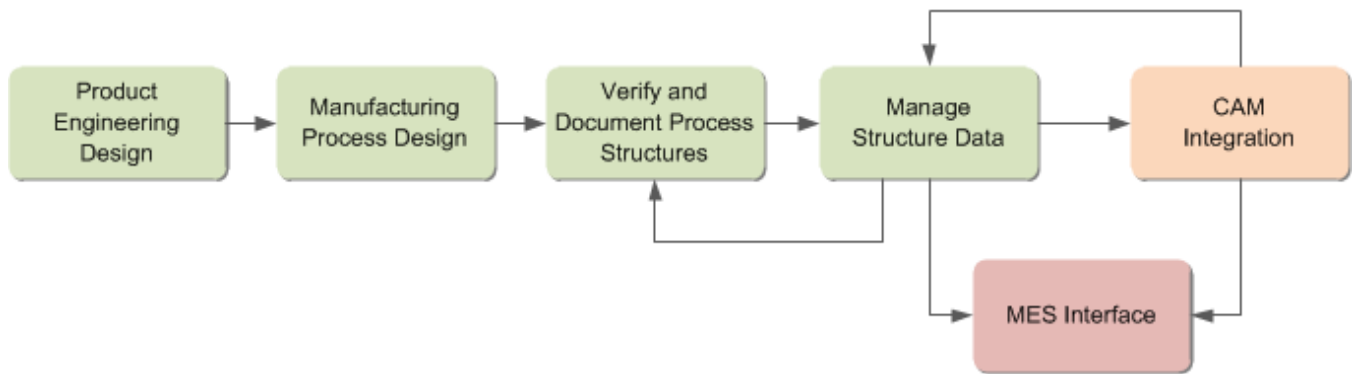
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1. What is Part Planner?

Part Planner allows you to design a plan that details how to manufacture a piece part. The manufacturing process plan includes a top-level structure of the process needed to manufacture the part, as well as a detailed design of the individual processes and activities to be included in the plan. You can create a common process plan for part manufacturing operations, including casting, machining, heat treatment, finishing, and painting.

As you build the process structure, you can assign resources such as tooling and fixtures to the various processes, operations, and activities. You can also identify the specific locations (for example, machines and work cells) within the plant where each operation and activity will be performed. You can create and classify process and operation templates for later retrieval and reuse.



2. Part planning process example

This portion of a part plan defines a process comprised of five sequential operations.

Operation	Description	Characteristic Stored in Operation	Type of Requirement
Op10	A rough material cut operation.		Production
Op20	An NC roughing operation.	Finish to ± 0.10	Production
Op30	An inspection operation.	Check to ± 0.10	Inspection
Op40	A finishing operation.	Finish to ± 0.01	Production
Op50	The final inspection.	Check to ± 0.01	Inspection

Each operation can contain specific attributes or characteristics that you define.

- Tolerance
- Operator Certification
- User Defined Data Fields

Sequence of Actions Taken in the Operations

- The operations shown are assigned tolerance characteristics.
- Final tolerance is specified at ± 0.01 .
- To achieve this, the roughing operation is assigned a tolerance of ± 0.10 inches. The same characteristics are then assigned to the related inspection operation.
- Work begins: NC programmer opens Op20, sets up the roughing operation based on the requirements. The result of Op20 is saved in the operation, including the in-process model generated by the operation.
- The in-process part is then inspected using the requirements set for Op30.
- After the roughing inspection, the NC programmer finishes the part to meet the requirements set for Op40 and the in-process model for Op40 is saved. When the part is finished, final inspection uses the requirements set for Op50.

You can define more specifications by attaching a form to the operation specifying additional data fields that must be collected. Once you complete the process plan and define the associated workflow, you can generate the necessary reports and work instructions.

3. Part Planner general functionality

Displaying information

Displaying information

You can display a variety of information in the primary and secondary views of Part Planner. Many of the secondary views are only available if you select an object in a primary view that provides valid input. For example, you can only open the **Activities** view if you select an operation.

How perspectives and views work


Working with manufacturing perspectives

Teamcenter presents manufacturing data in views, each of which provides its own specific way of managing or modifying data. The views provide an environment where, for example, you can construct processes and operations, relate additional relevant information, view different alternatives or studies, and collaborate with others who are working on the same information.

For common use cases, Teamcenter provides you with several collections of views, organized in collaboration contexts (CCs), that group the views that you need to perform common tasks. These CCs behave similarly to the Manufacturing Process Planner perspective.

For all Manufacturing Process Planner CCs, you can:

- Add these perspectives to the rich client navigation pane.
- View all loaded structures in the **Open Items** list and open structures from this list. If the structure is part of a collaboration context, the name of that collaboration context is shown in brackets behind the structure.
- Unload open structures by clicking the **Unload All** button in the **Open Items** list, or unload a single structure by right-clicking it and choosing **Unload**.

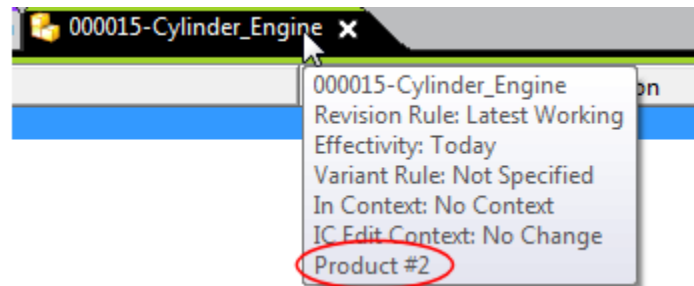
You can switch between perspectives using the  button. When you switch, the same structures are loaded in each perspective. You can see these structures in the **Collaboration Context Tree** view. Teamcenter displays the structures in the primary views of the perspective. If there is no suitable primary view in the perspective, the structure is listed in the **Open Items** list and the **Collaboration Context Tree** view from which you can activate it.

Secondary views are completely new between perspectives so the state of the secondary views are not the same when switching perspectives.

When you send an object from another application using the **Send To→Manufacturing Process Planner** shortcut menu command, Teamcenter opens the last Manufacturing Process Planner

perspective that you used. If you have a perspective open in the current session and send a structure to Manufacturing Process Planner, the structure opens in the current Manufacturing Process Planner perspective.

Each primary view is assigned a number which represents the view regardless of the Manufacturing Process Planner perspective. Views with the same number are the same view.



In the figure, the view tooltip in every perspective in which item 000015 is open shows **Product #2**.

By default, you can open 10 views for each type of primary structure view. Your administrator can change this number in the **MEMaxOpenViewsSameType** preference. The view remains open as long as it is open in any of the Manufacturing Process Planner perspectives. As long as there is still one instance of the view open, when you activate that view, it opens in the same state (for example, expansion state). After the last instance is closed, activating the view opens the structure, but the expansion state is lost. However, the data is still loaded, so re-expanding is fast.

Your administrator can add new perspectives to Teamcenter.

Working with manufacturing views

Teamcenter presents manufacturing data in views, each view providing its own specific way of managing or modifying the data. There are *primary* views and *secondary* views. The most commonly used views in Teamcenter include engineering bills of materials (EBOMs), manufacturing BOMS (MBOMs), plant and product bills of process (product and plant BOPs), and graphic views.

Views provide an environment where you can author manufacturing processes based on additional information available in Teamcenter. You can construct processes and operations, relate additional relevant information, and collaborate with others who are working on the same information using studies and alternatives. There are primary views and secondary views.

- A primary view shows one configurable structure. That structure can contain a base view and several occurrence groups.
- A secondary view shows specific types of data related to the primary view with which it is associated. It can, depending on your needs, change its content if you select a new object in a primary view. Many of the secondary views are available only if you select an object in a primary view that contains valid input.

In addition to primary and secondary views, you can use the following:

- **Collaboration Context Tree** view to show all loaded objects.
- **Structure Search** view that allows you to search for any object regardless of view.
- **Graphics** view to display any visualization data associated with the structure. The **Graphics** view is closely associated with the primary view from which you open it.




You can open multiple views simultaneously. You can undock views and move them to a convenient position. You can open the same structure multiple times in different views. To assist you in keeping track of which views are associated, primary views and secondary views are color-coded. Primary and associated secondary views have the same framed color. In addition, Teamcenter frames the active view (the one in which you are currently working) in black.







Each view has a toolbar with buttons to execute the common tasks pertaining to that particular view. The view menu contains additional menu commands pertaining to that view. More complex tasks or tasks pertaining to several views simultaneously are found on the main application toolbar. The views have some features in common, such as the ability to change the displayed columns or filtering the results. You find these features in the view menu.






List of manufacturing views








Teamcenter presents manufacturing data in views, each view providing its own specific way of managing or modifying the data. The views provide an environment where you can author manufacturing processes based on information available in Teamcenter. You can construct processes and operations, relate additional relevant information, view alternatives and isolated studies, and collaborate with others who are working on the same information.






There are primary views and secondary views. A primary view shows one configurable structure. That structure can contain a base view and several occurrence groups. A secondary view shows specific data and, depending on your needs, can change its content if you select a new object in a primary view.

View Icon	Name	Description
	2D Viewer	You can have one or many two-dimensional snapshots associated with a line in your product structure. When you open a selected line in the 2D Viewer view, Teamcenter displays an attached image dataset. If there are multiple image datasets attached, you can select any preferred image.
	Accountability Check	Displays the results of an accountability check . This view lists the problem lines in the source and target and provides a list of conflict details. Lines that are colored in the source and target structures are also colored in the view. Fully matched lines are not listed.
	Activities	Displays all activities to be completed as part of the operation selected in a process. This view is structure-dependent (it displays

View Icon	Name	Description
		<p>a tree table). Each listed activity is an expandable folder. Folder contents may include additional subactivities.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Tip:</p> <p>You can open many secondary views for activities, including the PERT or Attachments views.</p> </div>
	Activities Gantt	Provides a visual depiction of the start time and duration for all the activities scheduled for an operation. The view is available when an operation is selected in the structure view, or an activity is selected in the Activities view.
	Advanced Accountability Check	Displays the results of an advanced accountability check . The Advanced Accountability Check view lets you compare and propagate multiple types of views/structures, run assessment comparisons to repair one structure from another, set reporting and equivalence options, and set partial match criteria for different types of structures. Many options are available, other than those the standard accountability check offers.
	Attachments	<p>A structure-dependent data view that is always available when an object is selected in a structure view, the Attachments view displays the properties of all components attached to the selected object, including the base item component and all related subcomponents.</p> <p>Standard Teamcenter shortcut menu commands are available for any displayed object. Double-click an attachment on this view to open the attachment in its appropriate application.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note:</p> <p>The process revision is determined by the product structure's revision rule. This information cannot be specified in this view.</p> </div>
	Classification Properties	Shows the values that exist in the Classification application for the object currently selected in the structure view if that object is classified. This data is informational only and cannot be changed in this view. You must change the data through the Classification application.
	Collaboration Context Tree	<p>Contains a list of all structures currently open in the application. You can use the Collaboration Context (CC) view to load and unload structures, as well as to save structures as new structure contexts.</p> <p>The Collaboration Context Tree does not respond to selection in other views.</p>
	Graphics	Displays any 3D visualization data associated with the selected structure. The Graphics view is closely associated with the primary

View Icon	Name	Description
		view from which you open it. If you close the associated primary view, Teamcenter closes the Graphics view as well.
	Impact Analysis	<p>Identifies which other database components reference and thereby impact an object currently selected in a structure view, and displays any assemblies in which the selected object appears.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p>Note:</p> <p>You can use the Filter by Item Type command to display all operations currently associated with, and performed at, the work area selected in a plant structure.</p> </div>
	Incremental Change	Allows you to add, edit, or remove incremental changes from a selected line.
	IDC	Displays any Intermediate Data Captures (IDCs) associated with the selected structure. You can switch between captured states of an IDC by selecting from the Captured State list.
	Manufacturing BOM (MBOM)	One of the most important primary structure views, the Manufacturing BOM (MBOM) is a breakdown of a three-dimensional product design consisting of part and assembly models, usually derived from an Engineering BOM (EBOM) or design BOM, that reflects the needs of manufacturing processes. You must continually compare and update the EBOM and MBOM, often using an advanced accountability check, to reflect engineering and manufacturing changes that occur during the manufacturing process.
	PERT	<p>You can open this chart view for a process displayed in a structure view or for activities displayed in the Activities view. When opened on a process, the Program Evaluation Review Technique (PERT) view shows the sequence of the first-level processes or operations that exist for the selected process.</p> <p>When opened on a top-level activity, the PERT chart displays the first-level activities. Each process or operation within the selected process is represented by a box in this view. Each box contains the name and ID of the process or operation.</p> <p>Use this view to arrange the boxes and create a sequential flow of processes, operations, or activities within the selected object.</p>
NA	Part Planner Activities	<p>Displays all activities to be completed as part of the operation selected in a process. In addition, it displays tool number, start, and duration times for each of the activities.</p> <p>Each listed activity is an expandable folder object. The folder contents may include additional subactivities.</p> <p>You can open many secondary views for activities, including the PERT view or the Attachments view.</p>

View Icon	Name	Description
	Plant	A type of primary structure view that displays the plant , work areas, work stations, lines, or any physical location where your manufacturing processes take place. This view is sometimes referred to as a work area view.
	Plant Bill of Process (BOP)	A type of primary structure view that displays resources necessary for a plant to assemble a product.
	Process Gantt	Displays processes and operations and the relations between them in a bar chart that illustrates the work breakdown structure of a project using a time line, from the start and finish times of the operations or processes and summary elements (operations or higher level processes). The Gantt view also shows the dependency (sequence) of relationships between the elements.
NA	Product Manual	Displays work instructions created and edited using a Product Manual role.
	Product	Displays the product that you want to manufacture in a hierarchical tree structure.
NA	Report	Supports the creation of reports for all three types of structures: products, processes (including their operations and activities), and plants. The generated report is presented through a browser window. You can create customized style sheets or use other formatting tools to customize both the data content and the report format.
	Standard Text	Enables you to create and manage such as text, data collection definitions, and symbols that are compiled to create textual work instructions. The Standard Text view is generally used by the standard text librarian to manage the elements that the work instruction author chooses to create work instructions. Creating work instructions using standard text promotes standardization and consistency of work instructions throughout the organization. You can create the elements once, and then reuse them many times.
	Standard Text Library	Helps you to you use to create standard textual work instructions. A standard text library is a structure comprised of standard text folders and standard text elements nested under the folders.
	Structure	When you open the application, there are three empty structure views entitled Product , Process , and Plant . These views are placeholders for structures that you open. When you open a structure, it opens in the associated structure view and Teamcenter displays the information as a tree structure. You can open multiple structures at once, including multiple parts, processes, or plants. Each of these structures is displayed in a different view. You can configure these structures using revision rules, variant conditions, and effectivity dates.

View Icon	Name	Description
		<ul style="list-style-type: none"> • If you open a part, the structure view contains the product hierarchy being manufactured. You can allocate any consumed parts and workpieces or subsets of workpieces to an operation's setup. • If you open a process, the structure view shows the process hierarchy in the sequence it uses for manufacturing the part. The process structure contains subprocesses and operations. You can view the workflow from one process to the next, as well as see parallel processes. You can also see alternate processes for creating the target product and allocate work area items, tooling, and workpieces to a specific process. • If you open a plant, the structure view displays your factory environment hierarchy as a tree structure. The root level identifies the high-level plant structure. Each layer beneath the root level breaks down the work areas within the plant until the lowest level in the structure represents individual work areas where specific operations are performed. <p>Structure views are primary views for which you can open a variety of secondary views that provide detail information about the selected line. Although product, process, and plant are the most common types of structures that open in a primary view, there are additional types of structures that open in primary views, including an Intermediate Data Capture view, a Requirements view (when working in Systems Engineering), and a Standard Text view.</p>
	Textual Work Instructions	Helps you to author work instructions by choosing from a library of elements. Using this view, you can quickly create or edit textual work instructions for manufacturing processes or operations.
	Variants	Allows you to display and edit variant options, option defaults, and rule checks currently defined for the product selected in the structure pane.
	Viewer	Displays the content of a dataset that is attached to an item revision with a Rendering relationship, where possible. For example, if you select a text dataset, the viewer displays a text editor with the content of that text dataset. If you select a dataset containing a JT file, the viewer displays the JT.
	Workarea	A type of primary structure view used to display a plant, work area, work station, or any physical location where your manufacturing processes take place. This is sometimes referred to as the plant view.
	Work Instruction	If your administrator configured the publishing feature for manufacturing documentation, you may see the . The name of this view is configurable. Use it to create published pages containing manufacturing data. You can organize collections of publishing pages


View Icon	Name	Description
		into portfolios, which you can view, publish to a Web server or PDF, or print in My Teamcenter.

Note:

The **PS_assume_legacy_transform_units** preference determines how Teamcenter interprets the units of measure for legacy transform data. Teamcenter and NX currently use meters for transform units of measure; legacy measurements were in inches or millimeters. This preference affects all data using legacy transforms that have no database-resident indication of the unit measurement stored with them. The default setting is **Unknown**. If the preference is left in the default setting, you may see discrepancies between the model and display units when you view collaboration context structures in Manufacturing Process Planner.


Behavior of selected objects in active views

If you select an object in the active view, the selections in the other views change as follows. This is known as *selection synchronization*.

- Primary views can change their inner selection (highlight) to suit the active selection. The following situations can cause them not to do so:
 - The selection does not correspond to any object in the view.
 - The corresponding object is not currently expanded, and the **MEEExpandToSelection** preference is set to false.
 - An expensive search is required to find the corresponding line. In this case, use one of the **Find** commands.
- Secondary views can change their inner selection (highlight) to suit the active section when that selection occurs in a primary view or in another secondary view that is associated to the same primary view. The following situations can cause them not to do so:
 - The selection does not correspond to any object in the view.
 - The **Disable response to selections** button  is turned on.

Managing loaded objects with the Collaboration Context Tree view

The **Collaboration Context Tree** view displays all structures that are loaded in your session. You can use this view to load or unload structures or to make structures that have moved behind other structures in the structure view area visible. Additionally, you can use this view to create structure contexts from loaded structures, to create configuration contexts, and to save contexts into new or existing collaboration contexts.

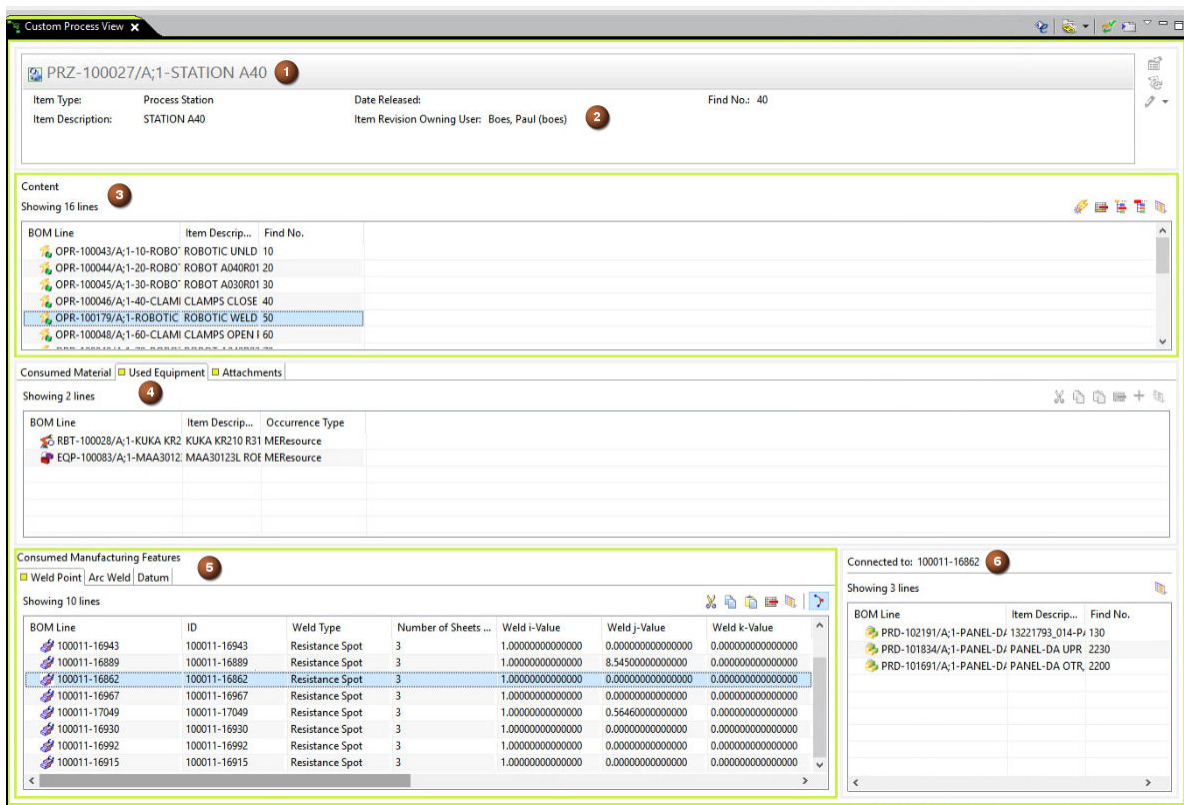
The **Collaboration Context Tree** view is not a primary or secondary view. It is not associated with other views and does not respond to selection in other views. You can display this view by clicking the **Open CC Tree** button  in the toolbar.

You can drag a collaboration context from your **Home** folder into the **Collaboration Context Tree** view.

Viewing a process plan in the Custom Process View


You can view the process plan in an alternative view called the **Custom Process View**. This view is based on configurable style sheets and preferences and can be opened using the **Open With** command. The view provides an overview, in tabular form, of all consumed material included in a process plan, including assigned parts, tools, and features. The view also includes a **Used Equipment** tab to create or view support equipment used in each selected object (such as robots and fixtures), and an **Attachments** tab to create/view attachments associated with the selected object. Additionally, you can specify which properties are shown in each table column and modify these properties directly in this view.

The **Custom Process View** displays data that is relevant to the type of object selected. For example, when you open a **Process Station** type, the **Custom Process View** lists the properties of the station and the child operations and allows you to assign parts and tools to the operations. When you open a **Process Line** type, the **Custom Process View** lists the properties of the line (which are different than the station) and the child processes and process areas. There is no requirement to assign parts to stations.



The screenshot displays the **Custom Process View** window for item **PRZ-100027/A;1-STATION A40**. The interface includes several sections:

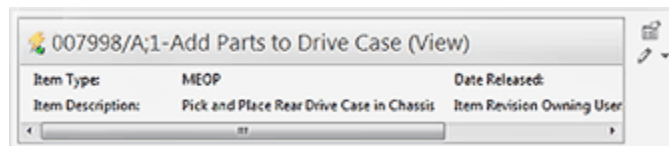
- Item Information:** Shows Item Type (Process Station), Date Released, Item Revision Owning User (Boes, Paul (boes)), and Find No. (40).
- Content:** Shows 16 lines of BOM data. The table includes columns for BOM Line, Item Description, and Find No. The selected line is **OPR-100179/A;1-ROBOTIC ROBOTIC WELD 50**.
- Consumed Material:** Shows 2 lines of BOM data. The table includes columns for BOM Line, Item Description, and Occurrence Type. The selected line is **RBT-100028/A;1-KUKA KR2 KUKA KR210 R31 MEResource**.
- Consumed Manufacturing Features:** Shows 10 lines of data. The table includes columns for BOM Line, ID, Weld Type, Number of Sheets, Weld i-Value, Weld j-Value, and Weld k-Value. The selected line is **100011-16862**.
- Used Equipment:** Shows 3 lines of data. The table includes columns for BOM Line, Item Description, and Find No. The selected line is **PRD-102191/A;1-PANEL-D/ 13221793_014-P/ 130**.

- 1 The top-level structures loaded from a collaboration context or structure appear here. They may be selected directly to activate them in the **Custom Process View**.
- 2 The top-level structure header specifies the current selected parent process (**MEProcess**) structure of the individual BOM Line selected. A toolbar provides access to the property edit tools. You can use the **Edit Rev Description** form and click **Edit** to open the **Object Properties** form.
- 3 The operation **Content** tables list child operations for the selected **MEProcess** and are arranged in tabular form. You create and edit **Operations**, **Remove Line**, and use **Column Management**  to view and select properties displayed in the **Properties Form**.

Note:

Do not manually enter or change values in the **Estimated Time** column of the **Content** pane. Only converted time properties should be used. Manually entered estimated time values are not saved.

When you double-click an operation in the **Content** table, an operation editing table opens:



The operation header lists the currently selected parent BOM line in the operation table. You can edit a description or a property. This may be used for updating specific properties or accessing the property form. This is same type of toolbar used in the top-level structure header.

- 4 This toolbar lists the objects that complete the population of the process/operation.
 - The **Consumed Material** and **Used Equipment** tabs contain this set of tools when a BOM line is selected:



You can cut, copy, open, and remove objects, search classification for resources, and configure how objects are displayed in the **Column Selection**.

- The **Attachments** tab contains these tools when available:



You can add a dataset or form, open or remove an attachment, and configure how objects are displayed in the **Column Selection**.

- 5 The **Consumed Manufacturing Features** section contains **Weld Point**, **Arc Weld**, and **Datum** tabs that display manufacturing features included in the station or operation selected in the **Content** section. Results are ordered by find number (sequence).

When you select a feature from any tab's table, parts connected to the selected feature are displayed in the **Consumed Material** tab, and resources assigned to the station or operation are displayed in the **Used Equipment** tab.


Note:

This section is visible only if an administrator or other person with administrative rights has set the preference **MECustomViewShowMfgFeatures** to **True**.

- The **Weld Point** tab contains these feature columns: **BOM Line**, **ID**, **Weld Type**, **Number of Sheets Welded**, **Weld i-Value**, **Weld j-Value**, and **Weld k-Value**.
- The **Arc Weld** tab contains these feature columns: **BOM Line**, **ID**, **Weld Type**, parts it is **Connected To**, and **Weld Length**.
- The **Datum** tab contains these feature columns: **ID**, **Datum Type**, **Control Direction** (FA=Fore/Aft, CC=Cross Car, UD= Up/Down), and parts that the datums are **Connected To**.

The **Consumed Manufacturing Features** section contains the same tools as the **Attachments** tab, plus **Show/Hide Connected To** (see below):




- 6 The **Connected to** section is displayed when you select a manufacturing feature and click **Show/Hide Connected To**  in the **Consumed Manufacturing Features** section (see above).

Whether you select a process station or operation, columns displayed include **Item Description** and **Find No.** You can also add assigned parts, resources, and manufacturing features columns using **Column Management**.

Open the Graphics view

The **Graphics** view is associated with the structure view from which you open it. You cannot change this association.

- In a structure view, click .

Teamcenter opens the **Graphics** view displaying the structure. The **Graphics** menu is displayed in the main menu bar if there is at least one **Graphics** view open.

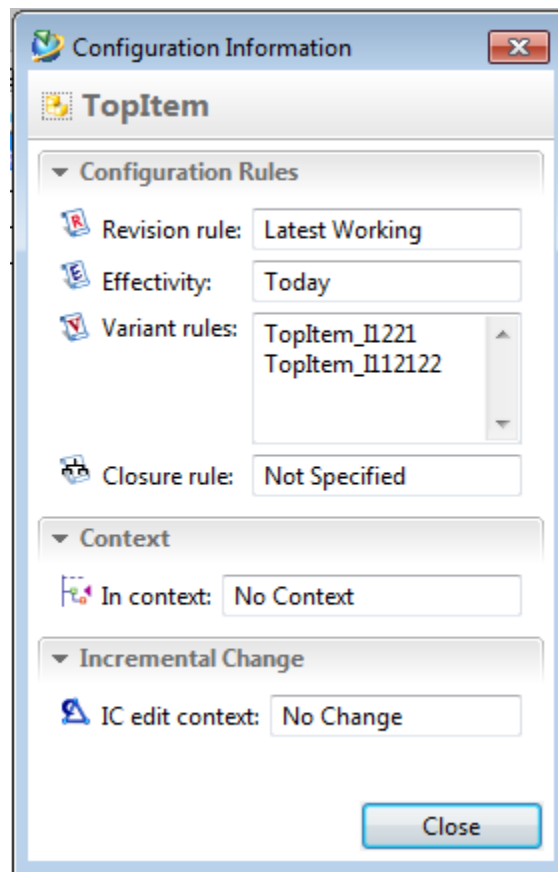
- When you close the primary view from which you opened the **Graphics** view, the **Graphics** view closes with it.
- If you unload data from the primary view, the **Graphics** view remains open, but empty.
- If you load a new structure into the primary view, the **Graphics** view is available, but the structure is only loaded when you select a structure to view.

Display configuration information for a primary view

Do one of the following:

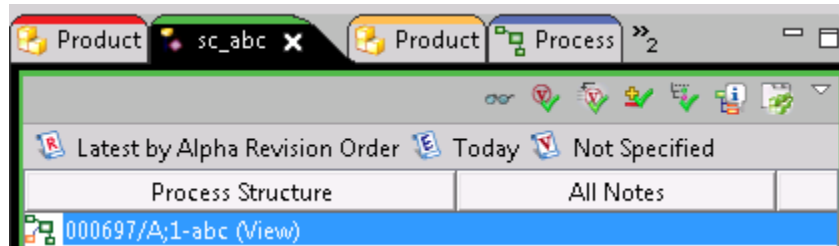
- Click  in a primary structure view to see configuration information about that structure.

The **Configuration Information** dialog box displays the following:



- The revision rule.
- The effectivity.
- The variant rule or rules currently in effect.

- Which structure is configuring the current structure.
- In-context information.
- Currently active incremental change.
- Ensure that the **MEShowConfigurationHeader** preference is set to **true**. This displays the current revision rule, effectivity, and variant rule at the top of the structure view. These entries are links that you can click to open the dialog boxes used to change the configuration.



Modify the column display

1. Select a line in the table in which you want to modify the columns to make the table the active one in the view.

This is important in views that contain multiple tables.

2. Click the **Menu** button ▼ and choose **Columns** from the view menu commands located in the top-right corner of the view.

Teamcenter displays the **Column Management** dialog box.

3. Select the desired columns from the **Available Properties** list and move them to the **Displayed Columns** list with the right arrow.
4. (Optional) Modify the order the columns appear in the selected view table using the up and down arrows.
5. Do one of the following:
 - Click **Apply** to save the current state.
 - Click **Save** and type a name for the column configuration. You can restore a saved column layout by choosing **Apply Column Configuration** from the view menu commands and selecting the saved configuration from the list.


Find in display

1. Click the **Menu** button ▼ and choose **Find in Display** from the view menu commands.

Teamcenter displays the **Find in Display** dialog box.


2. Click + to add a line to the table.
3. Double-click the **BOM Line** cell of the **Property Name** column and select the property name by which to search from the list.
4. Double-click the equal sign to change the operator.
5. Type a value corresponding to the property name, for example, **MEOP** if you select **Item Type** as the property name.
6. Click **Find**.

Teamcenter displays the number of matches in the bottom left of the dialog box.

7. Page through the matches using the right and left arrows, or display them all by clicking .

Teamcenter selects the matches in the view.

Sort data in view pane

1. Click the **Sort** button  at the top right of the view, or select **Sort** from the view menu commands.

Teamcenter displays the **Sort** dialog box.

2. Do one of the following:
 - Sort by default order by selecting **Select default order**.
 - Specify a different sort order.
 - a. Select **Select below criteria**.
 - b. In each of the three boxes, double-click in the box to select from a list of columns available in the view table.

You can modify the column display by inserting or removing columns from tables.
 - c. Select whether to sort the column entries in ascending or descending order.

3. Click **OK**.


Teamcenter sorts the data in the selected table in the order specified.

Filter search results

Several search features allow you to filter search results according to criteria that you specify.




- The **ALL** option displays properties for all the children of the object currently selected in the component view.
- You can use the **Filter Condition Editor** to create condition expressions for filtering the display.
- Expressions cannot be edited after they are listed in the **Auto Filter** dialog box, but they can be deleted.
- Teamcenter retains your filter condition expressions until you delete them.

To create conditions, click **Add a new search condition**  to display the **Filter Condition Editor**.

- To create an initial condition expression, select a property column value and a logical operator, and then enter an object value or select one from the list of objects displayed in the table, and then click **Add a new search condition** .

Note:

The = = operator tests for an exact match. The = operator tests for a match but is not case sensitive.

- To expand the expression with additional conditions, use the **ADD** and **OR** operators.
- Click **Remove the selected condition(s)**  to delete the selected condition line.
- Click **Clean all the conditions**  to delete the entire expression.
- Click **...not meet the condition(s)**  to negate the selected condition.
- Click **OK** to add the condition expression to the **Auto Filter** dialog box.

Saving changes

Teamcenter saves changes to the structure automatically. You do not need to save them manually.

Caution:

If the same structure is open in Structure Manager and Part Planner, one application can overwrite the changes made in the other application. To avoid this, close Part Planner before making changes in Structure Manager.

Comparing structures graphically

About comparing structures graphically

You can compare two structures (BOMs) and view the results to identify differences. The BOMs can contain different types of objects, such as mechanical parts, electrical parts, routes, and connections. You can use the graphical comparison capability with released BOMs or with structures that are configured by effectivity.

You can compare an assembly with an assembly, a part with a part, or two revisions of the same assembly. If you compare two revisions of an assembly, Teamcenter identifies the following supersedure information:

- Adds

These are objects that are in the target assembly but not in the source assembly. They have been added to the assembly.

- Cancels

These are objects that are in the source assembly but not in the target assembly. They have been removed from the assembly.

- Moves

These are objects that are in different positions in the source assembly and target assembly. Any object whose transform matrix differs between the source and target is identified as repositioned.

- Reshapes

These are objects that have alternate representations between the source assembly and target assembly. Any object identified with a **UG ALTREP** note type is identified as reshaped.

- Common

These are objects that are in both the source assembly and target assembly.

Compare two BOMs

1. Apply any revision rules or effectivity needed to configure the structures you want to compare.
2. Choose **Tools** → **Graphical BOM Compare**.

Teamcenter displays the **Graphical BOM Compare...** dialog box listing all loaded structures in both the **First Structure** and **Second Structure** boxes.

3. Select a first and second structure for compare from the lists and click **OK**.

Teamcenter analyzes the BOMs to identify any differences and displays the **Graphical BOM Compare** dialog box containing a visual indication of those differences.

Depending on the type of comparison, you can use the tools and controls in the window to change the view and examine differences more closely.

If you compare two versions of an assembly under change control (for example, a problem item and an affected item of an engineering change), Teamcenter displays a list of supersedures.

4. Click **Close** to close the window on completion.

Set color options

You can change the default colors in which differences and supersedures are displayed in the **Graphical BOM Compare** dialog box as follows:

1. Choose **Edit** → **Options**.

Teamcenter displays the **Options** dialog box.

2. Choose **Change Management** → **BOM Tracking** from the list of options.

Teamcenter shows the list of current colors assigned to the **Graphical BOM Compare** dialog box.

3. To change the color assigned to a difference type, double-click the current color assignment.

Teamcenter displays the palette of available colors. Click the required new color and click **OK** or **Apply** to change the color; alternatively, you can click **Cancel** to exit without changing the color.

View only specific occurrence types


You can use the occurrence type filter to specify which occurrence types to display in the structure. The occurrence type filter is available on all loadable structures.

1. Select the desired structure root (product, process, or plant).

2. Choose **Select Occurrence Type Filters** from the view menu.
3. Choose the types of occurrences that you want to appear in the selected structure.
4. Click **OK**.

Only the occurrence types that you selected are shown in the structure.

Note:

You can turn the filter on and off by choosing **Apply Occurrence Type Filter** from the view menu or clicking  in the view toolbar.

Refresh the display of attachments

Generally, when you modify a structure, it is automatically refreshed by Teamcenter. In some cases, however, the automatic refresh of new attachments is disabled, for example, when adding an attachment in another application such as My Teamcenter or NX. This is to ensure that performance is not impaired. Because of this, a new release status does not appear automatically in the **Attachments** view. To refresh, you can:

- Select a different line in the structure then select the original one again.
- Use the **Refresh Current Structure** command.
- Set the **MEAttachmentPanelEnableRefreshChildren** preference to **True**. This causes Teamcenter to automatically refresh the attachments in the **Attachments** view.

Pasting into a pseudofolder does not refresh the **Attachments** view. After pasting the design object under the **Represented by** pseudofolder in the **Attachments** view, choose one of the following solutions to see the pasted object:

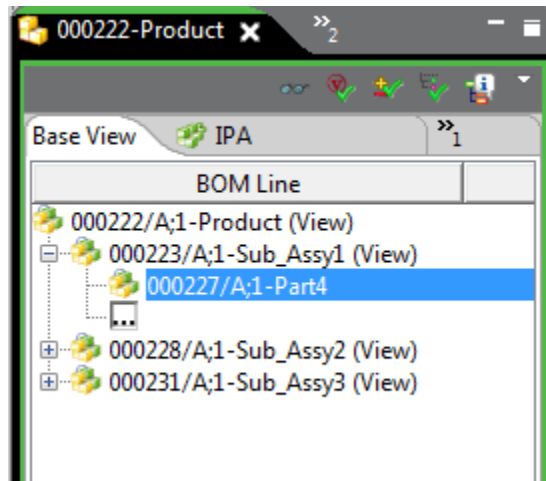
- Reload the part object again.
- Send the object from My Teamcenter to Part Planner.
- If the structure has more than one product, move the selection between the children.

The **Attachments** view is refreshed and you can see the pasted design object.

Expand partially loaded structures

When Teamcenter displays a BOM or manufacturing view containing the results of a search, the siblings of the node you searched for are hidden so the search results are displayed quickly. Each hidden node is represented by a ... symbol enclosed in a box. The ancestors of the found node are loaded and visible.

The following figure shows how a partly loaded structure displays in the BOM. In this example, three nodes are hidden and these nodes are siblings of the **000227/A;1-Part4** node found by the search.

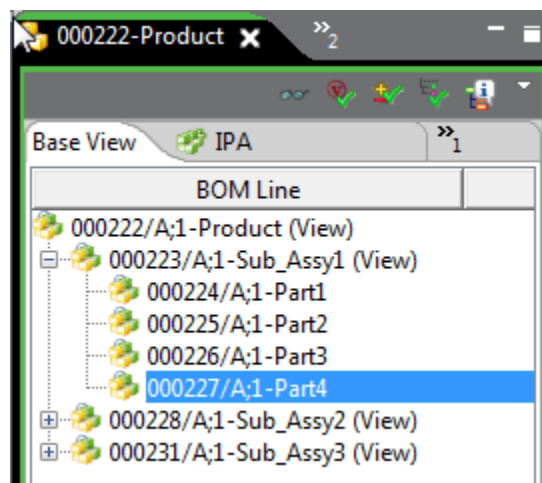


Partially loaded structure displayed as a result of a search

To expand this structure:

- Click



Teamcenter expands the structure showing the siblings of the search result.



Expanded structure

Pack/Unpack a bill of materials

- Click one of the following two buttons on the toolbar to group or ungroup multiple, identical components in one level of the assembly to pack and unpack the BOM.

- Click  to pack.
- Click  to unpack.

Note:

When lines are packed, one of the packed lines is always designated the master packed line. If the **TCVIS_Selection_From_Viewer** preference is set to true, you can select packed objects in the viewer using the buttons available in the **3D Selection** toolbar. However, if you select the master packed line, all packed lines are selected. If you do not want this behavior, you must unpack the packed lines before selecting the individual objects in the viewer.

Displaying activities in the Activities view

You display activities associated with an operation in the **Activities** view. Activities can have associated objects such as other activities or attachments. You can filter out which types of attachments are displayed in the **Activities** view using the **MEOperationActivitiesFilteredComponents** preference. To see all attachments, you can open the **Attachments** view on an activity in the **Activities** view.

Manage checked-out objects

You manage checked out objects by doing one of the following:

- Check in the object by clicking **Check In**.
- Return the object to the database without saving any of the changes you made by clicking **Cancel Check Out**.
- Transfer the checkout ownership to another user by clicking **Transfer Check Out**.
- If you have only one object selected, view a listing of previous checkout activity by clicking **View Check Out History**.

Note:

You can configure the columns that appear in the **Checked Out Objects** dialog box and filter its content.

Load data to Part Planner

Do one of the following:

- Use the **Send to** menu command in any other application.
- Use the **Open By Name** buttons.

- Use the **MRU (Most Recently Used Structures)** button.
- Use the **Quick Search** feature.
- Use the **Open Items** list.

The **Open Items** section of the navigation pane lists all items that are currently open in the perspective.

- Use the **History** list.

The **History** list in the navigation pane displays links to objects that you opened. Links are displayed in reverse order; the last object you opened is the first displayed in the list.

- Use the **Favorites** feature.
- Drag a collaboration context from your **Home** folder to the **Collaboration Context Tree** view.


If you want the related product and plant to open when you load a process, set the **MSE_load_related_product_process_plant** preference to **true**. Also, to enable auto-loading of all the linked product structures and plant structures to a Bill of Process or Plant Bill of Process, the **MELoadAllLinkedStructures** preference should be set to **true**.




Tip:



Use the **Open Items** list in the navigation pane to activate a structure that is already loaded but not currently visible.

Open structure by name


You can search for and open a product, process or operation, work area, collaboration context or structure context by name or object ID.

1. In the toolbar, click **Open by Name** .
2. Click one of the following:

Button	To open a
	Product
	Process or operation
	Work area

Button	To open a
	Collaboration context
	Structure context

If a structure is currently open in a structure view, it is listed in the **Association to** box.

- To find structures associated with the listed structure, select the **Association to** option and skip to step 4, otherwise, do one of the following:
 - If there is no structure identified or if you want to search for structures associated with a different structure, select the new structure and click the **Set to selected** button .

You can use this option to search for structures that are not associated to loaded root structures.

- Select the **Attributes** option and type a structure name or ID.

Note:


You can type an asterisk (*) as a wildcard character if you do not know the entire name or ID.

- Click **Search** or press the Enter key.

All structures that match your search criteria are listed in a table in the open structure dialog box.

- Double-click a structure in the table. It is opened in a structure view.

Opening the most recently used object

You can click the **MRU** (most recently used) button  to open any of the last few top-level structures you opened. This list is saved across sessions and is an easy way to reopen structures you were previously working on. Click an item revision in the MRU list to open it.

Note:

If the business object display rule for the **Item** business object is hidden in the Business Modeler IDE, **Service Plan** does not show up in the most recently used (MRU) list.

Unload data

- Select the structure in the **Collaboration Context Tree** view and choose **Unload** from the shortcut menu or from the view menu.

This unloads the selected structure from the perspective.

- In the structure view, choose **Unload** from the view menu.

This unloads the selected structure from the perspective.

- In the **Collaboration Context Tree** view, choose **Unload All** from the view menu or **File → Unload All**.

This unloads all structures from the perspective.

- In the **Open Items** section of the navigation pane, right-click the structure you want to unload and choose **Unload**.

This unloads the selected structure from the perspective.

- In the **Open Items** section of the navigation pane, click **Unload All** to unload all the structures open in the perspective.

This unloads all structures from the perspective.

Note:

- When you close the primary view without unloading data, the structure is still open. You can activate it from the **Collaboration Context Tree** view.
- You can only unload a structure context object separately if you loaded it separately. You can unload only an entire collaboration context object—not parts of it.

Expand and collapse a structure

1. Select an object in the loaded structure.
2. Do one of the following:
 - Choose **View → Expand Options → Expand** to expand the structure to one level below the selected line.
 - Choose **View → Expand Options → Expand Below** to expand the entire structure below the selected line.

Teamcenter expands only to the level of consumed objects. If you want to expand further, your administrator must define an appropriate closure rule, and then you can expand based on the closure rule.

Note:

This can be time-consuming in very large structures.

- Choose **View** → **Expand Options** → **Expand Below...** and select a level to which you want to expand the structure.
- Choose **View** → **Expand Options** → **Expand to Type**.

Teamcenter displays the **Expand to Type** dialog box.

- In the **Type** list, select the type to which you want to expand the structure.

The types listed are dependent on the type of selected object and the **MEEExpandToBaseTypes** preference. The **MEEExpandToBaseTypes** preference is only applicable to selected processes.

Selected object type	Behavior
Process	The list contains subtypes of both Process and Operation .
Operation	The Expand to Type command is unavailable.
Plant	The list contains subtypes of Plant .
Product	The list contains subtypes of Product .

- Click **OK**.

Teamcenter expands the tree to the selected type.

- If the expand mechanism reaches the given type in a branch, it stops and moves to the siblings.
- If the expand mechanism does not find an object of the selected type in the tree, it does not expand the tree.
- If the expand mechanism does not find an object of the selected type in a branch, the branch remains collapsed.

- (Optional) Collapse the structure by choosing one of the following:

- **View** → **Collapse Below** to collapse the entire structure.
- **View** → **Expand Options** → **Expand Below...** and selecting the **Collapse lower level** check box.

Tip:

Each of these commands are also available from the shortcut menu.

Suppress and unsuppress occurrences


You can hide lines in a structure in the context of another line higher in the structure. This is useful if a structure contains content that is not pertinent to every user. For example, if you want to send a tool design package to a tool designer, not every operation that is contained in the package is relevant to the tool designer's work. You can hide the nonrelevant lines in a structure as follows:










1. Right-click the line in the structure that is the context of the suppression and choose **Set In Context**. For example, if you want to hide some lines in a tool design package, you select the root process.
2. Select the line you want to hide and choose **Edit→Suppress/Unsuppress Line**.

Teamcenter hides the line in the structure. If you export a structure with hidden lines, they are not included in the PLM XML of the structure and are not exported.


You can display lines that are suppressed as follows:

- In the structure view, click  or choose **Show Suppressed Occurrences** from the view menu.

Teamcenter displays the lines that are suppressed with a symbol  in front of them. You can display the **Suppressed** column to assist you in determining whether a line is suppressed.

BOM Line	Suppressed
 002039/A;1-Top Process (View)	False
 002040/A;1-mr3395 (View)	False
 002044/A;1-kioe994	False
  002045/A;1-lewq936	True
 002046/A;1-bcv3779	False
 002041/A;1-jl423 (View)	False
 002042/A;1-al1962 (View)	False
 002043/A;1-ee5223 (View)	False

You can unsuppress lines in a structure as follows:

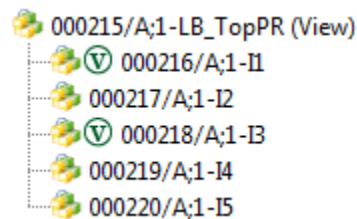
1. Display all suppressed lines by clicking  or choosing **Show Suppressed Occurrences** from the view menu.
2. Select the suppressed lines that you want to show and choose **Edit→Suppress/Unsuppress Line**.

Displaying and hiding structures using the Show Unconfigured buttons

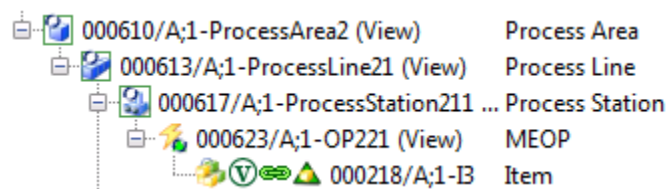
Teamcenter provides you with several buttons or menu commands that show or hide objects in a structure.

- **Show Suppressed Occurrences**
- **Show Unconfigured Variants**
- **Show Unconfigured By Occurrence Effectivity**
- **Show Unconfigured Changes**
- **Show Unconfigured Assigned Occurrences** (only applicable to a bill of process)
- **Apply Occurrence Type Filters**

If you have several structures open, the state of these buttons in the various structures affects what is visible in the structure. It can occur that you try to show unconfigured variants in a composition structure but are unsuccessful because they are not hidden in the parent structure. For example, you have the following product structure with Part2 configured out as a result of a variant rule, but with all variants exposed using the **Show Unconfigured Variants** button.



Additionally, you have a process structure that consumes Part2 from the product structure.



If, in the process structure, you turn off the **Show Unconfigured Assigned Occurrences**, you may expect the assigned part and the owning operation (depending on the settings of the **typeAndRuleForProcessConfiguration** preference) to be hidden in the process structure. If, however, in the product structure, the **Show Unconfigured Variants** button is turned on, you cannot hide the assigned occurrences in the plant BOP structure.


The following control only nodes in the process structure (processes and operations) and not assigned lines:

- **Show Suppressed Occurrences**
- **Show Unconfigured Variants**
- **Show Unconfigured By Occurrence Effectivity**
- **Show Unconfigured Changes**

The following control assignments being configured in and out:

- **Show Unconfigured Assigned Occurrences**
- **Apply Occurrence Type Filters**

Tip:

You can simultaneously show or hide all **Show unconfigured** options using the **Show Hide Unconfigured All**  list if your administrator sets the **MEShowHideUnconfiguredAll** preference to **All**.

Set or unset a closure rule

You can limit the expansion of the structure using site-specific criteria to reduce potentially time-consuming expansions. For example, if a line has a monolithic JT file attached to it, you may not want to expand the subassembly below it. Similarly, you may not want to expand an assembly if it is not assigned to the current project. The site administrator specifies the available rules in the **ClosureRulesForBomExpansion** preference.

Lines filtered out by a closure rule are not exported.

If lines are hidden by a closure rule, you cannot find them from other views using the **Find** menu commands.

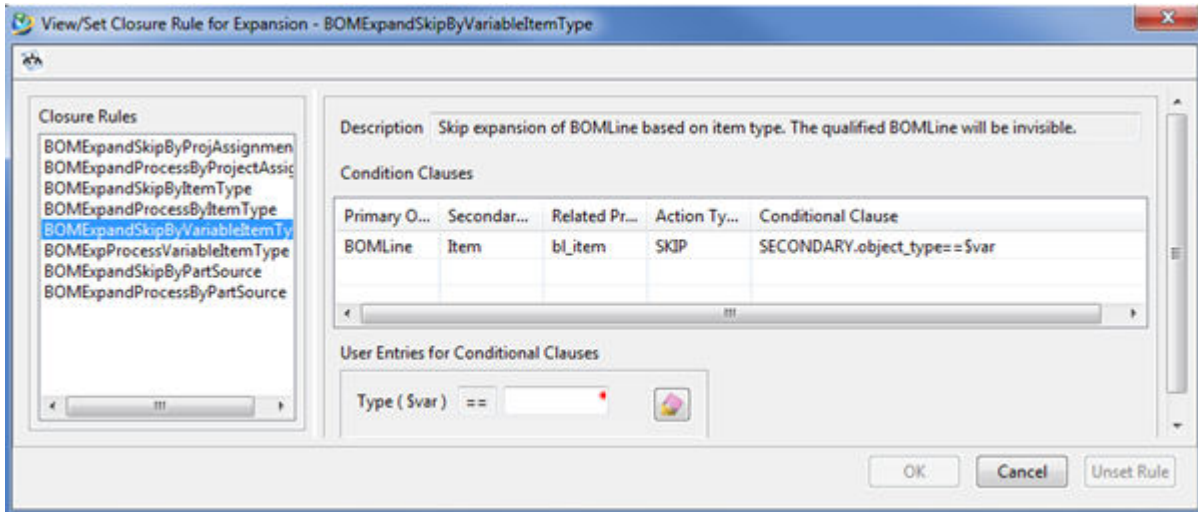
Note:

Expanding a structure based on a closure rule can affect the outcome of an accountability check. Because this type of expansion filters the displayed lines, it can interact with any inclusion rules you may set for the accountability check.

Select a closure rule before expanding the structure:

1. Choose **Tools**→**View/Set Closure Rule for Expansion**.

Teamcenter displays the **View/Set Closure Rule for Expansion** dialog box.



Note:

If the closure rules differ from those shown, the site administrator must edit the **ClosureRulesForBomExpansion** preference.

2. Select the required closure rule in the **Rules** list, and then enter any filter attributes necessary for the selected rule. In the example shown, you must specify at least one project identifier.

Note:

In a conditional clause, evaluation of the left-hand expression must give primitive data types such as string or integer. If the related property is a typed reference, untyped reference, relation, or external references, the left-hand expression must evaluate to a primitive data type that uses the property of the object. You must use the property of the object, rather than the object itself. For example, instead of using **PRIMARY.bl_uom=="kg"** in a condition clause, you should traverse from **BOMLine** to **UnitOfMeasure** using **bl_uom** and then use a icon property of **UnitOfMeasure**.

Primary object class	Primary object	Secondary object class	Secondary object	Relation type	Related property	Action type	Conditional clause
CLASS	BOMLine	CLASS	UnitOfMeasure	Property	bl_uom	Skip	SECONDARY.symbol==\$var

Note:

Line breaks are not supported in closure rules with variables.

3. After you enter the attributes, click **OK** to set the closure rule.


Teamcenter applies the closure rule to all future structure expansions until you unset it or set another rule.

Note:

You can set the **SkipClosureRuleEquivalent** user preference to determine whether the closure rule is re-evaluated if you reapply it in the same session and the referenced property has changed.

To unset the closure rule, select it in the **Rules** list and then click **Unset Rule**.

Tip:

You can see the name of the current closure rule in the tooltip on the structure tab or in the configuration information when you click .

If the action type in the closure rule is **SKIP**, lines meeting the criteria do not appear. If the action type is **PROCESS**, qualified lines appear but are not expanded (they show a + icon). To expand such a line, unset the closure rule from the window and then repeat the expansion of the subassembly.

Understanding equivalence and in-context ID (IDIC)

Teamcenter has several features that depend on finding parts that are considered *equivalent*. This equivalency is often dependent on the in-context ID (IDIC), also known as the *absolute occurrence ID*. The in-context ID is a unique identifier, generally alphanumeric, that determines if two parts or processes are equivalent.

You can view the in-context ID by displaying the **ID in Context Top Level** column. It is usually automatically generated, and you should exercise caution in modifying its value.

The following features depend on the in-context ID:

- Finding products in processes that are not yet expanded
- Running an accountability check to verify line equivalence
- Assigning parts to a cloned process structure
- Comparing structures to intermediate data captures

An in-context ID is automatically generated in the following situations:

- When you assign a bill of materials (BOM) to a BOM or a bill of process (BOP) to a BOP
- When you assign a BOM to a BOP or enterprise BOP (EBOP) structure if the **MECopyIdInContextToAssignedLine** preference is set to true

An in-context ID is not generated when you assign from an EBOP structure to an EBOP structure.

Caution:

If a line has an in-context ID and you cut it and paste the same line back into the structure, Teamcenter creates a new occurrence without an in-context ID. Therefore, any of the above comparisons based on the in-context ID no longer work.

Searching for components in other structures

Setting up the search for components in other structures

You can select one or more objects in the following areas of the user interface and search for them in a different structure.

- Lines in a view
- Consumed parts in a process
- An object in the **Navigation** pane (**Favorites**, **History**, **Open Items**)
- Objects in the **Home** folder
- Objects in the **My Worklist** folder
- Items attached to a Teamcenter mail
- Lines in the **Summary** view
- Objects in the **Graphics** view

Whether you need to expand a target structure before choosing the **Find in All Visible Views** menu command depends on the settings of the following two preferences:

MECopyIdInContextToAssignedLine
MECopyIdInContextLowerLevels

Note:

Whether you need to expand a structure before a found component can be highlighted within it depends on the value of the **MEEExpandToSelection** preference. If this preference is set to **false**, you must manually expand the target structure to highlight lines found within that structure.

Find components in open structures

1. Right-click one of the following:

- Lines in a view
 - Consumed parts in a process
 - An object in the **Navigation** pane (**Favorites, History, Open Items**)
 - Objects in the **Home** folder
 - Objects in the **My Worklist** folder
 - Items attached to a Teamcenter mail
 - Lines in the **Summary** view
 - Objects in the **Graphics** view
2. Choose one of the following from the shortcut menu.
- **Find** → **Find in all visible views** to find the line in all views that are open, not tabbed behind others, and not minimized.
 - **Find** and select the view in which you want to find the source line.
 - If the source structure is an occurrence group, choose **Find in Base View** to find the selected structure line in the base view associated with the occurrence group.

Teamcenter searches for the item in the alternate structure and, if successful, highlights it, as shown in the following figure.

BOM Line	Quantity	Item
000208/A;1-product1 (View)		
000209/A;1-p1		
000210/A;1-p2		
000211/A;1-p3		
000212/A;1-p4		
000213/A;1-p5		
000214/A;1-p6		

Process Structure	Item Type
000199/A;1-Proc_Root (View)	MEProcess
000200/A;1-Comp1	MEOP
000201/A;1-Comp2 (View)	MEOP
000210/A;1-p2	Item
000202/A;1-Comp3	MEOP
000203/A;1-Comp4	MEOP
000204/A;1-Comp5 (View)	MEOP
000212/A;1-p4	Item
000205/A;1-Comp6 (View)	MEOP
t1	OccurrenceGroup
000210/A;1-p2	Item
000212/A;1-p4	Item
000214/A;1-p6	Item
000206/A;1-Comp7	MEOP
000207/A;1-Comp8 (View)	MEOP

Individual search result

Recovering a manufacturing session

If you are working in a four-tier environment and a server or network failure or time-out occurs, Teamcenter reassigns the client session to another server. It also attempts to use the client cache to reconstruct the run-time configured structure views and minimize loss of information.

If the server connection is lost, Teamcenter displays two dialog boxes:

- **Server Reassigned**

Informs you that the server connection was lost. Click **OK** to dismiss the dialog box.

- **BOM Session Recovery**

Informs you that a BOM recovery session has started. Click **OK** to dismiss the dialog box.

Additional error messages may appear, depending on the state of the recovered session.

The primary structure views are recovered and the secondary views have one of the following states:

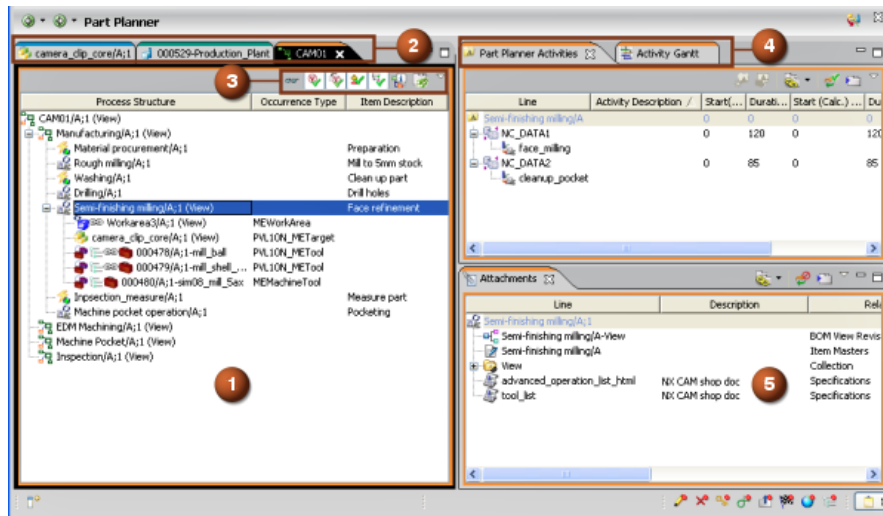
- Where possible, the view remains open.
- The view stays open, but its content is cleared.
- The view is closed.

The following limitations apply to BOM session recovery:

- BOM sessions are recovered only for the four-tier rich client.
- Teamcenter recovers the BOM session to a usable status, but not necessarily the exact state before failure or time-out occurred. For example, if you expanded multiple levels of the structure, Teamcenter recovers only the first-level expansion of the structure.
- The recovery may take an appreciable time to complete, depending on the quantity of data Teamcenter must process.
- Unsaved changes are lost. For example, if you modified the effectivity date on a revision rule but had not yet saved the change, the changes are not recovered.
- If you copied BOM lines to the clipboard before the server terminated, Teamcenter removes them.
- If the server terminated after encountering bad data during expansion, the recovery process may expand the same structure and encounter the same bad data. You must resolve these data issues in the database manually.
- If the server terminated due to memory shortage when expanding the first level of the structure, the recovery process may expand the same structure and encounter the same memory shortage. You must resolve such memory issues separately.
- The **Report** view is not recovered.
- The knowledge of which variant rule is in effect at the time of the crash is not recovered.

Part Planner interface

Part Planner interface overview
















- 1 Structure view Displays all the information pertaining to a structure.
- 2 Multiple structure views Shows each structure that is currently open. Each view can contain a product, process, or plant. These are referred to as *primary* views. You can open multiple views at once, including multiple products, processes or plants.
- 3 View toolbar Displays command buttons pertaining to one particular view only. Use this and the menu commands in the view menu beside these buttons to perform configuration tasks and other tasks for the current structure.
- 4 Secondary views Multiple views containing detailed information about different aspects of a primary structure. In this case, you see the **Part Planner Activities** view listing activities pertaining to the selected operation, as well as the **Activity Gantt** view, not currently visible, that helps you manage time information for activities belonging to the selected operation. These are two of many views available to assist you in planning parts for manufacture.
- 5 Docked **Attachments** view You can move views around and dock them in different positions in the user interface to arrange the work area to your liking. The **Attachments** view in the figure is arranged below the **Part Planner Activities** view as these are two common views necessary for part planning.






List of manufacturing views




Teamcenter presents manufacturing data in views, each view providing its own specific way of managing or modifying the data. The views provide an environment where you can author manufacturing processes based on information available in Teamcenter. You can construct processes and operations, relate additional relevant information, view alternatives and isolated studies, and collaborate with others who are working on the same information.






There are primary views and secondary views. A primary view shows one configurable structure. That structure can contain a base view and several occurrence groups. A secondary view shows specific data and, depending on your needs, can change its content if you select a new object in a primary view.

View Icon	Name	Description
	2D Viewer	You can have one or many two-dimensional snapshots associated with a line in your product structure. When you open a selected line in the 2D Viewer view, Teamcenter displays an attached image dataset. If there are multiple image datasets attached, you can select any preferred image.
	Accountability Check	Displays the results of an accountability check . This view lists the problem lines in the source and target and provides a list of conflict details. Lines that are colored in the source and target structures are also colored in the view. Fully matched lines are not listed.
	Activities	Displays all activities to be completed as part of the operation selected in a process. This view is structure-dependent (it displays a tree table). Each listed activity is an expandable folder. Folder contents may include additional subactivities. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Tip:</p> <p>You can open many secondary views for activities, including the PERT or Attachments views.</p> </div>
	Activities Gantt	Provides a visual depiction of the start time and duration for all the activities scheduled for an operation. The view is available when an operation is selected in the structure view, or an activity is selected in the Activities view.
	Advanced Accountability Check	Displays the results of an advanced accountability check . The Advanced Accountability Check view lets you compare and propagate multiple types of views/structures, run assessment comparisons to repair one structure from another, set reporting and equivalence options, and set partial match criteria for different types of structures. Many options are available, other than those the standard accountability check offers.
	Attachments	A structure-dependent data view that is always available when an object is selected in a structure view, the Attachments view displays

View Icon	Name	Description
		<p>the properties of all components attached to the selected object, including the base item component and all related subcomponents.</p> <p>Standard Teamcenter shortcut menu commands are available for any displayed object. Double-click an attachment on this view to open the attachment in its appropriate application.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note:</p> <p>The process revision is determined by the product structure's revision rule. This information cannot be specified in this view.</p> </div>
	Classification Properties	Shows the values that exist in the Classification application for the object currently selected in the structure view if that object is classified. This data is informational only and cannot be changed in this view. You must change the data through the Classification application.
	Collaboration Context Tree	<p>Contains a list of all structures currently open in the application. You can use the Collaboration Context (CC) view to load and unload structures, as well as to save structures as new structure contexts.</p> <p>The Collaboration Context Tree does not respond to selection in other views.</p>
	Graphics	Displays any 3D visualization data associated with the selected structure. The Graphics view is closely associated with the primary view from which you open it. If you close the associated primary view, Teamcenter closes the Graphics view as well.
	Impact Analysis	<p>Identifies which other database components reference and thereby impact an object currently selected in a structure view, and displays any assemblies in which the selected object appears.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note:</p> <p>You can use the Filter by Item Type command to display all operations currently associated with, and performed at, the work area selected in a plant structure.</p> </div>
	Incremental Change	Allows you to add, edit, or remove incremental changes from a selected line.
	IDC	Displays any Intermediate Data Captures (IDCs) associated with the selected structure. You can switch between captured states of an IDC by selecting from the Captured State list.
	Manufacturing BOM (MBOM)	One of the most important primary structure views, the Manufacturing BOM (MBOM) is a breakdown of a three-dimensional product design consisting of part and assembly models, usually derived from an Engineering BOM (EBOM) or design BOM, that

View Icon	Name	Description
		reflects the needs of manufacturing processes. You must continually compare and update the EBOM and MBOM, often using an advanced accountability check, to reflect engineering and manufacturing changes that occur during the manufacturing process.
	PERT	<p>You can open this chart view for a process displayed in a structure view or for activities displayed in the Activities view. When opened on a process, the Program Evaluation Review Technique (PERT) view shows the sequence of the first-level processes or operations that exist for the selected process.</p> <p>When opened on a top-level activity, the PERT chart displays the first-level activities. Each process or operation within the selected process is represented by a box in this view. Each box contains the name and ID of the process or operation.</p> <p>Use this view to arrange the boxes and create a sequential flow of processes, operations, or activities within the selected object.</p>
NA	Part Planner Activities	<p>Displays all activities to be completed as part of the operation selected in a process. In addition, it displays tool number, start, and duration times for each of the activities.</p> <p>Each listed activity is an expandable folder object. The folder contents may include additional subactivities.</p> <p>You can open many secondary views for activities, including the PERT view or the Attachments view.</p>
	Plant	A type of primary structure view that displays the plant , work areas, work stations, lines, or any physical location where your manufacturing processes take place. This view is sometimes referred to as a work area view.
	Plant Bill of Process (BOP)	A type of primary structure view that displays resources necessary for a plant to assemble a product.
	Process Gantt	Displays processes and operations and the relations between them in a bar chart that illustrates the work breakdown structure of a project using a time line, from the start and finish times of the operations or processes and summary elements (operations or higher level processes). The Gantt view also shows the dependency (sequence) of relationships between the elements.
NA	Product Manual	Displays work instructions created and edited using a Product Manual role.
	Product	Displays the product that you want to manufacture in a hierarchical tree structure.
NA	Report	Supports the creation of reports for all three types of structures: products, processes (including their operations and activities), and plants. The generated report is presented through a browser window.

View Icon	Name	Description
		You can create customized style sheets or use other formatting tools to customize both the data content and the report format.
	Standard Text	<p>Enables you to create and manage such as text, data collection definitions, and symbols that are compiled to create textual work instructions. The Standard Text view is generally used by the standard text librarian to manage the elements that the work instruction author chooses to create work instructions.</p> <p>Creating work instructions using standard text promotes standardization and consistency of work instructions throughout the organization. You can create the elements once, and then reuse them many times.</p>
	Standard Text Library	Helps you to you use to create standard textual work instructions. A standard text library is a structure comprised of standard text folders and standard text elements nested under the folders.
	Structure	<p>When you open the application, there are three empty structure views entitled Product, Process, and Plant. These views are placeholders for structures that you open. When you open a structure, it opens in the associated structure view and Teamcenter displays the information as a tree structure. You can open multiple structures at once, including multiple parts, processes, or plants. Each of these structures is displayed in a different view. You can configure these structures using revision rules, variant conditions, and effectivity dates.</p> <ul style="list-style-type: none"> • If you open a part, the structure view contains the product hierarchy being manufactured. You can allocate any consumed parts and workpieces or subsets of workpieces to an operation's setup. • If you open a process, the structure view shows the process hierarchy in the sequence it uses for manufacturing the part. The process structure contains subprocesses and operations. You can view the workflow from one process to the next, as well as see parallel processes. You can also see alternate processes for creating the target product and allocate work area items, tooling, and workpieces to a specific process. • If you open a plant, the structure view displays your factory environment hierarchy as a tree structure. The root level identifies the high-level plant structure. Each layer beneath the root level breaks down the work areas within the plant until the lowest level in the structure represents individual work areas where specific operations are performed. <p>Structure views are primary views for which you can open a variety of secondary views that provide detail information about the</p>

View Icon	Name	Description
		selected line. Although product, process, and plant are the most common types of structures that open in a primary view, there are additional types of structures that open in primary views, including an Intermediate Data Capture view, a Requirements view (when working in Systems Engineering), and a Standard Text view.
	Textual Work Instructions	Helps you to author work instructions by choosing from a library of elements. Using this view, you can quickly create or edit textual work instructions for manufacturing processes or operations.
	Variants	Allows you to display and edit variant options, option defaults, and rule checks currently defined for the product selected in the structure pane.
	Viewer	Displays the content of a dataset that is attached to an item revision with a Rendering relationship, where possible. For example, if you select a text dataset, the viewer displays a text editor with the content of that text dataset. If you select a dataset containing a JT file, the viewer displays the JT.
	Workarea	A type of primary structure view used to display a plant, work area, work station, or any physical location where your manufacturing processes take place. This is sometimes referred to as the plant view.
	Work Instruction	If your administrator configured the publishing feature for manufacturing documentation, you may see the . The name of this view is configurable. Use it to create published pages containing manufacturing data. You can organize collections of publishing pages into portfolios, which you can view, publish to a Web server or PDF, or print in My Teamcenter.

Note:

The **PS_assume_legacy_transform_units** preference determines how Teamcenter interprets the units of measure for legacy transform data. Teamcenter and NX currently use meters for transform units of measure; legacy measurements were in inches or millimeters. This preference affects all data using legacy transforms that have no database-resident indication of the unit measurement stored with them. The default setting is **Unknown**. If the preference is left in the default setting, you may see discrepancies between the model and display units when you view collaboration context structures in Manufacturing Process Planner.

Part Planner menus

Menu command	Purpose
File→New→Process	Creates a new process under the selected line in the structure pane or as a new root process.
File→New→Operation	Inserts a new operation under the selected line in the process structure.
File→New→Activity	Creates an activity under the selected item in the process structure.
File→New→Workarea	Adds a work area to the plant structure.
File→New→From Template→Process From Template	Creates a new process from an existing one.
File→New→From Template→Operation From Template	Creates a new operation from an existing one.
File→New→From Template→Workarea From Template	Creates a new work area from an existing one.
File→New→From Template→Item From Template	Creates a new item from an existing one.
File→New→From Template→Activity From Template	Creates a new activity from an existing one. This command is only available if you have an activity selected in the Activities view, or in the Activities section of the Time view.
File→New→Standard Text→Standard Text Library	Creates a standard text library that you can use to manage text and symbol building blocks to create textual work instructions. A standard text library is a structure comprised of standard text folders and standard text elements nested under the folders.
File→New→Standard Text→Standard Text Folder	Creates a standard text folder that helps you manage the structure of a standard text library.
File→New→Standard Text→Standard Text Element	Creates a standard text element that is one of the building blocks used to create textual work instructions. Standard text elements are stored in a standard text library.
File→New→Item	Creates a new item under the selected item in the product structure or as a new root product.
File→New→Part	Creates a new part.
File→New→Form	Attaches a form to an object in the structure context. This menu command is available only if the attachments pane is open.

Menu command	Purpose
File→New→Folder	Attaches a folder to an object in the structure context. This menu command is available only if the attachments pane is open.
File→New→Dataset	Attaches a dataset to an object in the structure.
File→New→BOM View Revision	Creates a new BOM view revision for the selected line.
File→New→Item Element	Creates objects to represent design or manufacturing features that are not defined as part of the physical structure in the BOM. Features are implemented as item elements, sometimes called general design elements (GDEs).
File→New→Connection→Non-Revisable	Creates a new nonrevisable Tc Link connection (for example, connection or datum point connection).
File→New→Connection→Revisable	Creates a new revisable Tc Link connection (for example, connection or datum point connection).
File→New→Collaboration Context	Creates an empty collaboration context.
File→New→Structure Context	Creates an empty structure context.
File→New→Configuration Context	Creates an empty configuration context.
File→New→Workflow Process	Creates a new workflow process with attachments, an associated process template and the ability to assign tasks to specific users.
File→New→URL	Attaches a URL to an object in the structure context. This menu command is available only if the attachments pane is open.
File→New→Envelope	Allows you to attach an envelope to an object in the structure context. This menu command is available only if the attachments pane is open.
File→Save As→Item(Revision)	Creates a new item revision of the selected line.
File→Save As→BOM View(Revision)	Creates a new BOM view revision of the selected item.
File→Open	Opens the selected object.
File→Open With	Allows you to select with which tool an object is opened.
File→Revise	Revises the selected item.
File→Open By Name	Open a product, process, work area, collaboration context, or structure context by name or ID.
File→Most Recently Used Structures	Displays a list of structures that you recently closed. Use this as a way to quickly open desired structures.

Menu command	Purpose
File→Print	Views, prints, or saves information about the currently selected structure.
File→Print...	Views, prints or saves properties, textual information, graphics or information associated with the selected item.
File→Define Configuring Structures	Enables you to specify which open structure configures a process structure.
File→Close	Closes the current application, in this case, Part Planner.
File→Unload All	Removes all structures from the collaboration pane and structure panes.
File→Exit	Ends your session.
Edit→Cut (Ctrl+X)	Marks the selected lines for removal and copies their contents to the clipboard. Cut lines are only removed once pasted elsewhere in the product structure.
Edit→Copy (Ctrl+C)	Copies the selected lines to the clipboard.
Edit→Paste (Ctrl+V)	Pastes item revisions from the clipboard as components of the selected lines.
Edit→Paste Substitute	Pastes item revisions from the clipboard as substitutes of the selected (assembly) lines.
Edit→Paste Special	Pastes components on the clipboard to the selected assembly (line).
Edit→Replace	Replaces the selected line with the item revision or item element on the clipboard.
Edit→Replace...	Opens a dialog box where you can type the item identifier of the component to replace the selected line.
Edit→Split Occurrence	Splits a line that represents several occurrences into two branches. The new branch and the original (changed) branch initially have the same notes, variant conditions, and other data, but you can subsequently modify them independently.
Edit→Insert Level	Creates an item and inserts it in the current structure as a new level below the selected line. The number of relative occurrences of the children is preserved.
Edit→Delete	Deletes a single item or an item and all its children. Optionally, you can also remove any associated referenced objects. This command permanently removes any selected item from the structure and the database.

Menu command	Purpose
Edit→Remove	Removes the selected lines from the structure. The lines removed by this method are not placed on the clipboard.
Edit→Notes	Views and edits all occurrence notes for the selected line.
Edit→Properties	Views and edits all properties of the selected line.
Edit→Purge	Permanently removes old versions of a dataset from the database. You can select whether to purge all old versions or specific versions of a dataset.
Edit→Latest	Displays the latest versions of all datasets in a selected folder. The Latest menu command updates all version-0 datasets to reference the latest saved version in the database. This feature is useful in a network environment when multiple users are working on the same dataset.
Edit→Change Ownership	Changes ownership of one or more objects. Using the Explore Selected Components option, you can select component objects and attachments, such as datasets, forms, and part files for ownership change.
Edit→User Setting	Changes your group, role or volume assignments, also your application logging and journaling options.
Edit→Options	Changes user interface settings that affect all applications.
Edit→Assign Resource	Assigns resources to a selected process or operation.
Edit→Variant Condition	Creates a variant condition on the selected line.
Edit→Toggle Precise/Imprecise	Changes the precision of the selected assembly (line).
View→Refresh Window	Reads information from the database and updates the information displayed in the application.
View→Refresh Current Structure	Updates information in the currently open and active structure. If you add datasets to an object in a different application (for example, My Teamcenter), use this menu command to update the Attachments view.
View→Show Connected Lines	Shows or hides all lines that are connected by the selected connection.
View→Access	Views, changes, and/or applies access permissions for a selected object.
View→Named References	Views, opens, imports, or exports the named references of a selected dataset. You can use the function buttons in the dialog box to cut or copy a selected reference to the clipboard and paste references from the clipboard.

Menu command	Purpose
View→File	Shows the audit file for the selected structure or assembly.
View→Pack/Unpack→Pack	Packs the selected lines so that all lines with the same item revision and find number are displayed as a single line. The actual quantity of lines is appended to the node.
View→Pack/Unpack→Pack All	Packs all packable lines in the displayed structure.
View→Pack/Unpack→Unpack	Unpacks the selected packed lines so that they are displayed as separate lines, one for each occurrence.
View→Pack/Unpack→Unpack All	Unpacks all lines in the displayed structure.
View→Expand Options→Expand	Expands the substructure immediately below the selected lines.
View→Expand Options→Expand Below	Expands the complete substructure below the selected lines.
View→Expand Options→Expand Below...	Expands the substructure below the selected lines to a user-selected level. You can also collapse an expanded substructure when you choose this command (hide certain child lines).
View→Expand Options→Expand to Type	Expands the substructure below the selected lines to a user-selected type.
View→Collapse Below	Collapses the complete substructure below the selected lines (hide all child lines).
Tools→Check-In/Out→Check-Out	Checks a selected component out of the database.
Tools→Check-In/Out→Check-In	Checks a selected component into the database.
Tools→Check-In/Out→Cancel Check-Out	Reverts checkout procedure.
Tools→Check-In/Out→Transfer Check-Out	Transfers a selected, checked-out component to another user.
Tools→Check-In/Out→Notification List	Views or edits the list of users who are informed if the selected component is checked in or checked out.
Tools→Check-In/Out→Check-Out History	Views the history of check out actions for the selected component.
Tools→ID Display Rule→View/Set Current	Views the ID display rule currently applied to the selected structure or set a different ID display rule.
Tools→ID Display Rule→Modify Current	Modifies the ID display rule currently applied to the selected structure.

Menu command	Purpose
Tools→ID Display Rule→Create/Edit	Creates a new ID display rule or modify an existing ID rule.
Tools→Project→Assign	Assigns the selected structure to a predefined project.
Tools→Project→Remove	Removes the selected structure from a project to which it is assigned.
Tools→Revision Rule→View/Set Current	Views or sets the revision rule for the currently displayed structure.
Tools→Revision Rule→Set Date/Unit/End Item	Sets the date, unit number, or end item to configure the structure, if the current rule allows.
Tools→Revision Rule→Set Override folder	Sets an override folder to override item revisions that would otherwise be selected by other criteria.
Tools→Revision Rule→Modify Current	Modifies the current revision rule and apply the modified rule to the current structure. You can save the change if you have write access to the original rule.
Tools→Revision Rule→Create/Edit	Creates or edits a revision rule.
Tools→Effectivity→Occurrence Effectivity	Views, edits, creates, or copies occurrence date effectivity data for the occurrence of the selected line, or for multiple lines. You must have the appropriate permissions to create or edit effectivity data.
Tools→Effectivity→Revision Effectivity	Allows you to view, edit, create, or copy effectivity data for the item revision of the selected line. You must have the appropriate permissions to create or edit effectivity data.
Tools→Effectivity→Effectivity Mapping	Allows you to view, edit, create, or copy effectivity mapping for an end item. Effectivity mappings are needed if you implement nested effectivity.
Tools→Variants→Configure Variants	Configures or edits a variant structure for the selected top-level module.
Tools→Variants→Only Configure Root	When on , displays options only for the top-level module, regardless of the line selected. Set to off to configure the structure for a lower level module.
Tools→Variants→Search	Searches for an existing variant item.
Tools→Variants→Count Modules	Counts the modules defined for the selected variant structure.
Tools→Variants→Unlink Variant Item	Unlinks a variant item from the generic module item to make changes.
Tools→Variants→Update Variant Items	Manually updates variant items. If you make structural changes to a generic item and create a new item revision,

Menu command	Purpose
	Teamcenter does not automatically propagate such changes to each associated variant item. You must make such changes manually.
<p>Note:</p> <p>The Incremental Change menu commands only appear if you set the Incremental_Change_Management preference to true.</p>	
Tools→Incremental Change→Display Icons	Customizes how incremental change icons are displayed and the contexts in which you want to see icons.
Tools→Incremental Change→Add	Retrospectively creates an add change and attaches it to the active incremental change.
Tools→Incremental Change→Remove	Retrospectively creates a remove change and attaches it to the active incremental change.
Tools→Incremental Change→Delete on Object	Establishes a delete change to the attachment.
Tools→Incremental Change→Create on Object	Establishes a create change to the attachment.
Tools→Incremental Change→Remove Changes	Removes (undoes) changes on the active incremental change.
Tools→Incremental Change→Incremental Change Baseline	Revises the parent assembly to create an incremental change baseline.
Tools→Incremental Change→Edit Attachment	Edits an attachment (dataset or form) and track the changes with the active incremental change.
Tools→Incremental Change→Split	Splits some of the changes from the active incremental change into another existing incremental change.
Tools→Accountability Check→Check	Allows you to compare two structures and view the differences (that is, how one structure uses objects compared to the other structure). This submenu is active when two structure panes are visible.
Tools→Accountability Check→Clear Display	Removes color highlights created by the accountability check.
Tools→Accountability Check→Select Unused	Runs the accountability check and shows all occurrences in the source pane that do not match an occurrence in the target pane in an occurrence group.

Menu command	Purpose
Tools→Accountability Check→Select Completely Used	Runs the accountability check and shows all occurrences in the source pane that match more than one occurrence in the target pane in an occurrence group.
Tools→Accountability Check→Select Overused	Runs the accountability check and shows all occurrences in the source pane that match a corresponding occurrence in the target pane in an occurrence group.
Tools→Accountability Check→Partial Compare Results	Displays all properties that were included in the partial compare criteria that you set in the Partial Match Options pane when running an accountability check.
Tools→Repair Broken Links	Identifies broken links and searches for possible repair candidates.
Tools→Multi-Site Collaboration	Controls the data shared with participating sites in a distributed network. Multi-Site Collaboration allows you to publish and unpublish objects.
Tools→Graphical BOM Compare	Compares two revisions of a part or assembly and examine the difference in the Viewer pane.
Tools→Resequence structure	Reorders the process to reflect a change in the process step numbers.
Tools→Update Flows	Updates PERT flows according to the find number of the selected component's children, or in the case of multiple selections, of the selected components.
Tools→Import→Objects	Imports objects into the database using various import formats.
Tools→Import→From PLMXML	Imports a PLM XML file into the database.
Tools→Import→Remote	Imports a structure from a remote site in a Multi-Site Collaboration environment. Search for the remote object in My Teamcenter.
Tools→Export→Objects	Exports the selected structure and its attachments in PLM XML format to a selected export directory. You must choose the appropriate transfer mode for the destination system.
Tools→Export→To PLMXML	Exports the selected structure and its attachments in PLM XML format to a selected export directory. You must choose the appropriate transfer mode for the destination system.
Tools→MES→Release to MES	Creates a work package to send to an external manufacturing execution system (MES).

Menu command	Purpose
Tools→MES→Validate for MES	By default, checks that all data has a released status. You can add custom validation checks to suit your business needs.
Tools→MES→Launch MES Web Page	Opens the Teamcenter Web Browser that displays MES information.
Tools→Send Data To	Sends selected data to an external application using an application interface object. Your Teamcenter administrator uses the Business Modeler IDE application to create new application interface types associated with a specific application. Each of these types are available in the Send Data To dialog box.
Tools→Send Additional Data To	Sends additional data to a running session of the application launched using the Send Data To menu command.
Tools→Address List	Displays lists of users who participate in workflow processes.
Tools→List Substitutes	Adds or removes substitute components or set the preferred substitute.
Tools→Manage Global Alternates	Shows a list of the global alternates available for the selected line. The preferred global alternate is indicated by an asterisk (*).
Tools→Intermediate Data Capture	Saves the current structure configuration to a PLM XML format that you can browse and compare against existing structures.
Tools→Baseline	Copies work-in-progress (WIP) item revisions. During the development of a product design, you may need to share such copies of your working design with other users at the same or different sites. You can also save your design for future reference.
Tools→Generate 3D PDF Report	Creates an interactive 3D documentation report that derives directly from process data stored in the database. The report is in PDF format and contains process information and 3D data.
Tools→Link/Associate→Link To Manufacturing Process	Enables you to share an operations across top levels to two process plans.
Tools→Link/Associate→Link As Required	Links product items that are required to carry out an operation. This menu command is available only on operations. The Link as Required relationship does not add an occurrence below the operation, unlike when you assign a product item as MEConsumed .

Menu command	Purpose
Tools→Link/Associate→Associate Product As Target	Associates a product to a process so that when opening one, the other opens automatically. You can turn this behavior off using the MSE_load_related_product_process_plant preference.
Tools→Link/Associate→Associate Workarea	Associates a work area to a process so that when opening one, the other opens automatically. You can turn this behavior off using the MSE_load_related_product_process_plant preference.
Advanced→Connect	Connects two selected lines with a revisable or nonrevisable connection.
Advanced→Disconnect	Disconnects the currently selected line with a revisable or nonrevisable connection to another line.
Advanced→Generate Portfolio	Creates a portfolio to hold manufacturing documentation.
Advanced→Organization	Displays your Teamcenter organizational structure including the groups in your enterprise, the roles in each group, and the users assigned to each role. <i>Organization Management Using Groups, Roles, and Users</i> explains how a user with dba privileges creates and manages the information displayed in the organization chart.

Note:

The **Graphics** menu appears only if you open the **Graphics** view.

Graphics→Selection→Select All	Selects all the objects displayed in the viewer.
Graphics→Selection→Select None	Clears any objects currently selected in the viewer.
Graphics→Selection→Reverse Selection	Selects all objects not selected in the viewer, while simultaneously unselecting any objects currently selected in the viewer.
Graphics→Selection→Define Selection Filter	Sets the object and/or occurrence types you want to hide from display in the Graphics view.
Graphics→Selection→Apply Selection Filter	Filters the objects and occurrence types that you specified in the Visualization Filter dialog box from view in the Graphics view.
Graphics→Visibility→View Selected	Blanks and unblanks objects loaded in the viewer.

Menu command	Purpose
Graphics→Visibility→Blank Selected	Makes any objects selected in the viewer invisible.
Graphics→Visibility→Blank All	Makes all objects in the viewer invisible.
Graphics→Visibility→Unblank All	Makes all objects loaded in the viewer visible.
Graphics→Visibility→Reverse Blank All	Makes any currently visible objects invisible, while simultaneously making visible any loaded objects that are currently invisible.
Graphics→Visibility→Unload Selected	Unloads any objects selected in the viewer.
Graphics→Visibility→Define Visualization Filter	Allows you to select object types to permanently hide from display in the viewer.
Graphics→Visibility→Apply Visualization Filter	Turns on the visibility filter that you specified using the Graphics→Visibility→Define Visualization Filter menu command.
Graphics→Visibility→Blank All By Type→	Hides objects in the viewer based on their types.
Graphics→Visibility→Display All By Type	Displays objects in the viewer based on their types.
Graphics→Edit Color/Translucency	Modifies the color, transparency, and shine of selected objects in the viewer. These settings only apply to the currently loaded objects. The next time the edited object is loaded, the settings revert to the default color and translucency.
Graphics→Insert	Allows you to insert JT, stereolithography (. stl) and VRML (. wrl) files as reference graphics.
Graphics→Insert→Insert from File	Inserts a reference graphic from the operating system, using the Open by Name dialog box.
Graphics→Insert→Insert from Clipboard	Inserts a reference graphics object from the clipboard.

Note:

The term *loaded* refers to an object whose JT file has been loaded in the viewer. A loaded object may or may not be visible, depending on whether it is blanked or unblanked.

Menu command	Purpose
	<div style="border: 1px solid black; padding: 5px;"> <p>Note:</p> <p>Only item revisions (not items) can be displayed as reference graphics.</p> </div>
Graphics→Views→View Control	Creates, edits, and displays standard views, using the Rotate and Standard Views dialog boxes.
Graphics→Draw Children	Displays the components of a subassembly. You can also access this command if you right-click in the BOM.
Graphics→Show Subcomponents	Breaks down solids in the corresponding monolithic JT files and make the subcomponents independently controllable. This function is only available for only leaf and unpacked BOM line nodes.
Graphics→Hide Subcomponents	Removes all merged subcomponents and the one-level tree from the tree. You can load or unload the monolithic JT file related to this structure line node in the normal way.
Graphics→Export 3D File	Exports the current visible objects to a STEP or VRML file.
Graphics→Replace JT File	Replaces the JT file that represents an item revision. You can choose a replacement file from one of the JT files associated with the current structure line item.
Graphics→Clearance→Preferences	Sets clearance analysis and preferences.
Graphics→Clearance→Toggle Results Window	Shows clearance results in a separate window.
Graphics→Transformation→Temporary Transformation	Repositions or scales objects in the viewer. These transformations are not saved in the database.
Graphics→Transformation→Persistent Transformation	Repositions objects in the viewer window and saves the transformations in the database.
Graphics→Preferences	Sets clearance analysis and general viewer preferences.
Graphics→Performance	Sets rendering, culling, and general performance preferences.

















The following menu commands are shown in the view menu of the primary structure views.







Menu command	Purpose
Show Graphics	Opens the Graphics view that displays visualization data associated with the selected structure. The Graphics view

Menu command	Purpose
	remains associated with the primary view from which it is opened.
Show Information	Displays configuration information about the open structure.
Revision Rule	Views or sets the revision rule on the currently selected line.
Variant Rule	Views, sets, saves, and loads the variant option values for the selected line.
Set Date/Unit/End Item	Sets the date, unit number, or end item to configure the structure, if the current rule allows.
Find in Display	Searches for an object in the currently displayed structure.
Search by ID in context	Searches for absolute occurrences using the identifier assigned in the ID In Context column of the property table.
Apply Occurrence Type Filter	Adjusts the display to show only the objects that you select using the Select Occurrence Type Filters command. This gives you a more compact and tidy view of very large structures.
Select Occurrence Type Filters	Chooses which objects are visible in the structure. Select the object types that you want to see.
Show Unconfigured Variants	Shows lines that are hidden because they are configured out using variants and options.
Show Unconfigured Changes	Shows lines that are configured out because an incremental change associated has an effectivity on it and the lines are not currently effective.
Show Unconfigured by Occurrence Effectivity	Shows lines that are configured out because they have an occurrence effectivity associated with them and the lines are not currently effective.
Show Unconfigured Assigned Occurrences	Shows lines that are configured out because they are assigned occurrences that are configured out for any reason in the original structure.
Define Configuring Structures	Enables you to specify which open structure configures a process structure.
Save as New Structure Context	Saves the selected structure as a new structure context.
Set In Context	Enables you to set the currently selected structure as the context for additional information set on child objects. For example, you can add an occurrence note to a child line







Menu command	Purpose
	in the structure that is only pertinent in the context of the currently selected structure line.
Unload	Unloads the current structure.

Part Planner buttons




Button	Purpose
	Triggers a soft abort to the current operation.
	Cuts the selected lines from the structure and places them on the clipboard.
	Copies the selected lines in the structure and places them on the clipboard.
	Pastes the components from the clipboard as children of the currently selected (assembly) line in the structure or into NX.
	Deletes the selected lines from the structure and does not place them on the clipboard.
	Removes the selected lines from the structure completely and does <i>not</i> place them on the clipboard.
	Creates a new process under the selected line in the process structure view. If nothing is selected, this command creates a new root process.
	Inserts a new operation under the selected line in the process structure view.
	Creates a new item under the selected item in the process structure view. If no item is selected, this command creates a new root product.
	Adds a work area to the plant structure. You should only do this in the plant structure view.
	Creates a holder for a collection of occurrences and absolute occurrences in the BOM. An occurrence group typically represents an assembly.
	Reorders the process to reflect a change in the process step numbers.
	Unpacks the selected packed lines so that they are displayed as separate lines, one for each occurrence.
	Packs the selected lines so that all lines with the same item revision and find number are displayed as a single line. The actual quantity of lines appended to the node.
	Adds or edits the occurrence notes of the selected line.
	Opens the Graphical Compare dialog box, allows you to visually compare two revisions of the same structure.

Button	Purpose
	Opens the Collaboration Context Tree view that displays all the open structures. You can use this view to make structures visible in the structure pane or to unload structures.
	Opens the Classification Search Dialog that you can use to assign a specific resource to a selected line in your structure.
	Browses for and opens a specific structure by name or ID. Click the arrow beside this button to open various types of structures such as a product, process, work area, collaboration context, or structure context.
	Shows a list of your most recently accessed structures. If you select an entry from the list, Teamcenter loads the structure into the structure pane. You can configure the number of entries shown in the MRU list by right-clicking the button and moving the slider to the desired number.
	Adds or removes substitute components or set the preferred substitute. This button is enabled if the selected line may have substitutes, otherwise it is disabled.
	Shows a list of the global alternates available for the selected line. The preferred global alternate is indicated by an asterisk (*).




The following toolbar buttons are only available if you enable incremental change.

	Creates a new incremental change object.
	Searches for a specific incremental change object.
	Displays a list of the most recently used incremental change objects.
	Displays information about the incremental change object.
	Turns off incremental change tracking.
	Sends an incremental change object to My Teamcenter.








The following buttons are found in most views:

	Associates the secondary view to the currently selected primary view or to the view that you select when you click the arrow beside this button.
	Locks the secondary view to the currently selected primary view. The secondary view then does not change its view association if you select a different primary view.
	Changes the association of the secondary view to the currently selected view, even if you have disabled the response to selection.




The following buttons are located in the **Collaboration Context Tree** view.

Button	Purpose
	In the Collaboration Context Tree view, makes the structure that you select visible and active in the structure view.
	In the Collaboration Context Tree view, unloads the open structures from all views. The empty views remain open.
	In the Collaboration Context Tree view, unloads all structures from all views. The empty views remain open.







The following buttons are located in the structure views.






	Opens the Graphics view to display visualization data associated with the structure.
	Shows lines that are hidden because they are configured out using variants and options.
	In a process structure view, shows lines that are configured out because they are assigned occurrences that are configured out for any reason in the original structure.
	Shows lines that are configured out because an incremental change associated has an effectivity on it and the lines are not currently effective.
	Shows lines that are configured out because they have an occurrence effectivity associated with them and the lines are not currently effective.
	Displays configuration information about the open structure.
	Enables you to show or hide any related occurrence groups.

The following buttons are located in the **Accountability Check** view.

















	Displays configuration information about the source and target structures.
	Sorts the check results in an order you specify in the dialog box.
	Filters the results by category. Using the filter, you can choose to show all categories or only a selection.

















The following buttons are located in the **Process Gantt** view.

	Scales the chart up or down to accommodate the entire process flow.
	Scales the chart up to show the currently selected time element placed in the middle of chart and taking up most approximately two thirds of the chart.
	Reduces the scale of the chart by a factor of two.
	Enlarges the scale of the chart by a factor of two.
	Copies the calculated duration to the allocated time field in the selected element.
	Unlocks the edit mode enabling you to changes activity duration times by dragging the time bar.




Button	Purpose
	Shows the calculated duration time. Teamcenter draws a bar across the top of each time element displaying the calculated duration path of the children of this time element.
	Displays the critical path.
	Displays the duration of the critical path.
	Deletes the flow between elements in the Gantt chart.
	Creates a flow between elements in the Gantt chart. The flow represents a chronological relationship between two elements.













The following buttons are located in the **PERT** view.

	Activates default select mode. You can make single/multiple selection by clicking or by using a rubber band selection, or relocate objects using drag-and-drop.
	Activates draw mode to create single or multiple flows continuously.
	If activated, shows information about assigned parts, resources, and features assigned to the object. If you hover with the mouse over the object, Teamcenter provides more information about the assigned objects.
	Reassigns the find number of all processes currently visible in the PERT chart according to the flow defined. You must define a start number and an increment.
	Removes flows from the PERT chart.
	Searches for a pattern within PERT node texts.
	Finds the next occurrence of the pattern.
	Enlarges PERT graphics.
	Makes PERT graphics smaller.
	Fits all the selected PERT boxes into the PERT chart window. If you do not make a selection, the command fits all boxes into the PERT chart window.
	Adjusts PERT graphics so that one pixel equals one point.
	Zooms into a selected area in the PERT graphics by using a rubber band selection.
	Changes the layout of the PERT chart to one of the following: <ul style="list-style-type: none"> • Hierarchical—Top to bottom  • Hierarchical—Right to left  • Hierarchical—Left to right 

Button	Purpose
	<ul style="list-style-type: none"> • Hierarchical—Bottom to top  • Hierarchical—Incremental  • Circular  • Orthographic  • Organic 
	<p>Aligns selected PERT nodes to the desired position. You can align to the following positions:</p> <ul style="list-style-type: none"> • Left  • Center  • Right  • Top  • Middle  • Bottom  • Distribute horizontally  • Distribute vertically 
	Moves to the parent of the selected node and displays its children in the PERT chart.
	Displays the children of the selected node in the PERT chart.

To format rich text, use the following buttons that are available in the **Drafting Symbols** tab and the **GDT Symbols** tab.

Symbol	Description
	Manually refreshes the editing box.
	Adds a frame around the selected characters.
	Bolds the selected text.

Symbol	Description
	Italicizes the selected text.
	Underlines the selected text.
	Sets the color of the selected text.
	Decreases the size of the selected text.
	Increases the size of the selected text.
	Subscripts the selected text.
	Superscripts the selected text.
	Aligns the selected text.
	Center aligns the selected text.
	Right aligns the selected text.
	Inserts the text you entered in the two boxes to the left of this button.
	Inserts a control frame around the selected characters.

Integrating with a manufacturing execution system

A manufacturing execution system (MES) is designed to help companies more effectively and efficiently execute manufacturing operations from the product order through each step of the manufacturing process to its final point of delivery. Equally important, an MES is a dynamic information system that is key to collaborative manufacturing strategies by providing mission-critical information about production activities to managers across an organization and its supply chain.

The integration between the definition process in product lifecycle management (PLM) and the control and execution process in an MES generates tremendous value for both processes. As part of the PLM process, the bills of process (BOPs) can be fully simulated in digital replications of the factory. These BOPs can be created, tuned, potentially optimized, validated, and then sent as a technical work package to an MES that automatically generates a work plan for the shopfloor. The MES also controls and monitors the execution of this work plan on the factory floor. Therefore, the interoperability between the MES and PLM is critical in closing the gap between simulation in the engineering environment and reality on the factory floor. As production ramps up, information collected by the MES is essential in adjusting the bills of process. This information is fed back to engineering to improve their knowledge of the actual BOPs needed to produce desired results. Continuous improvement initiatives can benefit from

the collection of data when the MES is monitoring and reporting what actually occurred on the physical factory floor.

The Manufacturing Execution System Integration collects the bill of process, the bill of materials, and any relevant work instructions into a work package that is released to the MES. The operator can use this information to machine the desired product. If there is a problem with the data, the planner can modify the contents of the work package and release it again.

4. Designing process structure

Creating product structures

About product structures

A *part structure* is a hierarchy of each of the component items arranged in parent-child relationships, and is the basis for the process definitions. The part may contain manufacturing features such as holes, pockets, and weld points to be manufactured using manufacturing processes.

A structure can have various configurations, also known as revisions, to capture the variations in a part.

Part Planner opens each product as a separate structure view. You can also view product structures using Structure Manager.

If the product structure contains an item that is owned by another site, it is initially labeled as **REMOTE OBJECT** (this is sometimes called a *stub*). To import the associated CAD data and attachments, select the assembly and choose the **Tools→Import→Import Remote** menu command. If the import request is successful, you see the full properties and attachments of the assembly, rather than the stub. You can import individual components and part family members in this way. To configure the import of part family members, choose the **Tools→Import→Import Remote Options** option and click the **NX Part Families** tab.

You can create product structures with CAD systems within Part Planner or Structure Manager.

Restructuring the product structure

Restructuring and editing the product structure

You can restructure a representation, including a BOM view, occurrence group, structure context, or composition. You must revise a frozen product structure before restructuring. Restructuring edits the product structure in downstream views (for example, manufacturing) while preserving the derived occurrence structure and data related to specific occurrences of parts and assemblies. Restructuring is disabled for product structures that contain CAD designs because it can make the CAD data invalid.

During restructuring operations, Teamcenter maintains the integrity of incremental changes, classic or modular variants, and structure relationships. Teamcenter displays warnings when it encounters absolute occurrences attributes and data.

If you have edits pending to a product structure, you must save the edits before you open the structure in another application.

In addition to restructuring, you can edit individual properties on any line, subject to the following limitations:

- Restructuring is not permitted on lines that have pending edits.
- Property edits are associated with a relative occurrence and are marked as pending until they are saved to the database.
- Property edits are highlighted only if you use the column editor. If you use other methods of changing properties (for example, the **Properties** dialog box), these edits are not visually highlighted in the properties table. However, Teamcenter still retains the details of such edits until you save or revert them.
- Use the **PS_structure_change_condition** preference to specify actions as structure edits. For example, by default, changing a reference designator is not considered as a structure edit, but you can add this action to the preference. NX requires reference designator changes to be considered as structure edits.
- If any note in the list of notes is edited, the **All Notes** field shows a ... icon with a red strike-through. It does not show the exact original value.
- Edits to the absolute or relative transformation matrix are not highlighted.
- You cannot edit the first property column (**BOM Line**).
- If you cut more than one BOM line to the clipboard and then modify the BOM lines on the clipboard, this action changes the ownership of the remaining BOM lines. For example, if you cut two BOM lines and then remove one of these lines from the clipboard, the status of the remaining line changes from *pending cut* to *pending copy*. If you want to modify the BOM lines that are the subject of a cut action, repeat the cut action on the required BOM lines, rather than modifying the contents of the clipboard.
- If you remove a line that contains one or more unsaved changes to its substructure, the system does not automatically save those changes.
- By default, if you cut or copy a line and then paste it to a new location, incremental change elements (ICEs) are not copied. This may necessitate significant manual recreation of data if you are cutting or copying many lines together. To automatically copy ICEs, the administrator must set two Business Modeler IDE constants:

- **Fnd0EnableIceCarryOver** business object constant

When moving, copying, or assigning a line from one location to another, this constant determines if the ICEs are carried forward. You must set this constant to **true** on both the source location's parent and the target location's parent.

- **Fnd0AttrICEsToExclude** property constant

Defines the occurrence attributes that Teamcenter does not copy to the target location for occurrence attribute changes.

These settings apply to in-context changes made to structure lines, their attachments, and their occurrence attributes.

Note:

Restructuring primitive actions include:

- Removing a level (removing a line and keeping child lines)
- Inserting a level (including pasting a line as a parent of selected lines)
- Moving a line to a new location (for example, cut and paste actions)
- Splitting an occurrence
- Replacing data in context

Only the last two actions make copies of the absolute occurrence data; the other actions share the existing absolute occurrence data.

In certain cases, restructuring may cause valid reports of broken links, as shown in the following examples:

Example 1:

```

A
+-----B
      +-----C (APN1 in context of A)
              +-----D
  
```

If you remove level **C**, the structure becomes:

```

A
+-----B
      +-----D
  
```

The link to **C** is lost. This is correctly reported as a broken link.

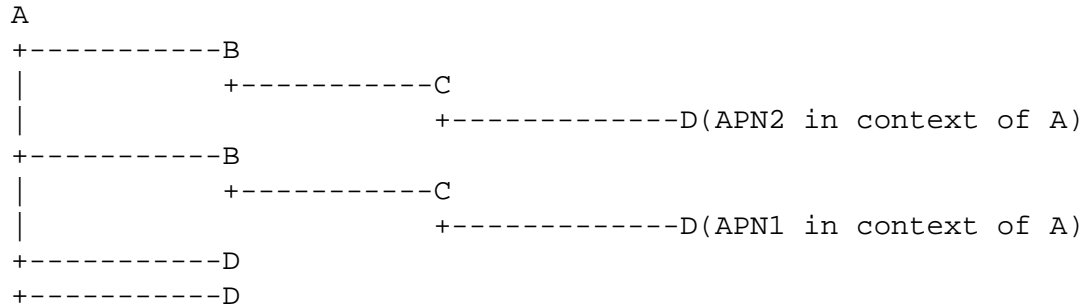
Example 2:

```

A
+-----E
+-----B
      +-----C
              +-----D(APN1 in context of B)
  
```

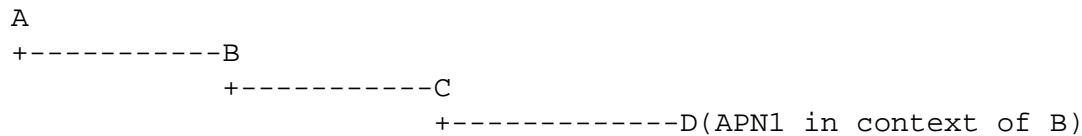
If you move **D** to **E**, it is outside of the context of **B** and **APN1** is lost. This is correctly reported as a broken link.

Example 3:

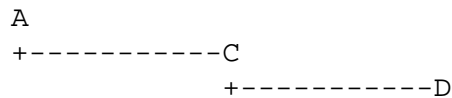


If you move **C** to **D**, the system cannot determine which **D** to move the APN to without user interaction. It skips the APN and logs an error message.

Example 4:



If you remove level **B**, it becomes:



The link to **D** is lost. This is correctly reported as a broken link.

Insert a level in the structure

You can create an item and insert it in the current structure as a new level below the selected line. The number of relative occurrences of the children is preserved. If you select more than one line, they must share the same parent.

1. Select the parent line of the new level and choose **Edit**→**Insert Level**.

Teamcenter displays the **Insert Level** dialog box.


2. Enter the item identifier and other attributes of the new item. If the inserted item is new, you must insert it with a quantity of **1**.
3. On completion, click **OK** or **Apply**.

Teamcenter creates the new item and inserts it as a new level. The selected branches become children of the inserted level, while the inserted level becomes a branch of the original parent. All existing variant conditions, notes, absolute occurrences, and other data is moved down with the selected branches. The default quantity of the new level is **1**, meaning that no quantity change occurs.

Note:

You can only insert a level if the line represents a standard business object type. If the line represents a custom type, copy it to the clipboard and choose **Paste Special**. Teamcenter pastes it as a new level above the currently selected line.

Remove a level from the structure

1. Select the affected line and choose **Edit→Remove** or click **Remove** .

Teamcenter displays the **Remove** dialog box.

2. Click **Yes** to confirm removal of the line. The total number of instances is preserved at the end of this action. Any options of the removed lines are moved up and variant conditions are merged.

If you try to remove a level that would result in option definitions becoming inconsistent (for example, options that are referenced by a parent line), Teamcenter displays an error message.

Move a node to another branch

You can move a selected node from one branch to another. All substructure and occurrence data moves with the node.

1. Move a node using any of the following methods:
 - Cut and paste using the **Edit→Cut** and **Edit→Paste** menu commands.
 - Cut and paste using the Ctrl+X and Ctrl+V shortcut keys.

Caution:

Do not try to move a node by dragging the line to its new position. Teamcenter performs a copy action when you drag a line.

Teamcenter displays the **Paste** dialog box.

2. Do one or more of the following:
 - Change the item ID and revision ID.

- Change the view type, if applicable.
- Select if the line should be pasted as a component of the selected assembly line, as a substitute for the selected line, or as a new level above the selected line.
- Specify the number of occurrences, quantity per occurrence, and find number.

3. Click **OK** or **Apply** to complete moving the line.

Caution:

If you cut a line and edit tracking is enabled, the line is displayed in red with a strike-through until you commit the edits. Do not attempt to edit or work with this line, or you may obtain unpredictable results. If you want to edit or work with a line that is marked as cut, revert changes to the line by choosing **Edit→Revert Edit** first.

Similarly, do not edit or work with a marked line in another structure editor such as Multi-Structure Manager. Always complete and save your work on the structure before you open it in another structure editor.


Replace a node

You can replace an item representing a node in the structure with another item. All data associated with the original node is preserved.

Note:

Your system administrator sets the **PS_replace_with_substructure** preference to determine if any substructure below the node is replaced. If this preference is **true**, the node and its entire substructure (if any) are replaced without prompting. If it is **false**, Teamcenter displays an error message and does not complete the replacement action.

You cannot use the **Replace** feature on any type of process or consumed line in manufacturing structures.

1. Select the line to replace and choose **Edit→Replace Node** or click .

Teamcenter displays the **Replace Node** dialog box.

2. Enter the item identifier and other attributes of the item that replaces the existing item.

3. Click **OK** or **Apply**.

Teamcenter replaces the existing item.

If you have edit highlighting turned on, the number of the original part is shown in red, strike-through text.

Split an occurrence

You can split a line that represents several occurrences into two branches. The new branch and the original (changed) branch initially have the same notes, variant conditions, and other data, but you can subsequently modify them independently. The quantity on the original line before the split must be greater than 1.

1. Select the occurrence line and choose **Edit→Split Occurrence**.

Teamcenter displays the **Split Occurrence** dialog box.

2. Enter the quantity for the new line that results from the split and click **OK** or **Apply**.

Working with global alternates

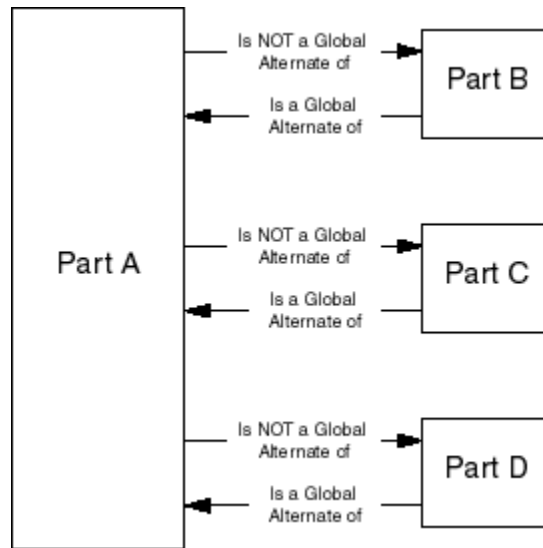
Global alternates overview

A *global alternate* part is interchangeable with another part in *all* circumstances, regardless of where the other part is used in the product structure. A global alternate applies to any revision of the part and is independent of any views.

Note:

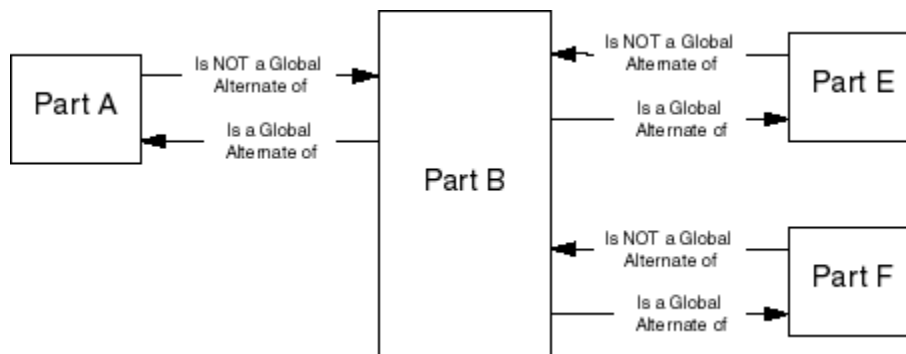
If the parts are interchangeable only in specific products or assemblies, use *substitutes* rather than global alternates.

Parts and their global alternates are related only in a single direction. For example, if part **A** has three global alternates (parts **B**, **C**, and **D**), then **B**, **C**, and **D** are each a global alternate of A. However, part A is not an alternate of **B**, **C**, or **D**, as shown next.



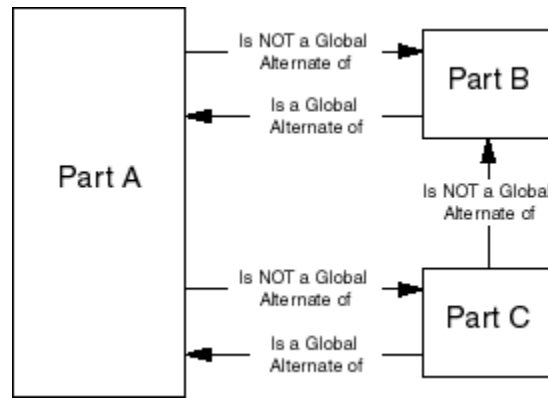
Global alternates – single direction

One part can be a global alternate of more than one other part. For example, part **B** may be a global alternate of parts **E** and **F**, as well as a global alternate of part **A**, as shown next.



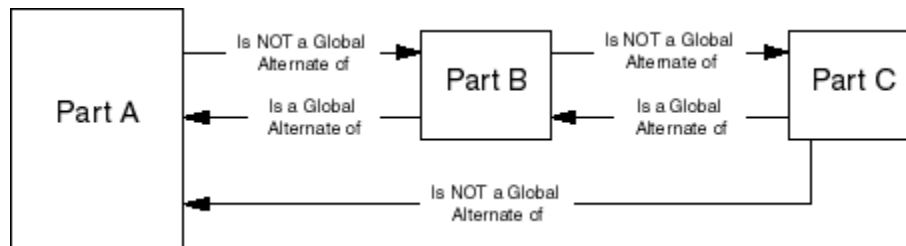
Global alternates – multiple alternates

Global alternate relationships are not shared. For example, part **C** is not a global alternate of part **B**, even though they are both global alternates of part **A**, as shown next.



Global alternates – nonsharing

Likewise, global alternate relationships are not chained. For example, if part B is a global alternate of part A, and part C is a global alternate of part B, part C is not a global alternate of part A, as shown next.



Global alternates – chaining

List global alternates

1. Select a line in the product structure. If it has global alternates, this is indicated by the 🌐 icon.
2. Click **Global Alternates** 🌐.

Teamcenter displays the **Global Alternate** dialog box, which lists all the global alternatives of the selected item. The preferred global alternate (if any) is marked with a check mark.

Note:

You can also list global alternates in My Teamcenter.

Add global alternates

1. List the global alternates (if any) of the item for which you want to add one or more global alternates.
2. In the **Global Alternate** dialog box, click **Open** 🗑️.

Teamcenter displays the **Open by Name** dialog box.

3. Search for the item that you want to define as a global alternate of the selected item.
4. If you want to define more than one global alternate of the selected item, repeat the previous step for each global alternate.

Note:


You cannot add the same item as the global alternate more than once. Teamcenter displays a **Cannot create duplicate alternates of same item** message if you attempt this action.

Remove global alternates

1. List the global alternates of the item from which you want to remove one or more global alternates.
2. In the **Global Alternate** dialog box, select one or more global alternates to remove and click **Remove**.

Teamcenter removes the selected global alternates from the list.

Note:

If you remove all the global alternates from an item, the corresponding line in the product structure no longer shows the  icon.

Set or unset preferred global alternate

1. List the global alternates of the item from which you want to remove one or more global alternates.
2. In the **Manage Global Alternates** dialog box, select a global alternate and click **Prefer**.

Teamcenter designates the selected global alternate as preferred and places a check mark next to it in the list.

To remove the preferred designation from a global alternate, select it and click **Prefer** again. Teamcenter removes the check mark next to it in the list of global alternates.


Open an existing part revision

When you open a part, the first BOM view revision (BVR) of that part opens by default. Your administrator can set the **MEManufacturingDefaultBVR** preference at your site to open another BVR if necessary.

Use one of the following methods to open a part:

- Find the part item in My Teamcenter. Using the mouse, drag the item or its revision to the Part Planner Manufacturing Process Planner application button in the navigation pane.
- Find the part item in My Teamcenter. Choose **Send To→Part Planner** from the shortcut menu.
- Open a process revision in Part Planner. The part revision that has been most recently assigned as a target item by this process is opened by default.
- Open a part revision in Part Planner using the **Open Product** dialog box.

Create a new structure using Part Planner

1. Choose **File→New→Item**, or click **Create New Item** .
2. In the **New Item** dialog box, select one of the item types from the list.
3. Click **Next**.
4. Enter the ID number to be assigned to this new part. If this new part is a revision of an existing one, type the ID of the existing part. You can assign a unique revision number in the **Revision** field.

To let the system automatically assign a unique ID, click **Assign**.

5. Type a name for the new part. Make it unique so you can search the database using this term.
6. Select **Show as new root** to specify that the newly created item is opened as a root object. It is not pasted to the selected item. If you do not select this option, the new item is pasted as a child of the selected item.

If the **Show as new root** option is selected but unavailable, Teamcenter does not allow you to create a new object under the selected object, for example, if you try to create a work area under a process.

7. Type a part description.

At this point, you have all the information required to create a new item.

8. (Optional) Select a unit of measure from the **Unit of Measure** list.
9. (Optional) Click **Next** to add optional information, such as filling out the item's forms, or checking the item out.
10. (Optional) Click **Define Options** to specify the following:

- Select **Use item identifier as default display** or **Use revision identifier as default display** if you created an alternate identifier for the item and want to use it as the default display object.
- Select **Check Out Item Revision on Create** to check the newly created item out of the database immediately upon creation.

11. Click **Finish** to create the new part.

12. Click **Close** to close the **New Item** dialog box.

Creating a new structure using a CAD system

Importing the part from a CAD system is the primary method for populating the database with a new product. The CAD system lets you design the structure and the detailed geometry of the part before you bring the structure into Part Planner.

Authoring MBOM

Reasons for creating an MBOM

When working in the manufacturing environment, Siemens Digital Industries Software recommends that you create a manufacturing bill of materials (MBOM) from your engineering bill of materials (EBOM). There are several reasons for this:

- Generally, manufacturing engineers do not have write privileges on the EBOM and cannot modify it. For example, a design engineer may specify that a part is going to be purchased and sets a property value to **buy**. Subsequently, the manufacturing department determines that it is more economical for them to make this part. They want to change that property to **make** but do not have the privilege to do so.
- Assembling a part requires a structure that is different from the EBOM structure. For example, in the BOM, the exhaust manifold is part of the engine compartment. During assembly, however, the exhaust manifold must be added after the body is built onto the chassis as the exhaust pipe must be put through the bumper. This type of regrouping and adding of manufacturing-specific parts is most efficiently performed in a separate manufacturing BOM structure.
- Especially for final assembly, companies often have manufacturing parts that they consume in different MBOMs. These can only be created in a structure to which you have write access.
- There may be changes to an EBOM that should not immediately be reflected in the process structure. For example, you may want to continue manufacturing using the current parts to use up existing inventory. By using an MBOM, the manufacturing engineers have control over when the changes to the EBOM are reflected in the manufacturing process.
- Some companies do not author the EBOM in Teamcenter. It is imported from another system so that the EBOM in Teamcenter is a replication of the status of the EBOM in another system. Using an MBOM

provides you with a buffer for these changes so that you can monitor and process them in a controlled manner.

Note:

You cannot open an MBOM in Siemens Digital Industries Software NX.

Automatically creating an MBOM from an EBOM

Teamcenter provides you with several automatic methods to create a manufacturing bill of materials (MBOM) from an EBOM (engineering bill of materials).

- **Create an MBOM from a recipe**

Create an MBOM from a template that contains a recipe for searching the EBOM for required parts. The recipe can contain a variety of search attributes such as an attribute search, spatial search, ID search, or combinations of search criteria.

This type of creation mechanism works well for *make to shelf* industries where the products are standardized such as the automotive or home appliance industries.

- **Use the `me_create_mbom` utility**

The `me_create_mbom` utility creates an MBOM based on a specific EBOM but replaces make parts or phantom levels in the EBOM with manufacturing-specific parts and directly copies over buy parts.

Your administrator can take advantage of user exits in this utility that allow you to embed your own logic into the utility.

Your administrator can take advantage of user exits in this utility that allow you to embed your own logic into the utility that specify:

- What constitutes a make part using the **USER_create_or_ref_item** user exit (exposed in Business Modeler IDE using the **BMF_ITEM_create_or_ref_id** operation on an **Item** object).
- How to synchronize equivalent lines and align properties using the **USER_synch_item** user exit (exposed in Business Modeler IDE using the **BMF_ITEM_sync** operation on an **Item** object).
- What constitutes equivalent lines if there is no in-context ID or occurrence thread using the **USER_item_find_equivalent_line** user exit (exposed in Business Modeler IDE using the **BMF_ITEM_find_eqv_line** operation on an **Item** object).
- Which action to take on a released MBOM **Item Revision** object during update using the **USER_item_action_on_release** user exit (exposed in Business Modeler IDE using the **BMF_ITEM_action_on_release** operation on an **Item** object).

For more information, see *Integration Toolkit Function Reference*.

Your administrator can create a workflow to run this utility using the **ME-create-mirror-AH** and the **ME-update-mirror-mbom-A** action handlers.

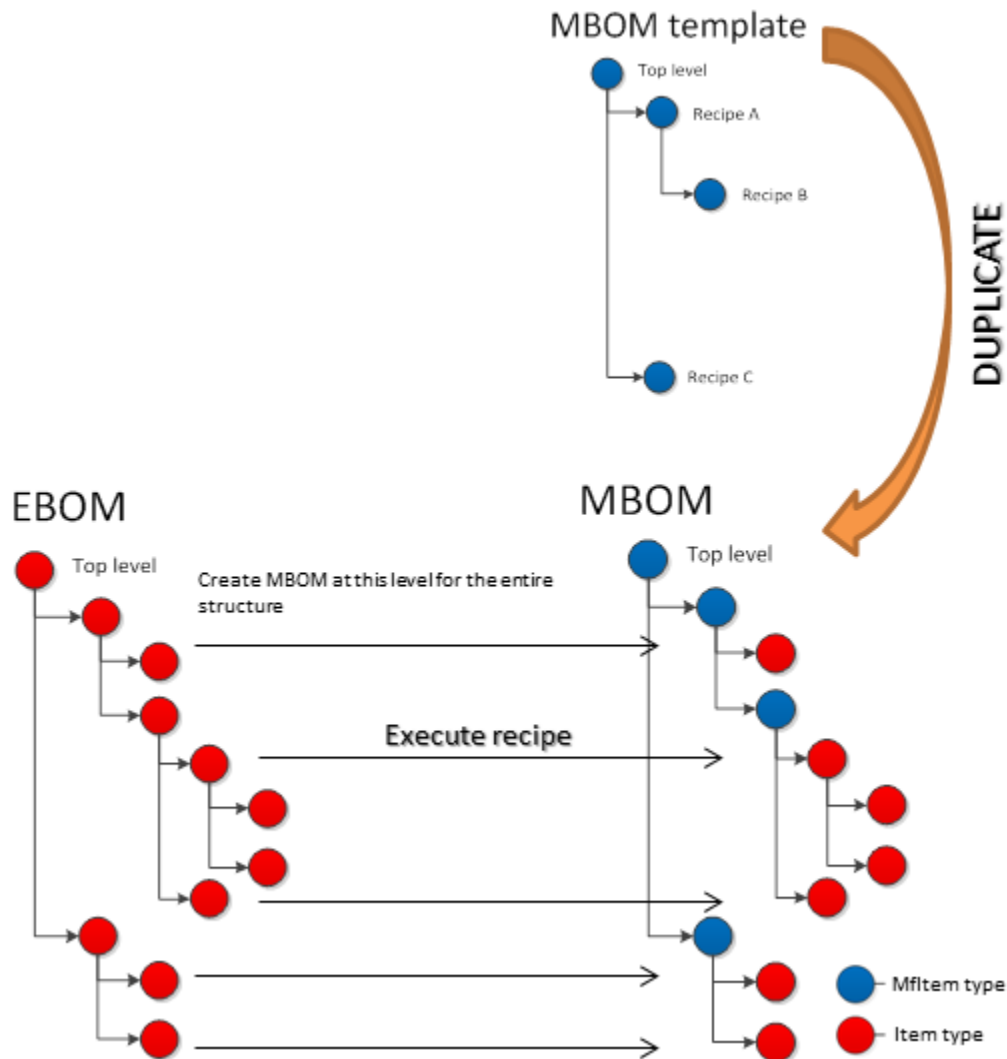
This type of MBOM creation method works well for *configure to order* customers such as heavy machinery.

Note:

Neither of the methods to create MBOMs supports part replacement through propagation.

Create an MBOM from a recipe

You can automatically create an MBOM based on a recipe. A recipe consists of search criteria saved on each node of an MBOM template that define the parts to assign to that specific node.




Beginning with an MBOM template that contains phantom levels, you define a recipe for each part that is to be manufactured. When you run the search, Teamcenter searches in the specified EBOM for parts that fulfill the criteria and assigns them to the MBOM.

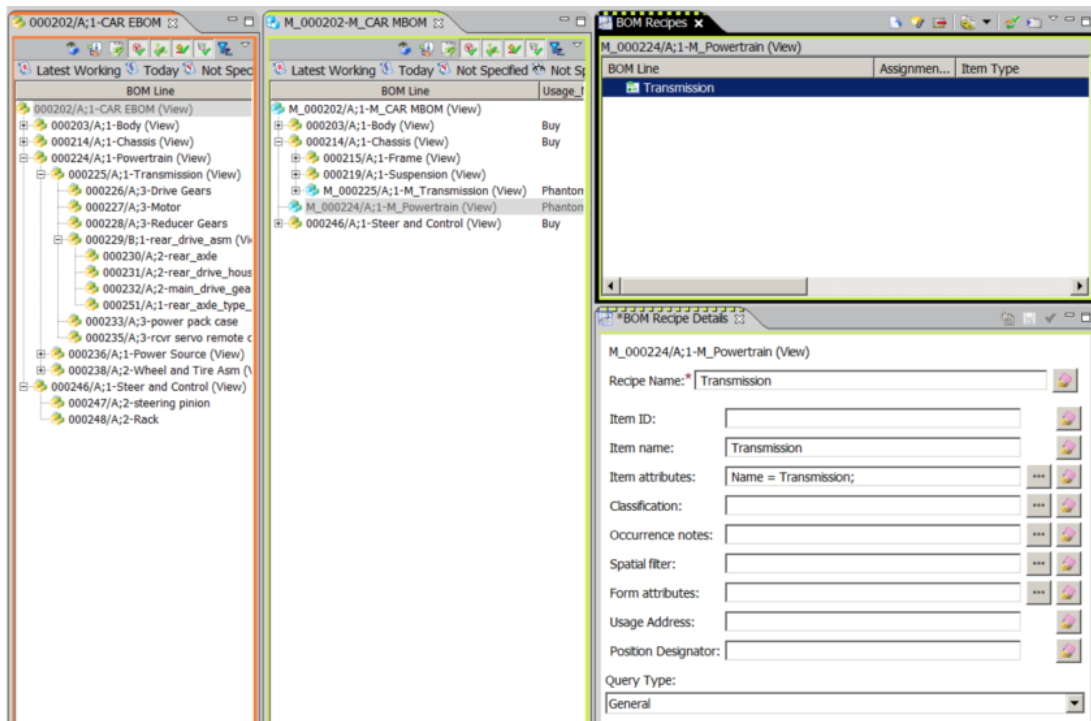
Unless a cloning rule is set up to ignore MBOM recipes, when you clone an MBOM that contains recipes, Teamcenter clones the recipes as well.

1. Open the MBOM template on which you want to save recipes.

This MBOM must already be linked to an EBOM structure.

2. Right-click a node on which you want to save a search criteria and choose **Open With**→**BOM Recipes**.
3. In the **BOM Recipes** view, click **Create/Update Recipe** .
4. In the **BOM Recipe Details** view, enter a name for the search and the search criteria that describe the parts that you want to add to the MBOM at the selected node.

What you enter as search criteria is company-specific but may include usage address, position designator, or a function-based numbering scheme making up the ID.



You can add multiple criteria to one search box by separating them with a semicolon.


5. Click **Validate BOM Recipe** .

Teamcenter runs the search on the EBOM and lists the parts that fulfill the search criteria in the **BOM Recipe Validation Results** view. Use this step to verify that you have entered the correct criteria.

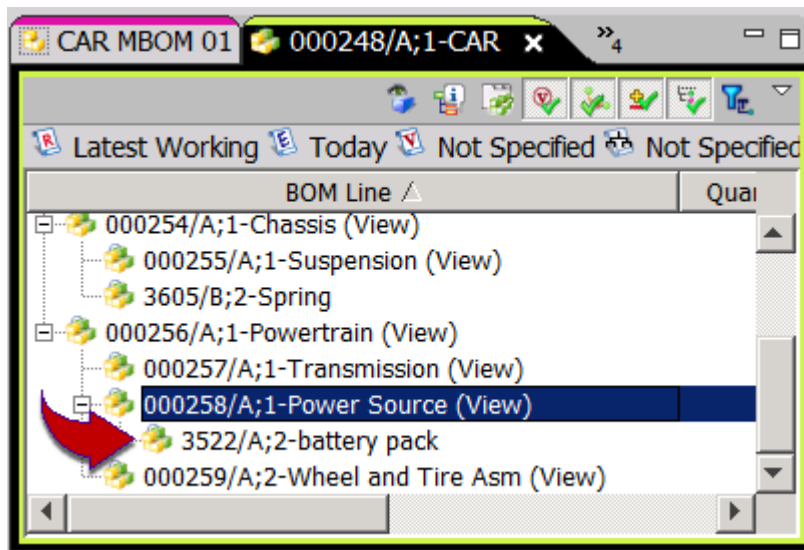
6. In the **BOM Recipe Details** view, click **Create New Recipe** .

Teamcenter lists the new recipe in the **BOM Recipes** view. You can save multiple recipes on an MBOM node.

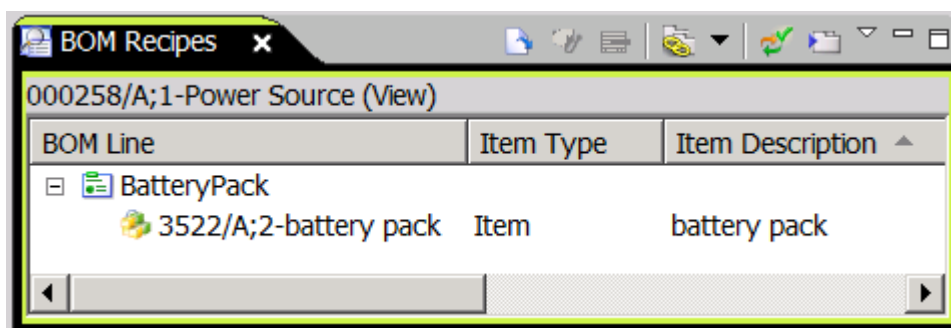
7. Do one of the following:

- To resolve one node of the MBOM template, select the recipe in the **BOM Recipes** view and click **Resolve BOM Recipe** .
 - To resolve multiple nodes of the MBOM template, select a node in the MBOM template and choose **Tools**→**Resolve BOM Recipe**.
8. In the **Resolve BOM Recipe** dialog box, select whether to remove the previously assigned parts and click **OK**. If you open the dialog box from the **Tools** menu, you can choose to resolve all nodes underneath the selected node by selecting **Resolve recipe recursively**.

Teamcenter adds the parts from the EBOM that fulfill the search criteria to the MBOM.



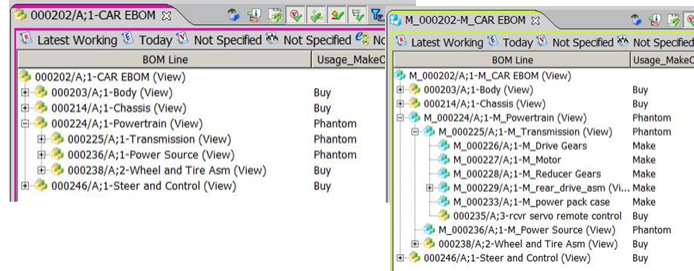
Additionally, the resolved parts are listed under the recipe in the **BOM Recipes** view.



You cannot directly copy a BOM recipe. You can, however, select a recipe in the **BOM Recipes** view, and then select a different node in the MBOM. The search criteria are still visible in the **BOM Recipe Details** view where you can save them as a new recipe on a different MBOM node.

Creating an MBOM using the me_create_mbom utility

The `me_create_mbom` utility creates an MBOM based on a specific EBOM, but replaces *make* parts or phantom levels in the EBOM with manufacturing-specific parts and directly copies over *buy* parts.



Except in specific cases (see preferences below), do not use this utility to update the MBOM. To update an MBOM, use an accountability check or an advanced accountability check.

You can create a manufacturing bill of materials (MBOM) from an engineering bill of materials (EBOM) automatically using the `me_create_mbom` utility. This utility creates a new MBOM root node, and then either:

- Copies over engineering parts that are designated as **Buy** or **Phantom**.
- Replaces the parts designated as **Make** with new manufacturing parts containing the same in-context ID (IDIC) as the engineering part for future comparison.

Example:

```
me_create_mbom -u=kj -p=kj -g=Engineering
-key="item_id=000159,object_type=Item" -revrule="Latest Working"
-mrevrule="Latest Working" -log=D:\workdir\create3.csv -usemfk
```

Caution:

Log off any interactive session that uses the same structures as the structures you update with the utility before you use the utility to avoid failures due to locking of objects in that user session.

The utility is affected by the values of these preferences:

- **MEMBOM_Mirror_MakeRules**

This preference specifies a BOM Line property, such as **bl_item_object_type**, and property value pair that serve as input for the decision as to whether to create a manufacturing-specific part.

There are two ways to view defined BOM Line property names:

1. In the BMIDE, you can check the properties defined for the object BOM Line.
2. In Structure Manager, if you right-click on the column title line and choose Insert Column(s)..., you get a list of the defined BOM Line properties.

Note:

This preference accepts only a string value.

If you require a boolean or other attribute, you should write your own Business Modeler Framework extension to control a make or buy decision.

Preference syntax

KEY:<BOMLinePropertyInternalName>,VALUE:<PropertyValue>,ACTION:<ActionValue>

- <BOMLinePropertyInternalName> is the property on which the value criterion will apply (e.g. "GCS CP").
- <PropertyValue> is the value used by the criterion.
- <ActionValue> is the action to undertake on the BOM node.

Valid values are **PartLink** (links a Design node to Part node) and **PartAssign** (links and assigns a Design node Under a Part node).

Note:

ACTION is only meant for Design/Part like structures. If more than one value for a given property can determine the action, the operator OR (|) can be used as follows: "KEY:<BOMLinePropertyInternalName>,VALUE:<PropertyValue1>,ACTION:<ActionValue1>|VALUE:<PropertyValue2>,ACTION:< ActionValue2>" (e.g. "KEY:GCS CP,VALUE:Make|VALUE:MakePart,ACTION:PartAssign|VALUE:MakeLink,ACTION:PartLink"). If there is no preference value, the item is shared between Engineering BOM (EBOM) and Manufacturing BOM (MBOM) structures.

A common criteria may be, for example, whether you make or buy a part. Any parts designated as **Make** or **Phantom** (for organizational purposes) in the EBOM are replaced by manufacturing-specific parts in the MBOM. In this case, the value of this preference may look like this:

KEY:Usage_MakeOrPurchase ,VALUE:Make | VALUE: Phantom

You can use a custom property in this preference. If you do not assign any value, the utility carries over the parts from the EBOM directly.

Note:

You should write your own Business Modeler Framework extension to control a make or buy decision.

- **MEMBOM_Mirror_TypePrefixSuffix**

This preference specifies the item type for the new manufacturing-specific item and any prefix or suffix to add to the item ID of the part in the EBOM that is being replaced by a new part in the MBOM. If you use custom manufacturing business object types, you can add this type to the value of this preference.

The default value of `-usemfk` is false. If true, and only the object type is present in **MEMBOM_Mirror_TypePrefixSuffix**, use that type and the ebom item id for MFK value. If you set the command line option `-usemfk` to `true` and specify *only* the item type, you can enter multifield keys.

If your company uses naming rules for new items, you must ensure that the prefix that you assign in this preference corresponds to the naming rules for the manufacturing item. Alternatively, you can remove all naming rules for manufacturing items. A conflict with item naming rules leads to this error message:

```
ERROR on line:250 creating mbom
74006: Valid pattern is aannnnnn. creating mbom
74007: Supplied item_id value "M_qp130410" is invalid. creating mbom
7007: Invalid Tag - the requested object does not exist creating mbom
```

- **MEMBOM_Mirror_ReplaceMakeOnChange**

This preference specifies the behavior when, after creation of an MBOM, you change a make/buy property value from **Make** to **Buy**. At update, by default, Teamcenter simply appends the buy part to the existing structure without removing the make part already in the MBOM. If you set this preference to **TRUE**, at update, Teamcenter replaces the make part in the MBOM with the buy part from the EBOM, avoiding duplication of parts.

- **MEMBOM_Mirror_RemoveLineWithIDIC**

This preference is applicable to updating an MBOM with the utility. It specifies that if the in-context ID (IDIC) of a line in the MBOM is not found in the EBOM, or if a line in the MBOM has no IDIC, it is not removed at update if it is already stamped with an IDIC.

- **MEMBOM_Mirror_IDICOnChildren**

This preference determines whether the IDIC is retained on a make part in the MBOM when updating it using the utility after changing a make part to a buy part in the EBOM. When updating, if the **MEMBOM_Mirror_ReplaceMakeOnChange** preference is set to **FALSE**, both the original make part

and the buy part exist in the MBOM after updating. This causes the accountability check to display multiple matches. Removing the IDIC on the make part ensures that there is only one match in an accountability check. If the **MEMBOM_Mirror_ReplaceMakeOnChange** preference is set to **TRUE**, the make line is replaced with the buy line from the EBOM so this preference is irrelevant.

- **MEMBOM_Mirror_IgnoreRules**

This preference uses the keyword **ACTION** to skip an EBOM node or to traverse below an EBOM node while ignoring that EBOM node. The children of the traversed EBOM node become the children of the corresponding MBOM parent.

- **MEMBOM_Mirror_AlignProperties**

This preference controls which properties and attachments are copied from the EBOM to the MBOM by enabling the alignment of properties on **Make** items and revisions. The **Make** nodes are of different types than the original EBOM nodes.

The following examples of running the utility demonstrate its use and the differences in output caused by changing the utility arguments. The initial values of the preferences are as follows.

```
MEMBOM_MakeRules=KEY:Usage_Product , VALUE:Make | VALUE:Phantom
```

```
MEMBOM_RemoveLineWithIDIC=FALSE
```

```
MEMBOM_TypePrefixSuffix=Company , ,
```

Note:

No prefix is used in this course due to the naming rule conflict.

Creating an MBOM

For the following EBOM:

BOM Line	Usage_MakeOrPurc..
000202/A;1-CAR EBOM (View)	
000203/A;1-Body (View)	Buy
000214/A;1-Chassis (View)	Buy
000224/A;1-Powertrain (View)	Phantom
000225/A;1-Transmission (View)	Phantom
000226/A;3-Drive Gears	Make
000227/A;3-Motor	Make
000228/A;3-Reducer Gears	Make
000229/A;2-rear_drive_asm (View)	Make
000230/A;2-rear_axde	Buy
000231/A;2-rear_drive_housing	Make
000232/A;2-main_drive_gear	Buy
000233/A;3-power pack case	Make
000235/A;3-rcvr servo remote control	Buy
000236/A;1-Power Source (View)	Phantom
000237/A;2-battery pack	Buy
000238/A;2-Wheel and Tire Asm (View)	Buy
000246/A;1-Steer and Control (View)	Buy

Run the utility:

```
me_create_mbom -u=user-name -p=password -g=group -ebomroot=000202
-revrule="Latest Working" -mrevrule="Latest Working"
```

Produces the following MBOM:

BOM Line	Usage_MakeO...
M_000202/A;1-M_CAR EBOM (View)	
000203/A;1-Body (View)	Buy
000214/A;1-Chassis (View)	Buy
M_000224/A;1-M_Powertrain (View)	Phantom
M_000225/A;1-M_Transmission (View)	Phantom
M_000226/A;1-M_Drive Gears	Make
M_000227/A;1-M_Motor	Make
M_000228/A;1-M_Reducer Gears	Make
M_000229/A;1-M_rear_drive_asm (Vi...	Make
M_000233/A;1-M_power pack case	Make
000235/A;3-rcvr servo remote control	Buy
M_000236/A;1-M_Power Source (View)	Phantom
000238/A;2-Wheel and Tire Asm (View)	Buy
000246/A;1-Steer and Control (View)	Buy

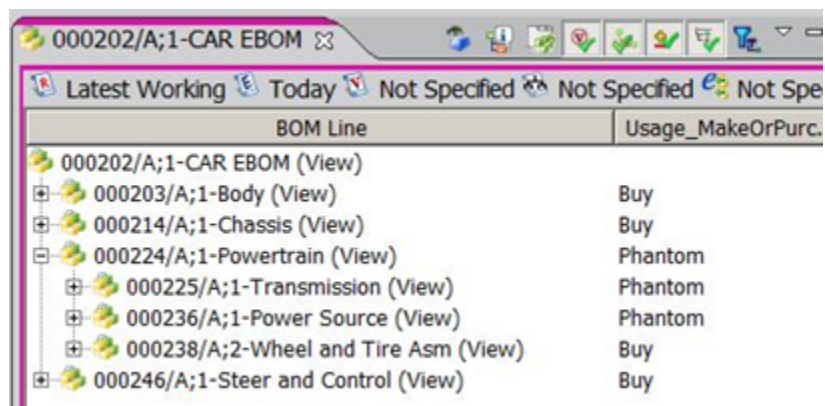
Note the following:

- The top-level node is replaced with a manufacturing-specific part.
- The make and phantom parts are replaced with new manufacturing-specific parts.

- The buy parts of the EBOM are directly copied over to the MBOM.
- An IDIC is generated for all parts except for those below a buy part.
- The in-context ID (IDIC) of the new parts is the same as the original part in the EBOM. This is true if the IDIC is already present in the EBOM part.
- When you right-click the top node of the EBOM or MBOM and choose **Link/Associate**→**Link Structures**, you can see that the utility has linked the two structures.

Creating the MBOM to a specific level

For the following EBOM:

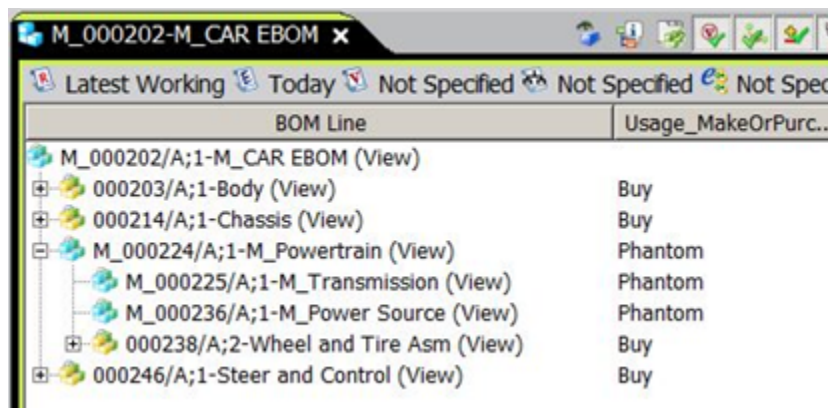


BOM Line	Usage_MakeOrPurc..
000202/A;1-CAR EBOM (View)	
000203/A;1-Body (View)	Buy
000214/A;1-Chassis (View)	Buy
000224/A;1-Powertrain (View)	Phantom
000225/A;1-Transmission (View)	Phantom
000236/A;1-Power Source (View)	Phantom
000238/A;2-Wheel and Tire Asm (View)	Buy
000246/A;1-Steer and Control (View)	Buy

Run the utility:

```
me_create_mbom -u=user-name -p=password -g=group -ebomroot=000202
-revrule="Latest Working" -mrevrule="Latest Working" -depth=2
```

Produces the following MBOM:



BOM Line	Usage_MakeOrPurc..
M_000202/A;1-M_CAR EBOM (View)	
000203/A;1-Body (View)	Buy
000214/A;1-Chassis (View)	Buy
M_000224/A;1-M_Powertrain (View)	Phantom
M_000225/A;1-M_Transmission (View)	Phantom
M_000236/A;1-M_Power Source (View)	Phantom
000238/A;2-Wheel and Tire Asm (View)	Buy
000246/A;1-Steer and Control (View)	Buy

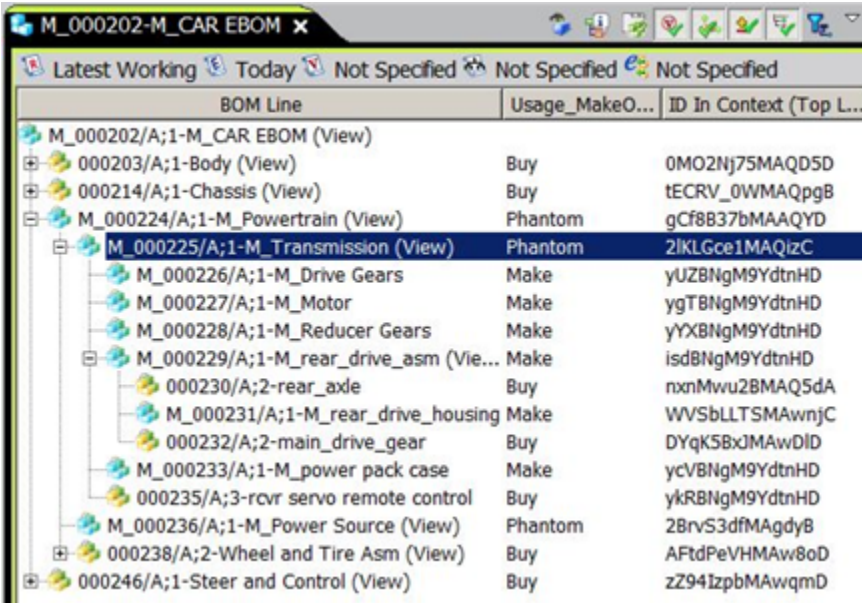
Note that the new MBOM contains only two levels of structure. The remaining levels in the EBOM are ignored.

Updating the MBOM from a specific line

You now update the MBOM above, but only for the M_000225 line and down, requiring the following utility command:

```
me_create_mbom -u=your-user-name -p=your-password -g=your-group
-ebomroot=000202 -scopeid=000225 -revrule="Latest Working"
-mbomroot=M_000202 -mrevrule="Latest Working"
```

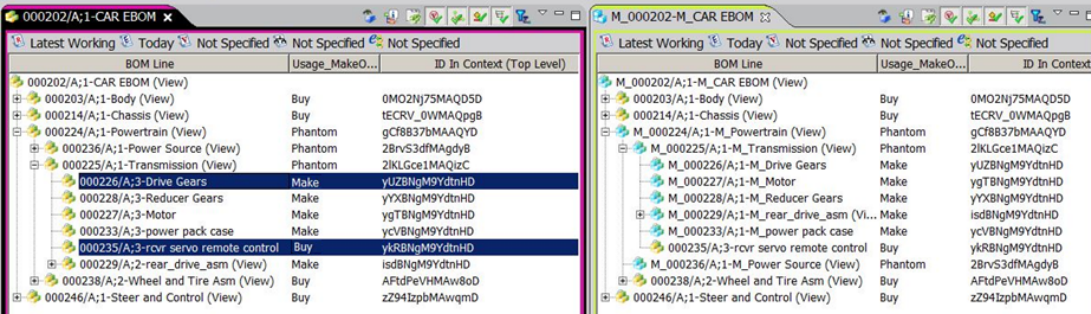
The utility creates the following MBOM:



BOM Line	Usage_MakeO...	ID In Context (Top L...
M_000202/A;1-M_CAR EBOM (View)		
000203/A;1-Body (View)	Buy	0M02Nj75MAQD5D
000214/A;1-Chassis (View)	Buy	tECRV_0WMAQpgB
M_000224/A;1-M_Powertrain (View)	Phantom	gCf8837bMAAQYD
M_000225/A;1-M_Transmission (View)	Phantom	2kLGce1MAQzC
M_000226/A;1-M_Drive Gears	Make	yUZBNgM9YdtnHD
M_000227/A;1-M_Motor	Make	ygTBNgM9YdtnHD
M_000228/A;1-M_Reducer Gears	Make	yYXBNgM9YdtnHD
M_000229/A;1-M_rear_drive_asm (View)	Make	isdBNgM9YdtnHD
000230/A;2-rear_axle	Buy	rxnMwu2BMAQ5dA
M_000231/A;1-M_rear_drive_housing	Make	WVsbLLTSMawnjC
000232/A;2-main_drive_gear	Buy	DYqK5BxJMAwDID
M_000233/A;1-M_power pack case	Make	ycVBNgM9YdtnHD
000235/A;3-rcvr servo remote control	Buy	ykRBNgM9YdtnHD
M_000236/A;1-M_Power Source (View)	Phantom	2BrvS3dfMAgdyB
000238/A;2-Wheel and Tire Asm (View)	Buy	ARtdPeVHMAw8oD
000246/A;1-Steer and Control (View)	Buy	zZ94IzpbMAwqmD

Changing Make to Buy and Buy to Make in the EBOM

For the following EBOM and MBOM:

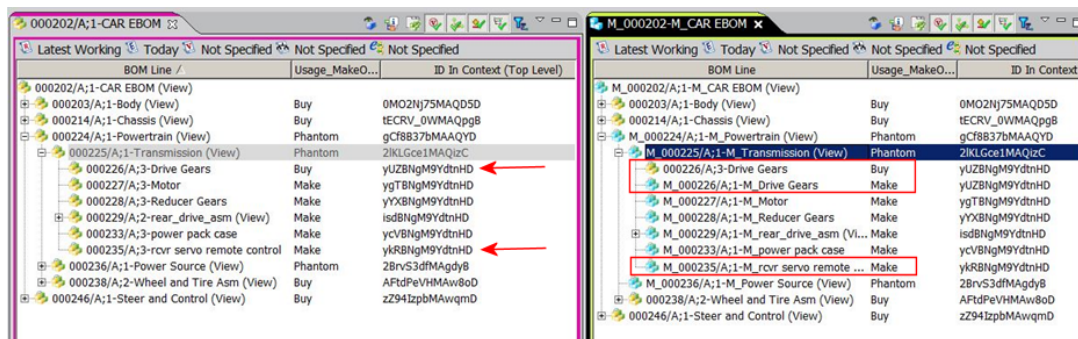


BOM Line	Usage_MakeO...	ID In Context (Top Level)
000202/A;1-CAR EBOM (View)		
000203/A;1-Body (View)	Buy	0M02Nj75MAQD5D
000214/A;1-Chassis (View)	Buy	tECRV_0WMAQpgB
000224/A;1-Powertrain (View)	Phantom	gCf8837bMAAQYD
000236/A;1-Power Source (View)	Phantom	2BrvS3dfMAgdyB
000225/A;1-Transmission (View)	Phantom	2kLGce1MAQzC
000226/A;3-Drive Gears	Make	yUZBNgM9YdtnHD
000228/A;3-Reducer Gears	Make	yYXBNgM9YdtnHD
000227/A;3-Motor	Make	ygTBNgM9YdtnHD
000233/A;3-power pack case	Make	ycVBNgM9YdtnHD
000235/A;3-rcvr servo remote control	Buy	ykRBNgM9YdtnHD
000229/A;2-rear_drive_asm (View)	Make	isdBNgM9YdtnHD
000238/A;2-Wheel and Tire Asm (View)	Buy	ARtdPeVHMAw8oD
000246/A;1-Steer and Control (View)	Buy	zZ94IzpbMAwqmD

You change the **Make** value to **Buy** for the drive gears and change the **Buy** value to **Make** for the rcvr remote control in the EBOM and run the utility as follows:

```
me_create_mbom -u=user-name -p=password -g=group -ebomroot=000202
-scopeid=000225 -revrule="Latest Working" -mbomroot=M_000202
-mrevrule="Latest Working" -update
```

The results are as follows:



When the rcvr remote control part is changed from a **Buy** to a **Make**, the utility replaces the buy part in the MBOM during update. Buy to make behavior is not affected by preference settings. For the make to buy change (the drive gears), the behavior depends on two preferences:

- The **MEMBOM_Mirror_ReplaceMakeOnChange** preference is set to **FALSE**. The make part is not removed from the MBOM. The buy part is added to the structure.

The IDIC values on the make part are determined by the **MEMBOM_Mirror_IDICOnChildren** preference.

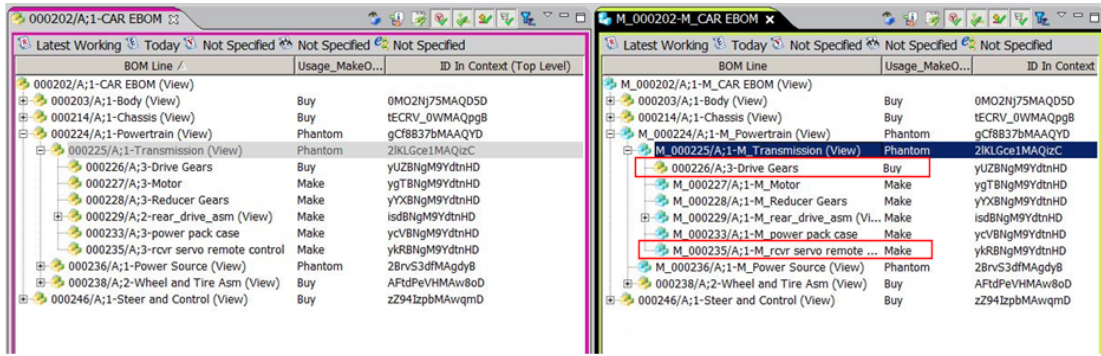
- If **MEMBOM_Mirror_IDICOnChildren** is set to **FALSE** (or does not exist), the IDIC on the make part in the MBOM is retained. Performing an accountability check between the EBOM and MBOM results in multiple matches as the MBOM contains both a make and a buy part with the same IDIC.
- If **MEMBOM_Mirror_IDICOnChildren** is set to **TRUE**, the IDIC on the make part in the MBOM is deleted and an accountability check displays the make part as missing in source.

Caution:

You must exercise caution when removing an IDIC on any part. This can cause problems in other areas, for example, if the part is consumed in an process structure, you lose the link to that line.

- The **MEMBOM_Mirror_ReplaceMakeOnChange** preference is set to **TRUE**.

The buy part (drive gears) replaces the make part. The result of the MBOM after update is as follows:

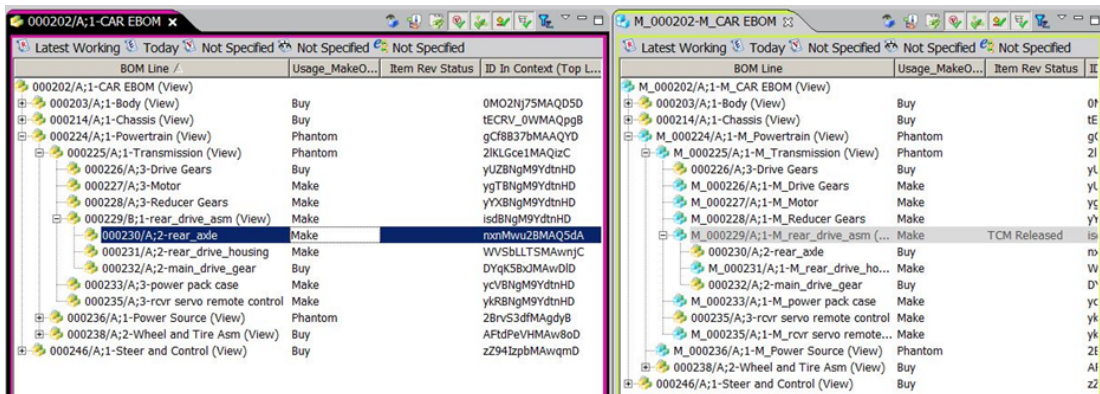


In summary, the behavior of the preferences is as follows:

MEMBOM_Mirror_ReplaceMakeOnChange	FALSE	The buy part is added to MBOM and the previous make part is kept in the structure but its IDIC is removed.
MEMBOM_Mirror_IDICOnChildren	TRUE	
MEMBOM_Mirror_ReplaceMakeOnChange	FALSE	The buy part is added to MBOM and the previous make part is kept in the structure but its IDIC is <i>not</i> removed.
MEMBOM_Mirror_IDICOnChildren	FALSE	
MEMBOM_Mirror_ReplaceMakeOnChange	TRUE	The buy part is added to MBOM and the previous make part is <i>removed</i> in the structure, irrespective of the value of MEMBOM_Mirror_IDICOnChildren .
MEMBOM_Mirror_IDICOnChildren	TRUE/FALSE	

Updating a released node in the MBOM

In the following EBOM and MBOM, **M_000229/A;1-M_rear_drive_asm** is released and then the make/buy property on its child, **000230/A;2-rear_axle**, is changed from **Buy** to **Make**.



You revise the MBOM part so you have write access and run the update utility.

You run the utility with the **-actiononrelease** argument set to **2**.

```
me_create_mbom -u=your-user-name -p=your-password -g=your-group
-e bomroot=000202 -scopeid=000225 -revrule="Latest Working"
-m bomroot=M_000202 -mrevrule="Latest Working" -actiononrelease=2 -update
```

The results are as follows:

BOM Line	Usage_MakeO...	Item Rev Status	ID In Context
M_000202/A;1-M_CAR EBOM (View)			
000203/A;1-Body (View)	Buy		0MO2Nj75MA
000214/A;1-Chassis (View)	Buy		tECRV_0WMA/
M_000224/A;1-M_Powertrain (View)	Phantom		gCf8B37bMA/
M_000225/A;1-M_Transmission (View)	Phantom		2IKLGce1MAÇ
000226/A;3-Drive Gears	Buy		yUZBNgM9Ydt
M_000226/A;1-M_Drive Gears	Make		yUZBNgM9Ydt
M_000227/A;1-M_Motor	Make		ygTBNgM9Ydt
M_000228/A;1-M_Reducer Gears	Make		yYXBNgM9Ydt
M_000229/B;1-M_rear_drive_asm (...)	Make		isdBNgM9Ydt
M_000230/A;1-M_rear_axle	Make		rxnMwu2BMA/
M_000231/A;1-M_rear_drive_ho...	Make		WVSbLLTSM/
000232/A;2-main_drive_gear	Buy		DYqK5BxJMAv
M_000233/A;1-M_power pack case	Make		ycVBNgM9Ydt
000235/A;3-rcvr servo remote control	Make		ykRBNgM9Ydt
M_000235/A;1-M_rcvr servo remote...	Make		ykRBNgM9Ydt
M_000236/A;1-M_Power Source (View)	Phantom		2BrvS3dfMAg
000238/A;2-Wheel and Tire Asm (View)	Buy		AftdPeVHMA/
000246/A;1-Steer and Control (View)	Buy		z294IzpbMAw

The utility revises the part and replaces the old revision with the new one.

Changing properties in the EBOM

To detect property changes in the EBOM, run an accountability check between the EBOM and MBOM. You can propagate any property differences using the accountability check mechanism.

Attachments

Attachments are always synchronized as the attachment is created as a reference on the new make part. Any changes to the attachments on the EBOM side are automatically reflected in the MBOM. If you add a new attachment to the EBOM, you must run the update to see it in the MBOM part.

In-context authoring

Cloning, copying, and replacing in-context assemblies

When you edit an assembly in context, you can modify occurrence properties of the lines beneath the top selected line in the context of that line only. No matter how many places the in-context lines occur

under other top structures, the changes will only affect this line. For more information on in-context editing, see *Performing in-context editing*.

If you have an assembly with in-context edits that is almost identical to another required assembly—for example, you have a parent with a specific occurrence effectivity and you need to create a new parent with different effectivity—you can save time by using one assembly as a template for another. In MBOM **Product** or **Workarea** views, you can:

- Use the **Clone Assembly in Context** to split an MBOM structure into two structures by cloning it within the same MBOM. You can also copy, reference, or exclude attachments from the structure being cloned and change the occurrence effectivities of both the items being cloned and the cloned structure.
- Copy an assembly with in-context edits and paste it elsewhere in the same MBOM using the **Paste Assembly in Context** command. This command creates a new absolute occurrence of the assembly while retaining in-context edits and attachments. Standard Teamcenter copy and paste commands do not retain any edits made in the assembly in the context of the parent lines above the line you are copying and pasting, so without this capability, you would have to remake these missing in-context edits.

To define different item types for different manufacturing nodes or simply change the item type of a manufacturing node because your manufacturing plan has changed, use the **Replace Assembly with Any Item Type** command. This command replaces the top item of an assembly with an item of a different item type and retains the original item's in-context edits. Using this command, you can also copy, reference, or exclude attachments from the original item.

Clone an in-context assembly

You can clone an assembly with in-context edits from a line in an MBOM to a different line in the same MBOM. This command:

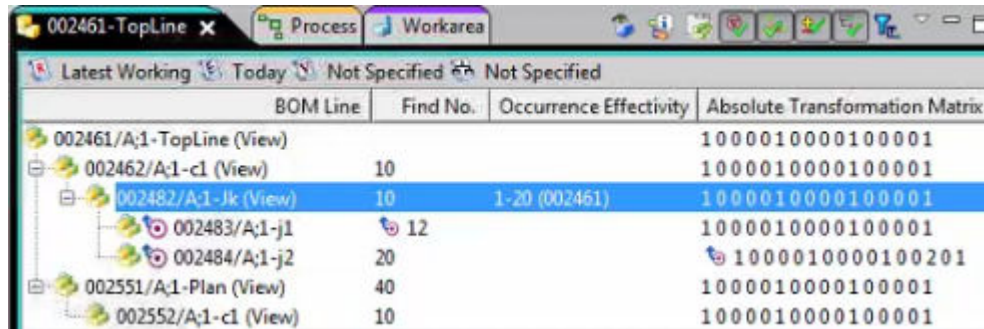
- Retains all in-context edits in the cloned assembly.
- Lets you copy, reference, or exclude in-context attachments from the structure being cloned.
- Optionally splits occurrence effectivity dates or ranges between the assembly being cloned and the cloned assembly.

Note:

- Existing BOM lines are not changed, only direct attachments that are on new items that are cloned. This command can also control in-context attachments in the cloned structure.
- Cloning rules are defined by your administrator using the **MECopyAssemblyInContextTemplates** preference. This preference points to the **Item.Item.CopyAssemblyInContext** preference, which lists the cloning rules for the case in

which the source is the first item and the target is the second item. By default, all items are cloned. Your results may not follow the same rules as those in this example.


1. If you are editing in context, hide in-context editing mode.
2. In the MBOM **Product** or **Workarea** view, select the line to be cloned.



BOM Line	Find No.	Occurrence Effectivity	Absolute Transformation Matrix
002461/A:1-TopLine (View)			1000010000100001
002462/A:1-c1 (View)	10		1000010000100001
002482/A:1-jk (View)	10	1-20 (002461)	1000010000100001
002483/A:1-j1	12		1000010000100001
002484/A:1-j2	20		1000010000100201
002551/A:1-Plan (View)	40		1000010000100001
002552/A:1-c1 (View)	10		1000010000100001

3. Choose **Edit**→**In Context**→**Clone Assembly in Context**.

In the **Clone Assembly In Context** dialog box, the selected line is displayed in the **Copy Of** box.



4. In the same MBOM, select the equivalent line to which you want to clone the assembly, and next to the **Paste To** box, click .
5. Click **Next**.
6. (Optional) In the **Assign information** section, in the **ID** box, type an ID or click **Assign**, and optionally, in the **Name** box, type a name for the cloned assembly.

If you do not type a name, the assembly inherits the name of the structure you selected in step 2.

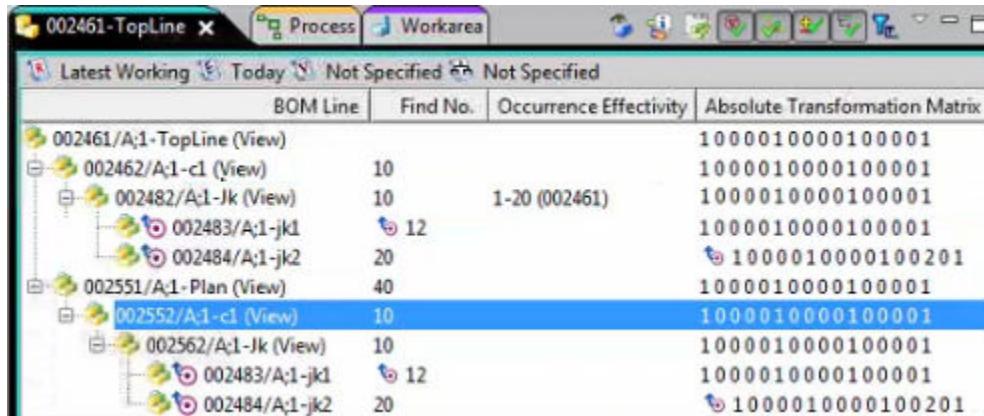
7. Click **Next**.
8. For each attached object, in the **Define Attached Objects** section, from the **Copy Option** column, select how the attachments should be handled.
 - **Copy Reference** creates a reference to the object attached to the structure that you are cloning.
 - **Copy Object** copies the object to the cloned structure.
 - **No Copy** creates neither a reference or copy of the object in the cloned structure.
9. Click **Next**.

10. (Optional) In the **Related Objects Information** section, expand the related structure items being cloned, type or assign new item revision IDs or related object names, and modify any user data as needed.

If you do not change the revision IDs, they are automatically assigned. If you do not change the related object names, they retain the names of the structures being cloned.

11. Click **Next**.
12. (Optional) In the **Occurrence Effectivity Cutback** section, set occurrence effectivity.
- To set a new effectivity for:
 - The structure being cloned, click  next to the original assembly.
 - The cloned assembly, click  next to the cloned assembly.
 - In the **Occurrence Effectivity** dialog box, define the appropriate effectivity for the structure being cloned or the cloned assembly.
13. Click **Finish**.

The assembly is cloned with all in-context edits intact.



BOM Line	Find No.	Occurrence Effectivity	Absolute Transformation Matrix
002461/A;1-TopLine (View)			1000010000100001
002462/A;1-c1 (View)	10		1000010000100001
002482/A;1-Jk (View)	10	1-20 (002461)	1000010000100001
002483/A;1-jk1	12		1000010000100001
002484/A;1-jk2	20		1000010000100201
002551/A;1-Plan (View)	40		1000010000100001
002552/A;1-c1 (View)	10		1000010000100001
002562/A;1-Jk (View)	10		1000010000100001
002483/A;1-jk1	12		1000010000100001
002484/A;1-jk2	20		1000010000100201

Copy and paste an in-context assembly

You can copy an assembly with in-context edits and paste it elsewhere in the same MBOM. This command creates a new absolute occurrence of the assembly while retaining in-context edits and attachments.

Note:

Cloning rules are defined by your administrator using the combined **MEDuplicateAssemblyInContextTemplates** and **Item.Item.DuplicateAssemblyInContext** preferences. Your rules may not match the rules in this example.

1. If you are editing in context, hide in-context editing mode.
2. In the MBOM **Product** or **Workarea** view, right-click the line to be copied and choose **Copy**.
3. In the same MBOM, right-click the equivalent line to which you want to paste the assembly.
4. Choose **Edit→In Context→Paste Assembly in Context**.

A new instance of the assembly is created with all in-context edits and attachments as specified in the cloning rules intact.

Replace an in-context line or assembly with a new item type

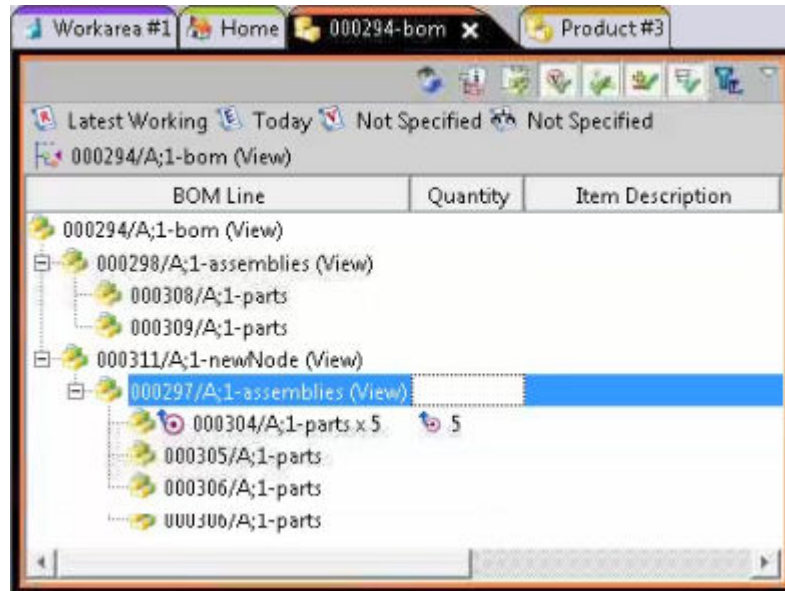
You can replace a manufacturing bill of materials (MBOM) or bill of equipment (BOE) line or assembly with a new item that has a new item type and retain the original line's or assembly's in-context edits. The procedure is similar to the **File→New** item command, but lets you retain in-context edits and also copy, reference, or exclude attachments from its original structure.

Since by default you cannot copy and paste items from the plant structure to the process structure as anything other than the type **item**, you can use the **Replace Assembly with Any Item Type** command to create a new item of a different item type and that type becomes the default paste option. For example, you could use the command to replace the item type as a resource (**MEResource** occurrence type) and the system lets you copy and paste items as resource by default.

Note:

Cloning rules are defined by your administrator using the combined **MEReplaceAssemblyInContextTemplates** and **Item.Item.ReplaceAssemblyInContext** preferences. Your rules may not match the rules in this example.

1. If you are editing in context, hide in-context editing mode.
2. In the MBOM or BOE **Product** or **Workarea** view, select the in-context line/assembly for which you want to change the item type.



3. Choose **Edit**→**In Context**→**Replace Assembly with Any Item Type**.
4. In the **New Item** dialog box, select the new item type and click **Next**.
5. In the **ID** and **Revision** boxes, type an ID and revision or click **Assign**.
6. In the **Name** box, type a name for the new item and click **Next**.

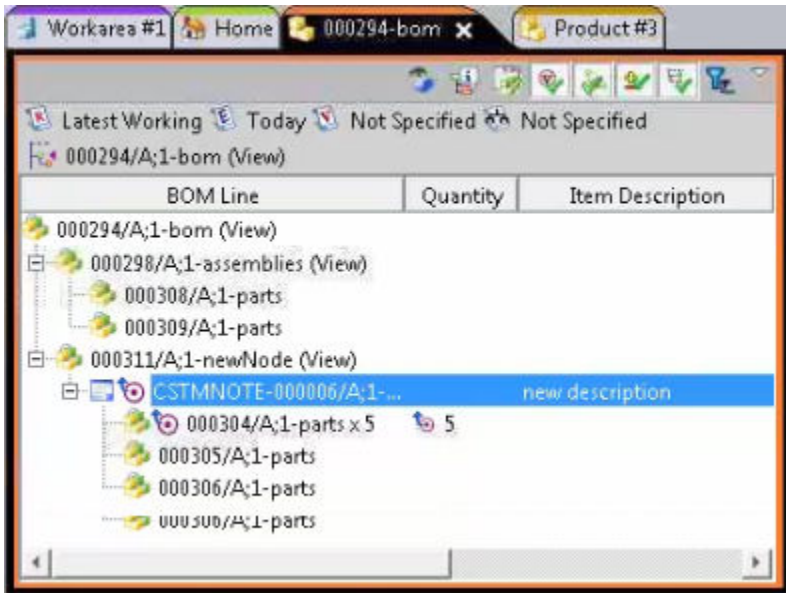
Properties from the in-context line or assembly for which you want to change the item type, such as name, description, and unit of measure, are prepopulated. Your administrator can map common item and revision properties between item types, and define custom item types and properties, using the **MEReplaceAssemblyInContextAlignProperties** preference.

If you click **Next**, the remaining prompts are similar to those in any **New Item** dialog box. You may click **Finish** at any time to accept defaults. Some attributes are prepopulated with the attributes of the original in-context line/assembly. Clicking **Next** lets you modify the defaults.

7. Click **Finish**.

The selected line is replaced with the new item type, ID, revision, and name, with all in-context edits intact.

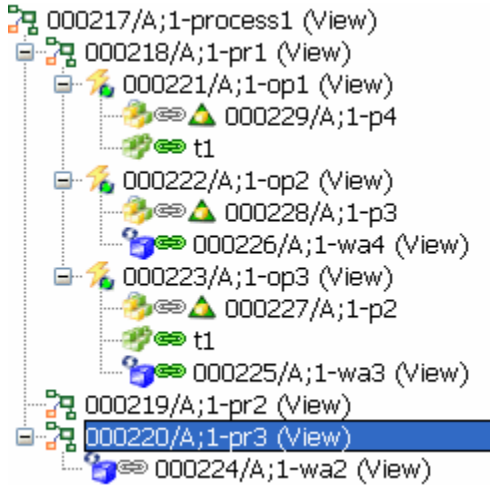
Now when you use the **Copy**, **Paste**, **Copy As**, or **Paste As** commands, the new item type is the default when you paste.



Creating process structures

About process structures

A *process structure* describes how an assembly or part is manufactured. Processes are structured in hierarchical parent-child relationships. Sequence relationships can also exist between child processes. These relationships let you specify both sequential and parallel processes, as shown in the following figure.



Defining process structures

A process is referred to as a *composition* structure because its configuration is affected by the configuration of its assigned structures. Although a process is a distinct entity and is revised and controlled independent of the part or product, lines in the process structure can configure out

depending on the configuration of the assigned structure. You can specify which open structure configures the process structure using the **Define Configuring Structures** menu command.


When you assign a product or part to a process, certain properties of the part are copied over to the process. You can specify which properties in the **MEAssignProperties** preference.

By default, when you assign a part to a process, Teamcenter assigns the part using the **MEConsumed** type. Your administrator can change the **controllingOccsForProcessConfiguration** preference to specify another occurrence type to use for assignment at your site. If this preference is blank, the configuration of consumed items does not affect the configuration of operations.

Also, by default, if an occurrence type is defined for a BOM line, and you assign the BOM line to a process or operation, Teamcenter assigns the BOM line using the same occurrence type. However, if your administrator sets the **MEAssignCustomizedOccurrenceType** preference, you can specify a different occurrence type during the assignment.

Create a new process structure

Create a process as a new root object or as a child of another process by selecting the parent process before you open the **New Process** dialog box.

1. Choose **File**→**New**→**Process** or click **Create a New Process** .
2. In the **New Process** dialog box, select one of the process types from the list.
3. Click **Next**.
4. Enter the ID number to be assigned to this new process. If this new process is a revision of an existing one, type the ID of the existing process. You can assign a unique revision number in the **Revision** box.

To let the system automatically assign a unique ID, click **Assign**.

5. Type a name for the new process. Make it unique so you can search the database using this term.
6. Select **Show as new root** to specify that the newly created process is opened as a root object. It is not pasted to the selected process. If you do not select this option, the new process is pasted as a child of the selected process.

If the **Show as new root** option is selected but unavailable, Teamcenter does not allow you to create a new object under the selected object, for example, if you try to create a work area under a process.

7. Type a process description.

At this point, you have all the information required to create a new process.

8. (Optional) Click **Next** to add optional information, such as filling out the item's forms, or checking the process item out of the database.
9. (Optional) Select **Define Options** to specify the following:
 - Select **Use item identifier as default display** or **Use revision identifier as default display** if you created an alternate identifier for the item and want to use it as the default display object.
 - Select **Check Out Process Revision on Create** to check the newly created process out of the database immediately upon creation.
10. Click **Finish** to create the new process.
11. Click **Close** to close the **New Process** dialog box.

Open an existing process structure

Do one of the following

- Open a process revision in the Part Planner using the **Open Process** dialog box.
- Find the process revision item in My Teamcenter. Using the mouse, drag it to Part Planner in the navigation pane, or use the shortcut menu and choose **Send To** to send the item to Part Planner.
- Open a part revision in Part Planner.

All processes and work areas associated as target to this part open by default if the **MSE_load_related_product_process_plant** preference is set to **true**. However, to enable auto-loading of all the linked product structures and plant structures to a Bill of Process or Plant Bill of Process, the **MELoadAllLinkedStructures** preference should also be set to **true**.

Process structure example

The following example of a crankshaft rod and piston assembly shows a process structure that involves both assembly and machining processes, which together describe a manufacturing process.

- Crankshaft assembly – the main process
 - Rod and piston – a subprocess
 - Assembly – assembly process to assemble the rod and piston
 - Rod – subprocess to capture the rod's manufacturing process
 - ◇ Raw material – operation to cut the raw material

- ◇ NC machining rough – machining operation to rough the material
- ◇ Heat treatment – operation to send the rough part through heat treatment to release stresses
- ◇ NC machining finish – operation to machine the part to its final dimensions
- ◇ Inspection – operation to inspect the part
- End caps – subprocess to manufacture the end caps. It contains individual operations as shown in the example above.
- Piston – subprocess to manufacture the piston. It contains individual operations as shown in the example above.

With the benefit of experience, standard process structures may be developed for your plant. Templates can be made from these processes to speed the workflow through your organization.

Importing structures using the `tcexcel_import` utility

Creating structures by importing from Excel

There are two ways to import structures using Microsoft Excel:

- You can populate structures in Teamcenter based on definitions in a Microsoft Excel spreadsheet using the `tcexcel_import` utility. The main purpose of this utility is to import process structures, such as build sequences or process plans, but the utility can also import any type of product, process, plant, and resource information. Additionally, the utility supports:
 - Linking between multiple structures.
 - Assigning relations (consumed, required, work area, and resources).
 - Attaching forms and filling out attribute values.
 - Modifying ownership.
 - Defining activities (with time information).
 - Attaching variant information.

Remember: The `tcexcel_import` utility is designed for data *creation* only. You can set the description on items and revisions during creation. Once you create an item, you can only update the item description.

Note:

Importing an item that already exists in the database can result in BOM duplications or new revisions. To avoid this problem, set **-o** (option) = **off** to update the database item using the information in the Excel spreadsheet.

Example:

```
tcexcel_import -u=username -p=password -o=off -i=<file_name>.txt
```

- You can use Microsoft Excel to import structures from an external source, for example, from a design contractor that does not have Teamcenter. The structure is defined in an Excel spreadsheet that Teamcenter validates against a predefined control file to ensure all the necessary data is present. If the structure subsequently changes, you can reimport the same spreadsheet and update the latest working data in Teamcenter. You must have Teamcenter Client for Microsoft Office installed to import or update structures in this way.

Note:

You can only import imprecise structures in this way. Also, the import process does not configure the structure (for example, by defining revision rules) or set the view, nor does it support absolute occurrences or incremental changes.

- You can import structures from an Excel file that was exported from Teamcenter using the **Work Offline and Import** option in the **Export to Excel** dialog box. With this option, the control file data is generated automatically on a separate tabbed sheet in the export file. The control file does not have to be predefined manually.

Import a spreadsheet into the database

- Create a Microsoft Excel file with specific headings. The import utility recognizes specific headings and formats in the Excel file and translates them into Teamcenter structures.

Sample Excel file:

	A	B	C	D	E
1	Header1	Item	Item	Item	Description
2	Header2	Item	Item	Item	
3	Header3	Item	Item	Item	
4	Title	Root	Sub1	Sub2	Descr
5		Product Root			New product for next year
6			Sub Assy 1		Structure Packaging
7				Comp11	Box
8				Comp12	Manual
9				Comp13	Package material
10			Sub Assy 2		Structure Engineering
11				Comp21	Product Component 1
12				Comp22	Product Component 2
13				Comp23	Product Component 3
14				Comp24	Product Component 4
15				Comp25	Product Component 5

2. Save the Excel file as a text file.
 - a. In Excel, click **File**→**Save** to save the Excel file.
 - b. Choose **File**→**Save as**.
 - c. In the **Save as type** box, select **Text (Tab delimited)(* .txt)**.

Sample .txt file saved from the sample Excel file:

```

Header1 Item    Item    Item    Description
Header2 Item    Item    Item
Header3 Item    Item    Item
Title   Root    Sub1    Sub2    Descr
        Product Root
                Sub Assy 1
                        Comp11 Box
                        Comp12 Manual
                        Comp13 Package material
                Sub Assy 2
                        Comp21 Product Component 1
                        Comp22 Product Component 2
                        Comp23 Product Component 3
                        Comp24 Product Component 4
                        Comp25 Product Component 5

```

- d. If you are updating the text file, you are asked if you want to replace the existing file. Click **Yes**.

Excel displays a message stating that certain features in your file may not conform to a tab-delimited text file.

- e. Click **Yes**.
- f. Click **File**→**Close** to close the Excel text file. If a dialog appears requesting that you save the text file, click **No**.

The text file is saved in the same directory as the Excel file. This is the input for the import utility.

Note:

The pipe character (|) is not permitted within the Excel file. It causes an error in the import routine.

The structures from the Excel file are imported into the database and you can open them in Part Planner.

3. Call the **tcexcel_import** utility to import the Excel file into the Teamcenter database.
 - a. Open a Teamcenter shell (Teamcenter command prompt).
 - b. Change to the import directory where the Microsoft Excel file is stored.
 - c. Call:

tcexcel_import -u=user_name -p=password -g=group_name -i=my_excel_file.txt

Sample structure created from the .txt file that was saved from the sample Excel file:

Product		Process	Plant
BOM Line	Item Description		
000170/A-Product Root (view)	New product for next year		
000171/A-Sub Assy 1 (view)	Structure Packaging		
000172/A-Comp11	Box		
000173/A-Comp12	Manual		
000174/A-Comp13	Package material		
000175/A-Sub Assy 2 (view)	Structure Engineering		
000176/A-Comp21	Product Component 1		
000177/A-Comp22	Product Component 2		
000178/A-Comp23	Product Component 3		
000179/A-Comp24	Product Component 4		
000180/A-Comp25	Product Component 5		

Creating a simple structure

The import utility recognizes specific row headings along with keywords found in those columns. The following is a very simple Microsoft Excel input file that creates a process containing a subprocess.

Header1	Item	Item	Description
Header2	Process	Process	
Header3	Process	Process	
Title	Root	Root	Description
	Process-Root		New Process
		sub process1	New Sub-process1

Note:

You can copy the content of HTML tables and paste them into an Excel file to use them as examples.

The keyword **Item** results in an item being created with the name listed in the **Item** column (for example, **Process-Root** or **sub-process1**). Because there are two columns with the header **Item**, the utility creates a nested structure—an item inside an item. The **Process** entries signify the types and subtypes of the item to be created. This results in the following structure.

Process Structure	Item Description	Item Type
001147/A-Process-Root (view)	New Process	MEProcess
001148/A-sub_process1	New Sub-process1	MEProcess

A more involved structure is shown in the following example.

Header1	Item	Item	Item	Description
Header2	Process	Process	OP	
Header3	Process	Process	NCMachining	
Title	Root	Root	Part no.	Description
	Process-Root			New Process
		sub_process1		New Sub-process1
			OP01	Read
			OP02	Get and place cable
			OP03	Record lot control
			OP04	Get from printer and place on carrier
		sub_process2		New Sub-process2
			OP05	Get sign and place on carrier
			OP06	Set model switch
			OP07	Remove beam from cart
		sub_process3		New Sub-process3
			OP08	Lock both sides and latch in place

		sub_process4		New Sub-process4
			OP09	Get wire harness and position

In this file:

- **Header1**, **Header2**, and **Header3** are mandatory row headings.
- The **Item** columns designate the number of levels in the structure you import. In the example, the imported structure has three levels, as seen by the three **Item** columns.
- The strings in the **Item** columns represent the names that are assigned to the newly created items (for example, **sub-process3** or **OP08**).
- The entries in the columns of the **Header2** row represent the types of the objects that you create. The entries in the columns of the **Header3** row represent the subtypes. In the example, the third **Item** column contains an operation of type **OP** that uses the **NCMachining** subtype.
- The **Description** column contains the description for each object you create.
- The utility ignores all entries in the row containing the **Title** heading.
- The utility looks for the first entry in the row following the **Title** row and uses this as the name of the root object for your structure. In the example, that is the **Process-Root** entry. You can insert any number of rows between the row containing **Title** and the last **Header** row before it to help organize your data, but they are ignored by the utility.
- If you want to stop the import at a certain point in the Excel file, insert **END-OF-PROCESS** (case sensitive) at the desired point in the first column of the spreadsheet. The utility stops importing when it hits that row.

Converting these Excel file creates the following structure.

Process Structure	Item Type	Item Description
000336/A-Process-Root (view)	MEProcess	New Process
000337/A-sub_process1 (view)	MEProcess	New Sub-process1
000338/A-OP01	MENCMachining	Read
000339/A-OP02	MENCMachining	Get and place cable
000340/A-OP03	MENCMachining	Record lot control
000341/A-OP04	MENCMachining	Get from printer and place on carrier
000342/A-sub_process2 (view)	MEProcess	New Sub-process2
000343/A-OP05	MENCMachining	Get sign and place on carrier
000344/A-OP06	MENCMachining	Set model switch
000345/A-OP07	MENCMachining	Remove beam from cart
000346/A-sub_process3 (view)	MEProcess	New Sub-process3
000347/A-OP08	MENCMachining	Lock both sides and latch in place
000348/A-sub_process4 (view)	MEProcess	New Sub-process4
000349/A-OP09	MENCMachining	Get wire harness and position

By default the item IDs are assigned automatically. You can also **specify item IDs or item revision IDs**.

All of this information holds true for other types of structures. The following example shows a product structure that is imported by the utility.

Header1	Item	Item	Item	Description
Header2	Item	Item	Item	
Header3	Item	Item	Item	
Title	Root	Name	Name.	Description
	Product			New Product
		Sub_Assy1		New_Sub_Assy1
			Part1	Desc of Part1
			Part2	Desc of Part2
			Part3	Desc of Part3
			Part4	Desc of Part4
		Sub_Assy2		New_Sub_Assy2
			Part5	Desc of Part5
			Part6	Desc of Part6
			Part7	Desc of Part7
		Sub_Assy3		New_Sub_Assy3
			Part8	Desc of Part8

This results in the following structure.

BOM Line	Item Type
000524/A-Product (view)	Item
000525/A-Sub_Assy1 (view)	Item
000526/A-Part1	Item
000527/A-Part2	Item
000528/A-Part3	Item
000529/A-Part4	Item
000530/A-Sub_Assy2 (view)	Item
000531/A-Part5	Item
000532/A-Part6	Item
000533/A-Part7	Item
000534/A-Sub_Assy3 (view)	Item
000535/A-Part8	Item

List of keywords

Header1	Header2	Header3	Data value	Remark
Item	<i>item_type</i>	<i>item_subtype</i>	<i>item_name</i>	The BOM line values define the item name.
Item	MEActivity	MEActivity	<i>activity_name</i>	Adds an activity to an operation.

Header1	Header2	Header3	Data value	Remark
Activity	Description	–	<i>description</i>	Specifies the activity description.
Activity	Time	–	<i>time</i>	Specifies the activity duration.
Activity	Unittime	–	number	Specifies the activity unit time.
Activity	Frequency	–	number	Specifies the activity frequency.
Activity	Category	–	VA, NVA, NVABR	Specifies the activity category.
ActivityForm	<i>form_name</i>	<i>form_attribute_name</i>	<i>attribute_value</i>	Adds a form to the activity and enters the attribute value.
ItemID	–	–	<i>item_ID</i>	Autogenerates an ID if the item ID value is empty.
ItemID	–	–	M:store_marker	Creates a new item and autogenerates the ID. Stores new ID and revision in a text file.
ItemID	–	–	L:use_marker	Creates a new item and uses ID stored as marker in the text file.
ItemRev	–	–	<i>revision</i>	Assigns an item revision if the item revision value is empty.
Description	–	–	<i>description</i>	Specifies the item description.
Type	–	–	<i>item_subtype</i>	Allows you to overwrite the item subtype from the Header3 Item column.
Attribute	<i>form_name</i>	<i>form_attribute_name</i>	<i>attribute_value</i>	Adds a form to the current item revision and enters the attribute values.
Attribute	ItemRevision Master	<i>form_attribute_name</i>	<i>attribute_value</i>	Enters attribute value in the corresponding revision master form.
Attribute	Item Master	<i>form_attribute_name</i>	<i>attribute_value</i>	Enters an attribute value in the corresponding item master form.
Occurrence	Note	<i>occ_note_name</i>	<i>occ_note_value</i>	Adds occurrence note to the BOM line.
Occurrence	AbsOccurrence	AbsOccurrence	<i>occ_ID_value</i>	Adds absolute occurrence ID to the BOM line.
Quantity	–	–	<i>number</i>	Adds a quantity to a BOM line.
NumOccs	–	–	<i>number</i>	Adds a number of occurrences to a BOM line.
Sequence	–	–	<i>number</i>	Adds a sequence (find number) to a BOM line.
Status	–	–	<i>status</i>	Adds a release status to an item revision.
Owner	–	–	<i>person;group</i>	For the root node, specifies the default owner for the entire structure.

Header1	Header2	Header3	Data value	Remark
Owner	–	–	<i>person</i>	For each item, specifies the owner for this item or item revision.
Variants	<i>item_ID/ item_revision</i>	–	<i>variant_conditions</i>	Specifies the item to which the variant options are assigned.
Relation	Consumed	<i>occurrence_type</i>	<i>product_root_ID</i>	Specifies the relation that links the process root to the product root to link the two structures.
Relation	Consumed	<i>occurrence_type</i>	<i>consumed_item</i>	Specifies one or multiple consumed items (separated by a ;) for all nodes other than the root node.
Relation	Workarea	<i>occurrence_type</i>	<i>plant_root_ID</i>	Specifies the relation that links the process root to the plant root to link the two structures.
Relation	Workarea	<i>occurrence_type</i>	<i>workarea_ID</i>	Specifies one or multiple work areas (separated by a ;) for all nodes other than the root node.
Relation	Resource	<i>occurrence_type</i>	<i>resource_ID</i>	Assigns a resource to an operation. The occurrence type from the Header3 column is used.
Relation	Resource	<i>occurrence_type</i>	<i>resource_ID~ occurrence_type</i>	Assigns a resource to an operation using the specified occurrence (not the one found in the Header3 column).
Relation	Resource	<i>occurrence_type</i>	<i>resource_ID [;resource_ID]</i>	Assigns multiple resources to an operation using the occurrence type specified in the Header3 column.

Specifying type

You can use the **Type** column to overwrite the item subtype that you specified in the **Header3** column for the corresponding item.

Header1	Item	Item	Type
Header2	Process	OP	
Header3	Process	OP	
Title	Process	Operation	
	CAM_Setup1		
		Material procurement	
		Rough milling	NCMachining
		Washing	
		Machine Pocket	NCMachining
		Inspection	
		Drilling	NCMachining
		Heat Treatment	

		Part Probing	
		Final Inspection	

This produces the following output.

BOM Line	Item Type
000039/A;1-CAM_Setup1 (view)	MEProcess
000040/A;1-Material procurement	MEOP
000041/A;1-Rough milling	MENCMachining
000042/A;1-Washing	MEOP
000043/A;1-Machine Pocket	MENCMachining
000044/A;1-Inspection	MEOP
000045/A;1-Drilling	MENCMachining
000046/A;1-Heat Treatment	MEOP
000047/A;1-Part Probing	MEOP
000048/A;1-Final Inspection	MEOP

Specifying IDs

By default, IDs are created automatically (based on the same rules that are applied by the business modeler). You can specify IDs in a **ItemID** column in the Microsoft Excel sheet that are assigned to the objects during import. If you specify an ID that already exists in the database, it is updated using the information from the Excel sheet.

Optionally, you can specify the item revision using an **ItemRev** column.

Header1	Item	Item	Description	ItemID	ItemRev
Header2	Item	Item			
Header3	Item	Item			
Title	Name	Name	Desc	ID	Revision
	Assy		Assembly	PAR_as-00	A
		Comp10	CheckBox	PAR_cn-10	A
		Comp20	RadioButton	PAR_cn-20	001
		Comp30	ListBox	PAR_cn-30	
		Comp40	StaticImage	PAR_cn-40	B
		Comp50	MenuItem	PAR_cn-50	002
		Comp60	DropDownList	PAR_cn-60	A
		Comp70	Spacer	PAR_cn-70	

Note:

You can also use the **ID** column to automatically generate IDs and store them in a text file for future reference.

Adding activities

You can add activities to an operation by adding rows in the Microsoft Excel sheet for these activities. In addition, you can add a **Time** column to enter the duration time for each activity.

Header1	Item	Item	Item	Description	Activity	Activity
Header2	Process	OP	Activity		Description	Time
Header3	Process	OP	Activity			
Title	Proc	Oper	Activity	Desc	Act-Desc	Time
	Act-Process					
		OP10		Operation10		
		OP20		Operation20		
			Act1		activity 1	6
			Act2		activity 2	10
			Act3		activity 3	3
		OP30		Operation30		
		OP40		Operation40		
			Act4		activity 4	2
			Act5		activity 5	4
		OP50		Operation50		
		OP60		Operation60		
		OP70		Operation70		

You must place activities on separate rows. These activities then appear in Manufacturing Process Planner as follows.

The screenshot shows two windows. The left window, titled '000177-A', displays a 'Process Structure' tree with the following items:

- 000177/A;1-Act-Process (View)
- 000178/A;1-OP10
- 000179/A;1-OP20
- 000180/A;1-OP30
- 000181/A;1-OP40
- 000182/A;1-OP50
- 000183/A;1-OP60
- 000184/A;1-OP70

The right window, titled 'Activities', shows a table with the following data:

Line	Description	Activity Description	Durati...	Start(...)
000179/A	Activity Root Object	Activity Root Object	0	0
Act1	activity 1	activity 1	6	0
Act3	activity 3	activity 3	3	0
Act2	activity 2	activity 2	10	0

Creating the PERT sequence on import

During import, the **tcexcel_import** utility can create the PERT sequence on the structures. The sequence is based on the hierarchy as listed in the template.

Example:

Create the following in the import template.

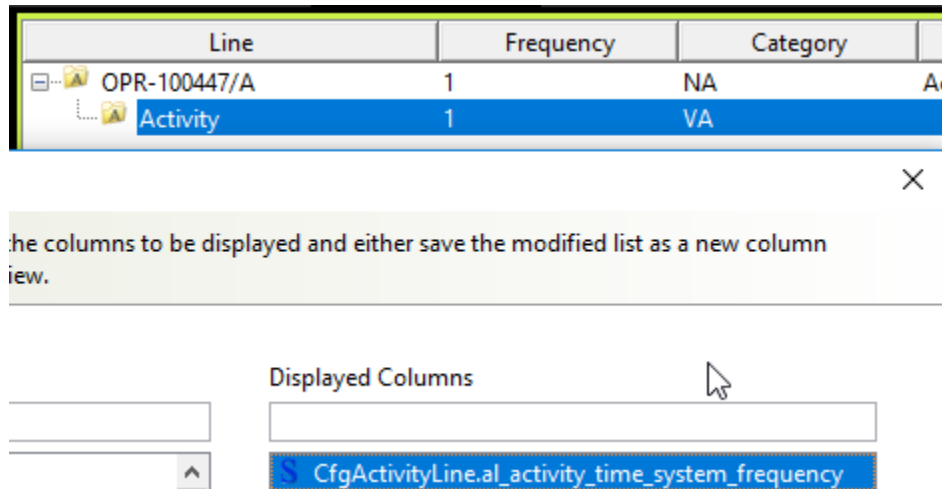
Item	Item
MEOP	MEActivity
MEOP	MEActivity
Operation	activity_name
INSTALL FRONT LH DOOR STRIKER	
	GET DOOR STRIKER KIT
	WALK TO VEHICLE
	LOAD PILOT LOCK

After importing, the following PERT sequence is created.



Importing the frequency of an activity

When importing plant structures, the **tcexcel_import** utility can also populate the frequency.

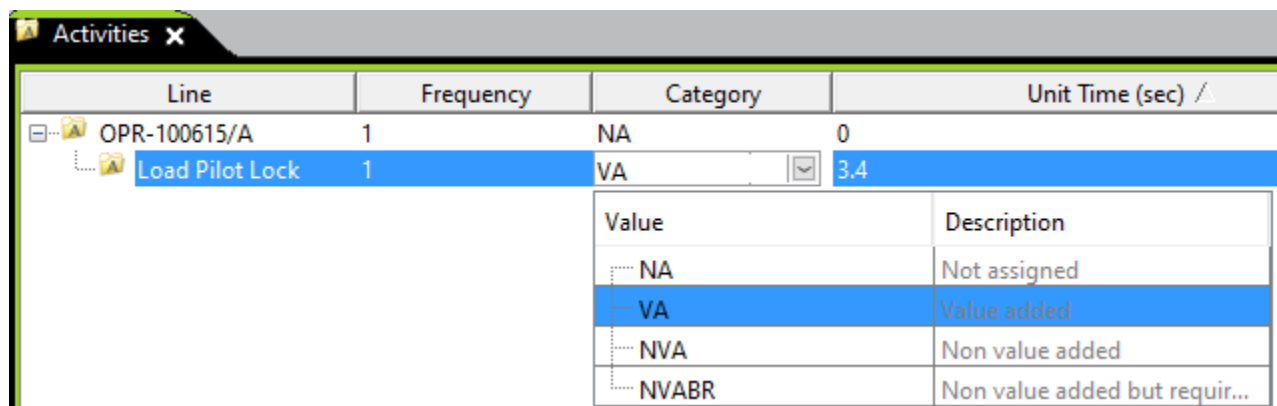


Note:

The frequencies are numeric values.

Importing the category of an activity

When importing plant structures, the **tcexcel_import** utility can also populate the category.



Note:

The category values are based on an existing (OOTB) LOV.

Importing the unit time of an activity

You can also use the **tcexcel_import** utility to populate the unit time of the imported plant structure, as shown in the **Activities** view above.

To do so, create the following in the import template.

Header1 Activity
Header2 Unittime

Note:

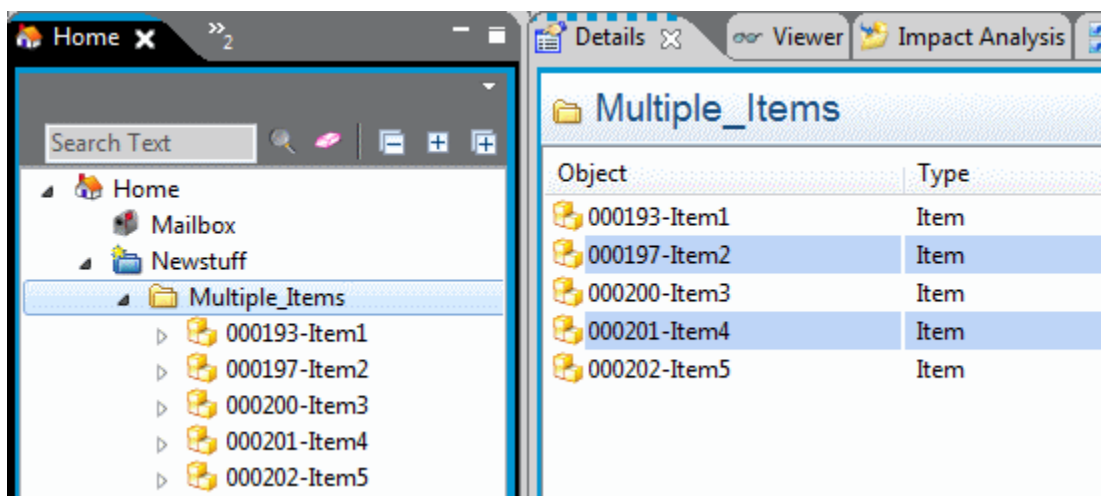
The unit times are numeric values.

Importing multiple structures

You can import multiple items on a single Microsoft Excel spreadsheet by adding the required item IDs to the **Item** column as follows.

Header1	Item	Item	Description
Header2	Item	Item	
Header3	Item	Item	
Title	Root	Sub	Desc
	Item1		Assembly 1
		Comp11	Component 11
		Comp12	Component 12
		Comp13	Component 13
	Item2		Assembly 2
		Comp21	Component 21
		Comp22	Component 22
	Item3		Item 3
	Item4		Item 4
	Item5		Assembly 5
		Comp51	Component 51

You can see the results of importing these structures in My Teamcenter.



Describing multiple BOM lines in one row

You can expand the types of definitions you assign to the imported objects by adding another header row to the Microsoft Excel file. This allows you to create, for example, several objects in one row and overwrite values that already exist with new values.

Header1	Item	Item	Item	Description	Description
Header2	Process	Process	OP		
Header3	Process	Process	NCMachining		
Header4	Root	Proc	Op	ALL	Op
Title	Root	Proc. Name	Op. Name	Description	Overwrite Description
	Process-Root			New Process	
		sub_process1	OP01	New Sub-process1	Read
			OP02		Get and place cable
			OP03		Record lot control
			OP04		Get from printer and place on carrier
		sub_process2	OP05	New Sub-process2	Get sign and place on carrier
			OP06		Set model switch
			OP07		Remove beam from cart
		sub_process3	OP08	New Sub-process3	Lock both sides and latch in place
		sub_process4	OP09	New Sub-process4	Get wire harness and position

The **Header4** row allows you to overwrite values for columns that exist twice. In the example, there are two **Description** columns. But if you look at the row containing **sub_process1**, you see that there are also two objects in the same row (**sub_process1** and **OP01**). The utility sees that there are two description columns. It assigns the description contained in the **ALL** column (this is a case-sensitive keyword) to everything except for that which is contained in the **Op** column (this is a reference to the first column named **Op**). The utility assigns the description in the first column (the one designated by **ALL**) to every object that it imports. It then looks at the second column and sees that this is a special description for all objects contained in the **Op** column. Importing the Excel file results in the following structure.

Process Structure	Item Type	Item Description
000461/A-Process-Root (view)	MEProcess	New Process
000462/A-sub_process1 (view)	MEProcess	New Sub-process1
000463/A-OP01	MENCMachining	Read
000464/A-OP02	MENCMachining	Get and place cable
000465/A-OP03	MENCMachining	Record lot control
000466/A-OP04	MENCMachining	Get from printer and place on carrier
000467/A-sub_process2 (view)	MEProcess	New Sub-process2
000468/A-OP05	MENCMachining	Get sign and place on carrier
000469/A-OP06	MENCMachining	Set model switch
000470/A-OP07	MENCMachining	Remove beam from cart
000471/A-sub_process3 (view)	MEProcess	New Sub-process3
000472/A-OP08	MENCMachining	Lock both sides and latch in place
000473/A-sub_process4 (view)	MEProcess	New Sub-process4
000474/A-OP09	MENCMachining	Get wire harness and position

You can now specify two different descriptions for two different objects in one line of the Microsoft Excel file.

Overwriting data in columns

Similar to overwriting descriptions, you can use the overwrite mechanism to overwrite other data in the structure. The following is an example of creating different values for the **cost_estimate** attribute in an **Impact Analysis** form in the same line in the Excel file.

Header1	Item	Item	Item	Item	Attribute	Attribute	Attribute
Header2	Item	Item	Item	Item	ImpactAnalysis Form	ImpactAnalysis Form	ImpactAnalysis Form
Header3	Item	Item	Item	Item	cost_estimate	cost_estimate	cost_estimate
Header4	Level1	Level2	Level3	Level4	ALL	Level3	Level4
Title					Attr: Cost	Attr: Cost	Attr: Cost
	Product-Root				0.00		
		P1	P1.1	P1.1.1	1.00	100.50	111
				P1.1.2			112
				P1.1.3			113
			P1.2	P1.2.1		123.45	121
				P1.2.2			122
		P2	P2.1	P2.1.1	2.00	90.00	211
			P2.1	P2.1.2			212
			P2.2	P2.2.1		200.00	221
			P2.3	P2.3.1		222.88	231

The resulting output shows the **cost_estimate** attribute set to **2.00**. This is specified by the **Header4** entry for the **Attribute** column that contains the keyword **ALL** (shown in white in the spreadsheet).

The screenshot shows the SAP BOM Explorer on the left and the ImpactAnalysis Form on the right. The BOM Explorer displays a hierarchy of BOM lines. The right pane shows the 'ImpactAnalysis Form' for line 000075/A;1-P2, with a 'cost_estimate' field set to 2.00.

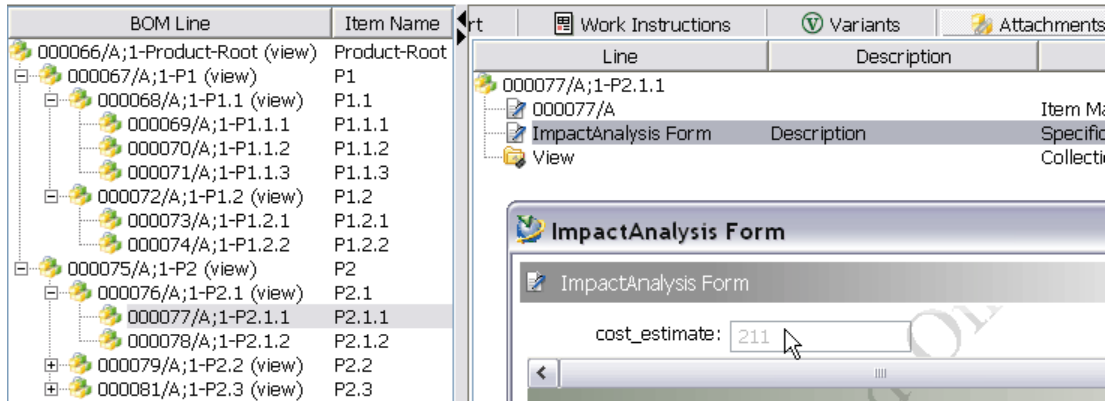
BOM Line	Item Name
000066/A;1-Product-Root (view)	Product-Root
000067/A;1-P1 (view)	P1
000068/A;1-P1.1 (view)	P1.1
000069/A;1-P1.1.1	P1.1.1
000070/A;1-P1.1.2	P1.1.2
000071/A;1-P1.1.3	P1.1.3
000072/A;1-P1.2 (view)	P1.2
000073/A;1-P1.2.1	P1.2.1
000074/A;1-P1.2.2	P1.2.2
000075/A;1-P2 (view)	P2
000076/A;1-P2.1 (view)	P2.1
000077/A;1-P2.1.1	P2.1.1
000078/A;1-P2.1.2	P2.1.2
000079/A;1-P2.2 (view)	P2.2
000081/A;1-P2.3 (view)	P2.3

The **Header4** entry for the next **Attribute** column, **Level3** (shown in red), specifies that the **cost_estimate** value for **P2.1** is set to **90.00**. This overwrites the value **2.00** that was set by the **ALL** entry in the previous figure.

The screenshot shows the SAP BOM Explorer on the left and the ImpactAnalysis Form on the right. The BOM Explorer displays a hierarchy of BOM lines. The right pane shows the 'ImpactAnalysis Form' for line 000076/A;1-P2.1, with a 'cost_estimate' field set to 90.00.

BOM Line	Item Name
000066/A;1-Product-Root (view)	Product-Root
000067/A;1-P1 (view)	P1
000068/A;1-P1.1 (view)	P1.1
000069/A;1-P1.1.1	P1.1.1
000070/A;1-P1.1.2	P1.1.2
000071/A;1-P1.1.3	P1.1.3
000072/A;1-P1.2 (view)	P1.2
000073/A;1-P1.2.1	P1.2.1
000074/A;1-P1.2.2	P1.2.2
000075/A;1-P2 (view)	P2
000076/A;1-P2.1 (view)	P2.1
000077/A;1-P2.1.1	P2.1.1
000078/A;1-P2.1.2	P2.1.2
000079/A;1-P2.2 (view)	P2.2
000081/A;1-P2.3 (view)	P2.3

The **Header4** entry for the next **Attribute** column, **Level4** (shown in cyan), specifies that the **cost_estimate** value for **P2.1.1** is set to **211**. This overwrites the value **2.00** that was set by the **ALL** entry and the **90.00** set by the **Level3** entry in the previous column.

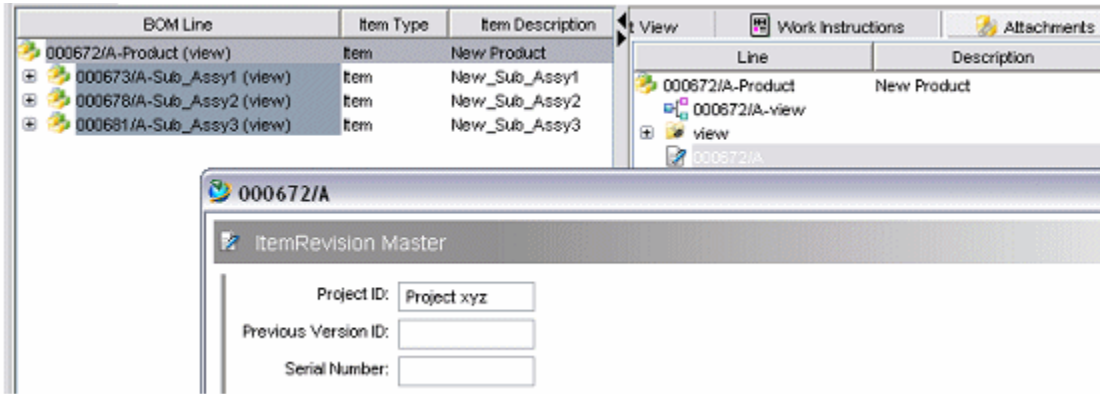


Attaching forms

You can add forms to your structure, and fill out attributes within these forms. The following Microsoft Excel sheet shows an example of this.

Header1	Item	Item	Item	Description	Attribute
Header2	Item	Item	Item		ItemRevision Master
Header3	Item	Item	Item		project_id
Title	Root	Proc. Name	Op. Name	Description	Item Project ID
	Product			New Product	Project xyz
		Sub_Assy1		New_Sub_Assy1	Project 1
			Part1	Desc of Part1	Project 1
			Part2	Desc of Part2	Project 1
			Part3	Desc of Part3	Project 1
			Part4	Desc of Part4	Project 1
		Sub_Assy2		New_Sub_Assy2	Project2
			Part5	Desc of Part5	Project2
			Part6	Desc of Part6	Project2
		Sub_Assy3		New_Sub_Assy3	Project3
			Part7	Desc of Part7	Project3

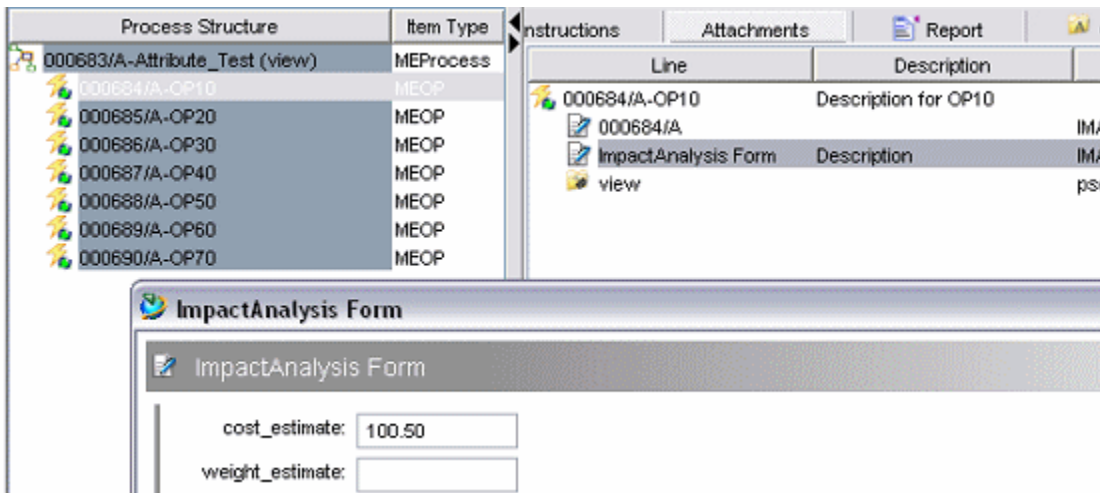
Item Master and **ItemRevision Master** are keywords that signify that the values in those columns should be inserted into the master form or the revision master form, respectively, of the type specified in the **Header2** row. The entry in the **Header3** row specifies the attribute to be filled in by the given values. This must be in the internal format specified in the Business Modeler IDE application (for example, in the previous example, the **Project ID** string is shown in the user interface, but the string shown in the Business Modeler IDE application is **project_id**).



You can also add a form of your choice to the structure. In the following example, in addition to entering a value in the revision master form for program ID, you add the **ImpactAnalysis** form to the operations and fill in the cost estimate field with the given values.

Header1	Item	Item	Description	Attribute	Attribute
Header2	Process	OP		ItemRevision Master	ImpactAnalysis Form
Header3	Process	OP		program_id	cost_estimate
Title	Proc	Oper	Desc	AttrProgram #	Cost
	Attribute_Test			F4711 0815	
		OP10	Description for OP10	F4711 0816	100.50
		OP20	Description for OP20	F4711 0817	123.45
		OP30	Description for OP30	F4711 0818	
		OP40	Description for OP40	F4711 0819	200.00
		OP50	Description for OP50	F4711 0820	222.88
		OP60	Description for OP60	F4711 0821	
		OP70	Description for OP70	F4711 0822	90.00

This results in the following structure.



Specifying the date attribute for forms

You can specify a date field in a form that you import using Microsoft Excel. The format for the date depends on the value for the **DefaultDateFormat** key defined in the **timelocal_locale.xml** file. This file is located in the following directory:

TC-root-directory\lang\textserver\en_US

If, for example, the following format for the date is specified in the **timelocal_locale.xml** file:

%d-%b-%Y %H:%M

You must enter the date and time as **15-Aug-2013 18:30** in the Excel input value. The date format is as follows:

- %d** Day of the month (0-31)
- %b** Abbreviated month name
- %Y** Year with century (1970-2069)
- %H** Hour (24-hour clock 00-23)
- %M** Minute (00-59)

The following spreadsheet shows how to add a date attribute value to the form.

Header1	Item	Attribute	Attribute
Header2	Item	Item Master	Item Master
Header3	Item	fnd0Date	user_data_3
Title	Name	Date Attribute	User Data
	Test	19-Aug-2013 18:30	check

This example imports an item called **Test** and the two attributes on the **Item Master** form, **fnd0Date** and **user_data_3**, are updated with the values **19-Aug-2013 18:30** and **check**, respectively.

Note:

The **fnd0Date** attribute is added on the **Item Master** form for illustration purposes only. This attribute is not available by default in Teamcenter.

Attaching multiple forms of the same type to an activity

You can create multiple forms of the same type when creating operation activities. The header definition for creating forms does not change. You specify the data for multiple forms in the value fields separated by the ~ character, for example, **V41~V42~V43**. The number of entries in the **Attribute** column defines

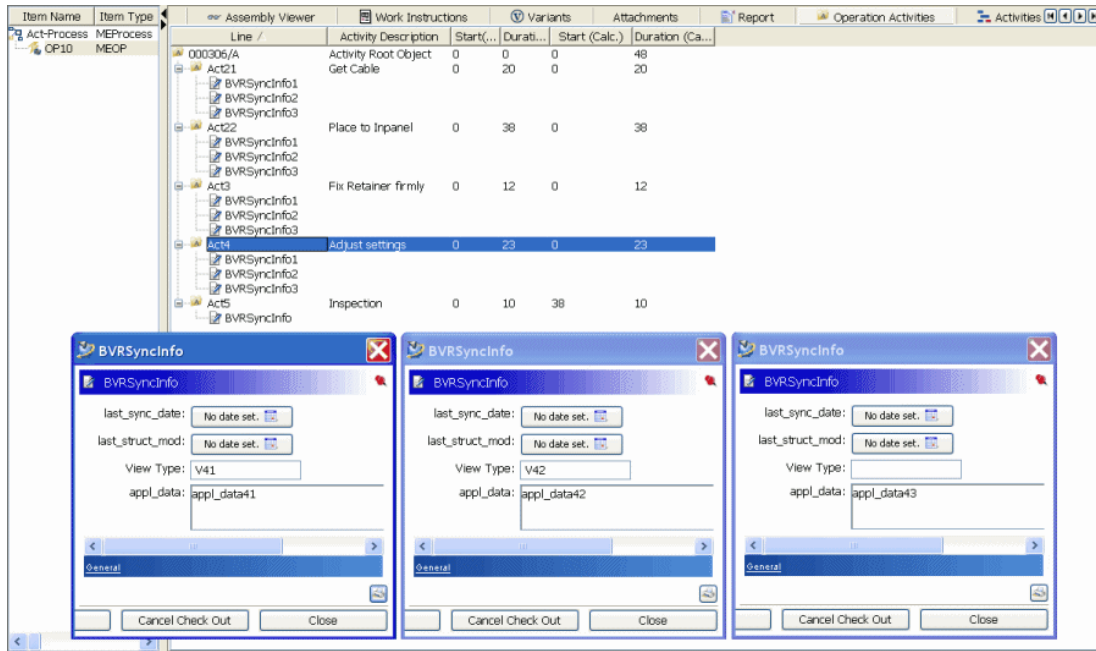
the number of forms that are created. The attribute values are written into the forms in the order that they appear in the cell. The first entry is written into the first form, the second entry is written into the second, and so on, until there are no more attribute values in the cell.

The following spreadsheet shows how to add multiple forms to activities.

Header1	Item	Item	Item	Description	Activity	Activity	ActivityForm	ActivityForm
Header2	Process	OP	Activity		Description	Time	BVRSyncInfo	BVRSyncInfo
Header3	Process	OP	Activity				appl_data	view_type
Title	Proc	Oper	Activity	Desc	Act-Desc	Time	Attr user1	Attr user2
	Act-Process							
		OP10		READ INPANEL SHEET				
			Act1		Get Cable	20	appl_data11~appl_data 12	V11~V12~V13
			Act2		Place to Inpane	38	appl_data21~appl_data 22 ~appl_data23	V21~V22
			Act3		Fix Retainer firmly	12	appl_data31	V31~V32~V33
			Act4		Adjust settings	23	appl_data41~appl_data 42 ~appl_data43	V41~V42
			Act5		Inspection	10	appl_data51	V51

In this example, in the row containing **Act4**, three forms are created because the cell in the **appl_data** attribute column contains three entries.

The Excel input produces the following output.



Assign resources

You can assign resources to operations in a process structure or to work areas in a plant structure.

1. If necessary, import the resources into the database.

Header1	Item	Item	ItemID
Header2	Item	Item	
Header3	Item	Item	
Title	Root	Sub	ID
	Milling Tool Assembly		res_tool_mill_001
		Holder	
		Cutter	
		Insert	
	Twist Drilling Tool		res_tool_drill_001
		Holder HSK63	
		Twist Drill	
	Spot Drilling Tool		res_tool_drill_002
		Machine Adapter	
		Spot Drill	
	EcoMill 350 Siemens 802C		res_machine_001

2. Create a Microsoft Excel spreadsheet that includes a column with the following keywords:
 - Add the **Relation** keyword to the **Header1** row.

- Add the **Resource** keyword to the **Header2** row.
 - In the **Header3** row, type the occurrence type of the resource, for example, **Tool** or **Resource**.
3. Assign these resources operations in the process structure as follows.

Header1	Item	Item	Description	Relation
Header2	Process	OP		Resource
Header3	Process	OP		Tool
Title	Process	Operation	Description	Resource
	Proc_Root			
		OP10	Rough Milling	res_tool_mill_001
		OP20	Heat Treatment	
		OP30	Finishing	MachineTool~ res_machine_001
		OP40	Washing	
		OP50	Drilling	res_tool_drill_001; res_tool_drill_002
		OP50	Inspection	

Importing this sheet results in the following structure.

Item Description	Occurrence Type
000041/A;1-OP10 (view)	Rough Milling
res_tool_mill_001/A;1-Milling Tool Assembly (view)	METool
000042/A;1-OP20	Heat Treatment
000043/A;1-OP30 (view)	Finishing
res_machine_001/A;1-EcoMill 350 Siemens 802C	MEMachineTool
000044/A;1-OP40	Washing
000045/A;1-OP50 (view)	Drilling
res_tool_drill_001/A;1-Twist Drilling Tool (view)	METool
res_tool_drill_002/A;1-Spot Drilling Tool (view)	METool
000046/A;1-OP60	Inspection

There are several points to note about this structure:

- The **Relation** column must contain the item IDs (not the names) of the resources or work areas.
- Resources that are classified in the database are indicated as such in the structure by the classified symbol . The import utility can assign both classified and nonclassified resources.

- The resources must already exist in the database.
- You can assign multiple resources to a single BOM line by separating them with a semicolon.
- You can specify an occurrence type in **Header3** of the **Relation** column that is then used for all the relations. If, however, you enter an occurrence type in the cells of the relation column (designated by *occurrence type~item ID*), this occurrence type is used instead of the one in **Header3**. In the preceding example, for **res_machine_001**, the **MachineTool** occurrence type is used instead of the default **Tool**.

Importing quantity and number of occurrences

You can add the quantity or number of occurrences to the process structure by adding a **Quantity** or **NumOccs** column to the **Header1** row. You can also add both simultaneously.

Header1	Item	Item	Description	Q u a n t i t y
Header2	Item	Item		
Header3	Item	Item		
Title	Root	Sub	Desc	Q u a n t i t y b y O c c s
	Quantity_Test			
		Item10	Description 10	1
		Item20	Use 2 of Item20	2
		Item30	Description 30	1
		Item40	Add 4 of Item40	4
		Item50	Description 50	3
		Item60	Description 60	1
		Item70	Description 70	2

This produces the following output.

000017-Quantity_Test (Latest Working Effectivity: Not Specified)		
BOM Line	Quantity	Pack Count
000017/A;1-Quantity_Test (view)		1
000018/A;1-Item10 x 1	1	1
000019/A;1-Item20 x 2	2	1
000020/A;1-Item30		1
000021/A;1-Item40 x 8	8	2
000022/A;1-Item50 x 3	3	3
000023/A;1-Item60 x 1	1	1
000024/A;1-Item70 x 4	4	2

If you unpack this, you see the following.

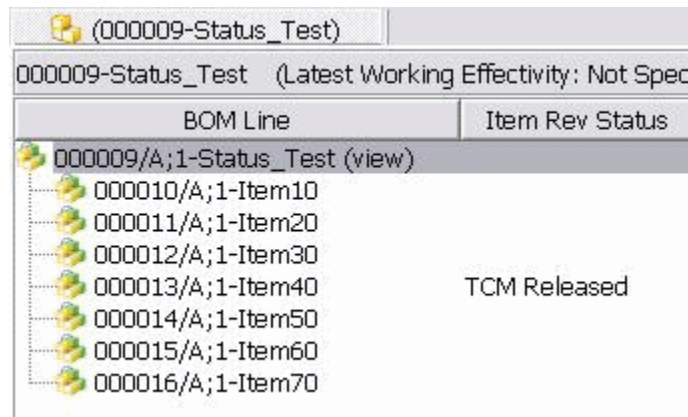
000017-Quantity_Test (Latest Working Effectivity: Not Specified)		
BOM Line	Quantity	Pack Count
000017/A;1-Quantity_Test (view)		1
000018/A;1-Item10 x 1	1	1
000019/A;1-Item20 x 2	2	1
000020/A;1-Item30		1
000021/A;1-Item40 x 4	4	1
000021/A;1-Item40 x 4	4	1
000022/A;1-Item50		1
000022/A;1-Item50		1
000022/A;1-Item50		1
000023/A;1-Item60 x 1	1	1
000024/A;1-Item70 x 2	2	1
000024/A;1-Item70 x 2	2	1

Importing release status

You can add the release status to the process structure by adding a **Status** column to the **Header1** row and assigning an existing release status to an item or item revision.

Header1	Item	Item	Description	Status
Header2	Item	Item		
Header3	Item	Item		
Title	Root	Sub	Desc	Release Status
	Status_Test			
		Item10	Description of Item10	
		Item20	Description of Item20	
		Item30	Description of Item30	
		Item40	Item-Rev with status	TCM Released
		Item50	Description of Item50	
		Item60	Description of Item60	
		Item70	Description of Item70	

This produces the following results.

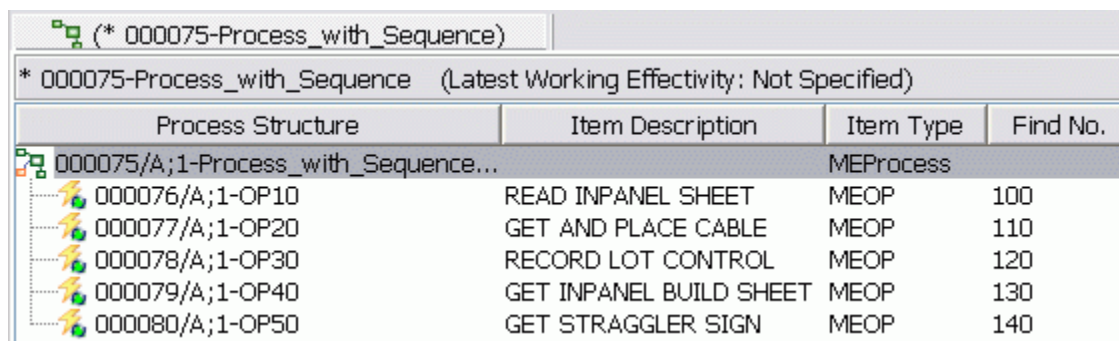


Assigning find numbers

You can use the **Sequence** heading to help you assign find numbers to the structure you are importing.

Header1	Item	Item	Description	Sequence
Header2	Process	OP		
Header3	Process	OP		
Title	Root	Oper	Description	Seq No.
	Process_with_Sequence			
		OP10	READ INPANEL SHEET	100
		OP10	GET AND PLACE CABLE	110
		OP10	RECORD LOT CONTROL	120
		OP10	GET INPANEL BUILD SHEET	130
		OP10	GET STRAGGLER SIGN	140

This results in the following output:



Attaching notes

You can use the **Occurrence** header to help you attach notes to the structure you are importing.

Header1	Item	Item	Description	Occurrence
Header2	Process	OP		Note
Header3	Process	OP		ResourceID
Title	Root	Part no.	Description	Occ-Note
	OCC-Note-Test			
		Part1	Read	OCN1
		Part2	Get and place	OCN2
		Part3	Record	OCN3
		Part4	Get from printer	OCN4
		Part5	Get and place	OCN5
		Part6	Set Switch	OCN6
		Part7	Remove beam	OCN7
		Part8	Lock sides	OCN8
		Part9	Place Beam	OCN9
		Part10	Route	OCN10

This results in the following structure.

Process Structure	Item Description	Item Type	All Notes
000880/A-Occ-Note-Test (view)		MEProcess	
000881/A-Part1	Read	MEOP	MEResourceID: OCN1
000882/A-Part2	Get and place	MEOP	MEResourceID: OCN2
000883/A-Part3	Record	MEOP	MEResourceID: OCN3
000884/A-Part4	Get from printer	MEOP	MEResourceID: OCN4
000885/A-Part5	Get and place	MEOP	MEResourceID: OCN5
000886/A-Part6	Set switch	MEOP	MEResourceID: OCN6
000887/A-Part7	Remove beam	MEOP	MEResourceID: OCN7
000888/A-Part8	Lock sides	MEOP	MEResourceID: OCN8
000889/A-Part9	Place Beam	MEOP	MEResourceID: OCN9
000890/A-Part10	Route	MEOP	MEResourceID: OCN10

Importing transformation data

You can import transformation matrix data by specifying the data in the **Matrix** column of the Excel spreadsheet.

Header1	Item	Item	Description	Matrix
Header2	Item	Item		
Header3	Item	Item		
Title	Root	Sub	Desc	Matrix
	Transformation_Text			
		Item10	Description 10	1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1
		Item20	Description 20	1 0 0 1 0 1 0 4 0 0 1 1 0 0 0 1
		Item30	Description 30	1 0 0 1 0 1 0 7 0 0 1 1 0 0 0 1
		Item40	Description 40	1 0 0 1 0 1 0 10 0 0 1 1 0 0 0 1

	Item50	Description 50	1 0 0 1 0 1 0 1 3 0 0 1 1 0 0 0 1
	Item60	Description 60	1 0 0 7 0 1 0 4 0 0 1 1 0 0 0 1
	Item70	Description 70	1 0 0 7 0 1 0 7 0 0 1 1 0 0 0 1

You can see the transformation data in the **Absolute Transformation Matrix** column in Teamcenter.

Assigning absolute occurrence IDs

You can use the **Occurrence** column to help you assign absolute occurrence IDs.

Header1	Item	Item	Item	Description	Occurrence
Header2	Process	Process	OP		AbsOccurrence
Header3	Process	Process	OP		AbsOccurrence
Title	Root	Substructure	Operation	Description	Abs-Occ-Ids
	Process-Root				
		Sub10			
			F02211	READ SHEET	AbsOccID-F02211
			F01760	GET AND PLACE CABLE REEL	AbsOccID-F01760
			F01459	RECORD LOT CONTROL	AbsOccID-F01459
			F00269	GET SHEET FROM PRINTER	AbsOccID-F00269
		Sub20			
			F00270	PLACE ON INPANEL	AbsOccID-F00270
			F01206	SET MODEL SWITCH	AbsOccID-F01206
			F00271	REMOVE BEAM COMP	AbsOccID-F00271
		Sub30			
			F00272	LOCK BOTH SIDES OF LATCH	AbsOccID-F00272
			F00273	INSTALL HARNESS	AbsOccID-F00273
			F00279	ROUTE BEAM	AbsOccID-F00279

This produces the following output.

BOM Line	Item Description	Item Name	Item Type	ID In Context (Top Level)
000097/A;1-Proc-Root (view)		Proc-Root	MEProcess	
000098/A;1-Sub10 (view)		Sub10	MEProcess	
000099/A;1-F02211	READ SHEET	F02211	MEOP	AbsOccID-F02211
000100/A;1-F01760	GET AND PLACE CABLE REEL	F01760	MEOP	AbsOccID-F01760
000101/A;1-F01459	RECORD LOT CONTROL	F01459	MEOP	AbsOccID-F01459
000102/A;1-F00269	GET SHEET FROM PRINTER	F00269	MEOP	AbsOccID-F00269
000103/A;1-Sub20 (view)		Sub20	MEProcess	
000104/A;1-F00270	PLACE ON INPANEL	F00270	MEOP	AbsOccID-F00270
000105/A;1-F01206	SET MODEL SWITCH	F01206	MEOP	AbsOccID-F01206
000106/A;1-F00271	REMOVE BEAM COMP	F00271	MEOP	AbsOccID-F00271
000107/A;1-Sub30 (view)		Sub30	MEProcess	
000108/A;1-F00272	LOCK BOTH SIDES OF LATCH	F00272	MEOP	AbsOccID-F00272
000109/A;1-F00273	INSTALL HARNESS	F00273	MEOP	AbsOccID-F00273
000110/A;1-F00279	ROUTE BEAM	F00279	MEOP	AbsOccID-F00279

Assigning ownership to objects

You can change the ownership of objects you import into the database by using an **Owner** column. The first entry in this column after the title row (that is, the root entry) defines the global owner and group. If you leave any of the subsequent owner cells empty, the object's ownership is changed to the root owner and root group. In the following example, this is **Person 1** belonging to the **Mfg** group.

Tip:

Make the **Owning user** column visible in Teamcenter to verify that the owner is imported correctly.

Header1	Item	Item	Item	Item	Description	Owner
Header2	Process	Process	Process	OP		
Header3	Process	Process	Process	OP		
Title	Proc	Proc	Proc	Oper	Desc	Owner/Group
	Owner-Test				Info: usera	Person 1;Mfg
		Proc1			Info: usera	
			Subproc11		Info: usera	
				OP111	Info: userb	Person 2
				OP112	Info: userc	Person 3
			Subproc12		Info: userb	Person 2
				OP121	Info: usera	
				OP122	Info: userc	Person 3
				OP123	Info: usera	
			Subproc13		Info: usera	Person 1
				OP131	Info: userd	Person 4
		Proc2			Info: usera	
			Subproc21		Info: userc	Person 3
				OP211	Info: usera	
			Subproc22		Info: userd	Person 4
				OP212	Info: usera	
				OP222	Info: userc	Person 3
		Proc3			Info: userb	Person 2
			Subproc31		Info: userd	Person 4

Importing this spreadsheet results in the following structure in the database.

Process Structure	Item Description	Item Revision	Owning User	Owning Group
000045/A;1-Owner-Test (view)	Info: usera	Person 1 (usera)		Mfg
000046/A;1-Proc1 (view)	Info: usera	Person 1 (usera)		Mfg
000047/A;1-Subproc11 (view)	Info: usera	Person 1 (usera)		Mfg
000048/A;1-OP111	Info: userb	Person 2 (userb)		Mfg
000049/A;1-OP112	Info: userc	Person 3 (userc)		Mfg
000050/A;1-Subproc12 (view)	Info: userb	Person 2 (userb)		Mfg
000051/A;1-OP121	Info: usera	Person 1 (usera)		Mfg
000052/A;1-OP122	Info: userc	Person 3 (userc)		Mfg
000053/A;1-OP123	Info: usera	Person 1 (usera)		Mfg
000054/A;1-Subproc13 (view)	Info: usera	Person 1 (usera)		Mfg
000055/A;1-OP131	Info: userd	Person 4 (userd)		Mfg
000056/A;1-Proc2 (view)	Info: usera	Person 1 (usera)		Mfg
000057/A;1-Subproc21 (view)	Info: userc	Person 3 (userc)		Mfg
000058/A;1-OP211	Info: usera	Person 1 (usera)		Mfg
000059/A;1-Subproc22 (view)	Info: userd	Person 4 (userd)		Mfg
000060/A;1-OP212	Info: usera	Person 1 (usera)		Mfg
000061/A;1-OP222	Info: userc	Person 3 (userc)		Mfg
000062/A;1-Proc3 (view)	Info: userb	Person 2 (userb)		Mfg
000063/A;1-Subproc31	Info: userd	Person 4 (userd)		Mfg

Linking multiple structures

Linking multiple structures—overview

To link product to process, or plant to process, you must link the structures in the Microsoft Excel files to each other.

In the first Excel file, you specify some BOM lines that you want to link to in another Excel file. This is done in the column with **Header1; ItemID** using the syntax **M:my_marker**.

In the second Excel file, you specify a link to this marker (again in the **ItemID** column). Instead of creating a new item for the BOM line, the system uses the existing item that is specified using the syntax **L:my_marker**.

You can **specify a specific item ID** in the **ItemID** column. If you do this, the system uses an existing item with this ID. If this item ID does not exist in the database, it generates a new item with ID. If **ItemID** is not specified, the system always generates a new item and assigns the item ID automatically.

If you specify **M:any-marker-label**, the system generates a new item and assigns the item ID automatically. Additionally, the newly-generated ID and revision are stored in a text file with the name **marker.txt**. In **Example A**, the following **marker.txt** is generated:

```
M:op20_marker 024528 A
M:op40_marker 024530 A
```

Note:

Markers (specified using **<M:marker>** and **<L:marker>**) must be unique.

For each **M:** entry, the system writes one line to the **marker.txt** file with the actual ID and revision. If you now load the second Excel file, you must specify the additional **marker.txt** parameter. The system checks for **L:** entries in the **ItemID** column and replaces this label with the correct item ID from the

marker.txt file causing the system to reuse the previously generated item, instead of creating a new one.

Example A

This example links operations between two structures. You can link any process step between multiple structures. Note the **M:** and **L:** entries for **OP20** and **OP40**.

Header1	Item	Item	Description	ItemID	Sequence
Header2	Process	OP			
Header3	Process	OP			
Title	Root	Root	Description	Store markers	Seq. No.
	Process-1–Root				
		OP10	Read		100
		OP20	Get and place cable	M:op20_marker	110
		OP30	Record lot control		120
		OP40	Get from printer and place on carrier	M:op40_marker	130
		OP50	New Sub-process2		140
		OP60	Get sign and place on carrier		150

Header1	Item	Item	Description	ItemID	Sequence
Header2	Process	OP			
Header3	Process	OP			
Title	Root	Root	Description	Use markers	Seq. No.
	Process-2–Root				
		PS05	Set switch		200
		PS10	Remove beam		210
		PS15	Place carrier		220
		OP20	Get and place cable	L:op20_marker	230
		PS25	Lock		240
		OP40	Get from printer and place on carrier	L:op40_marker	250
		PS35	Get wire		260

As a result, you get the following two linked structures.

Process Structure	Item Type	Item Description	Process Structure	Item Type	Item Description
000750/A-Process-1-Root	MEProc...		000757/A-Process-2-Root...	MEProcess	
000751/A-OP10	MEOP	Read	000758/A-PS05	MEOP	Set switch
000752/A-OP20	MEOP	Get and place cable	000759/A-PS10	MEOP	Remove beam
000753/A-OP30	MEOP	Record lot control	000760/A-PS15	MEOP	Place carrier
000754/A-OP40	MEOP	Get from printer and place	000752/A-OP20	MEOP	Get and place cable
000755/A-OP50	MEOP	New Sub-process2	000761/A-PS25	MEOP	Lock
000756/A-OP60	MEOP	Get sign and place on carr	000754/A-OP40	MEOP	Get from printer and place on carrier
			000762/A-PS35	MEOP	Get wire

When **OP20** and **OP40** are used in **Process-2-Root**, they are the same operations that are used in **Process-1-Root** (items **000752** and **000754**).

Example B

You can also link related objects such as consumed/required parts, work areas, or resources. In this example, you link plant information (**Workarea**) to a process structure.

Header1	Item	Item	Description	ItemID	Sequence
Header2	WorkArea	WorkArea			
Header3	Plant	Station			
Title	Root	Station	Description	Store markers	Seq. No.
	Plant-Root			M:proot	
		OP10	Station 1	M:op10	100
		OP20	Station 2	M:op20	110
		OP30	Station 3	M:op30	120
		OP40	Station 4	M:op40	130
		OP50	Station 5	M:op50	140

Header1	Item	Item	Description	Relation	Sequence
Header2	Process	OP		Workarea	
Header3	Process	OP			
Title	Root	Oper	Description	Link to markers	Seq. No.
	Process-Root			L:proot	
		OP10	Read	L:op10	100
		OP20	Get	L:op20	110
		OP30	Record	L:op30	120
		OP40	Save	L:op40	130
		OP50	Send	L:op50	140

As a result, you get the following two linked structures.

BOM Line	Item Description
000187/A;1-Plant-Root (View)	
000188/A;1-OP10 (View)	Station 1
000189/A;1-OP20 (View)	Station 2
000190/A;1-OP30 (View)	Station 3
000191/A;1-OP40 (View)	Station 4
000192/A;1-OP50 (View)	Station 5

Process Structure	Item Type	Occurrence Type	Item Description
000193/A;1-Process-Root (View)	MEProcess		
000194/A;1-OP10 (View)	MEOP		Read
000188/A;1-OP10 (View)	MESStation	MEWorkArea	Station 1
000195/A;1-OP20 (View)	MEOP		Get
000189/A;1-OP20 (View)	MESStation	MEWorkArea	Station 2
000196/A;1-OP30 (View)	MEOP		Record
000190/A;1-OP30 (View)	MESStation	MEWorkArea	Station 3
000197/A;1-OP40 (View)	MEOP		Save
000191/A;1-OP40 (View)	MESStation	MEWorkArea	Station 4
000198/A;1-OP50 (View)	MEOP		Send
000192/A;1-OP50 (View)	MESStation	MEWorkArea	Station 5

The plant objects are linked to the process structure using the specified **WorkArea** occurrence type.

Link two structures

1. Save the two Microsoft Excel files as **(Tab delimited)(* .txt)** text files.
2. Import the *first* file (containing the **M:** markers):

```
tcexcel_import -u=user_name -p=password -g=group_name -i=Link-Process_structure-1.txt
-m=my_marker_file.txt
```

Note:

If you do not specify a name for the marker file using the **-m** parameter, Teamcenter outputs a file named **marker.txt**

3. Import the second file (containing the **L:** markers) with the parameter *my_marker_file.txt*:

```
tcexcel_import -u=user_name -p=password -g=group_name -i=Link-Process_structure-2.txt
-m=my_marker_file.txt
```

Caution:

If you want to repeat this procedure using the same two input files, you must delete the *my_marker_file.txt* by hand before doing so.

Attaching variant data

If you want to load variants, an item must exist in your database containing all the variant options. For the next example, the item revision (**v_item/A**) has the following options.

Remark	Option	Value1	Value2	Value3	Value4
Motor Engine	Engine	V8	V10	V12	
Transmission	TRN	THX4	TCX7	TJS8	TDT9
Air Conditioning System	AC	Y	N		
Entertainment System	E_TAPE	Y	N		
	E_CD	Y	N		
	E_NAVI	Y	N		

The variant item revision is specified in the **Variants** column in the **Header2** row as shown in the following example.

Header1	Item	Item	Variants
Header2	Process	OP	v_item/A
Header3	Process	OP	
Title	Root	Sub	Variant Definitions
	Proc_Root		
		Comp1	
		Comp2	AC==N
		Comp3	AC==Y AND E_NAVI==Y
		Comp4	
		Comp5	Engine==V8 OR Engine==V10
		Comp6	Engine==V10 AND (TRN==TCX7 OR TRN==TJS8)
		Comp7	(Engine==V12 OR TRN==THX4) AND (AC==Y AND (E_TAPE==Y OR E_CD==Y))
		Comp8	Engine==V8 OR TRN==TJS8 OR AC==Y OR E_NAVI==Y

Importing this sheet results in the following structure.

BOM Line	Variant Conditions
010083/A;1-Proc_Root (View)	
010091/A;1-Comp8	Engine = V8 OR TRN = TJS8 OR AC = Y OR E_NAVI = Y
010088/A;1-Comp5	Engine = V8 OR Engine = V10
010089/A;1-Comp6	Engine = V10 AND (TRN = TCX7 OR TRN = TJS8)
010086/A;1-Comp3	AC = Y AND E_NAVI = Y
010085/A;1-Comp2	AC = N
010090/A;1-Comp7	(Engine = V12 OR TRN = THX4) AND (AC = Y AND (E_TAPE = Y OR E_CD = Y))
010084/A;1-Comp1	
010087/A;1-Comp4	

Load a variant item into the database

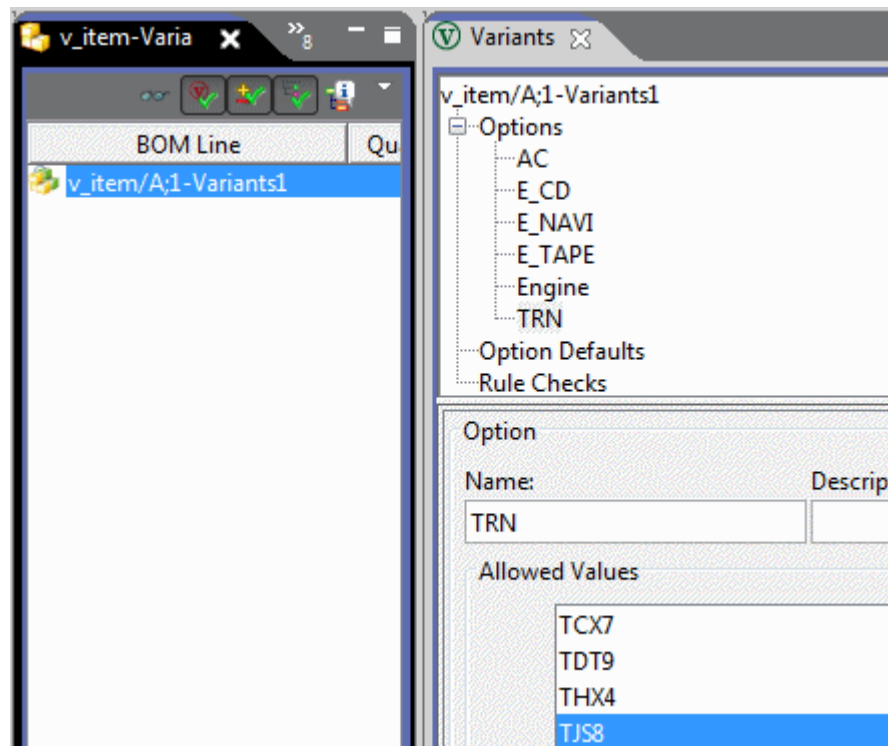
1. Copy the following four lines into a file named **variant_options.pim**:

```
#COL level item rev name descr type option
#DELIMITER #
#ALT_DELIMITER ;
0#v_item#A#Variants1#Variants Option
Definitions#Item#Engine;V8;V10;V12;-;
TRN;THX4;TCX7;TJS8;TDT9;-;AC;Y;N;-;E_TAPE;Y;N;-;E_CD;Y;N;-;E_NAVI;Y;N
```

2. Change to the directory containing the **variant_options.pim** file.
3. Create **v_item/A** by using the following command to import **variant_options.pim**:

```
tcexcel_import.exe -u=user_name -p=password -g=group_name -psfile -i=variant_options.pim
```

The variant options for **v_item/A** appear as follows.



Importing standard text library structures from a legacy system

If you have a standard text library structure in a system other than Teamcenter, you can re-create this structure in Teamcenter using the **tcexcel_import** utility. You define the full library structure containing folders and standard text elements in a Microsoft Excel spreadsheet and save it to a tab-delimited file. This file is then used as input for the **tcexcel_import** utility that creates the structure and attaches documents to the standard text elements. In the spreadsheet, you specify the paths to the documents that are to be attached to the standard text elements. The textual content for each of the standard text elements can come from:

- TXT files containing only rich text.
- DOCX files containing tables, images, formatting, header and footer content.

After import, a standard text librarian can modify the library structure and an author can modify the documents and save the modifications.

The following is an example of an input file with a simple library structure. The first four columns represent the structure of the standard text library. The last column, the **StxFilePath** column, contains the path to the document that will be attached to the standard text element.

Header1	Item	Item	Item	StxFilePath
Header2	Mes0MESTXLibrary	Mes0MESTXFolder	Mes0MESTXElement	
Header3	Mes0MESTXLibrary	Mes0MESTXFolder	Mes0MESTXElement	
Title	Root	Sub1	Sub2	Sub3
	Library			
		Safety instructions		
			STX1	D:\templgoggles.docx
			STX2	D:\templboots.docx
			STX3	D:\templhelmet.docx
		Folder2		
			STX4	D:\templmagnet.docx
			STX5	D:\templtable_example.docx
			STX6	D:\templrich_text_example.docx
			STX7	D:\templhelmet.docx
			STX8	D:\templhelmet.docx

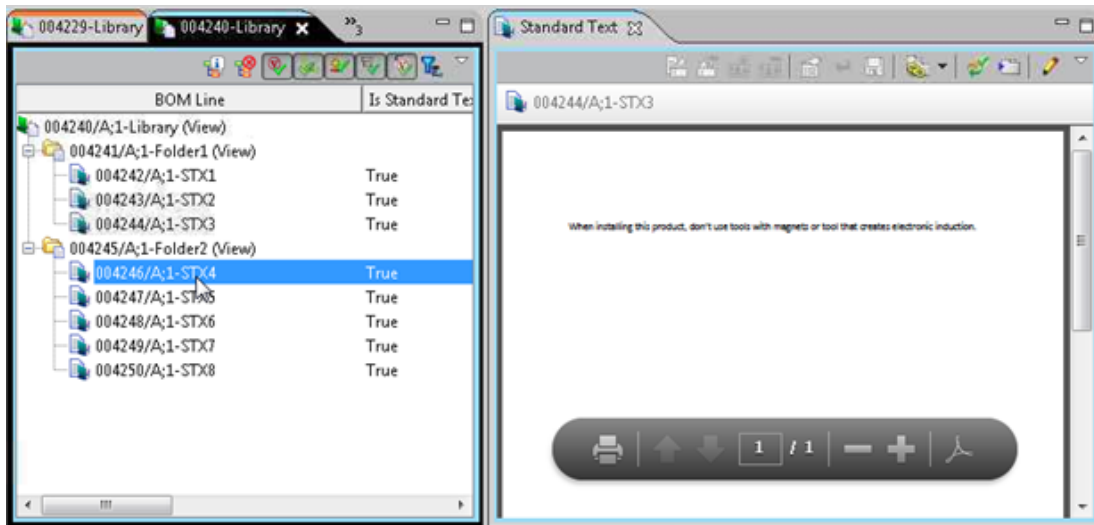
Note:

This example imports only DOCX files, but both DOCX and TXT files are supported.

You can import this structure into Teamcenter by saving the Microsoft Excel spreadsheet as a text file and import that file into Teamcenter using the following **tcexcel_import** utility call:

```
tcexcel_import -u=username -p=password -g=dba -i=path-to-txt-file
```

The resulting structure appears as follows in Teamcenter.



Note that the standard text elements have documents attached. You can modify these documents, save them, and continue to work with them in the customary fashion.

Note:

You can only use the **tcexcel_import** utility to create new library structures. You cannot use it to update structures.

Sequence processes without the process flow viewer

When you add an object to a process or plant structure, you often need to add it between existing objects. You can do this by giving the new object a find number that falls between the existing objects. When the existing objects have no number space between them, you need to resequence the structure. For example, you have the existing numbers 11,12,13 and must change these to 10,20,30. If you do not use PERT flows, or intend to use them later in the process, you can resequence the structure as follows:

1. Select the parent object of the structure that you want to resequence.
2. Choose **Tools**→**Re-Sequence Structure**.

Teamcenter displays the **Re-sequence** dialog box.

3. Type a start number and increment.
4. Clear the **Consider flows** check box.

The default state of this check box is stored in the **MEConsiderFlowsOnReSequence** preference. After the first time you open the dialog box, the check box state is stored in a cookie.

5. Click **OK**.

Sequencing processes with the PERT view

Sequencing processes and operations with the PERT view

The **PERT** view displays a graphical representation of process flow in PERT chart format. You can edit and manipulate the process flow in the graphical environment. You can also assign parts, resources, or manufacturing features directly in the **PERT** view.

The **PERT** view is used in different contexts, for example:

- When you select a process.

The **PERT** view displays the flow of operations and processes directly under the selected process.

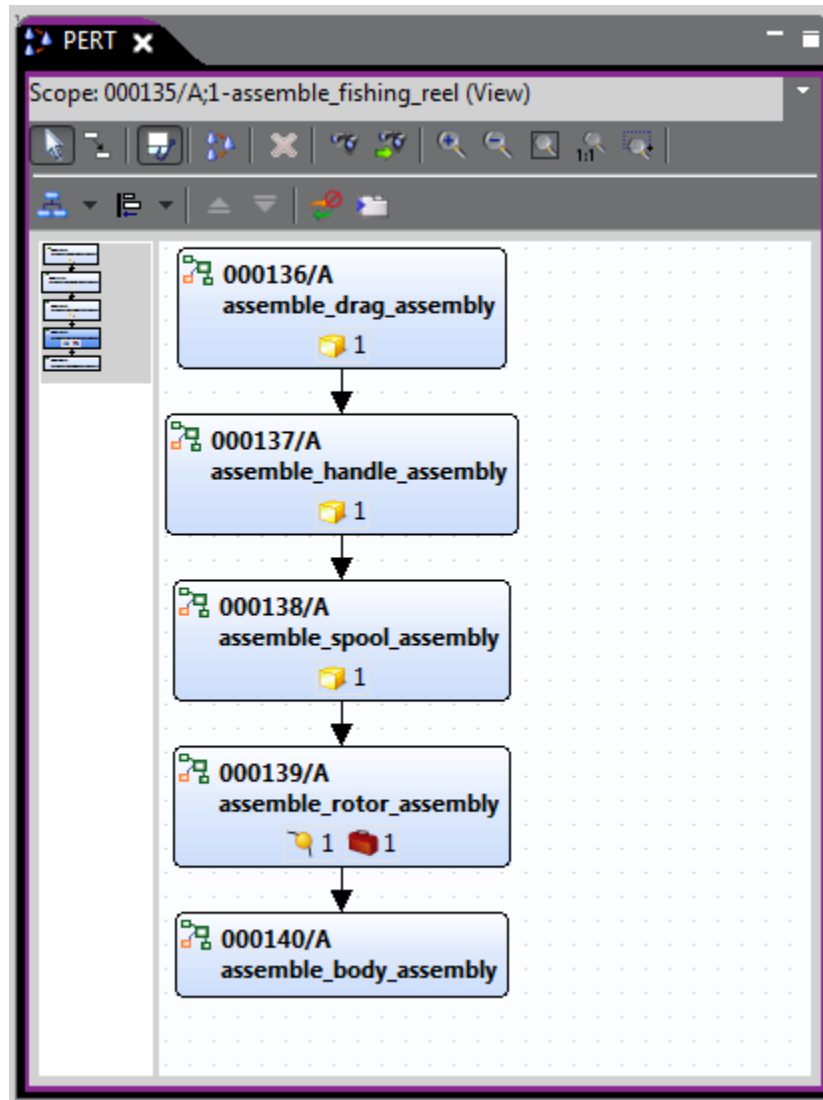
- When you select a work area object.

The **PERT** view displays the physical flow on the plant floor.

- When you select an activity in the **Activities** view.

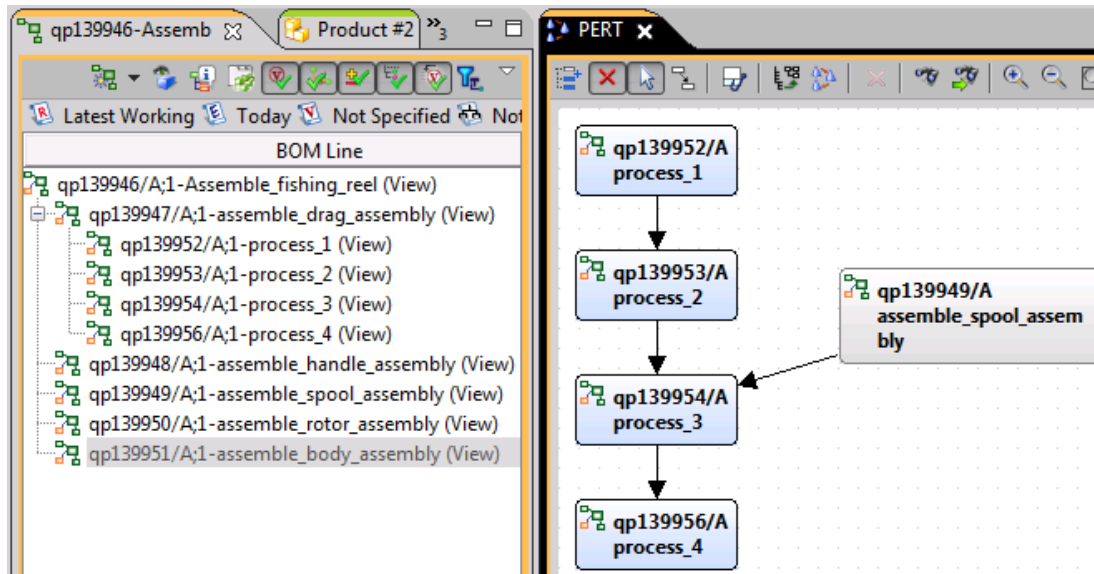
The **PERT** view displays the flows of activities directly under the selected activity.


When you create a process, Teamcenter creates a default process flow that includes all the children (subprocesses and operations) of the process. The default flow appears in the structure view, starting at the top left and continuing down in a tree-like fashion, and in the PERT chart.



You can additionally add nodes to the PERT chart from siblings of the selected process.

You can additionally create flows to and from a node that is not a direct child of the selected parent node that you open as scope in the PERT chart. These types of flows are called *scope flows* and are displayed with a gray (configurable) background color.





If the **Show Assignments** button is turned on, the PERT nodes provide you with information about assigned parts, resources, and features assigned to the object. If you place the mouse over the object, Teamcenter provides more information about the assigned objects. Additionally, Teamcenter displays the  symbol if a process has any variant information associated, as well as incremental change icons, if applicable.

Teamcenter occasionally creates implicit flows to retain necessary dependencies between objects. This can happen, for example, when you begin with process A→process B→process C, and then configure process B out of the structure using variants. Teamcenter creates an implicit flow between process A and process C. Teamcenter displays these flows in a different color, and you cannot modify or delete them.

You can configure the attributes that determine how each process, operation, or root activity node is displayed. You can override some of these configuration settings individually.

When you select a node in the PERT chart, Teamcenter selects the equivalent line in the structure view, and vice versa. If you remove a node in the PERT chart, Teamcenter removes the equivalent line from the structure.

Draw flows

1. Click the **Draw Flow** button  on the PERT toolbar. The draw flow mode is activated and the cursor changes to .
2. Draw flows as required by clicking the origin node, then the target node.
3. Exit the draw flow mode using one of the following methods:
 - a. Press the Esc key.

- b. Click the **Select** button  on the PERT toolbar.


If you select an incorrect source or target while drawing a flow, the PERT chart:

- Does not create any arrows.
- Does not display an error message.
- Remains in draw flow mode.


Create flows to and from external processes or operations

You can add processes or operations to a PERT chart that are not immediate children of the process on which you open the PERT chart. Any flows you create to and from these *external* processes or operations are called *scope flows*. This is useful when you model fishbone structures of sublines merging or leaving a main line.

You can create scope flows between the following structures:

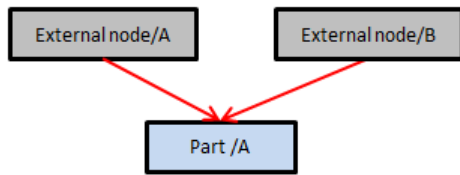
- Processes
 - Processes and operations
 - Process areas
 - All types of process areas
1. With a process open in the PERT chart, select an external node in the same process structure. This node can be a sibling of the process that you send to the PERT or it can be any child of a sibling.
 2. Click **Add External Nodes** .

Teamcenter adds the process or operation to the PERT chart with a gray background.

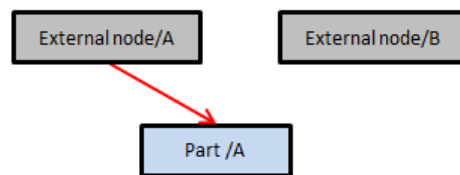
3. Create a flow to or from the external node.
4. (Optional) Select an external node and click  to remove the node.

When you revise a part, any existing scope flows are copied. If you then delete the copied flow, the scope flow between the original parts still exists. This behavior means that different revisions of parts can participate in different scope flows.

Scope flows after revise



Scope flows after deleting new scope flow




Select objects in the PERT view

Do one of the following:


- Select a single node or flow by clicking it.
- Select multiple nodes by dragging a rectangle around them with the cursor.
- Select a mixture of flows and nodes by keeping the Ctrl key pressed and clicking them.
- Select all nodes by right-clicking in an empty area of the **PERT** view and selecting **Select PERT Nodes**.
- Select all flows by right-clicking in an empty area of the **PERT** view and selecting **Select Flows**.
- Select all flows and all PERT nodes by right-clicking in an empty area of the **PERT** view and selecting **Select All** or by pressing Ctrl+A.

Delete flows

1. Select the flow or flows you want to delete.
2. Perform one of these delete actions:
 - Click the **Delete** button  on the PERT toolbar.
 - Press Delete on the keyboard.

Deleting flows disconnects the PERT nodes from each other.

Remove PERT nodes in a process PERT view


1. Select the node or nodes that you want to remove.
2. Do one of the following:
 - Click **Remove a Line**  in the main toolbar.

- Press Ctrl+R.

Teamcenter removes all selected occurrences from the current structure.

Processes and operations are BOM lines so you cannot delete them from the database, only remove them from a structure.

Delete nodes in an activity PERT view.

1. Select the activity node or nodes that you want to delete.
2. Click the **Delete** button  on the PERT toolbar.


Activities are not BOM lines and Teamcenter can, therefore, delete them from the database.

Resequence a process in the PERT chart

The sequence of processes in the process structure are represented by *find* numbers. Find numbers are assigned according to the predecessor relationships between the children. Children with no predecessor are all assigned the same starting find number. Children with the same predecessor are all assigned the same number—the number of the predecessor plus a defined increment. Children with multiple predecessors are assigned the highest predecessor's find number plus the defined increment.

Note:

To see the find numbers in the user interface, add the **Find No.** column.

1. Do one of the following:
 - Click  on the PERT toolbar.
 - Choose **Tools**→**Re-Sequence Structure**.

Teamcenter displays the **Re-Sequence Structure** dialog box.

2. Type a start number and increment, then click **OK**.

Teamcenter changes the line find numbers and the order of the children in the structure pane according to your entries.

3. To resequence the child processes, operations, and activities of the current structure, select **Include Descendants**.
4. To resequence the lines in the structure without taking the flows into consideration using the process flow viewer, clear the **Consider flows** check box.

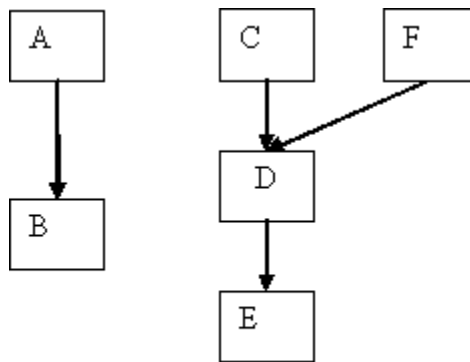
Note:

The resequence action does not work in the case of cyclical links.

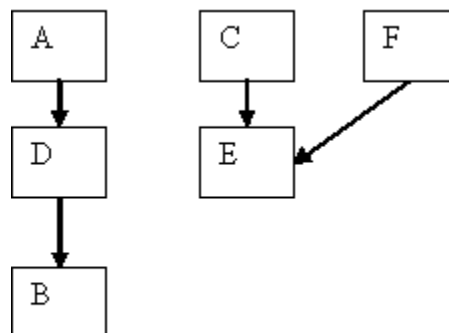
The resequence feature is applicable only to the process or work area PERT chart. If you open the PERT view on an activity, the resequence button on the toolbar is unavailable.

Resequencing by drag-and-drop on a flow

You can drag-and-drop a PERT node onto a flow to change the node order and put the dragged node in between the two nodes previously connected by the flow. For example:



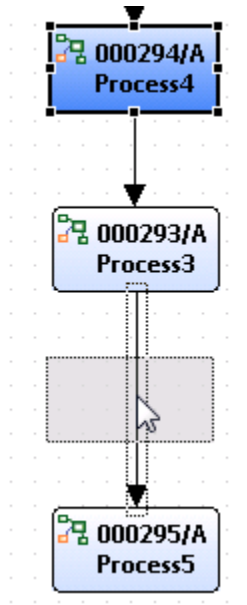
Dragging the node D on to the flow between A and B results in the following order:



- The dragged node is disconnected from its old predecessors and successors.
- New flows are created between all predecessors of the dragged node to all successors of the dragged node.

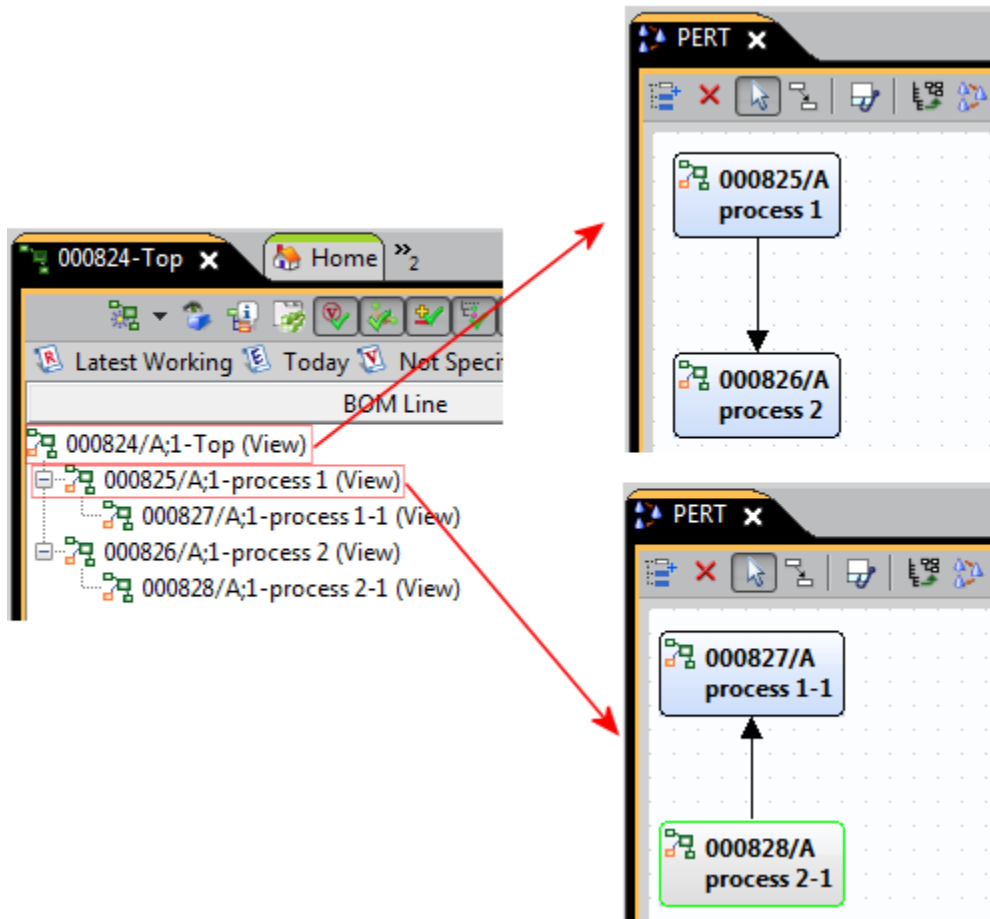
- If the dragged node has either predecessors or successors, but not both (meaning if it was either the first node in a chain or the last node in a chain), no substitute flow is created.
- The dragged node is connected to its new predecessor and successor. The only predecessor of the dragged node is the source of the flow on to which it was dragged. The only successor of the dragged node is the target of the flow on to which it was dragged.

When dragging the node over a flow, the target flow is selected to indicate that it is the target for the drop.



Analyzing circular structures

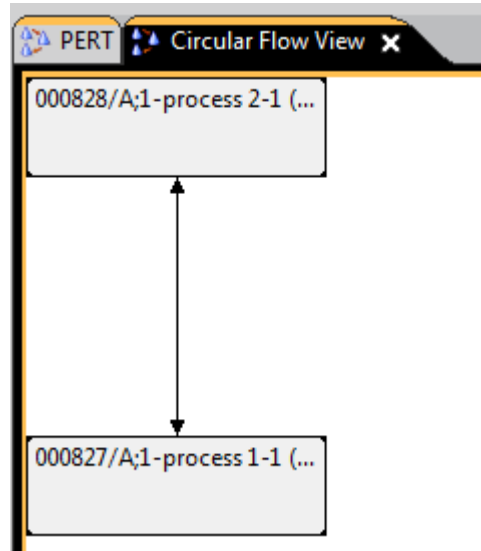
When sequencing processes with the PERT chart, you may end up with a circular structures. For example:



In large structures, these can be difficult to find. Using the **Circular Flow** view, you can quickly find the problem areas and rectify them.

1. Right-click a process and choose **Open With**→**Circular Flow**.

Regardless of which process you select in a structure, Teamcenter considers the entire structure when searching for circular flows. The view displays one circular flow at a time.



2. Correct the circular flow in the PERT chart.
3. Open the process repeatedly in the **Circular Flow** view, repairing the problems in the PERT chart, until Teamcenter does not find any more circular flows.


Reassign flows by drag-and-drop

You can modify flow source/target nodes by dragging the origin or end point of one of the flows to another target. For example, if node A is connected to node B and you want to modify this relation to go from A to C:

1. Select the end point of the flow.
2. Move the end point from B to C.

If you move the edge of the flow to a nonvalid area, the flow remains connected to the original source and target nodes.


Find objects in the PERT view

1. Click **Find**  in the **PERT** view toolbar.


Teamcenter displays the **Find** dialog box.

2. Type the desired string and click **OK**.

Teamcenter highlights the first instance of the string in the PERT chart.

3. Keep clicking **Find again**  to find the next instances of the string.

Displaying assignments in the PERT chart

If the **Show Assignments** button  is turned on, the PERT nodes provide you with information about assigned parts, resources, and features assigned to the object. If you place the mouse over the object, Teamcenter provides more information about the assigned objects.

The following preferences control the display of assignments:

MERelationTypeFeature

Specifies which types of manufacturing features are counted when showing the number of features.

MERelationTypePartsConsumed




Specifies which types of assigned objects are counted when showing the number of consumed objects.

MERelationTypeUsedEquipment

Specifies which types of resources are counted when showing the number of assigned resources.

Show or hide assignments

1. In the **PERT** view, click the **Show Assignments** button .

Each process, operation, activity, or work area node lists the consumed parts , resources , or manufacturing features , and their occurrence types.

2. Move the cursor over the symbol of the part, resource, or feature in the PERT chart to view more detailed information.

Notice that the part, resource, or feature symbol turns into a button when you hover over it with the cursor. You can use this to unassign consumed parts, resources, or features.

3. (Optional) Hide the assignments by clicking the **Show Assignments** button again.

Note:

Teamcenter remembers the state of the **Show Assignments** button when you close the **PERT** view.

Assign parts in the PERT chart

Do one of the following:

- Drag a part from a product, process, or work area structure to a process, operation, or activity PERT node.

- Copy a part from a product, process, or work area structure. Right-click a PERT node and select **Paste**.

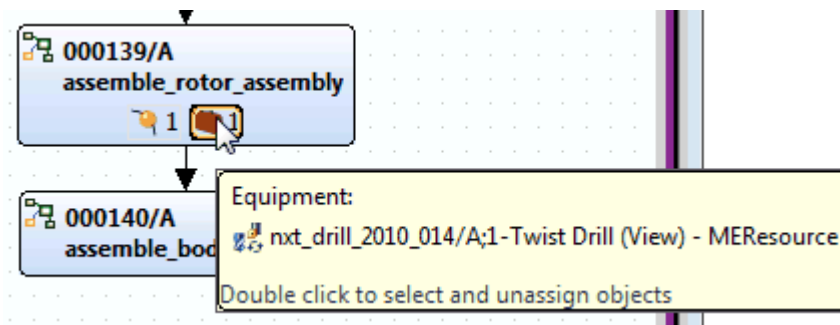
If the **Show Assignments** button is selected, the PERT node immediately displays the assignments. If the button is not selected, Teamcenter performs the assignments, but nothing is shown in the PERT node.

Assign a part with a specific occurrence type

1. In the structure view containing the part that you want to assign, copy the part.
2. In the associated PERT chart, right-click the node to which you want to assign the part and choose **Paste As** and select the appropriate occurrence type.

Unassign consumed parts, resources, or features

1. Move the cursor over the symbol of the part, resource, or feature in the PERT chart.



Notice that the part, resource, or feature symbol turns into a button when you place the mouse over it.


2. Double-click the part, resource, or feature button.

Teamcenter displays a dialog box listing the assigned objects.

3. Select one or multiple objects and click **Unassign**.

Teamcenter removes the objects from the structure.

Assign resources using the Classification Search Dialog

1. Select a process or operation PERT node.
2. Choose **Edit→Assign Resource**, or click the **Assign Resource** button  on the toolbar.
3. Expand the **Classification Root** folder entry in the Classification Search Dialog.
4. Search the various classes and subclasses to locate and select the appropriate resource.

- If necessary, change the occurrence type of the resource by selecting from the **Occurrence Type** list.







Your administrator can modify the occurrence types that are displayed by default in the **MEAssignCustomizedOccurrenceType** preference.

- Click **OK** to close the Classification Search Dialog.

Teamcenter assigns the resource to the selected node in the PERT chart.

Zoom in and out

You can view the entire process flow or only selected operations by zooming in or out of the PERT chart as follows:

Click	To
 Zoom In	Increase the magnification by 25 percent and view a correspondingly smaller area.
 Zoom Out	Decrease the magnification by 25 percent and view a correspondingly larger area.
 Zoom to Fit	Set the PERT chart's zoom ratio to fit all the selected PERT boxes into the PERT chart window. If you do not select anything, the command fits all boxes into the PERT chart window.
 Actual Size	Display the chart in its original, as-designed size.
 Zoom Window	Drag a box around an area in the PERT chart to which you want to zoom. Press Esc or click Select  to exit the Zoom Window mode.

Resize nodes in the PERT chart

If the **Auto Size Pert Boxes** option is turned off in the manufacturing options, you can re-size one or many PERT nodes.

- To resize nodes manually, select one or more nodes and drag them to the desired size.

Note:

You cannot drag a node larger than the size specified by the **PertChart.BoxAutoSizeMaxWidth** preference.

- To resize nodes automatically, do one of the following:

- To resize one or several PERT nodes, select the nodes and choose **Autosize** from the shortcut menu.
- To resize all PERT nodes, right-click the background of the PERT chart and choose **Autosize**.

Teamcenter resizes the nodes to 138 x 50 pixels, or to the size specified in the `PertChart.BoxDefaultWidth` and `PertChart.BoxDefaultHeight` preferences, if they are set.

Change the layout of PERT nodes

- Click **Apply Layout Algorithm**  and select one of the following:

Hierarchical → **Top-to-Bottom**

Highlights the main direction of a graph, beginning with a top node and flowing to the bottom.

Hierarchical → **Right-to-Left**

Highlights the main direction of a graph, beginning with node at the right and flowing to the left.

Hierarchical → **Left-to-Right**

Highlights the main direction of a graph, beginning with a node at the left and flowing to the right.

Hierarchical → **Bottom-to-Top**

Highlights the main direction of a graph, beginning with a node at the bottom and flowing to the top.

Hierarchical → **Incremental**

Displays only the changes to a particular section of the graph.

Circular

Displays group and tree structures within a network in a ring and star pattern.

Orthographic

Creates compact graphs with no overlaps, few crossings, and few bends. Most appropriate for medium-sized sparse graphs.


Organic










Creates a layout with the nodes spaced as far away from each other as possible, still while minimizing this distance. Most appropriate for undirected, complex graphs.

Align process steps

You can drag one or more selected process boxes to a different position. Teamcenter remembers the new position without the need to save changes.


To help align the process steps:

1. Switch on a grid in the process flow viewer by clicking **Grid Mode** . The grid is displayed in the background of the PERT chart. When it is visible, each box snaps to the grid coordinates
2. Select the boxes that you want to align and do one of the following:

- Click **Shape Alignment**  and choose one of the following alignment options:
 - Left 
 - Center 
 - Right 
 - Top 
 - Middle 
 - Bottom 
 - Distribute horizontally 
 - Distribute vertically 

Drill up and down in a structure

Do one of the following:

- To drill down, select a node and click  or double-click the node.

Teamcenter displays the children of the selected node in the **PERT** view.

- To drill up one level, click .

Teamcenter changes the scope to the parent of the previously displayed scope and displays the parent's children.

Print a PERT chart

1. With a PERT chart open in the PERT view, choose **Print** from the view menu.
2. Select a printer and click **Print**.

Teamcenter prints the PERT chart.

Export a PERT chart

1. From the view menu, choose **Export**.
2. Choose a file type to export. You can choose from JPG, PNG, or BMP.

3. Specify an export directory.

Change the appearance of the PERT chart background

- From the view menu, choose **Change Grid Style**.

Teamcenter changes the background. The background cycles from dotted, to line grid, to an empty background each time you select the menu command.

Show and hide PERT chart overview pane

1. From the view menu, choose **Show Overview** to turn on the menu button.


Teamcenter shows the overview pane at the left of the PERT chart that helps you located your position within the PERT chart. You can change the size of the overview pane to suit your needs by dragging the pane divider to the left or right.

2. From the view menu, choose **Show Overview** again to turn off the menu button.

Teamcenter closes the overview pane.

Teamcenter saves the status of this command for the next session.

View the properties of a step

1. Click the box of the process, activity, or work area in the PERT chart.
2. Click **Launch Teamcenter line properties** .

Update PERT flows

Use this feature to update pert flows according to the find number of the selected line's children, or in the case of multiple selections, of the selected lines. This is necessary if you change the find numbers of processes or operations in a structure.

1. Select the scope.
 - If the **PERT** view is open, ensure that the scope selected for the **PERT** view is the desired one.

Teamcenter uses the **PERT** view's scope as the scope to update the flows.

- If the **PERT** view is not open, select one or more lines in a process structure.
2. Choose **Tools**→**Update Flows**.

3. Select **Include Structure Sub-Hierarchies** to update all sub-hierarchy flows except for activity flows.
4. Click **OK**. This command works only for processes with children. If you make multiple selections, the command works only for processes with the same parent and of the same type.

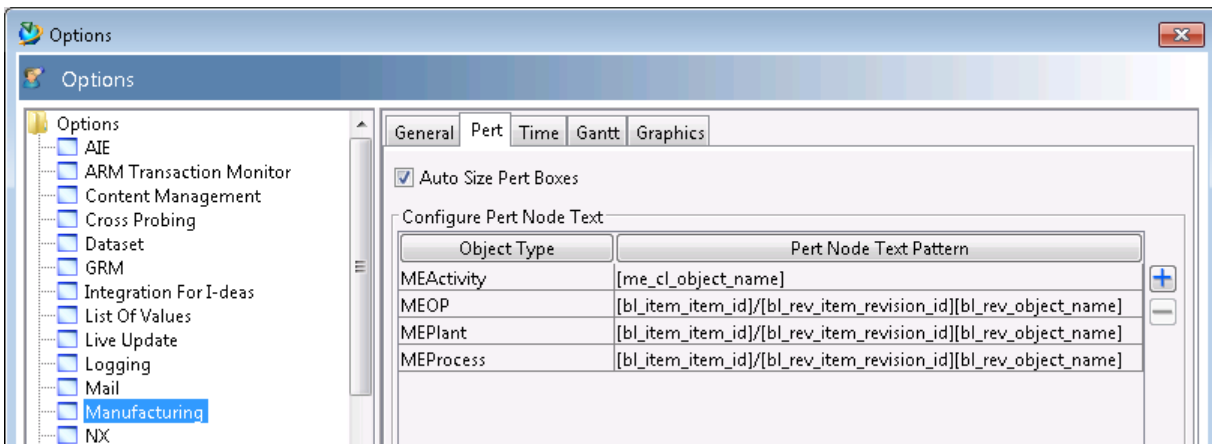
Teamcenter removes all the flows of the selected process and creates new flows according to the find numbers.

5. (Optional) Reapply a layout algorithm to clean up the PERT chart.

Configure the PERT chart

You can configure the behavior of the PERT chart in the **Manufacturing** options, as well as by using some preferences.

1. In the **Manufacturing Process Planner** perspective, choose **Edit**→**Options** and select **Manufacturing** from the **Options** list.
2. Click the **Pert** tab.



3. If you want Teamcenter to automatically fit the size of a new PERT node to the text it contains, select **Auto Size Pert Boxes**. If you do not select this, Teamcenter creates each new node the same size.
4. Configure the text that Teamcenter displays in each PERT node using the **Configure Pert Node Text** table. You can specify the contents of a PERT node that depends on which type of object is displayed.

Object Type	Pert Node Text Pattern
MEActivity	[me_cl_object_name]
MEOP	[bl_item_item_id]/[bl_rev_item_revision_id][bl_rev_...
MEPlant	[bl_item_item_id]/[bl_rev_item_revision_id][bl_rev_...
MEProcess	[bl_item_item_id]/[bl_rev_item_revision_id][bl_rev_...

- Add a new object type to the **Object Type** list by clicking **+**.
Teamcenter displays a new line in the table.
- Select an object type by clicking in the **Object Type** cell.
- Click in the **Pert Node Text Pattern** cell.
- Type the property names that you want to appear in the PERT node. These must have the following format:

free-text[bl_item_item_id]/[bl_rev_item_revision_id][bl_rev_object_name]

where:

<i>free-text</i>	Any text except for square brackets []. HTML is not supported.
<i>[property_name]</i>	A valid property name for the property type that must be wrapped in square brackets, for example: [bl_rev_object_name] .

Putting text on a new line displays the text on a new line in the PERT node.

For the process PERT chart and the station flowchart, the fields that comprise the formula may be selected from the BOM line properties or occurrence notes of the object. For the activities flowchart, the fields may be selected from the activity attributes.

For example, if you enter the following for an **OP** object type:

Revision: [bl_bomview_rev] Class: [bl_line_object_class]

Teamcenter displays the following operation in the PERT node:

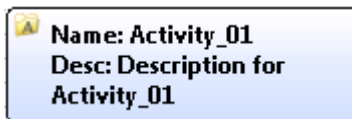


and if you enter the following for an **Activity** object type:

Name: [me_cl_display_string]

Desc: [me_cl_object_desc]

Teamcenter displays the following activity PERT node:



Note:

These values are also stored in the **PertChart.Object_Type.Text** preference.

Note:

If you customized text in the PERT nodes prior to Teamcenter 9.0, you must remove the HTML tagging and use plain text.

- On the **Gantt** tab of the manufacturing options, change the implicit flow color.

This implicit flow color is used in the **PERT** view as well.

- Change other pertinent preferences. Some of the preferences listed do not exist in the database; you must create them manually.

Preference

Usage

PertChart.NodeDefault.Text

Configures the default text for all types derived from operation/process and work area class.

PertChart.ActivityDefault.Text

Configures the default text for all types derived from activity class.

PertChart.BoxDefaultWidth

PertChart.BoxDefaultHeight

Configures the default width/height to be used when new PERT nodes are created in the preference file (per site, group or user). The values of width and height are any positive integers and specify the number of pixels used for the width and height of newly created PERT nodes. If the **BoxDefaultWidth** and/or **BoxDefaultHeight** entry do not exist, 138 / 50 is used as default. Those values are common for all PERT chart types. Once they are defined in the process PERT chart, the activity and station flowcharts use these values to define the size of newly created PERT nodes.

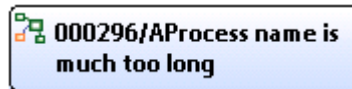
PertChart.AutoSizeMode

Preference**Usage**

Turns autosize on or off. When autosize is off, the size of the all newly created PERT nodes is uniform. When autosize is on, the size of the newly created PERT nodes is automatically fitted to the displayed text, including allowing for multiple lines. This preference is applied to all PERT chart types (process, activity, and plant PERT charts). If the entry is not defined in the preference file, nonautosize mode is used as default.

PertChart.BoxAutoSizeMaxWidth

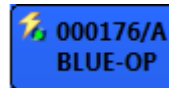
If the autosize mode is on, configures the maximum width in pixels to be used when new PERT nodes are created. For example, **PertChart.BoxAutoSizeMaxWidth=150** causes the following text to be split into multiple lines:



If this preference is not set, Teamcenter uses a default value of **170**.

PertChart.Object_Type.BGColor

Defines a background color for a specific object type. For example, **PertChart.OP.BGColor=40,100,240** displays the following operation node:

**PertChart.NodeDefault.BGColor**

Defines the background color for nodes in the process and station flow PERT chart that do not have an explicit background color definition.

PertChart. ActivityDefault.BGColor

Defines the background color for nodes in the activity PERT chart that do not have an explicit background color definition.

PertChartCreationLayout

Defines where newly created nodes are placed in the PERT chart. If the value is **Horizontal**, all newly created nodes are put at the top right corner.

7. Close the **PERT** view and reopen it to see the changes.

Filter the process structure

You can select only certain occurrence types to display in the process structure.

1. Choose **Select Occurrence Type Filters** from the **View Menu** list.

Part Planner displays a dialog box that allows you to define the occurrence types that are displayed.

2. Move each occurrence type that you want to include in the process structure display to the **Shown Types** column in the dialog box. When the required types are selected, click **OK** to implement the selections and close the dialog box, or click **Apply** to implement the selections without closing the dialog box.
3. Choose **Apply Occurrence Type Filter** from the **View Menu** list to turn on the defined filter.

Creating operations and activities

Operation types

Each process structure contains individual process operations. These operations describe one step in the manufacturing process of a part. Each operation is executed at a specific work area on the shop floor.

There are many different types of operations that can be included in a manufacturing process model. Examples of operation types include:

- Machining (NC CAM) Operations
- Painting
- Quality Control
- Heat Treatment
- Assembly
- Welding

Each operation is revision controlled independently, and can be shared by several process plans.

Each operation type is associated with different types of data. In general, this data can be classified as follows:

Data type	Description
Input data	Results from a previous operation or activity, such as an in-process model that was generated in the previous step.
Work instruction data	Contains all information necessary to execute the work. This may include information about tooling and setup and necessary action to execute the operation. If the work area is not explicitly defined, the requirements for the work area are specified as part of the work instructions.
Output data	Generated when work instructions are applied to the input data. An example includes a resulting in-process model and any instructions to be used in the next operation or activity.

Data type	Description
Analysis data	Derived from work instructions used to perform analysis across different process operations. This may include cost and time.
Product data	Associated with one or more parts in the part structure.
Work area data	Associated with one work area.
Resource data	References resources used during completion, such as standard equipment of the work area or additional items needed.

Note:


By default, classify immediately is disabled for a root item in Manufacturing Process Planner.

Create a new operation

After you create a top-level manufacturing process, create the individual operations completed as part of the process.

Note:

You may also want to create stand-alone operations that are not part of a process structure so you can save these operations as templates and clone their structures.

- In a process structure view, select the process to which you want to add an operation.
If the new operation is not to be associated with a process, skip this step.
- Choose **File**→**New**→**Operation**, or click **Create New Operation**  on the toolbar.
The **New Operation** dialog box is displayed.
- Select one of the operation types from the list.
- Click **Next**.
- Enter the ID number to be assigned to this new operation. If this new operation is a revision of an existing one, type the ID of the existing operation. You can assign a unique revision number in the **Revision** field.
To let the system automatically assign a unique ID, click **Assign**.
- Type a name for the new operation. Make it unique so you can search the database using this term.

7. Select **Show as new root** to specify that the newly created operation is opened as a root object. It is not pasted to the selected object. If you do not select this option, the new operation is pasted as a child of the selected process.

If the **Show as new root** option is selected but unavailable, Teamcenter does not allow you to create a new object under the selected object, for example, if you try to create an operation under a part.

8. Type an operation description.

At this point, you have all the information required to create a new operation.

9. (Optional) Click **Next** to add optional information, such as filling out the operation's forms, or checking the operation out of the database.

10. Enter logical designator information.

A logical designator is an expression associated with a process, operation or partition that captures commonality between them. This step appears only if you are creating an operation under a generic BOM, and only if your administrator has defined a logical designator class for the operation. This form may include mandatory fields. You cannot proceed until these are filled. If you create multiple operations, the information you enter in this form is passed to each logical designator in each new operation.

11. (Optional) Select **Define Options** to specify the following:

- Select **Use item identifier as default display** or **Use revision identifier as default display** if you created an alternate identifier for the item and want to use it as the default display object.
- Select **Check Out Operation Revision on Create** to check the newly created operation out of the database immediately upon creation.

12. Click **Finish** to create the new operation.

13. Click **Close** to close the **New Operation** dialog box.

After the operations are created, create the individual activities that are to be performed as part of this operation.

Open an existing operation

Do one of the following:

- Expand the process hierarchy in the structure view and open an existing process structure.

- Open an operation structure by name in the Part Planner using the **Open Process or Operation** dialog box.
- Use the My Teamcenter application to search for operations and then send them to the Part Planner application.

Create operation activities using the Activities view

Each operation can have individual activities that break down the operation into steps describing in detail what is done as part of that operation. For example, a material procurement operation may include an activity to unload the material and another activity to move the material to a storage area. The activities are created as children of the operation.

Each activity is defined by its type, description, start time, and duration. An activity can also reference Teamcenter objects. This enables you to attach any forms to the activity that represent features and their associated tooling and instructions.


Note:

You cannot create revisions of activities.

The cumulative time of all activities is recorded and charted on the **Activities Gantt** view.

1. In the process structure view, select the operation to which you want to add an activity.
2. Choose **Open With**→**Activities**.

Teamcenter opens the **Activities** view displaying all the activities belonging to the selected operation.

3. Select the parent activity for the new activity.
4. Click the **Create New Activity** button  on the view toolbar.

The **New Activity** dialog box is displayed.

5. Select the activity type. If there are many types to choose from, you can type a search filter to narrow your choices.
6. Click **Next**.
7. Enter the required information in the activity form. The information you enter here is dependent on your business needs. Mandatory fields are designated by a red star.
8. Click **Finish** to add the activity.

9. (Optional) After adding the activities, specify the desired sequence operation activity.

To create an activity from a template:

1. In the structure view, select the operation to which you want to add an activity.
2. Choose **Open With**→**Activities** from the shortcut menu.
3. Select the parent object for the activity in the **Operation Activities** pane.
4. Choose **File**→**New**→**From Template**→**Activity from Template**.
5. Click the **Find Template** tab to search for an existing template, or select a template from the **Favorite Templates** pane.

Sequence operation activities

After you create the individual activities to be completed as part of an operation, you can modify the sequence in which these activities are performed. This sequence is called the *activity flow*.

As you sequence the activity flow, identify:

- Preceding activities (those that must be completed before others can be started)
- Parallel activities (those that can be completed at the same time as others)

To sequence operation activities:

1. Select an operation in the structure view.
2. Choose **Open With**→**Activities** from the shortcut menu.
3. In the **Activities** view, select the root activity.
4. Choose **Open With**→**PERT** from the shortcut menu.

Teamcenter opens a **PERT** view with the selected activity as scope.

5. Sequence activities with the **PERT** view.

Note:

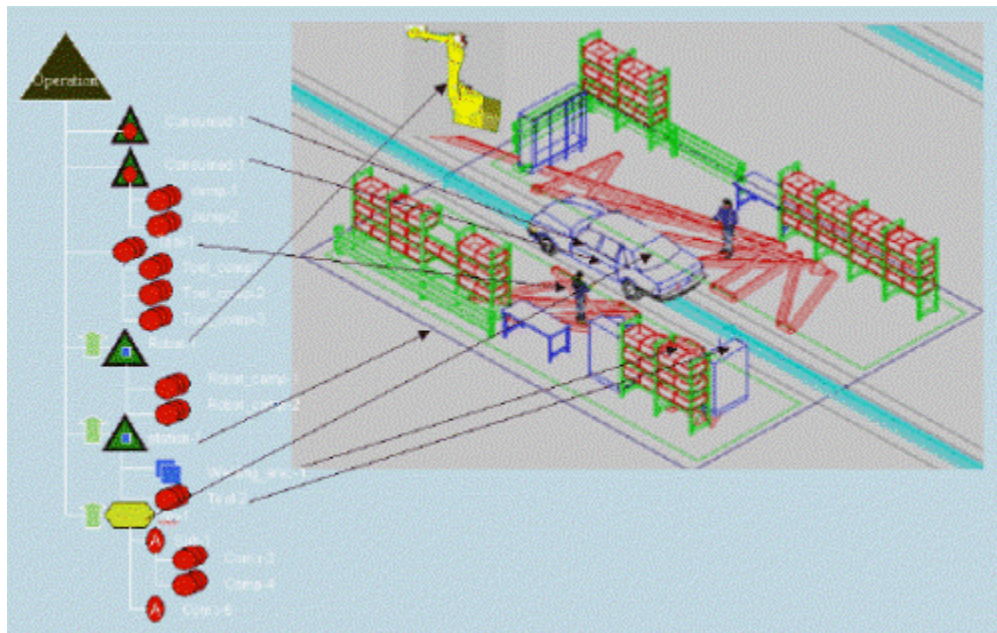
You can also use the **Activities Gantt Chart** tab to sequence an activity.

Understanding setup structure

The setup structure describes the structure containing operations to be performed. This structure contains the tooling, resources, parts, and workpieces and their position in the work process.

The following figure shows an example of the operation's setup as it inherits the process setup and all the elements that make up the setup structure. The setup structure mainly consists of the following:

- Operation's specific resources
- Factory resources linked to plant occurrences
- Consumed parts linked to the product occurrences
- Workpiece
- Inherited process setup structure.



Parts to operations processes

A process structure can be created to describe the flow of processes. Each process may be a container for all operations performed in one work area. In this case, all the common work area elements from the factory and the common tooling can be defined at the process level and any specific tooling and consumed item can be defined at the operation level.

The operation setup structure inherits the elements in its loaded parent process. You must ensure that the components of the process setup structure and the operation structure are positioned correctly. Because an operation can be shared across many processes, the inheriting setup is shown only if the

operation is shown in the context of its parent process. If only the operation is loaded, the process setup is not shown.

Operation setup may include additional toolings that are specific for performing the operation, consumed parts, and workpieces. When dealing with large assemblies, not all parts of the workpiece are of interest to the operation. In this case, you can define a subset of the workpiece that is of interest for details planning. This subset is another occurrence group that is assigned to the operation. Keep in mind the following:

- The operation setup includes its parent process setup.
- You can allocate consumed items from any of the manufacturing views.

Create an operation setup structure

1. Create the structure.
2. View the structure and make any necessary changes.
3. Allocate workpieces to the setup structure from any product view. Each element in the setup structure can be assigned a type. A workpiece has the type **MEWorkpiece**.
4. Allocate work area elements as resources.
5. Allocate resources from the resource library.

Assign consumed items to operations

As you create a process plan, indicate the materials that will be consumed during the execution of each process operation. Consumed items can include parts and components as well as materials such as grease and gloves.

Use the following steps to specify the items in the part structure to be consumed by the operations in your plan.

1. Expand the relevant sections of the product and process structures.
2. In the product structure view, select the component to be used by the operation.
3. Do one of the following:
 - With both product and process structure views visible, drag the selected component to the operation.

- Choose **Copy** from the shortcut menu and paste the copied component to the operation. By default, objects are assigned using an **MEConsumed** occurrence type. To specify a different occurrence, use the **Paste As** menu command.

4. Repeat this process for each operation to consume an item from the structure.

Note:

By default, an occurrence of the **MEConsumed** type may be assigned to a process. Your administrator can change the **controllingOccsForProcessConfiguration** preference to specify another occurrence type as valid for assignment at your site. If this preference is blank, the configuration of consumed items does not affect the configuration of operations.

To identify components that are already consumed and components that are not yet consumed, do a BOM comparison between the product and the process.

Assign work areas


After you create a process operation and its activities, identify where in the plant the operations take place. To do this, establish a relationship between the operation and the work area where the production occurs.

1. Expand the relevant sections of the work area and process structures.
2. In the work area structure view, select the work area or station where the operation is to be performed.
3. Do one of the following:
 - With both work area and process structure views visible, drag the selected work area or station to the operation.
 - Select **Copy** from the shortcut menu and paste the copied work area to the operation. By default, objects are assigned using an **WorkArea** occurrence type. To specify a different occurrence, use the **Paste As** command.
4. Repeat this process for each operation to consume an item from the structure.
5. Repeat these steps for each process and operation you create.

By default, an occurrence of the **WorkArea** type may be assigned to a process. Your administrator can change the **controllingOccsForProcessConfiguration** preference to specify another occurrence type as valid for assignment at your site. If this preference is blank, the configuration of consumed items does not affect the configuration of operations.

Assign classified resources to an operation


Do one of the following:

- For rough planning, choose **Window**→**Show View**→**Classification** or click .

Teamcenter displays the **Classification** view from which you can drag resources directly to a structure.

If you need to paste the same resource into a structure multiple times, copy the resource and use the **Paste Duplicate** command to ensure that each resource is a separate resource with a new item ID. This allows you to position a resource without repositioning other instances of the same resource.

- For more detailed planning, open the **Classification Search Dialog**.
 1. Select an operation from an expanded process hierarchy in the structure view and select the top-level operation to which you want to attach resources.

2. Choose **Edit**→**Assign Resource**, or click the **Assign Resource** button  on the toolbar.

The Classification Search Dialog is displayed.


3. Expand the **Root** folder entry on the Classification Search Dialog.
4. Search the various classes and subclasses to locate and select the appropriate resource.
5. If necessary, change the occurrence type of the resource by selecting from the **Occurrence Type** list.

Your administrator can modify the occurrence types that are displayed by default in the **MEAssignCustomizedOccurrenceType** preference.

6. Click **OK** to close the Classification Search Dialog.

Assign unclassified resources to an operation

Assign unclassified resources (such as tools) to an operation as follows:

1. Open the My Teamcenter application and find the resource to be assigned to the operation.
2. Select the object and click the **Copy** button  on the toolbar.
3. Open the Part Planner application.
4. Select the operation in the process structure.

5. Choose **Edit→Paste Special**.

Teamcenter displays the **Paste Special** dialog box.


6. Select **as component of selected assembly**.
7. Enter the number of occurrences, quantity, and find number.
8. Select **MEResource** from the **Occurrence Type** list.
9. Click **OK**.

Note:

You did not make a copy of actual data when you performed the copy and paste functions. You merely copied an object that points to the data in the database.

Assign resources to activities


As you create operations in your process plan, you create individual activities to be executed as part of the operation. If any of the activities require that a resource be used during its execution, assign the resource to the activity.

1. Expand the process hierarchy in the structure view and select an operation.
2. Choose **Open with→Activities** view.
3. Select an activity.
4. Click  on the **Activities** view toolbar.

The **Activity Assignments** dialog box is displayed.

Only resources previously assigned to the operation to which this activity belongs are listed. You can use one of the resources already assigned to the operation, or assign a new resource from the Classification application.

5. Select the resource using one of the following:
 - To assign a resource already used in the top-level operation:
 - a. In the **Occurrences on Operation** list, choose the resource to be assigned to the activity. Repeat this function until all necessary resources are selected.
 - b. Close the **Activity Assignments** dialog box.

- To assign a resource from the Classification application:
 - a. Click the **Assign New Resource From Library** button  in the **Activity Assignments** dialog box.

The Classification Search Dialog is displayed.
 - b. Expand the classification tree if it is compressed.
 - c. Search the various classes and subclasses to locate and assign the appropriate resource to the activity.
 - d. If necessary, change the occurrence type of the resource by selecting from the **Occurrence Type** list.

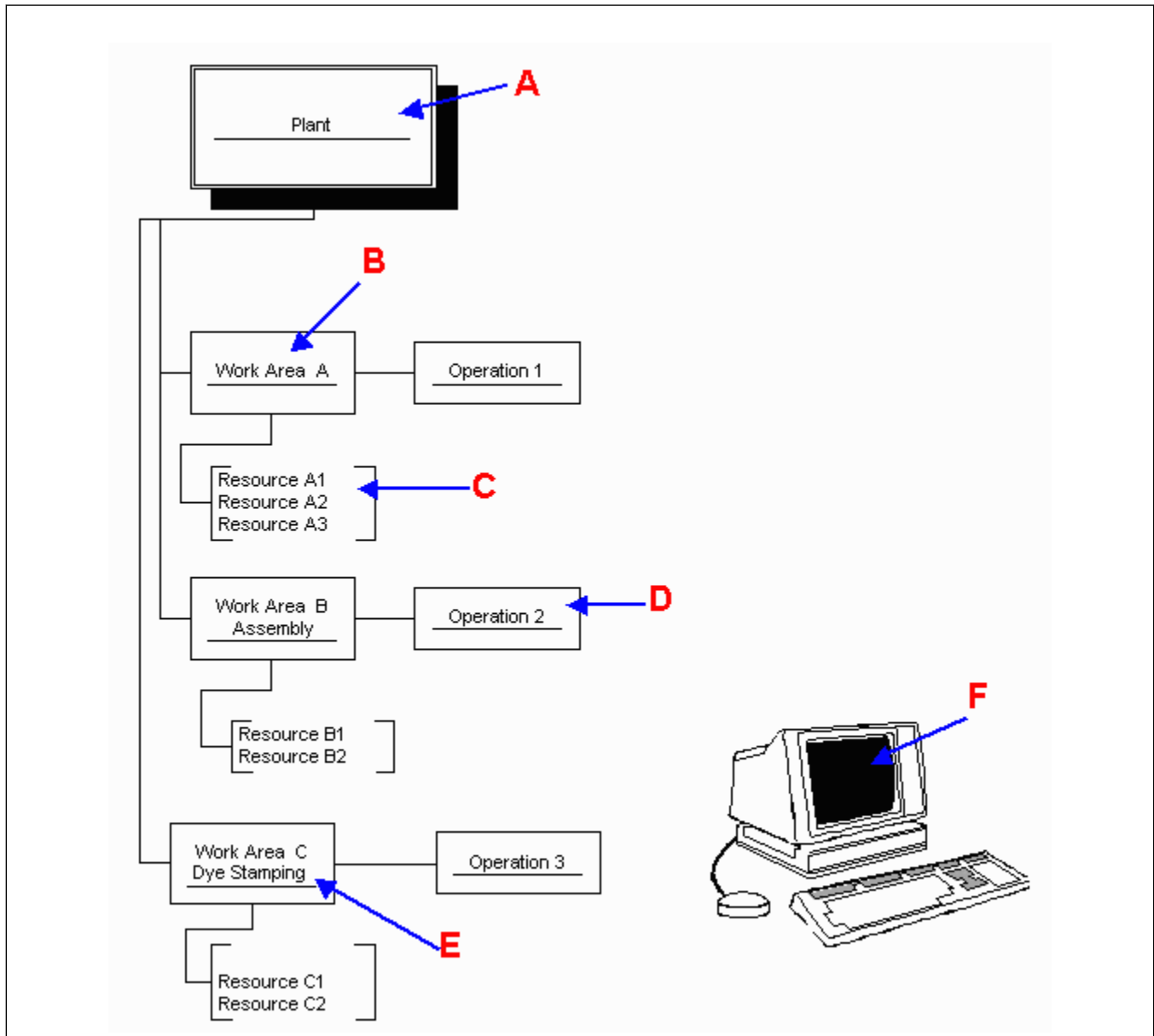
Your administrator can modify the occurrence types that are displayed by default in the **MEAssignCustomizedOccurrenceType** preference.
 - e. Click **OK** to close the Classification Search Dialog.
 - f. Click **OK** to close the **Activity Assignments** dialog box.

Creating plant structures

About plant structures

A *plant structure* is a hierarchy of work areas, as illustrated in the *Sample plant structure*. The work areas describe the locations existing in a plant in which manufacturing operations are performed. The hierarchy of the work areas can be very different from one plant to another.

Sample plant structure



Plant architecture example

- A The plant structure can represent the entire plant.
- B The plant structure can also represent work areas, sections, line cells, or stations within the plant.
- C Each work area can include resources that are permanently positioned at the work area.
- D Individual process operations used to manufacture a product are assigned to the work areas in which they are performed.

- E Each work area is typically configured with standard equipment but also can be specially configured with any equipment necessary to execute a specific operation.
- F If special resources are needed, create work instructions that explain how to configure the work area to meet an operation's special needs. If appropriate, create a workflow process to release the work instructions.

For example, if a process operation requires tools that are not already at the assigned work area (such as those that are part of work area C), work instructions are generated to identify which tools need to be available and installed when the process operation is executed.


Note:

You cannot create a plant in a plant structure. The plant structure represents the plant itself.

Plant layout tools such as FactoryCAD are generally used to populate the work area structure within your plant. Using a plant layout tool lets you create detailed designs of each work area.

Create a new work area structure

The physical layout of equipment in each work area and the relative locations of these areas throughout the plant are the scope of the work area structure definitions. Standard equipment is organized hierarchically into work areas depending on their location on the shop floor.

1. Open a plant structure in a structure view.
2. Choose **File**→**New**→**Work Area**, or click **Create Work Area** .
3. In the **New Work Area** dialog box, select one of the work area types from the list.
4. Click **Next**.
5. Enter the ID number to be assigned to this new work area. If this new work area is a revision of an existing one, type the ID of the existing work area. You can assign a unique revision number in the **Revision** field.

To let the system automatically assign a unique ID, click **Assign**.

6. Type a name for the new work area. Make it unique so you can search the database using this term.
7. Select **Show as new root** to specify that the newly created work area is opened as a root object. It is not pasted to the selected work area. If you do not select this option, the new work area is pasted as a child of the selected work area.

If the **Show as new root** option is selected but unavailable, Teamcenter does not allow you to create a new object under the selected object, for example, if you try to create a work area under a process.

8. Type a work area description.

At this point, you have all the information required to create a new process.

9. (Optional) Select a unit of measure from the **Unit of Measure** list.
10. (Optional) Click **Next** to add optional information, such as filling out the work area item's forms, or checking the work area item out of the database.
11. (Optional) Click **Define Options** to specify the following:
 - Select **Use item identifier as default display** or **Use revision identifier as default display** if you created an alternate identifier for the item and want to use it as the default display object.
 - Select **Check Out Workarea Revision on Create** to check the newly created work area out of the database immediately upon creation.
12. Click **Finish** to create the new work area.
13. Click **Close** to close the **New Work Area** dialog box.

Open an existing work area structure

Do one of the following:

- Open a work area revision in Part Planner using the **Open Work Area** dialog box.
- Find the work area revision item in My Teamcenter. Using the mouse, drag it to the **Part Planner** button in the navigation pane; or use the shortcut menu and choose **Send To** to send it to the Part Planner application.
- Open a process revision in Part Planner. The work area most recently assigned as a target by the process is opened by default.

The process revision most recently assigned as a target item by this part opens by default if the **MSE_load_related_product_process_plant** preference is set to **true**.

Sequence the work area flow

The work area sequence represents the line of work areas a product passes through during the manufacturing process. As you develop your work area structure, you may need to modify the sequence of the individual work areas in your plant. Set both parallel and linear sequences as necessary using the

PERT view. While this sequence is independent of any process flow, it does impose constraints on the process flow through the plant.

Managing collaboration contexts

About collaboration contexts

A collaboration context is used to save groups of data in a specific configuration. It is a Teamcenter object that holds a collection of data contained in structure and configuration contexts. This data allows you to capture multiple different Teamcenter structures in one container. You can open a collaboration context in the Multi-Structure Manager application, in Manufacturing Process Planner, in Multi-BOM Management, or in Part Planner. You can use the **Collaboration Context Tree** view to manipulate the object within collaboration contexts.

A collaboration context consists of any number of structure contexts and one configuration context. A structure context can contain any BOM or assembly structures. It holds occurrence groups, items, and item revisions. A configuration context holds the revision rule, variant rules, and closure rule applicable to the collaboration context, as well as the current state of various buttons that affect the objects seen in the structure tree and view, such as **Show Unconfigured Variants** or **Show Unconfigured Changes**.

You can also use a collaboration context to collect data to share with a third-party application.

You can specify which type of object is pasted under the structure context using the **MESaveAsSC_PasteType** preference.

Note:

The **PS_assume_legacy_transform_units** preference determines how Teamcenter interprets the units of measure for legacy transform data. Teamcenter and NX currently use meters for transform units of measure; legacy measurements were in inches or millimeters. This preference affects all data using legacy transforms that have no database-resident indication of the unit measurement stored with them. The default setting is **Unknown**. If the preference is left in the default setting, you may see discrepancies between the model and display units when you view collaboration context structures in Manufacturing Process Planner.

Overview of creating a collaboration context

There are two methods used to create a collaboration context:

- Top down:
 1. Create an empty collaboration context.
 2. Create empty structure contexts within the collaboration context.
 3. Fill up the content of the new structure context by inserting items.

- Bottom up:
 1. Open desired objects.
 2. Save these objects as structure contexts.
 3. Save all structure contexts in the session to a new collaboration context or move structure contexts into an existing collaboration context.

You can create a collaboration context for each instance of a collaboration between applications within Teamcenter or between Teamcenter and an external application. For example, if your Teamcenter system connects to a Tecnomatix system, you must define a single collaboration context to allow the two systems to share data.

Create a new collaboration context

How you create collaboration contexts depends on the method you use to build your collaboration context structure.

- If you use a top down method:
 1. Choose **File**→**New**→**Collaboration Context**.
Teamcenter displays the **New Collaboration Context** dialog box.
 2. Choose a collaboration context type from the list.
 - Your administrator can create additional types as necessary with the Business Modeler IDE administration application.
 - Teamcenter places the types of collaboration context you previously created in the **Most Recently Used** list.
 3. (Optional) Select **Open on Create**.

If you select this option, Teamcenter opens the new collaboration context in the application directly after creation.

Tip:

If you do not select this option, you can find the new collaboration context in the **Newstuff** folder in My Teamcenter.

4. Click **Next**.
5. Type a name in the **Name** box.

Mandatory parameters are marked by a red asterisk.

6. (Optional) Type a description of the collaboration context.
7. Click **Finish**.

Note:

You can create a collaboration context in Multi-Structure Manager, Manufacturing Process Planner, Part Planner, Multi-BOM Management, and My Teamcenter.

If you selected **Open on create**, Teamcenter displays the context as a top-level line.

Teamcenter always stores the new collaboration context in the **Newstuff** folder in My Teamcenter.

- If you use a bottom-up approach to creating collaboration contexts, you can also create a new collaboration context that contains an existing structure context.
- Choose **Save as New Collaboration Context** from the **Collaboration Context Tree** view menu.

Save objects as collaboration contexts

You can save loaded structures, including studies, to a new collaboration context. Teamcenter creates a structure context from each loaded structure that you include in the collaboration context if it is not already contained in a structure context.

1. Select a root line of an object in the collaboration pane and choose **File→Save as→Save as New Collaboration Context**.

Teamcenter displays the **Save as New Collaboration Context** dialog box.

2. Type a name and description for the new collaboration context in the **Name** and **Description** boxes.
3. Select a type of context from the list. Click **More** to see a complete list of structure context types.

Your administrator can create new collaboration context business objects (types) in the Business Modeler IDE.

4. For each structure in the list on the left that you want to save, enter the following information. Your administrator can change the existing defaults for this information in the **Default_StructureContext_Type** preference.
 - Name of the structure context
 - (Optional) Description

- Type of the structure context
- Type of the configuration context to be created for this structure context

If the structure is already a part of a structure context, you can see this information when you select the structure in the structure list. Even if a structure is already part of a structure context, Teamcenter creates a new structure context for the structure that is based on the existing one and includes any modifications made to the current structure.

5. (Optional) If you want to save loaded structures to a new collaboration context that captures linked released studies or all studies, review the **Include Studies** list and select the studies to include.
6. (Optional) Select the **Open On Create** option to open the new collaboration context.

Teamcenter opens the new collaboration context. The participating structures appear twice: once in their previous location (as a root structure or as part of another collaboration context object) and once under the new collaboration context. Additionally, each participating structure is now displayed in two structure views—one displaying the original structure and one displaying the newly created structure context.

If you do not choose this option, you can find the new collaboration context in the **NewStuff** folder in My Teamcenter.

7. Click **OK**.

Teamcenter collects all of these structure contexts into the new collaboration context. In addition, it creates a configuration context within the structure context containing the revision and variant rules currently applied to the object. It clones or references the revision and variant rules of the existing structure, according to the following rules:

- If the current revision rule is saved as public, it creates a reference to it.
- If the current revision rule is modified and not saved, it clones the modified rule to create a private revision rule for the configuration context.
- If the current variant rule is saved as public, it creates a reference to it.
- If the current variant rule is modified and not saved, it clones the modified rule to create a private variant rule for the configuration context. If the variant rule is cloned, it is not linked to the top line item in the structure.
- It does not define a closure rule.

Each new structure context refers to all of the occurrence groups that have manufacturing views (visible tabs) when you save it.

Note:

If you try to save a structure that is configured by multiple variant rules, you must set the **DisableSaveSOS** preference to **true**.

Save objects as structure contexts

1. Select the object in the **Collaboration Context Tree** view or ensure the structure view is in focus.
2. Choose **Save as New Structure Context** from:
 - The view menu of the **Collaboration Context Tree** view or the structure view.
 - The **Collaboration Context** menu command in the **File** menu.
 - The shortcut menu of the **Collaboration Context Tree** view.
3. Choose a structure context type from the list and click **Next**.
 - Your administrator can create additional types as necessary with the Business Modeler IDE administration application.
 - Teamcenter places the types of structure context you previously created in the **Most Recently Used** list.
4. Type a name in the **Name** box.

Mandatory parameters are marked by a red asterisk.
5. (Optional) Type a description of the structure context.
6. Click **Finish**.

Teamcenter creates the new structure context and displays it in the **Collaboration Context Tree** view. It moves the original structure into the new structure context in the view. In addition, the name of the structure displayed on the tab in the structure view changes to the name of the new structure context.

Opening a collaboration or structure context

When you **open a collaboration context** in Part Planner, each structure context within the collaboration context appears in a separate view. The collaboration context is listed in the **Collaboration Context Tree** view.

Saving a collaboration context

Teamcenter saves any changes you make to the collaboration context automatically, except for configuration changes. You must save these using the **File→Collaboration Context→Save Configuration** menu command or choosing **Save Configuration** from the view menu in the **Collaboration Context Tree** view.

Manipulate objects in a collaboration context

You can move structure contexts in and out of a collaboration context in the **Collaboration Context Tree** view.

- Move a structure context into a collaboration context.

1. Select a structure context.

The structure context that you select here must be open as a root structure (must show as a root structure in the **Collaboration Context Tree** view) and not as part of a collaboration context.

2. Choose **Move Structure Context into CC Object** from the view menu or choose **File→Collaboration Context→Move Structure Context into CC Object**.

Teamcenter displays the **Move Structure Context into CC Object** dialog box. The **CC Object** list displays all open collaboration contexts.

3. From the **CC Object** list, select a collaboration context and click **OK**.

Teamcenter adds the structure context to the specified collaboration context.

- Remove a structure context from a collaboration context.

1. Select a structure context in a collaboration context.

2. Choose **Remove Structure Context from CC Object** from the view menu or choose **File→Collaboration Context→Remove Structure Context from CC Object**.

Teamcenter removes the structure context from the collaboration context and displays it as a root structure in the **Collaboration Context Tree** view.

Find collaboration contexts containing a selected line

1. Right-click a line in a structure and choose **Tools→Find Affected Collaboration Contexts**.

Teamcenter displays a list of any collaboration contexts in the database that contain the selected line except for structure contexts that consist of occurrence groups, generic BOPs, or plant BOPs.

2. Right-click the desired collaboration context and choose **Send To→Part Planner** or double-click the collaboration context to open it in Part Planner.

Manage configuration contexts

You can save a specific configuration to a configuration context. You can apply this configuration to a structure context at a later point. In this way, you can easily change between various configurations to see their effect on a structure.

Tip:

You can see the currently active configuration in the **Configuration Information** dialog box or in the configuration header of the structure view. If the configuration header is not visible, set the **MEShowConfigurationHeader** preference to **true**.

Do any of the following:

- Create a new configuration context.
 1. With a collaboration context selected, choose **File→New→Configuration Context**.
 2. Select a type of configuration context from the list and click **OK**.
 3. Type a name for the configuration context and, optionally, a description.
 4. (Optional) Specify the revision rule to save in the configuration context.
 5. (Optional) Specify the closure rule to save in the configuration context.
 6. (Optional) Save the state of the **Show unconfigured** buttons.
 7. Click **Finish**.

Teamcenter saves the configuration context object in the **Newstuff** folder in My Teamcenter.

Caution:


If you create a new configuration context while you have a collaboration context selected, the new collaboration context replaces the existing collaboration context.

- Save the configuration of an open structure to a configuration context.
 1. Select the structure with the configuration you want to save. You can select a root structure or a structure context.

2. Choose **Save as New Configuration Context** from the **Collaboration Context Tree** view menu or choose **File→Configuration Context→Save as New Configuration Context**.
 3. Select a type of configuration context from the list.
 4. If you selected a structure context in step 1, select **Paste to Structure** if you want the new configuration context to replace the one currently belonging to the structure context.
 5. Click **Next**.
 6. Type a name for the configuration context and, optionally, a description.
 7. Click **Finish**.
- Apply a saved configuration to an open structure.
 1. Select a structure context or an open structure.
 2. Choose **Apply Configuration Context** from the **Collaboration Context Tree** view menu or choose **File→Configuration Context→Apply Configuration Context**.

Note:

When applying a configuration context that contains the **Preference-Driven** entry for the **Show Unconfigured** buttons, Teamcenter respects the settings of the structure to which the configuration context is being applied and does not change the state of the buttons to reflect the **MEShowUnconfigured...** preferences.

3. Search for a configuration context by clicking **Open an object by name** .

Teamcenter displays the configuration contained in the selected configuration context in the **Apply Configuration Context** dialog box. These entries are for informational purposes only. You cannot change them.

4. Click **OK**.

Teamcenter applies the new configuration to the open structure.

- Restore a configuration to the one saved in the loaded configuration context.
 1. Select the structure context.
 2. Choose **Restore Configuration** from the **Collaboration Context Tree** view menu or choose **File→Configuration Context→Restore Configuration**.

Teamcenter applies the configuration contained in the existing configuration context to the structure view.

Note:

When applying a configuration context that contains the **Preference-Driven** entry for the **Show Unconfigured** buttons, Teamcenter respects the settings of the structure to which the configuration context is being applied and does not change the state of the buttons to reflect the **MEShowUnconfigured...** preferences.

- Save an existing configuration.
- Select a structure and choose **Save Configuration** from the **Collaboration Context Tree** view menu or choose **File→Configuration Context→Save Configuration**.

If you select	This happens
A structure context that has a configuration context	The configuration context is updated to reflect the current configuration.
A structure context that does not have a configuration context	A dialog box opens where you can choose the name, type, and description for the new configuration context. The new configuration context reflects the current configuration.
A collaboration context	For each structure context under the collaboration context: <ul style="list-style-type: none"> ■ If the structure context has a configuration context, the configuration context is updated to reflect the current configuration. ■ If the structure context does not have a configuration context, a configuration context is not created and a message lists the structure contexts for which a configuration was not saved.

Saving the state of the Show Unconfigured ... buttons

Teamcenter provides you with several buttons or menu options that show or hide objects in the structure and in the **Graphics** view. These are:

- **Show Suppressed Occurrences**
- **Show Unconfigured Variants**
- **Show Unconfigured By Occurrence Effectivity**

- **Show Unconfigured Changes**
- **Show Unconfigured Assigned Occurrences** (only applicable to process assemblies)
- **Show GCS Connection Points**
- **Apply Occurrence Type Filters**

Whether these buttons are turned on or off affects what is shown in the **Graphics** view, and, therefore, affects any product view snapshots created in that view. Teamcenter saves the state of these buttons so that when a product view is restored, the same objects are displayed in the **Graphics** view as when the snapshot was created. The state of these buttons is stored in a configuration context.

When you create a new configuration context or save an existing configuration to a configuration context, you can specify the state of the first four of these buttons (**On** or **Off**), or you can specify that the state is **Preference-driven**. The following preferences specify the state of these **Show Unconfigured** buttons:

- **MEShowSuppressedOccsDefaultState**
- **MEShowUnconfiguredVariantsDefaultState**
- **MEShowUnconfiguredOccurrencesEffectivityDefaultState**
- **MEShowUnconfiguredChangesDefaultState**
- **MEShowUnconfiguredAssignedOccurrencesDefaultState**

You can also view or change the state of all options in the configuration context properties.

Occurrence Type Filters:

Show Guided Component Search Connection Points:

Show Suppressed Occurrences:

Show Unconfigured Assigned Occurrences:

Show Unconfigured By Occurrence Effectivity:

Show Unconfigured Changes:

Show Unconfigured Variants:

Note:

When applying or restoring a configuration context that contains the **Preference-Driven** entry for the **Show Unconfigured** buttons, Teamcenter respects the settings of the structure to which the configuration context is being applied or for which the configuration context is being restored and does not change the state of the buttons to reflect the **MEShowUnconfigured...** preferences. This retains the behavior of configuration contexts that were created prior to Teamcenter 10.0, when the configuration context did not save the state of the buttons. When you open a structure or collaboration context containing a configuration context where all values are set to **Preference-Driven**, the structure view opens with the states of the **Show Unconfigured** buttons reflecting the values of the preferences.

Pasting under a collaboration context object

When pasting a structure context to a collaboration context or a configuration context to a structure context object, Teamcenter pastes it with an **IMAN_CCContext** relation. Do not use the **Paste As** command to change this relation when pasting collaboration context objects. If you change the relation, the associated contexts will no longer load when loading the collaboration context.

Creating structures from templates

About cloning structures

When creating structures, it can be convenient to create a structure identical to another one. This may be because, over time, you may design standard products, processes, operations, and activities that act as templates that can be reused to manufacture typical products. Or, it may simply be the most convenient way to quickly generate another structure.

You can clone structures in one of two ways:

- Use the **Paste Duplicate** command to quickly clone a structure from another structure that is visible or easily available in the user interface.
- Use the **File**→**New**→**From Template** menu commands to create a structure that is based on another structure that is not currently open. You also use this method to clone structures when you want to select configuration options for the cloning process.

You can clone a process, product, or plant structure. Your administrator specifies *cloning rules* that determine the actions taken when you clone a structure, as follows:

- **Clone**

The new structure includes a copy of the object that is referenced by the source structure.

- **Reference**

The new structure references the same object that is included in the source structure.

- **Ignore**

The new structure does not include or reference the object.

- **Map**

The system maps the template to a replacement structure. For example, this allows you to create a process structure from an existing process or from a process template. Optionally, this rule may be allowed by a second (default) action: **Reference** or **Ignore**.

You can use the cloning mechanism to create a new process structure that consumes the same parts as an existing structure. This action is based on in-context IDs.

Note:

Cloning is a core capability and is used in various functions, such as, create alternate, create from template, process synchronize, and isolated study. It is very recursive and database I/O intensive. To help reduce the number of database commits to the minimum needed, your Teamcenter administrator can create a preference named **ME_defer_save_in_clone** and set it to **true**.

IMPORTANT: The value of this preference should be made **true** only after running cloning usecases in a test environment. This is required as cloning may fail in specific data conditions when the preference is set to **true**.

Create a structure from a template

Note:

Ensure that the necessary **Product.Template**, **Process.Template**, and **Plant.Template** cloning preferences are defined. These preferences contain the rules that determine how the objects in the template are mapped to the objects in the new plant structure.

1. Choose **File**→**New**→**From Template** and the type of structure that you want to create.
2. Click the **Choose Template** tab.
3. In the **Template ID** box, enter the ID of the structure that you want to use as a template and press Enter.

You can also browse to the template you want to clone using Resource Manager, either by name or by searching for a template in the Classification Search Dialog if it is classified.

Teamcenter assigns a new ID in the **Process ID** box.

4. (Optional) Rename the new structure in the **Name** box.

5. Click the **Configuration** tab.
6. Select a revision rule from the **Revision Rule** list.
7. Select an effectivity by clicking **Set Date/Unit/End Item**.
8. Do one of the following:
 - Click **Process all variants** to traverse the structure considering all unconfigured variants.
 - Click **Process configured** to only process the configured structure. You must specify a variant rule when you choose this option. The structure is configured using the variant rule and unconfigured variants are not considered during cloning.
9. From the **Cloning Rule** list, select a rule.
10. If you are creating a process from a template,
 - Choose the product to which you want to map the consumed products by selecting it in the **Product Reference Structure** list.
 - Choose the work area to which you want to map the consumed work areas by selecting it in the **Plant Reference Structure** list.

This allows you to clone a process and map the consumed objects to different structures from the one chosen in the prototype.

11. (Optional) Select **Carry over future incremental changes**.

If you select this option, you must set the date in the cloning dialog. If you do not select this option, cloning copies the configured structure only.
12. (Optional) Select **Show as new root** to create the cloned structure as a top-level object.
13. Click **OK** or **Apply** to create the new structure from the template you choose.

At the end of any cloning operation, if new incremental changes are created as part of cloning process, Teamcenter displays a dialog box listing the new incremental changes.

Attaching variants as cloned structures

When a template is used, the structure it represents is duplicated to create a cloned structure. The cloned structure includes the manufacturing processes, operations, activities, and parts of the structures associated with them. Any variant options attached to template objects are cloned and attached to the matching clone objects. **Load If** variant conditions, **Set If** option defaults, and **Error If** rule checks in template structure occurrences are duplicated in the clone structure.

Variant expressions referring to variant options attached to template objects are matched to the options attached to the corresponding clone objects. For example, consider a part that includes **Item 001 – Mounting Thread**. This item has a variant option called **Dimension**, which can have a value of either **Metric** or **Imperial**. The part (**Item 001**) includes an occurrence of **Item 002**, thread insert with a variant condition stating **Load if Item 001's Dimension = Metric**.

When this part is used as a template, two items are cloned:

- **Item 001–Mounting Thread** is cloned to **Item 101–Mounting Thread**. It has an option called **Dimension**, which can equal **Metric** or **Imperial**.
- **Item 002–Thread Insert** is cloned to **Item 102–Thread Insert**. It has a variant condition stating **Load if Item 101's Mounting Thread = Metric**.

Note:

This only works with classic variants.

Consuming products in cloned processes

Set a cloned process structure to consume products from a cloned product structure

A process structure consumes products from a product structure. By default, a cloned process structure consumes products from the same product structure as the original process structure. If you want a cloned process structure to consume products from a cloned product structure, you must set up this type of cloning when you create the cloned process structure.

In this example, the original process structure is called **Process Structure 1**. The original product structure is called **Product Structure 1** and the clone of **Product Structure 1** is called **Product Structure 2**.

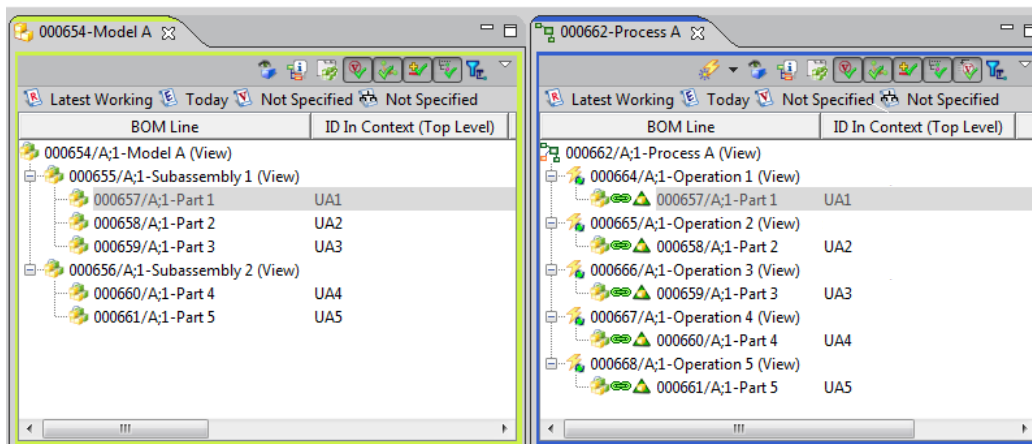
1. Make sure that the in-context IDs in **Product Structure 2** are the same as those in **Product Structure 1**. This is the case when you clone **Product Structure 2** from **Product Structure 1**.
2. Make sure **Product Structure 2** is loaded when you clone the process structure.
3. In the **New Process from Template** dialog box:
 - a. Select **Process Structure 1** as the template.
 - b. Click the **Configuration** tab.
 - c. Select **Product Structure 2** from the **Product Reference Structure** list.
 - d. Click **OK**.

The newly cloned **Process Structure 2** now consumes a part in **Product Structure 2** for each part in **Product Structure 1** that is consumed by the **Process Structure 1** template process.

Consuming parts in a cloned process using smart in-context IDs

You can use smart in-context IDs (IDICs) to consume parts with the same usage into cloned process structures. Your administrator can set up the in-context ID to be based on other BOM line properties such as usage address or reference designator so that they are independent of the top line.

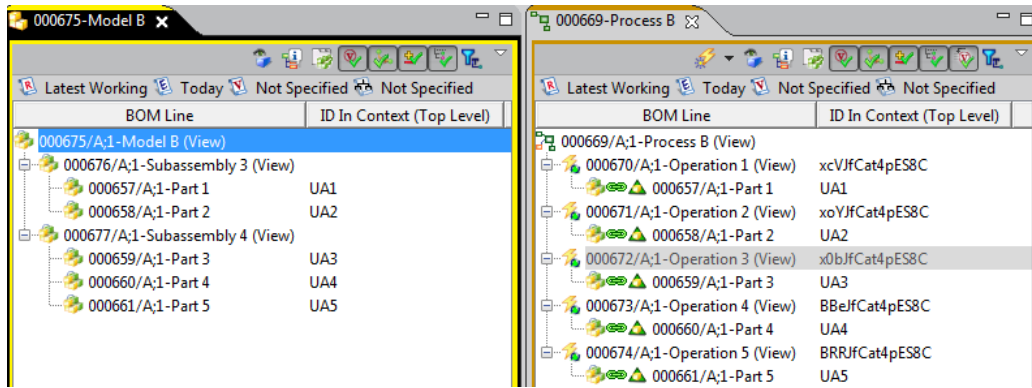
For example, you have a product structure (**Model A**) which is consumed in a process (**Process A**).



You also have a new product, **Model B**, with the same part usages. You then clone **Process A** to create the new process to manufacture **Model B** and call it **Process B**. Ideally, you want all the parts that are consumed in **Process A** to be automatically consumed in their counterparts in **Process B**, based on the same part usage.

Your administrator has configured the in-context ID to consist of the property or properties that represent the part usage (for example, usage address). The parts in **Model A** are stamped with these in-context IDs which are carried with the parts when they are assigned to **Process A**.

When **Process A** is cloned to fetch consumed parts from **Model B** (cloned with the option to map consumed from a reference product), **Process B** is created with the appropriate consumed parts from **Model B**.



Apply revision rules to templates

1. On the **New Process from Template** or **New Operation from Template** dialog box, click the **Configuration** tab.
2. Click **Revision Rule** to select a revision rule for the template. The box lists all revision rules that are defined in the database.

-or-

Click **Cloning Rule** to select a cloning rule for the template. The box lists all cloning rules that are defined in the database.

Save template favorites

Save commonly used templates to a favorites palette so they can be quickly accessed and used.

1. Open the **New Process from Template**, **New Operation from Template**, or **New Activity** dialog box.
2. Select the template using one of the following methods:
 - For processes and operations, type a **Template ID** value on the **Choose Template** tab. The template ID is the process ID or operation ID of the process or operation being cloned.
 - For activities, specify an **Operation ID** value for the operation where the activity occurs on the **Find Template** tab, then select the **Operation Revision** and **Activity** as a basis for the template.

Note:

You may also use the **Find by Name** or **Find by Class** buttons to find the template in the database.

3. Click **Add to Favorites**.

Select a process or operation template

Any template previously saved as a favorite is displayed by name on the **Choose Template** tab. Templates not saved as favorites may be accessed from the database.

To select template that is saved as a favorite:

1. Open the **New Process from Template** or **New Operation from Template** dialog box.
2. On the **Choose Template** tab, click the favorite template you want to use. Use the scroll bars on the right of the tab if the list is extensive.
 - The **Template ID** text box is automatically updated with the template ID of the selected favorite template.
 - The **Item Details** section in the dialog box is automatically completed with the process or operation ID, revision, and name upon which the template is based.
3. If necessary, click the **Configuration** tab and set a revision rule for the template.
4. Select **Show as new root** to open this new process or operation as the root process or operation in a structure view.
5. Click **OK**.

The new process or operation is created.

To select a template from the database:

1. Open the **New Process from Template** or **New Operation from Template** dialog box.
2. On the **Choose Template** tab, use one of the following methods to search for the template.
 - In the **Template ID** box, type the ID of the process or operation to be used as a template.
 - Click the **Find Template by Name** button and search for the template using its name or ID. Use wildcard characters in your search, if necessary.
 - Click the **Find Template by Class** button to open the Classification Search Dialog and search for a classified template.

The **Item Details** section is completed with the information for the template you have selected.

3. If necessary, click the **Configuration** tab and set a revision rule for the template.
4. Select **Show as new root** to open the template as the new root process or operation.

5. Click **OK**.

Select an activity template

Any templates previously saved as favorites display by name on the **Favorite Templates** tab in the dialog box. Templates not saved as favorites can be accessed from the database.




To select a template that is saved as a favorite:

1. In the **New Activity** dialog box, click the **Favorite Templates** tab.

All activities previously saved as favorites are listed.

2. Click the favorite template to be used.
3. Click **OK**.

To select a template from the database:

1. In the **New Activity** dialog box, click the **Find Template** tab.
2. Use one of the following methods to specify the template ID:
 - In the **Operation ID** box, type the ID of the parent operation for the activity to be used.
 - Click the **Find Operation by Name** button  and search for the parent operation using its name or ID. Use wildcard characters in your search, if necessary.
 - Click the **Find Operation by Class** button  to open the Classification Search Dialog and search for a classified activity template.
3. After you specify an operation ID, click the **Operation Revision** button  to open the **Revision Selection** dialog box.
4. In the **Revision Selection** dialog box, use **Revision Display Filter** to filter revision types for the selected operation. Use the additional filter buttons to clarify the filter further for only released, in-process, or working revisions.
5. Double-click the appropriate revision.

The revision is displayed in the **New Activity** dialog box. All activities that exist as part of the operation revision are loaded into the **Activity** list.

6. Select an activity.
7. Click **OK**.

Remove a favorite template

1. Open the **New Process from Template, New Workarea from Template, New Operation from Template, or New Activity** dialog box.
2. From the **Choose Template** (processes and operations) or **Favorite Templates** (activity) tab in the **Template** pane, choose the template to be removed.
3. From the shortcut menu, choose **Remove from Favorites**.

The template is removed.

Note:

To remove a database template that is not saved as a favorite, use the same process you would use to remove any other database item.

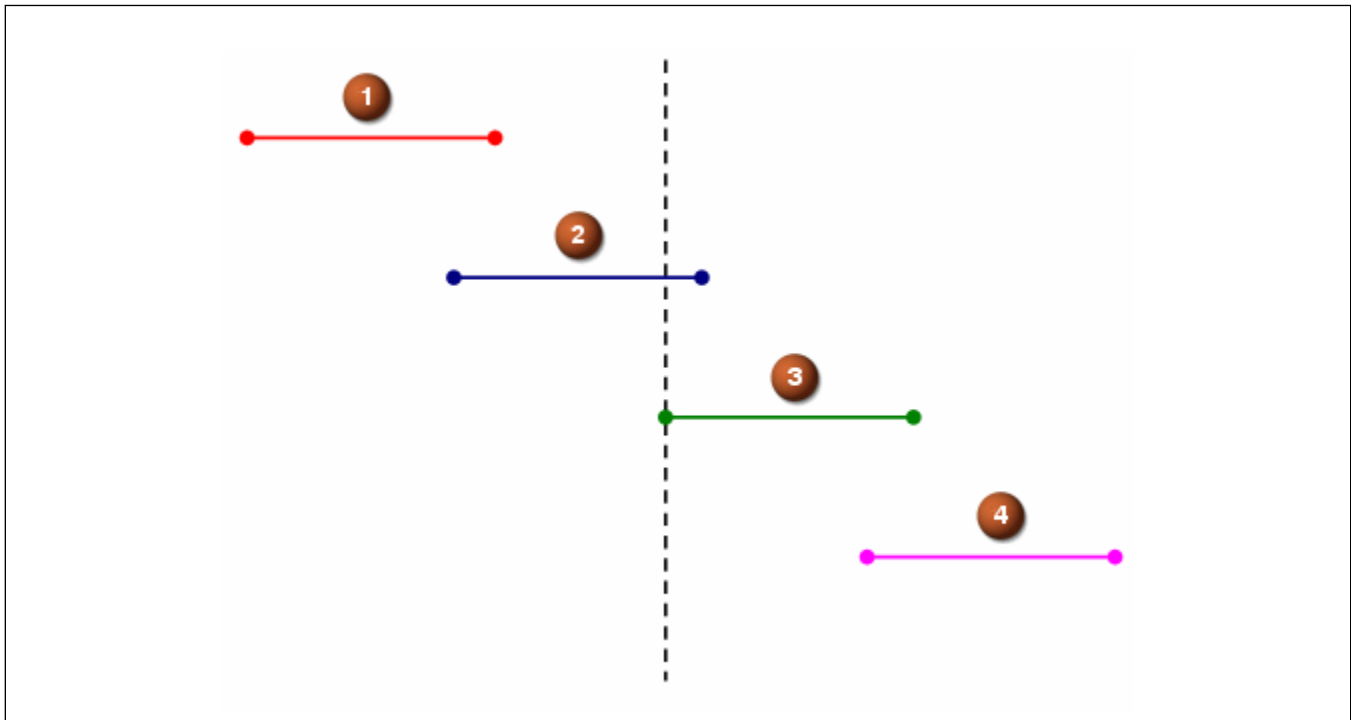
Carrying over future incremental change when cloning

When cloning, you have the option to carry over future effective incremental changes. If you are using date effectivity, *future* is anything falling after the date set in cloning dialog box. If you are using unit effectivity, future is anything after the unit number set in the cloning dialog box. Incremental changes that are currently effective are merged with the currently set incremental change. Those that are effective in the future are carried forward to the new cloned structure or re-created under new incremental change revisions. Any incremental changes whose effectivities are in the past are dropped from the cloned incremental change.

Note:

- Specify the release status type that is assigned to any newly created incremental change revisions during cloning in the **Clone_Pending_Release_Status** preference.
- Specify the release status type that should be considered as secure in the **Clone_Secured_Release_Status** preference.

In the following figure, the vertical line represents the point of cloning.



Cloning with incremental changes


1	IC1	Incremental change 1 whose effectivity lies in the past.
2	IC2	Incremental change 2 that is secure and configured.
3	IC3	Incremental change 3 is the current IC (set at the bottom of the pane) that is configured and pending. This is the target IC.
4	IC4	Incremental change 4 is pending and unconfigured.

After cloning, Teamcenter:

- Disregards IC1.
- Clones IC2 to a new IC5 and the change elements in IC2 (that is, **add** or **remove**) that are associated with the cloned object are cloned and added to IC5. IC5 then has a **pending** status.
- IC4 is left alone and the new change elements are added to it. This is not cloned because the status is pending and the **out** effectivity does not match the currently set IC revision (IC3).

Override copy action rules

To override the template copy action for any object found in a structure, add a template action occurrence note to the object in the cloned structure as follows:

1. From the **Edit** menu, choose **Notes**, or click the **Notes** button  on the toolbar.
2. In the **Create** list, choose **TEMPLATE ACTION**.
3. Enter **Ignore**, **Reference**, or **Clone** in the **Description** box.
4. Click **OK**.

Associating product and process structures

Creating a relationship between product and process structures

After you define all operations and activities that comprise a manufacturing process, establish a relationship between the process and the part it manufactures. To do this, associate the part as a target item of the process.

You can also assign product parts to the process structure with a specific occurrence type. The following table lists some of the available occurrence types.

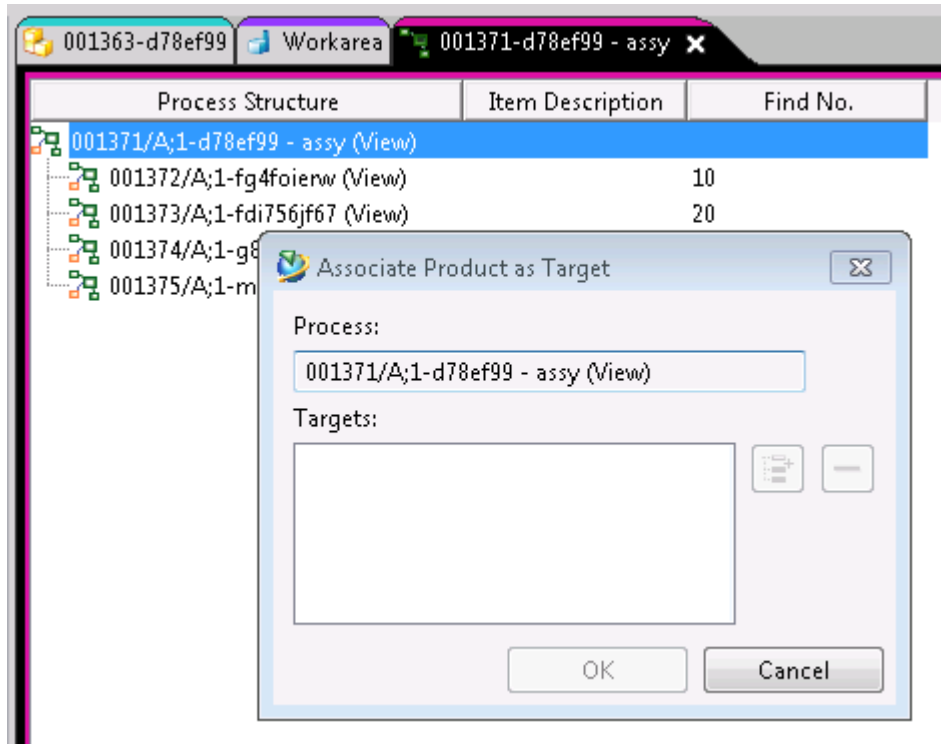
Occurrence type	Use
ME Assign	Used when assigning parts to processes.
MEConsumed	Used by the operation that takes a part out of the bin.
METool	Used to assign tools to processes and operations.
MEResource	Used to assign equipment to processes and operations.
ME Assemble	Used by the operation that attaches the part to the product.
ME Disassemble	Used by operations when they disassemble a part.
ME Handle	Used when all other relationships to an operation do not apply.
ME Feature Assign	Used when assigning manufacturing features to operations.
METarget and MEOther	Used for other types of assignments that do not involve consuming, handling, assembling, or disassembling for operations and assignment for processes.


Associate a product as target

When you associate a product as the target, you create a relationship between the product structure and the process. You can link a product and a process several times if the process is repeated.

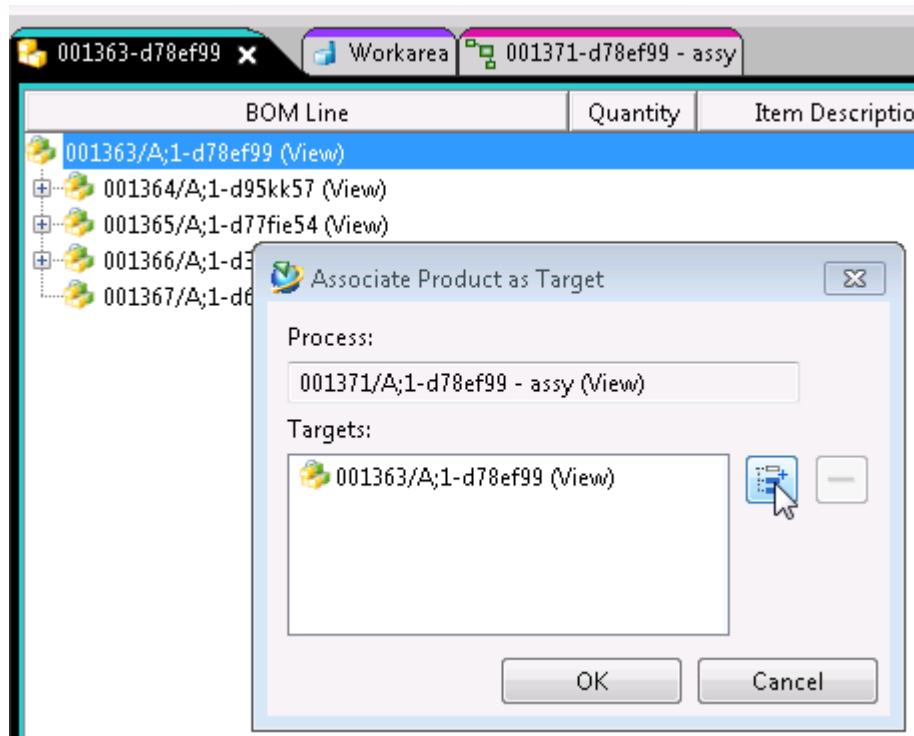
1. Right-click the process line and choose **Link/Associate** → **Associate Product as Target**.

Teamcenter opens the **Associate Product as Target** dialog box with the process listed in the **Process** box.



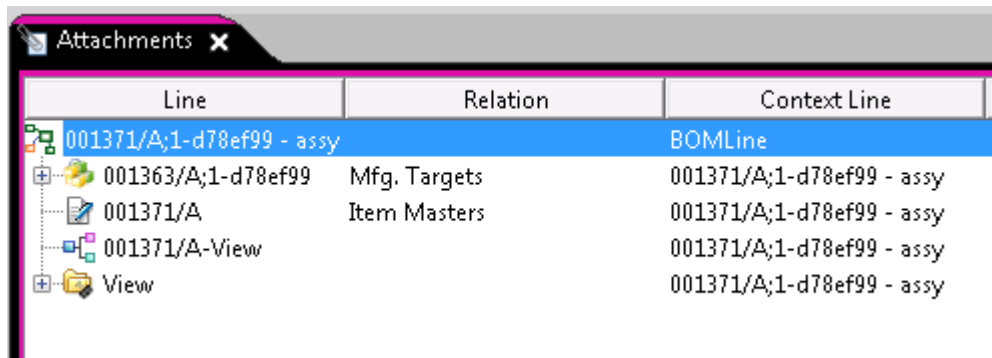
- In the product structure view, select the product line that you want to associate as the target and click the **Set/add current selection** button  in the **Associate Product as Target** dialog box.

Teamcenter enters the name of the part in the **Targets** box.



3. Click **OK**.

This attaches the part structure as the target to the setup structure of the process. You have established the relationship between the part and top-level process used to manufacture that part.




You typically choose this option for a part of the **METarget** occurrence type that is defined in the NX CAM Integration.

Note:

When you save an **MENCMachining** operation in the NX CAM Integration, the associated part is automatically assigned as the target in Manufacturing Process Management.

Assign a part to a process

Do one of the following:


- Use the **Copy** and **Paste** commands.
 1. Right-click a part revision in a structure view and choose **Copy**, or click the **Copy** button  on the toolbar.
 2. In the process pane, select the appropriate process and choose **Paste**.
- Drag the part to the appropriate process.

By default, if an occurrence type is defined for a BOM line and you assign the BOM line to a process or operation, Teamcenter uses the same occurrence type. However, if your administrator sets the **MEAssignCustomizedOccurrenceType** preference, you can specify a different occurrence type during the assignment.

You can specify the properties that are copied over from part to process during the assignment process using the **MEAssignProperties** preference.

Assign a product with a specific occurrence type

Do one of the following:

- Assign using **Copy** and **Paste As**.
 1. Right-click a part revision in a structure view and choose **Copy**, or click the **Copy** button  on the toolbar.
 2. In the process pane, select the top-level process to be assigned to the part selected in the product pane and choose **Paste As** and one of the occurrence types listed, depending on the purpose of your assignment.

If you assign as **MEConsumed**, Teamcenter establishes the link between a part and the process when the part is consumed in an assembly operation. A consumed item is required during a manufacturing process or operation.

If you assign as **MEWorkpiece**, Teamcenter establishes the link between the workpiece and a process or operation. A workpiece can represent an intermediate state of the product during the manufacturing process.

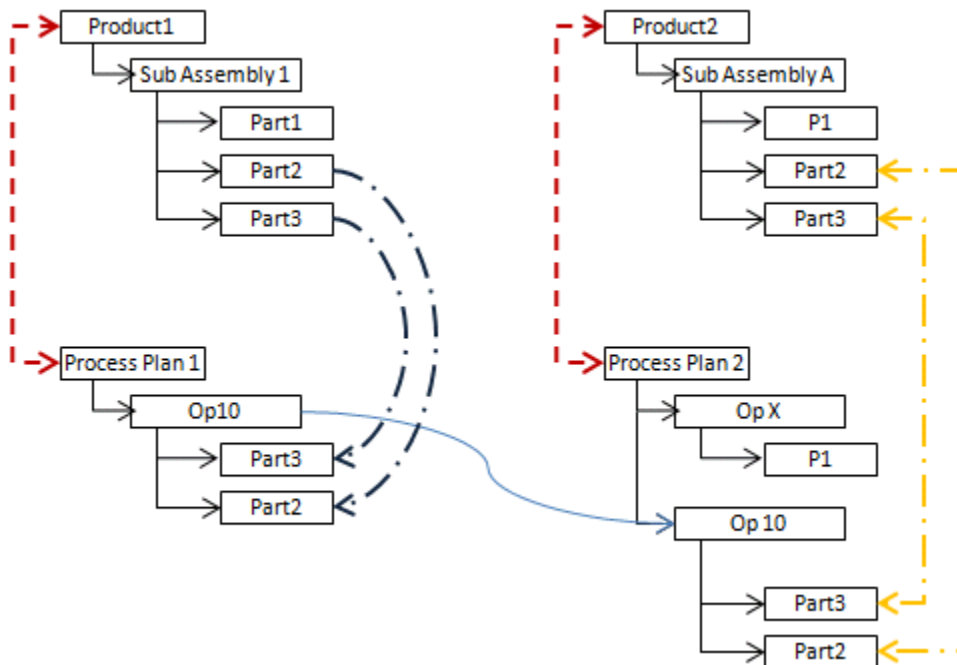
Note:

The occurrence types available to you are determined by your administrator using the **MEDisplayOccurrenceType** preference.

- Change the occurrence type in the **Occurrence Type** column.

Share an operation across process plans

You can share an operation across top levels of two process plans.



Associate product to process



Assign parts to process



Share an operation



Link to manufacturing process

Note:

You cannot use this method to share operations within the same process plan.


1. Copy the operation that you want to share to the clipboard.

2. Load the second top-level plan with which the operation is to be shared.
3. Expand the process plan to the required subprocess.
4. Paste the operation to the subprocess.

Teamcenter does not create a new operation with a unique ID.

5. Expand the subprocess to the required items that are consumed in the shared operation for this top level.
6. Select the consumed item in the process and choose **Link/Associate** → **Link to Manufacturing Process** from the shortcut menu.

Teamcenter displays the **Link to Manufacturing Process** dialog box.




7. Select the desired part from the **Source parts** list or select the part in the product structure and click **Set/Add current selection** .
8. Click **OK**.

Reconciling broken links

About broken links

Changes to the product or plant structure are not automatically updated in the process tree where the occurrence is referenced. This results in a *broken* link. With this feature, you can identify broken links and search for the possible occurrence that was originally defined, for example, as a consumed part.

When you expand a process to display linked items, each link line includes a symbol indicating the state of the reference:

Symbol	Description
	Occurrence is linked to a product or plant structure.
	Link is broken.
	Occurrence is linked to a product or plant structure that is not currently loaded, or a product or plant structure is loaded but not currently configuring the process structure.


Note:

Teamcenter retrieves the status of a link from a run-time property, **Mfg0LinkState**.

When performing the search for broken links, Teamcenter searches through process structures that you specify and looks for broken links. It then looks through product or plant structures that you specify for likely *candidates* to repair these links. The search is based on criteria that you can specify in the **MPP_DefaultCandidateSearchCriteria** preference. Once found, you can have Teamcenter repair these links automatically, or you can choose to select candidates manually from the candidates list.

Your administrator can save search criteria for you to use. You can further modify these criteria and save your modifications to the saved criteria.

When there are many broken links and each broken link has many candidates, a large amount of memory is required for high-speed processing. If the total number of broken links and candidates is too large, for example, 32,000 lines, the memory usage may be a concern if you are performing the search on an underpowered computer. To speed up the search, divide the search scope into smaller pieces to reduce memory usage; for example, select subnodes instead of the root node.

If you see the white link symbol  for a line, it means that the occurrence is linked to a product or plant structure that is not currently configuring the process structure. Select **Define Configuring Structures** from the view menu to specify the product or plant that should configure the process.

The following properties are supported in a search for broken links:

- A selection of BOM line properties:


Item Id
Find number
Quantity
Usage Address
Reference Designator
Position Designator

- All types of occurrence notes
- Any extended or custom properties your administrator creates
- Properties found on the weld attribute form

Identify broken links

1. Open the process in which you want to search for broken links.
2. Choose **Tools**→**Repair Broken Links** or choose **Repair Broken Links** from the shortcut menu.

Teamcenter displays the **Repair Broken Links** dialog box.

3. Modify the scope for the broken link candidate search by adding or removing product structure lines. Do this by selecting them in the product structure and clicking **Set/Add current selection** .

4. (Optional) Modify the search criteria.
5. To set a revision rule, click **Alternative Revision Rule**.

You can choose to view or set the revision rule, enter the end unit/date, or set an override folder.

6. Choose whether you want to perform a quick or a more thorough search in the **Structures Traversal** section.

Click	To
Visible Structure	Search through the launched, loaded structure (all the currently expanded and visible lines). The quick search does not include nodes that have never been expanded (that is, nodes that are not loaded) or are hidden due to effectivity or variant conditions.
Full Structure	Search through the complete tree in the launched structures, loading as necessary. The search expands collapsed (unloaded) nodes; it does not include nodes hidden due to effectivity or variant conditions.

7. To search for broken links only, and not perform the more time-consuming candidate search, clear **Include Candidates**.
8. To have Teamcenter repair the links automatically, select **Automatic Repair**.

Teamcenter searches for eligible candidates in the product or plant structure and, if only one candidate is found, automatically creates a relationship of the same type as the broken link between the process line and the lone candidate.

9. Click **Search**.

Teamcenter searches for all broken links from the selected process node down to the leaf nodes and displays them in the **Broken Links** list. If you select **Include Candidates**, it also searches for all candidates that fulfill the search criteria and displays them in the **Candidates** list.

If you select a line in the process structure on which to perform the search with multiple broken links in the substructure, and **Automatic Repair** is active, all broken links for which Teamcenter finds a unique candidate are repaired.

Repair broken links

1. Search for broken links.
2. Select the broken link that you want to repair from the **Broken Links** list.

3. (Optional) Click **Show in Tree** to see the line containing the broken link highlighted in the process structure.
4. Select the candidate to which you want to relink the process line in the **Candidates** list.
5. (Optional) Click **Show in Tree** to see the candidate for repair highlighted in the product or plant structure.
6. Click **Repair**.

Teamcenter relinks the process line to the product or plant line and the symbol is updated in the **Broken Links** list to show the link is no longer broken. You can select multiple pairs of broken links/candidates before clicking the **Repair** button. Teamcenter remembers your choices and processes all the pairs that you select.

Modify search criteria

By default, when searching for candidates to repair broken links, Teamcenter examines the properties listed in the search criteria that you select from the **Stored Criteria** list. If the criteria of a perspective candidate match the values in the search criteria, the candidate is proposed as a replacement.

1. Select a search criteria from the **Stored Criteria** list.

The choices shown are saved by your administrator.

2. Click **Edit** beside the **Stored Criteria** box and add BOM line properties by clicking the **Add +** button.

Teamcenter adds new properties to the criteria list in the order in which they are displayed in the columns of the process view. To display more properties, you must first add new columns with the desired properties to the process view.

Note:

If a property is added by a preference, its name is displayed as the internal property name.

3. Designate whether the properties should be considered as mandatory or optional by clicking in the cell and selecting a value.
4. Enter a property value.

You can use the * wildcard symbol or a space between characters.
5. (Optional) Save the modified search criteria by clicking **Save Criteria**.


You can only modify search criteria that were saved by your administrator. You cannot modify the **MPP_DefaultCandidateSearchCriteria** search criteria.

Break associations

To break an association between a part and a process or a work area and a process, do the following:

1. Right-click the process root and choose **Link/Associate→Associate Product as Target** or **Link/Associate→Associate Workarea**, depending on which association you want to break.

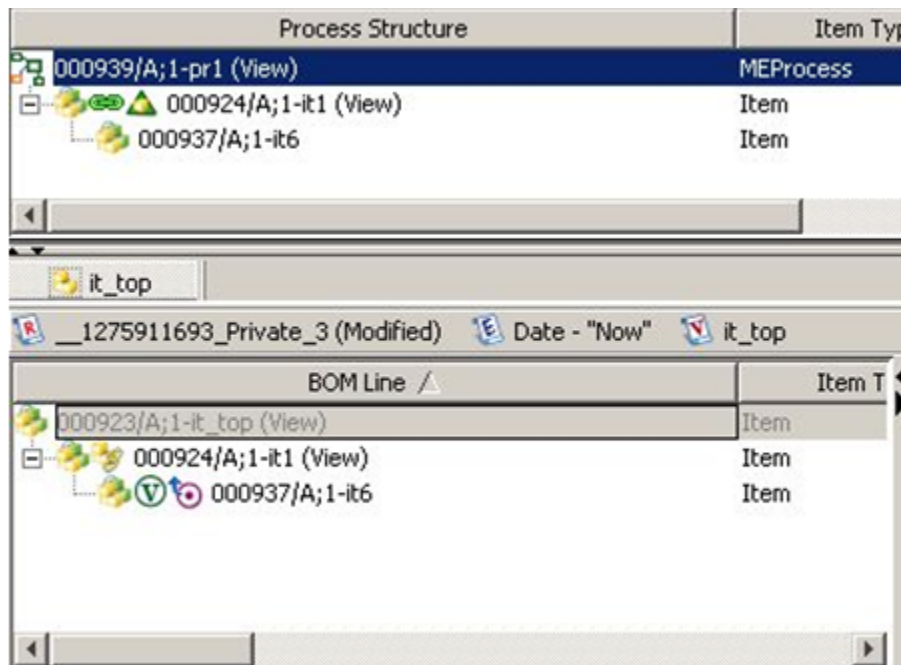
Teamcenter displays a dialog box listing the existing associations.

2. Select the undesired association and click **Remove selected object** .

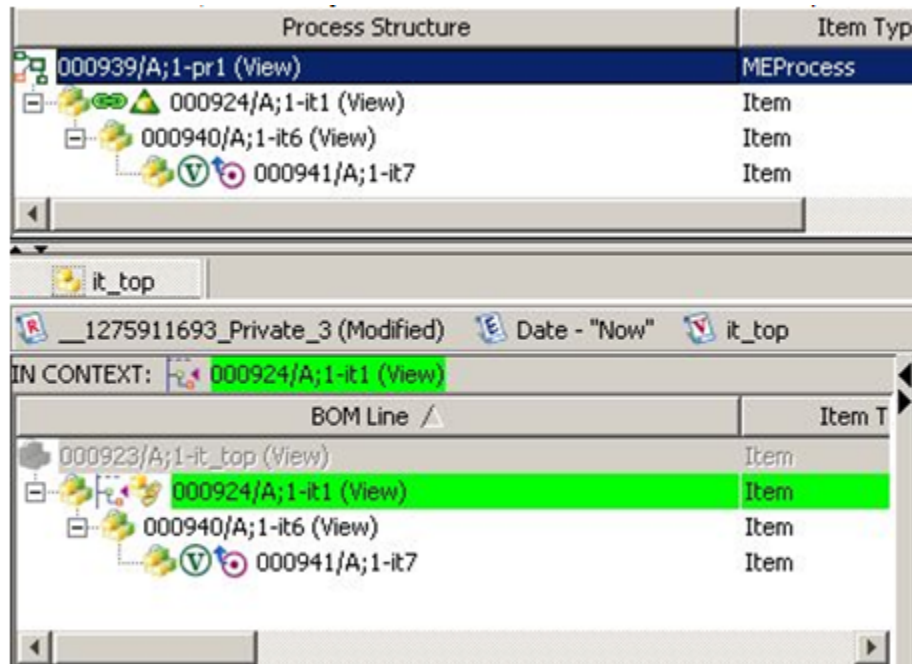
Teamcenter removes the association between the part and process or work area and process.

Consuming an assembly with in-context information

In the following example, an assembly part is consumed below a process structure. If a child item in the product structure contains in-context information that was edited for a part above the consumed part, you cannot see the in-context information in the process structure. In the following example, **it6** has a variant condition in the context of **it_top**. Therefore, you see the variant symbol and the target symbol in the product structure.



If the in-context information is added in the context of the consumed line or below it, it is visible. In the following example, the variant condition of **it7** is edited in the context of **it1**, which is the consumed line. Therefore, the in-context information is available in the process structure.




Link unconsumed items as required

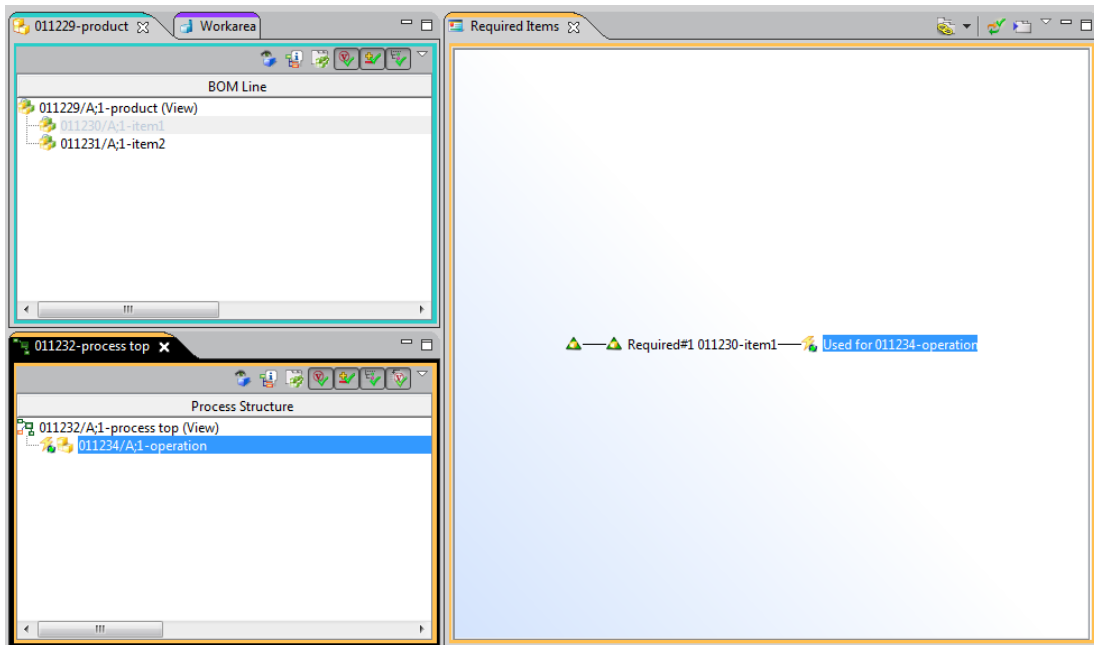
You can add items to a process plan that are used by a process but not consumed by it, such as glue or heat treatment. You link these using a **MERequired** relation.

1. Open the process structure and the product structure that contains the item you want to link.
2. Right-click the appropriate operation in the process structure and choose **Link→Link As Required**.

Teamcenter displays the **Link as Required** dialog box.

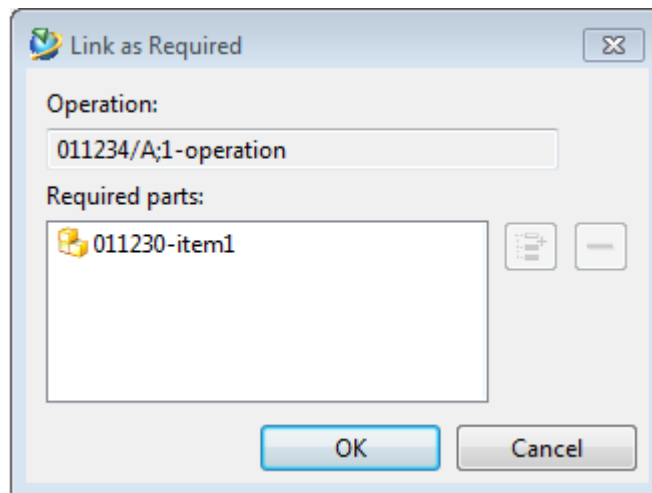
3. Select the item in the product structure that you want to link to the operation and click  in the **Link as Required** dialog box.
4. Click **OK**.
5. Right-click the operation and choose **Open With→Required Items**.

Teamcenter displays the **Required Items** view showing the item that is linked.



- (Optional) Reopen the **Link as Required** dialog box as described in steps 1 and 2.


Teamcenter displays the linked item in the list.




Visualizing structures

Ways to visualize structures

You can visualize a structure in several ways.

- The **Graphics** view available in the manufacturing applications allows you to visualize the product, process, or plant structure. You open the **Graphics** view, sometimes referred to as the *embedded viewer*, by clicking  in the structure view toolbar.

When the **Graphics** view is open, many of the secondary views exhibit boxes in front of the nodes in the hierarchy structure that you can use to turn graphics display on and off.

- The rich client Lifecycle Viewer application provides you with nearly all of the visualization tools offered by the stand-alone viewer, many of which are not available in the embedded viewer within Teamcenter applications. You open the rich client Lifecycle Viewer application by clicking the **Lifecycle Viewer** application icon .
- Stand-alone Lifecycle Visualization provides you with all the functionality of a viewer view or the Lifecycle Viewer but with support for optional software modules such as Concept, Visualization Illustration, Quality Producer, and Variation Analysis. Stand-alone Lifecycle Visualization is integrated with Teamcenter, so you can send data from Teamcenter applications into the stand-alone viewer, perform analysis, and then save your work back to the database.

Display images in the Graphics view

If an image is associated with the object selected in a structure view, opening the associated **Graphics** view displays that image.

The following image types are available in this view:

- **DirectModel**

Imported **.jt** files or **.jt** files created by the translators. These datasets containing these files must be attached to the item or item revision with a **Rendering** relation.

- **DirectModelMarkup**

Captured image of a DirectModel dataset.


- **DrawingSheets and Markup**

Imported **.cgm** files.

- **Image**

Imported **.tif**, **.gif**, **.jpeg** and similar file types.

When you open an image in the **Graphics** view, the **Graphics** menu is displayed in the menu bar.

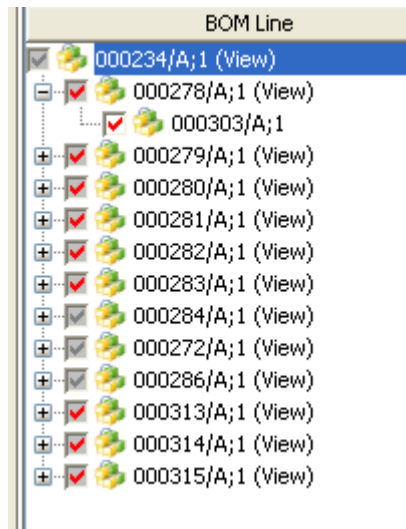
1. Right-click a line in the structure view and click  in the view toolbar.

Teamcenter opens the **Graphics** view associated with the structure view from which you open it.

Note:

Do not confuse this assembly viewer with the viewers that you can open using the **Open With** shortcut menu command. The assembly viewer has more features that you can use to view and manipulate 3D assemblies.

- Select the check boxes next to the components in the tree that you want to display in the **Graphics** view. If you select the root item, the entire structure is displayed.



When you open the **Graphics** view, other views that display the hierarchy also display the check boxes that you can use to blank and display graphics. These check boxes are slightly different.

The following states exist for the check boxes.

Check box	State
<input checked="" type="checkbox"/>	The part or assembly is fully loaded and visible.
<input checked="" type="checkbox"/>	The assembly component is fully loaded but only partly visible. This can be because a part is turned off or because geometry does not exist for one or more parts.
<input checked="" type="checkbox"/>	The assembly component is partially loaded and only partially visible.
<input checked="" type="checkbox"/>	All available geometry is visible, but geometry does not exist for every part.
<input type="checkbox"/>	The part or assembly is loaded but not visible.
<input type="checkbox"/>	No geometry exists for the selected part, or if this is a parent structure, it is not fully loaded and not visible.

Tip:

If you want to display a single component in a large structure, additionally use the **Viewer** view that you open using the **Open With** shortcut menu command.

Toolbars available in the Graphics view

Use this toolbar	To
3D Alignment	Move individual parts or groups of parts and align them to other parts in the viewer.
3D Appearance	Work with advanced appearance attributes.
3D CAE Viewing	View Computer Aided Engineering (CAE) Finite Element Analysis (FEA) results.
3D Clearance	Check the clearance of parts in your model.
3D Comparison	Compare the geometry of two sets of parts.
3D Coordinate System	Create and manage coordinate systems. You can also align parts or your view to a coordinate system.
3D Display Modes	Control the display mode of geometry in the viewer. You can display geometry as shaded, tessellated lines, feature lines, or any combination of these. Tessellation or feature lines hidden by other geometry can be viewed as normal, semi-transparent, or invisible.
3D GDT Markup	Insert GD&T markups on your 3D models.
3D Markup	Add text or graphical elements on your 3D model in the viewer.
3D Measurement	Measure your 3D model.
3D Movie Capture	Capture the contents of the viewer as you move the camera around, show or hide parts, transform parts, play animation sequences, and play VFM motion files associated with your model.
3D Navigation	Manipulate the 3D view.
3D PMI	Display and control Product and Manufacturing Information (PMI) in your model.

Note:

PMI functionality is available only when PMI is enabled on your system. If PMI is enabled, you can right-click a part and choose one of the following commands:

Use this toolbar	To
	<ul style="list-style-type: none"> • Show PMI Shows all effective PMI on the selected part or subassembly and its children. • Toggle in PMI Tree Adds PMI from the selected part or subassembly and its children to the PMI tree. Alternatively, if the part or subassembly is already in the PMI tree, Teamcenter removes it.
3D Part Manipulation	Manipulate parts by dragging.
3D Part Transformation	Translate, rotate, and scale parts in your model.
3D Section	Work with cross sections of your 3D model.
3D Selection	Pick part entities.
3D Standard Views	Examine your model from different views.
3D Thrustline Editor	Create and manipulate thrustlines.
3D Visibility	Hide obscuring parts and clip areas of your model.
Create Markup	Create product views, capture an image of the current geometry or show or hide the 3D PMI tree.
Print	Print an image or display a print preview.

Displaying images in views other than the Graphics view

When you open the **Graphics** view, other views that display the hierarchy also display the check boxes that you can use to blank and display graphics. These slightly different check boxes are displayed in the following views:

- **Gantt** view
- **Manufacturing Features** view
- **Structure Search Criteria** view (in the **Current Scopes** section)
- **Structure Search Results** view
- **Accountability Check** view
- **Assignments** view

Search Result	
BOM Line	Item
<input checked="" type="checkbox"/> 000066/A;1-Body Sub:123-00	Item
<input checked="" type="checkbox"/> 000201/A;1-item	Item
<input checked="" type="checkbox"/> 000092/A;1-Case_SubAssy (V	Item
<input type="checkbox"/> 000089/A;1-Head_SubAssy_C	Item
<input checked="" type="checkbox"/> 000067/A;1-Head2 Sub;0,Pa	Item
<input type="checkbox"/> 000069/A;1-Spark Plug	Item
<input checked="" type="checkbox"/> 000098/A;1-CamShaft Sub:1:	Item
<input type="checkbox"/> 000070/A;1-Head Nut	Item
<input checked="" type="checkbox"/> 000088/A;1-Valve Cover_cop	Item
<input type="checkbox"/> 000087/A;1-Rocker Arm_cop	Item
<input checked="" type="checkbox"/> 000084/A;1-Valve_Sub;0,Par	Item
<input type="checkbox"/> 000068/A;1-Head_2	Item
<input type="checkbox"/> 000086/A;1-Rocker Arm	Item
<input type="checkbox"/> 000078/A;1-Valve Spring	Item
<input type="checkbox"/> 000078/A;1-Valve Spring	Item
<input checked="" type="checkbox"/> 000071/A;1-Rocker_Sub;0,Pc	Item
<input type="checkbox"/> 000070/A;1-Head Nut	Item
<input type="checkbox"/> 000079/A;1-Valve_Sub;0,Par	Item
<input checked="" type="checkbox"/> 000095/A;1-Cylinder_2	Item
<input type="checkbox"/> 000096/A;1-Cylinder_1	Item
<input checked="" type="checkbox"/> 000097/A;1-cylinder bolt pat	Item
<input type="checkbox"/> 000100/A;1-Crank_Assy (Vie	Item
<input type="checkbox"/> 000108/A;1-Lifter	Item
<input type="checkbox"/> 000110/A;1-crank_gear	Item
<input type="checkbox"/> 000109/A;1-cam_gear	Item
<input type="checkbox"/> 000108/A;1-Lifter	Item

The following states exist for the check boxes.

Check box	State
<input checked="" type="checkbox"/>	The node is displayed in the Graphics view. If it is a leaf node (no children), it has geometric data. If it has children, all the children are currently visible.
<input checked="" type="checkbox"/>	The node has children, and only some of them are currently displayed.
<input type="checkbox"/>	The node is not displayed in the Graphics view for one of the following reasons: <ul style="list-style-type: none"> • The user has chosen to hide it. • There is no geometric data attached to it. • The geometric data of the node is not yet loaded, so it is uncertain whether the node has geometric data.
<input checked="" type="checkbox"/>	The node is a leaf node and has no geometric data.

Isolate parts for viewing

You can remove unwanted parts from the viewer, isolating the part of interest:

1. Select one or more the parts you want to see in the viewer and deselect unwanted parts.
2. Choose **Graphics→Visibility→View Selected** and Teamcenter blanks all unwanted visible parts and shows only the selected parts. Alternatively, you can right-click required parts in the viewer and choose **View Selected**.

Selecting packed objects for display

When lines are packed, one of the packed lines is always designated the master packed line. If the **TCVIS_Selection_From_Viewer** preference is set to true, you can select packed objects in the viewer using the buttons available in the **3D Selection** toolbar. However, if you select the master packed line, all packed lines are selected. If you do not want this behavior, you must unpack the packed lines before selecting the individual objects in the viewer.

Manipulate graphics

You can use transformation tools to graphically manipulate parts or assemblies in the structure.

You can perform two types of manipulations:

- Choose **Graphics→Transformation→Temporary Transformation** to temporarily translate, rotate, or scale parts or assemblies. You cannot save temporary transformations, but you can capture images of them.
- Choose **Graphics→Transformation→Persistent Transformation** to edit the structure by permanently translating and rotating parts or assemblies. (Scale option is not available.)

Note:

If there are arrangements in the structure, by default persistent transformations are applied to all of them. To limit persistent transformations to the active arrangement, set the **TCVIS_reposition_all_arrangements** preference to **False**.

The differences between performing a temporary transformation and editing the structure are listed in the following table.

Functionality	Temporary Transformation	Persistent Transformation (editing the structure)
Permanence	All changes are temporary. Teamcenter removes the	Changes are permanent.

Functionality	Temporary Transformation	Persistent Transformation (editing the structure)
	modifications when you close the window.	
Repositioning options	All options are permitted.	All options are permitted except scaling.
Occurrences repositioning	Occurrences are not repositioned.	Occurrences are repositioned, potentially updating multiple BOM lines.

The **Temporary Transformation** dialog box provides the same options as the Lifecycle Viewer **Part Transformation** dialog box. The **Permanent Transformation** dialog box provides the same options, except for scaling.

Displaying objects by type

Overview of displaying objects by type

You can display or blank objects in the **Graphics** view based on their type, occurrence type, or a combination of both. For example, you may want to blank all weld points or display only the parts consumed by a process. In addition, a visualization filter allows you to set the object and/or occurrence types you want to hide from the display on a more permanent basis.

The types of objects you can blank or display depend on the type of structure on which you are working. For a process structure, you can display or blank:

- Item types such as **Item**, **WeldPoint**, or **Workarea**. All item types that derive from **Item**, **Workarea**, and **PSConnection** (including **WeldPoint**) are supported.
- All available occurrence types such as **MEConsumed** or **ME Weld Point**.
- Any combination of these item and occurrence types.

For a product structure, you can display all types that derive from:

- **Item**
- **PSConnection**

For a plant structure, you can select all types that derive from the **Workarea** item type.

The object types to be blanked or displayed in the structure must exactly match the selected types. Selecting an item does not select every object derived from the **Item** type.

To reduce the size of this potentially long list of candidates, you can store the commonly used item list in the **MEBlankDisplayTypes** preference.

Display/blank objects by type

1. With a structure open in the **Graphics** view, do one of the following:
 - Choose **Graphics→Visibility→Display/Blank Selected by Type→Object/Occurrence Type**
 - Right-click in the viewer pane and choose **Display/Blank Selected by Type**.
 - Right-click a subassembly in the structure tree and choose **Display/Blank Selected by Type**.
2. Choose the type of object or occurrence type that you want to blank or display.

The entries in this list are dictated by the value in the **MEBlankDisplayTypes** preference.



The object types that you select are displayed or blanked in the viewer.

Display/blank multiple object types

1. Choose **Graphics→Visibility→Display/Blank Selected by Type→Advanced**.
2. Select all the object types that you want to display. If you open the dialog box with a process displayed in the viewer, you can also select occurrence types.
3. (Optional) Select **Display only selected types** to blank all types other than those selected in the dialog box.
4. Click **OK**.

Set the visualization filter

Use the visualization filter to set the object and/or occurrence types you want to permanently hide from the display.

1. With a structure open in the **Graphics** view, choose **Graphics→Visibility→Define Visualization Filter**, or click the **Define Visualization Filter** button  in the toolbar.
2. Choose the object or occurrence types that you want to hide permanently from the display.
3. (Optional) Select **Apply visualization filter** to activate the filter as soon as you close the dialog box.
4. Click **OK**.
5. (Optional) If you did not activate the filter in step 3, activate it by choosing **Graphics→Visibility→Apply Visualization Filter** or clicking the **Apply Visualization Filter** button  in the toolbar.

Working with product views

About product views

You can save data in the assembly viewer, including current items, zoom factor, rotation angle, and pan displacements. You can retrieve a saved product view (sometimes called a *3D snapshot* or *snapshot view*) during a subsequent session or share it with other users. You can only save or retrieve product views when a base view structure is displayed in the viewer. You cannot create product views of occurrence groups.

You can create product views that contain one or more of the following:

- Collaboration contexts
- Structure contexts
- Configurator contexts
- Item revisions (structure lines)
- 2D and 3D NX CAD and Lifecycle Visualization files
- Motion (VFM) files
- Published documents, including work instructions

Each product view is stored in a dataset containing a thumbnail image file, a PLM XML session file, 3D markup layers, and the top-level item of the view.

You can configure the structure with revision rules, effectivity, variant rules, and similar techniques. If appropriate, you can use several **Show Unconfigured** menu commands to hide unconfigured objects in the structure and in the viewer. When product views are captured, these view selections are taken into account; otherwise, potentially unbuildable combinations of parts may be displayed when the view is restored. You can retrieve the original state of the menu commands and consequently the original state of the view.

If the product view is attached to a structure and the structure is cloned, the product view functions correctly in the new (clone) structure. Likewise, product views may be attached to a structure that is shared with Multi-Site Collaboration.

You can also update product views in the Lifecycle Viewer or stand-alone Lifecycle Visualization. You send a dynamic product view to one of these applications, and then create a new product view or update and replace the existing one. When you send the updated product view back to Teamcenter, you can open it in the assembly viewer.

Your Teamcenter administrator sets the size and presentation of the product views with system properties and preferences..

Note:

In Teamcenter 8.0, the file format of 3D product views changed. If you open a file that was created in an earlier Teamcenter version, it is automatically converted to the new format.


Create and save a product view

1. Adjust the content of the viewer window using the pan, rotate, eyeball, and zoom buttons to create the necessary scene.
2. Select an object in the structure base view window.
3. If necessary, right-click in the viewer menu bar and choose **Create Markup**.

Teamcenter displays the **Create Markup** toolbar.

4. Click **Create 3D Product Views**  on the **Create Markup** toolbar in the assembly viewer.

Teamcenter displays the **Product View Gallery** dialog box, which contains thumbnails of any previously saved product views that are associated with the selected object.

5. Do one of the following:
 - Click **New Product View** .
 - Right-click in the window and choose **Create New Product View**.

You are prompted to enter a name for the product view if the **Vis_PV_Show_Name_Dialog** user preference is set to **True**. If it set to **False**, Teamcenter generates a name automatically.

Teamcenter saves the product view and its configuration in a dataset. It also adds a thumbnail of the view to the **Product Views** dialog box.

Note:

Thumbnails of all product views are not visible at all times, only for those items related to the selected end item (the top entry in the structure window).

Configure and manage product views

1. Choose **Options**→**Visualization**→**Product View**.

Teamcenter displays the **Product View Creation Preferences** pane.

- Set the following preferences as required:

Preference	Description
Geometry Asset	Determines whether a geometry asset file is added when a product view is created. This file is required if you want to export a PLM XML file of the product view. This option is equivalent to the Vis_PV_Geometry_Asset preference.
Show Product View name dialog	If selected, you are prompted for a name each time you create a product view. If not selected, Teamcenter generates the name automatically. This option is equivalent to the Vis_PV_Show_Name_Dialog preference.
View Toggle Warning Level	If selected, Teamcenter displays a warning or prevents you from continuing if you try to create a product view when one or more of the View menu commands to show unconfigured data is selected. This option is equivalent to the Vis_PV_InvalidConfigWarnLevel preference.
View Toggles to consider	Select the View menu commands to show unconfigured data that are considered if the View Toggle Warning Level option is selected. This option is equivalent to the VisPVBlockingViewToggles preference.
Image Capture	Determines if Teamcenter saves a preview image of the 3D product view when it is created. If you choose Perform Image Capture (Using Image Export Dialog) , you are prompted for the settings to use. If you choose, Perform Image Capture (with preferences) , it uses values set in preferences. This option is equivalent to the Vis_PV_ImageCapture preference.
Image Format: Image Resolution, Width of image, and Height of image	Depending on the setting of the Image Capture option, these options may determine the file format, resolution, and size of the preview image. If Perform Image Capture (Using Image Export Dialog) is set, these options are disabled. These options are equivalent to the Vis_PV_ImageCaptureType , Vis_PV_ImageCaptureResolution , Vis_PV_ImageCaptureWidth , and Vis_PV_ImageCaptureHeight preferences, respectively.
Thumbnail: Width, Height, and Quality	Determine the size and resolution of the thumbnail image created for each product view. These options are equivalent to the

Preference	Description
	Vis_PV_ThumbnailWidth , Vis_PV_ThumbnailHeight , and Vis_PV_ThumbnailQuality preferences, respectively.
Play motion in current view	If selected, any motion (VFM) file in the current product view plays when the view is selected. This option is equivalent to the Vis_PV_Play_Motion preference.
Configuration rule to use	Offers you two choices: <ul style="list-style-type: none"> • Use configuration from the current BOM ignores stored rules and preserves the configuration that was active before you applied the product view. • Use configuration from product view considers any arrangements, effectivity, variant rules, and revision rules stored with the product view when you apply it. <p>This option is equivalent to the Vis_PV_HowTo_Configure_BOM preference.</p>

Note:

Your administrator may configure these preferences with SITE or GROUP protection scope, rather than USER protection scope. If so, you may be able to view but not change the current settings.

3. Right-click a selected product view thumbnail in the **Product View Gallery** dialog box.




Teamcenter displays a shortcut menu.

Note:

You can identify the currently selected product view by the green border (if checked out) or red border (if not checked out) around its thumbnail.

4. Choose one of the following.

Command	Description
New Tab	Creates a new tab for the element currently selected in the structure. This tab is unavailable if no element is selected in the structure base view window.
Refresh Tab	Refreshes the currently selected tab in the product view gallery to reflect structure configuration changes.

Command	Description
Remove Tab	Removes the current tab from the dialog box.
Refresh All Tabs	Refreshes all the tabs in the product view gallery to reflect structure configuration changes.
Remove All Tabs	Removes all tabs from the dialog box.
Add 	Creates a new product view from the current contents of the viewer.
Apply	Applies the configuration of the selected product view to the viewer.
Delete 	Deletes the selected product view.
Update 	Refreshes the stored product view with changes made in the viewer. This command is enabled only if you check out the product view dataset.
Rename	<p>Displays a dialog box that allows you to change the name and description of the selected product view. A product view name appears below each button; the description appears when the cursor is placed over the button.</p> <p>If you rename a product view, the order in which thumbnails are displayed in the Product View Gallery dialog box changes. Teamcenter generates the default name of a view from the date and time it was initially created. It lists available views in alphanumeric order. You can choose an appropriate new name to move the view up or down the list.</p>
Enable Multiple Selection	Allows you to select more than one product view.
Options	Displays the Product View Creation Preferences pane.

Note:

If you right-click any part of the **Product View Gallery** dialog box (except one of the buttons) and no product view is selected, the menu commands to apply, update, rename, and delete the product view are unavailable.

Create product view preview manually

Note:

The menu commands described in this procedure are available only if the **Image Capture** option is set to **Perform Image Capture (using Image Export dialog)**. If you do not select this option,

you cannot manually adjust the size, resolution and file format each time you create or update a product view.

1. Right-click a product view or the **Product View Gallery** tab and select **Image Capture**.

Teamcenter enables the capture of 2D images, as indicated by a check mark next to the menu command.

2. Create or modify the product view.

If you selected **Perform Image Capture (using Image Export dialog)** previously, Teamcenter displays the **Image Export** dialog box.

3. Change the size and file format of the image if necessary, then click **OK**.

Teamcenter creates the product view using the parameters you entered.

Manage unconfigured data in a product view

You can use several menu commands to show or hide unconfigured objects in the structure and in the viewer, as follows:

- **Show Unconfigured Variants**
- **Show Unconfigured By Occurrence Effectivity**
- **Show Unconfigured Changes**
- **Show Unconfigured Assigned Occurrences**
- **Show GCS Connection Points**
- **Apply Occurrence Type Filters**

When product views are captured and restored, these view selections are preserved; otherwise, potentially unbuildable combinations of parts may be displayed when the view is restored. If you choose to update the configuration from the product view when you reopen it, the saved view selections are retrieved; if you choose to use the current configuration, the saved view selections are ignored.

To evaluate the configuration of an existing product view, right-click a product view in the **Product View Gallery** and choose **Show Configuration**.

Teamcenter displays a dialog box that shows the assembly configuration when the product view was created. The name of the product view is shown in the title bar of the dialog box. The dialog box also lists any **Show Unconfigured** menu commands that were active at the time the product view was created.

If you show the configuration for product views created on a composite structure (such as a process), the results are displayed in tabular form with each member structure occupying a line in the table. If any **Show Unconfigured ...** command was set to **Off** for all the assemblies contained in the structure, the corresponding column is not displayed. In the following figure, the **Show Unconfigured Changes** and **Show Unconfigured by Occurrence Effectivity** commands were turned off when the product view was created and those entries do not appear as columns.

Title	Revision Rule	Show Unconfigur...	Show Guided Co...	Show Unconfigur...
000770-al_assemble_base_plate	Latest Working	✗ On	✗ On	✗ On
000769-al_base_plate	Latest Working	✗ On	✗ On	Preference-driven

Retrieve and open an existing product view

- Open the product view in Teamcenter:
 1. Select an object in the structure base view window and open the assembly viewer.
 2. Click the **Create 3D Product Views** button on the viewer toolbar.

Teamcenter displays the **Product View Gallery** dialog box containing thumbnails of available product views of the selected structure. Only product datasets associated with the currently selected end item are visible.

3. Right-click below the image area in the **Product View Gallery** dialog box and select the configuration that you want to use for the product view.

Command

Description

Options→Configuration rule to use→Use configuration from Current BOM

Applies the product structure configuration that is currently set to the product view that you are loading.

Options→Configuration rule to use→Use configuration from product view

Adopts the configuration that was set at the time the product view being loaded was created.

4. Do one of the following:

- Select the thumbnail of the product view you want to open and click **Apply**.


Teamcenter opens the product view and retrieves the saved configuration for the structure window and viewer. You can then click **Cancel** to close the dialog box without opening the product view.

- Select the thumbnail of the product view you want to open and click **OK**.

Teamcenter opens the product view as before and closes the dialog box immediately.

5. If the product view contains a motion file, replay it by right-clicking the product view and choosing **Load Motion File(s)**. If **Play motion in current view** is selected, the motion file is played against the current structure; otherwise, it is played against the original structure.

- Open the product view in stand-alone Teamcenter lifecycle visualization:

1. Select one or more product view datasets in the **Attachments** tab.
2. Click the **Send to Lifecycle Visualization**  button.

Checking product views in and out

After you create a product view (3D snapshot), you can check it into the Teamcenter database to make it available to other users. To refresh or delete an existing product view, you must first check it out to prevent other users from inadvertently overwriting your changes.

You can identify a checked out product view by a green frame around the thumbnail image in the **Product View Gallery** dialog box. Similarly, you can identify a checked in product view by a red frame around the thumbnail.

Check out product view dataset

Select a product view and choose **Tools**→**Check-In/Out**→**Check-Out**.

Teamcenter applies a checkout lock to the dataset, allowing you to refresh or delete the product view. Other users cannot refresh or delete the product view while you have checked it out.

Note:

If you close the **Product View Gallery** dialog box while you still have datasets checked out, Teamcenter displays a request for confirmation that you want to continue. If you do, all active checkout locks are canceled.

The **Check-Out** command is enabled only if you select a product view that is not checked out by another user.

Check in product view dataset

Select the product view you checked out and choose **Tools→Check-In/Out→Check-In**.

Teamcenter removes the checkout lock from the dataset, allowing other users to update or delete the product view.

Cancel checkout of product view dataset

Select the checked out product view and choose **Tools→Check-In/Out→Cancel Check-Out**.

Teamcenter removes the checkout lock from the dataset, allowing other users to update or delete the product view.

Refresh a product view

You can refresh a saved product view of the current structure at any time with changes you make during the current session in one of the following ways:

- Right-click the product view gallery and choose **Refresh Tab** to update the 3D snapshot in the selected tab to reflect any structure configuration changes.
- Right-click the product view gallery and choose **Refresh All Tabs** to update the 3D snapshots in all tabs to reflect any structure configuration changes.
- Right-click the product view and click the refresh product view button, which is the center graphical button in the middle row of buttons.
- Right-click the product view and choose **Apply**.

Note:

The **Apply** command and refresh button are only enabled if you check out the product view.

Send a product view to an external viewer

Select one or more product views in the structure tree and choose **File→Open in TcVis** or right-click and choose **Send to→Lifecycle Viewer**.

The selected viewer opens the product view with a configured structure. If you already have a 3D document active, Teamcenter allows you to open your product view or merge it into the active document, if the formats are compatible.

Note:

This method is not available if an incremental change is applied to the structure.

Note:

You can also select multiple product views in the product view gallery and send them to the Lifecycle Viewer or stand-alone Lifecycle Visualization. The product views open one at a time and any configuration of the original structure is retained.

Delete a product view

1. Click the floppy disk button on the Viewer toolbar.

Teamcenter displays the **Product Views** dialog box.

2. Select the thumbnail of the product view you want to delete and click the delete product view button, which is the right graphical button in the middle row of buttons. Alternatively, you can right-click in the window and choose **Delete**.

Teamcenter deletes the product view and its associated dataset.

Working with markups

Adding and deleting markups

When an image is loaded in the viewer, you can add markup layers to the image. You can mark up JT files that are attached to **DirectModel** datasets or schematic geometries. You can also view images in JPEG or BMP formats that are attached to a schematic geometry. To view and mark up schematics, your administrator must set the **TC_Schematic_BOMView_Types** preference to **on**.

Markups are text or graphical elements that you draw in the viewer with your model or schematic. 3D markups display on 3D layers.

Markups may include lines, rectangles, polygons, ellipses, inset images, and text.

Anchored text markups can include part information and metadata attributes.

To create or modify markups, display the relevant toolbar by right-clicking the Lifecycle Visualization base toolbar and choose the appropriate command from the shortcut menu.

Note:

If you are working with schematics, only a limited set of functions are available. The following options do not apply to schematics: edit color/translucency, insert, view control, export 3D, reposition, rotate, PMI, clearance, cross-section, navigation, and visibility.

Working with 3D and schematic markups

Create a 3D markup dataset

You need to create a **DirectModel3DMarkup** dataset to store 3D markups of structures or assemblies.

Note:

You **MUST HAVE** at least the Teamcenter lifecycle visualization standard configuration installed to work with 3D markups.

1. Load the structure or assembly (**DirectModel** dataset) in the viewer.

Teamcenter displays the model and the Lifecycle Visualization toolbar.

2. Click the **Create Markup**  button.

Teamcenter displays the **Create Markup3D Dataset** dialog box.

3. In the dialog box, type a name for the dataset in the **Dataset Name** box.
4. (Optional) Type a description of the dataset.
5. Click **OK**.

Teamcenter creates the **DirectModel3DMarkup** dataset and attaches it to the **DirectModel** dataset.





You can create multiple **DirectModel3DMarkup** datasets under a single structure or assembly. Each **DirectModel3DMarkup** dataset can contain multiple markup layers.

Note:

Markup layers are stored as VPL files.

Draw 3D markups

Perform the following steps to draw markups on structures, assemblies, or schematics:

1. On the **3D Markup** toolbar, click **Enable Markup** .
2. (Optional) To change colors, fill styles, line and edge styles and sizes, and font styles and sizes, click **Preferences** .
3. (Optional) To draw a filled ellipse, polygon, rectangle, or text markup, click **Fill** .
4. (Optional) To attach the markup to a point on the model or schematic click **Anchor** .

Anchored markups display, hide, and move with their attached parts. Anchored text markups are attached to parts with leader lines.

5. (Optional) Create or select a layer for the markup. If you do not have a markup layer, one is created when you add the first markup.
6. Specify the markup type by clicking the corresponding button on the **3D Markup** toolbar.

Teamcenter changes the cursor to indicate the type of markup.

7. Place the markup in one of these ways:

To place this markup	Perform these actions
Line	<ol style="list-style-type: none"> a. (For an anchored markup) Select a point on the model or schematic. b. In the viewer, drag the mouse pointer to draw a line. c. (Optional) To draw a horizontal or vertical line, press and hold the shift key as you drag.
Polyline	<ol style="list-style-type: none"> a. (For an anchored markup) Select a point on the model or schematic. b. In the viewer, click to place one endpoint. c. (Optional) To draw horizontal or vertical polyline segments, press and hold the shift key. d. Click to place each vertex. e. Double-click to place the last vertex.

To place this markup	Perform these actions
Freehand line	<ul style="list-style-type: none"> a. (For an anchored markup) Select a point on the model or schematic. b. In the viewer, drag the mouse pointer to draw.
Rectangle	<ul style="list-style-type: none"> a. (For an anchored markup) Select a point on the model or schematic. b. In the viewer, click to place one corner. c. Drag the mouse pointer, and then release to place the opposite corner. d. (Optional) To draw a square, press and hold the shift key as you drag.
Polygon	<ul style="list-style-type: none"> a. (For an anchored markup) Select a point on the model or schematic. b. In the viewer, click to place each vertex. c. (Optional) To draw horizontal or vertical segments, press and hold the shift key as click. d. Double-click to place the last vertex.
Ellipse	<ul style="list-style-type: none"> a. (For an anchored markup) Select a point on the model or schematic. b. In the viewer, drag the mouse pointer to draw. c. (Optional) To draw a circle, press and hold the shift key as you drag the mouse pointer.
Inset image	<ul style="list-style-type: none"> a. In the Open dialog box, select the image dataset and click Open. b. (For an anchored markup) Select a point on the model or schematic. c. In the viewer, drag the mouse pointer to place and size the image.

To place this markup**Perform these actions**

Text

- a. (For an anchored text markup) Select a point on the model or schematic. Teamcenter displays the **Markup Text** dialog box.
- b. (Optional for an anchored text markup) In the **Markup Text** dialog box, click **Advanced** to add part information or metadata attributes.
- c. (For a floating text markup) Click a point in the viewer to place the text markup. Teamcenter displays the **Markup Text** dialog box.
- d. (Optional) Change the font, size, and style of the text.
- e. (Optional) To change the shape in which the text appears, from the **Bounding shape** list, choose the **None**, **Rectangle**, or **Circle**.
- f. Type the text of the markup in the **Text** box.
- g. Click **OK**.

URL

- a. Place a text or inset image markup.
- b. Right-click the markup, and choose **Properties**.
- c. In the **Properties** dialog box, click the **Hyperlink** tab.
- d. In the **Link Specification** box, type the URL, or click **Browse** and browse to the appropriate file path. You can link to any type of file. The application that is associated with the file type opens and displays the file.
- e. Click **OK**.
- f. To navigate to the URL or launch the referenced file, double-click the link.

Note:

When you open a URL for an animation (VAN) file, the animation plays automatically.

To create a URL markup that opens the default E-mail program and addresses a message, type **mailto:** in the

To place this markup**Perform these actions**

Address box. When you double-click the link, the E-mail program is launched and a message is addressed to the specified address.

The markup appears in the viewer, with a list of markups under the selected markup layer. If Teamcenter displays an asterisk (*) before the markup layer name, changes were made to the markup layer since it was last saved.


Note:

If you open a 3D model that includes an anchored text markup that is anchored to an item that has been removed from the current 3D model or moved to a different structure in the same 3D model, when the 3D model file opens, the leader line does not appear and the text of the 3D markup appears in red.

Create a 3D markup layer

Create a 3D markup layer using one of the following methods:

Initial markup layer

1. Ensure a 3D markup is visible.
2. Click the **Save Layers**  button on the Lifecycle Visualization base toolbar.

The system displays the **Save Layer** dialog box.

3. Type a name for the new layer in the **Name** box and click **OK**.

Teamcenter displays the new layer in the **Markup Layers** list.

Note:

The **Markup Layers** list does not display until you create a 3D layer.

Additional markup layers

1. Right-click in the **Markup Layers** list and choose **New Layer** from the shortcut menu.

Teamcenter displays the **Save Layer** dialog box.

2. Type a name for the new layer in the **Name** box and click **OK**.

Teamcenter displays the new layer in the **Markup Layers** list.

Note:

The **Markup Layers** list does not appear until you create a 3D layer.

Open 3D markup layers

- Select a 3D Markup dataset.

Teamcenter opens the **Markup Layers** list containing the saved layers for the dataset.

Save 3D markup layers

When you create or edit a 3D layer, an asterisk (*) appears before the name of the layer in the **Markup Layers** list until you save the layer. When you save the layer, the asterisk disappears until the layer is edited again.

Save 3D layers together or separately. Perform the following steps to save layers:

1. From the **Markup Layers** list, select the layer that you want to save.
2. Right-click and choose **Save Layer** from the shortcut menu.

Teamcenter removes the asterisk next to the layer name in the list.


Delete 3D markup layers

1. Right-click the **DirectModel3DMarkup** dataset in the tree.

Teamcenter displays the **Dataset Object** menu.

2. Choose **Named References**.

Teamcenter displays the **Named References** dialog box.

3. In the named reference table, select the markup layer that you want to delete.
4. Click the **Cut**  button.

Teamcenter removes the layer from the named reference list.

5. Click the **Close** button.

Teamcenter closes the **Named References** dialog box.

Control the display of 3D markup layers

To	Perform these actions
Display or hide 3D layers	Select or clear the state indicator to the left of the layer name in the Markup Layers list.
Save all layers	Save all the 3D layers, separately, with their current file names.
Save layer	Save the selected 3D layer.
Save layer as	Save the selected 3D layer with a new file name.
Capture view	Capture the orientation of the model and markup as seen in the viewer for the selected layer.
Apply view	Restore the captured view for the layer selected.
Hide view	Hide the captured view for the layer selected.

Working with 2D markups


View 2D images

1. Select the **DirectModel** dataset in the navigation tree or **Properties** table and click the **Viewer** tab.

Note:

To view a named reference of the **DirectModel** dataset, right-click the dataset in the tree, choose **Visualize Named Reference** from the **Dataset Object** menu, and choose the named reference file that you want to view.

Teamcenter displays a message indicating that you are about to view a JT assembly and verifying that you want to download all the components of the assembly.

2. Click **OK** to download the components.
3. Click the **Image Capture**  button in the viewer pane. The **Create Markup Layer** dialog box appears, allowing you to create a **DirectModelMarkup** dataset and attach it to the original **DirectModel** dataset as a markup relationship. The **Viewer** pane now contains a **Markup Layers** tree to the left of the graphical display.





Compare 2D image layers

You can compare image layers when you want to:


- Display common areas and differences.
 - Display the common areas of both layers, one of the comparison layers, or all of the comparison layers.
 - Change the colors of one or both image layers in your comparison.
1. Choose two 2D image datasets in the navigation tree.
 2. Choose **Compare 2D Images** from the **View** menu.

Teamcenter displays the images in the **Viewer** tab and displays the 2D Compare toolbar.

3. Perform one of the following tasks:

To	Perform these actions
Display only the compare layer (common areas of both layers)	Click the Display Compare Layer button  on the 2D Compare toolbar. Only the compare layer is displayed in the Viewer tab. The information that is common to both layers is drawn in black.
Display one layer and not the other	Click the Display 1st Layer button  or the Display 2nd Layer button  .
Display all comparison layers	Click the Display All Layers button  . All the comparison layers are displayed. Unless you have changed the color preferences, the first layer is green; the second layer is red; the comparison layer is black.

Create 2D markups

1. Select the 3D format (**DirectModel**) of the object that you want to revise.
2. Click the **2D Markup** button  in the viewer pane.


Teamcenter displays the **Create Markup Layer** dialog box.

3. Type the name of the markup layer that you are creating in the **Name** box.
4. Select the type of file from the **File Type** list.
5. Type a brief explanation of the markup layer's purpose and content in the **Description** box and click **OK**.

The new markup layer can be found in the **Properties** table, or by expanding the **DirectModel** object in the tree.

Create 2D markup layers

You can use **DirectModelMarkup** and **Markup** datasets to create a new markup layer for a 2D format image, as follows:

1. In the navigation tree, select a **DirectModelMarkup** or **Markup** dataset for the object that you want to revise and click the **Graphics** view.
2. Mark up the 2D image using the markup toolbar.
3. Save the markup layer in the new dataset component.
4. Click the **Save 2D Markup** button .

Teamcenter displays the **Save Layer** dialog box.

5. Type the name of the layer that you are creating in the **Name** box and click **OK**.

Teamcenter generates a 2D file, stores it in the current dataset and displays it in the **Markup Layers** tree. If multiple markup layers are created in the same session, they can all be saved simultaneously. Teamcenter displays a separate **Save Layer** dialog box for each saved layer.

Working with drafting symbols and GD&T symbols

Your administrator may permit the use of drafting symbols and geometric dimensioning and tolerance (GD&T) symbols in any of the fields of a form.

To add or edit symbols in a form, display the form in the **Viewer** view and click the **Edit** button. Teamcenter displays the **Change GD&T Symbols** dialog box.

To add or edit drafting symbols, click the **Drafting Symbols** tab and click one or more of the predefined symbol buttons. To add or edit GD&T symbols, click the **GDT Symbols** tab and click one or more of the predefined symbol buttons.

To format rich text, use the following buttons that are available in the **Drafting Symbols** tab and the **GDT Symbols** tab:



Manually refresh the editing box.



Add a frame around the selected characters.



Bold the selected text.



Italicize the selected text.



Underline the selected text.



Set the color of the selected text.



Decrease the size of the selected text.



Increase the size of the selected text.



Subscript the selected text.



Superscript the selected text.



Align the selected text.



Center align the selected text.



Right align the selected text.



Insert the text you typed in the two boxes to the left of this button.



Insert a control frame around the selected characters.

Additions and changes are reflected in the editing box of **Change GD&T Symbols** dialog box. To save changes and exit, click the **Edit** button again.

5. Verifying structure design

Modifying process plan data

Create item revisions

Use item revisions to manage changes or revisions to part, process, and work area items. When you create a new item, Teamcenter automatically creates the first item revision. You can then add additional revisions as necessary.

Note:

There is always only one working revision at any one time.

1. Open a process or part.
2. Select the object that you want to revise.
3. Choose **File**→**Revise**.

The **Revise** dialog box is displayed. The item ID is preselected so it mirrors the original item.

4. Type a new revision ID.
5. Give the revision a new name, if necessary.
6. Click **OK**.

The new item revision is displayed in the structure view.

Creating variant configurations

Variant configuration allows you to create options (such as manufacturing locations) and allowed values (such as a specific plant within the company) and associate these options with an item revision. This is usually done at the top-level but can be implemented anywhere in the BOM.

You can use the **Show Unconfigured Variants** menu command to show any BOM lines that are configured out by variant rules. However, if you create compositions (for example, a process) where the items are assigned from another top line (for example, a product or work area), the configuration is controlled by the configuration of the original BOM line. You can configure out the original BOM line (for example, the consumed items in the product) by effectivity, incremental change or variants, and the corresponding BOM line in the composition is configured out. Thus, the line in the composition is hidden or shown if it was assigned from another top line, irrespective of the cause of its configuration in the original BOM. Such lines are also configured out if the original BOM is not loaded while you open the

composition. You can show assigned objects in the structure using the **Show Unconfigured Assigned Occurrences** menu command.

You can specify which loaded BOM structure configures a process structure.

Perform where-used searches

1. Right-click an object in a structure view and choose **Open with→Impact Analysis**.
2. Set the **Where** box to **Used**.
3. Set the **Depth** box as required:
 - **One Level** to report immediate parent objects only
 - **All Levels** to report all objects up to the top-level product
 - **Top Level** to report final objects only
4. In the **Where Used Options** area, set the **Rule** box as required:
 - Click **All** to report all revisions.
 - Select the required revision rule from those listed to report only the configured revisions.
5. Select what object is shown in the tree nodes from the **Display** list.
6. In the viewer pane, double-click the object for the search.

The results of the search display graphically.

7. Double-click any of the resulting objects to continue the where-used search.

Perform where-referenced searches

1. Right-click an object in a structure view and choose **Open with→Impact Analysis**.
2. Set the **Where** box to **Referenced**.
3. Set the **Depth** box as required:
 - **One Level** to report immediate parent objects only
 - **All Levels** to report all objects up to the top-level product

- **Top Level** to report final objects only
4. Double-click the object for the search.

The results display in the viewer pane.
 5. Double-click any of the resulting objects to continue the where-referenced search.

Create duplicate items

1. Open the appropriate process, part, or work area.
2. Choose **File**→**Save As**.

The **Save As** dialog box is displayed.
3. Type a new ID and revision for the new item.
4. Click **OK**.

The new item opens in My Teamcenter.

Cutting, copying, pasting multiple processes and operations

When you cut or copy and paste multiple processes or operations in Part Planner, the predecessor and sequence information is moved with the processes or operations. For example, if you copy multiple operations or processes from one source process and paste them to one target process:


- Teamcenter keeps the relative find numbers of operations or processes. For example, copying **10,20,20,30** results in $X, X+10, X+10, X+20$, where X is the next available find number (with increment of 10).
- Flows between the copied operations or processes are also copied.
- A new flow is not created between the last process/operation/work area and the new one. Use the **Update Pert Flows** command to achieve this.

Use **Edit**→**Paste Special** to designate the behavior of the copied lines. You can specify the occurrence type to use when pasting, assigning, or using drag-and-drop in the **MEAssignCustomizedOccurrenceType** preference.

Add, edit, and delete text notes

You can add text notes to the various objects in your process plan that can be viewed by others in your organization as they work with the plan. These notes can also be edited and deleted, and can be printed with the Report Generator application.

To open the **Notes** dialog box:

1. Select an object using one of the following:
 - Select an object from the tree hierarchy in a structure view.
 - Click one of the boxes in the **PERT** view.
2. From the **Edit** menu, choose **Notes**, or click the **Notes** button  on the toolbar.

The **Notes** dialog box is displayed.

3. Perform one of the following:

Action	Steps
Add a new note	<ol style="list-style-type: none"> a. From the Create list, choose the type of note to be created. b. Type the text of the note. c. Click OK.
Edit a note	<ol style="list-style-type: none"> a. From the Existing Notes list, choose the type of note to be edited. b. Change the text, as necessary, in the description area. When you are done, click OK.
Delete a note	<ol style="list-style-type: none"> a. From the Existing Notes list, choose the type of note to be deleted. b. Click Remove.

Attaching objects to the process plan

Overview of attaching objects to the process plan

Each process, operation, activity, and work area can have objects associated with it. These objects can include items such as detailed work instructions, drawing sheets, and NC programs.

The following types of objects can be attached:

Object type	Purpose
Datasets	Application-specific objects used to manage data files created by other software applications. When you double-click a dataset in a BOM, the system launches the software application (tool) associated with the dataset.
Folders	Containers for objects and can reference any object type.
Forms	Objects you define that are managed by the application as a form type. The form holds any additional data you want to associate with a process, operation, or work area.
Other objects	Objects can be associated with manufacturing processes, operations, activities, and work areas by specific relationship types. These relationship types are set by your system administrator.

You can view attached objects in the **Attachments** view. If you attach datasets in another application (for example, My Teamcenter), you can use the **Refresh Window** and **Refresh Current Structure** menu commands to display them in the **Attachments** view.

Attach new datasets

- Select an item revision:
 - For activities, select the activity in the **Activities** view.
 - For parts, processes, operations, or work areas, select the object in the structure view.

- On the **File** menu, choose **New→Dataset**.

The **New Dataset** dialog box is displayed.

- From the pane on the left side of the **New Dataset** dialog box, click the dataset type to be attached.



Click **More** if the list does not contain the dataset type you need.

- Type a name for the attachment.
- (Optional) Type a description of the attachment.
- Click the **Browse** button ... to import a file.

The **File Import** dialog box is displayed.

7. Search for and select the file to be attached, then click **Import**.
8. Select the relation type with which the dataset is attached to the item in the **Relation** list.
9. To open the attachment in the application window after import, check the **Open on Create** check box. Otherwise, leave this check box unselected.
10. Click one of the following buttons:
 - **OK** to add the dataset and close the **New Dataset** dialog box.
 - **Apply** to add the dataset and redisplay the **New Dataset** dialog box.

Attach existing datasets

1. Find the object to be attached using the My Teamcenter application.
2. Select the object and click the **Copy** button  on the toolbar.
3. Open Part Planner.
4. Select the object where you wish to attach the dataset.
5. Click the **Paste** button  on the toolbar.

Attach new forms

A form is a user-defined object managed in the database as a form type.



Note:

Forms cannot be attached to operation activities.

1. In the **Attachments** view, select the item where you want to attach the form:
2. In the **File** menu, choose **New→Form**.
The **New Form** dialog box is displayed.
3. From the pane on the left side of the **New Form** dialog box, click the form type you want to attach.
4. Type a name for the form.
5. Optionally, type a description of the form.

6. To open the form in the application window upon import of the file, check the **Open on Create** check box. Otherwise, leave this check box unchecked.
7. Click one of the following buttons:
 - **OK** to attach the form and close the **New Form** dialog box.
 - **Apply** to attach the form and redisplay the **New Form** dialog box.

Attach existing forms


1. In My Teamcenter, find the form you want to attach.
2. Select the form and click the **Copy** button  on the toolbar.
3. Open Part Planner.
4. Select the object where you want to attach the form.
5. Click the **Paste** button  on the toolbar.

Remove objects and attachments

As you design and create revisions of your part, process, and work area structures, you may need to remove objects and object attachments from the structure tree.

When you remove an object or attachment, it is removed from the current structure but not deleted from the database.


To remove an object from the structure view:

1. Select the object in the structure view.
2. Click the **Remove a Line** button  on the toolbar.

Teamcenter removes the line from the structure.

To remove an attachment:

1. Right-click the object containing the attachment in the structure view and choose **Open with → Attachments**.
2. In the **Attachments** view, select one of the attachments.

3. Choose **Edit→Cut** or click the **Cut** button  on the toolbar.

Delete objects and attachments



Before you can delete an object from the database, you must first remove all but one reference to it. This is usually done by:

1. Performing a where-referenced search on the object using the **Impact Analysis** view.
2. Removing all of the objects but one using **Cut**. Choosing **Cut** does not delete the object from the database.


Note:

In order to delete an object, you must have read, write, and delete privilege on that object.

To delete an object:

1. Select the object from the **Product**, **Process**, or **Plant** structure view.
2. Click the **Remove a Line** button  on the toolbar.
3. Open the My Teamcenter application and locate the object.
4. Select the item and click **Delete**  on the toolbar.

To delete an attachment:


1. Select the object in the **Attachments** view.
2. Choose **Edit→Delete** or click **Delete**  on the toolbar.

Creating substitute occurrences

As in the Teamcenter applications, the Part Planner application allows you to create substitute components in your part, process, and work area structures. The substitutes you create are specific to a single occurrence.

Some key points for using substitutes include:

- One of the substitutes is the *preferred* substitute and is always displayed in the BOM.
- You can change the preferred substitute.

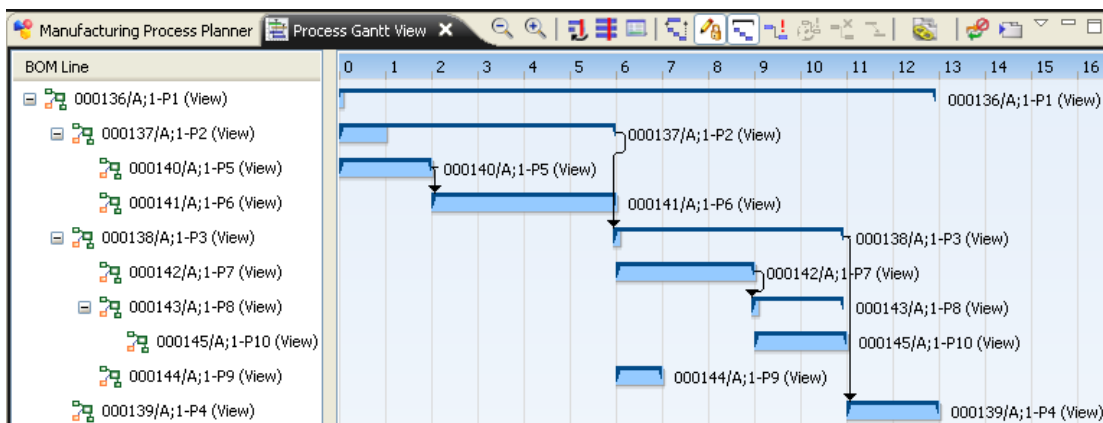
- You can add any number of substitute components for a particular line in the BOM.
- Substitutes are unique to the BOM. For example, if you were to identify a substitute station in the current work area structure, only the current work area structure is impacted. Other work area structures are not affected.
- To view the substitute components for a part, process, or work area, select the component in the structure view. Then click the  button.

Modify object properties

1. Do one of the following
 - Double-click the property form in the **Attachments** view.
 - Right-click the property form in the **Attachments** view and choose **Open with → Viewer**.
2. Check out the property form and edit the required properties.
3. Check the form back in.

Understand the Gantt

The **Process Gantt** view displays processes and operations and the relations between them in a chart. A process Gantt chart is a bar chart that illustrates the work breakdown structure of a project. It illustrates the start and finish times of the operations or processes, or the relationships between those start and finish times if they overlap, as well as summary elements (operations or higher level processes) of the project using a time line. The Gantt chart also shows the dependency (sequence) relationships between the elements.




Using the **Process Gantt** view, you can:

- Configure the view using preferences.

- Change the time duration of elements.
- Reset the scope (structural selection) of the Gantt view, or otherwise modify the view.
- Create and delete flows.
- Show and hide the critical path (sequence of processes/operations that defines the longest path of the project).
- Expand and collapse structures within the chart.
- Set the calculated duration time (the overall time it takes to execute a process's or operation's direct children) in the chart, and propagate the allocated (allowed) time from the calculated (perceived) duration.
- Set cycle time and display time units as red lines in the chart.
- Use wrapped cycle time to show that even though a task exceeds its assigned cycle time, it can still be completed in time for the next task to begin.
- Set custom colors to better identify resources assigned to processes in the chart.

Note the following about the **Process Gantt** view.

- The duration of an element in the Gantt chart represents its allocated time. You can also set the allocated time in the **Time view**.
- You cannot set start times manually in the **Process Gantt** view. Start times are calculated based on previous processes or operations.
- To help you avoid making inadvertent changes to activity durations, the **Process Gantt** view is locked in edit mode when you first open it. You must unlock this mode by clicking  before you can modify duration times by dragging the time bar.
- If objects are configured out in the initiating process structure, the Gantt chart ignores them.
- You can drop a process into the Gantt chart; the behavior is identical to dropping it in the same position in the structure view.
- When you select a process or time element in the **Process Gantt** view, the same process is selected in the structure view.
- You cannot delete a process that has flows attached to it.

Open the Process Gantt view

1. Select a process or operation in the structure view.
2. Choose **Window**→**Show View**→**Process Gantt**.



Teamcenter displays the **Process Gantt** view. The selected process or operation is the root node of the process tree. The pane on the right displays the start time and duration time for each line of the process structure. You can open multiple **Process Gantt** views for comparison purposes.

Note:

You cannot manipulate start times in the **Process Gantt** view.

Change duration times

Do one of the following:

1. Make sure that the **Lock editing** button  is off.
2. Move the cursor over the end of the time bar until it changes to a double-ended arrow .
3. Drag the end of the bar to the desired duration time.

-or-


1. Right-click the time bar and choose **Show property dialog**.
2. Type a new end time and click **OK**.

Teamcenter changes the length of the time element to reflect the new time.

Tip:

Teamcenter displays the duration time in a tool tip for the process or operation, as well as in the **allocated_time** column of the view navigation pane.





Reset the scope

1. Select a process or operation in the structure view.
2. Click .

Teamcenter removes the current process or operation from the **Process Gantt** view and replaces it with the selected one.

Modify the view

Do one of the following.

Click	To
	Scale the chart up or down to accommodate the entire process flow.
	Scale the chart up to show the currently selected time element placed in the middle of chart and taking up most approximately two thirds of the chart.
	Reduce the scale of the chart by a factor of two.
	Enlarge the scale of the chart by a factor of two.

Tip:

Use the Ctrl key to help you draw a box around a group of time elements to select multiple objects.


You can also use the following shortcut menu commands to help you modify the view:

Menu command	Description
Collapse element	Collapses the tree structure under the selected line. It also collapse the corresponding time elements.
Expand element	Expands the tree structure to one level under the selected line. It also expands the corresponding time elements.

Create a flow

You can only create flows between processes or operations at the same level in a structure that have the same parent (sibling lines).


Do one of the following:

- Create a flow between elements by selecting at least two bars in the Gantt chart and click .

Teamcenter creates a flow between the elements in the order that you selected them.

- Create a flow by dragging one bar to another in the representation pane.

If, for example, you drag **Process 1** to **Process 2**, Teamcenter creates a flow from **Process 1** to **Process 2**.

- Select the desired nodes in the tree structure in the navigation pane and click .


Teamcenter creates a flow between the elements in the order that the nodes appear in the tree.

Tip:

Teamcenter displays the names of the source and target elements in a tool tip on the flow.


Delete a flow

Select the flow by clicking the line and do one of the following:


- Click .
- Choose **Delete flow** from the shortcut menu.
- Press the Delete key.

Show/hide the critical path

The *critical path* is the sequence of processes/operations that defines the longest path of the project. The project cannot be executed in a shorter time than the critical path. A project might have more than one critical path. In the case of a single critical path, if you make a modification that shortens the duration of any of the elements, you shorten the overall duration of the project.

1. Click the **Mark Critical Path** button  to display or hide the critical path.

If there is more than one critical path in the Gantt chart or some alternative paths have the same critical path length, Teamcenter shows all the critical paths.

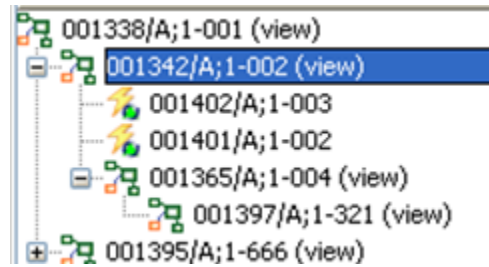
2. (Optional) Click  to view the duration of the critical path.

Teamcenter displays the read-only **Critical Path Length** dialog box.

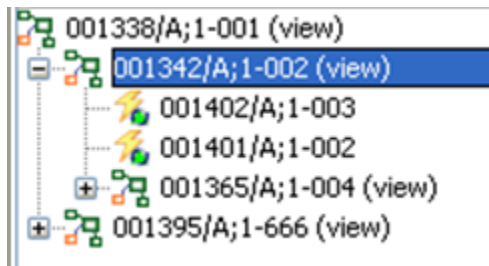
Expanding and collapsing structures

When expanding and collapsing structures in the navigation pane of the **Process Gantt** view, the behavior differs from the expand/collapse behavior in the navigation pane of the application. In the **Process Gantt** view, if a structure that includes expanded children is collapsed, the children are also collapsed.

In the navigation pane of the application, if you collapse the selected line, and then expand it again, you see the same structure.



In the navigation pane of the **Process Gantt** view, if you collapse the selected line, and then expand it again, you see the following.




Understanding the calculated duration time

Duration of an element is the overall time it takes to execute its direct children. If all the children are parallel (no flows between them), it is the length of the longest child. In the case where there are flows between the children, it is the overall time it takes to execute the children according to the order (flows) between them. Calculated duration of upper levels is based on the calculated duration of lower levels. If the lower level has no children (for example, a process that has no processes or operations below), its calculated duration is equal to its duration.

- For a process with only child operations, the calculated duration is the length of the longest path of operations. If the operations have flows between them, it is the overall time it takes to execute them according to the flows.
- For a process with child processes, Teamcenter first calculates the calculated duration of each child process containing only child operations, and then calculates the longest process duration of the processes based on the calculated duration time of the subprocesses and operations.

If there are, for example, four operations with the same parent, having duration times of one second, two seconds, three seconds, and four seconds, the calculated time for the parent process is four seconds. If, however, the second operation must be completed before the third, the calculated duration time is 5 seconds for the parent process.

Use the **Show calc duration** button  to show or hide the calculated duration time. Teamcenter shows a bar across the top of each time element displaying the calculated duration path of the children of this time element.

Calculating start times based on calculated duration

When the calculated duration mode is turned on, the calculation of start times is based on the calculated duration of the predecessors. If calculated duration is off, the start times are calculated based on the duration of the predecessors.

Teamcenter always turns off the critical path mode when you change the calculated duration mode because the critical path most likely changes after the calculated duration mode is switched.

Propagate allocated time from the calculated duration

Propagating allocated time from the calculated duration copies the calculated duration to the allocated time field in the selected element.

1. Select the line you want to have as the top line of the populate action.

The line you select is the starting point for counting the traversal of parent-child relationships when propagating calculated duration.

2. Click .

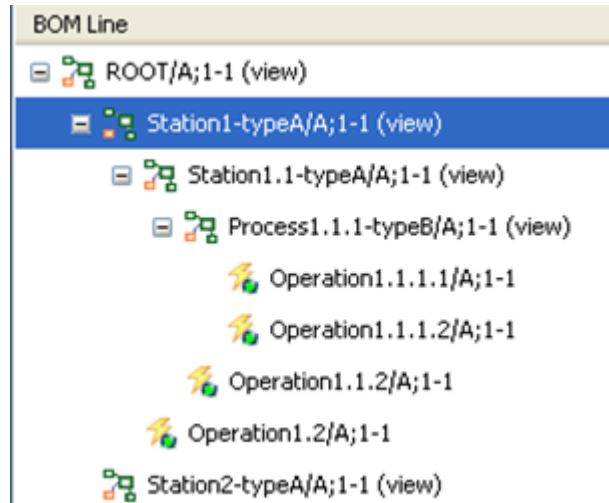
Teamcenter displays the **Propagate Calculated Duration** dialog box.

3. (Optional) Select **Propagate up to level** and enter a level number.

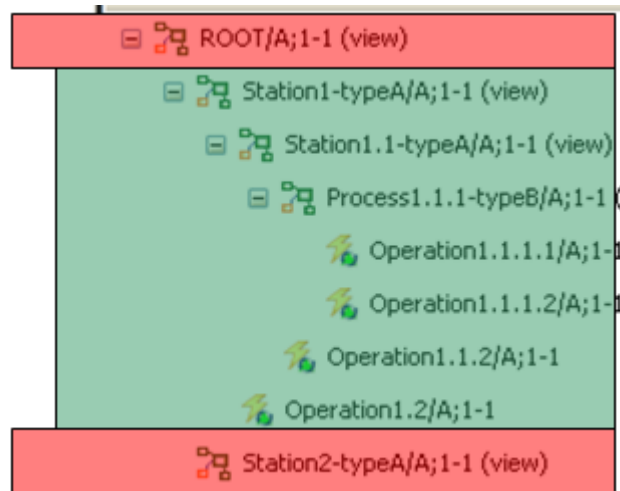
All leaf objects that are of a distance from the top level object that is greater than or equal to the number you specify in this option are calculated.

If you do not enter a number, Teamcenter uses the default level of **0** indicating that all elements below the top element are propagated.

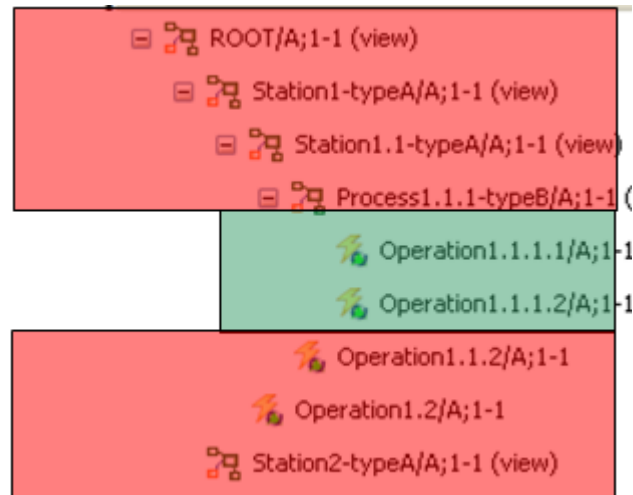
In the following example, **Station1** is selected and acts as the top element of the population.



In the following figure, if the population start depth is **0**, **ROOT** and **Station2** are not populated because they are not descendants of the top element. The elements in green are populated.



In the following figure, if the population start depth is **3**, **ROOT** and **Station2** are not populated because they are not descendants of the selected element (**Station1**) and **Station1.1**, **Process1.1.1**, **Operation1.1.2**, and **Operation1.2** are not populated because they are less than three levels from **Station1**.



4. Click **OK**.

If the **Process Gantt** view is in calculated duration mode, it updates all start times and refreshes itself after the populate operation.

If the critical path mode was turned on before this populate operation, Teamcenter turns it off because the critical path has most likely changed after population.

Configure the Process Gantt view

1. Choose **Edit→Options**.

Teamcenter displays the **Options** dialog box.


2. Select **Manufacturing** from the tree.
3. Click the **Gantt** tab and set any of the following preferences:

Option	Description
Show calculated duration	Specifies whether the calculated duration time is displayed by default in the Process Gantt view. This information is stored in the MEGANTTDefaultDisplayMode preference.
Full edit mode	Allows you to use drag options to edit and modify the elements in the Gantt chart. This information is stored in the MEGANTTDefaultEditMode preference.

Option	Description
Zoom level	Specifies the X-axis zoom level that is active when a Gantt chart is opened.
Element height	Specifies the height of one element of the Gantt chart in the navigation and the representation area (the amount of pixels that are used for one element). There is no space between the elements (10 elements use 10 times the space of one element). This information is stored in the MEGANTTElementHeight preference.
Element color	Specifies the fill color of the elements in RGB code. This information is stored in the MEGANTTElementRGBfillColor preference.
Critical path element color	Specifies the color of the critical path elements in the Process Gantt view representation area. This information is stored in the MEGANTTDefaultMarkedColor preference.
Selection color	Specifies the color of a selected element in the Process Gantt view representation area. This information is stored in the MEGANTTDefaultMarkedColor preference.
Calculated duration color	Specifies the color of the duration time bar in the Process Gantt view representation area. This information is stored in the MEGANTTDefaultDurationTimeColor preference.
Flow color	Specifies the color of a flow in the Process Gantt view representation area. This information is stored in the MEGANTTDefaultFlowColor preference.
Critical path flow color	Specifies the color of critical path flow in the Process Gantt view representation area. This information is stored in the MEGANTTMarkedFlowColor preference.
Implicit flow color	Specifies the color of an implicit flow (created by Teamcenter to retain necessary dependencies) in the Process Gantt view representation area. This information is stored in the MEGANTTImplicitFlowColor preference.

These preferences are applied to any newly opened **Process Gantt** view.

Edit operation resources

1. In the process structure, select the resource to be removed. To select multiple resources, either hold the shift key (for contiguous objects) or control key (for noncontiguous objects) while clicking resources in the list.
2. On the **Edit** menu, choose **Remove**, or click the **Remove a Line**  button on the toolbar.
3. Assign new resources as necessary.

Resequence activities

As you modify your process plan, you may need to resequence the order or performance for operation's activities.


Managing activity times with the Activities Gantt view

The **Activities Gantt** view displays activities and the chronological relation between them in a chart. An activities Gantt chart is a bar chart that illustrates the work breakdown structure of an operation. It illustrates the start and finish times using a timeline. The Gantt chart also shows the dependency (sequence) relationships between the activities.

Using the **Activities Gantt** view, you can:

- Change the duration of elements.
- Populate the duration time based on leaf elements.
- Show and hide the critical path.
- Zoom in and out of the chart.

Note the following about the **Activities Gantt** view:



- The length of an element in the Gantt chart represents the duration of an activity. You can also set the duration in the **Activities** view.
- You cannot set start times manually in the **Activities Gantt** view.
- To help you avoid making inadvertent changes to activity durations, the **Activities Gantt** view is locked in edit mode when you first open it. You must unlock this mode by clicking  before you can modify duration times by dragging the time bar.

Open the Activities Gantt view

- Right-click an operation in the structure view or an activity in the **Activities** view and choose **Open With→Activities Gantt**.

Teamcenter displays the **Activities Gantt** view displaying the start time and duration time for each activity in the operation. You can open multiple **Activities Gantt** views for comparison purposes.

Change duration times


- Make sure that the **Lock editing** button  is off.
- Move the cursor over the end of the time bar until it changes to a double-ended arrow .
- Drag the end of the bar to the desired duration time.

Teamcenter changes the length of the activity time to reflect the new time.

Tip:

Teamcenter displays the duration time in a tooltip, as well as in the **Duration** column of the **Activities** view.



Reset the scope



- Select a new operation in the structure view.
- Click .

Teamcenter removes the current activities from the **Activities Gantt** view and replaces them with the activities of the selected operation.

Modify the view

Do one of the following.

Click	To
	Scale the chart up or down to accommodate the entire process flow.
	Scale the chart up to show the currently selected placed in the middle of chart and taking up most approximately two thirds of the chart.


Click	To
	Reduce the scale of the chart by a factor of two.
	Enlarge the scale of the chart by a factor of two.

Understanding the calculated duration time

Duration of an activity is the overall time it takes to execute its direct children. If all the children are parallel, it is the length of the longest child. Calculated duration of upper levels is based on the calculated duration of lower levels. If the lower level has no children (for example, activities with no subactivities), its calculated duration is equal to its duration.

- For an operation that has only one level of activities below it, the calculated duration is the length of the longest path of activities. If the activities have start times associated with them, the calculated duration is the overall time it takes to execute the activities taking the start times into consideration.
- For an activity with subactivities, Teamcenter first calculates the calculated duration of each subactivity, and then calculates the longest duration of the activities based on the calculated duration time of the subactivities.

If there are, for example, four activities with the same parent, having duration times of one second, two seconds, three seconds, and four seconds, the calculated time for the parent activity is four seconds. If, however, the second activity must be completed before the third, the calculated duration time is five seconds for the parent process.

Use the **Show calc duration** button  to show or hide the calculated duration time. Teamcenter shows a bar across the top of each activity displaying the calculated duration path of the children of this activity.

Calculating start times based on calculated duration

When the calculated duration mode is turned on, the calculation of start times is based on the calculated duration of the predecessors. If calculated duration is off, the start times are calculated based on the duration of the predecessors.

Teamcenter always turns off the critical path mode when you change the calculated duration mode because the critical path most likely changes after the calculated duration mode is switched.

Configure the Activities Gantt view

1. Choose **Edit→Options**.

Teamcenter displays the **Options** dialog box.

2. Select **Manufacturing** from the tree.

3. Click the **Gantt** tab and set any of the following preferences.

Option	Description
Show calculated duration	<p>Specifies whether the calculated duration time is displayed by default in the Activities Gantt view.</p> <p>This information is stored in the MEGANTTDefaultDisplayMode preference.</p>
Full edit mode	<p>Allows you to use drag options to edit and modify the elements in the Gantt chart.</p> <p>This information is stored in the MEGANTTDefaultEditMode preference.</p>
Zoom level	<p>Specifies the X-axis zoom level that is active when a Gantt chart is opened.</p>
Element height	<p>Specifies the height of one element of the Gantt chart in the navigation and the representation area (the amount of pixels that are used for one element). There is no space between the elements (10 elements use 10 times the space of one element).</p> <p>This information is stored in the MEGANTTElementHeight preference.</p>
Element color	<p>Specifies the fill color of the elements in RGB code.</p> <p>This information is stored in the MEGANTTElementRGBfillColor preference.</p>
Critical path element color	<p>Specifies the color of the critical path elements in the Activities Gantt view representation area.</p> <p>This information is stored in the MEGANTTDefaultMarkedColor preference.</p>
Selection color	<p>Specifies the color of a selected element in the Activities Gantt view representation area.</p> <p>This information is stored in the MEGANTTDefaultMarkedColor preference.</p>
Calculated duration color	<p>Specifies the color of the duration time bar in the Activities Gantt view representation area.</p> <p>This information is stored in the MEGANTTDefaultDurationTimeColor preference.</p>
Flow color	<p>Specifies the color of a flow in the Activities Gantt view representation area.</p>

Option	Description
	This information is stored in the MEGANTTDefaultFlowColor preference.
Critical path flow color	Specifies the color of critical path flow in the Activities Gantt view representation area. This information is stored in the MEGANTTMarkedFlowColor preference.
Implicit flow color	Specifies the color of an implicit flow (created by Teamcenter to retain necessary dependencies) in the Activities Gantt view representation area. This information is stored in the MEGANTTImplicitFlowColor preference.

These preferences are applied to any newly opened **Activities Gantt** view.

Edit activity start times and durations in the Operation Activities tab

1. Expand the process hierarchy in the **Process** pane and select an operation.
2. Choose **Open with → Activities**.
3. Double-click a **Start** or **Duration** value. The value becomes editable.

Note:

The **Calculated Start** and **Calculated Duration** values cannot be changed.


4. Type a new value.
5. Click outside of the entry box to exit edit mode.

The root activity's **Duration** is automatically recalculated using the new values.

Edit activity resources


When you modify a process plan, you may need to add resources to an operation's activities or edit existing ones. All resources assigned to an activity are automatically assigned to its parent operation.

1. Select an operation from the process structure.
2. Choose **Open with → Activities**.

3. Select the activity to which you want to add resources.
4. Click the **Edit Activity Occurrences** button .

The **Edit Activity Occurrences** dialog box is displayed. All resources currently assigned to the activity or the activity's parent operation are listed in the dialog box. Add and delete resources for the activity through this dialog box.

5. Do one of the following:

To	Do this
Delete existing resources	<ol style="list-style-type: none"> a. Select the resource to be deleted. To select multiple resources, hold either the shift key (for contiguous objects) or control key (for noncontiguous objects) while clicking resources. b. Click < to remove selected resources from the list or click << to remove all resources from the list.
Assign additional resources	<ul style="list-style-type: none"> • To assign a resource already in use by the activity's parent operation, choose the resource from the Occurrences on Operation list and move it to the Occurrences on Activity list. • To assign a new resource from the classification hierarchy, click the Assign Resource button . The Classification Search Dialog is displayed.

Using feature management

Using feature management

Teamcenter allows you to define features, which represent design or manufacturing features that are not defined as part of the physical structure in the BOM.

Features are implemented as item elements, sometimes called generic design elements (GDEs).

Add item element features to a structure

You can add features to any structure (for example, a manufacturing process) as follows:

1. Select the BOM line to which you want to attach the feature and choose **File** → **New** → **Item Element**.

Teamcenter displays the **Item Element** dialog box.

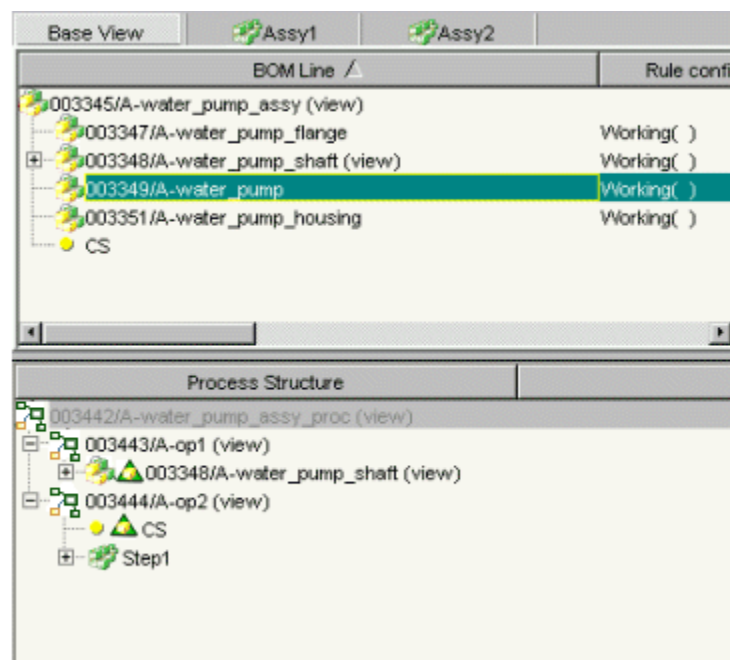
2. Select the item element type from the left-hand pane in the dialog box, type a name and description of the feature, then click **OK** to attach the feature.

Optionally, you can select the **Open on Create** check box and Teamcenter opens the feature immediately.

You can also add a feature to a BOM line by copying or cutting the feature from another BOM line and pasting it to the required BOM line.

Add *connections* between BOM lines in the same way as features, choosing the appropriate item element for the connection. To add a revisable connection between two item elements, select the item elements and choose **Advanced**→**Connect**. To add a nonrevisable link between two item elements, select the item elements and choose **File**→**New**→**Non-revisable**. To remove a connection or a link, select the item elements and choose **Advanced**→**Disconnect**.

The following figure shows a feature called **CS** as a consumed item in the **op2** operation of the **water_pump_assy_proc** process. Because the feature does not have revisions, there is no + sign in its line.



Feature (item element) as consumed item in manufacturing process

Note:

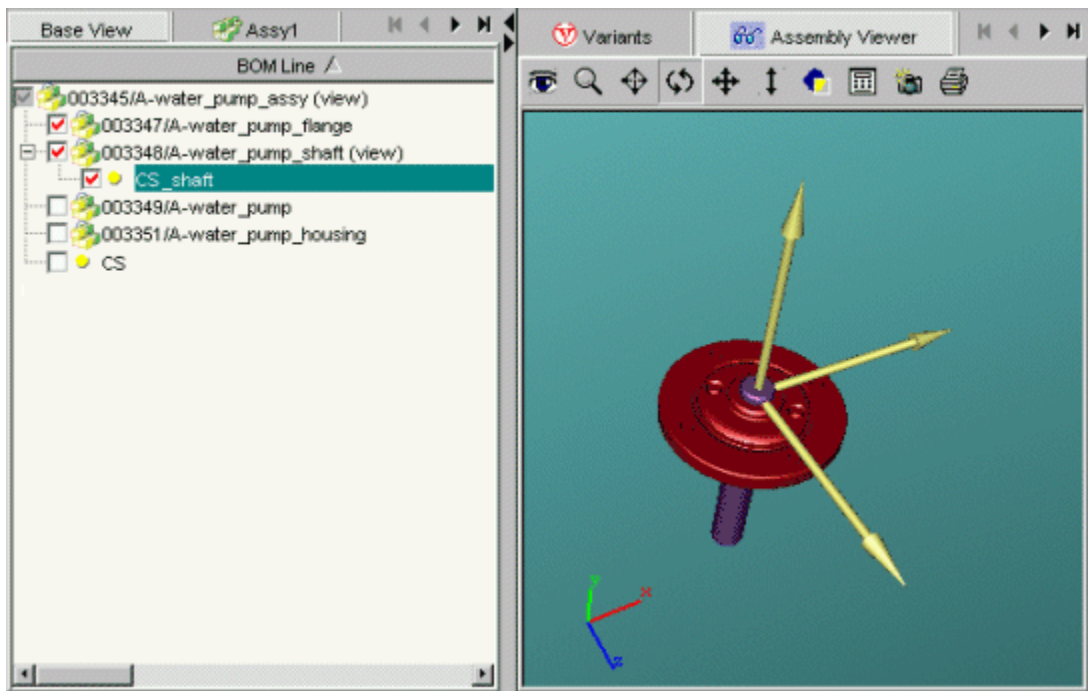
The line assigned for the feature in the process structure carries an occurrence type with a specific meaning, for example, consumed item, workpiece, or resource.

Manufacturing Process Management creates a link between the occurrence path of the feature in the product structure and its assigned line in the product structure.

Visualizing features

You can attach one or more JT files to a feature using the **Rendering** relationship, allowing the feature to be viewed in the same way as any other item in the BOM. You can uncheck a line in the BOM containing a feature if you do not want to visualize it.

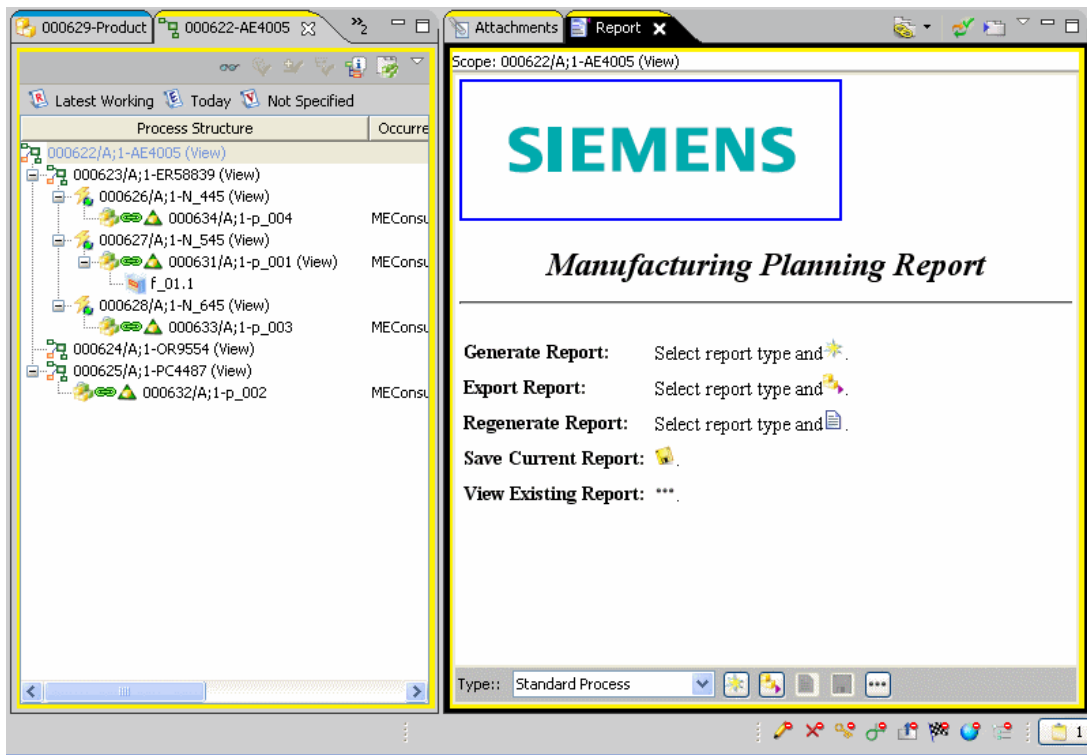
The following figure shows a feature selected for visualization; in this case, the selected feature is **CS_shaft**, a datum represented by a coordinate system. Click and hide the check mark in the BOM line to hide the image.



Feature (item element) with attached JT file selected for visualization

Generating reports for features

You can obtain several types of reports. For a selected process or part, the **Report** view lets you generate a report of the selected type. For example, for a process, you can generate weld sequence, datum utilization, and datum coordination reports. For a product, you can generate an unallocated welds report.



Sample report

Use the menu at the bottom of the view to choose the criteria for a report, and click the buttons to select the desired action, such as generate, save, or view the report.

The weld process report is applicable to a station process structure built according to best practice. The report assumes that the station process root contains multiple operations directly below it. You must customize the report if the structure you use differs from this best practice.






Configuring process structures

Set configuration for multiple structures

Use the **Configure Structure Contexts** dialog box in to configure multiple structures revision rule, effectivity, and other configuration items. This function is helpful if you are configuring more than one structure to the same configuration.

To use this feature, make sure you load all structures that you want to configure in .

1. In , choose **Advanced**→**Configure Structures**.
2. In the **Configure Structure Contexts** dialog box, select **Structures and Collaboration Contexts** to bulk apply variants, effectivity, and occurrences.

- a. Select the structures to configure by selecting the check box in the **Structure Name** column.
 - b. In the **Revision Rule** column, select the revision to use in the configuration.
 - c. In the **Variant Rules** column, select the variant to use in the configuration.
 - d. In the  column, select the check box if unconfigured variants of the structure are to be shown in the configuration.
 - e. In the  column, select the check box if unconfigured by occurrence effectivity of the structure are to be shown in the configuration.
 - f. In the  column, select the check box if suppressed occurrences of the structure are to be shown in the configuration.
 - g. In the  column, select the check box if unconfigured changes of the structure are to be shown in the configuration.
 - h. In the  column, select the check box if unconfigured assigned occurrences of the structure is to be shown in the configuration.
 - i. In the **Effectivity Groups** column, select the effectivity groups to use in the configuration for each structure.
 - j. In the **Effectivity** column, select the effectivity to use in the configuration for each structure.
3. To update all BOM views with the selected values, click **Apply**.
 4. To save all configuration changes including changes to loaded collaboration context, click **Apply and Save**.
 5. To exit, click **Close**.

About process configuration


A manufacturing process plan consists of three interconnected structures:

- Part
- Processes and operations
- Work area

Configuration management helps you define and apply variant rules to each of these structures independent of the other structures.


Because the process structure can have its own lifecycle and variability, lines in a process can configure out in one of the following ways:

- By occurrence effectivity

If you add an operation with occurrence effectivity, it is configured out when it is not effective. Show these lines using the **Show Unconfigured by Occurrence Effectivity** button  in the structure view or choosing **Show Unconfigured by Occurrence Effectivity** from the view menu.


The default state of this button is determined by the **MEShowUnconfiguredOccurrencesEffectivityDefaultState** preference.

- By incremental change effectivity

If you make changes with an incremental change (IC) and if it carries effectivity, the changes related to it are configured out if it is not effective. Show these changes by choosing the **Show Unconfigured Changes** button  in the structure view or choosing **Show Unconfigured Changes** from the view menu.


The default state of this button is determined by the **MEShowUnconfiguredChangesDefaultState** preference.

- By variants/options

If a BOM line carries a variant condition making it valid for a certain set of options, it is configured out for a different option set for which it is not valid. Show these lines by clicking the **Show Unconfigured Variants** button  in the structure view or by choosing **Show Unconfigured Variants** from the view menu. Using this menu command also shows objects that were configured out using effectivity.

The default state of this button is determined by the **MEShowUnconfiguredVariantsDefaultState** preference.

- By reference window

If you have a composition-type process, a line (for example, a consumed item) may be configured out because it is configured out in the reference or parent window on which it is based. Teamcenter does not differentiate why it was configured out in the other window. Show these lines by clicking the **Show Unconfigured Assigned Occurrences** button  in the structure view or by choosing **Show Unconfigured Assigned Occurrences** from the view menu. In this case, the lines are gone from this process window because they are configured out of the parent structure. It is irrelevant whether they are configured out of the parent structure because of occurrence effectivity, incremental change effectivity, or variants/options.

The default state of this button is determined by the **MEShowUnconfiguredAssignedOccurrencesDefaultState** preference.

The following preferences play a role in what processes you see when child processes are configured out:

- `controllingOccsForProcessConfiguration`
- `typeAndRuleForProcessConfiguration`

Select configuring structures

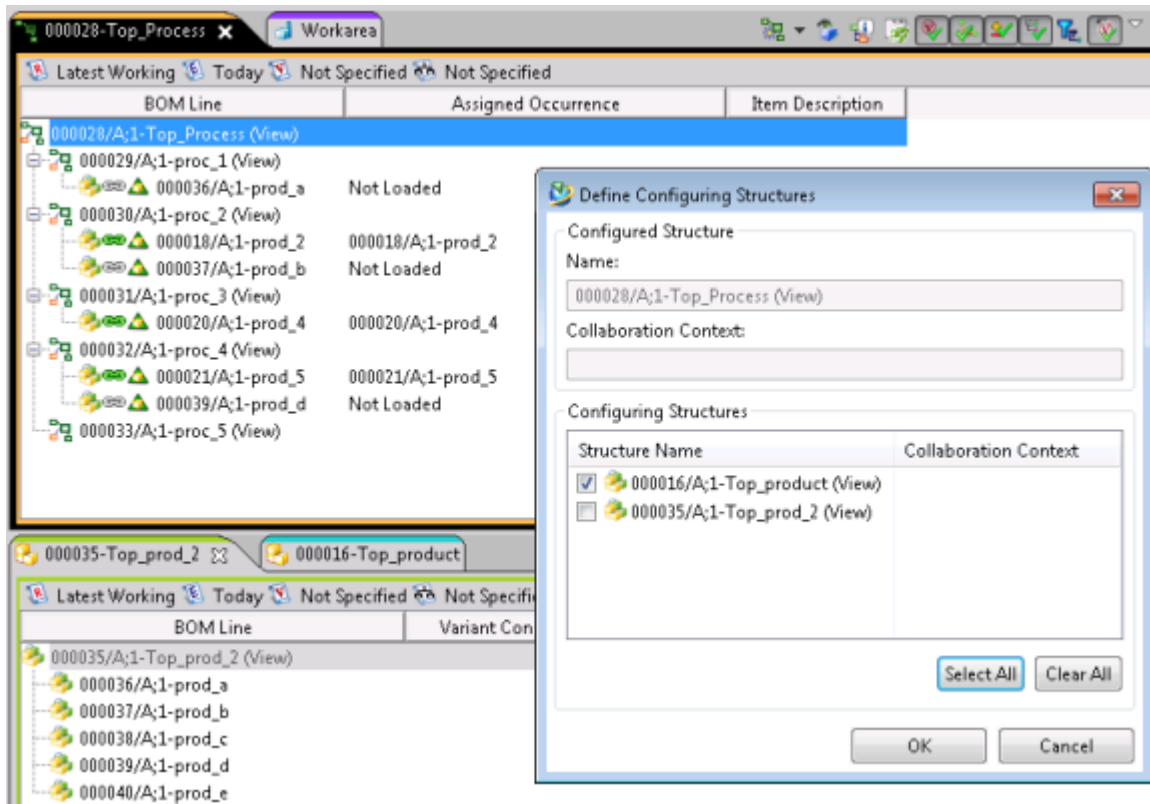
In some cases, it is unclear which loaded structures configure a loaded process. For example, a process may contain consumed items from two different product structures and you only want to see the operations containing parts from one of these product structures. Another example is when you have two product structures and two process structures loaded. You want to configure each process by their associated product structure.

You can define which loaded structures configure loaded processes.

1. Select a process.
2. Do one of the following:
 - In the process structure view menu, choose **Define Configuring Structures**.
 - Choose **Tools**→**Define Configuring Structures**.

Teamcenter displays the **Define Configuring Structures** dialog box that contains:

- The name of the selected process.
- The name of the collaboration context containing the selected process, if applicable.
- A list of all loaded structures.



- In the **Configuring Structures** list, select one or multiple structures that you want to configure the process. You can also clear all the selections so that the process is not configured by any structure. This behavior is equivalent to not having any product structure loaded.

If only one structure is loaded, the **Define Configuring Structures** dialog box will not appear.

By default, a product contained within a collaboration context configures a process located in the same collaboration context.

If you select an occurrence group in the first step, Teamcenter carries out the command on the corresponding base view.

Tip:

- Teamcenter maintains the selection of a configuring structure until one of the structures is unloaded. To maintain the selection, save the structures to a collaboration context.
- To use the pre-Teamcenter 9.0 behavior where each loaded composition structure is configured by all loaded structures, set the **MEConfiguringStructuresMode** preference.

Configuring structures by occurrence effectivity

About occurrence effectivity

The effectivity of an occurrence can be expressed as a date range or a range of units with respect to an *end item*. An occurrence can have multiple expressions comprising date effectivity, unit effectivity, or both. Multiple unit effectivity expressions may reference the same end item or different end items. If no occurrence effectivity is specified, the occurrence is considered to be always effective; that is, it is not constrained by any effectivity definition.

Occurrence effectivity is used principally for two purposes:

- To reflect changes to the structure over time as new parts replace old ones.
- To explicitly state the content of a unit or range of units as a means of managing the variability of the product. This technique is an alternative to using options and variants to configure the parts needed to fulfill a particular offering.

Occurrence effectivity is frequently used by manufacturers of military and aerospace products. The end item may correspond to a serial number or the tail number of an aircraft.

For example, there may be different hydraulic cylinders in the landing gear of an aircraft, depending on whether the aircraft is certified for unimproved runways. There may be additional differences to the aircraft to meet this purpose, such as debris deflectors, wheels, and tires. Using options and variants, you could define an option called **RW_Class = Paved or Gravel**, and there would be a variant rule on stouter cylinder to configure it in for the **Gravel** option. Using occurrence effectivity, the unit number of each aircraft unit that is certified for operation on gravel runways (for example, units 3-6, 17, 33-45) would be used in the effectivity specified for parts such as stouter cylinders. The effectivity of the regular cylinder would be specified using the other units (unit 1-2, 7-16, 18-32, 46-up).

Understanding occurrence effectivity

Understanding occurrence effectivity

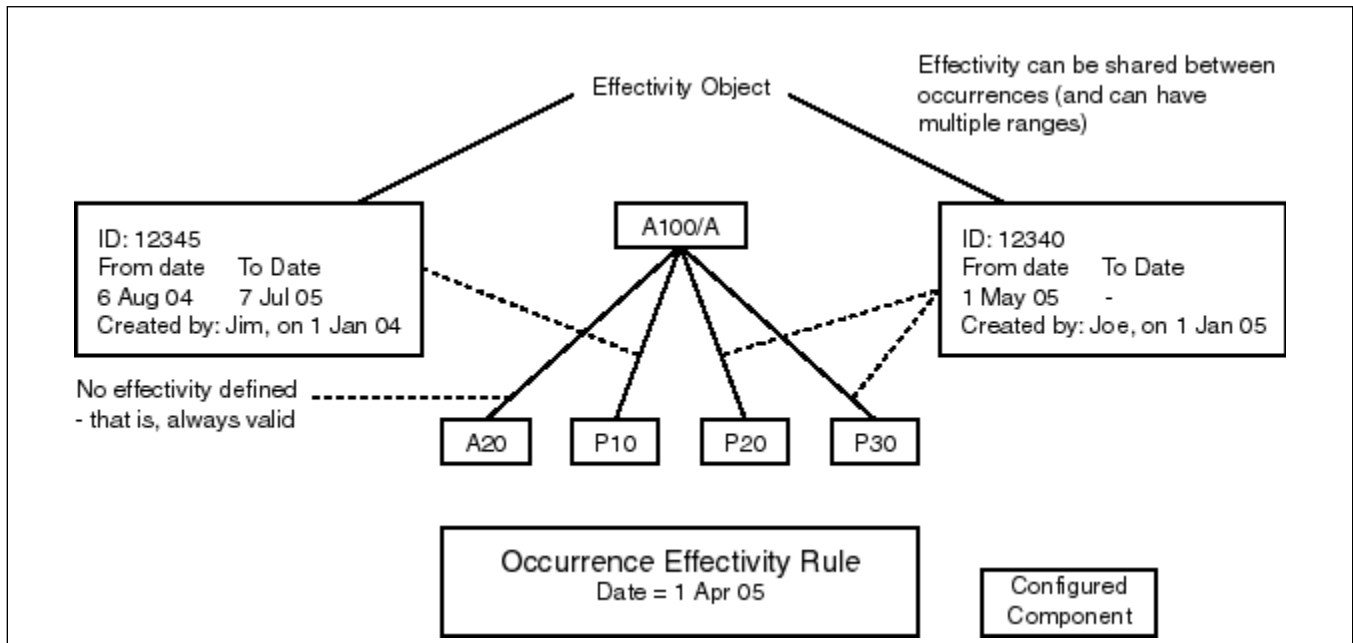
Several occurrences may share an effectivity. When you edit the effectivity range on one occurrence, Teamcenter applies the change to all occurrences. (This is generally the reason for sharing effectivity.)

You can also pack occurrences if they share the same unit or date range and access protection status. Packed occurrences are displayed in a similar way to packed structure lines.

You cannot import or export structures containing occurrence effectivity. If you require individual structure nodes to have effectivity, consider the use of incremental change.

If an occurrence does not have an associated effectivity object, Teamcenter assumes it is always effective and it is configured regardless of the date or unit number set by the revision rule, as shown in the following figure.

If you do not split effectivities, you can optionally use the **Configuration Item** check box to indicate the end item, although Teamcenter does not enforce this use.



Occurrence effectivity rule

When you create an effectivity condition on an occurrence, you change the parent BOM view revision. Consequently, you must have write access to the BOM view revision. However, you can make subsequent changes to the effectivity range if you have write access to the effectivity object, allowing you to edit effectivity data after the structure is released.

Note:

The import or export of a structure containing legacy occurrence effectivities is not supported. If you require individual structure nodes to have effectivity, consider using incremental change instead of occurrence effectivity. Structures managed with incremental change can be imported and exported using Multi-Site Collaboration.

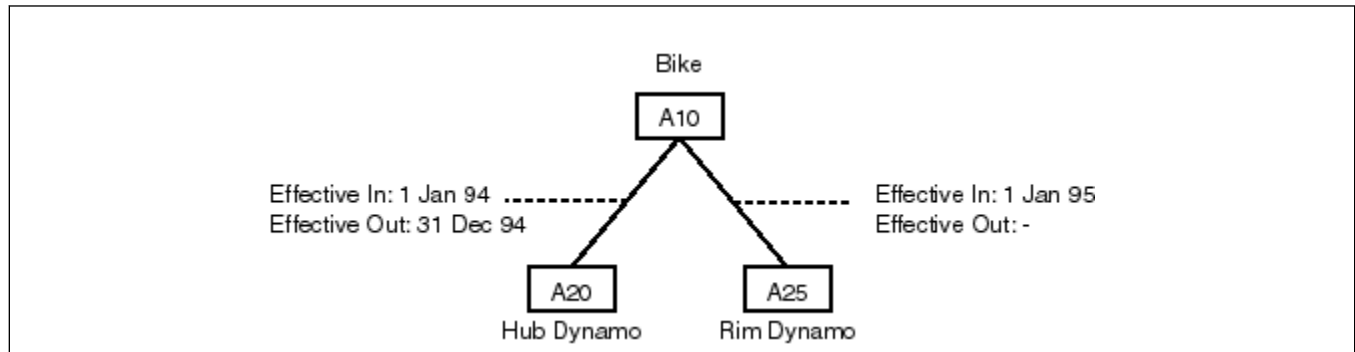
Validating effectivity

You should check that effectivity ranges are consistent within the whole structure, ensuring that effectivity ranges lower down the structure lie within ranges higher up. You may not be aware of the constraints higher up the structure when you initially specify effectivity ranges at lower levels.

Teamcenter does not perform this validation automatically but you can include it as part of a workflow process that approves the effectivity ranges. In certain cases, this validation may not be appropriate, for example, when the structure is shared between different products.

Defining mutually exclusive effectivity ranges

If you intend to define occurrences as mutually exclusive, manually check that they do not have overlapping effectivity ranges. For example, in the following figure, there are two different types of dynamo and it would be wrong to configure two dynamos at the same time.



Mutually exclusive effectivity ranges

When specifying effectivity, you can make the association between the occurrences clearer by using the same find number or attaching a special effectivity note to each.

Understanding unit net effectivity

For a large and complex structure, it is useful to understand the net effectivity of components within the structure. A lower level component may have been originally specified for any effectivity or a large range, but a narrower range applied at a higher level in the structure can reduce the net range for that component line.

Unit net effectivity can be considered as the intersection of an occurrence's unit occurrence effectivity with its parent's calculated unit net effectivity, from the specified structure line up to the top of the structure. For a line without an underlying occurrence (top line of a structure), there is no occurrence effectivity. This line is considered unconstrained and always configured. The unit net effectivity of a line that has no unit occurrence effectivity is equivalent to its parent's calculated unit net effectivity.

- If the line has only date effectivity expressions, these are ignored and the unit net effectivity is the same as its parent's calculated net effectivity.
- If there are multiple unit effectivity expressions with the same end item, these expressions are merged before intersection with the parent's calculated net effectivity.
- The intersection is taken with respect to the end item designations of the parent's unit net effectivity expressions. Unit effectivity expressions whose end items do not match any in the parent's unit net effectivity are ignored.
- If there is no intersection of the line's unit occurrence effectivity and the parent's unit net effectivity, the line's unit net effectivity is set empty (fully constrained).

- The unit net effectivity of a line whose parent's unit net effectivity is empty also has an empty unit net effectivity, regardless of the line's unit occurrence effectivity.
- The unit net effectivity of a particular component line is calculated when you display the line and is not persisted in subsequent sessions.

Effectivity flow-down reporting helps the user understand effectivity ranges and the impact of changes, especially as the complexity of the effectivity increases through the structure.

Calculate unit net effectivity

To calculate the net occurrence effectivity of a selected structure line, choose **Tools**→**Effectivity**→**Occurrence Effectivity**→**Calculate Net Effectivity**.

Teamcenter displays the occurrence effectivity, unit net effectivity, and net effective occurrence configured (EOC) information for the selected line.

BOM Line	Occurrence Effectivity	EOC - Effective Occ. Config'd	Unit Net Effectivity	Unit Net - Effective Occurrence Configured (EOC)
000021/A;1-top (View)		True		True
000022/A;1-c1	1-UP (000081)	True	1-UP (000081)	True
000023/A;1-c2		True		True

The unit net EOC is set to **true** if the occurrence would be configured in based on the comparison of its calculated unit net effectivity with the revision rule occurrence effectivity entry. Teamcenter performs this comparison at run time and it is not persisted.

Property Name	Property Value
Occurrence Effectivity	1-UP (000081)
Unit Net Effectivity	1-UP (000081)
Unit Net - Effective Occurrence Configured (EOC)	true

Note:

If you select a root line or more than one line, an error message is displayed.

Configuring by occurrence effectivity

If the revision rule controlling the configuration of a structure contains an entry for occurrence effectivity, occurrences for which no occurrence effectivity is specified are configured, together with occurrences whose effectivity expressions match some part of the revision rule occurrence effectivity

entry. If **Show Unconfigured By Occurrence Effectivity** is selected, an occurrence may be shown or hidden, depending on occurrence effectivity (which may be a greater range than unit net effectivity).

The calculated net effectivity is also compared with the revision rule occurrence effectivity entry.

- If the unit net effectivity of a line is unconstrained, the unit net-EOC is **true**, regardless of any occurrence effectivity entry in the revision rule.
- If the unit net effectivity of a line is empty, the unit net-EOC is **false**, regardless of any occurrence effectivity entry in the revision rule.
- For a line whose unit net effectivity is not unconstrained or empty, its unit net-EOC is **false** if there is no occurrence effectivity entry in the revision rule.
- If there is an occurrence effectivity entry in the revision rule, the unit net-EOC is **true** only if the unit net effectivity matches some part of the revision rule occurrence effectivity entry.
- Any date effectivity expressions in the revision rule occurrence effectivity entry are ignored for the unit net-EOC comparison. A date range is not considered as a scope for unit net effectivity,

You may explicitly set an occurrence effectivity entry in the existing revision rule by choosing **Revision Rule** → **Set Date/Unit/End Item....** You can then set a unit range defining the scope of effective occurrences you want to review. The **Unit Net-EOC** property shows whether the computed net effectivity is in that scope.

Using effectivity cutback

While defining a product managed with occurrence effectivity, the effectivity decisions evolve as the product content itself is developed. The design engineer makes decisions for effectivity ranges that reflect the implementation plan for when additional or replacement parts should be included in the bill of materials.

In general, there are many technical and logistical decisions that go into setting the date or unit range of the effectivity. To support this process, the engineer must understand the chain of effectivity for a given part. The engineer may choose to adjust the effectivity ranges when necessary. Over the life cycle of development and service of the product, customers using occurrence effectivity replace parts with other parts. As these changes are made, the historical chain of effectivity must remain consistent.

When a new occurrence of a part is specified as a replacement for an existing occurrence in a structure, the effectivity of the replaced part should be reduced (cut back) so that it does not overlap with the effectivity of the replacing part.

When a part with occurrence effectivity is replaced and cut back, prior generations that were replaced by the cutback part should also be considered for cutback, if the range of the newest replacement overlaps effectivity.

Note:

Effectivity cutback is only supported with unit effectivity, not with date effectivity.

The following actions are supported by effectivity cutback:

- Replacing N parts with M replacements and updating ranges of effectivity. The historical chain of effectivity retains the N:M relationship, in case a future cutback operation needs to fully span the content of a link in the chain to cut it back.
- Validating prior replacements in the history of effectivity and updating accordingly.
- Enabling efficient updates to effectivity ranges after a replacement.

The following example shows how effectivity cutback occurs when an engineer modifies an assembly that is managed with occurrence effectivity.

1. The engineer specifies replacement parts P21, P22, and P23 for parts P11 and P12 with a unit range of 10-up.

The system adds the occurrences P21, P22, and P23 effective unit 10-up. The effectivity of P11 and P12 is cut back to the portion of the range not set on the replacements, namely units 1-9.

2. The engineer indicates parts P31, P32, and P33 are specified as replacements to P21, P22, and P23 for a range starting at unit 5.

The system determines from the chain of effectivity and replacements that P21, P22, and P23 are replacements.

The full range of effectivity is overlapped, so P21, P22, and P23 are no longer in effect. The span of replacement is complete, so the parts previously replaced are considered and P11 and P12 are cut back accordingly to 1-4.

3. The engineer specifies P42 as a replacement for P32 for a range within the span of effectivity of P32.

P42 is effective for the range specified (units 20-30) and the replaced occurrence split to 5-19, and 31-up.

4. The engineer adjusts the effectivity range of P42 to units 22-32.

The effectivity of P42 is updated to the new range.

5. A reviewer or the engineer validates the effectivity chain of P42.

The system evaluates the effectivity of P42 against the parts it replaced or is replaced by. It identifies:

- A gap

Unit 20,21 does not include replaced (P32) or replacing (P42) parts.

- An overlap

Units 31 and 32 include both replaced (P32) and replacing (P42) parts.

6. The engineer replaces a part where only a portion of the historical replacement chain is changing.

While a cutback of P33 by replacing part P43 is unambiguous, there is not an unambiguous action to take on P11 and P12 because P33 is only a subset of the historical chain:

(P11,P12):(P21, P22, P23):(P31, P32, P33)

After replacing an occurrence and performing a cutback of the replaced part, the effectivity range of a part can be adjusted. If the new range overlaps with the effectivity of any parts in the historical chain of effectivity, the system issues a warning.

The following table shows how effectivity cutback occurs in this scenario.

Step	Task	Part P11	Part P12	Part P21	Part P22	Part P31	Part P32	Part P33	Part P42	Part P43
1	Initial state	1-up	1-up							
2	Replace P11 & P12 with P21, P22,P23 at unit 10	1-9	1-9	10-up	10-up					
3	Replace P21, P22, P23 with P31, P32,	1-4	1-4			5-up	5-up	5-up		

Step	Task	Part P11	Part P12	Part P21	Part P22	Part P31	Part P32	Part P33	Part P42	Part P43
	P33 at unit 5									
4	Replace P32 with P42 for units 20-30	1-4	1-4			5-up	5-up	5-up	20-30	
5	Adjust effectivity of P42 to units 22- 32						Warning		22-32	
6	Replace P33 with P43 for units 3-7	Error	Error					8-up		3-7

When a link in a chain of occurrence effectivities is completely overlapped (that is, a complete cutback is made of its entire range) it is logically removed from the structure. The system informs the user there is no effectivity for that occurrence. A logically removed occurrence can be removed from the structure and removed from historical chains of effectivity used for evaluation of future cutback operations. In this situation, the change history is the only way to know the part ever existed in the structure.

Editing occurrence effectivity

To edit occurrence effectivity data, your Teamcenter user name must be included in the appropriate effectivity user group and role that the administrator defines.


Associate existing effectivity to an occurrence

Note:

Use this approach only when you want the effectivity to be the same for all occurrences sharing this effectivity object. If you edit the effectivity object's date or unit number ranges, Teamcenter applies this change to all occurrences that reference it.

1. Select the line in the structure representing the occurrence with which you want to associate effectivity.
2. Choose **Tools**→**Effectivity**→**Occurrence Effectivity**→**View, Create and Edit**.

Teamcenter opens the **Occurrence Effectivity** dialog box.

3. In the **Effectivity ID** box, type the identifier of the effectivity object you want to associate with the occurrence, and press the Enter key. Alternatively, you can search for the effectivity object by clicking **Search**  adjacent to the **Effectivity ID** box.

Teamcenter populates the date or unit number table with the ranges from the effectivity object.

4. Click **OK** and Teamcenter associates the effectivity with the occurrence.

Create effectivity on multiple occurrences

Create and associate the same effectivity with several occurrences by selecting the appropriate line in the structure and choosing **Tools**→**Effectivity**→**Occurrence Effectivity**→**Create on Multiple BOM Lines**. The effectivity may be:

- Shared

Shared effectivity must have an ID. If you are creating shared effectivity, ensure the **Use shared effectivity** check box is selected.

- Unshared

Unshared effectivity has no ID. If you are creating unshared effectivity, ensure the **Use shared effectivity** check box is cleared.

Modify the effectivity of an occurrence

Note:

Any changes you make affect all occurrences sharing the same effectivity object.



1. Select the line in the structure representing the occurrence whose effectivity you want to modify.
2. Choose **Tools**→**Effectivity**→**Occurrence Effectivity**→**View, Create and Edit**.

Teamcenter opens the **Occurrence Effectivity** dialog box.

3. In the **Occurrence Effectivity** dialog box, choose **Units** or **Dates** effectivity, as appropriate, and define the effectivity range.
 - If defining unit effectivity, type the desired effectivity range in the **Units** box. Use the - character within a continuous range, and the , character to separate discontinuous ranges. For example, the unit range **1-5,7-9** defines effectivity for units 1 through 5, and 7 through 9 (but not effective for unit 6).
 - If defining date effectivity, select a cell in the **From** or **To** column, select a date from the calendar (and optionally type a time), and click **Set Date** to place that date in the selected cell. Click the **Clear Date** button to remove the date from the currently selected cell. Repeat this step for additional cells until you have entered all the desired date ranges.
 - Click the **UP** button to add the **and up** (open-ended effectivity) condition to the end of the unit or date effectivity range. If you are defining date effectivity,
 - Click the **SO** button to add the **stock out** condition to the end of the unit or date effectivity range.


Note:

Teamcenter interprets **UP** and **SO** conditions as open-ended for revision configuration purposes. The revision is considered effective for any value greater than or equal to the unit or date value immediately preceding the **UP** or **SO**. *Stock out* indicates that existing stocks of a component revision should be used up before the next revision.

- Check the **Apply Access Manager effectivity protection** check box to apply the predefined access rules to this effectivity.
- (Optional) For date effectivity, use the **End Item** dialog box to define an end item to qualify the effectivity range. You *must* use this with unit effectivity to specify a product, module, or subsystem that carries the unit number to which this effectivity refers. You can select an end item in one of the following ways:
 - Clicking **Open by Name**  adjacent to the **End Item** box and searching for an item by identifier and/or name.
 - Copying an item to the clipboard before opening the **Occurrence Effectivity** dialog box and clicking **Paste**  adjacent to the **End Item** box.

- Clicking **MRU**  adjacent to the **End Item** box.

Note:

If you want to remove the entered end item, click **Clear**  adjacent to the **End Item** box.

4. Click **OK** to save the occurrence effectivity data you entered.

Remove effectivity from an occurrence

1. Select the line in the structure representing the occurrence whose effectivity you want to remove.
2. Choose **Tools**→**Effectivity**→**Occurrence Effectivity**→**View, Create and Edit**.

Teamcenter displays the **Occurrence Effectivity** dialog box.

3. Click **Remove** to clear all boxes, including the identifier.
4. Click **OK** and Teamcenter removes the effectivity object from the selected occurrence. Any other occurrences sharing this effectivity retain their references to the effectivity object.

Copying occurrences with effectivity

When you save a BOM view revision with a different name (perform a **Save As** action), Teamcenter copies any occurrences that reference an effectivity object to the new BOM view revision. Thus, the same effectivity ranges apply to the copied structure.

When you copy, cut or paste, Teamcenter does not reproduce any references to effectivity objects in the copy occurrences.

Setting the date for occurrence effectivity

Teamcenter configures the occurrence effectivity by the date defined in the current revision rule. Teamcenter uses an explicit date entry, if the current rule contains one. If the rule has no date entry, the effective date defaults to **today**, but you can manually set a different date using the **Tools**→**Revision Rule**→**Set Date/Unit/End Item** menu command.

You can choose to show only the configured occurrences, or all occurrences. You can toggle this setting by choosing **View**→**Show Unconfigured by Occurrence Effectivity**. If you display the **EOC - Effective Occ. Config'd** column in the structure properties, occurrences that are configured show a **Y**. If the occurrences are not configured, the column is blank.

Occurrences are configured if:

- The effectivity range encompasses the date specified by the current revision rule.

- They have no effectivity object. Such occurrences are always configured, regardless of date.

Combining occurrence effectivity and variant configuration

Variant and occurrence date effectivity are occurrence-based configuration methods that operate independently. The **View** menu includes separate commands to show or hide occurrences that are unconfigured by the two methods. In some cases, you may want to view a specific variant of the product at a particular effective date. In this case, you hide occurrences that are unconfigured by *both* date and variants. Similarly, you may want to view a generic product at a particular date, in which case, you would hide occurrences unconfigured by date only. To show how a single variant changes with effective date, you can hide unconfigured variants only.

Configuring occurrences with multi-unit configuration

About multi-unit configuration

Teamcenter allows you to configure product structure occurrences of an assembly based on specified multiple end items and the unit effectivity ranges for each of those end items. You can do impact analysis and eliminate the duplicate work required to maintain different product structures and complicated manual reconciliation.

A combination of multiple end items and range of units for each end item used to configure product structure occurrences is referred to as a *multi-unit configuration*.

The administrator at your site enables this feature. It allows you to:

- Specify multi-unit configurations and save them as effectivity groups.
- Save a combination of effectivity groups and revision rule as a configurator context. You can use the saved configurator context to apply the effectivity groups and revision rule to configure occurrences.
- View the configured structure in Lifecycle Visualization, CAD tools, and the embedded viewers of appropriate rich client applications.
- Configure occurrences by matching the occurrence effectivity with the multi-unit configuration.
- Configure occurrences that are added and deleted by incremental changes by matching the incremental change effectivity with the multi-unit configuration.

Note:

Teamcenter displays the **Revision Rule Entry** value for an incremental change (IC) configured by a multi-unit configuration as **Effectivity Group**. Therefore, ignore the status of this check box in the **IC Information** pane.

When an occurrence has occurrence effectivity and it is removed in the context of an IC, the occurrence is not configured if the multi-unit configuration matches the effectivity of the removing IC. This occurs whether the occurrence effectivity matches partially or completely with the multi-unit configuration.

Multi-unit configuration does not support nested effectivity and effectivity mapping.

Create a new effectivity group

1. In My Teamcenter, choose **File→New→Item**.

Teamcenter displays the **New Item** dialog box.

2. Select **Effectivity Group**, enter the necessary name, description, and identifier, and then click **Finish**.

Teamcenter creates the base revision of the new effectivity group. (Effectivity groups cannot be revised, and you are unable to create further revisions of the new group.)

Capture a multi-unit configuration and save it to an effectivity group

1. In My Teamcenter, right-click an effectivity group revision and choose **View/Edit Multi-Unit Configuration**.

Teamcenter displays the **View/Edit Multi Unit Configuration** dialog box with the **View/Edit Multi Unit Configuration** pane visible.

Note:

The **Most Recently Used** option is not available in this dialog box. Also, the **Open By Name** box is not available on the **Effectivity Groups** pane in this dialog box.

Caution:

This is a modeless dialog box. It allows you to copy items from other locations, such as your **Favorites** folder, and paste them into the dialog box. However, it also allows you to perform other actions, such as **Revise** and **Close** commands in My Teamcenter with the dialog box open.

If you open this dialog box using **View/Edit** in the **Set Date/Unit/End Item** dialog box (**Effectivity Groups** tab), the dialog box is modal and does not allow you to paste between applications.

2. Enter the necessary end item and unit range information, and then click **Add**, **Edit**, **Remove**, or **Undo** to update the effectivity group, as follows:

- To add an end item unit range, enter the end item ID and the effective unit range and click the **Add** button. You can also search or browse for an end item to populate the **End Item** box. You can also copy the end item from your **Favorites** folder in My Teamcenter and paste it here. You can specify a combination of units or unit ranges in comma-separated format.
- To remove an end item unit range, select it in the table and click **Remove**.
- To edit an end item unit range, select it in the table and the system populates the **End Item ID** and **Unit Range** boxes from the selected entry. After you make the required changes, click **Modify**.
- To revert the last change made in the dialog box, click **Undo**.

Note:

Undo allows you to go back one level to the previous state in the dialog box. Thereafter, any subsequent clicks on the **Undo** button cause the dialog box to toggle between its current state and previous state.

Note:

You can view and edit effectivity groups with certain limitations. Use the **View/Edit** button in the **Effectivity Groups** pane of the **Set Date/Unit/End Item** dialog box to add or modify the end items by manually typing the necessary data. You cannot search for or copy and paste end items here.

Set an effectivity group to configure occurrences

You set an effectivity group or groups to configure the product structure occurrences in addition to the revision rule.

1. Load the assembly to configure and choose **Tools**→**Revision Rule**→**Set Date/Unit/End Item**.

Teamcenter displays the **Set Date/Unit/End Item** dialog box.

2. Enter the effectivity group identifier in the **Effectivity Group** box, and then click **Replace**, **Insert**, or **Append** to update the list of groups.

Note:

To remove an effectivity group from the list, select it and click **Remove**.

3. (Optional) To view the multi-unit configuration on an effectivity group, select it and click **View/Edit**. The system displays the **View/Edit Multi Unit Configuration** dialog box, as described previously. If you have the necessary access privileges, you can also modify the configuration.

When you apply the configuration, the system matches the occurrence effectivities configured for each occurrence with the multi-unit configuration set in the effectivity groups. Any occurrence whose

occurrence effectivity is valid for any of the end item and unit range entries in the effectivity groups is displayed. An occurrence is loaded only once even if its effectivity matches more than one end item entry in the effectivity groups set in the session.

Caution:

You can configure product structures with incremental changes using effectivity groups. However, only limited support is provided to configure occurrences with incremental changes using multi-unit configuration and the following limitations apply.

- You can configure only the addition and deletion of occurrences using effectivity groups. Other edits in the context of incremental change cannot be configured.
- An **add** occurrence edit is effective if the multi-unit configuration partially overlaps the effectivity of the incremental change.
- A **remove** occurrence edit is effective if the multi-unit configuration completely overlaps or is within the limits of the effectivity of the incremental change. That is, a partial overlap is not sufficient to configure the **remove** edit. If there are multiple **remove** incremental changes, Teamcenter compares each of them with the multi-unit configuration separately. (It does not calculate the total **remove** effectivity and compare a single value with the multi-unit configuration.)
- Teamcenter evaluates the configuration of an occurrence based on an incremental change independently of its occurrence effectivity.
- If Teamcenter finds competing incremental changes (one adding the occurrence and the other removing it) and both can be configured with effectivity groups, it gives precedence to the **add** occurrence edit.

The following examples show how occurrence effectivity and incremental change interact.

Structure line number	Type	Occurrence effectivity (explicit or implied)	Effectivity on removing IC1 and removing IC2	Multi-unit configuration set on BOM window	Result
1	Component	EndItem(1-20)	IC1(-) → EndItem1(1-9) IC2(-) → EndItem(10-20)	EndItem1(1-9)	Occurrence <i>not</i> configured.
2	Component	EndItem(1-20)	IC1(-) → EndItem1(1-9) IC2(-) → EndItem(10-20)	EndItem1(1-20)	Occurrence configured as Teamcenter checks occurrence effectivity, multi-

Structure line number	Type	Occurrence effectivity (explicit or implied)	Effectivity on removing IC1 and removing IC2	Multi-unit configuration set on BOM window	Result
					unit configuration, and each incremental change individually.

Customizing occurrence effectivity

You can customize Teamcenter behavior when the user applies or sets occurrence effectivity on a BOM line.

To allow customization of the behavior when setting effectivity on an occurrence, the **bl_occ_effectivity** BOM line property is modifiable, and a setter method is provided on this property. Use the setter method of the property to attach an extension point if required.

Managing incremental changes

Managing incremental changes

Incremental change management is the process of controlling changes and providing an audit history of a part's definition and configuration. An incremental change collects together a number of structure changes to a component such as addition or removal of components or changes to attachments (data). Effectivity can be applied to incremental changes to configure the associated changes. This method of change control allows several independent structure changes to be made concurrently, including the addition or removal of unrelated components. Those changes can be implemented in any sequence.

The following actions constitute a reason for creating a change in manufacturing:

- Adding and removing existing processes and operations from parent processes.
- Replacing a process or operation with another process or operation.
- Adding, removing, or replacing relationships between a top-level process and a target product, process, and plant with other product and plant objects.
- Adding, removing, or replacing items from the setup structure at the operation level. This includes consumed items, work areas, and resources.
- Adding, removing, or replacing objects that are attached to a process or an operation such as datasets, forms, and other items.

- Adding, removing, or replacing objects in an activity folder with other objects such as other activities, tools, and programs.

A single change can add or remove multiple objects from an item or item revision. A single object can be added to an item or item revision with different effectivities by several changes and removed with different effectivities by several other change objects.

You can also create a baseline item revision by configuring all the incremental changes.

Note:

- Precedence relations between operations in a manufacturing process are not supported within Part Planner.
- You can create incremental change (IC) information about occurrence groups and their content (children). However, configuring the view to show or hide configured changes does not work for this information. Only incremental change information that is common with the base view (in the item structure) is filtered.

Show or hide incremental change management

Using incremental change management is optional. To use it, your administrator must set the **Incremental_Change_Management** preference to **true**. When this preference is set to **false**, the incremental change toolbar is not visible and any loaded items or relationships under incremental change control display in a different color.

You can specify whether incremental change is applied per structure or per application using the **MEIncrementalChangeMode** preference. If set to **structure**, incremental change is relevant only for the selected structure and for the secondary views connected to the selected structure. In this mode, each structure can use its own incremental change.

Turn off incremental change tracking

- Click the  button in the toolbar.

Teamcenter removes the header information from the view and stops tracking edits.

Customize buttons

Incremental changes are displayed by icons at the beginning of a structure line. When you add or remove a structure line, Teamcenter displays a plus or minus icon in front of the respective line.

- Customize when incremental change icons are displayed by choosing **Tools→Incremental Change→Display Icons** and selecting the contexts in which you want to see the icons.

- Choose **Tools**→**Incremental Change**→**Display Icons**→**Hide/Remove Icons** to always hide the display of the icons in the tree structure.

Setting up incremental change

Before using incremental change, you must complete several setup procedures, including creating the necessary change types, providing users with access, defining releases statuses, and writing revisions rules.

Create a new incremental change

1. Click the **Create Incremental Change** button .

Teamcenter displays the **Create/Revise Incremental Change** dialog box.

2. Click the **IC Attributes** tab and set the following incremental change attributes:
 - Type an ID and revision for the change object. Alternately, click **Assign** to let the system assign this information for you.
 - (Optional) Type a description for the incremental change.
 - Select a change type from the **Incremental Change Type** list. Note that some of these types may be for general changes, not incremental changes.
3. Click the **Effectivity** tab and specify whether to set effectivity for the incremental change using unit serial numbers or dates by doing one of the following:

Note:

You cannot specify an effectivity until the incremental change is released. An incremental change may be released by a workflow process that is specific for your company or site.

If you do not specify an effectivity, Teamcenter creates the change object without a status.

The administrator determines the initial release status of all new incremental changes by setting a site preference. If the preference is not set, you cannot set effectivity while creating the incremental change. You must release the incremental change (revision) separately with the appropriate process. Once the release status is attached, you can set the effectivity on the incremental change.

- Click **Units** and specify the range of serial numbers to which the effectivity is to be applied. You can also click one of the following buttons:

- **UP** button to define an unlimited effectivity from a starting number. For example, typing **1-UP** means the change is effective from unit 1 upward.
- **SO** button to define an effectivity until all stock is exhausted. For example, typing **1-SO** means the change is effective from unit 1 until no stock remains.

Tip:

The tooltip provides you with more information about the formatting for this entry.

- Click **Dates** to set effectivity based on calendar dates. Multiple date ranges can be entered. To set a date:
 - Type the start and end dates for the effectivity period into the **From Date** and **To Date** cells in the date table.
 - Select a date in the calendar table and click **Set Date** to specify both the **From Date** and the **To Date** entries.

When the correct effectivity is shown, click **OK**.

4. If unit effectivity is set, populate the **End Item** box on the **Effectivity** tab using one of the following methods:
 - From the list of most recently used end items
 - Using the **Search** function to open an item by name or ID
 - By pasting an item from the clipboard
5. Click **OK** to finish creating a new incremental change and close the dialog box, or click **Cancel** to cancel the operation.

Teamcenter creates a copy of the new incremental change in your **New Stuff** folder.

6. At an appropriate time, the designated user or a workflow process approves the change object by adding the release status. The change object is now *locked* and you cannot use it to track further changes to the process or operation.

Note:

You can use a Workflow handler that renames the status and retains the effectivity, for example, the **add_status** handler with a **-remove** option.

Showing unconfigured changes

You can configure the display of the tree table to show the following:

- All components and attachments.
- Only those components and attachments that are configured by the current revision rule.

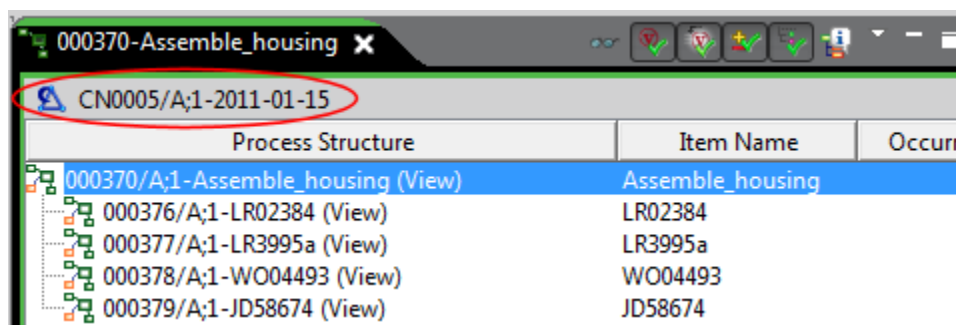
To control the display of unconfigured changes:


- Choose **Show Unconfigured Changes** from the view menu to toggle between showing all lines or only those set by the current revision rule.

To identify changes made in the current context, click the **Changed by Current IC Edit Context** column header to re-sort the structure into changed and unchanged lines. This allows you to more easily identify the changes made to the structure in the current context.

Find and make active an existing change object

When an incremental change is active, all edits are made in the context of that incremental change. Teamcenter shows the ID and name of the active incremental change in the structure view header.



You can also view the active incremental change in the **Configuration Information** dialog box by clicking .

1. Click the **Select an Incremental Change context** button .

Teamcenter displays the **Select an Incremental Change context** dialog box.


2. Type either the name or ID of the change object to be displayed. You can use wildcard search characters, if necessary.
3. Click **Find**.

All change objects matching your selection criteria are displayed in the dialog box. Use the navigation buttons at the bottom of the dialog box to navigate the list.

4. To select an incremental change object for display, double-click the change object in the dialog box list.

View or edit information about an incremental change

Do one of the following:

- Click the **View/edit current IC information** button .
- Click **More IC Info** in the **Incremental Change** data tab.

Teamcenter displays the **View/edit Change** dialog box, which includes the following tabs:

- **IC Attributes** shows the change object name, description, and tag type.
- **Incremental Changes** shows the individual changes to activities, components, attachments, created/deleted data, and predecessors that are tracked against this incremental change.

Note:

A replacement is shown as an override.

- **Effectivity** allows you to view and edit the effectivity of the change object if you have the access permission to do so. Double-click a specific release status to open a dialog box containing all the effectivity information for the selected release status.
- **Intents** displays the intents for which the incremental change is valid.

You can create a new intent by clicking the **Intent** button and typing the appropriate information in the **Create Intent** dialog box. You can then add the intent to the incremental change by ensuring it appears in the **Intent to add** box and clicking **+**. You can also search for existing intents and add them to the incremental change.

Note:

To make the **Intents** tab visible, set the **EnableIntents** preference to **true**.

You can also use the icons on a structure line to identify adds, removes, and absolute occurrences. For attachments, these icons are displayed in the **Attachments** view, not the structure view.

View incremental changes for a structure

To view all the incremental changes associated with a structure, select a line in the structure and choose **Open with → Incremental Change**. For each line, this view lists:

- **Type**

For attachments only, specifies the type of incremental change, **create**, **delete**, **add**, or **remove**. Note that edits to attachments are shown as **create** types.

- **IC Context**

Specifies the incremental change objects affecting the structure, listed in the order they are applied.

- **Release Status**

Specifies the release status of the incremental change object, for example, **Production**.

- **Effectivity**

Specifies the date or unit number effectivity of the incremental change.


- **IC Configured By**

Specifies the revision rule that configures the incremental change for this structure. This allows you to see if an incremental change is configured and, if so, how it is configured.

For attachment changes, the affected lines and changed relationships are also listed. For occurrence attribute changes, the affected attributes and changed values are also listed.

To see more information about an incremental change, double-click the line in this pane; Teamcenter displays the changes made by the incremental change.

Find recently used change objects

Click the **Most Recently Used** button () to display a list of previously used incremental changes from which you can choose.

Track attachments with incremental changes

You can create an attachment to an item revision and track its status with an incremental change object, as follows:

1. Ensure you have created the appropriate incremental change object and that it is active. The active incremental change is shown in the structure view header.

2. Select the structure line corresponding to the *item revision* under which you want to create the attachment.
3. Choose **Open with→Attachments**.
4. Select the root node (item revision) in the **Attachments** pane.
5. Create a new attachment by choosing **File→New→Dataset/Form**.

Alternatively, you can attach an existing object by copying the dataset or form to the clipboard, then pasting it to the root node (item revision) in the **Attachments** view.

Track changes to an attachment

To track changes (edits) made to an attachment, select the attachment (dataset or form) and choose **Tools→Incremental Change→Edit Attachment**.

Teamcenter also tracks edits if you double-click the dataset or form. With a dataset, the change is tracked when you open the form to edit; with a form, the change is tracked only when you click **OK** or **Apply**. Teamcenter tracks the changes by creating a copy of the dataset or form.

The **Attachments** pane displays the appropriate version of the attachment according to the configured incremental change against which the edits were tracked.

Note:

You can view the original, unchanged attachment in My Teamcenter.

If you open an attachment, check it out, and then close it, the checkout lock is not retained. The checkout is retained only if you save the attachment at least once before closing it.

Track the creation or deletion of an attachment

You can track the creation of a dataset or form against an incremental change, so that the attachment itself has an effectivity that is derived from the effectivity of the incremental change; this is in addition to the effectivity applied by the incremental change that attaches the attachment to an item revision. This feature may be useful if the attachment is attached to more than one item revision.

- To track the creation of an attachment, select the attachment in the **Attachments** pane and choose **Tools→Incremental Change→Create on Object**.
- To track the deletion of an attachment, select the attachment in the **Attachments** pane and choose **Tools→Incremental Change→Delete on Object**.

Track changes retrospectively

If you forgot to activate an incremental change, you can retrospectively track changes by making the incremental change active and doing one of the following:

- Select the item or attachment that you wanted to track as *added* and choose **Tools→Incremental Change→Add**.
- Select the item or attachment that you wanted to track as *removed* and choose **Tools→Incremental Change→Remove**.

Teamcenter saves edits immediately to the database. It is not necessary to choose the **Save Changes** command.

You can only make changes to the *active* incremental change, that is, the one shown in the structure view header. If you try to edit an incremental change that is not configured by the current revision rule, Teamcenter displays an error message.

Remove incremental changes

You can remove individual incremental changes one of two ways, from the **Incremental Change** view or with an **Incremental Change** menu command.

Note:

You require write access to edit structures with incremental changes in this way.

For structure and attachment changes:

- If the corresponding change is a remove, Teamcenter deletes it.
- If the corresponding change is an add and the user has write access to the parent BVR, Teamcenter deletes the add but not the occurrence. If you want to remove the occurrence, choose **Edit→Remove**. If the user does not have write access, the deletion request fails.

For occurrence attribute changes, if the change to undo is an add and it is the only change to the attribute, the change and the override value are both deleted. In other cases, only the change is deleted.

Remove an individual change from the incremental change information pane

1. In the **Incremental Change** view, select the structure line of the occurrence or attachment whose changes you want to remove.
2. Select the change to undo and click **Undo Change**, depending on the change type that you want to remove. You can undo multiple changes in a single operation.

Remove changes from an item with the Remove Changes command

1. To remove changes to an occurrence, select the corresponding structure line.

To remove changes to a dataset or form, select it in the **Attachments** view.

2. Choose **Tools**→**Incremental Change**→**Remove Changes**.

Teamcenter displays the **Remove Incremental Changes** dialog box.

3. Select the check box next to each change you want to remove, or click **Select All** to remove all changes, then click **OK**.

Note:

Occurrence attributes are not displayed in the **Remove Incremental Changes** dialog box; you can only undo them from the **Incremental Change Information** pane.

Split an incremental change

You may want to change the effectivity of some of the incremental change elements in an incremental change. As all elements of an incremental change have the same effectivity, you can only accomplish this by moving some of the incremental change elements into a different incremental change. To do this, choose **Tools**→**Incremental Change**→**Split**. You can move the incremental changes to an existing change object or create a new change object for the purpose.

Working with incremental change baselines

Create an incremental change baseline item revision

Changes to a process plan can be managed by making incremental changes, which are tied to incremental change objects. This enables you to track and configure the changes without forcing you to create a new revision. After making several sets of incremental changes, you may want to roll up the changes made into a new baseline revision. The baseline item revision allows you to create a new revision of an item by capturing all the changes made using incremental change objects until the configuration date or unit number. The baseline item revision can be created at any stage.

1. Select an item revision and choose **Tools**→**Incremental Change**→**Incremental Change Baseline**.

Teamcenter displays the **Baseline** dialog box.

2. Type a name and a description. Teamcenter displays the selected item revision and revision ID by default. These boxes cannot be edited.
3. Click **OK**.

Baselining structures with active incremental changes

Optionally, when you create an incremental change of an item revision, any incremental changes that are active are carried forward or rolled up. An active change is any incremental change that has an **out** effectivity equal to or greater than the baseline effectivity, including any open-ended effectivity.

When you carry forward a change, the affected object of the change is copied to the new item revision. The copy of the affected object is qualified to the same incremental change. Consequently, the old and new copies of the affected object share the same change effectivity.

When you roll up a change, *only* the affected object of the change is copied forward. The qualification is not present on the new item revision.

Determining active changes

Teamcenter drops, rolls up, or carries forward changes to the new item revision, depending on the following conditions. (X indicates the baseline, which may be a unit number or date.)

Lower end	Higher end	Drop, roll up, or carry forward?	Explanation
<X	<X	Drop	The change was effective in the past with respect to the baseline and will not be effective in the future. The change is dropped.
<=X	>=X	Carry forward	The change is effective and remains effective to a certain point in the future. Beyond that point, the change is not configured and is therefore carried forward.
<=X	UP	Carry forward if Pending status or roll up if Secured status.	The change is effective and remains effective in the future. It can be rolled up into the next revision. However, if the incremental change is not released, it can be edited and such edits may be reverted. Therefore, if the status is Pending , changes are carried forward.
>X	>X,UP	Carry forward	The change is effective in the future, so is carried forward.

Note:

Teamcenter supports discontinuous effectivity, with multiple **out** effectivities. If any of the effectivities is equal to or greater than the baseline effectivity, the change is considered active.

When you create the baseline, changes that are past effective are dropped, irrespective of status. For example, if you create a baseline at unit 25, there may be changes on an incremental change with effectivity on units 5 to 15. All these changes are dropped because they are past effective. If you subsequently change the effectivity of this incremental change to span or cross baseline unit 25, you must recreate the baseline to take the effectivity change into account.

Teamcenter determines if an effectivity is *applicable* in the current context. An item revision under incremental change may have several status objects attached to it, and the objects may be different types. A revision rule may have several entries configured by effectivity, and the entries may specify different status and effectivity types. To determine if an effectivity statement on an incremental change revision applies to the revision rule, Teamcenter checks that the combination of status type and effectivity type (date or unit) match an entry in the revision rule.

Carrying forward or rolling up active changes

Teamcenter carries forward active changes if:

- The change is currently active and the qualifying incremental change is not released, or
- The change will be configured in the future.

It copies the affected object to the new item revision. It also connects the new copy of the affected object by an incremental change element (ICE) to the same incremental change as the original affected object.

Teamcenter rolls up active changes if the change is currently active and the qualifying incremental change is released. It copies *only* the affected object to the new item revision.

ICEs link affected objects to *revisions* of incremental changes. As an incremental change evolves, the affected object may be qualified by several ICEs to multiple revisions of the same incremental change. If you do not assign explicit **out** effectivities, but supersede them with later **in** points (for example, A: 1–UP, B: 10–UP, C: 20–UP), multiple revisions of the same incremental change may be considered active. If the baseline effectivity is equal to or more than 20, the latest in rule determines that C is the currently configured revision. However, as you may subsequently change any effectivity, Teamcenter carries forward the affected object with ICE qualification to all of these active incremental change revisions.

Dropping inactive changes

If Teamcenter determines that a change is not active, it is dropped from the new item revision. If the affected object is added by the incremental change, because the relevant change is no longer

active, Teamcenter omits the affected object from the new item revision. If the object is removed by the incremental change, the removal is reversed and the affected object is copied forward without the incremental change qualification.

Modify a process or plant structure

If a process structure or plant structure is write-protected, you can still modify its structure with incremental changes. You can also add datasets or forms to an item revision or remove them from a revision by defining an incremental change.

Exporting and importing incremental change data

About exporting and importing incremental change data

You can export changes (deltas) to the structure if they are tracked by incremental changes in two formats—TC XML using a briefcase file or PLM XML. Teamcenter allows you to export the structure changes alone (not the entire structure) without needing to create a new revision. The exported changes contain all the relevant data required by the importing site to achieve the same structure configuration as exists at the exporting site. You can export multiple independent, dependent, or overlapping incremental changes in a single action.

When you use this feature, you must ensure the structure is configured with the required effectivity and revision rules before initiating the export. Effectivity and revision rules are not exported with the changes; you must ensure they are identical in the exporting and importing sites separately.

Teamcenter tracks and exports the following changes when they are tracked by incremental changes:

- Adding a new or existing line to the structure
- Adding a new or existing subassembly to the structure
- Removing a line or subassembly from the structure
- Modifying relative occurrence properties
- Creating or modifying absolute occurrence properties
- Adding a new or existing attachment to a line, for example, a form or dataset
- Deleting an attachment
- Modifying an attachment

When exporting incremental change data using PLM XML:

- The structure must be fully configured.

- Any related changes that are not tracked by an incremental change are not considered for export.
- Changes in the context of incremental changes are considered as export candidates. For example, if you add, modify or remove a structure line in the context of an incremental change, all of its parents up to the top level are exported in addition to the affected line. However, the siblings of lines affected by the incremental changes are not exported.
- If you add, modify, or remove a subassembly under an incremental change, its children are exported even though they are not directly affected under the incremental change.

You can create an incremental baseline for a structure that was already exported. This action creates a new revision of the structure. As active changes are carried forward into the new incremental change baseline revision, you may add new incremental change elements (ICEs) affecting the new structure revision to the incremental change revision that is the parent of the original active ICEs. (This incremental change revision may already be exported for the original structure.) Because the new ICEs do not affect the revision of the structure that was exported when you perform a TC XML export, they are exported as a stub. The incremental baseline action has no additional effect on the export of the original structure and the incremental change revisions that affect it.

Export incremental change data using a briefcase file

1. Choose **Tools**→**Export**→**To Briefcase**.

Teamcenter displays the **Export To Briefcase Via Global Services** dialog box.

2. Click the **Display/Set export options** button  in the bottom right-hand corner of the dialog box.

Teamcenter displays the **TIE Export Configured Export Default** dialog box.

3. Select the check box corresponding to each of the export options you want to use and then click **OK**.

Teamcenter closes the **TIE Export Configured Export Default** dialog box.

4. In the **Export To Briefcase Via Global Services** dialog box, enter all the required information including **Reason**, **Target Sites**, **Option Set**, **Briefcase Package Name**, **Revision Rule**, and **Variant Rule**, and then click **OK**.

Note:

Ensure you select the **TIEConfiguredExportDefault** transfer option set to export incremental change based deltas.

Teamcenter displays the **Remote Export Options Setting** confirmation dialog box.


5. Click **Yes**.

Teamcenter starts the export of the product structure using the options you entered.

Import incremental change data using a briefcase file

1. Choose **Tools**→**Import**→**From Briefcase**.

Teamcenter displays the **Import from Briefcase Without Global Services** dialog box.

2. Navigate to or type the path and file name of the briefcase file in the **Briefcase File** box. Select **TIEConfiguredImportDefault** from the **Option Set** list.
3. Click the **Display/Set export options** button  and select the desired options.
4. (Optional) Select the **Site Check-In after import** box. If you select this box, all objects that are checked out to the unmanaged site are checked in during the import process. Otherwise, you must check them in individually after they are imported.
5. Click **Yes** to begin the import.

Note:

The importing site does not verify it has the same base structure against which the delta was calculated.

If you select a collaboration context for export of incremental change deltas, the export file includes the structure context and configurator contexts contained in it, as well as the configured incremental change data.

Export incremental change data using PLM XML

1. Choose **Tools**→**Export**→**To PLMXML**.

Teamcenter displays the **PLMXML Export** dialog box.

2. Enter the required export directory, file name, choose the appropriate IC delta transfer mode (for example, **ConfiguredDataExportDefault**), and then click **OK**.

Teamcenter displays a confirmation message if the export is successfully completed. It generates the output PLM XML file in directory the location shown in the **PLMXML Export** dialog box.

Import incremental change data using PLM XML

1. Choose **Tools**→**Import**→**From PLMXML**.

Teamcenter displays the **PLMXML Import** dialog box.

- Enter the name of the PLM XML file to import, choose the appropriate IC delta transfer mode (for example, **ConfiguredDataImportDefault**), select the required incremental change context, and then click **OK**.

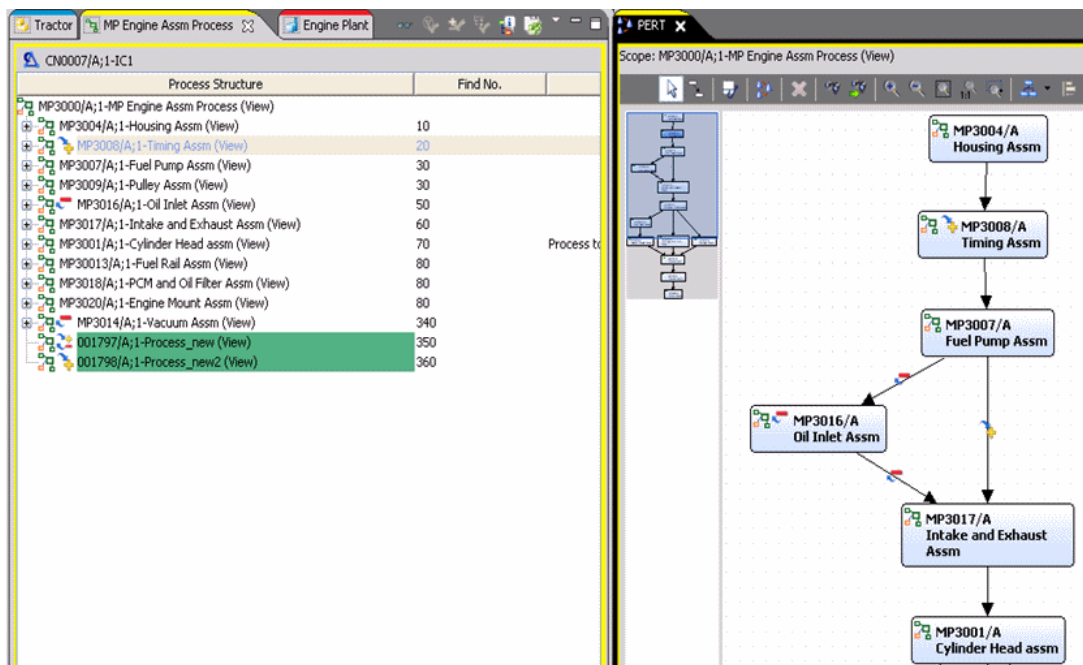
Teamcenter displays a confirmation message if the import is successfully completed. It imports only changes to the structure, as captured in the exported PLM XML file.

Working with incremental changes and predecessors

About incremental changes and predecessors

A *predecessor* represents a sequential relationship between two processes, operations, or activities; the predecessor must complete before the second process, operation, or activity. You can use this relationship to track changes to the sequence of operations in a process or to activities in an operation. For example, you can use it to define a flow of operations or processes to be effective from a certain date or unit number. If you use a change object to add a predecessor, the change effectivity is attached to the predecessor and the predecessor becomes effective as of that change.

The following figure shows how Manufacturing Process Management displays the predecessors of a process or operation. If a + sign appears on the symbol, the predecessor was added with an incremental change; if a – sign appears on the symbol, the predecessor was removed with an incremental change.



Incremental changes on predecessors

Add an incremental change on a predecessor

- Open the **PERT** view.

2. Create a new flow between (sequence) between the related processes or operations.

Remove an incremental change from a sequence

If you remove or delete a predecessor, it remains displayed in the **PERT** view but is marked for deletion when the relevant change becomes effective.

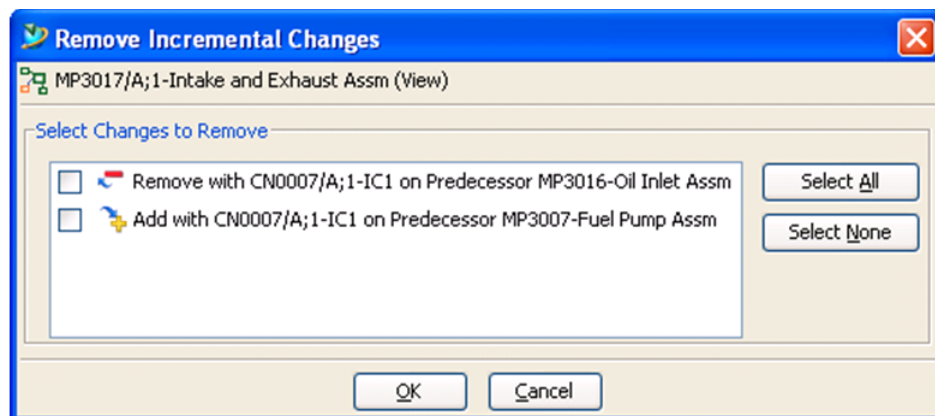
To remove an incremental change from a sequence, do the following:

1. Open the **PERT** view on a process.
2. Select the sequence line and click **Delete** from the PERT toolbar.

Roll back incremental changes on the sequence

1. Open the **PERT** view on the process.
2. Select the target node of the sequence on which you want to remove incremental changes.
3. Choose **Tools**→**Incremental Change**→**Remove Changes**.

Teamcenter displays the **Remove Incremental Changes** dialog box.



4. Select the desired change and click **OK**.

Teamcenter removes the selected changes.

Managing absolute occurrences (in-context editing)

Managing absolute occurrences (in-context editing)

An *absolute occurrence* is a specific instance of a component or assembly in a structure. It may be independent of the top-level assembly and only meaningful in the context of a lower level assembly. For example, you may have four occurrences of a wheel in the design of a vehicle; you can label one of those occurrences as **left rear wheel**, which is an absolute occurrence of the wheel. When you open a window containing the structure, each absolute occurrence is represented by a single line.

To create an absolute occurrence, you edit the occurrence line *in context* with respect to the assembly in which the absolute occurrence data is meaningful. Hence, the creation of absolute occurrences is sometimes referred to as *editing in context*.

Note:

Absolute occurrences are not the same as *appearances*. Absolute occurrences are generated when you build the structure (edit in context) and do not have associated spatial information.

A component or subassembly that appears in more than one product structure can have the same absolute occurrence in each structure.

You cannot create absolute occurrences directly, only by converting a relative occurrence and editing its properties. Similarly, you cannot delete absolute occurrences directly. You cannot create absolute occurrences on substitutes.

An absolute occurrence may appear more than once in the structure, depending on the context in which you created it.

Interpreting absolute occurrence data

The following figure shows how absolute occurrences appear in the structure when in context editing is enabled.

Incremental Change (IC) Edit Context: No IC context

ASSY_2345-04-69/B-VOLVO ASSEMBLY FOR BETA TESTING (view) - Latest Working - Date - "Now"

IN CONTEXT: 20487187/C (view)

BOM Line	Seq...	Assy Note	Item Rev...	Configured ICs	Revision Effectivity	Associated ICs	...
ASSY_2345-04-69/B-VOLVO AS...	B						Y
04_MAJ/A	A 10		Released		Released 1-UP (ASSY_2345-0...		Y
TYPE-FM_NORMAL_WSD-2...	A 20		Released		Released 1-UP (ASSY_2345-0...		Y
ENG-VE12_UTURBOC/A	A 30		Released		Released 1-UP (ASSY_2345-0...		Y
04_MR/A	A 40		Released		Released 1-UP (ASSY_2345-0...		Y
PAP3140/A	A 50		Released		Released 1-UP (ASSY_2345-0...		Y
RAP_6640/A	A 60		Released		Released 1-UP (ASSY_2345-0...		Y
ASSY_2345-04-69_1/A	A 70		Released		Released 1-UP (ASSY_2345-0...		Y
ASSY_2345-04-69_2/A	A 80		Released		Released 1-UP (ASSY_2345-0...		Y
20409535/A (view)	A 90		Released		Released 1-UP (ASSY_2345-0...		Y
20392008/A	A 10		Released		Released 1-UP (ASSY_2345-0...		Y
20567341/A (view)	A 100		Released		Released 1-UP (ASSY_2345-0...		Y
20453035/A	A 10		Released		Released 1-UP (ASSY_2345-0...		Y
20453035/A	A 20		Released		Released 1-UP (ASSY_2345-0...		Y
20487187/C (view)	C 300		Released		Released 1-UP (ASSY_2345-0...		Y
20367635_101/B (view)	B 10	AAA	Released		Released 1-UP (ASSY_2345-0...		Y
20367635_201/A	A 10	CCC	Released		Released 1-UP (ASSY_2345-0...		Y
20367635_3/A	A 10	XXX	Released		Released 1-UP (ASSY_2345-0...		Y
3988731/A	A 20		Released		Released 1-UP (ASSY_2345-0...		Y
3988731/A	A 30		Released		Released 1-UP (ASSY_2345-0...		Y
20429251/A	A 40		Released		Released 1-UP (ASSY_2345-0...		Y
20429252/A	A 50		Released		Released 1-UP (ASSY_2345-0...		Y
1076334/A	A 60		Released		Released 1-UP (ASSY_2345-0...		Y
1076334/A	A 70		Released		Released 1-UP (ASSY_2345-0...		Y
1075726/A (view)	A 80		Released		Released 1-UP (ASSY_2345-0...		Y
1075726/A (view)	A 90		Released		Released 1-UP (ASSY_2345-0...		Y
3171036/A	A 100		Released		Released 1-UP (ASSY_2345-0...		Y
3171036/A	A 110		Released		Released 1-UP (ASSY_2345-0...		Y
3171036/A	A 120		Released		Released 1-UP (ASSY_2345-0...		Y
3171036/A	A 130		Released		Released 1-UP (ASSY_2345-0...		Y
1075723/A	A 140		Released		Released 1-UP (ASSY_2345-0...		Y
1075723/A	A 150		Released		Released 1-UP (ASSY_2345-0...		Y
1075723/A	A 160		Released		Released 1-UP (ASSY_2345-0...		Y
1075723/A	A 170		Released		Released 1-UP (ASSY_2345-0...		Y
20374919/A	A 180		Released		Released 1-UP (ASSY_2345-0...		Y
20374919/A	A 190		Released		Released 1-UP (ASSY_2345-0...		Y
1628449/A	A 200		Released		Released 1-UP (ASSY_2345-0...		Y
1628449/A	A 210		Released		Released 1-UP (ASSY_2345-0...		Y
914170/A	A 220		Released		Released 1-UP (ASSY_2345-0...		Y
914170/A	A 230		Released		Released 1-UP (ASSY_2345-0...		Y
914170/A	A 240		Released		Released 1-UP (ASSY_2345-0...		Y
914170/A	A 250		Released		Released 1-UP (ASSY_2345-0...		Y
914170/A	A 260		Released		Released 1-UP (ASSY_2345-0...		Y
914170/A	A 270		Released		Released 1-UP (ASSY_2345-0...		Y
966360/A	A 280		Released		Released 1-UP (ASSY_2345-0...		Y
966360/A	A 290		Released		Released 1-UP (ASSY_2345-0...		Y

Absolute occurrences in a structure

Note the following lines in this structure:

Line


20487187/C (view)

Purpose

The immediate parent that is in context for absolute occurrence edits.






The line is also color-coded in the structure and in the title bar of the pane where the current context is shown. The color is green in this example but may be changed by your administrator.

Lines that are *not* in the current context are grayed out. Similarly, the out-of-context parts corresponding to the grayed out lines may also be grayed-out in the viewer. You cannot create absolute occurrences from grayed-out lines in

Line	Purpose
	the current context and you cannot edit an existing property value on such lines.
	Lines below 20487187/C (view) are generally not grayed out and <i>are</i> in context.
20367635_101/B (view)	This is a standard occurrence note. It is in context and may be edited.
20367635_201/A	This occurrence note is <i>not</i> in context because it is not in all occurrences of the immediate parent assembly.
20367635_3/A	The overriding note value in the context of 20487187 only for this specific occurrence of the parent. To obtain more information about edited absolute occurrence data, place the cursor over any cell containing the  icon. The tool tip banner shows the context in which the edited data is valid.





By default, the assembly viewer highlights only those items in the assembly that are in scope in the selected context; items that are not in context are shown grayed out. The administrator may optionally change this behavior so that all items are shown.

The structure contains icons that indicate the status of the structure lines as follows:

Icon	Indicates
	A line containing this icon is the context for the creation of certain absolute occurrences. The line is also color-coded in the structure and in the title bar of the pane where the current context is shown.
	A line that contains this icon has one or more of the absolute occurrences edited in a context but not necessarily the current context.
	A property cell containing this icon is already edited in a context; the current absolute occurrence data is shown in the cell. Each cell that contains data for a specific absolute occurrence includes this icon.
	A line that contains this icon before its name is a target for editing data in the current context. Look for a  icon in one or more properties cells of the same line to identify if the necessary edits are already made.

Note:

This icon identifies a target in the current context. It may not appear in the same line if you select a different context.

Icon	Indicates
	A line that contains this icon has an in-context edit made by an incremental change. The edit may be an add, remove, or both.
	A cell that contains this icon has an in-context edit removed by an incremental change.
	A cell that contains this icon has an in-context edit added by an incremental change.
	A cell that contains this icon has in-context edits added and removed by an incremental change.

Showing and hiding the in-context line

You can show or hide the line that is the context of a particular in-context edit.

To show the line:

1. Click in a property cell, then click outside the same property cell. Ensure you do not select *another* property cell.

Note:

Right-clicking when editing the value in a cell has no effect.

2. Hover the cursor over the same property cell, right-click, and then choose **Show/Hide In-Context BOM Line** from the menu.

Structure Manager shows the in-context line highlighted in yellow and the editable property cells are highlighted similarly.

To hide the line, click outside the property cell you edited, right-click, and then choose **Show/Hide In-Context BOM Line** from the menu.


Structure Manager hides the previously highlighted in-context line.

Create absolute occurrences

To create an absolute occurrence, you must enable in-context editing mode and edit the properties of an occurrence, as follows:

1. If necessary, expand the structure by choosing **View** → **Expand Options** → **Expand Below** or choosing **Expand Below** from the shortcut menu.


- Right-click the top line that is the context of this edit and choose **Set In-Context** from the shortcut menu.

If a line in the displayed structure is marked with a  icon and colored green, it is the item that is the context for the creation of absolute occurrences. If a line is grayed out, it is not in the selected context and you cannot create absolute occurrences for these lines. The in-context item is also identified in the title bar of the structure tree.

- You cannot enable in-context editing mode for a line that has no children.
 - You cannot create an absolute occurrence in the context of its immediate parent.
 - You cannot change the value of a property that is already overridden at a higher level.
- Click the cell in the lower line containing the property you want to enter or edit. You must select one of the following supported properties:
 - Suppressed
 - Position constrained
 - Suppression constrained
 - Any GRM relation impacted by preferences
 - Any occurrence note
 - Quantity
 - Find number
 - Occurrence type
 - Variant conditions
 - Variant formula
 - Absolute transformation matrix
 - Unit of measure
 - Is designed in place
 - Requires positioned design

Caution:

Ensure you have selected in-context editing mode. If this mode is not selected, the change is made to *every* instance of the selected item anywhere in the assembly.

- Type the required new value and press the Enter key. A  icon on the line indicates one of its property cells has an absolute occurrence override.

Note:

If you create an absolute occurrence override of a property and the same property is already overridden at a lower level in the structure, the new, higher level value replaces the existing value. Conversely, you cannot edit an individual property value if the same property is overridden at a higher level in the structure.

Identify absolute occurrences

You can assign identifiers to absolute occurrences and these identifiers are displayed in two columns in the property table, as follows:

- **ID In Context (Top Level)**

Shows only the identifier assigned to the line in the context of the loaded top-level line. You can add or edit an identifier by double-clicking in this cell and typing the necessary value.

Note:

Any absolute occurrence identifiers defined at a lower level than the currently selected top-level line are not visible.

If in-context editing mode is disabled, the top-level line is always considered the in-context line.

- **ID In Context (All Levels)**

Shows the identifiers assigned to the line in all contexts. You cannot edit this column.

Change absolute occurrence override data

You can change the override data for an existing absolute occurrence at any time. For example, you may want to change the quantity assigned to a structure line to correct a previous error. It is not necessary to enable context editing to make such changes, ensure only the correct context is selected, then double-click the property cell and edit the value.

Note:

If you want to define relative occurrence data for a property that is already defined in context, remove the absolute occurrence data from the property first.

Remove absolute occurrence override data

You can remove override data from an absolute occurrence without entering replacement data. To do this, right-click the property to remove (that is, select the relevant cell) and choose the **Remove In Context Override** command.

Deselect in-context editing mode

When you are not creating or editing absolute occurrence data, consider deselecting in-context editing mode to avoid inadvertent changes.

- Right-click the green context line and choose **Set in Context**.

Associate data with absolute occurrences

About associating data with absolute occurrences

During the design process, an engineer may attach data such as a CAD design file, viewer (JT) file, classification information, and specifications to an item revision. The actual usage of the item revision in the structure, including its transformation, is tied to an occurrence.

You can attach data to a specific instance of an item revision in the structure, which is represented by an absolute occurrence. You can attach data that is unique to the absolute occurrence, or information that is already attached to the associated item revision or occurrence. Examples of data that you may want to attach to a specific absolute occurrence include:

- Cost data
- Transformations
- Quantity
- Variant conditions (not modular variant expressions)
- Viewer information
- Name and ID
- Occurrence note, type, or find number
- Instance number
- Find number
- Occurrence position constrained
- Occurrence suppressed

For example, you may want to attach a different occurrence note to each absolute occurrence to specify additional assembly work instructions.

The level of the absolute occurrence in the structure determines the precedence of data you attach to it. Data attached at a high or mid-level in the structure override the corresponding data at lower levels; data attached to an absolute occurrence at the lowest level does not override data elsewhere.

Associate a dataset or form with an absolute occurrence

1. Ensure you have selected in-context editing mode by right-clicking the structure line and choosing **Set In Context**.

2. Select the line containing the absolute occurrence with which you want to associate a new instance-specific dataset or form and open it in the **Attachments** view.
3. If you are associating a new dataset or form, create it by choosing **File→New→Dataset** or **File→New→Form**, respectively.

If you are replacing an existing dataset or form, select it in the **Attachments** view. You can then search for and insert a replacement dataset or form.

Associate a transformation with an absolute occurrence

Note:

You cannot associate a transformation (positioning information) with an absolute occurrence in Teamcenter manufacturing process management; you can only make the initial association in Structure Manager.

1. Ensure you have selected in-context editing mode by right-clicking the structure line and choosing **Set In Context**.
2. Select the line containing the absolute occurrence for which you want to change the transformation.
3. Select the **Graphics** view and choose **Graphics→Transformation→Persistent Transformation**.
4. Change the position of the affected component and save the changes.

Associate an occurrence note with an absolute occurrence

1. Ensure you have selected in-context editing mode by right-clicking the structure line and choosing **Set In Context**.
2. Select the line containing the absolute occurrence with which you want to associate an occurrence note.
3. Choose **Edit→Notes**, or click the **Notes** button on the toolbar.

Teamcenter displays the **Notes** dialog box.

4. Type the properties of the note and click **OK**.

Apply a variant condition to an absolute occurrence

1. Ensure you have selected in-context editing mode by right-clicking the structure line and choosing **Set In Context**.

2. Select the line containing the absolute occurrence with which you want to associate a variant condition.
3. Choose **Edit→Variant Condition**.


Teamcenter displays the **Variant Condition** dialog box.

4. Add a new variant condition to the absolute occurrence or edit the existing variant condition.

View attachments associated with an absolute occurrence

To view all the attachments associated with an absolute occurrence, select the line containing the absolute occurrence and open the **Attachments** view. All the attachments to the absolute occurrence are shown below the absolute occurrence.

Note:

If incremental change orders are used at your site, attachments associated with unconfigured changes may be hidden. To view all absolute occurrence data, choose **Show Unconfigured Changes** from the view menu or click  in the view toolbar.

Associating occurrence data in the context of a composition

A composition is a structure that comprises components from different top lines, in the context of a configured top-level assembly. It is represented by a single line in the structure. It can contain a set of occurrences, absolute occurrences, occurrence group and filtered occurrences (a filtered occurrence references occurrence groups from the item it instantiates). For example, a composition may contain the design view and the process view of the same assembly.

When you view a composition, the revision rule and variant conditions for the referenced window configure the occurrences, if they are linked to a referring window by a corresponding absolute occurrence for the relevant top level. The occurrence groups are configured according to the configuration of absolute occurrences in the top level.

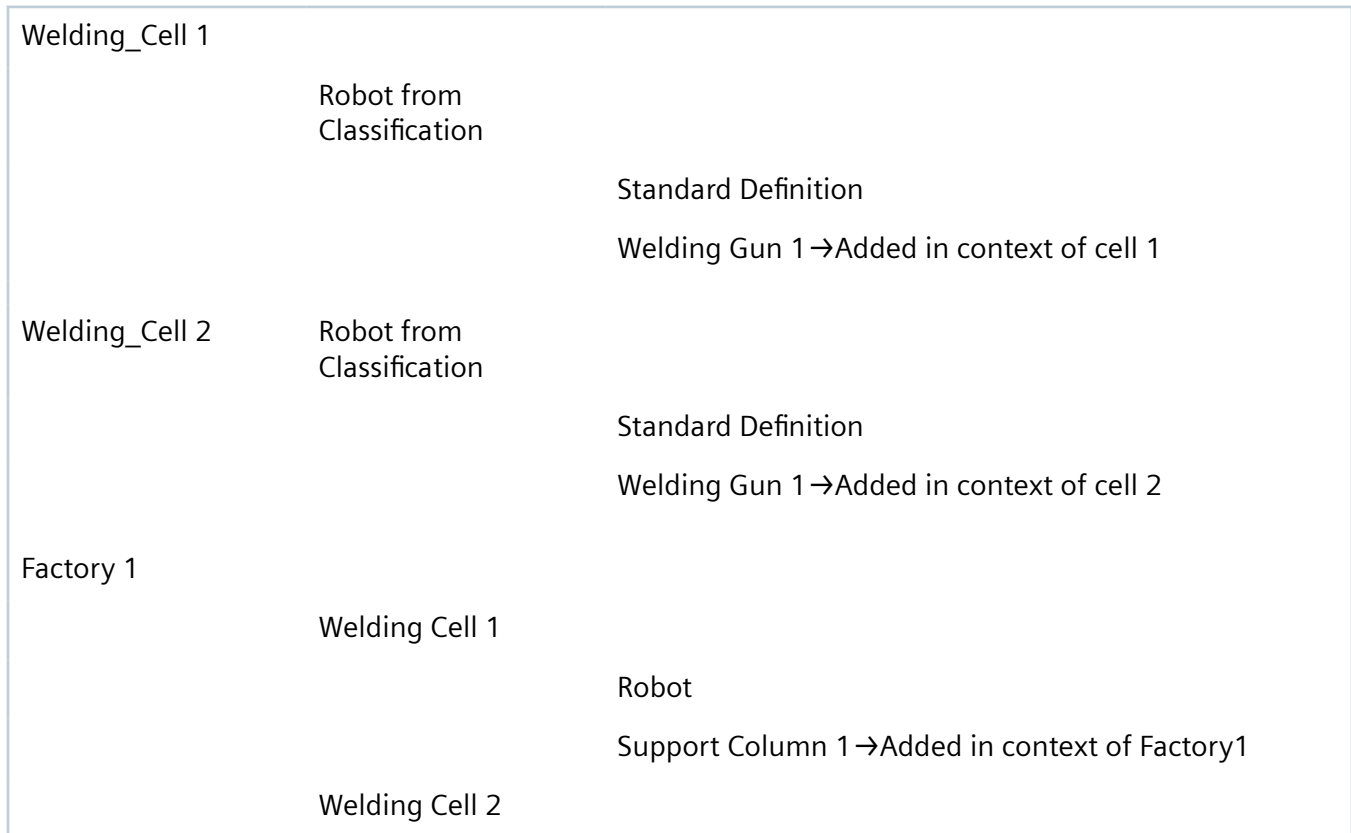
You can associate data to any of the absolute occurrences in the occurrence group, in the context of the composition. You can subsequently view the data associated with absolute occurrences included in occurrence groups in the structure.

If the content (members) of an occurrence group in the composition is changed in another location, your view of the occurrence group is refreshed. Such changes may be made in the source or in another instance of the group that is referenced in a composition.

You can change an occurrence group in the composition (for example, adding or removing members) without having to return to the source view. Any changes you make to the composition are proliferated to all other instances of the occurrence group.

Add components in a context

You can add components to a structure in the context of the top level. These components are then visible when you select the top line of the structure. The following examples show how resources may be attached to a structure:



When you open factory 1, you see welding gun 1 in the context of cell 1 and support column 1 in the context of factory 1. If you view the same robot in My Teamcenter, none of these components are visible as they are not part of a standard robot.

To do this, you can create an absolute occurrence in the context of a top-level item. Add welding gun 1 in the context of cell 1 by adding an absolute occurrence to cell 1 under the robot.

Note:

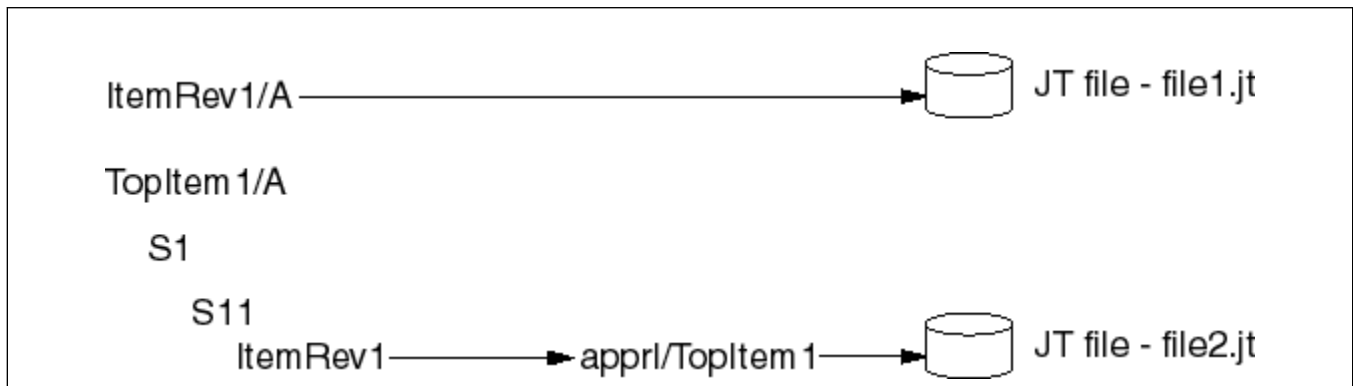
When you create an absolute occurrence for a top-level item, you also create absolute occurrences for all children of a parent under which you add the component.

Data precedence

About data precedence

You can associate data with an item revision or absolute occurrence. You can create the absolute occurrence in the context of a top-level item.

The following figure shows how visualization (JT) files may be attached to items.



Attaching visualization files to items

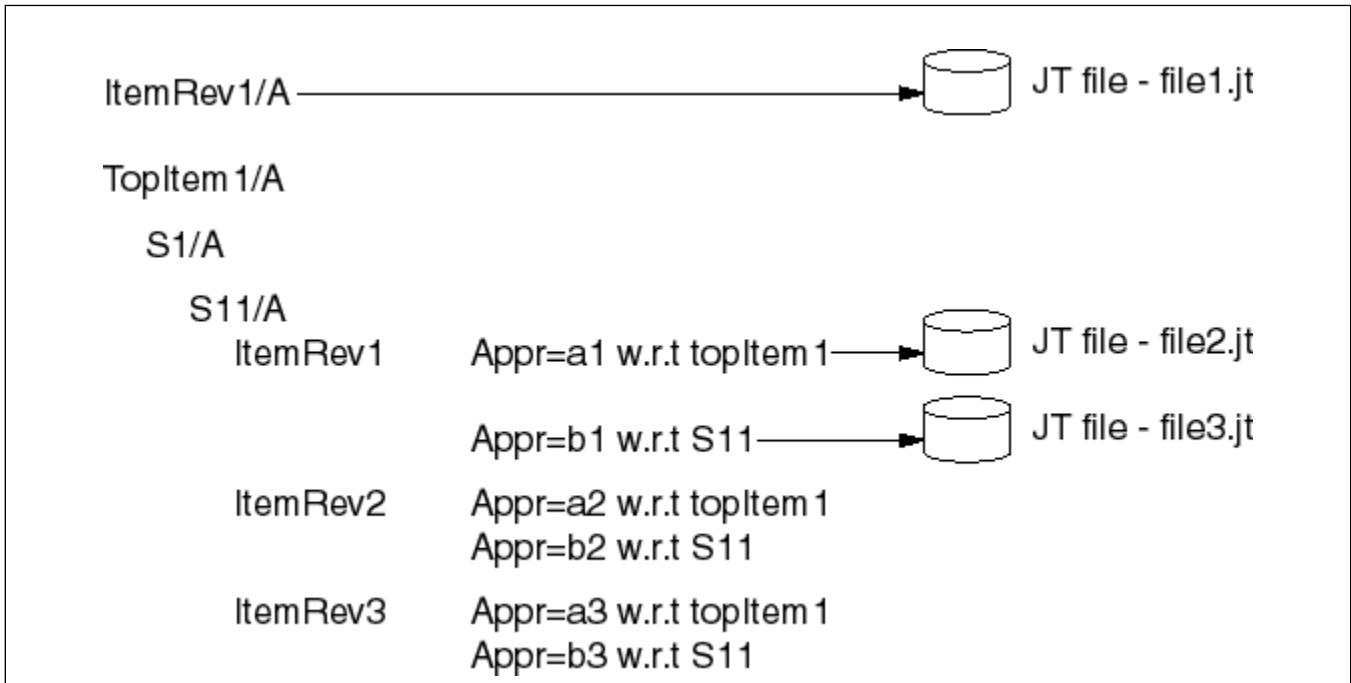
In this example, you can see **file1.jt** in the viewer in My Teamcenter without any context. However, when you view the same item revision (**ItemRev1**) in the context of **TopItem1**, you see the JT file (**file2.jt**) that is associated with the corresponding absolute occurrence (**appr1**) in the context of item **TopItem1/A**.

You can associate a different JT file as an override if **TopItem1** is revised from revision A to revision B.

Data is associated with an absolute occurrence in the context of a specified revision. When you revise an item, the data associated with the previous revision is copied and you can change it as necessary.

Propagate override data

You can associate data to absolute occurrences in the context of an intermediate level, as well as in the context of the top level, as shown in the following figure.

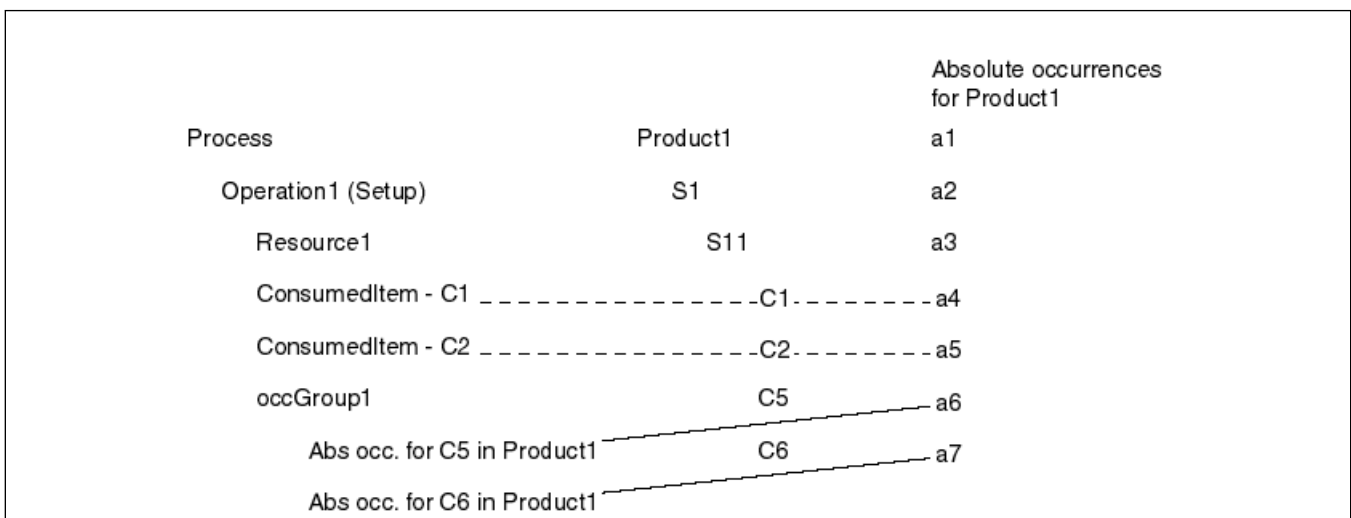


Propagate override data

In this example, **ItemRev1** has two override JT files, **file2.jt** and **file3.jt**. The **file2.jt** file is added in the context of **TopItem1/A**, while the **file3.jt** file is added in the context of **S11/A**. Consequently, if you view **ItemRev1** in the context of **TopItem1/A**, you see the **file2.jt** file.

Override data in the context of a composition

You can associate data to a composition in the context of an operation or process setup. The following figure shows how you may override data in the context of a setup.



Override occurrence data in the context of a composition

This structure contains occurrences (**Resource 1**, and consumed items **C1** and **C2**) and a collection of absolute occurrences (**occGroup1**). This collection consists of absolute occurrences **a6** and **a7** which Teamcenter configures if you load **Product 1**. Thus, **a6** and **a7** in the process structure are absolute occurrences in the context of **occGroup1**. The consumed item **C1** is an occurrence in the setup for **Operation 1** and is linked to absolute occurrence **a4** in **Product 1**.

Note:

The process structure may also have its own absolute occurrences.

You can override data in the context of the process. You can also override data in the context of **Product 1** through the absolute occurrences in the occurrence groups. The override data is controlled by a rule that allows you to attach JT files at a top level and at an intermediate level. Consequently, a JT file attached to **c5** under **Occurrence Group 1** in the context of the **Operation 1** BOM view revision (BVR) overrides the default file, and also the file associated with **a6** in the product 1 BVR.

If you create absolute occurrences for the process structure and (assuming **P6** is the occurrence for **C5**), the data attached to **P6** in the context of **Process** overrides data attached to **a6** in the context of the **Product 1** BVR.

Override data in multiple contexts

You can create absolute occurrence data on a single line in more than one context. For example, you may want to override the find number in the context of the top-level assembly and the quantity in the context of a lower level assembly. Make these in-context edits in turn, ensuring you have selected the correct context (line) each time. The system shows the relevant absolute occurrence data for the current context and consequently data that applies to other contexts is hidden.

Note:

You cannot change the value of a property that is already overridden in a higher level context.

Understanding ID in context and assigned products

When assigning a product to a process or copying processes or operations from one process structure to another, Teamcenter can assign the same ID in context (IDIC) to the structure lines in the source and target structure. Doing so provides a method for Teamcenter to find the assigned objects in the other structure, for instance, when using the **Find in All Visible Views** menu command or running an accountability check.

This mechanism is controlled by two preferences:

- **MECopyIdInContextToAssignedLine**

If set to **True**, Teamcenter copies any existing in-context IDs to the target structure when assigning a product to a process or copying a process or operation from one structure to another. If an in-context

ID does not exist, Teamcenter creates one on the source and copies it to the target object. Any generated IDs are unique within the source and target structures.

If set to **False**, no in-context ID is copied.

- **MECopyIdInContextLowerLevels**

If set to **True**, Teamcenter copies any existing in-context IDs of consumed items under subprocesses and suboperations to the target structure when copying a process or operation from one structure to another. If an in-context ID does not exist, Teamcenter does *not* create one.

If set to **False**, no in-context ID gets copied for the consumed items under subprocesses and suboperations, even if one is present.

Note:

The **MECopyIdInContextLowerLevels** preference is considered only if **MECopyIdInContextToAssignedLine** is set to **True**.

In the following example, if you copy process **P1.1** from **Proc1** in the upper pane to **Proc4** in the lower pane:

- Teamcenter only generates an in-context ID for the process that is being copied. It never generates an in-context ID for subprocesses, suboperations, or their consumed items, regardless of the settings for these preferences.
- If **MECopyIdInContextToAssignedLine = false** and **MECopyIdInContextLowerLevels = false**, Teamcenter does not copy any in-context ID.

Note:

For **P1.1**, the ID is not generated at the source if it is not present (in the following example, it is already generated).

BOM Line	ID In Context (Top Level)
000528/A;1-Proc1 (View)	
000529/A;1-P1.1 (View)	kJBtMh0hAABaaA
000532/A;1-P1.1.1 (View)	
000533/A;1-P1.1.2 (View)	
000536/A;1-I1.2	kdGtMh0hAABaaA
000535/A;1-I1.1	USktMh0hAABaaA
000530/A;1-P1.2 (View)	

BOM Line	ID In Context (Top Level)
000540/A;1-Proc4 (View)	
000529/A;1-P1.1 (View)	kJBtMh0hAABaaA
000532/A;1-P1.1.1 (View)	
000533/A;1-P1.1.2 (View)	
000536/A;1-I1.2	
000535/A;1-I1.1	USktMh0hAABaaA

After copying, under the **Proc4** process, note that there are no in-context IDs in the **ID In Context (Top Level)** column.

- If **MECopyIdInContextToAssignedLine = true** and **MECopyIdInContextLowerLevels = false**, the in-context ID for **P1.1** and **I1.1** only are copied. The existing in-context ID for **I1.2** is not copied because **I1.2** is the consumed item of a lower level.

Note:

For **P1.1**, the in-context ID is generated at the source if it is not present and then copied. For **I1.1**, the ID is not generated if it is not present.

BOM Line	ID In Context (Top Level)
000528/A;1-Proc1 (View)	
000529/A;1-P1.1 (View)	kJBtMh0hAABaaA
000532/A;1-P1.1.1 (View)	
000533/A;1-P1.1.2 (View)	
000536/A;1-I1.2	kdGtMh0hAABaaA
000535/A;1-I1.1	USktMh0hAABaaA
000530/A;1-P1.2 (View)	

BOM Line	ID In Context (Top Level)
000540/A;1-Proc4 (View)	
000529/A;1-P1.1 (View)	kJBtMh0hAABaaA
000532/A;1-P1.1.1 (View)	
000533/A;1-P1.1.2 (View)	
000536/A;1-I1.2	
000535/A;1-I1.1	USktMh0hAABaaA

- If **MECopyIdInContextToAssignedLine = true** and **MECopyIdInContextLowerLevels = true**, the IDs for **P1.1**, **I1.1**, and **I1.2** are all copied.

Note:

For **P1.1** the ID is generated at the source if it is not present and then copied. For **I1.1** and **I1.2**, if the ID is not present, it is not generated, but if it is present, it is copied.

(* 000528/A;1-Proc1)		(000534/A;1-Prod1)
Latest Working		Not Specified
BOM Line	ID In Context (Top Level)	
000528/A;1-Proc1 (View)		
000529/A;1-P1.1 (View)	kJbtMh0hAABaaA	
000532/A;1-P1.1.1 (View)		
000533/A;1-P1.1.2 (View)		
000536/A;1-I1.2	kdGtMh0hAABaaA	
000535/A;1-I1.1	USktMh0hAABaaA	
000530/A;1-P1.2 (View)		

(* 000538/A;1-Proc2)		(* 000539/A;1-Proc3)	(*)
Latest Working		Not Specified	Not Specified
BOM Line	ID In Context (Top Level)		
000538/A;1-Proc2 (View)			
000529/A;1-P1.1 (View)	kJbtMh0hAABaaA		
000532/A;1-P1.1.1 (View)			
000533/A;1-P1.1.2 (View)			
000536/A;1-I1.2	kdGtMh0hAABaaA		
000535/A;1-I1.1	USktMh0hAABaaA		

6. Managing process structure data

Running accountability checks

Running accountability checks

You can compare two structures to ensure all lines in the source structure are accounted for in the target structure. For example, you can compare the EBOM structure to the MBOM structure to ensure all parts and assemblies are assigned or compare the product structure and the process structure to ensure that all occurrences of product components and features are used in the process structure as consumed items. You can compare the entire assembly or only a subassembly to the process structure. These types of comparison are performed using an *accountability check*.

Any differences found during the comparison are reported, as they may indicate problems in manufacturing the product to its specification. However, an imbalance between the structures may not necessarily indicate a problem with the structure itself.

An accountability check or comparison:

1. Traverses the source structure.
2. For each line in the source, finds one or more matching lines in the target structure, according to defined equivalence criteria.
3. For each pair of equivalent lines, identifies if there is a full match or a partial match. A partial match exists if one or more aspects of the structures that you compare are not equal.
4. Colors each line in the structures and, if you have the correct license, opens the **Accountability Check Result** view displaying the full matches, partial matches, and unmatched lines.

The following differences are reported:

- Lines in the source structure that do not have counterparts in the target
- Lines in the source that have more than one counterpart in the target
- Lines in the target that do not have counterparts in the source
- Lines in the source whose counterparts in the target have some significant difference, for example, a different quantity

The analysis is done on the structures as they are configured in the rich client. You can run the analysis with any combination of configuration options on both structures.

When setting up the accountability check feature, a power user generally creates favorites—a collection of typical options and settings for different situations. An administrator can publish these favorites for different groups or roles so that regular users can then select one of them to quickly run the comparison.

Understanding line equivalence


When comparing product and process, the standard accountability check comparison is based on the assignments between the structures. When comparing two process structures, Teamcenter additionally uses the in-context ID and any common assignments to the same product to determine equivalence. Because the accountability check is based on the assign action, it does not compare by item ID and does not recognize if a line is copied from another structure or from the **Newstuff** folder.

Run an advanced accountability check

As an advanced user, you can set a variety of options before you run an advanced accountability check. If you save these options as favorites, you can repeat the advanced accountability check using the same options.

Note:

To run an advanced accountability check, you must have two linked source and target structures to compare. These are typically a source engineering bill of materials (EBOM) generated from a design BOM that is exported from a CAD application such as NX or CATIA, and a target manufacturing BOM (MBOM) created for specific manufacturing needs from the EBOM. When the EBOM is updated, the MBOM must be compared and updated as well. This is the purpose of an advanced accountability check: the two structures must be examined to ensure that they share equivalent BOM lines.

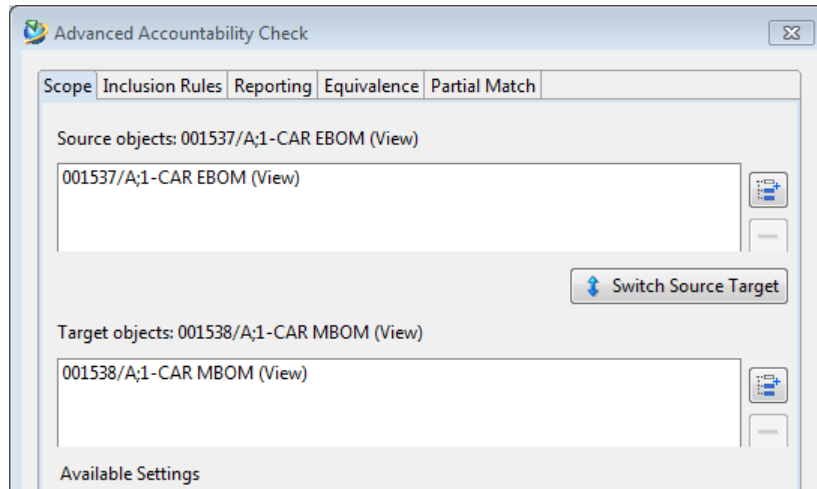
1. Select the source objects in the source pane.
2. Select the target objects in the target pane.
3. Select source and target objects in structure views and open the **Advanced Accountability Check** dialog box by choosing **Tools**→**Accountability Check**→**Advanced Accountability Check**. Use one of the following methods:
 - Select a source line, open the dialog box, and then select a target line and click **Set/add current selection**  beside the **Selected target objects** box.
 - Select the source and target lines in the structure views, and then open the **Advanced Accountability Check** dialog box.



Tip:

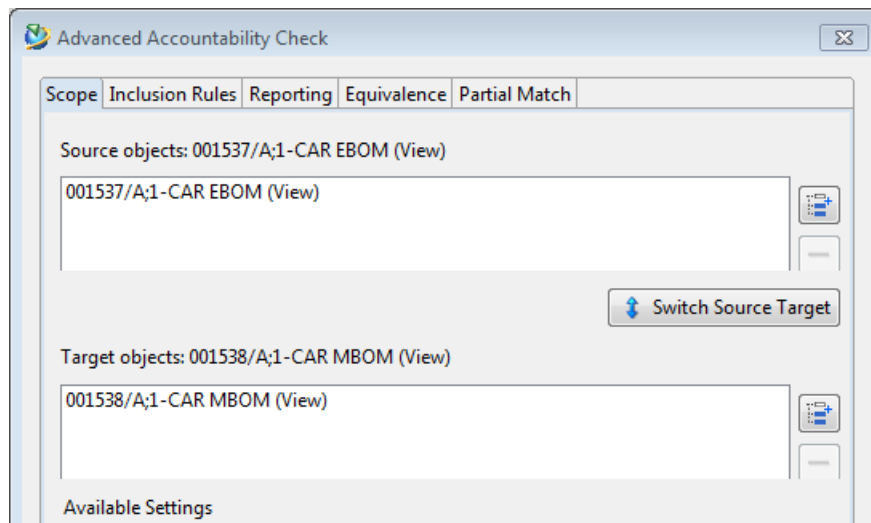
As long as only the source and target views are open, autodetects and adds the correct source and target lines to the **Source objects** and **Target objects** boxes.

Note:

You must select at least one line before you can open the **Advanced Accountability Check** dialog box.



- (Optional) Change the source or target object at any time by selecting the desired line in the structure and clicking the respective **Set/add current selection** button . You can add multiple scope lines from the same structure or remove a scope line by selecting it and clicking .



- Ensure that you correctly selected the source and target objects. If not, switch the source and target by clicking the **Switch Source Target** button.

6. Click the **Inclusion Rules** tab, and do one of the following:
 - Select **Search currently expanded source lines** to run the accountability check on the selected lines and all visible lines below the selected lines. Additionally, you can choose to run the accountability check on all the lowest visible (expanded) lines under the selected scope line by selecting **Compare lowest visible level of source**.
 - a. Select **Search lines per filtering rule** to expand the source and target structures and only consider a subset of the lines during the accountability check.
 - b. Select the **Source filtering rule**. For a description of the filtering rules, move your mouse over the list. The rules along with their short descriptions are displayed.

You can specify to which level in a structure you want the check to consider by selecting **Limit search in source/target to first x levels** and typing a value for x.

Note:

For information about filtering rules, see *Managing filter rules in the Tc XML and PLM XML Configuration for Data Import and Export*.

Note:

When you set these options, the values take effect in all applications that support accountability checks.

7. (Optional) If you know the source and target scope lines to be different because these lines are source and target specific, select the **Do not compare selected lines** check box .

In the advanced accountability check results, the selected scope lines do not appear as missing in target and missing in source.

8. Click the **Reporting** tab and set the result reporting options.
9. Click the **Equivalence** tab and set the equivalence options.
10. Click the **Partial Match** tab and specify the partial match criteria.
11. Click **OK** to run the accountability check.

Teamcenter displays the **Accountability Check** view.

Note:

The number of lines returned in the accountability check is limited by the value of the **MEAccountabilityCheckAllowableReturnedLines** preference. If the number of lines to return exceeds the preference value, a message will be displayed notifying you that there are more lines to be returned, and that an Accountability Check Excel report has been created and stored, thus saving the work.

12. After running the accountability check, examine the results and make any necessary modifications to the structure.

13. Rerun the check using the same settings by clicking  in the **Accountability Check** view.

Note:

- Rerunning an accountability check does not recreate an accountability check report or a result reported in an occurrence group.
- For information about narrowing the scope of the accountability check, see the *PLMXML Export Import Administration Guide*.

Types of structures you can compare

Using an accountability check, you can compare the following pairs of source and target structures:

- EBOM and MBOM to see which of the EBOM parts are aligned to the MBOM
- Product and product
- Process and product to see if all parts are consumed
- Process and process
- Process and plant

The following is an overview of the types of structures you can compare.

Set the result reporting options

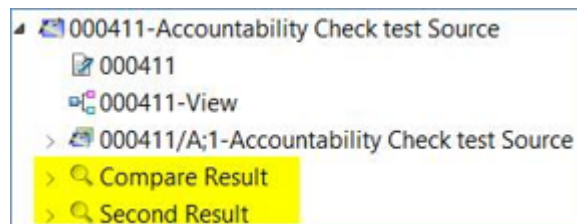
The accountability check displays its results by highlighting the checked objects in the structure pane in a variety of colors that you can change, if desired. To help users who cannot differentiate colors well, a tool tip shows the name of the color. If the name is not available, the tooltip displays the RGB value.

1. Open the accountability check dialog box.

2. Click the **Reporting** tab.
3. Select one of the following:

- **Report in occurrence groups**

Teamcenter can store and display the result of the accountability check in an additional tab in the structure pane grouped by anomaly. This result is only computed for the source item and is stored in the database as a structure of **UsageCompareResultView** objects related to the item of the source revision. You can specify the name for the result of the check. By default, it is named **Compare Result**.



- **Report the selected check criteria**

Teamcenter offers you two methods to visualize the results of the accountability check. You can select one or both of the following:

- Select **Color the compared objects** to color the line and the matching lines according to the match results and color scheme that you set in the **Reporting** section.
- Select **Printable report** to capture the results of the accountability check in an Excel spreadsheet.

4. Check the display options you require:

Option	Description
Full Match	If the object (occurrence) in the source structure has one and only one equivalent in the target structure, both objects are set to the same background color. If you also selected the Partial Match option, a full match also means that all partial match criteria of the equivalent objects match, for example, properties or relations, if you use enterprise BOP structures. The default color is green.
Partial Match	For equivalent objects (occurrences), if one or more partial match criteria are not identical, both objects are set to the same background color. The default color is yellow.

Option	Description
Multiple Match	<p>If objects have more than a single equivalent in either structure and all properties of the source objects are identical to the properties of target objects, all objects are set to the same background color. The default color is orange.</p> <p>Only available when you do not use net effectivity.</p>
Multiple Partial Match	<p>If objects have more than a single equivalent in either structure and in addition, one or more properties are not identical, all objects are set to the same background color. The default color is pink.</p> <p>Only available when you do not use net effectivity.</p>
Effectivity mismatch	<p>Only available when you use net effectivity.</p> <p>For equivalent objects (occurrences), if the net effectivities differ, both objects are set to the same background color. The default color is orange.</p>
Partial & effectivity mismatch	<p>Only available when you use net effectivity.</p> <p>For equivalent objects (occurrences), if one or more properties are not identical and the net effectivities differ, both objects are set to the same background color. The default color is pink.</p>
Missing Target	<p>If occurrences of the source structure are not found in the target, the source objects are set to this color. The default color is red.</p>
Missing Source	<p>If occurrences of the target structure are not found in the source structure, the target objects are set to this color. The default color is light blue.</p>

5. (Optional) Change the default color by clicking **...** next to the color.
6. Set the colors by choosing a color swatch, and setting HSB (hue, saturation, brilliance) or RGB (red, green, blue) values.

Set the equivalence options

1. Open the accountability check dialog box.
2. Click the **Equivalence** tab.
3. Select the comparison options you require:

Option	Description
Equivalent Logical Designator	<p>If you use enterprise BOP structures, the accountability check takes process logical designators into consideration as an additional comparison criteria when checking the process, operation, or partition lines for equivalence.</p> <p>This check box is available only when both structures are enterprise BOP structures.</p>
Equivalent PublishLink Connection	<p>If you use publish links, the accountability check highlights occurrences that are mapped using publish links. If a part occurrence is set to not require positioned design, it is also taken into consideration.</p>

Note:

When checking accountability between structures, the direction of tracelinks is not considered.

Specify partial match criteria

You can specify which data to compare between equivalent lines. You can choose to compare a specific set of properties or, if you are comparing enterprise BOP structures, you can additionally compare any relation type of these lines to other lines. For example, you can compare assignment or predecessor relations.

1. Click the **Partial Match** tab.
2. On the **Properties** tab, select **Consider values of properties when searching for a partial match**.
3. Choose the properties that you want included in the accountability check by selecting them in the **Available Properties** list and clicking **+** to move them to the **Selected Properties** list.

The accountability check matches lines in the source and target that have the same properties as those you select in the **Selected Properties** list. Your administrator determines which properties are available for selection in the **AdditionalAccountabilityCheckProperties** preference. Any differences in the selected properties are identified as differences between the structures.

The values of the **DefaultAccountabilityCheckProperties** preference are ignored.

About the Accountability Check view

When you run the accountability check, Teamcenter displays the results in the **Accountability Check** view. This view lists the problematic lines in the source and target and provides a list of conflict details. Lines that are colored in the source and target structures are also colored in the view. Fully matched lines are not listed by default.


Note:

Displaying fully matched lines in large structures can clutter the view

Lines in the **Accountability Check** view behave in the same fashion as lines in the source and target structures. If you remove a line in the view, Teamcenter removes the line from the source or target. You can copy lines from the view into the clipboard, drag them to another structure, or send them to another application.

When you select or target line that is marked as having net effectivity or being a partial match, Teamcenter displays the conflicts in a third pane at the bottom of the view.

When you select a line in the source section of the **Accountability Check** view, you can click the **Equivalent Lines** tab in the target section of the view to find the lines in the target structure that match the selected source line, and vice versa. These lines are then selected in the visible structure views.

When you work through the accountability check results, resolving conflicts, the accountability check results are not updated—the lines remain highlighted in the original check colors. To update the lines, you must rerun the accountability check. You can do this using the same settings by clicking  in the **Accountability Check** view.

Note:

The **Accountability Check** view is not displayed when one or both of the structures being compared is an intermediate data capture.

Display the partial compare results

After running an accountability check, you can view the partial compare results. Do one of the following:

- Select a partial match line in either the **Source** or **Target** section of the **Accountability Check** view.

Teamcenter displays the partial compare results in the **Partial Match** section at the bottom of the view.

- Right-click a partial match line in the structure pane and choose **Partial Compare Results**, or choose **Tools→Accountability Check→Partial Compare Results**.

Teamcenter displays the **Partial Compare Results** dialog box.

View settings used to run the accountability check

You can display a read-only listing of the settings in force when you ran the accountability check report.

- Click  .

Teamcenter opens the **Accountability Check Settings** dialog box displaying the scope and configuration in effect at the time the check was made. This is not necessarily the same as the currently active configuration.

Filter accountability check results

When you run the accountability check, you can select check criteria in the **Accountability Check** dialog box. After running the report, you may find that the **Accountability Check** view shows too many results and the display is cluttered. You can filter out some of the check criteria in the view to make it more readable without having to rerun the accountability check.

1. Click **Filter**.
2. Clear the categories that you want to hide in the view and click **OK**.

Teamcenter displays only those categories that are selected in the **Filter** dialog box. The filter button is turned on when you remove the check mark from any categories to indicate that filtering is applied.

Using the Accountability Check view options

The **Accountability Check** view provides a multitude of options that are common to many views.

Do any of the following:

- Find individual objects in the view.
- Customize the column display.

Clear display

You can reset all background colors on objects in the active window and their corresponding objects in the process window to the default colors.

- Choose **Tools**→**Accountability Check**→**Clear Accountability Check Display**.

Note:

The command works only if either the source view or the target view is the active window.

Filtering and expanding source and target structures

You can narrow the scope of the accountability check by limiting it to only the lines pertinent to your use case.

The filter mechanism is based on closure rules that traverse the structures and take only those objects specified in the closure rules into consideration. The closure rules that are used in the accountability check are referred to as *inclusion rules* and are not available to use for importing and exporting.

By default, Teamcenter presents you with a set of inclusion rules. Your administrator can modify these inclusion rules or create new ones to suit your business needs.

Note:

When running the accountability check based on inclusion rules, there is no need to expand or unpack any of the structures. This improves the performance of the check.

When running the accountability check without inclusion rules, you must first expand and unpack the compared lines in the source structure.

Expanding a structure based on closure rules also plays a role in which objects are taken into consideration in the accountability check. If you expand using an appropriate closure rule, you may not have to set an inclusion rule when running an accountability check.

Inclusion rules

Inclusion rule	Description
AccountabilityAll	Includes all lines.
AccountabilityLeavesOnly	Includes only leaf nodes; excludes all hierarchy nodes.
AccountabilityLinkedAssm OrLeaves	Includes assigned assembly nodes but excludes their children. If an assembly is not assigned, includes its leaf nodes.
AccountabilityProcess Consumption	Includes assigned nodes under a process or operation that are of occurrence type MEConsumed . Excludes all process and operation nodes.
AccountabilityProcess Assignments	Includes assigned nodes (including work areas, parts, and tools) under processes and operations. Excludes all processes and operations nodes. If the assigned-from structure is not loaded, those nodes are also excluded.
AccountabilityProcessAll NoAssign	Include process and operation nodes.
AccountabilityProcessAll	Include process and operation nodes and all of their assigned nodes. If the assigned structure is not loaded, their nodes are excluded.

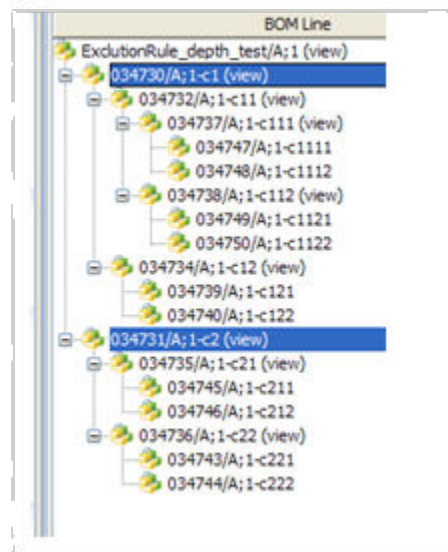
Inclusion rule	Description
AccountabilityProcessOnly WithPA	Includes processes, operations, and process areas only.
ACPlantBOPDerivedProcesses AndOps	Includes only operations and processes that are linked to the source (for example, in a product BOP). This rule is used when comparing a product BOP to a plant BOP and skips plant-specific operations.

Note:

None of the inclusion rules include occurrence group nodes, but they can include the children under those nodes.

Specifying levels for comparison

If you use inclusion rules, you can limit the number of levels that the accountability check considers for comparison. In the following figure, processes **C1** (ID = **034730**) and **C2** (ID = **034731**) are selected as the source in an accountability check. To specify a level, run an advanced accountability check.



If you specify a level of **1**, the accountability check considers the following items for comparison:

c11, c12

c21, c22

If you specify a level of **2**, the accountability check considers the following items:

c11, c12, c21, c22

c111, c112, c121, c122, c211, c212, c221, c222

Expanding structures to check

Whether or not you need to expand a target structure before running an accountability check depends on the settings of the following two preferences:

MECopyIdInContextToAssignedLine

MECopyIdInContextLowerLevels

Note:

If there are packed lines in the source window, the accountability check may report incorrect results for the quantity of an absolute occurrence of a component that is packed to a sibling. To avoid this situation, always unpack all lines before starting an accountability check.

Expanding a structure based on closure rules also plays a role in which objects are taken into consideration in the accountability check. If you expand using a closure rule, it may have the same effect as setting an inclusion rule.

Understanding net effectivity

You can use net effectivity during the accountability check if the following is true:

- Defining unit effectivity on an occurrence is enabled.
- The ability to configure structures to show multiple units on multiple end items at once is configured.
- The net effectivity compare extension is registered.

When these points are fulfilled, you can compare the effectivity of matching source/target objects. However, the effectivity that you define on each object is not necessarily the actual effectivity. The actual effectivity is the intersection of all effectivities set on the path from the root node to the selected object. This intersection is referred to as *net effectivity*. In addition, when you compare two structures, the net effectivity includes the intersection of the effectivities of these two structures.

Create a printable Excel report

Teamcenter can create a printable Excel report containing the results of an accountability check. If you have write access to the target structure, Teamcenter stores the Excel file as a dataset on the top-level item revision of the target structure. If you do not have write access, Teamcenter stores the Excel file in the **Newstuff** folder.

1. Open the **Accountability Check** dialog box.

2. Select all necessary options to create the accountability report.
3. Click the **Reporting** tab and select **Report the selected check criteria**.
4. Select **Printable report**.
5. Assign a name for the new dataset.

If a dataset of this name and type already exists in the item revision, Teamcenter opens a dialog box where you can change the name or replace the dataset with the new one. You can change this behavior in the **TC_CRF_overwrite_existing_dataset_content** preference. If this preference is set to **1** (true), Teamcenter does not remove the dataset but replaces the content.

6. Click **OK**.

Teamcenter creates a report containing:

- General information such as the date and time of the check and the user ID and name.
- Compare options.
- Context data such as the source top level item, the target top level item, incremental change, and revision and variant rules.
- Accountability check results such as the source name, target name, match status, and all the checked properties. Multiple matched objects and missing source objects are displayed in separate sections.

Teamcenter adds the Excel file to a dataset attached to the target structure.

Note:

If you use the **MEAccountabilityCheckEnableNetEffectivity** preference to report net effectivity mismatches, the Excel report also reports those mismatches.

Net Effectivity Mismatches														
Mismatched Sources			Mismatched Targets			Mismatch Details								
BOM Line	Occurrence	Effectivity	Find No.	BOM Line	Occurrence	Effectivity	Find No.	End Item	Units	# in Source	# in Target	Category		
000054/A	1-a1	6-UP (000049)	1-9 (00005)	10	000054/A	1-a1		10	000049-EBOM	1-5	0	1	Missing in Source	
									000050-MBOM	10-UP	0	1	Missing in Source	
000056/A	1-a3	9-15 (000050)		30	000056/A	1-a3		30	000049-EBOM	1-15	21-UP	0	2	Missing in Source
000056/A	1-a3	5-8 (000050)		10	000056/A	1-a3	5-8 (000050)	20	000049-EBOM	16-20		0	3	Missing in Source
								30	000050-MBOM	1, 3, 16-UP		0	2	Missing in Source
								10	000050-MBOM	2, 4		0	3	Missing in Source
								20	000050-MBOM	9, 11-15		1	2	Overlapping
								10	000050-MBOM	10		1	3	Overlapping
								10	000050-MBOM	6, 8		1	6	Overlapping
								10	000050-MBOM	5, 7		1	5	Overlapping
000058/A	1-a6	01-Aug-2015 00:00 to 28		10	000058/A	1-a6		20	000050-MBOM	1, 3, 5, 7, 9		1	0	Missing in Target
000059/A	1-a8	6 (000050)		20	000059/A	1-a8	8 (000049)	30	000050-MBOM	6		1	0	Missing in Target
									000049-EBOM	8		0	1	Missing in Source

Customize the Excel report

1. Create your own XSL style sheet.
2. Add it to the **Accountability Check Report (TC_2007_00_CUS_RPT_0002)** report in the Report Builder application.
3. Modify the **AccountabilityCheckReportStylesheetName** preference to contain the name of the new style sheet.

Note:

If you created a custom style sheet prior to upgrading to Teamcenter 11.4 or greater, by default, the Excel report uses a new style sheet called **acc_chk_rpt_excel.xsl**. Your customized stylesheet must have a different, unique name (for example, **my_acc_chk_rpt_excel.xsl**). When the value of the preference **MEAccountabilityCheckReportCombineLines** is true (default), the generated xml file will not support legacy stylesheets. To generate legacy data xml files, change the preference value to **false**.

Reporting the check result in occurrence groups

Alternatively to reporting the accountability check results in colors, Teamcenter can report anomalies in occurrence groups that are displayed in an additional tab in the structure pane. These occurrence groups are stored as persistent objects in the database.

If you compare the base view of the entire product structure or a subassembly, the accountability check searches for every BOM line in the process plan. If you compare the manufacturing view of the product or a subassembly, the check only searches for a line in the process plan if the line's direct parent is an occurrence group. In the manufacturing view, if the BOM line's direct parent is not an occurrence group, you must allocate it to the view as a component of a subassembly in the original EBOM. For example, component **C** is part of subassembly **A** in the EBOM, while subassembly **A** is assigned to the manufacturing view under occurrence group **G**. Consequently, **C** also appears in the manufacturing view under **A**, then under **G**. The direct parent of **A** is an occurrence group, while the direct parent of **C** is **A**, which is not an occurrence group. When you compare structures, the utility searches for **A** but not for **C**. Typically, if you did not allocate to the manufacturing view, you would not expect to consume it in the process.

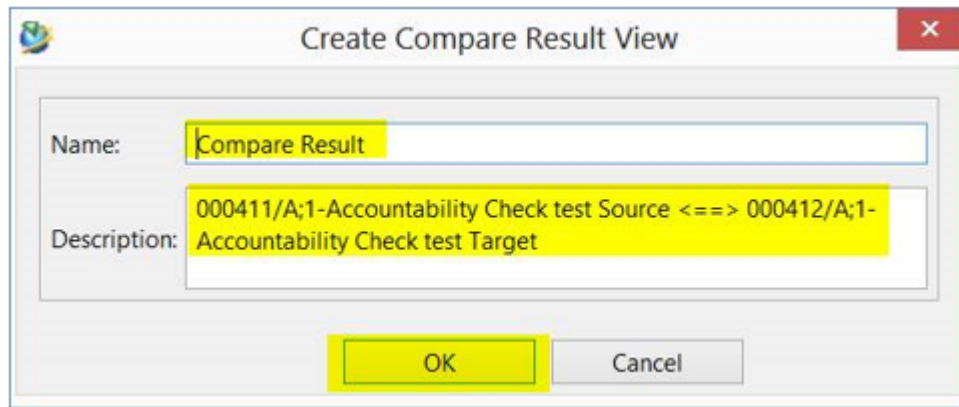
The scope of the comparison depends on the selections you made in the **Accountability Check** dialog box.

Generate the results grouped by anomaly

1. To generate the report:
 - a. Open the **Accountability Check** dialog box.

- b. On the **Reporting** tab, click **Report in occurrence group**.
- c. Click **OK**.

The **Create Compare Result View** dialog is displayed.

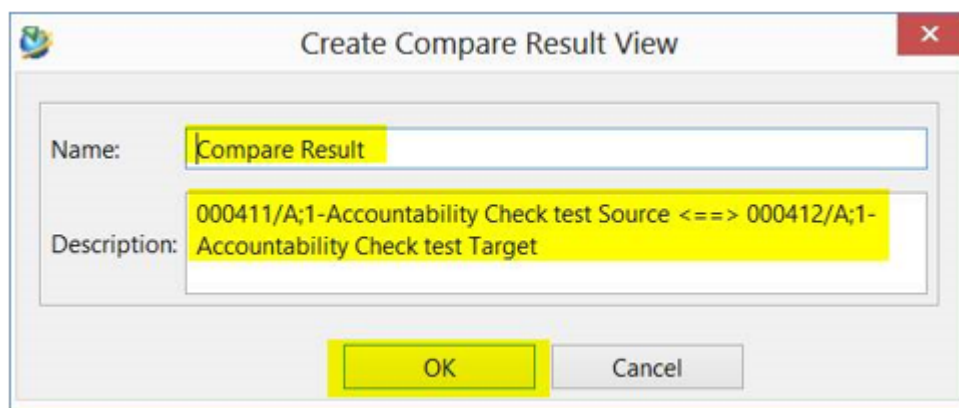


- d. Modify the system generated **Name** and **Description** as required.

The **Name** of the result view is displayed as the name of the additional tab. Multiple result views can be displayed at a time. If a view with the same name exists, the system displays a message asking if the result view should be overwritten or renamed. In this case, you must have write access to overwrite the existing view.

- e. Click **OK**.

Teamcenter creates **UsageCompareResultView** objects for each type of anomaly and displays them in the **Compare Result** tab.



Teamcenter creates occurrence groups for each type of anomaly and displays them in the **Compare Result** tab (an occurrence group tab). The names of the anomalies are fixed and are as follows:

- **Unused/Under-used**

Contains all occurrences in the source pane that do not match an occurrence in the target pane.

- **Completely Used**

Contains all occurrences in the source pane that match a corresponding occurrence in the target pane.

- **Over-used**

Contains all occurrences in the source pane that match more than one occurrence in the target pane.

- **Partial Match**

Contains all occurrences in the source pane that have mismatched properties compared to their corresponding occurrence in the target pane.

2. (Optional) Expand the subgroups to view the items contained in these groups and take appropriate action.

You must rerun the accountability check to view any changed results.

Releasing preliminary structures

About baselining or preliminary structures

You can release intermediate structure data for other users or suppliers to review or consume. An intermediate data release or baseline of in-progress data is sometimes called a preliminary data indicator (PDI).

You must create a baseline (PDI) of the related product structure and plant structure before you create a baseline of the process structure. This allows you to reproduce the process structure when necessary by applying the appropriate product and plant configuration rules that were applied when you created the PDI.

Creating PDIs

When you create a PDI, Teamcenter traverses each child of the structure, creates a new item revision under a specified baseline revision ID, and releases the new item revision. It does not include any occurrence groups in the structure in the PDI.

Creating a dry run

Before creating a new item revision for a PDI, you can optionally make a *dry run* to validate the baseline. Teamcenter provides detailed status information about the structure. If there are any errors

in the structure, Teamcenter displays their details, halts the baseline process, and does not release the structure. Your administrator can set a preference that determines if validation is always required before you create the baseline, or if you can validate the structure only when you consider it necessary.

Creating precise and imprecise baselines

Depending on the configuration of your structure, you can create the baseline as a precise structure or an imprecise structure. If you want a precise structure of a process, you must also baseline the product structure and plant structure first to be able to reproduce the revision status of the PDI in the future. In this case, all the relevant structures (product, plant and process) must be precise to allow their accurate reproduction in future sessions.

Viewing a PDI

You can view a PDI immediately when the baseline is created. However, the revision rule is not automatically applied when the baseline is loaded, and you must apply it manually.

You can also view the baseline in My Teamcenter and choose the appropriate item revision from the list of available item revisions. You can distinguish baseline revisions from other released revisions by the specific revision ID format.

Create a baseline of a structure

1. Open the structure revision.
2. Select the top line of the structure and choose **Tools**→**Baseline**.

Teamcenter checks if you can create a baseline of the selected revision. If not, Teamcenter displays the reason (for example, you cannot create a baseline from an existing baseline). Otherwise, Teamcenter displays the **Baseline** dialog box, showing the item ID, baseline revision, and baseline name.

3. Enter the following information in the **Baseline** dialog box.

Box	Entry
Description	Type a description of the baseline.
Baseline Template	Choose a baseline release procedure template from the list of available procedures. Your administrator defines the available procedures with the Baseline_release_procedures preference.
Job Name	Note the job name. The job name is automatically generated and you cannot change

Box	Entry
Baseline Label	<p>it. Your administrator defines the naming scheme in the Business Modeler IDE application.</p> <p>Type an alphanumeric string that represents the baseline label. Teamcenter uses the label you enter as the name of the baseline folder. This box is only displayed if your site uses baseline labels.</p>
Job Description	Type a description of the PDI job.
Open On Create	Select this check box if you want Teamcenter to open the baseline for viewing when it is created. You must apply the revision rule manually when the baseline is open.
Dry Run Creation	Select this check box if you only want to validate the structure as suitable for creating a baseline. If you clear this check box, Teamcenter validates the structure and creates an item revision for the baseline.
Precise Baseline	<p>Note:</p> <p>Your administrator can set the Baseline_dryrun_always system preference to determine if a dry run is always required.</p> <p>Select the type of baseline to create— precise or imprecise. Your site may be configured to allow only precise baselines, depending on the setting of the Baseline_precise_bvr preference.</p>

- Click **OK** or **Apply** to create the baseline. Alternatively, you can click **Cancel** to exit without creating a baseline.

Teamcenter optionally creates a baseline folder to hold the baseline. Your administrator specifies if a folder is created by setting the **baseline_create_snapshot_folder** preference.

If the value of this preference is **0**, the baseline folder name is in the format *Baseline_ItemId_BaselineRevId* and may be truncated to 32 characters, if necessary. The folder is attached to the top structure.

If the value of this preference is **1**, the baseline folder name is the alphanumeric string you entered in the **Baseline Label** box in the **Baseline** dialog box.

Note:

In addition to setting this preference, you must set the **Snapshot** relationship on the item revision to make the snapshot folder visible. Do this by choosing **Edit→Options→General→Item Revision** and adding **Snapshot** to the **Shown Relations** column of both the **General** and **Related Object** tabs.

Caution:

If you expand the baseline item revision below a certain level, the application displays duplicate objects.

5. Save the revision rule for the product structure, process structure, and plant structure by saving the structure as a collaboration context. After you do this:
 - The product root item is the baseline product.
 - The plant root item is the plant baseline.
 - The process root item is the process baseline.

Managing intermediate data captures

About intermediate data captures

An intermediate data capture (IDC) is a PLM XML file that contains an exported structure with the configuration in effect at the time the IDC is created. An IDC may contain any configured structure including a collaboration context, structure context, or group of BOM lines. You can manage the PLM XML file in the same way as any other workspace object, including assigning it to a workflow, assigning it a release status, running accountability checks, and controlling access privileges with Access Manager.

After you create an IDC, it appears as a separate structure view and an entry for it appears in the **Collaboration Context Tree** view.

After creation, you can compare an IDC to existing structures. For example, if you create an IDC from a product structure, and then make modifications in that product structure, you can run an accountability check that compares the IDC to the modified structure to see the modifications.

To compare IDCs with each other or another structure, each line being compared must contain an in-context ID. Your administrator can run the **bom_expand** utility to ensure that each relevant line in the structure is stamped with an in-context ID.

When you create an IDC, Teamcenter uses transfer modes to export the structure and alias files to determine what to include in the IDC viewer. If you want to export custom objects or properties to the IDC, you must ensure that a transfer mode exists that contains clauses that includes these objects. You must also ensure that the alias files are modified to include the desired objects. If you want to see these

objects or properties in the IDC viewer in the rich client, you must modify the alias files so that the viewer can extract them from the request object's XML. The location of the various alias files is found in the following preferences:

- **Structure_Alias_File**
- **Attachment_Alias_File**
- **Dataset_Alias_File**

An intermediate data capture structure is view-only. You cannot make changes to this structure.

There are various views available when working with an IDC, such as the **Attachments** view and the **Graphics** view.

Capture structures in an IDC

1. Select the root object in the structure and choose **Tools→Intermediate Data Capture**. You can capture BOM lines, an occurrence group, a structure context with multiple roots, or a collaboration context containing multiple structures.

Teamcenter displays the **New Intermediate Data Capture** dialog box.

2. Select the type of IDC you want to create in the list on the left.
3. Type the name and optional description of the intermediate data capture, and select the appropriate transfer mode name from the list.
4. To open the IDC in Part Planner, select **Open on Create**. If you do not select this option, you can find the IDC in the **Newstuff** folder in My Teamcenter.
5. Click **OK** or **Apply**.

Teamcenter validates the objects you selected. If any of the objects cannot be captured, Teamcenter displays an error message, otherwise it creates the PLM XML file containing the IDC and displays it in a structure view.

6. (Optional) Open the IDC in the **Viewer** view in My Teamcenter or in the **Object View** tab in Multi-Structure Manager to see a list of the captured states, including their descriptions and creation dates.
7. (Optional) If you make changes to the originally captured structure, create a new captured state in My Teamcenter or Multi-Structure Manager by clicking **Add State**.

Administering process template rules

Working with copy action rules

Copy action rules define how process structures and their individual processes, operations, and activities are duplicated when you use a process template to create a new process structure. These copy actions are defined by your administrator as preferences.

The available copy actions include:

Copy action	Result
Ignore	No copy action is taken. Neither the database object nor any references to it are duplicated in the new structure.
Copy by Reference	The duplicated process structure references the original object in the database. Any changes to the database object are reflected in the duplicated structure.
Clone and Reference	The database object is cloned and the duplicated process structure references the newly cloned object. Any changes made to the original database object are not reflected in the duplicated structure because it references the cloned database object, not the original database object.

Determining copy action candidates

Copy action candidates are the objects considered for duplication into the new structure when a process template is used.

When you create a new process structure from a template, the template process is opened behind the scenes as the root in a temporary BOM window. The process is expanded, and each child of the process becomes a copy action candidate.

Rules defined as preferences by your administrator determine the copy action to take for each child item. Each child item chosen for a **Clone** copy action is expanded and its children also become copy action candidates. This process occurs recursively until every branch in the BOM window is either exhausted or not cloned.

Copy action candidate	Copy actions available
Objects found in structures	<ul style="list-style-type: none"> • Ignore • Copy by Reference • Clone and Reference
Items found by relation	<ul style="list-style-type: none"> • Ignore • Copy by Reference

Copy action candidate	Copy actions available
Objects found in folders	<ul style="list-style-type: none"> • Clone and Reference <p>Copy actions available for objects found in folders are processed following the set of rules and specifying a relation of attribute equal to contents.</p>

Creating copy action rules

When an object is a copy action candidate, the copy action is determined by a series of rules that are identified by preferences. For each rule, the system administrator indicates specifications for the parent object, the child object, and the relation. The administrator also specifies the copy action.

Relation specifications

Relation specifications can be by:

- Teamcenter relation type
- BOM structure occurrence type
- Folder content

The Teamcenter relation type may be a wildcard character or a Teamcenter relation type name.

The structure occurrence type may be an asterisk, null (for no occurrence type), or the occurrence type name.

Folder contents are specified with the string *contents*.

Occurrences in cloned structures

Any occurrence in the BOM view revision of a cloned item, process, or revision is considered a cloned occurrence, regardless of whether the loaded child object is cloned or referenced. Quantities, occurrence types, notes, find numbers, and user interface locations of cloned occurrences match those in the template occurrence.

Each occurrence predecessor is processed according to the following rules:

- If the predecessor sibling was ignored during the copy action and is not represented in the clone, the predecessor is not set.
- If the predecessor sibling is cloned, the predecessor is the clone.
- If the predecessor sibling is referenced, the predecessor is the same as in the template.

Applying copy action rules

When a new structure is created from a template, the first copy action rule specified by the preference that applies to an object determines the copy action. This lets you specify general copy rules using wildcards that can be overridden with more specific rules.

For example, to apply a specific copy action rule to a child item, you could use a wildcard to specify a general rule for the parent item but have a specific rule in place for the child. When the template is used to duplicate a structure, the general parent specification is overridden by the specific rule for the child.

The default copy action rule is **Copy by Reference**, where the duplicated process structure references the original object in the database.

7. Managing time

Managing time with the Time view

Using the **Time** view you can manage time information on activities, operations, and processes. You can start by estimating the time it takes to execute operations. Later, you can refine the time information by defining activities holding time information. You can define the category of each activity, for example, **Value Added** or **Non-Value Added**, and later analyze how much time in your overall process structure (or any other process level) is spent on each category. This view also lets you roll up the time information from lower levels to upper levels and define the allocated time of each of the leaves.

The **Time** view provides information specific to the process or operation so that its appearance varies depending on which of these you select.

Times are stored in the **Time Analysis** form on the process or operation. Activity times are stored as fields directly on the class. In contrast to process or operation, there is no additional activity time form. You can modify times in the **Time** view and these changes are then reflected in the forms.

Time units are stored in seconds in the database. You can configure which units are shown in the **Time** view.

Open the Time view

1. Select a process or operation.
2. Choose **Open with**→**Time**.

Teamcenter opens the **Time** view.

- If a process is selected, the **Time** view contains the **Time Values** and **Time Analysis** sections.

Use this section	To
Time Values	Edit allocated, estimated, and simulated times for a process or operation. Use the Calculate button to populate the allocated time and roll up the summary to upper levels.
Time Analysis	See the analysis of the activities for the selected object. The total work, total duration, and pie chart are calculated for the activities of all descendents of the selected process or operation.

- If an operation is selected, the **Time** view additionally contains the **Work Content** and **Activities** sections.

Use this section	To
Work Content	Display the work content of the operation. This is customer-specific information and is not used for any calculation. You can expand or collapse this section to suit your needs.
Activities	Edit operation activities with time information and classify them into time categories.

Edit operation activities

Activities are intended to break down an operation to define its detailed time information. Each activity can have the following time information:

- **Code**

The code of an activity is defined in a time standard such as the Methods Time Measurement (MTM) system or in your company's standard.

- **Unit Time**

The unit time is the time it takes to execute this activity.

- **Frequency**

Frequency represents how many times this activity is executed. The default is 1.

- **Work Time**

The total time it takes to execute this activity. This work time is the result of multiplying the unit time by the frequency.

- **Category**

The time category to which this activity belongs (for example, **Value Added**).

With the **Time** view open for an operation, do any of the following:

Use	To
Add Below	Add a new activity as a descendent of the selected activity.
Add After	Create a new sibling activity after the selected activity.
Data Card	Open the Data Card dialog box.

Use	To
Time System	Open the TiCon Search view to search for elements in the TiCon time system.
Remove	Delete an activity.
Properties	Open the activities Properties form.
Move Up	Change the order of the activities. This order is also reflected in the Activity Flow PERT chart.
Move Down	

Note:

Use these buttons to change the order of a linear flow of activities only. If you use these on parallel flows, the changed order can lead to incorrect flows.

F2 key or select the cell

Edit the cell contents, including the name.

Shortcut menu

Obtain additional commands to perform on a selected activity:

- **Cut/Copy/Paste**
- **Expand**
- **Expand Below**
- **Collapse Below**
- **Refresh**
- **Properties**
- **Activity Assignments**

Note:

If an activity in the **Activities** table of the **Time** view contains child activities, the time displayed for it is the cumulative time of all the child activities. For this reason, you cannot use **Add Below** if an activity already contains a time, and you cannot use **Replace** if the activity already has children.

Adding activities based on time standards

Adding activities based on the Methods Time Measurement (MTM) system

You can add activities based on predefined time information available in the Methods Time Measurement (MTM) system to operations in the **Time** view. This system sets industry-standard times required to perform standard manual tasks. The standards include a list of time elements where each element represents a specific and short step a worker can perform as part of the execution of an operation. Typically, the time elements are organized into groups according to types, distance, and difficulty. The standards are based on repeated measurements done on real production lines.

In the **Time** view, you can open a data card and select individual tasks containing a set time. Each of these tasks is added as a separate activity, including a name, unit time, and code as defined in the data card. You can then use these standard times to run time calculations and analyses.

Note:

You must install this feature before using it.

You can also replace the MTM data card with a customized one that includes times required for tasks that are specific to your company.


Add activities using a data card

Note:

You must install the MTM data card before using it.

1. In the **Activities** section of the **Time** view, select an activity where you want to add the MTM activity.
2. If you are familiar with time codes, type the code directly in the **Code** box of an activity.

Teamcenter automatically retrieves the time and name of the activity from the data card. In this way, you can use the time standards without needing to open the data card.

Otherwise, click .

Teamcenter displays the **Data Card** dialog box containing lists of predefined activities.

3. Select one of the following:
 - **Add Below**

Adds the new activity below the activity that is selected in the **Activities** section of the **Time** view. You cannot use this option if the activity selected in the **Time** view already has an associated time.

- **Add After**

Adds the new activity at the same level as the selected activity in the **Time** view. You cannot use this option if the selected activity is the root node.

- **Replace**

Replaces the activity selected in the **Time** view with the new activity. You cannot use this option if the activity selected in the **Time** view has children.

4. Use the tree structure on the left in combination with the tabs to navigate to the appropriate time element.
5. Select a time element in the table.

Teamcenter adds an activity corresponding to the selected time element to the **Activities** section of the **Time** view in the manner you indicated in step 3.

6. (Optional) Select different activities and repeat these steps to continue to add or replace activities while the **Data Card** dialog box is open.

Edit data card activities in the Time view

Since time codes are common and generally known to time engineers, Teamcenter allows you to type the code directly in the **Code** box of an activity. Teamcenter automatically retrieves the time and name of the activity from the data card. In this way, you can use the time standards without opening the data card.

1. Double-click in the **Code** cell of an activity in the **Activities** table.
2. Type a modified entry into the cell.
 - When you edit the **Code** cell, Teamcenter provides you with a list of all the codes available in the data card. As you type a new code, or any part of a code, into the cell, Teamcenter reduces this list to show only those codes from the data cards that contain the characters you type. For example, if you type **kz**, the list displays all codes that contain those two consecutive letters anywhere in the string, such as **2000AKZ05**. Select a code from the list and press the Enter key. Teamcenter replaces the time information of the activity with the new time information as defined in the data card.
 - If you edit the time entry of the cell, you overwrite the predefined data card time.

- The tool tips in the **Activities** table display the complete activity data card information.

Managing activity times using the TiCon integration

Using the TiCon integration

You can access time data from TiCon, an external time management system, using a web service and assign the data to activities. You can search for time elements in TiCon, create new operations containing time activities, or overwrite existing activities with the timing data of time elements, and update activities assigned to time elements that were changed in TiCon. You can use the existing time management features to calculate time analysis based on the TiCon data.

Teamcenter automatically creates a new operation for each TiCon time activity that you add to a process structure. It calculates the allocated time of the process based on the PERT flows of the process. If you update the PERT flows using the **Resequence Structure** command, the allocated time contains the sum of all the activity times contained in the child operations. If you do not update the PERT flows, the allocated time on the process represents the maximum time of all the child operations.

You can map your company's activity properties to the TiCon time element attributes.

Note:

The speed in which data is returned from the TiCon server is dependent on your network connection to that server.

Log on to TiCon

1. Do one of the following:
 - Select a process to which you want to add time data and choose **Open With**→**Time**.
 - In the **Activities** section of the **Time** view, select the activity to which you want to add additional TiCon time elements or replace existing ones.

2. Click the **Open TiCon Search** button .

Teamcenter displays the **TiCon Login** dialog box.

3. Type your TiCon user name and password, select a data area in which to work, and click **Login**.

Teamcenter connects to the TiCon time system and opens the **TiCon Search** view.

Search for time elements

1. Log on to TiCon.

Teamcenter connects to the TiCon time system and opens the **TiCon Search** view.

2. In the **Search Criteria** section, type the criterion for which you want to search. By default, you can search for code, index, or variant of a time element.

You can use the * or % as a wildcard to assist your search.

Your administrator can customize which search criteria are displayed in the **Search Criteria** section in the **METimeSystemSearchCriterionFields** preference.

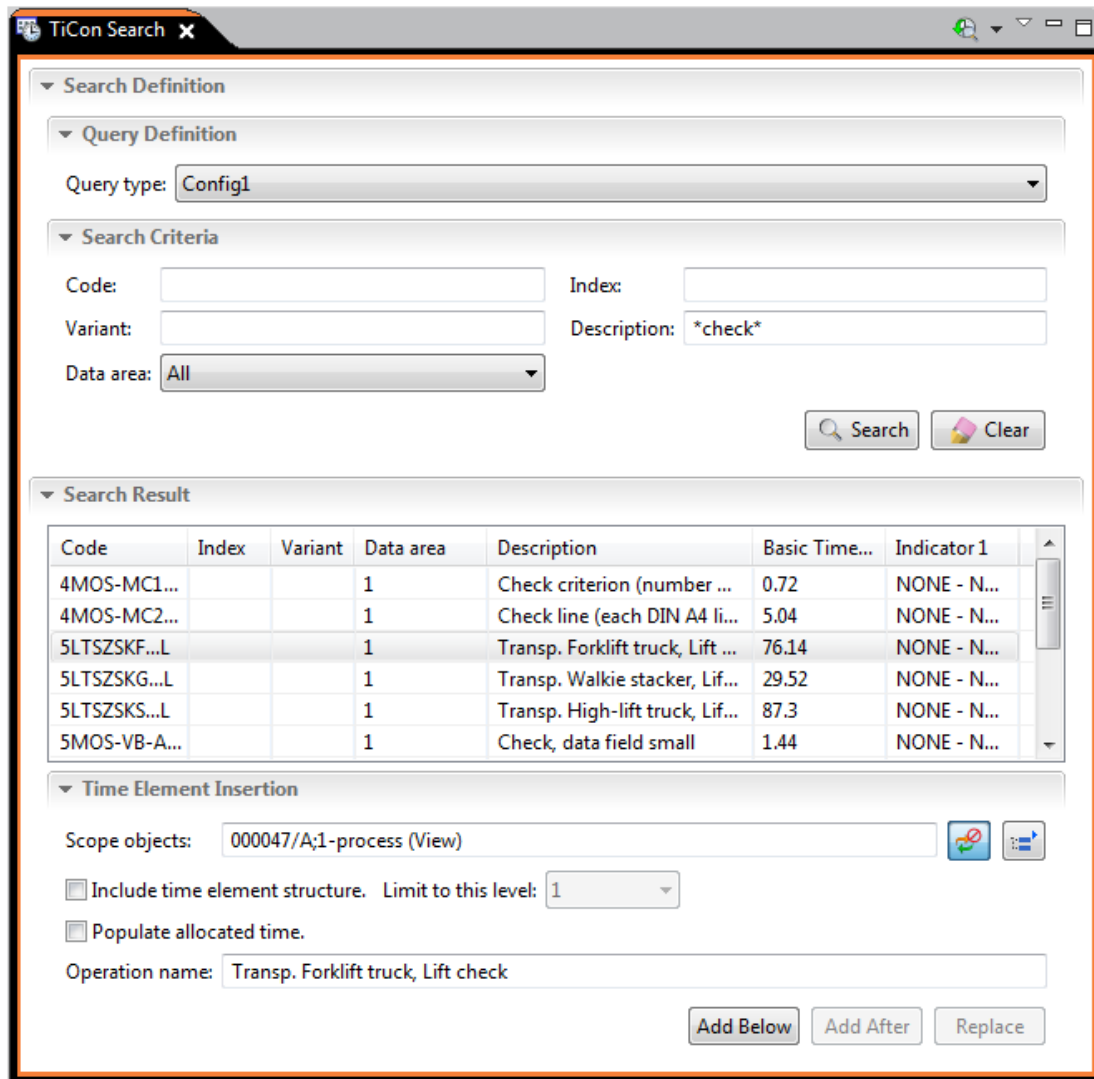
3. Click **Search**.

Teamcenter lists all results in the **Search Result** section of the **TiCon Search** view.

Your administrator can customize which columns are displayed in the **Search Result** section in the **METimeSystemSearchResultFields** preference.

Add and replace activities by assigning time elements

1. Search for a time element and select an appropriate one from the **Search Result** section of the **TiCon Search** view.



2. If the time element in TiCon contains a substructure, specify the number of levels of structure that you want to include in the activity structure. You can select from one to five levels, or all levels by selecting **Unlimited**.
3. (Optional, for a process only) In **Operation name**, overwrite the name of the TiCon activity. By default, Teamcenter assigns the description of the TiCon element as the name of the new operation containing that activity.
4. Do one of the following:
 - With a process selected as scope, click **Add Below**.

Teamcenter creates a new operation as a child of the selected process and adds the selected search result below the operation. If you select multiple TiCon elements, Teamcenter creates a new operation for each one. You cannot use this option if the scope activity already has an associated time.

- With an activity selected as scope, click **Add Below**.

Teamcenter creates an activity with the selected time element and adds it under the current scope. This option is available only for a root activity or an activity that is not associated with a time element.

- With an activity selected as scope, click **Add After**.


Teamcenter adds the selected search result at the same level as the scope activity. You cannot use this option if the scope activity is the root node.

- With an activity selected as scope, click **Replace**.

Replaces the scope activity selected in the **Time** view with the selected search result. You cannot use this option if the scope activity has children.

5. Select **Populate allocated time** to calculate the allocated time on the parent process.

This option is available only if the view's scope is a process.

6. (Optional) To add an element to a different activity, select the activity in **Activities** section of the **Time** view and click **Change Scope**  or click **Unlock Scope** to work on the selected activity instead.

Update activities assigned to time elements

Over time, time data can change and it can become necessary to update the TiCon time elements contained in your structure.

1. Do one of the following to select the object to update:

- Select a process or operation in the structure view.
- Select an activity in the **Activities** section of the **Time** view.

2. Choose **Tools**→**TiCon**→**Update** from the main toolbar.

Teamcenter displays the **TiCon Update** dialog box.

3. If the time element in TiCon contains a substructure, specify the number of levels of structure that you want to include in the activity structure and click **Start**.

Tip:

You can use this option to remove levels from or add levels to a substructure by specifying fewer or more levels than you did when you created the activity or last performed an update.

Teamcenter compares all the time information in the activities belonging to the selected structure with the current time information for the associated time element in TiCon. If it finds differences, it lists them in the dialog box.

4. (Optional) Navigate through the changes selecting each line. For each selected line, Teamcenter displays the potential change at the bottom of the dialog box.
5. Click **Update** to apply the changes, or **Cancel** to close the dialog box without updating.

Log off the TiCon time system

Do one of the following:

- In the **View Menu** list, select **Logout**.
- Choose **Tools**→**TiCon**→**Logout**.

The next time you attempt to search in the **TiCon Search** view, you must log on again.

Performing a time analysis

When Teamcenter performs a time analysis, it calculates total work and total duration of descendents of the selected object. In addition, it calculates the time required for each category of time and displays these in a pie chart. By default, Teamcenter provides you with three categories of activities, value-added (VA), non-value-added (NVA), non-value-added but required (NVABR). Your administrator can configure the time view to suit your needs.

- If you select an operation, Teamcenter performs a time analysis automatically when you open the **Time** view.
- If you select a process, these calculations can be very time-consuming, so you must initiate them manually by clicking **Calculate**.

Note:

Teamcenter caches the time analysis calculations for a process but does not update them automatically if any changes occur. If you make any changes that affect stored times, you must click **Calculate** again to obtain the updated values.

Teamcenter does not save the time analysis information to the database, it only saves it in the current session. It does this because a time analysis result depends on the current configuration of the structure. You can generate a report of the time analysis which is saved as an attachment to the process.

Populate allocated time

Allocated time is the *official* time of each process and operation. You can manually define the allocated time or you can populate it from other time fields. You can choose the basis on which to calculate the allocated time. This calculation updates the allocated time of all the descendents of the selected process or operation. The calculation is done from the lowest level upwards (*rollup*).

If flows between operations are created in a PERT chart, populating the allocated time will sum up the values of sub-levels and display the sum in the target process. If flows are not created between operations in PERT chart, then to sum up the values of sub-levels and display the sum in the target process, you or an administrator must update the **MICollectionTypeProcesses** preference with the process type (**Process** or the internal name of the custom process type).

1. Do one of the following:
 - In the **Time** view, in the **Time Values** section, click **Calculate**.
 - Choose **Tools** → **Populate Allocated Time**.

Teamcenter opens the **Populate Allocated Time** dialog box.

2. Select one of the following:

Use this option	To calculate allocated time based on
Estimated Time	Time information used in the preplanning stages, before detailed time analysis data is available.
Simulated Time	Time values that are determined as a result of a simulation.
Time Analysis Duration	The total duration as calculated in the Time Analysis section.
Prioritized list of time properties	<p>A configured list of data sources. Teamcenter considers these sources in order of their appearance in this list, looking for a value that does not equal zero. As soon as it finds one, Teamcenter populates the allocated time and does not consider the rest of the list.</p> <p>You can move data sources up or down in the list, or remove them completely. If you select only one option, for example, Simulated Time, in this list, Teamcenter</p>

Use this option**To calculate allocated time based on**

behaves in an identical fashion to selecting **Simulated Time** on the upper part of this dialog box.

This list of data sources is not evaluated if the node has children whose accumulated allocated time is not equal to zero.

3. (Optional) Specify how many levels are populated by selecting a value from the **Populate up to level** list.

All leaf objects are calculated that are of a distance from the top-level object that is greater than or equal to the number you specify in this option.

4. Select **Populate zero values** if you want to override the allocated time for a specific object with zero values, even if the object's original allocated time value is not zero.

If you select this option in conjunction with the **Prioritized list of time properties** option, Teamcenter populates allocated time with zero values if all the values of the sources in the list are zero.

If you do not select this option, original values that are not equal to zero are not replaced with zero values.

Filtering activity attachments from the structure

You can suppress the display of different types of attachments in the **Activities** section of the **Time** view using the **METimeTabFilteredComponents** preference. If you want to see the attachments, open the **Attachments** view on the operation activity.

Working with time reports

Creating time reports

When working in the **Time** view, you can run two reports:

- **Time Analysis Report**

This report summarizes the time analysis for the selected object and below that object. It includes the time analysis information for each process and operation. It contains the name of the process, operation or activity, code, unit time, frequency, work time, duration, and times for different categories. You run this report from the **Time Analysis** section of the **Time** view.

- **Allocated Time Report**

This report contains the name of the process or operation, allocated, estimated, and simulated times and the duration. You run this report from the **Time Values** section of the **Time** view.

Teamcenter creates these reports as Excel files that are attached as datasets to the corresponding object. You can customize the reports in the Report Builder application.

Run a time report

1. In the **Time** view, do one of the following:
 - In the **Time Analysis** section, click **Report** to create a time analysis report.
 - In the **Time Values** section, click **Report** to create an allocated time report.

Teamcenter opens a dialog box where you can specify the name of the dataset.

- If the **TC_CRF_overwrite_existing_dataset_content** preference is set to **true**, Teamcenter replaces the contents of the dataset.
 - If the **TC_CRF_overwrite_existing_dataset_content** preference is set to **false**, Teamcenter creates a new dataset.
2. Type a new name into the box, or click **Replace** to overwrite the dataset contents.
 3. Click **OK** to close the resulting dialog box and open the report.

If you create a time analysis report, Teamcenter calculates and exports the time analysis values of the selected object and all its descendents. If you generate an allocated time report, no calculation is performed. The report reflects the current state of the data.

Customizing a time report

You can customize a time report in any of the following ways.

- Change the report to be used by changing the value of the **METimeAnalysisReportDefinitionID** or **MEAllocatedTimeReportDefinitionID** preferences.
- Add one or more style sheet to the report definition by modifying the **METimeAnalysisReportStylesheet** and **MEAllocatedTimeReportStylesheet** preferences.
- Customize the report contents in the Report Builder application.
 - The **SHOW** parameter specifies which Teamcenter columns are displayed as rows in the report.
 - The **TRANSFER_MODE** parameter specifies the name of the transfer mode to be used to export additional data. You must customize the XSL style sheet to show the exported data.

Configure the Time view

In addition to configuring the **Time** view using preferences, you can configure the following:

- Add new categories in the Business Modeler IDE application.
- Specify the color in which each time category appears. This category is reflected in the **Activities** section of the **Time** view and in the colors of the pie chart in the **Time Analysis** section.

1. Choose **Edit→Options**.

Teamcenter opens the **Options** dialog box.

2. Click **Manufacturing** in the hierarchy tree.
3. Click the **Time** tab.
4. In the **Colors Representing Time Analysis Types** section:
 - a. Click any of the displayed colors.

Teamcenter opens the **Color Chooser** dialog box.

- b. Click a new color.
- c. Click **OK**.

These changes are saved in the **MEActivityTypeColors** preference.

- Change the time unit that appears in the **Time Analysis** section as follows:

1. Choose **Edit→Options**.

Teamcenter opens the **Options** dialog box.

2. Click **Manufacturing** in the hierarchy tree.
3. Click the **Time** tab.
4. Choose the time unit that you want to display in the **Current Time Unit** list. You can choose from any of the following units:

Unit ID	Long display name (localizable)	Short display name (localizable)	Multiplier to seconds
1000th_min	1/1000 min	0.001m	0.06
100th_min	1/100 min	0.01m	0.6
10th_min	1/10 min	0.1m	6
FAC	FAC	FAC	0.18
MOD	MOD	MOD	0.129
TMU	TMU	TMU	0.036
day	Day	d	86400
hour	Hour	h	3600
minute	Minute	min	60
second	Second	sec	1

- (Optional) Make further adjustments to the time units using the **MEAvailableTimeUnits** and **MECurrentTimeUnit** preferences.

8. Process documents and work instructions

Creating, viewing, and editing manufacturing documentation

About manufacturing documentation

Teamcenter manufacturing documentation provides rich work instructions and collaboration between departments, integrated with the planning environment, leveraging Teamcenter data management capabilities.

- Teamcenter Publish

Provides an environment for creating work instructions for manufacturing operations. Teamcenter Publish enables you to author, distribute, and visualize the most current product and process data. Its main features include:

- Technical illustrations including text, 2D images, 3D graphics, table, text, and hyperlinks (for example, a link to a movie file) to improve clarity and enhanced quality on the shopfloor.
- Easy update based on the most current planning data in Teamcenter, reducing rework and update times.
- Batch processing and scheduling of reports.
- Familiar Microsoft Visio authoring environment allowing WYSIWYG editing.

Using Teamcenter Publish

To create or view manufacturing documentation using Teamcenter Publish, install Microsoft Visio. Both Visio Standard and Visio Professional are certified. You can install Visio before or after the Teamcenter installation.

The **Save as PDF** feature is included with Visio and does not require installing the separate PDF add-in.

The administrator creates an alias file that determines the permissible contents of the documentation. For example, if the administrator uses the default alias file, you can create work instructions and product manuals, and a view for each of these is available.

When you first select a documentation view, Teamcenter loads the Visualization Illustration and Visio components. Depending on your workstation, this process may take several seconds to complete and Teamcenter displays a progress dialog box until it is complete.

Working with publishing tools

You can create publishing pages in the embedded viewer and collect them into portfolios. A typical publishing page is a work instruction document, and a portfolio may contain all the work instructions needed at a particular assembly station. By default after installation, Teamcenter provides you with sample files. To use publishing tools in your environment, you must configure it to suit your needs.

Publishing pages are Visio files that are saved as datasets with the selected BOM line.

Visio documents are constructed using shapes that can appear as text and graphics. A rich library of shapes are provided in the Visio installation.

The Teamcenter publishing tools extend the shape library to include shapes called *assets* that you can link to data in Teamcenter. Assets can display text, tables, images, or a link to a Microsoft Word file or master form. For example, in Teamcenter you can configure a product assembly, view it, add markups, and capture the graphics in a product view (snapshot) that you can then display in a 3D asset. If the data in Teamcenter is subsequently updated, you can update the publishing page to show the changes.

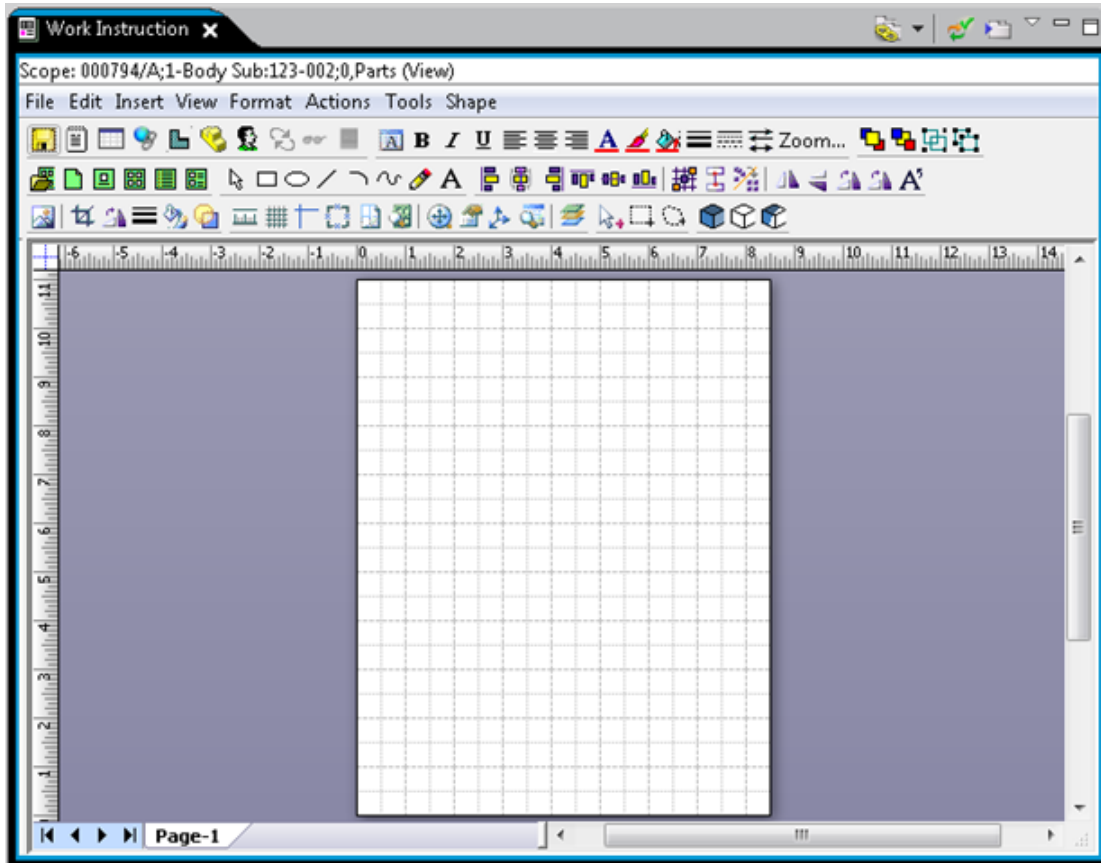
You can organize collections of publishing pages into portfolios, which you can view, publish to HTML for a Web server or publish to PDF, or print in My Teamcenter using the options that appear in the **Graphics** view after you select the portfolio object. A portfolio can contain multiple work instructions, generic pages, header and footer information, a table of contents, and cover and trailer pages.

Publishing page roles

Publishing page documents can be used for any number of purposes. By default, two roles are provided, **Work Instructions** and, when a product structure is selected, **Product Manual**. Your database may be configured to support any number of roles. This documentation refers to the **Work Instructions** role, but the behavior of the pane is the same for each role.

Creating and editing publishing pages overview

When you first open the **Work Instructions** view, you see a blank page.



You can immediately begin to create a work instruction on this page or you can load a template and work from there.

The following is an overview of the process for creating a publishing page.

1. Add any static Visio shapes, text or graphics you need to the page.
2. Associate the page with an alias file.

Alias files tell Teamcenter what data to display in different assets on the page and how to find that data. This step is optional; a default file is loaded.

3. Place the required assets on the page. These are placeholders. You can place the following objects in a work instruction page, each embedded in an asset of the same name:
 - Text that is bound to a property of an object in Teamcenter.
 - Tables whose cells map to object properties in Teamcenter.
 - 2D images (for example, BMP, GIF or JPEG files)
 - 3D geometry assets

These are objects that you create or view in the embedded viewer, such as a factory view or the desired state of the product at a certain assembly station.

- 2D snapshots

These are dynamic objects that represent a 2D scene (a view of the base image and markups) that are associated with a BOM line in your product structure.

- Links

You can create a link to a Microsoft Word file or text file.

4. Associate the asset with a transfer mode and an alias name.

The transfer mode and the alias tell Teamcenter how to find the data in the database that is displayed in the asset.


5. (Optional) Save this page as a template for reuse.

6. Select one or more assets and an object in Teamcenter to populate the assets.

This step traverses the structure to find the desired data or files and places them in the selected assets.

The objects used to populate assets depend on which structure line is selected.

Note:


Be careful when selecting new structures for populating assets. You must first click the **Disable response to selections** button  and then select a different structure. If you do not, the scope of the **Work Instruction** view changes and Teamcenter attaches the newly created work instruction dataset to the newly selected structure.

Create a publishing page

1. Right-click the BOM line with which you want to associate the work instructions, for example, the item revision of an assembly or operation, and choose **Open with → Work Instructions**.

The selected line is the scope for the work instruction that you create. The new work instruction is attached to the line that you select here.

Note:

Be careful when selecting new structures. You must first click the **Disable response to selections** button  then select a different structure. If you do not, the scope of the

Work Instruction view changes and Teamcenter attaches the newly created work instruction dataset to the newly selected structure.






2. From the menu commands in the **Work Instructions** view, choose **File → New TI Dataset**.

Teamcenter displays the **New Dataset** dialog box.

3. Type a name and description in the boxes at the bottom of the dialog box and click **OK**.

Teamcenter creates the new publishing page dataset.

4. To add data placeholders (assets) to the template:

Click	To add
	Data found in a text file attached to a structure line.
	A collection of data found in various properties in tabular form.
	A link to a Microsoft Word file or a text file.
	A 2D image or a 2D snapshot attached to a structure line.
	A 3D image attached to a structure line.

5. Drag these placeholders to the desired spot on the page, resizing if necessary.

6. Right-click the asset and choose **Bind**.

Teamcenter displays the **Bind Table Placeholder** dialog box.

7. Select the transfer mode and alias to use for the data to populate this asset and click **OK**.

Note:

The work instructions are attached to the BOM line with a **IMAN_MEWorkInstruction** relation.

Binding assets overview

There are several different types of placeholders (assets) that you can place on a publishing page. Each of these must be bound with data from a structure. When you bind the asset, the **Bind** dialog box contains a list of transfer modes and a number of choices, called aliases, from which you can select. The choice you make for each asset defines how Teamcenter finds the data that is displayed in the asset when you populate it.

Bind textual information

You can bind information found in the text field of an object's properties. You can enter free-form text within the asset to complement the bound information. For example:


Operator must tighten **&&SUM(<alias_1>&&** bolts with torque **&&MAX(<alias_2>&&** and any other **&&alias_3&&**.

1. In the **Work Instructions** view, click .

Teamcenter creates a placeholder for the text on the work instruction page.

2. Save the work instruction.

You must always save a work instruction once to create the dataset before you can populate an asset.

3. Click the **Text Tool** button  to add free-form text to the asset.
4. Right-click the placeholder and select **Bind**.

Teamcenter displays the **Bind Text Placeholder** dialog box.

5. From the **Transfer Modes** list, select **tcm_export** transfer mode.



You can select only one transfer mode per text alias.


6. In the **Aliases** list, open the **ObjectProperties** entry and select the piece of textual information that you want to embed. You can choose to manipulate the asset data using the list of simple formula.

Each piece of bound data is added to the end of the text asset. You may have to rearrange the information after binding the data.

7. Click **Add**.

Tip:

- You can also type the binding directly into the text asset if you know the format.
- You can bind multiple times to create free-form text plus embedded text in one asset. Switch back and forth between binding and typing free-form text by doing the following:
 - Click the **Arrow Tool**  button and right-click the text asset to access the bind dialog.
 - Click the **Text Tool** button  and select the text asset to type free-form text.

8. Select the object in the structure view containing the text that you want to embed in the Teamcenter window. For example, if you want to embed the description of a particular item revision, select that item revision in the structure view.
9. In the **Work Instruction** view, with the text placeholder still selected, click the **Populate Asset** button .

Teamcenter displays the specified text on the work instructions page.

Bind data to display in a table format

Use the table asset to embed multiple pieces of information about a selected object.

1. In the **Work Instructions** view, click .

Teamcenter creates a placeholder for the table on the work instruction page.

2. Save the work instruction.


You must always save a work instruction once to create the dataset before you can populate an asset.

3. Right-click the placeholder and select **Bind**.

Teamcenter displays the **Bind Table Placeholder** dialog box.

4. From the **Transfer Modes** list, select **tcm_export** transfer mode.
5. In the **Aliases** list, open the appropriate alias, and select the type of information you want in the list and click the plus sign.

If you select multiple entries, the selected objects appear as columns of the table in the same order as in the **Aliases** pane.

6. Click **OK**.
7. Select the revision in the structure view containing the objects that you want to embed in the Teamcenter window. For example, if you want to embed the ID, name, and description of all members of an assembly, select the assembly root structure in the structure view.
8. In the **Work Instruction** view, with the table placeholder still selected, click the **Populate Asset** button .

Teamcenter displays the specified information on the work instructions page.

Bind linked data

To bind linked data, a dataset with a **.txt** file imported into it must exist. In addition, you must be able to open this **.txt** file in an associated text editor.

1. In the **Work Instructions** view, click .

Teamcenter creates a placeholder for the link on the work instruction page.

2. Save the work instruction.

You must always save a work instruction once to create the dataset before you can populate an asset.

3. Right-click the placeholder and choose **Bind**.

Teamcenter displays the **Bind Link Placeholder** dialog box.

4. From the **Transfer Modes** list, select the **ExportGraphic** transfer mode.

5. From the **Aliases** list, select **LinkedDataset**.

6. In the **Attachment** view, select the text dataset and click **Populate** in the **Work Instructions** view.

Teamcenter displays the link on the work instructions page.

Bind a 2D image

You can bind a 2D image that is attached to a revision.

1. In the **Work Instructions** view, click .

Teamcenter creates a placeholder for the image on the work instruction page.

2. Save the work instruction.


You must always save a work instruction once to create the dataset before you can populate an asset.

3. Right-click the placeholder and select **Bind**.

Teamcenter displays the **Bind Image Placeholder** dialog box.

4. From the **Transfer Modes** list, select **ExportGraphic** transfer mode.

5. In the **Aliases** list, open the **2DGraphic** entry and select **file**.

6. Open the **Attachments** view.
7. Select the image that you want to embed.
8. In the **Work Instruction** view, with the image placeholder still selected, click the **Populate Asset** button .

Teamcenter displays the selected image on the work instructions page.

Bind a 2D snapshot

If you embed a 2D snapshot, a 2D geometry asset must exist for it.

1. In the **Work Instructions** view, click .

Teamcenter creates a placeholder for the image on the work instruction page.

2. Save the work instruction.

You must always save a work instruction once to create the dataset before you can populate an asset.

3. Right-click the placeholder and select **Bind**.


Teamcenter displays the **Bind Image Placeholder** dialog box.

4. From the **Transfer Modes** list, select **ExportGraphic** transfer mode.

5. In the **Aliases** list, open the **2DSnapshot** entry and select **file**.

6. Do one of the following to specify which 2D snapshot should be populated:

- In the **Attachments** view, select the snapshot.
- In the **2D Viewer** view, open the **2D Snapshots Gallery** dialog window and select an existing snapshot.
- In the **2D Viewer** view, arrange the snapshot. When you populate the asset, Teamcenter automatically creates the snapshot for you.

7. In the **Work Instruction** view, with the image placeholder still selected, click the **Populate Asset** button .


Teamcenter displays the 2D snapshot on the work instructions page.

Note:

If you receive an error saying **Failed to load Error document (2DSnapshot & file)** when populating a 2D asset, the 2D snapshot does not contain a 2D geometry asset.

Recapture the 2D snapshot with the option to capture 2D geometry asset data turned on.

Bind a 3D asset

1. Open a structure to which you want to attach a work instruction.
2. In the **Work Instructions** view, click the **3D Graphic** button .

Teamcenter creates a placeholder on the work instruction page.

3. In the **Work Instructions** view, select **File** → **Save TI Illustration**.

You must save the work instruction once to create the dataset. If you do not save first, you receive an error when populating the asset. Once the dataset exists, this step is no longer required, unless you want to save changes to the work instruction page.

4. Right-click the placeholder and select **Bind**.


Teamcenter displays the **Bind Geometry Asset Placeholder** dialog box.

5. From the **Transfer Modes** list, select **ExportGraphic** transfer mode.
6. In the **Aliases** list, open the **3DGeometryAsset** entry and select **file**.
7. Do one of the following to specify which 3D geometry should be populated:

- In the **Graphics** view, open the **3D Product View Gallery** dialog box, create a snapshot, then select it.

Caution:


You must ensure that the **Add or Update 3D Geometry Asset** option is selected before you create a snapshot.

- In the **Attachments** view, select the 3D snapshot.
 - In the **Graphics** view, arrange the snapshot. When you populate the asset, Teamcenter automatically creates the snapshot for you.
8. In the **Work Instruction** view, with the placeholder still selected, click the **Populate Asset** button .


Teamcenter displays the 3D geometry asset on the work instructions page.

Populate an empty asset

When you populate an asset, you associate Teamcenter data with it.

1. Select the asset.
2. Select the object in Teamcenter to which you want to link the asset.
3. Disable response to selections by clicking .

When selecting structures to populate assets, it is important to understand the role of the **Disable response to selections** button. Clicking this button locks the view so that when you select a line in a different structure, the scope of the view does not change and the work instruction dataset, when created, is attached to the originally selected structure line. If the view is not locked (it responds to selection), when you select a line in a different structure to populate an asset, the work instruction dataset is attached to the newly selected structure line.

4. Click the **Populate Asset** button  or menu command.

Creating a publishing page template

Your site may provide publishing page templates whose content can be used as the starting point for the creation of a new publishing page. A publishing page template is a publishing page dataset that is not populated with actual data.

A page template may contain standard data such as a company logo, pictures, and required text. It may also contain empty placeholders, whose content you must fill for each instance of a publishing page you create from the template.

You can classify templates in the Classification application for easy retrieval.


Classify a template

1. Add the **TCPublishingPage** business object type to the **ics_classifiable_types** preference.
2. Create a publishing page template.
3. In the **Attachments** view, select the template and choose **Send to→Classification**.
4. In Classification, classify the template.


The template is now available when you create a new publishing page from a template.

Create a publishing page from a template

1. If you know the name of the required template, type it in the **Template name** box.

If you do not know the name of the template, you can search the database for it. In the **Templates** pane at the top of the dialog box, click the **Find a Template by name** button  next to the **Template name** box.

Teamcenter displays the **Find by Name** dialog box, and you can search by part of the name and with wildcard (*) characters.

If templates are classified, you can click Classification Search Dialog  to find the template you require.

2. When you identify the publishing page you want to use as a template, double-click the name to select it and return to the **New Dataset** dialog box.
3. (Optional) Click the **Add To Favorites** button to add the selected template to the list in the **Templates** pane above it.
4. (Optional) Click the **Use as Default** button to use the specified dataset as the default template if no TI dataset is loaded.
5. In the **File** section, select **Use Template**.
6. Type a name and description in the relevant boxes.
7. Click **OK**.

Teamcenter creates the new publishing page dataset.

Using default templates


All of the default templates contain 3D geometry assets. You can add the following details to specific page templates.

Template	Purpose
TCPartList	Specifies the part list table. When populated, it lists all the parts under the selected BOM line. It includes the item identifier, item name, revision identifier, description, and find number of each part in the list.
TCAssemblyOperation	Use this template at the operation level in a manufacturing structure. It briefly describes the operation, its activities, the consumed parts, and tools required to perform the operation. The Activities table lists all the activities under the selected operation,

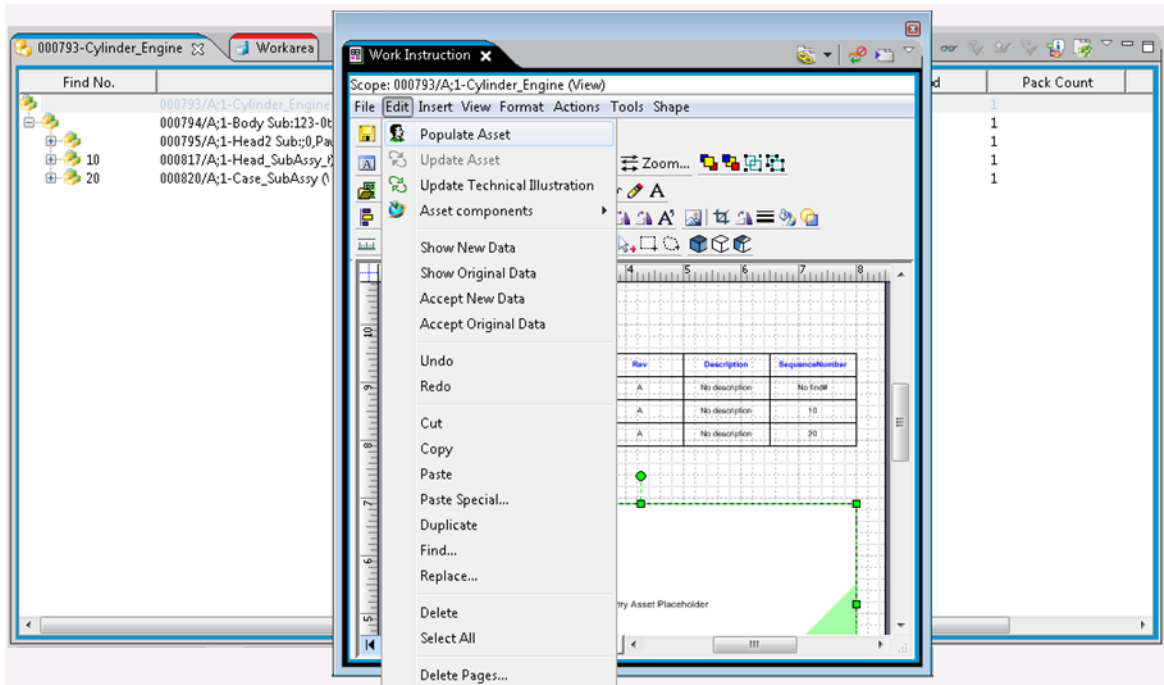
Template	Purpose
TCOperationRouting	<p>their descriptions and durations. The consumed parts table lists the parts consumed by the selected operation, their identifiers, names, revision identifiers, descriptions, and logical identifiers. The Tools table lists the set of tools required by the operation, their identifiers, names, and descriptions.</p> <p>This template lists manufacturing process details, including the operations under it, the consumed parts of those operations and the list of tools used in those operations. Use this template at the process level. The Operations List table lists all the operations under the selected process. The consumed parts table lists all the consumed parts under all the operations below the process. The Resource List table lists all the resources under all the operations below the process.</p>
TCActivityDetails	<p>This template describes the activities under an operation. Use this template at the operation level of a structure. For each activity, the name, description, start time, duration, calculated start time, and calculated duration are listed.</p>
TCActivityRouting	<p>This template lists manufacturing activity details, including the operations under it. Use this template at the operation level.</p>
TCActivityToolList	<p>This template contains detailed description of the activities in the structure. It may also be used at the operation level. It lists the following activity details:</p> <ul style="list-style-type: none"> • The Activities Consumed Parts table lists all the activities, their descriptions, and the parts consumed in each of these activities. • The Activities Used Resources table lists all the activities, their descriptions, and resources used in each of the activities.

Example — Populate assets using the TcPartList template

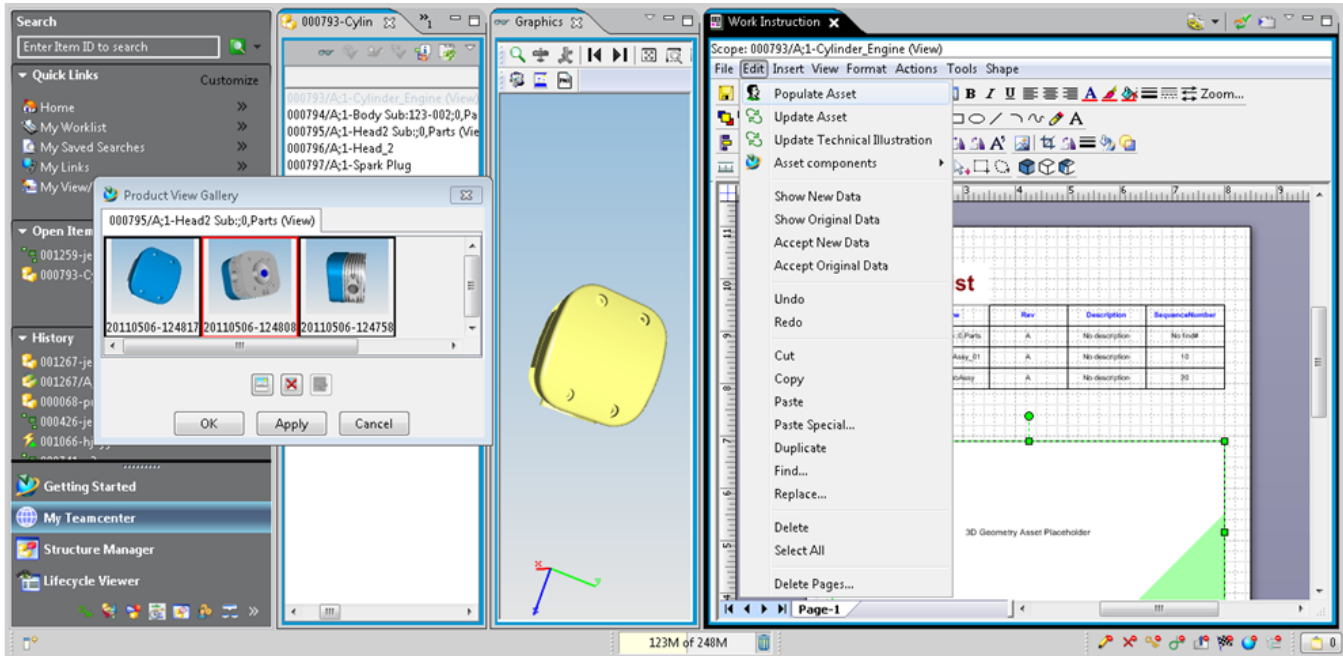
Teamcenter delivers several templates that are ready for you to use. The following is an example of how to use the **TcPartList** template.

1. Load a product assembly. To use the 3D asset, you must load an assembly that displays parts in the assembly viewer.
2. Select a BOM line to which you want to add a publishing page. You can select the top line, if necessary.
3. Open the **Work Instruction** view or some other publishing page view.
4. Hide the response to selections by clicking .

5. In the publishing page view, select **File→New TI Dataset**.
6. In the dialog box, find the **TcPartList** template by name and use it as the starting template.
7. Specify a dataset name and click **OK**. The template should appear in the publishing page viewer.
8. Populate the table assets by selecting the node (BOM line) whose data you want to populate in the table asset component in the relevant structure view. Then select the table asset component in the publishing page view and choose **Edit→Populate Asset**.



9. Populate the 3D geometry asset as follows:
 - a. Click the **Graphics** view to make it the active view.
 - b. Turn on parts and use the 3D viewer to manipulate the view until it shows what you want to see in the asset. Include markups if desired.
 - c. Ensure that a BOM line is still selected, then select the 3D asset in the publishing page viewer and select the **Populate** button. This creates a new snapshot (product view) dataset and populates the asset with it. You can also populate a 3D asset from an existing snapshot. However, the dataset must have an asset file attached to it. Asset file creation is an option; use the named reference dialog to determine whether or not the dataset has an asset file.
 - Select a snapshot dataset in the **Attachments** view or in another application.
 - Select a 3D snapshot (product view) in the **Product Views** dialog box of the assembly viewer. Asset file creation is controlled by a menu in this dialog box.



Updating publishing pages

When an asset is populated, a reference to the selected Teamcenter populating object is stored in the asset. If the data in Teamcenter changes, you can update the asset to show the changes. Updating is not automatic; you must explicitly perform an update.

Take, for example, the **TcPartList** template's table. Long after you create the publishing page and populate the table asset, the product structure can be modified. Item names can change or BOM lines can be added or removed from the line that was used to populate the table. After this happens, you can update the publishing page to show the changes.

Update an asset

1. Open the page dataset in a publishing page viewer anywhere in Teamcenter.
2. Select the asset and choose **Edit** → **Update Asset** from the page viewer menu.

The new contents of the asset are displayed, along with a triangle indicating that the display shows new (and so far unaccepted) data.

3. Switch between displaying the old and the new data by choosing **Show Original Data** and **Show New Data** from the asset's shortcut menu. The asset is in an uncommitted state. You cannot update the asset again or repopulate it while it is in this state.
4. Accept or reject the change by choosing **Accept New Data** or **Accept Original Data** from the asset's shortcut menu. All of the assets on a page can be updated at once using the publishing page **Edit** → **Update Technical Illustration** menu. Other **Edit** menus let you toggle the display and accept or reject the changes for all of the assets on the page at once.

Note:

You cannot update data in the database (other than the publishing page itself) by updating an asset. Assets can only display what is already in the database. To update a 3D asset, you must first update the snapshot dataset in the assembly viewer.

Repopulate an asset

An asset that has been populated can be repopulated with a different Teamcenter component.

1. Select the asset in the publishing page view.
2. Select the component in another view, and choose **Edit** → **Populate Asset** in the publishing page view.
3. Switch between displaying the old and the new data by choosing **Show Original Data** and **Show New Data** from the asset's shortcut menu. The asset is in an uncommitted state. You cannot update the asset again or repopulate it while it is in this state.
4. Accept or reject the change by choosing **Accept New Data** or **Accept Original Data** from the asset's shortcut menu. All of the assets on a page can be updated at once using the publishing page **Edit** → **Update Technical Illustration** menu command. Other **Edit** menus let you toggle the display and accept or reject the changes for all of the assets on the page at once.

Note:

You cannot update data in the database (other than the publishing page itself) by updating an asset. Assets only can display what is already in the database. To update a 3D asset, you must first update the snapshot dataset in the **Graphics** view.

View populating and end objects

The populating object is the one that was selected when the asset was populated. The end object is the object that is actually displayed in the asset after it is populated. These can be the same object, or different ones, depending on your alias definition.

You can view these objects.

1. Select the asset in the **Work Instructions** view.
2. Do one of the following:
 - To show the populating object in My Teamcenter, choose **Edit** → **Asset Components** → **Send to My Teamcenter** → **Populating Components**.

- To show the end object in My Teamcenter, choose **Edit** → **Asset Components** → **Send to My Teamcenter** → **End Object**.
- To view the populating object in the default viewer without switching applications, choose **Edit** → **Asset Components** → **View Populating Components**.
- To view the end object in the default viewer without switching applications, choose **Edit** → **Asset Components** → **View End Object**.

Note:

These menu commands may not work depending on how the alias file is implemented. For more information, contact your administrator.

Create a new work instruction

1. Select the BOM line with which you want to associate the work instructions, for example, the item revision of an assembly or operation.
2. Open the **Work Instructions** view.
3. In the **Work Instructions** view, choose **File** → **New TI Dataset**.

Teamcenter displays the **New Document** dialog box.

4. If your site uses templates, select the name of a template, enter a dataset name, and click **OK**.

Note:

The work instructions are attached to the BOM line with a **IMAN_MEWorkInstruction** relation.

Add new pages to the work instructions or product manual

- Choose **Insert** → **New Page**.

Teamcenter adds a new, blank page to the active work instructions or product manual. You can also search for an existing page by name or use a Classification search to find a classified page.

Delete pages from the work instructions or product manual

1. Choose **Edit** → **Delete Pages**.

Teamcenter displays the **Delete Pages** dialog box containing a list of available pages.

2. Select the page to delete and click **OK**.

Teamcenter deletes the page from the work instructions or product manual.

Save changes to the work instructions or product manual

- Choose **File** → **Save**.

Teamcenter saves any changes that you made.

Reserve space for headers and footers

You reserve space for headers and footers on a publishing page. When you print or export the work instructions or product manual, any shapes on the publishing page are clipped to the defined margins.

1. Open the work instructions.
2. Choose **View** → **Page Margins**.

Teamcenter adds a gray-shaded background at the top, bottom, left, and right of the page.

Add export tags

You can add export tags to a page that are replaced with actual information when you print or export it. For example, if you select **page**, the actual page number appears. Additional export tags include date, long date, document file name, portfolio file name and total number of pages.

1. Open the work instructions or product manual.
2. Choose **Insert** → **Portfolio Export Tag** and select a tag from the displayed list. The tag you select appears on the work instructions or product manual.
3. (Optional) Move or resize the export tag on the work instructions or product manual.

Navigate to another publishing page

Use one of the following methods to navigate to another publishing page:

1. Choose **View** → **Page** → **Go to**.

Teamcenter displays the **Select Page** dialog box.

2. Select the page to you want to navigate.

- or -

Use the navigation arrow buttons to browse through the available pages.

Export publishing pages to HTML

1. Choose **File** → **Save as Web Page**.

Teamcenter displays the **Save As** dialog box.

2. Type a name for the exported file and click **Save**.

Teamcenter displays the **Save as Web Page** dialog box.

3. Change settings for the following options:

Tab	Options	Description
General tab	Pages to Publish	Choose Select All to print all pages or Select Pages from and then type the page span.
	Publishing options	Select any of the publishing options, which appear in the finished Web page to aid navigation and searching.
	Additional options	Choose any of the following: <ul style="list-style-type: none"> • Automatically open Web page in browser • Organize supporting files in a folder • Type text in the Page title box to name the exported HTML output.
Advanced tab	Output formats	Select a format for the HTML output.
	Provide alternate format for older browsers	Choose a format from the list.
	Target monitor	Choose the monitor size.
	Host in Web page	Select a Web page from the list or browse to a file.
	Style sheet	Select a style sheet from the list or browse to a file.

4. Click **OK**.

Teamcenter displays the publishing pages as a Web page in your default browser.

Export publishing pages to PDF

You can print a portfolio to PDF in My Teamcenter. Before you do this, you must install third party software capable of creating PDF output.

1. Create a portfolio.
2. Open My Teamcenter.
3. In the **File** menu on the viewer tab, choose **Publish PDF to Database**.

About portfolios

Portfolios act as a container for work instructions or product manuals and supporting documents, such as a table of contents, cover or trailer pages, and header and footer information. Portfolios may contain a reference to a publishing page or generic page or to an embedded generic page. You can use portfolios to store document structure information, print multiple publishing pages, and export portfolio contents to HTML or PDF.

You generate portfolios in Manufacturing Process Planner, Part Planner, Multi-Structure Manager, Service Planner, or Plant Designer. You manage portfolios in My Teamcenter only.

When managing a portfolio:

- Use container nodes to add an organizational hierarchy to the portfolio. Think of container nodes as chapters in a book, in which you can separate and group documents. Container nodes are useful for multiple levels in the table of contents.
- During printing operations, Teamcenter creates the table of contents information in a dynamic page.
- Create generic pages for any information page to add to the portfolio, such as cover or trailer pages. Generic pages are not considered publishing pages and Teamcenter does not apply headers and footers to them.
- Add header and footer information to portfolios by creating a special page. Teamcenter copies the shapes in this page to the published pages during printing and export operations. The same header and footer appears on every page.
- When adding supporting documents to portfolios, choose from the following options:
 - **Insert Reference**
Select a supporting document for the portfolio to reference.
 - **Create**

Add a new supporting document that Teamcenter embeds in the portfolio. You can only create and embed generic pages.

- **Embed**

Copy a supporting document into the portfolio.

Create a portfolio

1. Select the BOM line to which you want to associate the portfolio, which may be a configured item or process revision or occurrence in the structure. The portfolio contains the publishing pages that are attached to the BOM line's child lines.

2. In the Teamcenter window, choose **Tools → Generate Portfolio**.

Teamcenter displays the **Generate Technical Portfolio** dialog box.

3. In the dialog box, enter a name and select a role such as **Work Instructions** and click **OK**.

Teamcenter creates a portfolio dataset that contains all of the appropriate pages. The portfolio is created under an intermediate data capture (IDC). If a structure context is opened, the IDC is attached to the structure context. Otherwise it is stored in the **New Stuff** folder.

4. (Optional) To view the portfolio, select it in My Teamcenter and click the viewer tab.

Tip:

Note the menu and toolbars in the **Graphics** view. These commands help you manage portfolios.


Create container nodes

You can create one or more container nodes in the portfolio in My Teamcenter in the viewer.

1. Select the portfolio  in the **Newstuff** folder in My Teamcenter.


Teamcenter opens the viewer.

2. Using the menu commands within the **Viewer** view, do one of the following:


- Choose **Actions → Create** and select **Container Node**.
- On the **Technical Portfolio** toolbar, click the **Create container** button .

Create the table of contents

You can create the table of contents for a portfolio in My Teamcenter in the viewer.

1. Select the portfolio  in the **Newstuff** folder in My Teamcenter.

Teamcenter opens the viewer.

2. Using the menu commands in the viewer, do one of the following:
 - Choose **Actions** → **Create** and select **Table of Contents Placeholder**.
 - On the **Technical Portfolio** toolbar, click the **Create table of contents** button .

Add a generic page

You can add a generic page to a portfolio in My Teamcenter in the **Portfolio** pane.


1. Select the portfolio  in the **Newstuff** folder in My Teamcenter.

Teamcenter opens the **Portfolio** pane.

2. Select an area to place the generic page.
3. Using the menu commands within the **Portfolio** pane, do one of the following:
 - Choose **Actions** → **Create**, **Actions** → **Insert Reference** or **Actions** → **Embed**, and select **Generic Page**.

Note:

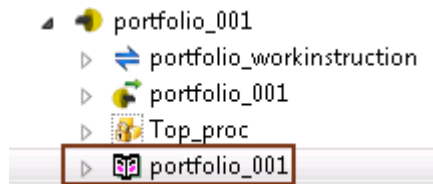
You cannot search using the classification search if working in My Teamcenter.

- On the **Technical Portfolio** toolbar, click the **Create generic page** button .

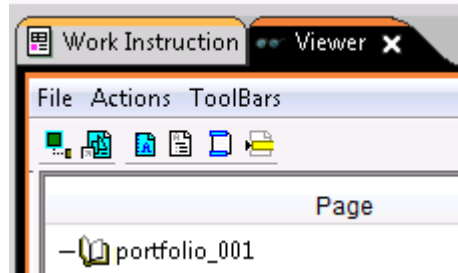
Add a new page in My Teamcenter

When you edit a portfolio in My Teamcenter, you can insert pages by choosing the **Insert Reference**→**Technical Illustration** or **Generic Technical Illustration** menu commands. In the resulting dialog box, the Classification search button is not available. To use the Classification search, you must send the portfolio to Manufacturing Process Planner.

- If you created the portfolio using the **Generate Portfolio** menu command:
 1. Select the portfolio in My Teamcenter and send it to Manufacturing Process Planner.



2. Open the **Collaboration Context** view and expand the portfolio intermediate data capture.
3. Right-click the portfolio and choose **Open With**→**Viewer**.



4. Choose **Actions**→**Insert Reference**→**Technical Illustration** or **Generic Technical Illustration**.

The Classification search is available.


- If you do not generate the portfolio from the menu command, you can view the portfolio in Manufacturing Process Planner as follows:
 1. Create an item.
 2. Copy the portfolio dataset and paste it to the item revision.
 3. Send the item revision to the Manufacturing Process Planner application.
 4. Open the **Collaboration Context** view and proceed as above. You can copy the dataset from the Classification Search Dialog to the clipboard and paste it into the portfolio dataset in My Teamcenter.

Create a header and footer page

You can create a header and footer page in a portfolio in My Teamcenter in the viewer. Teamcenter copies the shapes in this page to the published pages during printing and export operations. The same header and footer appears on every page.

1. Select the portfolio  in the **Newstuff** folder in My Teamcenter.

Teamcenter opens the viewer.

2. Select an area in the portfolio to place the header and footer page.
3. Using the menu commands within the viewer, do one of the following:
 - Choose **Actions** → **Create**, **Actions** → **Insert Reference** or **Actions** → **Embed**, and select **Header/Footer Definition Page**.
 - On the **Technical Portfolio** toolbar, click the **Create header/footer data** button .

Teamcenter opens a new viewer window with a blank page.

4. Using the commands in the new window, choose **Insert** → **Portfolio Export Tag** and select one of the following:
 - **Date**
 - **Long Date**
 - **Document File Name**
 - **Portfolio File Name**
 - **Pages**
 - **Total Number of Pages**

Teamcenter creates a placeholder for the object on the page.

5. Move the placeholder to the desired position.
6. When you have placed all desired export tags, choose **File** → **Post to Technical Portfolio**.
7. Click **Close**.
8. In the viewer, click **File** → **Save**.

Modify header and footer information

1. Select the portfolio  in the **Newstuff** folder in My Teamcenter.

Teamcenter opens the viewer.

2. Right-click the header and footer page in the portfolio tree and choose **Open**.
3. Make any necessary changes.

4. Choose **File** → **Post to Technical Portfolio**.
5. Click **Close**.
6. In the viewer, click **File** → **Save**.

Add a work instruction

1. Select an area in the portfolio to place the work instructions.
2. Do one of the following:
 - Choose **Actions** → **Insert Reference** and select **Technical Illustration**.
 - On the **Technical Portfolio** toolbar, click the **Technical Illustration** button.

The system displays the **Insert Page** dialog box.

3. Click the **Find a page by name** button and type the name of the work instruction that you want to add.
4. Click **Open**. The work instruction you chose appears in the tab.

Publish a portfolio to HTML

You can publish a portfolio on a Web server by exporting its contents in HTML format. This allows consumer users access to work instructions or product manuals from any Web browser.

1. Choose **File** → **Publish Zip to Database**.

The system displays the **Publish to HTML Options** dialog box.

2. Edit the export options in these ways:

Tab	Options	Description
General tab	Destination Folder	Specify the destination folder where the export data is written by clicking Save .

Note:

Specifying the destination folder is the only required selection in this dialog box. All other options in

Tab	Options	Description
		<div style="border: 1px solid black; padding: 5px;"> this dialog box are discretionary selections. </div>
	Create zip file	Create a ZIP file of all export data. Click the Browse button to specify the location of the ZIP file. Use this option to allow users without access to Teamcenter to view the data.
	Use title page template	Use a template file for the main HTML title page. Click the Browse button to choose the HTML file.
	Replace or remove logo	By default, the HTML output includes the Siemens Digital Industries Software logo. To replace the default Siemens Digital Industries Software logo graphic, click the Browse button to locate a replacement graphic. To remove the default Siemens Digital Industries Software logo graphic, click the Remove button.
Export Options tab	Stop if error occurs	Stop the export operation if an error is encountered.
	Produce flat output	Remove the portfolio structure and document hierarchy.
	Publishing options	Indicate specific control panes to be included in the HTML output for each published page. <ul style="list-style-type: none"> • Choose Show Details to display custom shape properties. • Choose Go to Page to include navigation for multi-page work instructions or product manual. • Choose Search to enable the ability to search shapes. • Choose Pan and Zoom to enable panning and zooming on a page.

Tab	Options	Description
		<p>Note:</p> <p>The Publishing Options option is only applicable if you select VML for the Output format (VML is the default). VML output only displays Publishing Options if you use the Internet Explorer browser.</p>
Advanced Options tab	Output formats	Choose the primary output format for the exported published pages.
	Provide alternate format for older browsers	Indicate a secondary output format for exported published pages, used for older browsers.
	Display options	Select a target monitor size.

- Click **OK**.

The Report Definition wizard displays the status of the export operation.

Note:

Name lists the supporting documents in the portfolio; **Status** indicates if the supporting documents were exported.

- Click **Next**.

The system displays the **Create Report Output** dialog box.

- Create a standard or custom report output format.

Publish a portfolio to PDF

You can create a PDF file from the portfolio that is attached as a dataset provided you have Microsoft Office installed.

- Select the portfolio  in the **Newstuff** folder in My Teamcenter.

Teamcenter opens the viewer.

- Using the menu commands in the viewer, choose **File** → **Publish PDF to Database**

Teamcenter creates the PDF and attaches it to the portfolio dataset. You can view it in the viewer.

Creating manufacturing documentation in batch mode overview

You can create and update Teamcenter work instructions and portfolios in batch mode, processing multiple documents using the **Teamcenter Publish Batch** dialog box. You do not need to process individual documents manually. You can schedule these tasks to take place immediately or at a later date.

Batch processing uses the Dispatcher infrastructure for scheduling create and update features. Additionally, Dispatcher has built-in status, logging, and error reporting features.

You must set up the batch processing in the Manufacturing Process Planner or Multi-Structure Manager applications. You can use My Teamcenter to modify the scheduling of the batch process.

Creating textual work instructions using standard text

Authoring work instructions

Authoring work instructions overview

You can write new work instructions, or edit existing work instructions in the **Textual Work Instructions** view if the access control list permits. Work instructions are associated with operations or processes in a process structure.

The **Textual Work Instructions** view opens in view mode (read-only). When entering edit mode, Teamcenter checks out the operation or process and enables editing. When exiting edit mode, Teamcenter checks in the operation or process and filters out editing. If you want to edit the work instructions on multiple operations, you can check them out manually before you begin. This decreases the time it takes to edit each individual work instruction.

If this is the first editing session for the current work instructions document, Teamcenter loads the work instructions template, as defined in the **MEWiWorkInstructionTemplate** preference.

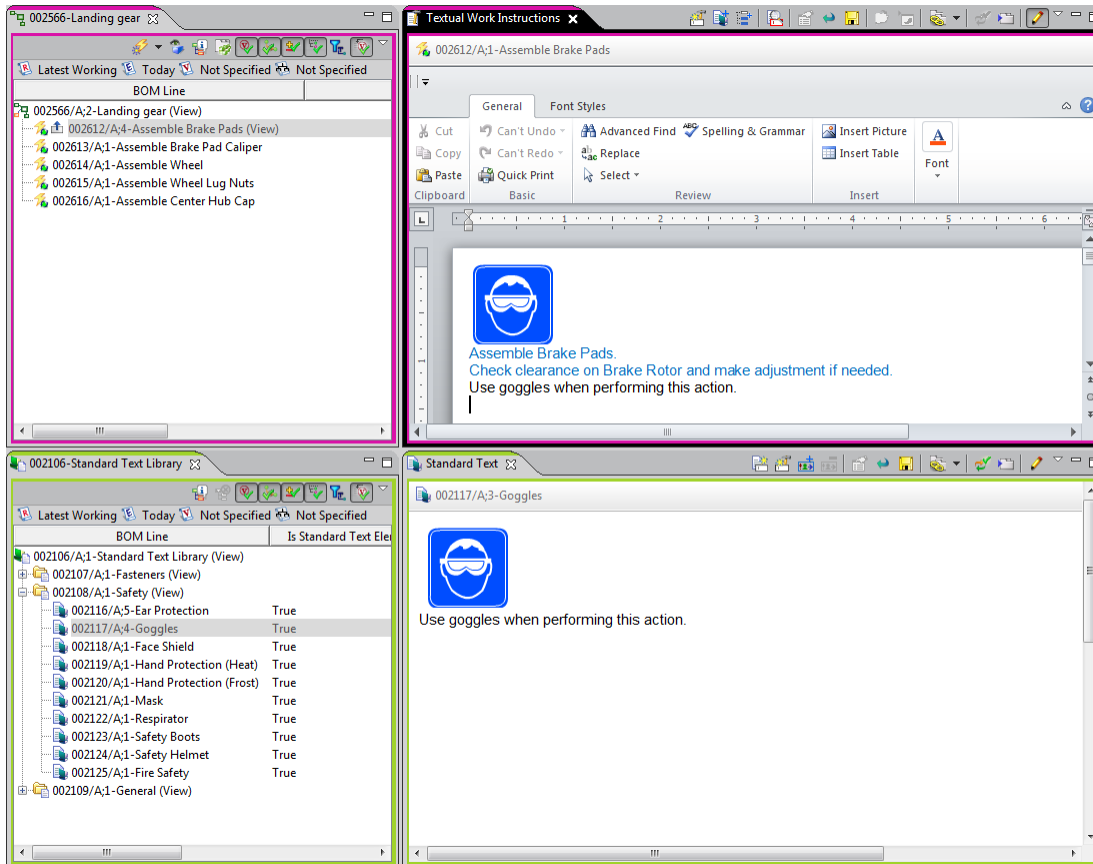
You can double-click the work instructions preview datasets in the Teamcenter **Attachments** view to open them in their associated applications. For example, if the preview file is stored in PDF format, it opens in a PDF reader.

The preview file is in one of the following formats: PDF, MHT, DOCX, or RTF, as configured in the **MEWiPreviewFormat** preference.

All editing changes take effect only after you perform a **Save** operation. For example, if you search for a text snippet in the **Structure Search** view, your search only returns results for already saved text snippets.

When adding standard text elements (from a standard text library) to work instructions documents (associated with operations or processes in a process structure), ensure that both the library structure and the process structure have the same configuration rule. If the configuration rule of the library structure and the process structure are different, you may be adding data with the incorrect revision. In this case, Teamcenter issues a message to inform you what has happened.

The following figure displays a process structure and a standard text library structure. The two views on the right are the **Textual Work Instructions** view displaying the work instructions document of an operation, and beneath it the **Standard Text** view displaying a preview of a standard text element.



Activate the textual work instructions editor

Activate the textual work instructions editor in one of the following ways:

- Choose **Window**→**Show view**→**Textual Work Instructions**.
- Right-click an operation or process in the process structure and choose **Open with**→**Textual Work Instructions**.
- Right-click an operation or process in the **Result** pane of the **Structure Search** view and choose **Open with**→**Textual Work Instructions**.

Edit work instructions


When you select an operation or a process in the process structure, Teamcenter displays the preview file associated with the selected operation or process. If no preview file is defined, the **Textual Work Instructions** view displays the following message:


No preview file is available

- Click **Edit**  .

When entering edit mode, Teamcenter checks out the operation or process, updates property controls, and enables editing. You can now begin editing the work instructions document.

Tip:

If you edit multiple work instruction documents and want to decrease the time it takes to open each individually for edit, check out all the owning processes or operations manually before clicking **Edit**  .

When editing work instructions, you can add and remove content of standard text, text, and data collection definitions. Teamcenter applies all the changes after you click **Save** .

Note:

- Typically, you can use standard text for many of the steps of your work instructions document. Supplement these with text and data collection definitions to create a complete work instructions document.
- If the administrator adds operation or process properties to the template, these are visible in the document header. You cannot edit them.

Add text

Click anywhere in the document and write the new text. After performing a **Save** operation, Teamcenter captures the text in a text control and links it to the database. The text becomes searchable and localizable in Teamcenter. If you wish the text to remain in the body of the document and not in a text control, set the **METWICreateTextControlsOnSave** preference to **False**.

Add a symbol


You can add symbols to the work instructions document. The symbols appear in the document in the symbols section.

Note:

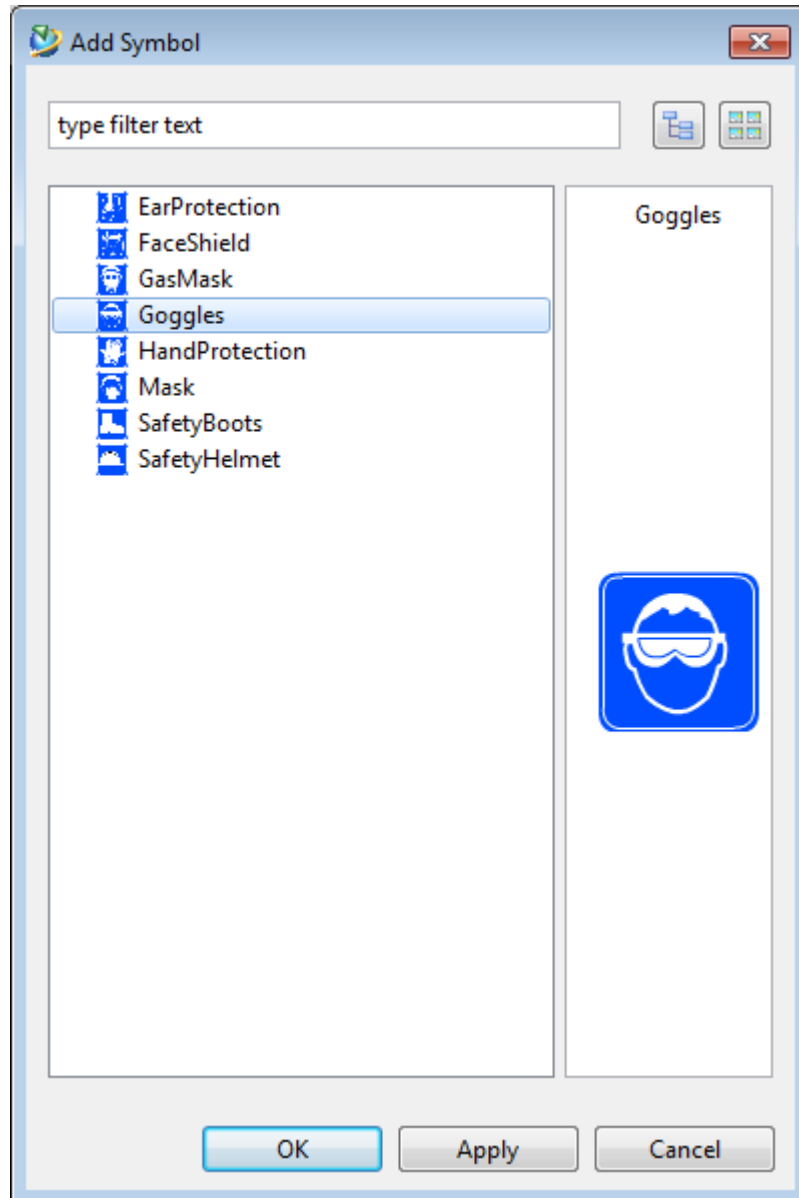
By default, adding and removing symbols is enabled in the **Standard Text** view. If you do not use a standard text library, your administrator can move these buttons to the **Textual Work Instructions** view.

1. Click anywhere in the **Textual Work Instruction** view.

The Teamcenter focus returns to the view.

2. Click **Add symbol** .


Teamcenter displays the **Add Symbol** dialog box listing all the symbols (contained in **Work Instructions Symbol** datasets) in the database. If you manage symbols in a folder structure, this structure is reflected in the **Add Symbol** dialog box.

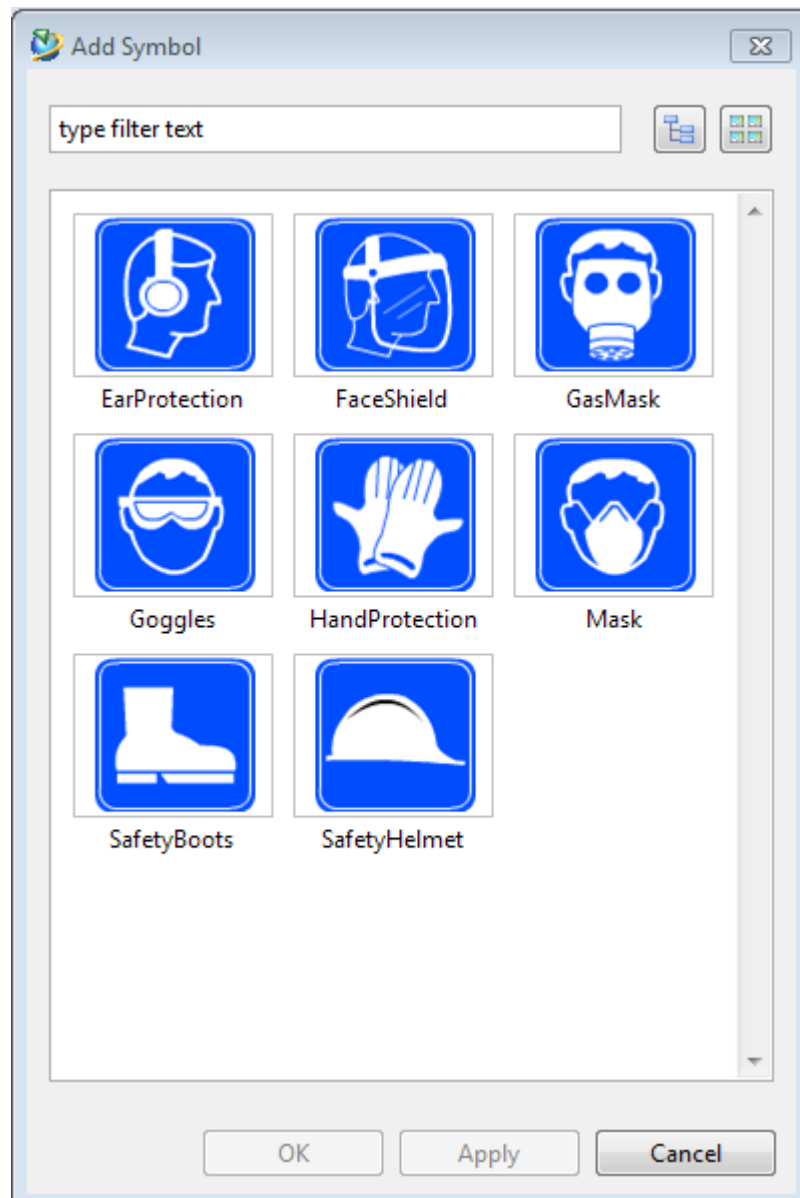


3. Do any of the following:

- Enter any part of the name of the symbol for which you are searching in the search box.

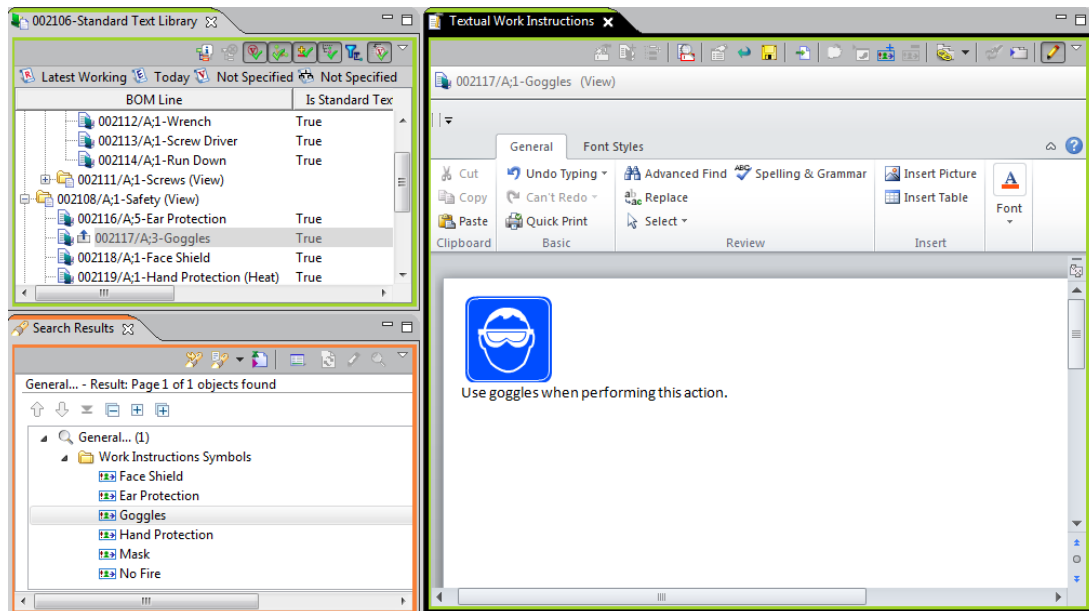
Teamcenter automatically filters search results as you type.

- Browse through the results by selecting each symbol in the list and viewing the thumbnail in the right pane.
- Click  to switch to the thumbnail view where you can view all symbols.




4. Select one or multiple symbols and click **OK** to close the dialog box or **Apply** to add the symbol but leave the dialog box open for further selection.

Teamcenter adds the desired symbols to the symbol section in your document.

**Note:**

- Teamcenter always adds symbols to the symbol section. It does not matter where the cursor is when performing the **Add symbol** operation.
- You may select multiple symbols and add them with a single **Add symbol** operation.
- You cannot insert a particular symbol more than once.
- After performing this action, you cannot undo any previous actions (the **Undo** list is cleared).

Remove a symbol

- In the document, select the symbol you want to remove and click **Remove symbol** .

Note:

By default, the **Add Symbol** and **Remove Symbol** buttons are located in the **Standard Text** view. If you do not use a standard text library, your administrator can move these buttons to the **Textual Work Instructions** view.

Teamcenter removes the symbol.

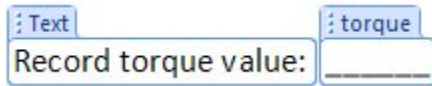
Note:

After performing this action, you cannot undo any previous actions (the **Undo** list is cleared).

Add a data collection definition

You add a data collection definition to the document. This contains an instruction to perform data collection on the shop floor. You can also define the required properties for the new data.

For example, if you require production workers to note a torque value, you can use text followed by a data collection definition.



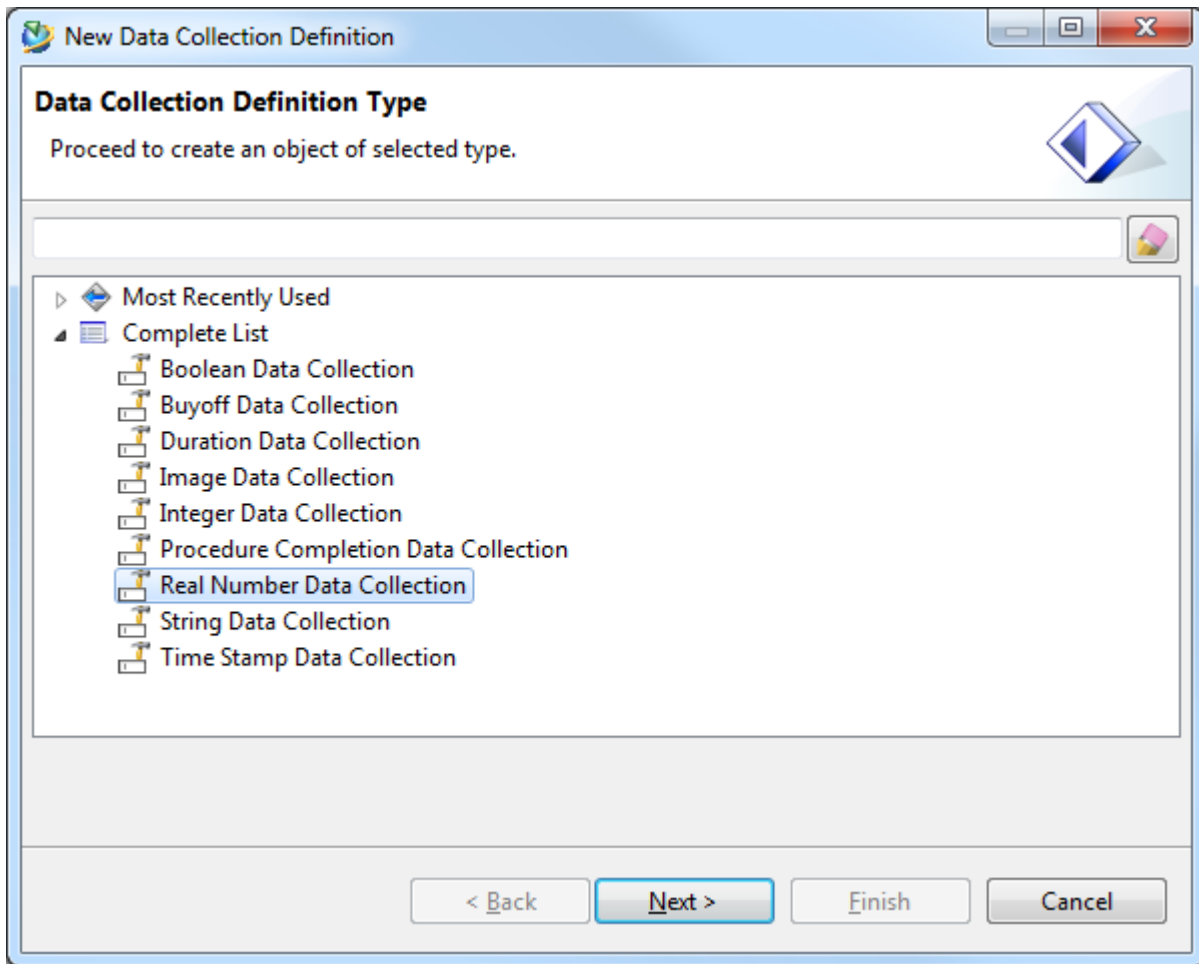
Note:

Data collection definitions are not visible in the Teamcenter structure.

1. Place your cursor at the location at which to add the data collection definition and click **New dcd**



The New Data Collection Definition wizard is displayed.



The following data collection definition types are available:

- **Boolean**
- **Buyoff**
- **Duration**
- **Image**
- **Integer**
- **Procedure Completion**
- **Real Number**
- **String Data**
- **Time Stamp**

- **List of Values**

All the data collection definition types can be user-customized and are automatically supported by the editor.

2. Select the type of data control definition or type it and click **Next**.

The Data Collection Definition Create Information wizard is displayed.

New Data Collection Definition

Data Collection Definition Create Information
Define the information for the creation of a Data Collection Definition

Real Number Data Collection
Real Number Data Collection Information

Properties (required)

Name*:

Description:

Is Optional: True False

Number Of Decimal Places:

Minimum Allowed Value:

Maximum Allowed Value:

Alert Minimum Value:

Alert Maximum Value:

Caution Minimum Value:

Caution Maximum Value:

Out-Of-Range Behavior:

Data Acquisition Method:

Placeholder String:

< Back Next > **Finish** Cancel

3. Enter the attributes for the new data collection definition and click **Finish**.

- **Name** is required; all the other attributes are optional.
- The **Placeholder String** property holds the characters to be displayed in the document. If this is left empty, ... (an ellipsis) is displayed in the standard text document.

- The default value for **Is Optional** is **False**. This means that the data collection definition is not optional and a measurement must be recorded. You can set **Is Optional** to **True** to make the data collection definition optional.

The new data collection definition is displayed in your document.

Note:

You cannot copy data collection definitions.

Data collection properties

In addition to the **Name**, **Description**, **Is Optional**, and **Placeholder String** properties that each data collection type possesses, most data collection types have additional properties, except for **Boolean Data Collection** and **Duration Data Collection**.

The following table lists the additional properties and the data collection definition types that include them.

Property	Data collection definitions
Time format	Time Stamp, Procedure Completion, Buyoff
Allow characters	String
Maximum length	String
Minimum allowed value	Integer, Real Number
Maximum allowed value	Integer, Real Number
Caution minimum value	Integer, Real Number
Caution maximum value	Integer, Real Number
Alert minimum value	Integer, Real Number
Alert maximum value	Integer, Real Number
Number of decimal places	Real Number
Out-Of-Range Behavior	Integer, Real Number, Image
Data Acquisition Method	Integer, Real Number, Image

Note:

An administrator can add the **List of Values** type as a customized type when he or she sets up standard text.

View and edit properties

You can view the properties of a data definition collection, planner input field, or standard text document.

- Select a data definition collection, planner input field, or standard text document and click **Properties**



The **Properties** dialog box appears.

The screenshot shows the 'Properties' dialog box with the following fields and options:

- Name:** Torque Value
- Description:** (Empty text area)
- Is Optional:** True False
- Number Of Decimal Places:** 2
- Minimum Allowed Value:** (Empty text field)
- Maximum Allowed Value:** (Empty text field)
- Alert Minimum Value:** (Empty text field)
- Alert Maximum Value:** (Empty text field)
- Caution Minimum Value:** (Empty text field)
- Caution Maximum Value:** (Empty text field)
- Out-Of-Range Behavior:** (Dropdown menu)
- Data Acquisition Method:** (Dropdown menu)
- Placeholder String:** (Empty text field)

Buttons: OK, Cancel

A data definition collection can appear in the current textual work instructions document in one of two ways:

- Directly inserted into the current textual work instructions document—all the properties are editable.

- As part of the content of standard text that you added to the textual work instructions document—some properties are not editable, as defined in the **MEWiDcdNotEditableProperties** preference.

Note:

- For data collection definitions added to your work instruction document as part of a standard text, the **MEWiDcdNotEditableProperties** preference lists the properties that are not editable for each data collection definition type.
 - The default value is **Placeholder**. The administrator can delete this value to enable editing the **Placeholder** value.
 - The administrator can delete the values for a specific data collection definition type.
 - If the **MEWiDcdNotEditableProperties** preference for a specific data collection definition type is empty, all its properties are editable. If, however, the preference for a derived data collection definition type is empty, the preference inherits properties from its basic data collection definition type ancestor.
 - You can add other properties to the **MEWiDcdNotEditableProperties** preference to protect them.
- You can edit the **Placeholder String** property by typing in the document without accessing the properties of the data collection definition. To complete the change, click anywhere in the document outside the data collection definition.

All the planner input field properties in the **Textual Work Instructions** view are read-only except for **Value** and **Skip Validity Check**.

Teamcenter enables you to omit the validity check for a planner input field. This is useful, for example, in an incremental drilling process. The process requires drilling a hole of a specific diameter and then drilling again to increase the diameter to a very accurate value. The result of the initial drilling operation does not meet the requirements noted in the planner input fields. The result of the subsequent drilling operation does, however, meet the requirements. In this case, it is desirable to skip the planner input field validity check for the initial drilling operation.

If you set **Skip Validity Check** to true, Teamcenter omits all the validity checks except for the following:

- String length - If the length of the **Value** you entered exceeds the **Maximum Length** for the planner input field, Teamcenter issues a warning that the string will be truncated when you save the planner input field. You can either proceed or edit the string.
- If **Is Optional** is set to **False**, Teamcenter performs all validity checks on the planner input field even if **Skip Validity Check** is set to true.

Remove a data collection definition

- Select the data collection definition and press the Delete key.

Note:

If the data collection definition is embedded in the content of standard text that you added to the textual work instructions document, you cannot delete it.

Add reference


You can link text in your textual work instructions to datasets or product views. For example, you can instruct the operator to read a safety instructions document and provide a link to the dataset containing that document. You can instruct the operator to measure a particular dimension on a part and provide a link to the product view displaying the part with the dimension emphasized.

1. Select one of the following to be the target for the new reference:

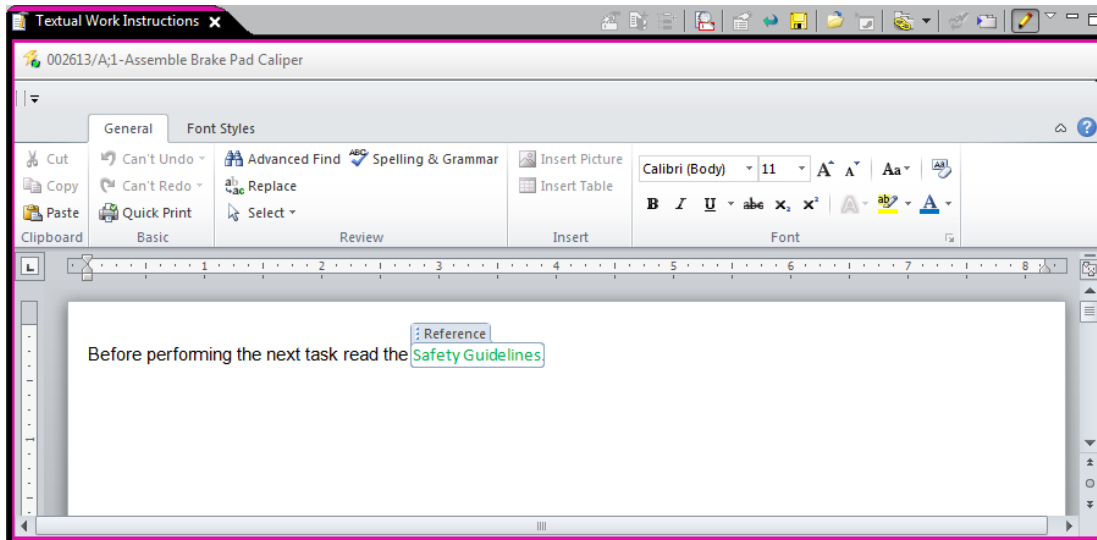
- Dataset in the **Attachments** or **Search Results** view.
- Product view in the **Attachments** view or **Product View Gallery**.

Note:

- If the **Product View Gallery** is visible, the system uses the product view from the gallery even if you have selected product views in the **Attachments** view or **Search Results** view.
- The product view must be attached to the current process (or a process nested under the current process).
- If you select an item that is neither a dataset nor a product view, the system returns an error.

2. Place your cursor at the location in which to create the new reference.
3. Click **Add Reference** .

A content control is added to the document referencing the dataset or product view.



If you select text before invoking the command, the reference is created with the selected text. If no text is selected, the reference displays the name of the referenced dataset or product view.



4. If you wish to change the text of the reference, use the keyboard to place your cursor in the content control and edit the text. Even though you have changed the text of the reference, it still links to the same target.

Note:

You cannot change the referenced target. If you need to do this, delete the reference and create a new one.

Activate reference


Do one of the following:

- Click the reference and click one of the following:
 - For a referenced dataset, click **Open Referenced Object** .
 - For a referenced product view, click **Apply Referenced Product View** .
- Double-click the reference.

The target document opens in its native application. If the target is a product view, the graphic view refreshes and displays the target image.

Add standard text

You can insert the content of standard text to your textual work instructions document to compose a procedure.

1. Select a standard text element in the library structure or the **Search** view.
2. Place your cursor at the location in the textual work instructions document at which to add the standard text and click **Add standard text document** .

The standard text content is added to the textual work instructions document. The text is embedded in a text control, named after the source standard text element and is not editable. If the source standard text element contained symbols, these are added to the symbol section of the textual work instructions document. A specific symbol only appears once even if it is associated with more than a single source standard text element.

It is also possible to add data collection definitions and planner input fields to the textual work instructions document.

Note:

- You cannot copy standard text. If you attempt to do this, Teamcenter returns an error message and clears the undo stack.
- Standard text elements are not visible in the process structure.
- Ensure that the configuration rule applied to the library structure is the same as that applied to the process structure. This ensures that you add the same content to the textual work instructions document as that which you viewed in library.
- If adding the standard text document causes the addition of a symbol to the textual work instructions document, Teamcenter clears the undo stack.

Remove standard text

- Click the standard text document and press the Delete key.

Note:

- Teamcenter also removes symbols associated with the standard text element from the textual work instructions document.
- If a symbol is associated with more than one standard text element, Teamcenter retains it in the textual work instructions document.

- Teamcenter clears the undo stack.

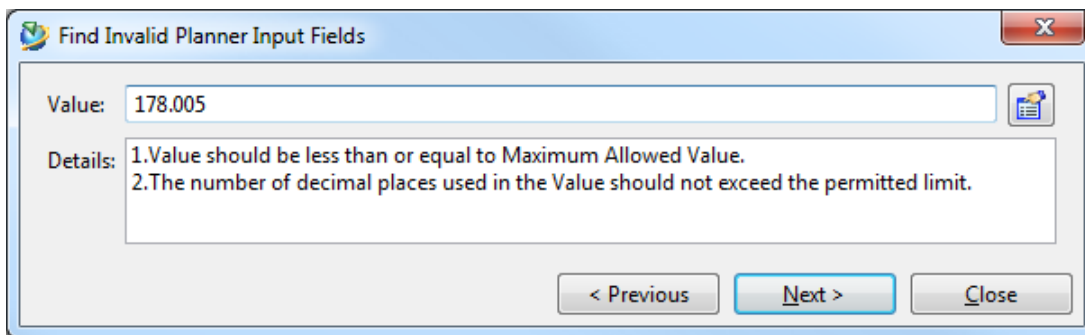
Finding invalid planner input fields

If there are invalid planner input fields in your standard text document, it can be a tedious task to locate them and correct the problem. This may occur if, for example, a new revision has come into use where a property has been updated. Even if there are invalid planner input fields in your standard text document, Teamcenter enables you to save your work. When you next open the document, Teamcenter issues a message that there are invalid planner input fields.

Find invalid planner input fields


1. Click the **Validate PIF** button .

The **Find Invalid Planner Input Fields** dialog box appears.



Note:

If there are no invalid planner input fields, Teamcenter issues a message instead of opening the dialog box.

2. Click the **Properties** button  and fix the invalid planner input field as required.


The **Details** section displays **Valid** to indicate that you have fixed the current invalid planner input field.

3. Click **Find Next** and fix the next invalid planner input field as many times as necessary.

Note:


Teamcenter allows you to save and close the current document and continue fixing invalid planner input fields in your next work session.

Save changes

- Click **Save**  to save the current changes in your document.


Teamcenter saves the document and updates the preview document.

Discard changes

- Click **Discard changes**  to discard your current work and reload the last saved version of the document.

Set the scope

In edit mode, you can change the editing focus from the current document to another document (the new scope) without exiting edit mode.

1. Click the desired element in the structure.
2. Click **Set scope** .

If there are unsaved changes in the current document, Teamcenter prompts you to save them before exiting the current document.

Teamcenter closes the current document, checks out the target operation or process, and loads the target document. You can now begin editing the target document.

Note:

The **Set scope** command does not work if any of the following conditions apply:

- The target scope is not an operation or process.
- You do not have permission to edit the target scope, as defined by the access control list in *Access Management Using Rules and ACLs*.

About creating textual work instructions using standard text

Teamcenter enables creating textual work instructions using standard text as building blocks. These textual work instructions are associated with operations or processes in the process structure.

The standard text library is a Teamcenter structure comprised of standard text folders and standard text elements nested under the folders. Standard text content is associated with standard text elements by a specific type of dataset and is accessible in the Teamcenter **Attachments** view.

The benefits of standard text include:

- Standardization and consistency of textual work instructions throughout the entire organization.
- Managing standard text content. Standard text enables you to write once only and reuse the same text many times.
- Easy maintenance of up-to-date textual work instructions when products are upgraded. Make a single change in a procedure and propagate the change through all the relevant documents.
- Improved accuracy. Textual work instructions are intrinsically connected with the process structure; they are a textual expression of the manufacturing process.
- Textual work instructions are composed by the planners or engineers who designed the process, increasing accuracy.
- Standard text is stored in the database, enabling you to search for text by its ID, name, or the text itself.
- Easy localization.
- Easy transfer of documents between different virtual engineering systems.

Typically, there are three user roles involved in creating textual work instructions:

- Administrator

Responsible for creating and maintaining standard text templates and textual work instructions templates. The **MEWiStandardTextTemplate** preference defines the template used for standard text documents, and the **MEWiWorkInstructionTemplate** preference defines the template used for textual work instructions. By default, both preferences are set to the same template. The administrator can change these templates or create new ones according to organizational requirements. The templates are in Microsoft Word DOCX format and are associated with a dedicated dataset object.

- Librarian

Responsible for creating standard text libraries, managing standard text folders and elements, authoring standard text, and creating and managing standard text symbols. Standard text is written in a generic style so that it can be reused in varying contexts. An example of standard text is a procedure describing how to mount a wheel on a car and this can be reused in multiple projects. The librarian uses the standard text editor to write standard text elements and the standard text library interface to manage them. Additionally, the librarian may use the **Teamcenter Search** view and **Results** window as aids.

- Planner or engineer

Uses standard text as building blocks to compose work instructions. Planners cannot edit standard text in the standard text library; however, they may add free text to the work instructions document associated with an operation or process and edit properties related to the standard text content. Additionally, the planner may use process structure, the textual work instructions editor, **Teamcenter Search** view, and the **Results** window as aids.

You can use Access Manager to configure various permissions for different roles using access control lists (ACLs). Siemens Digital Industries Software recommends using the scenario of administrator, librarian, and planner.

Note:

To use standard text features, Microsoft Word is required. For certified versions, see the Hardware and Software Certifications knowledge base article on Support Center.

Creating standard text symbols

By default, all standard text and work instructions have a symbol section at the top of the body text (just below the header). Teamcenter adds symbols to the symbol section (and nowhere else). However, Teamcenter only adds symbols of the **Work Instructions Symbol** type.

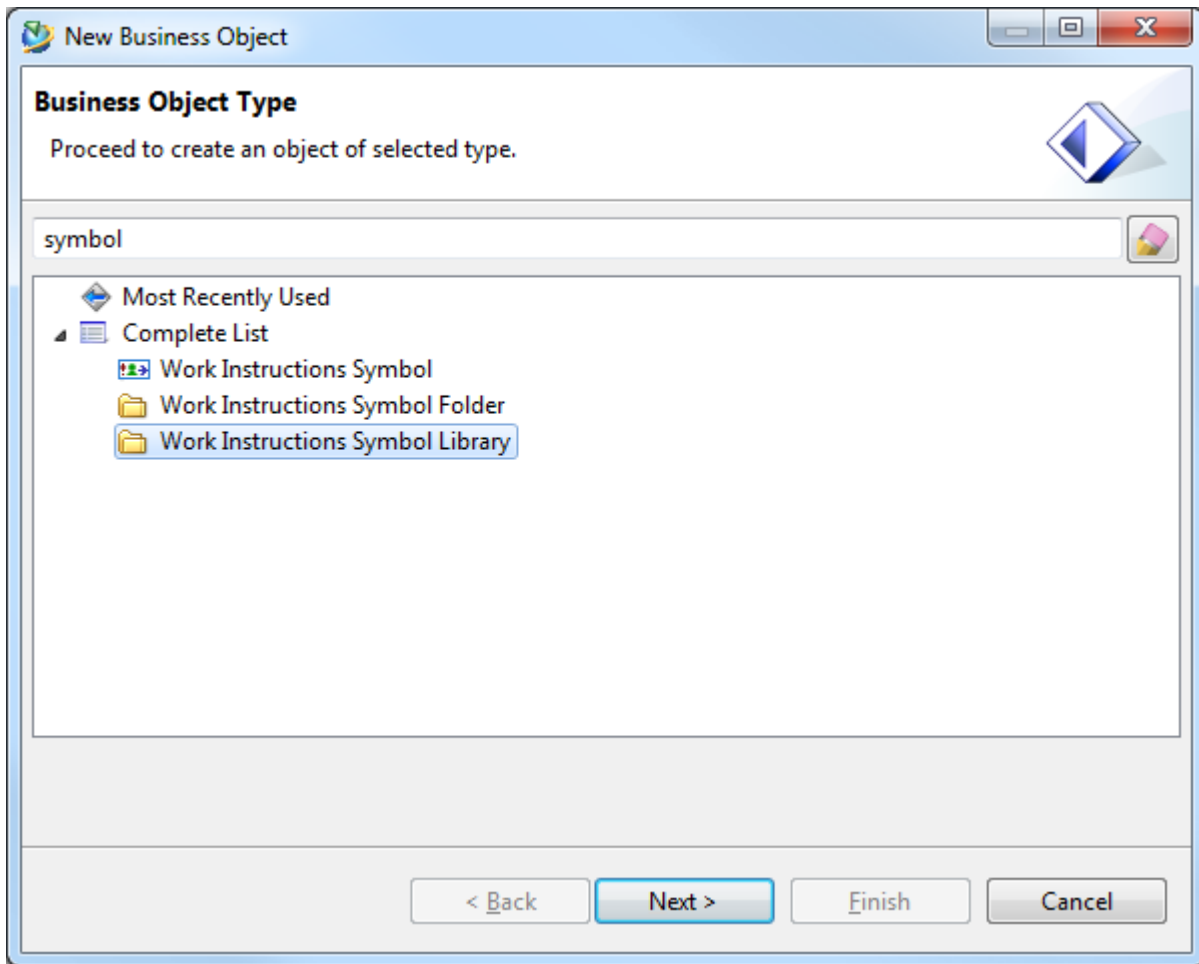
Librarians can create symbols for use in standard text and work instructions by adding a graphic file to a symbol dataset in My Teamcenter. You can manage the symbols by creating symbol libraries and folders and nesting the symbols.

Manage standard text symbols

If you have a large number of standard text symbols, you can create symbol libraries and folders in My Teamcenter. This enables you to organize your data and facilitates using symbols.

1. In My Teamcenter, select an object to be the parent of the new symbol library or folder and choose **File→New→Other**.

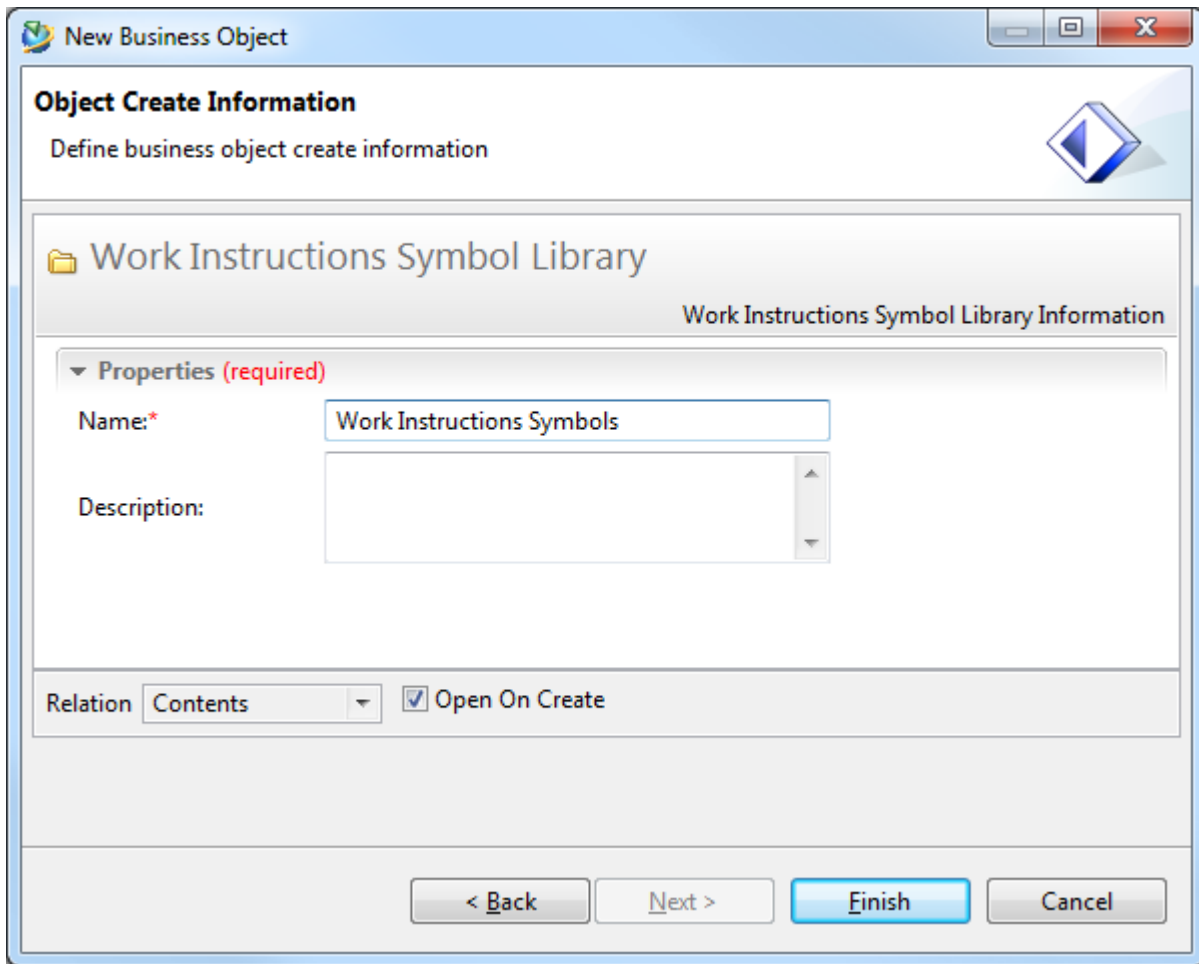
The **New Business Object** dialog box appears.



2. Select **Work Instructions Symbol Library** or **Work Instructions Symbol Folder** and click **Next**.

Alternatively, type **symbol** in the search box. The **New Business Object** dialog box filters the objects and displays only symbol types.

The **Object Create Information** dialog box appears.



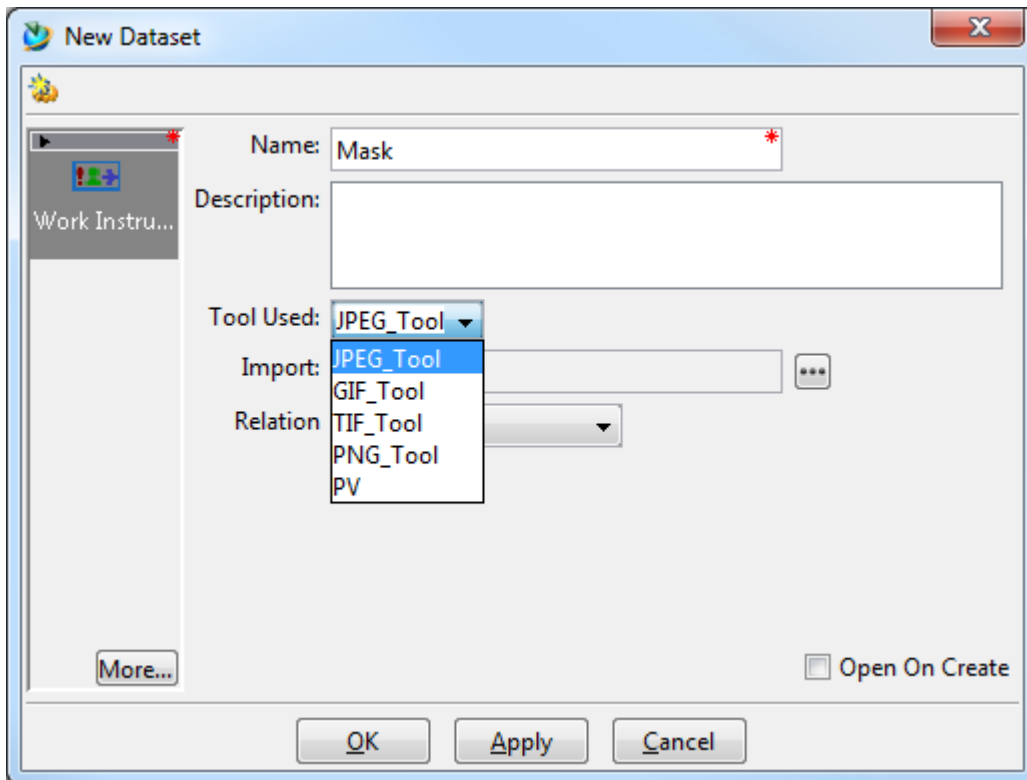
3. Type a name in the **Name** box, enter other optional attributes, and click **Finish**.

Teamcenter displays the new symbol library or folder under the selected object in My Teamcenter.

Create a standard text symbol

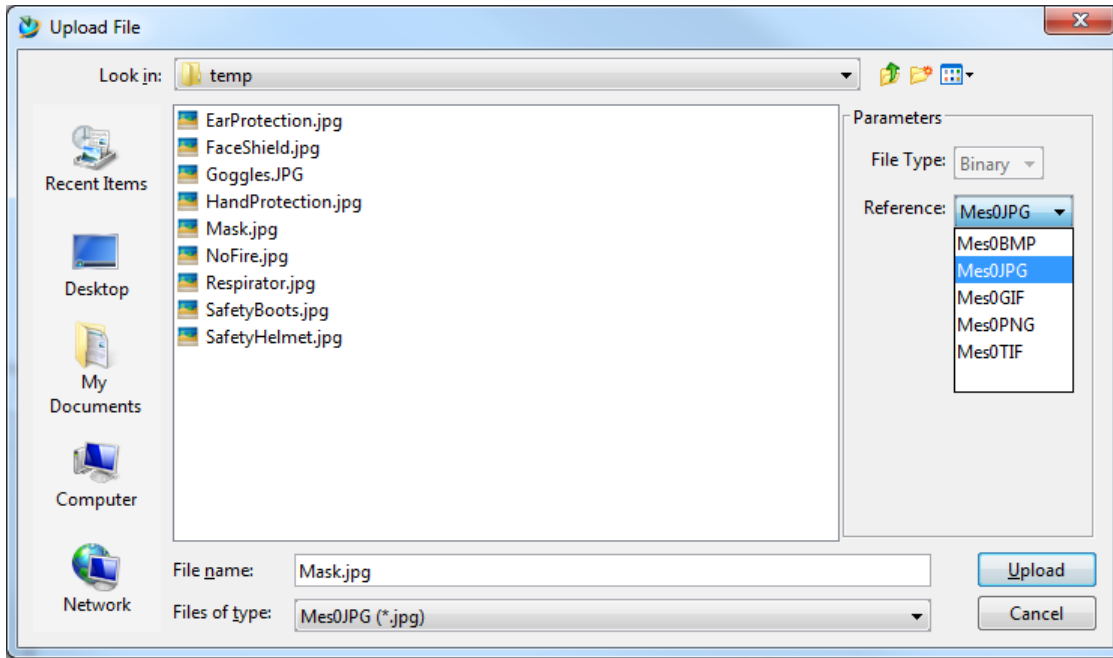
1. In My Teamcenter, select an object to be the parent of the new symbol (for example, symbol folder) and choose **File**→**New**→**Dataset**.

The **New Dataset** dialog box appears.



2. Select **Work Instructions Symbol** on the left side of the dialog box.
3. Type a name in the **Name** box, and enter other optional attributes.
4. Click the browse button next to the **Import** box.

The **Upload File** dialog box appears.



- From the **Reference** list, select the desired file format.

The **Work Instructions Symbol** dataset can contain graphic files of the following formats: BMP, JPG, GIF, PNG, and TIF.

Teamcenter displays the selected format in the **Files of type** list and filters the display accordingly.

- Navigate to the desired symbol file and click **Import**.

Note:
Only a single file should be imported per dataset.

The **Import** box contains the imported file name.

- Select a tool from the **Tool Used** list according to the reference type of the imported file:

Reference type	Tool used
BMP	PV
JPG	JPEG_Tool
GIF	GIF_Tool
PNG	PNG_Tool
TIF	TIF_Tool

8. Click **OK**.

Teamcenter creates the symbol dataset.

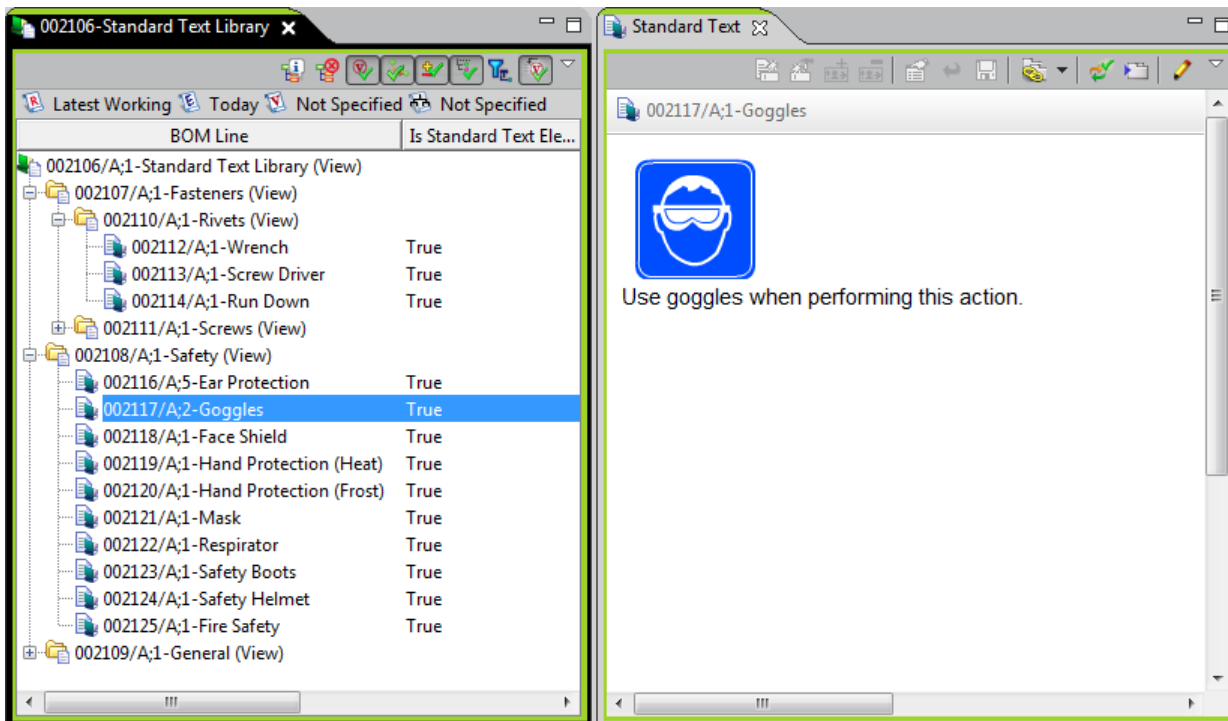
Note:

After creating the dataset, you can double-click it to launch the tool and display its image.

Creating standard text library structure

A standard text library object is a Teamcenter structure and is the root of a hierarchical structure comprised of standard text folders and standard text elements.

Each standard text element can be associated with specific content comprised of text, data collection information, and symbols. Following is an example of a standard text library structure and the standard text editor displaying a preview of specific standard text content.



Standard text elements are revisable.

Note:

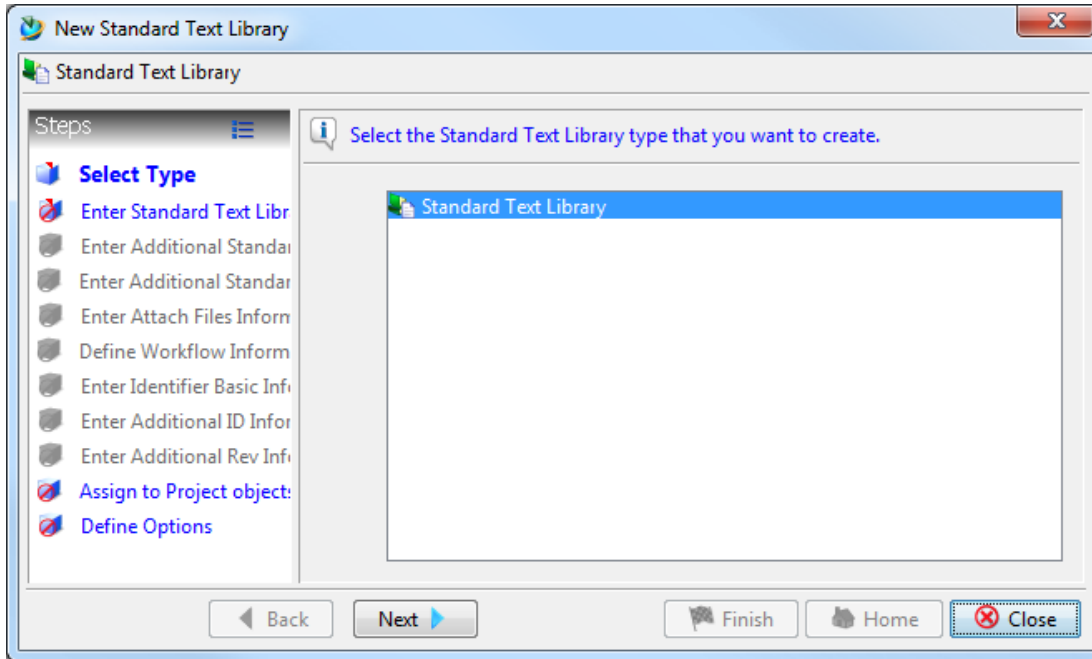
You can add standard text library structures to collaboration context objects.

You can use Manufacturing Process Planner or Part Planner to create standard text libraries, folders, and elements. You can use the standard text editor to edit standard text and then use the textual work instructions editor to insert the content of the standard text to create work instructions.

Create a standard text library

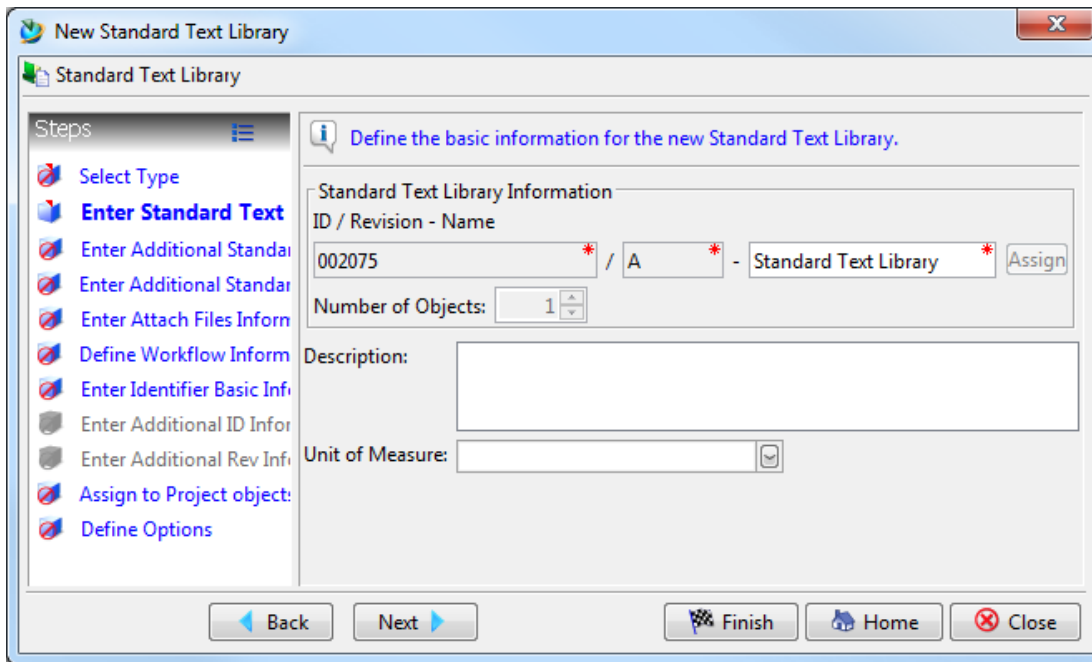
1. Choose **File**→**New**→**Standard Text**→**Standard Text Library**.

The New Standard Text Library wizard is displayed.



2. Select the library type and click **Next**.

The New Standard Text Library basic information window is displayed.



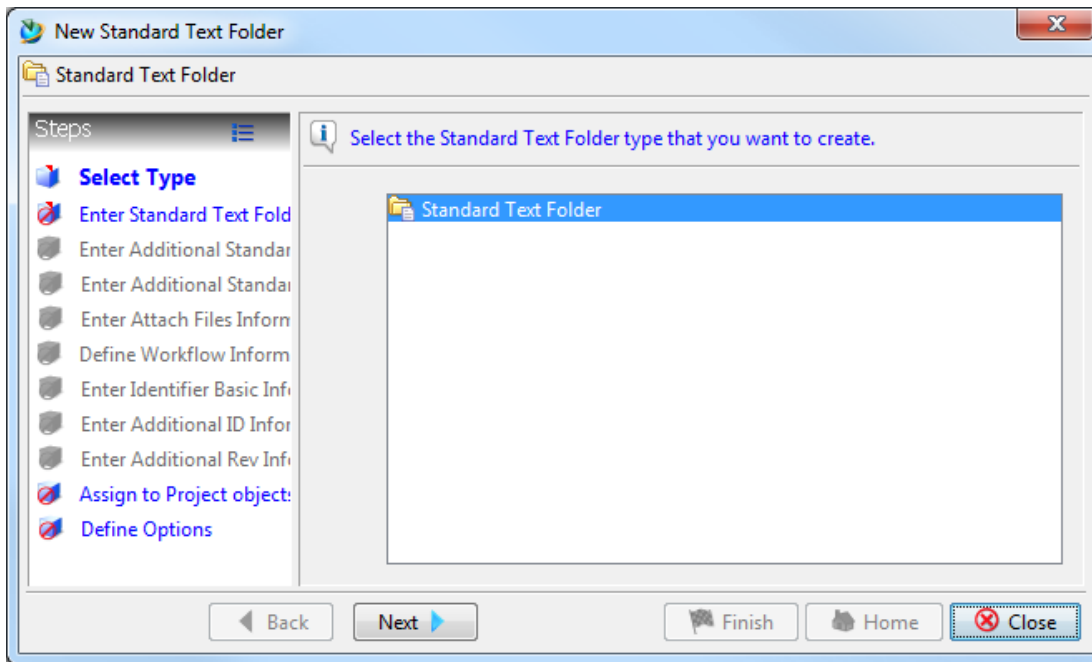
3. Type entries for the following mandatory boxes: **ID**, **Revision**, and **Name**.
4. Click **Next** to add optional parameters or **Finish** to create the new standard text library.

The application displays the new standard text library as a new root. This is a structure context with the standard text library at its root.

Create a standard text folder

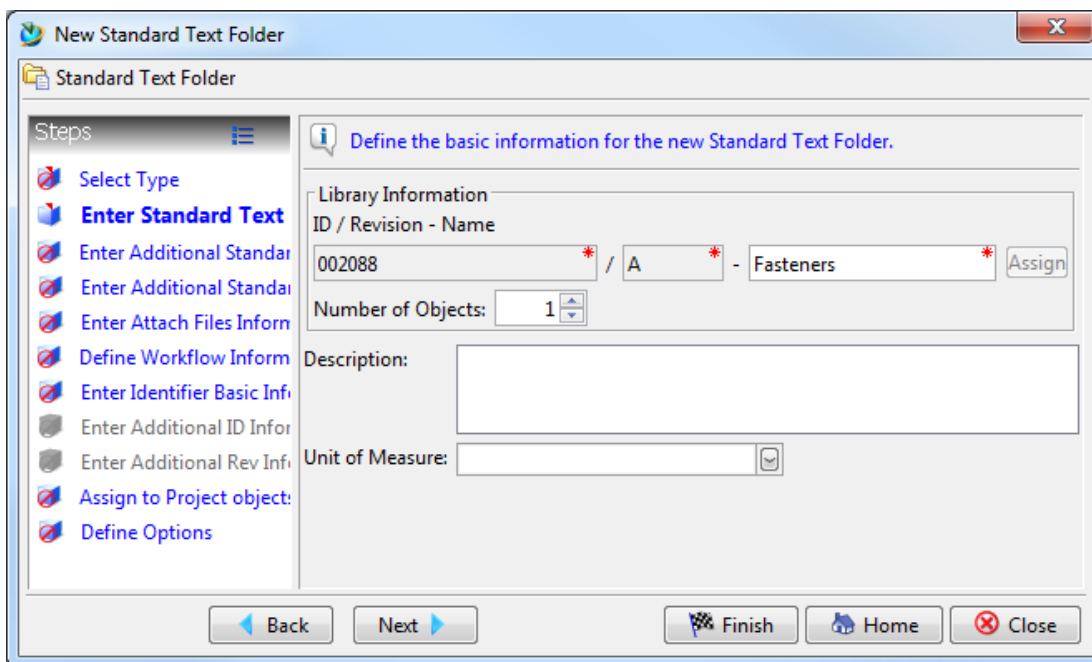
1. Select a standard text library or folder and choose **File**→**New**→**Standard Text**→**Standard Text Folder**.

The New Standard Text Folder wizard is displayed.



2. Select the folder type and click **Next**.

The New Standard Text Folder basic information window is displayed.



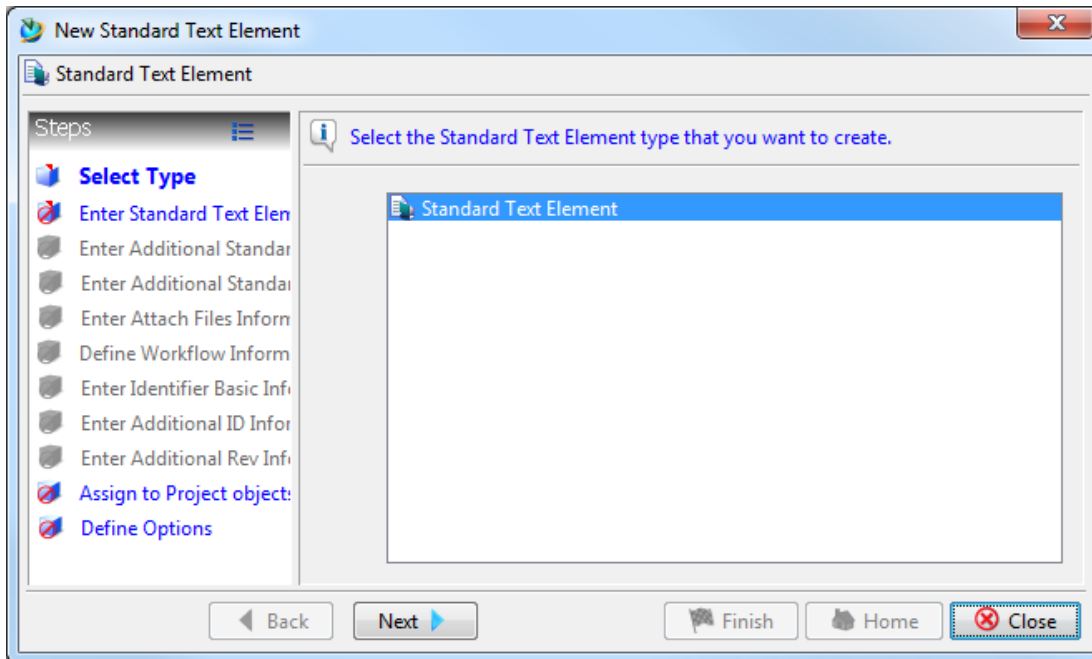
3. Type entries for the following mandatory boxes: **ID**, **Revision**, and **Name**.
4. Click **Next** to add optional parameters or **Finish** to create the new standard text folder.

Teamcenter displays the new standard text folder nested under the selected standard text library or folder.

Create a standard text element

1. Select a standard text library or folder and choose **File**→**New**→**Standard Text**→**Standard Text Element**.

The New Standard Text Element wizard is displayed.



2. Select the element type and click **Next**.

The New Standard Text Element basic information window is displayed.

The screenshot shows a 'New Standard Text Element' dialog box. On the left, a 'Steps' list includes: Select Type, Enter Standard Text (highlighted), Enter Additional Standar..., Enter Additional Standar..., Enter Attach Files Inform..., Define Workflow Inform..., Enter Identifier Basic Inf..., Enter Additional ID Infor..., Enter Additional Rev Inf..., Assign to Project object:, and Define Options. The main area is titled 'Standard Text Element Information' and contains the following fields: 'ID / Revision - Name' with the value '002092' / 'A' - 'Wrench' and an 'Assign' button; 'Number of Objects' with a spinner set to '1'; 'Description' with an empty text box; and 'Unit of Measure' with a dropdown menu. At the bottom, there are buttons for 'Back', 'Next', 'Finish', 'Home', and 'Close'.

3. Type entries for the following mandatory boxes: **ID**, **Revision**, and **Name**.
4. Click **Next** to add optional parameters or **Finish** to create the new standard text element.

Teamcenter displays the new standard text element nested under the selected standard text library or folder.

The following figure displays a standard text structure.

BOM Line	Is Standard Text Element Active	Item Type
002106/A;1-Standard Text Library (View)		Standard Text Library
002107/A;1-Fasteners (View)		Standard Text Folder
002110/A;1-Rivets (View)		Standard Text Folder
002112/A;1-Wrench	True	Standard Text Element
002113/A;1-Screw Driver	True	Standard Text Element
002114/A;1-Run Down	True	Standard Text Element
002111/A;1-Screws (View)		Standard Text Folder
002108/A;1-Safety (View)		Standard Text Folder
002116/A;5-Ear Protection	True	Standard Text Element
002117/A;2-Goggles	True	Standard Text Element
002118/A;1-Face Shield	True	Standard Text Element
002119/A;1-Hand Protection (Heat)	True	Standard Text Element
002120/A;1-Hand Protection (Frost)	True	Standard Text Element
002121/A;1-Mask	True	Standard Text Element
002122/A;1-Respirator	True	Standard Text Element
002123/A;1-Safety Boots	True	Standard Text Element
002124/A;1-Safety Helmet	True	Standard Text Element
002125/A;1-Fire Safety	True	Standard Text Element
002109/A;1-General (View)		Standard Text Folder

Getting started with standard text editor

You can locate standard text libraries using My Teamcenter or with the Teamcenter **Search** view and send them to Manufacturing Process Planner or Part Planner.

The following items are associated with each standard text element (after adding text to it and saving it):

- Preview file

When you click the standard text element, the standard text view displays a preview. Preview files are in one of the following formats: PDF, MHT, DOCX, or RTF, as defined in the **MEWiPreviewFormat** preference. The preview file is updated with the latest information you entered in the standard text document.

Note:

Preview files in MHT format do not display the headers and footers.

The preview file is not visible in the library structure. However, you can double-click it in the Teamcenter **Attachments** view to open it in its associated application. For example, if the preview file is stored in PDF format, it opens in a PDF reader.

- Document

When you enter edit mode, Teamcenter closes the preview file and loads the live standard text document. All the data you enter is stored in this file.

The standard text document is not visible in the library structure.

View standard text content

1. In My Teamcenter, right-click the standard text library and choose **Send to→Manufacturing Process Planner** or **Send to→Part Planner**.
2. In the library, right-click a standard text element and choose **Open with→Standard Text**.

For a new standard text element that does not contain any text, no preview is available; in this case, the **Standard Text** pane displays the following message:

```
No preview file is available
```

After adding text and saving the standard text element, accessing the **Standard Text** view opens and displays the preview file associated with the selected standard text element.

Editing standard text documents

Editing standard text—overview

You can edit standard text when the elements are active and the access control list permits.

When editing standard text, you can add and remove text, data collection definitions, and symbols.

- Click **Edit**  .

Note:

- Only the librarian is permitted to enter edit mode, as defined in the access control list.
- All editing changes take effect only after you perform a **Save** operation. For example, if you employ a standard text query to search for a text snippet in the **Structure Search** view, your search only returns the result for an already saved text snippet.

Edit standard text


1. Right-click a standard text element in the standard text library and choose **Open with→Standard text**.


The **Standard Text** view opens and displays the preview file associated with the selected standard text element. If there is no preview file, the **Standard Text** pane displays the following message:

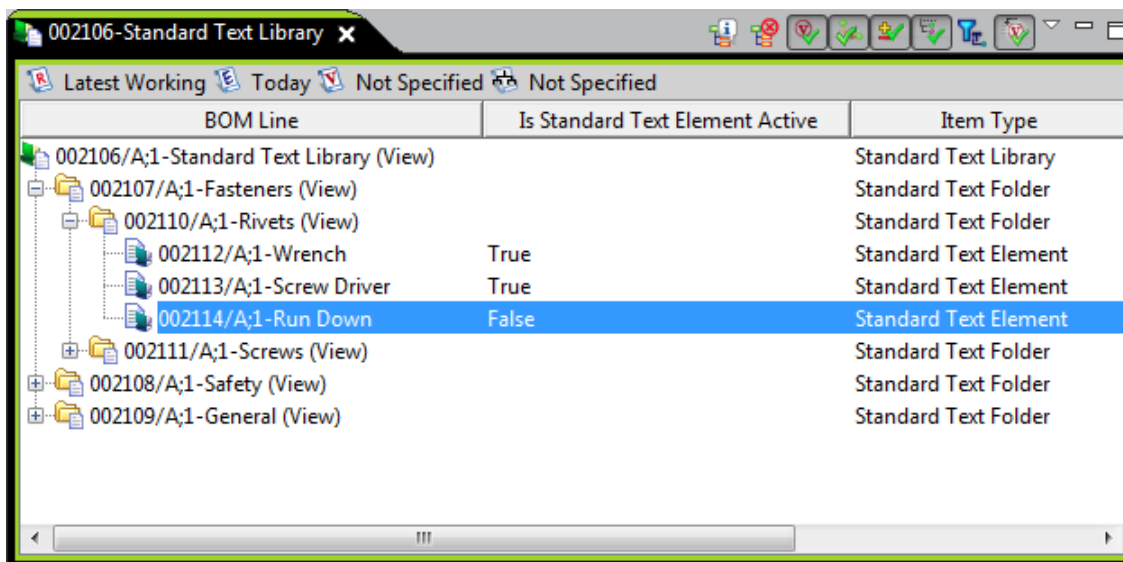
No preview file is available

Note:

- When the standard text editor is running in preview mode, you can select any standard text element in the standard text library and the preview is automatically refreshed to display the newly selected element. You can also preview deactivated standard text elements.

2. To edit the standard text element, click **Edit**  .

When entering edit mode, Teamcenter closes the preview, checks out the standard text element, and loads the standard text document. Teamcenter marks the checked-out element with the  symbol.



BOM Line	Is Standard Text Element Active	Item Type
002106/A;1-Standard Text Library (View)		Standard Text Library
002107/A;1-Fasteners (View)		Standard Text Folder
002110/A;1-Rivets (View)		Standard Text Folder
002112/A;1-Wrench	True	Standard Text Element
002113/A;1-Screw Driver	True	Standard Text Element
002114/A;1-Run Down	False	Standard Text Element
002111/A;1-Screws (View)		Standard Text Folder
002108/A;1-Safety (View)		Standard Text Folder
002109/A;1-General (View)		Standard Text Folder

If this is the first editing session for the current standard text element, Teamcenter loads the standard text template, as defined in the **MEWiStandardTextTemplate** preference.

You can now begin editing the document.

Note:

- If you have deactivated a standard text document, for example, if it is out-of-date, you cannot access edit mode.
- When accessing edit mode, the cursor is placed after the last character in the standard text document.

- When exiting edit mode, Teamcenter checks in the standard text element.

Add text

Click anywhere in the document and write the new text. After performing a **Save** operation, Teamcenter captures the text in a text control and links it to the database. The text becomes searchable and localizable in Teamcenter. If you wish the text to remain in the body of the document and not in a text control, set the **METWICreateTextControlsOnSave** preference to **False**.

Add a symbol


You can add symbols to the standard text element. The symbols appear in the document in the symbols section. When you add the content of a standard text document to a work instructions document, Teamcenter also adds the symbols of the standard text document to the work instructions document.

Note:

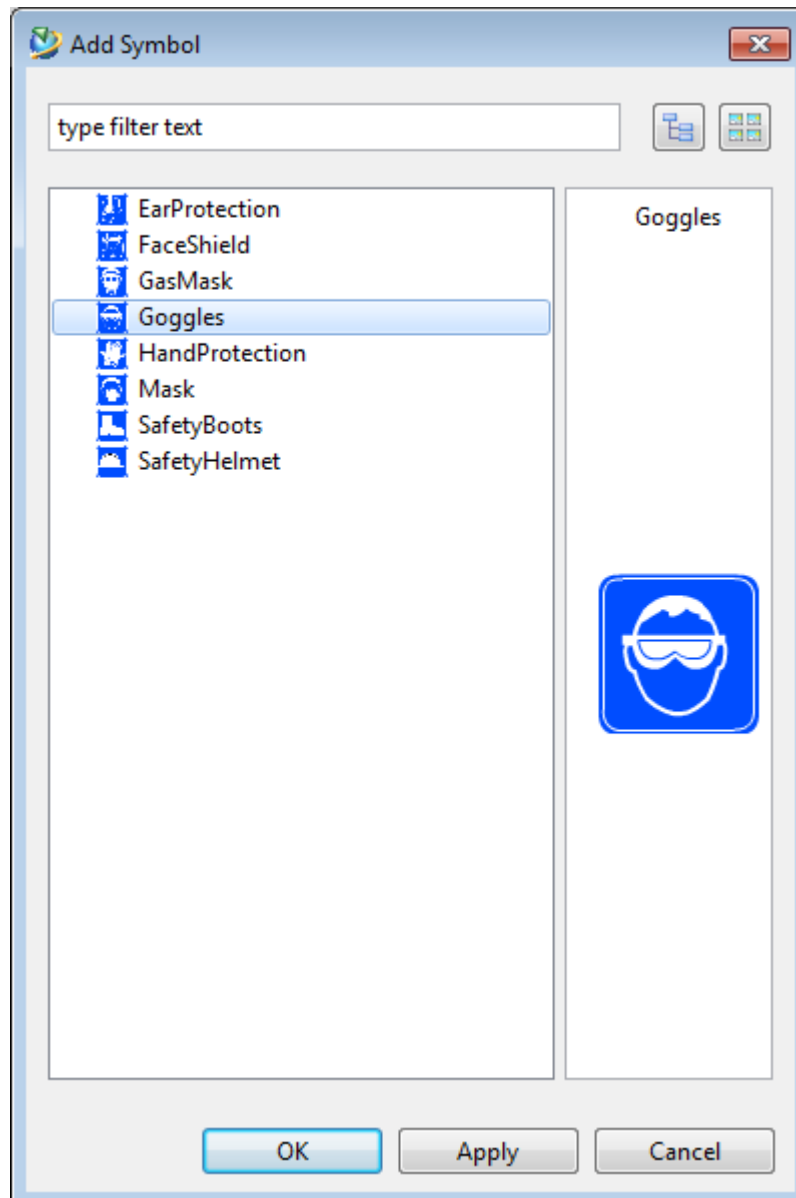
Your administrator may have moved the **Add Symbol** and **Remove Symbol** buttons to the **Textual Work Instructions** view. If this is the case, you can add symbols directly to a work instruction document without adding them to a standard text element first.

1. Click anywhere in the standard text view.

The Teamcenter focus returns to the standard text view.

2. Click **Add symbol** .


Teamcenter displays the **Add Symbol** dialog box listing all the symbols (contained in **Work Instructions Symbol** datasets) in the database. If you manage symbols in a folder structure, this structure is reflected in the **Add Symbol** dialog box.

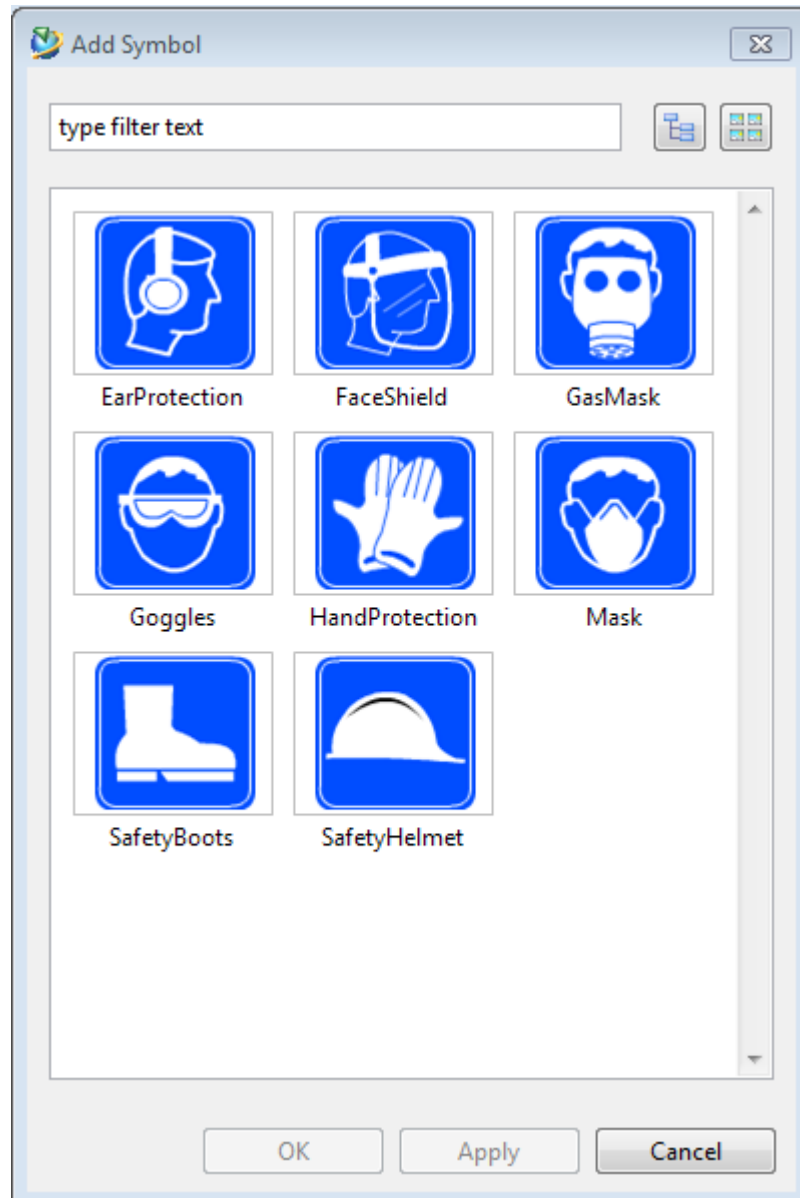


3. Do any of the following:

- Enter any part of the name of the symbol for which you are searching in the search box.

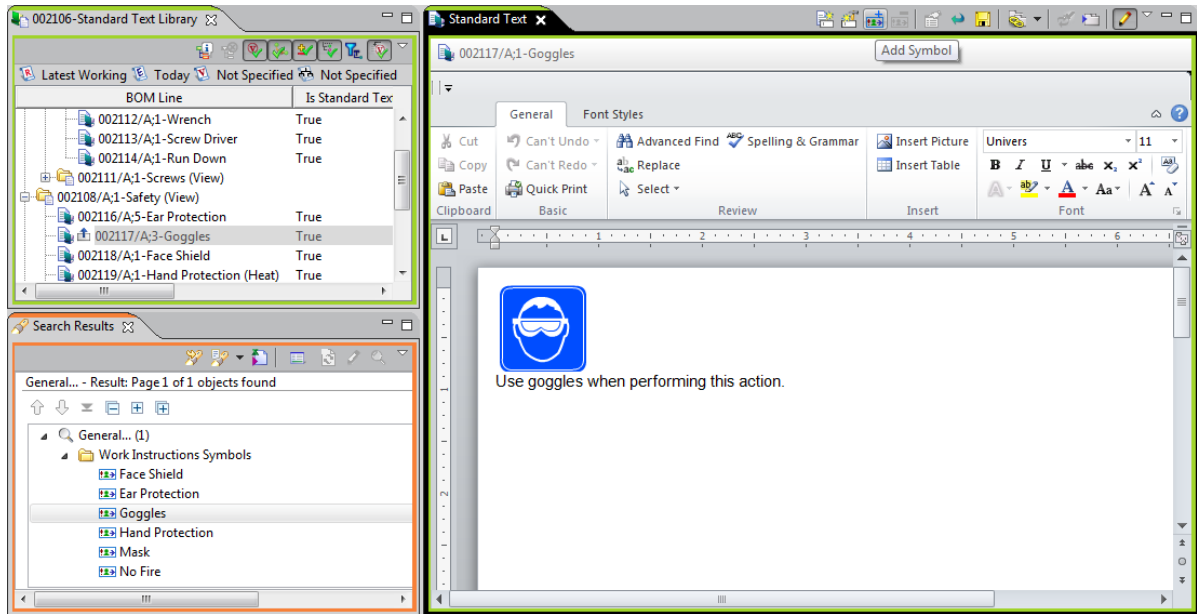
Teamcenter automatically filters search results as you type.

- Browse through the results by selecting each symbol in the list and viewing the thumbnail in the right pane.
- Click  to switch to the thumbnail view where you can view all symbols.



4. Select one or multiple symbols and click **OK** to close the dialog box or **Apply** to add the symbol but leave the dialog box open for further selection.


Teamcenter adds the desired symbols to the symbol section in your document.



Note:

- Teamcenter always adds symbols to the symbol section. It does not matter where the cursor is when performing the **Add symbol** operation.
- You may select multiple symbols and add them with a single **Add symbol** operation.
- You cannot insert a particular symbol more than once.
- After performing this action, you cannot undo any previous actions (the **Undo** list is cleared).

Remove a symbol

- In the document, select the symbol you want to remove and click **Remove symbol** .

Teamcenter removes the symbol.

Note:

After performing this action, you cannot undo any previous actions (the **Undo** list is cleared).

Add a data collection definition

You add a data collection definition to the document. This contains an instruction to perform data collection on the shop floor. You can also define the required properties for the new data.

For example, if you require production workers to note a torque value, you can use text followed by a data collection definition.

Text torque
Record torque value:

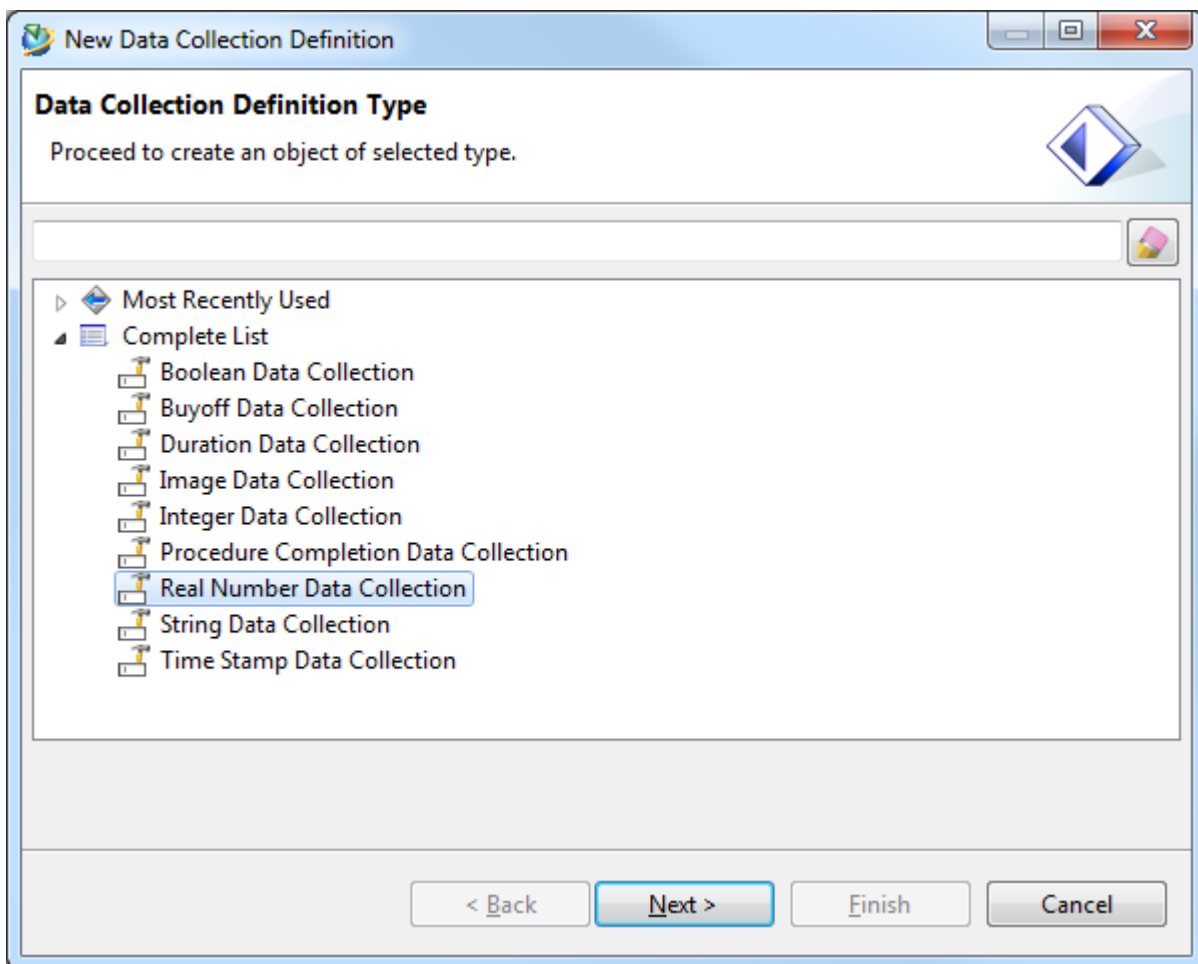
Note:

Data collection definitions are not visible in the Teamcenter structure.

1. Place your cursor at the location at which to add the data collection definition and click **New dcd**



The New Data Collection Definition wizard is displayed.



The following data collection definition types are available:

- **Boolean**

- **Buyoff**
- **Duration**
- **Image**
- **Integer**
- **Procedure Completion**
- **Real Number**
- **String Data**
- **Time Stamp**
- **List of Values**

All the data collection definition types can be user-customized and are automatically supported by the editor.

2. Select the type of data control definition or type it and click **Next**.

The Data Collection Definition Create Information wizard is displayed.

New Data Collection Definition

Data Collection Definition Create Information
Define the information for the creation of a Data Collection Definition

Real Number Data Collection
Real Number Data Collection Information

▼ **Properties (required)**

Name*:

Description:

Is Optional: True False

Number Of Decimal Places:

Minimum Allowed Value:

Maximum Allowed Value:

Alert Minimum Value:

Alert Maximum Value:

Caution Minimum Value:

Caution Maximum Value:

Out-Of-Range Behavior:

Data Acquisition Method:

Placeholder String:

< Back Next > **Finish** Cancel

3. Enter the attributes for the new data collection definition and click **Finish**.

- **Name** is required; all the other attributes are optional.
- The **Placeholder String** property holds the characters to be displayed in the document. If this is left empty, ... (an ellipsis) is displayed in the standard text document.

- The default value for **Is Optional** is **False**. This means that the data collection definition is not optional and a measurement must be recorded. You can set **Is Optional** to **True** to make the data collection definition optional.

The new data collection definition is displayed in your document.

Note:

You cannot copy data collection definitions.

Data collection properties

In addition to the **Name**, **Description**, **Is Optional**, and **Placeholder String** properties that each data collection type possesses, most data collection types have additional properties, except for **Boolean Data Collection** and **Duration Data Collection**.

The following table lists the additional properties and the data collection definition types that include them.

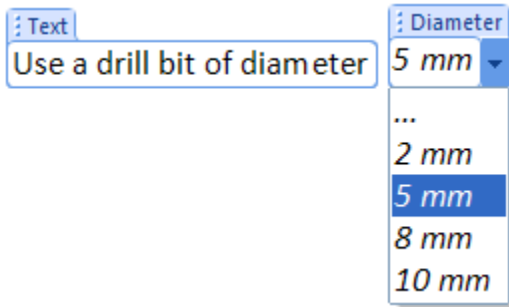
Property	Data collection definitions
Time format	Time Stamp, Procedure Completion, Buyoff
Allow characters	String
Maximum length	String
Minimum allowed value	Integer, Real Number
Maximum allowed value	Integer, Real Number
Caution minimum value	Integer, Real Number
Caution maximum value	Integer, Real Number
Alert minimum value	Integer, Real Number
Alert maximum value	Integer, Real Number
Number of decimal places	Real Number
Out-Of-Range Behavior	Integer, Real Number, Image
Data Acquisition Method	Integer, Real Number, Image

Note:

An administrator can add the **List of Values** type as a customized type when he or she sets up standard text.

Add a planner input field


You can use a planner input field in a standard text document to create generic standard text elements for repeated use in varying scenarios. This is done by combining text and planner input fields. For example:



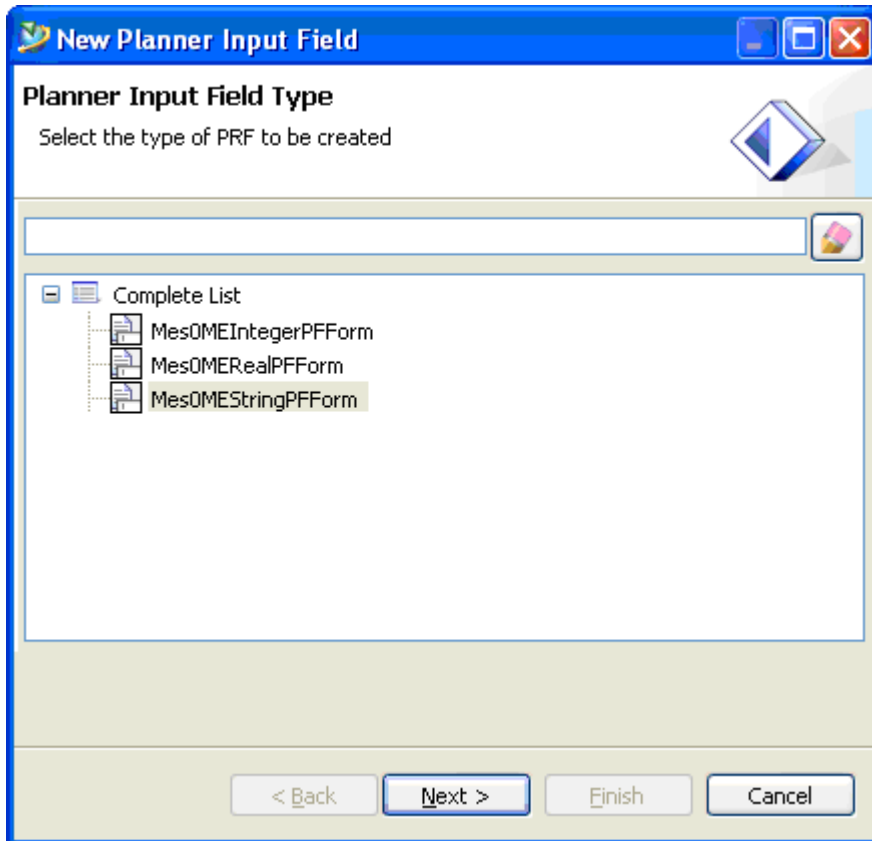
You can also define the required properties for the new data.

Note:

Planner input fields are not visible in the Teamcenter structure.

1. Place your cursor at the location at which to add the planner input field and click **New pif** .

The **New Planner Input Field** dialog box is displayed.



The following planner input field types are available:

- **Integer**
- **Real**
- **String**
- **Customized**

Note:

Customized planner input fields require a dedicated style sheet. If this is missing, the **New Planner Input Field** dialog box prevents you from proceeding to the next stage.

All the planner input field types can be user-customized and are automatically supported by the editor.

2. Select the type of planner input field or type it and click **Next**.

The **Planner Input Field Create Information** dialog box is displayed.

3. Enter the attributes for the planner input field definition and click **Finish**.

Name attribute is required; all the other attributes are optional.

The new planner input field is displayed in your document. It displays **Name** in its title bar.

4. Click **Finish**.

Teamcenter performs a validity check on the new planner input field.

Planner input field type	Teamcenter checks that...
Integer	The value is not less than the minimum (if defined) and does not exceed the maximum (if defined).
Real	The value is not less than the minimum (if defined) and does not exceed the maximum (if defined). The number of fraction digits does not exceed the allowed number (if defined).
String	The number of characters in the string does not exceed the maximum length. If it does, Teamcenter truncates the excess characters when saving the planner input field. The default maximum length is 512 characters.

Planner input field type	Teamcenter checks that...
	<p>The string is in the legal format (if defined). Teamcenter checks whether the string conforms to regular expression patterns. The following are examples of commonly used regular expression patterns:</p> <ul style="list-style-type: none"> • Date (dd/mm/yyyy): <code>(0?[1-9] [12][0-9] 3[01])/(0?[1-9] 1[012])/((19 20)\d\d)</code> • Email: <code>^[_A-Za-z0-9-]+(\.[_A-Za-z0-9-]+)*@[A-Za-z0-9]+(\.[A-Za-z0-9]+)*(\.[A-Za-z]{2,})\$</code> • IP address: <code>^([01]?\d\d? 2[0-4]\d 25[0-5])\.([01]?\d\d? 2[0-4]\d 25[0-5])\.([01]?\d\d? 2[0-4]\d 25[0-5])\.([01]?\d\d? 2[0-4]\d 25[0-5])\$</code>

Note:

- If the validity check fails, the system issues an error message detailing the problem. The **Planner Input Field Create Information** dialog box remains active until the problem is solved.
- You cannot copy planner input fields.

View and edit properties

You can view and edit the properties for data collection definitions and planner input fields.

- Click **Properties**  to view or edit the properties of the selected item in the current document.

Properties

Name:

Description:

Is Optional: True False

Number Of Decimal Places:

Minimum Allowed Value:

Maximum Allowed Value:

Alert Minimum Value:

Alert Maximum Value:

Caution Minimum Value:

Caution Maximum Value:

Out-Of-Range Behavior:

Data Acquisition Method:

Placeholder String:

Note:

You can edit the **Placeholder String** property in-place without accessing the properties of the data collection definition. To complete the change, click anywhere in the document outside the data collection definition.


Remove a data collection definition

- Select the data collection definition and press the Delete key.

Remove a planner input field


- Select the planner input field and press the Delete key.

Save changes

- Click **Save**  to save the current changes in your document.


Teamcenter saves the document and updates the preview document.

Discard changes

- Click **Discard changes**  to discard your current work and reload the last saved version of the document.

Set the scope

In edit mode, you can change the editing focus from the current document to another document (the new scope) without exiting edit mode.

1. Click the desired element in the structure.
2. Click **Set scope** .

If there are unsaved changes in the current document, Teamcenter prompts you to save them before exiting the current document.

Teamcenter closes the current document, checks out the target standard text element, and loads the target document. You can now begin editing the target document.

Note:

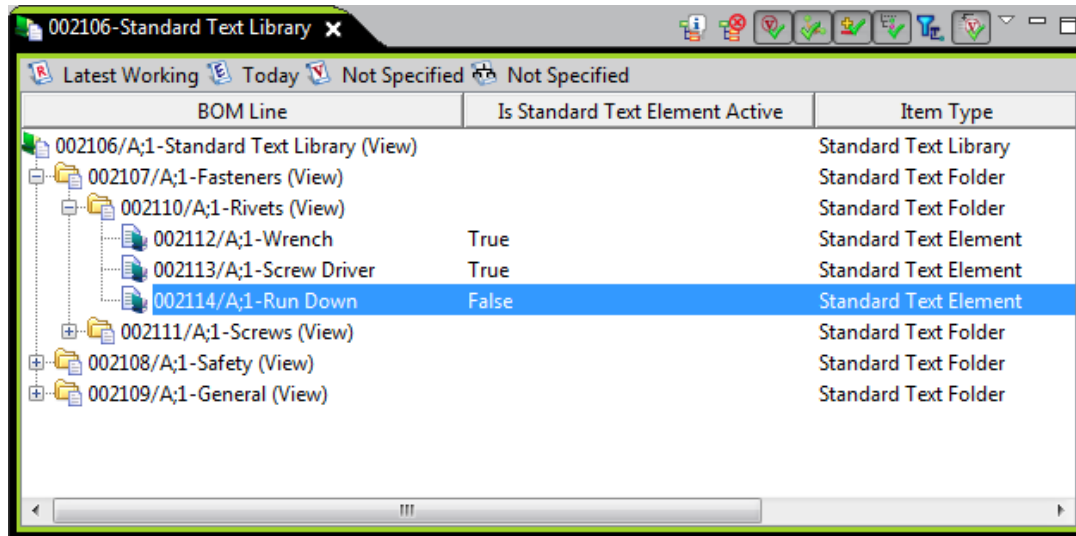
The **Set scope** command does not work if any of the following conditions apply:

- The target scope is inactive.
- The target scope is not a standard text element.
- You do not have permission to edit the target scope, as defined by the access control list.

Activate/deactivate a standard text element

You can deactivate a standard text element if it is no longer valid. You cannot edit inactive standard text elements or add them to textual work instructions.

- To deactivate a standard text element, select it and change its **Is Standard Text Element Active** cell from **True** to **False**.




BOM Line	Is Standard Text Element Active	Item Type
002106/A;1-Standard Text Library (View)		Standard Text Library
002107/A;1-Fasteners (View)		Standard Text Folder
002110/A;1-Rivets (View)		Standard Text Folder
002112/A;1-Wrench	True	Standard Text Element
002113/A;1-Screw Driver	True	Standard Text Element
002114/A;1-Run Down	False	Standard Text Element
002111/A;1-Screws (View)		Standard Text Folder
002108/A;1-Safety (View)		Standard Text Folder
002109/A;1-General (View)		Standard Text Folder

- To reactivate a standard text element, change its **Is Standard Text Element Active** cell back to **True**.
- If the **Is Standard Text Element Active** column is not visible, use the **Change Columns** dialog box to display the **Is Standard Text Element Active** column.
- You can still view deactivated elements.

Search a standard text element for a specific text string

You can search for standard text elements that contain specific text in their documents.

The **METWICreateTextControlsOnSave** preference must be set to **true** for this search to function properly.

- Type the string in the text field at the top of the **Standard Text Library** view and click .

Teamcenter displays all the standard text elements in the **Search Results** section at the bottom of the view. You can work with these lines in the same fashion as you work with the lines at the top of the view.

The screenshot shows a software window titled "003124-Demo_stx_lib" with a search bar containing "pre". The main area displays a BOM tree structure with columns for "BOM Line", "Is Standard Text Ele...", "Occurrence Type", and "Item Rev Stat". The tree includes folders like "003124/A;1-Demo_stx_lib" and "003125/A;1-folder", and several STX elements (E1 through E5). The element "003128/A;3-STX_E3" is highlighted in blue. Below the tree, a "Search Result [2]" section shows a table with two results:

BOM Line	Item Type
003126/A;2-STX_E1	Standard Text Element
003127/A;3-STX_E2	Standard Text Element

9. Collaboration and CAM integration

Working with projects

About projects

Projects represent and control access to a particular piece of work that may be accessible to multiple organizations, such as project teams, development teams, suppliers, and customers.

Objects, such as items, item revisions, datasets, and forms can be assigned to projects. Additionally, folders, or folders and their contents can be assigned to projects. Items, item revisions, and engineering change objects can be assigned to projects during the creation process. All other workspace objects can only be assigned to projects after the object has been created. Objects can be selected from search results and assigned to a project or projects.

When an object is assigned to a project, attachment objects, as defined by the propagation rules, are also assigned to the project. Propagation rules are determined by include and exclude relations lists. By default, the include relation list contains the following relation types:

- **Specification**
- **Manifestation**
- **AltRep**
- **EC_affected_item_rel**
- **EC_solution_item_rel**

You can only assign objects to projects if you are a privileged project team member.

If you are a Teamcenter administrator or a project administrator, you can assign multiple objects in a structure to a project by running the **update_project_bom** utility. You can also use this utility to remove multiple objects from a structure.

Assigning objects to projects

Objects can be assigned to projects either during the creation process or after they are created. Items, item revisions, and engineering change objects can be assigned to a project during the creation process, all other objects must be assigned after they are created.

Objects can be assigned to projects by making selections from the tree or **Properties** table or by selecting from the search results display.

Note:

You can select from different lists of values (LOVs) for a property, depending on which project the object is assigned to.

Assign objects to projects from the tree or Properties table

1. Select one or more objects in the tree display or **Properties** table.
2. Right-click and choose **Project→Assign**, or choose **Tools→Project→Assign** from the main menu.

If multiple objects were selected in step 1, the system displays the **Assign Objects to Projects** dialog box. If a single object was selected, the system displays the **Assign an Object to Projects** dialog box. The projects of which you are a privileged member are displayed in the **Projects for Selection** list.

Caution:

The objects you selected in step 1 may already be assigned to one or more projects. However, this is not reflected in the selection list.

3. Select the project or projects to which the objects will be assigned and move them to the **Selected Projects** list using the right-arrow button. To select all projects in the list, click the double-arrow button.
4. Click **Apply** to assign the objects to the projects and retain the dialog box. Click **OK** to assign the projects and dismiss the dialog box.

Note:

You can also assign a selected object to a project by dragging it onto the project icon.

Assign objects to projects by search results page

1. Right-click a search results tab.

Teamcenter displays the Explorer shortcut menu.

2. Choose **Project→Assign**.

Teamcenter displays the **Assign Object to Projects** dialog box.

3. Select the project or projects to which the objects will be assigned and move them to the **Selected Projects** list using the right-arrow button. To select all projects in the list, click the double-arrow button.

4. Select the objects to be assigned by selecting either the **Current Page** or **All Found Objects** button.
5. Click **Apply** to assign the objects to the projects and retain the dialog box. Click **OK** to assign the projects and dismiss the dialog box.

To selectively assign objects displayed in the search results tab, select the search results tab and perform the steps described in *Assign objects to projects from the tree or Properties table*.

Remove objects from projects

1. Select one or more objects in the tree display or **Properties** table. You can also select the objects from the results of a search.

Note:

Two standard search forms, the **Projects Search** form and **Objects in Projects** form can be used to locate objects for removal from a project.

2. Right-click and choose **Project→Remove**, or choose **Tools→Project→Remove** from the main menu.

If multiple objects were selected in step 1, the system displays the **Remove Objects From Projects** dialog box. If a single object was selected, the system displays the **Remove an Object from Projects** dialog box. The projects of which you are a privileged member are displayed in the **Projects for Selection** list.

3. Select the project or projects from which the objects will be removed and move them to the **Selected Projects** list using the right-arrow button. To select all projects in the list, click the double-arrow button.
4. Click **Apply** to remove the objects from the projects and retain the dialog box. Click **OK** to remove the projects and dismiss the dialog box.

Using NX CAM Integration

Using NX CAM Integration

The NX CAM Integration allows you to manage your NX CAM setups and output files, such as CL source files, NC data, and shop floor documentation files, in the Teamcenter database. The output files are automatically attached to a process structure. The benefits of these files and setup being managed in Teamcenter are that the information is shared in a common manufacturing information management platform. The latest data is associated by the Part Planner application to create and deliver a consistent part.

Creating the setup templates allows you to leverage established machining practices against new manufacturing. For example, a series of parts with similar or identical features such as holes or pockets might typically use the same cutting tools, feeds and speeds, clamps, fixtures, and machine tools. These features are assembled once in the CAM setup template and used repeatedly, establishing best practices. In addition, all items that were part of the CAM setup template assembly are included in the process planning setup, which allows the where-used search functionality to be used. Also, by associating all CAM operations and data to the process (which is associated to the product), you have all CAM data available in the database associated with the product for any subsequent work with that product.

You can generate shop floor documentation (*shop docs*) to convey information to the shop floor. This information may include tooling lists, operations lists, custom reports, setup drawings, and inspection sketches.

If the NC programmer creates a tool in the CAM environment, it is available in Manufacturing Process Management. Similarly, any machine tool that is referenced in NX Library is available in Manufacturing Process Management.

Tooling libraries for the CAM environment may be maintained in Classification, allowing you access to tool resources from Part Planner.

Setting up a machining environment using the master model concept

The CAM integration supports the Master Model concept for setting up an assembly part. The Master Model approach enables you to separate the derived data for a part, from the basic geometric definition of it. A good example of this, in practice, is to separate NC data from the geometric definition of your part. To do this, you create a separate part file and then include the master part file (the geometry) as a component in it. You can then create NC data in a part file that references the geometry and other necessary part files, as follows:

```
CAM part (ugmaster of MENCMachining type)
  |_ geometry (ugmaster)
  |_ machine (for example, sim010101_001)
  |_ fixtures
  |_ workpiece
```

Create operations

A planner creates **NCMachining** operations in Part Planner for each CAM setup required for a machining operation. When NX CAM Integration is started, the machining operations that were defined by the planner display as setups within the NX Manufacturing application for the NC programmer to choose from.

1. In NX, create your own setup. The **NCMachining** operation uses the setup template to position the workpiece in the correct location in an assembly that includes all of the components that were saved in the template. In addition, the template can include NX CAM objects such as tools, coordinate systems, and program groups pre-set for the generation of CAM tool paths.

2. In Part Planner, open the geometry part (item) in the structure view.
3. Create a new process.
4. Associate the product as target for the process.
5. Create operations under the new process. Any operation that you want to open in NX CAM must be of the **NCMachining** type or of a type you have specified to be supported in NX CAM.
6. (Optional) Add resources (tools, machines or fixtures) to the machining operations using the Classification Search Dialog. The process resembles the following:

	Process	Occurrence Type
53684/A – Process_for_Product		
└─ 53686/A – OP10	OP	
└─ 53687/A – OP20	OP	
└─ 53688/A – OP30	NCMachining	
└─ ugt0101_001/A	Item	METool
└─ ugt0202_001/A	Item	METool
└─ ugt0212_001/A	Item	METool
└─ 53689/A – OP40	OP	
└─ 53690/A – OP50	NCMachining	

These resources have an **METool** occurrence type. You can list the occurrence types by adding the **Occurrence Type** property to your column list.

Open NX CAM Integration

Once you create operations in Part Planner, you can open NX Manufacturing to create the NX operations required to machine the part.




1. In the **Attachments** view in Part Planner, with the root process selected, double-click the geometry part to open it in NX.
2. In NX, start **Manufacturing**.

The **Machining Environment** dialog box is displayed.

3. Select **cam_part_planner_mrl.dat**.

The **Setup Selection** dialog box opens showing the product containing the process you created to manufacture this part. All operations of **MENCMachining** type (or any custom NX CAM Integration type) are visible under this process, as follows:

Setup selection

Object	Name
53683	Product
 53684	Process_for_Product
 53688	OP30
 53690	OP50

4. Select a planning operation (for example, **OP30** or **OP50**).

The **Library Class Selection** dialog box displays the available CAM setup templates. These templates contain the different setup types that are available by default in Manufacturing, such as operation types, tool types and method types.

5. Select a setup template that you created in step 1.

The information in the selected setup template is copied into your new CAM part, thus initializing it.

6. It may be necessary to position a machine or fixture if you added them to the Teamcenter operation. If you added any resources in Teamcenter, you now see them in NX.

You are now ready to create NC operations.

Create CAM data

After you enter the NX Manufacturing application, create CAM output data in your usual way. There is no difference for the NC programmer in creating CAM data to working in NX native mode.

Note:

You can only make changes to CAM NC machining operations in NX; you cannot change these operations in Teamcenter and export the changes back to NX.

1. Create CAM operations.
2. Create or retrieve tools from the database.
3. Retrieve or replace a machine.

4. Generate tool paths and NC files (CLSF or NC file)
5. Generate shop floor documentation.
6. After you complete this work, save the file.

You are prompted to import the datasets you have created into the Teamcenter database.

7. Click **OK**.

The **Import Files for Part** dialog box appears.

8. Click **OK**.

In Teamcenter:

- The CAM part file is stored with the planning operation.
- The machining setup is stored under the planning operation (for example, geometry (master), machine, fixtures, and tools).
- Shop floor documentation is attached to the planning operation.
- Each time you postprocess, the system generates an activity with the name of the CAM program group and attaches all related NC files to it.

You are now ready to look at your work in Teamcenter.

Display CAM data in Part Planner

To display data that was created in the CAM environment in Part Planner, do the following:

1. Open Part Planner.
2. Open the top-level process where the NX CAM Integration data was created.
3. In the process view, right-click the **MENCMachining** operation for the newly generated CAM output.
4. Choose **Open with** → **Activities**.

An **MENCProgram** activity is created under the operation using the program name of the object selected in NX CAM for postprocessing. This activity contains:

- Datasets for the NC program (the PTP and CLS files).

- A reference to each tool used in the NC program. Teamcenter lists the cutter time in the **Duration** column of the **Activity** view. You can also see the tool number in a separate column.
- The time required for the postprocessing in the activity **Duration** column for each NC program that is postprocessed. You can also see this time in the properties of the activity. Teamcenter overwrites any previously existing time.

5. Open the **Attachments** view.

The NX CAM Integration shop document is attached as a dataset to the **MENCMachining** operation revision. Double-click a shop document file to open and view or edit its contents. You can save changes you make to the file for subsequent sessions, including CAM sessions.

Note:

If you had Part Planner open while working in NX, it may be necessary to close the application and reopen it to see any changes made in NX.

Note:

To have a visual representation of an NX part available in Teamcenter, you must save the file as a JT file in NX. To do this, choose **File**→**Save Options**→**Save JT Data**. A JT file is attached as a **DirectModel** dataset to the item revision and is available in the viewer. NX updates JT data only if the part changes after the previous save.

Displaying CAM data in the NX Teamcenter Navigator

In NX, you can use the Teamcenter Navigator to locate documents stored with the CAM part in the Teamcenter database. For example, you can open the shop floor documentation. The resulting NC programs are organized under the **Manufacturing Activities** section. In this section, you can identify the program groups that you selected for postprocessing. The related NC tape file and optionally the CLS file is managed in this section. The manufacturing data includes the CAM setup showing the design part to be machined together with the fixture and clamping devices. Additionally, you can identify the resource list including the selected machine and the list of tools used for this CAM part. The NC programmer can always look at this data inside NX without the need to search in Teamcenter.

The screenshot displays the NX Teamcenter Navigator interface with three main panes:

- Teamcenter:** A tree view showing the project structure. The selected path is MachiningNX6/A. The table below shows the items in this path.
- Manufacturing Activities:** A table showing activities for the selected MachiningNX6/A. It includes CAM Data items and MENCProg items.
- Manufacturing Occurrences:** A table showing occurrences for the selected MachiningNX6/A, including simulation and tooling items.

Object	Number	Revis...	Description	Type	Chec...	Access	Statu...	Date M...
Teamcenter			beste	Folder				
Home			beste	Mail Folder				
Mailbox			beste	Newstuff F...				
Newstuff			infodba	Folder				
Home								
cam_et_housing_cover	cam_et_...			Item				
cam_et_housing_NX6	cam_et_...		cam_et_ho...	Item				
MachiningNX6	Machinin...		Machining...	MENCMac...				
MachiningNX6/A	Machinin...	A	Machining...	MENCMac...				
MachiningNX6-A	Machinin...	A		Assembly				
MachiningNX6-A-dwg1	Machinin...	A	Machining...	Drawing				
cam_et_housing_NX6/A	cam_et_...	A	cam_et_ho...	ItemRevision				

Object	Number	Revis...	Description	Type	Chec...	Access	Statu...	Date M...
MachiningNX6/A				MEActivity		Write		5-Feb-2
cavity_mill				MENCProg...		Write		4-Feb-2
mill_3_axis			CAM Data...			Write		31-Jan-2
clsf_standard			CAM Data...			Write		4-Feb-2
milling				MENCProg...		Write		4-Feb-2
Unload Part				MEActivity		Write		4-Feb-2
cavity_mill_copy				MENCProg...		Write		5-Feb-2

Object	Number	Revis...	Description	Type	Chec...	Access	S...	D...
MachiningNX6/A	Machinin...	A	Machining...	MENCMac...		Write		
sim010101_001_mm/A	sim0101...	A	MRM Reso...	ItemRevision		Write		
tla_thread_mill/A	tla_threa...	A		ItemRevision		Write		
tla_mill_7parameter/A	tla_mill_7...	A		ItemRevision		Write		
tla_mill_7parameter_2/A	tla_mill_7...	A	Milling tool ...	ItemRevision		Write		
tla_ball_mill_16/A	tla_ball_...	A		ItemRevision		Write		
tla_barrel_cutter_20/A	tla_barrel...	A		ItemRevision		Write		


Note:

The NX Teamcenter Navigator is available with NX 6 and later. You must activate the different panes in the NX **Customer Defaults**. To do so, choose **File** → **Utilities** → **Customer Defaults**, and then choose **Teamcenter Integration for NX** → **General** → **Teamcenter Navigator** and select the panes you want to display.

Creating resources

Depending on whether you are the process planner, who works primarily in Teamcenter, or the NC programmer, who works primarily in NX, you assign tools, machine tools, or fixtures in different ways.

- Process planner

The process planner assigns resources in Part Planner. The Classification Search dialog  is used to add resources from the Teamcenter database to the **MENCMachining** operation. All tools must be assigned using the **METool** occurrence type. All machines must be assigned using the **MEMachineTool** occurrence type.

Note:

Find the **Occurrence Type** box at the bottom of the Classification Search dialog.

- NC programmer

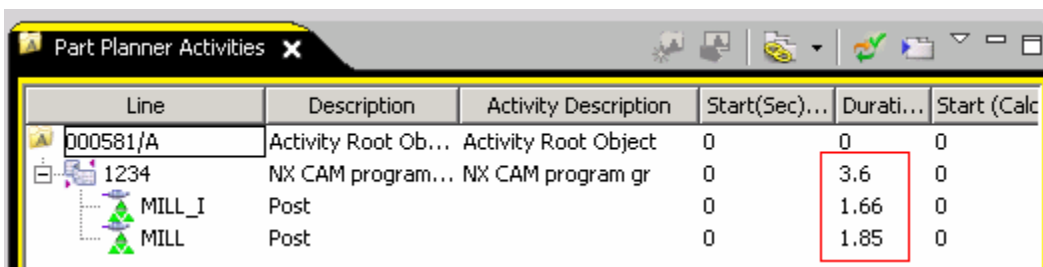
The NC programmer retrieves or loads tools in NX CAM using the NX Library mechanism. Generally, these resources are stored in the Teamcenter database. In addition, the NC programmer can create nonlibrary tools in NX Manufacturing by specifying tool parameters in the tool creation dialog boxes. When the CAM part is saved in NX, the resource list is exposed to the corresponding **MENCMachining** planning operation in Teamcenter. Teamcenter saves all tools using the **METool** occurrence type and any machine using the **MEMachineTool** occurrence type.

Tip:

If you change a tool (cutter, component or tooling), you can use the Teamcenter **Where Used** search to find all NX CAM part files that use this cutter.

Displaying NX CAM tool times

You can store NX CAM tools and their individual time values with their corresponding NC programs. The tools are displayed in the **Activities** view. Cutting times are shown in seconds in the **Duration** column.



Line	Description	Activity Description	Start(Sec)...	Durati...	Start (Calc
000581/A	Activity Root Ob...	Activity Root Object	0	0	0
1234	NX CAM program...	NX CAM program gr	0	3.6	0
MILL_I	Post		0	1.66	0
MILL	Post		0	1.85	0

These activities are stored in an operation of the **MENCMachining** type.

If you update an operation in NX, Teamcenter updates the CAM tools in Part Planner, including adding or deleting tools.

To pass additional CAM-related time values to the **Activities** view from NX models, install the **PMOPartManufacturing** BMIDE template that contains the time definitions with Teamcenter. Some of the CAM-related time values you might want to pass to the **Activities** view are **Positioning Time**, **Designing Time**, **Delay Time**, **Wait Time**, and **Tool Change Time**.

Note:

In the preference **MPP_ToolActivity_NXCamTime**, you can define a single NX time to be passed as a default table column time. You can also add any defined time values to the **Activities** view. Just right-click the column header, select the preferred column names, and choose **Insert column(s)**.

If **MPP_ToolActivity_NXCamTime** is not set, the default legacy value of **0** appears in the **Activities** view table columns.

Create an NX machining setup template

You can create your own machining setup that gets copied into each new CAM part upon initialization. The NX CAM Integration stores this template in the library class hierarchy along with the existing setup templates and it is available for your reuse.

1. In NX, create a part file containing everything you want in the setup template. This could include:
 - Machine
 - Tools
 - CAM operations
 - Fixtures
2. Save this part as a template by choosing **Export→Setup Template**.

The **Library Class Selection** dialog box appears.

Note:

This menu command is only available from within the Manufacturing application.

3. In the setup template tree, select the class in which your new template should be stored and click **OK**.

The **Template Attributes** dialog box appears.

4. Enter a descriptive name for the template and specify the unit for which the template is applicable.

5. If the **Import Files for Part** dialog box appears, click **OK**.
6. Click **OK**.

Teamcenter automatically saves the part file as a template. The template is listed in the **template_part_planner.dat** file, which is a named reference in the **UGCAMTemplateData** dataset in the database and is now available from the **Library Class Selection** dialog box the next time you initialize a part.

Working with Integrated Simulation and Verification (ISV)

If you want to retrieve machine tools in NX CAM while storing your parts and machine tools in the Teamcenter database, there are several points to consider:

- The resource kit provided with Teamcenter contains the same sample machines that are provided in the **MACH\resource\library\machine** directory in NX. Teamcenter checks for the machine DAT file in the **MACH\resource\postprocessor** directory. To run the machine tool simulation using these sample machines, copy the machine DAT file (listed in the **PP config file** attribute in the database) to the **postprocessor** directory.
- Postprocessor and machine tool driver files can remain in the NX installation (in the **MACH/resource/postprocessor** directory) or be stored in the Teamcenter database.

Create an in-process workpiece in Teamcenter

You can include an in-process workpiece (IPW) as part of the CAM setup. The workpiece can be created automatically from within NX Manufacturing or you can use a designed workpiece such as a casting.

1. Create an IPW in the NX Manufacturing application by saving the workpiece as an IPW and using it as input for the next machining operation.
2. Save your part in NX.

The IPW is stored as an NX part file in the Teamcenter database. It is now time to assign your workpiece to the next machining operation in Part Planner.

3. Find the new item representing the IPW in the My Teamcenter application and copy it to the clipboard.
4. In Part Planner, select the machining operation for which the copied part will be the workpiece.
5. Choose **Edit→Paste Special**.

The **Paste** dialog box appears.

6. In the **Occurrence Type** box, select **MEWorkpiece**.

7. Click **OK**.

The NX IPW is added as a workpiece for the manufacturing operation.

The next time you open the **MENCMachining** operation in NX Manufacturing, you are prompted to position the workpiece into the machining session.

Using Multi-Site Collaboration

About using Multi-Site Collaboration in manufacturing

You can use Multi-Site Collaboration to share structures with other sites. If you use it to share collaboration context objects, take the following into consideration:

- Export all revision rules at the original site using **plmxml_export -xml_file=file_name -class=revisionrule** and use **plmxml_import -xml_file=file_name** at the importing site before using Multi-Site Collaboration with collaboration or structure context objects.
- Export individual structures prior to exporting a collaboration or structure context in order to get the proper revisions of the objects in the structures.
- The configuration context does not affect which revisions are exported if you export a BOM with a collaboration or structure context.
- To be able to consume exported objects at the remote site when you do not have write access to the product item, create a new item at the remote site that acts as the local product root, and copy the product under it.

Sharing compositions

If you create a process in site B and import it to site A using the following procedure, the assigned product/plant information is not displayed in the structure:

1. Create process in site B and assign a product/plant.
2. Close and restart Part Planner.
3. Create a top-level process in site A.
4. Open My Teamcenter and copy the process created in step 1.
5. Paste the process under top-level process created in step 3.

When you create a root process and paste in another process, the product and plant are not displayed. Pasting the process does not automatically populate these structures. You can work around this problem as follows:

- Load the old product and plant structures into Part Planner.

The assignments appear in the process structure.

- Ensure that the product and plant load automatically the next time you open the new process in Part Planner. To do this:
 - Use the **Associate** commands to link the roots.

Generating reports

Generating reports

You can generate reports for most aspects of a process plan including products, manufacturing processes, and plant structures.

You can view image datasets of the **Image** type that represent target parts and are attached to the operation. They are shown in the right-hand side of the report and can be viewed in the **Viewer** view. You can also view images that were created by clicking the **Image Capture** button in the **Viewer** view in this way.

10. NX CAM to Teamcenter custom user tooling data synchronization

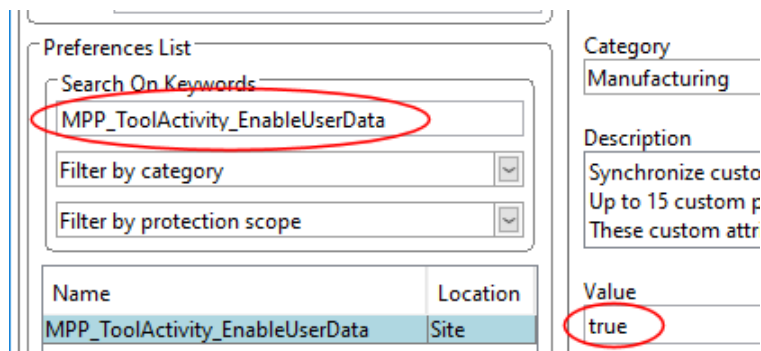
Synchronize NX CAM to Teamcenter custom user tooling data

You can define custom attributes to be synchronized between NX CAM and Teamcenter, such as pocket ID, tool description, technology data, and adjust register. You can synchronize up to fifteen custom properties that are stored with the **MENCToolActivity** attribute of a CAM setup.

Before custom attributes can be synchronized, you must install the **Part Manufacturing Shopfloor Integration e.g., Presetter and Activity User Data** feature, and must set and define the **two mandatory preferences**.

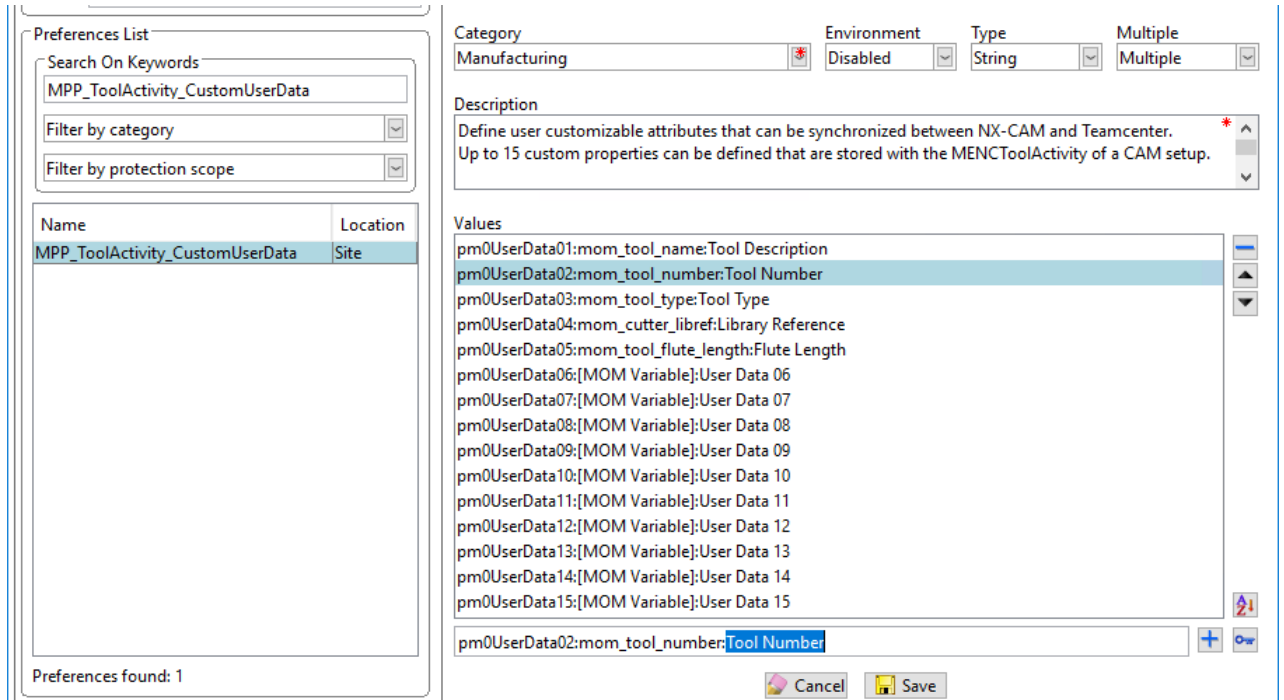
The following is step-by-step example of how to create, process, and view custom attributes synchronized between NX CAM and Teamcenter.

1. Perform the initial preparation (only needs to be done once).
 - a. Install the **Part Manufacturing Shopfloor Integration e.g., Presetter and Activity User Data** feature.
 - b. Set the **MPP_ToolActivity_EnableUserData** preference to **true**.

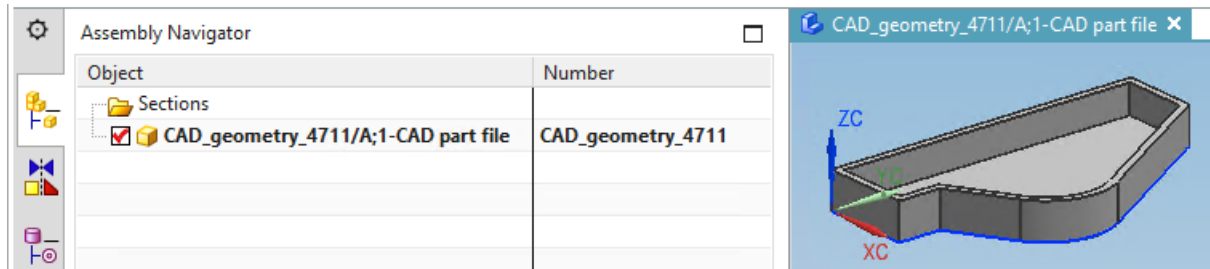


- c. Use the Teamcenter preference **MPP_ToolActivity_CustomUserData** to define the custom attributes.

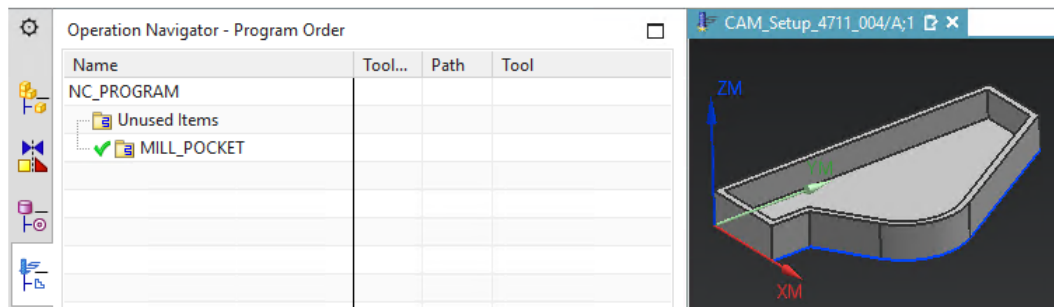
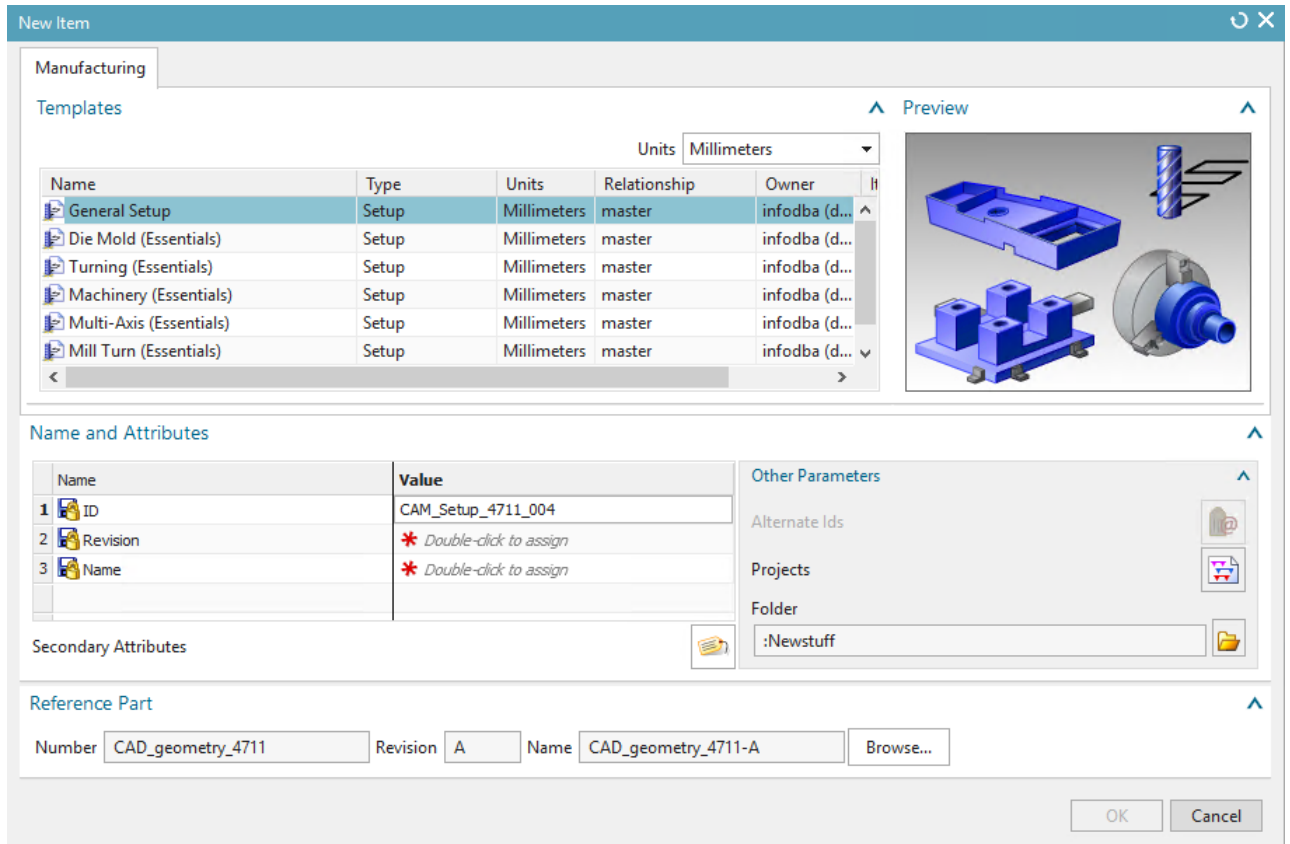
For example, specify the mom variable to output the Tool Number:
pm0UserData02:mom_tool_number:Tool Number



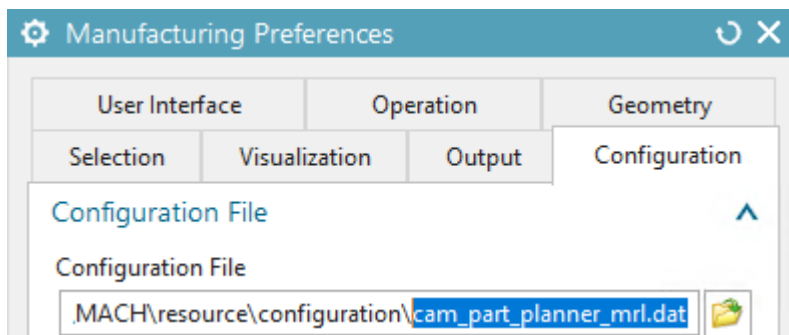
2. Create CAM setup in NX and generate NC output data.
 - a. Open a CAD file in NX (CAD_geometry_4711 is used in this example).



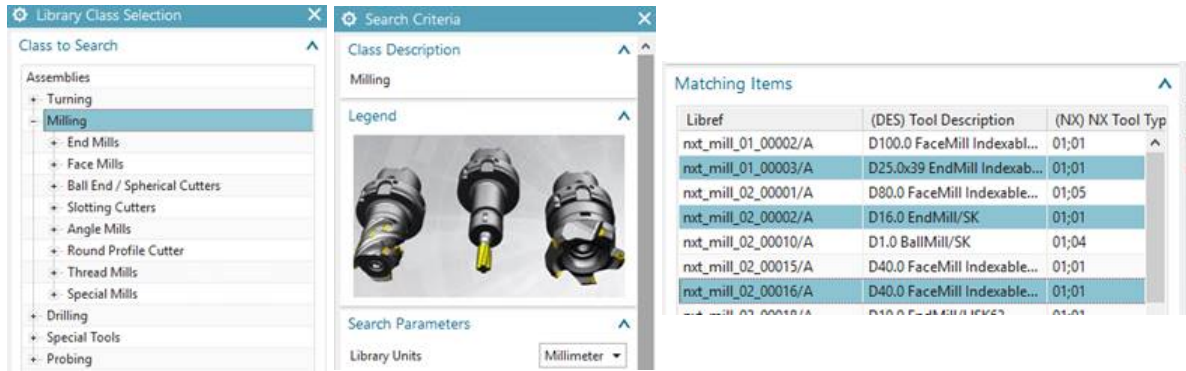
- b. Create a CAM part file for the CAD model: **File** → **New** → **Item** (CAM_Setup_4711_004 is used in this example).



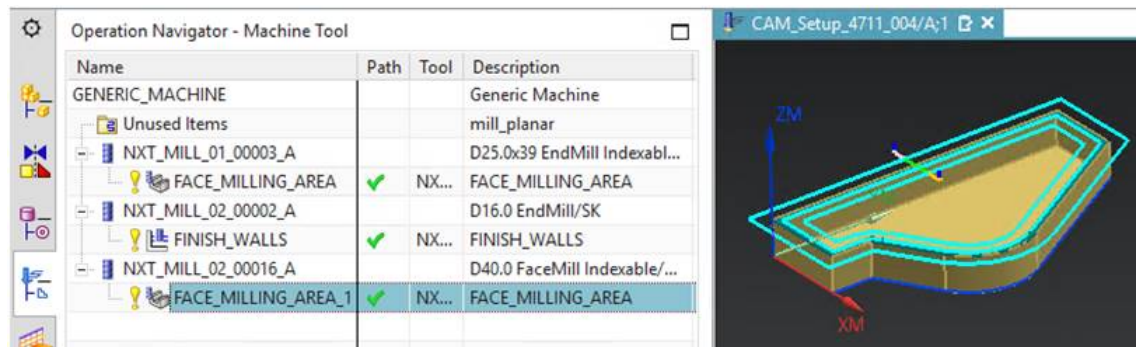
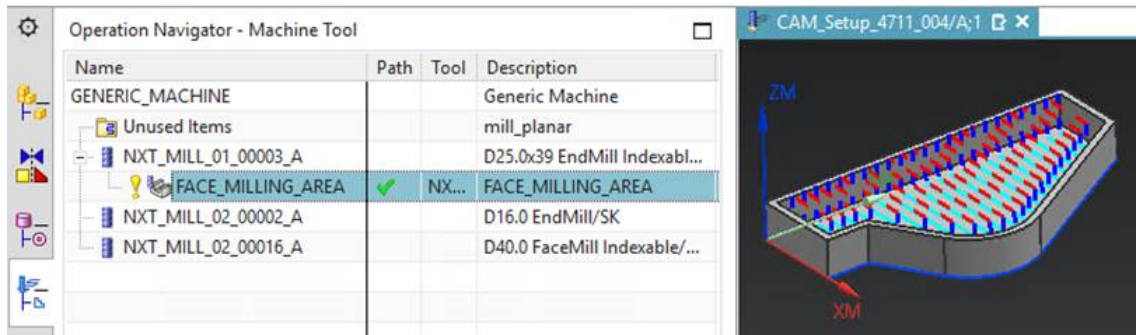
- c. Make sure you use a CAM configuration that includes the Teamcenter connection, such as `cam_part_planner_mrl.dat`.



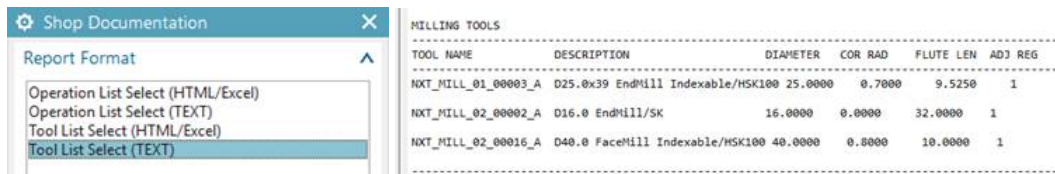
d. Retrieve tools from the **Manufacturing Resource Library**.

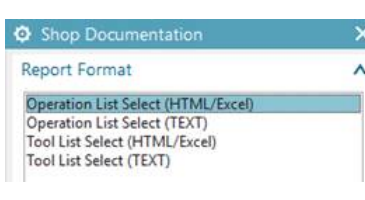





e. Generate CAM operations using the tools.



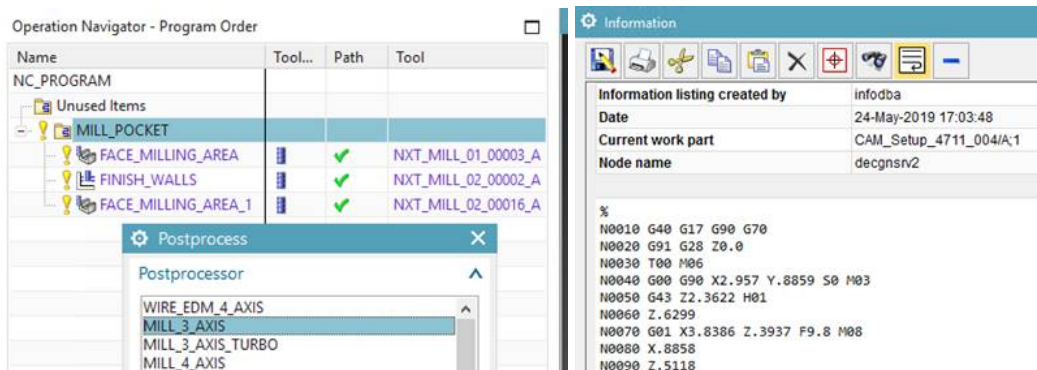
f. Generate shop-floor documentation, such as a tool list or an operation report.





Index	Operation Name	Type	Program	Machine Mode	Tool Name	Tool Path Time in Minutes	Path Image
1	FACE_MILLING_AREA	Volume Based 2.5D Milling	MILL_POCKET	--	NXT_MILL_01_00003_A	15.19	
2	FINISH_WALLS	Planar Milling	MILL_POCKET	--	NXT_MILL_02_00002_A	4.72	
3	FACE_MILLING_AREA_1	Volume Based 2.5D Milling	MILL_POCKET	--	NXT_MILL_02_00016_A	14.12	

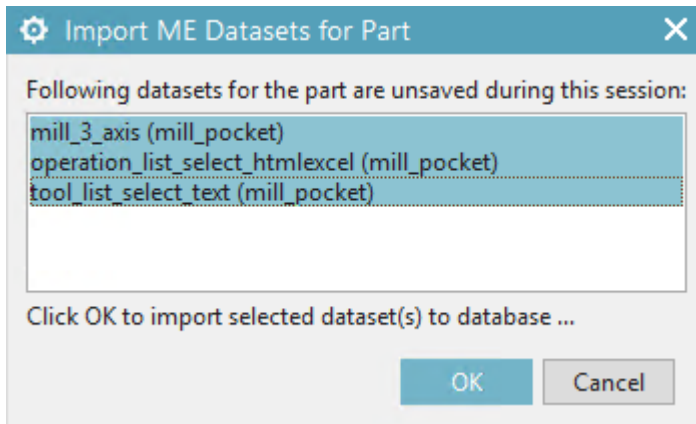
- g. Postprocess the NC file for the program group.



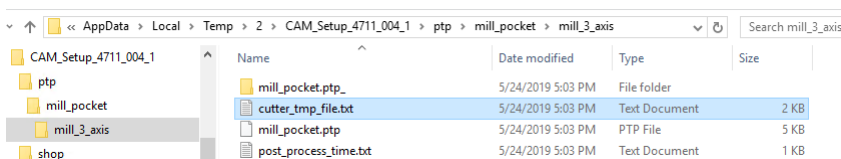
Now that you have completed the tasks in NX CAM, you can save the results in Teamcenter.

3. Save CAM files and data in the database.

- Once you save the CAM part file, the system checks for any generated files (NC program and shop-floor documentation) that should also be stored.



- Additionally, the system generates the file **cutter_tmp_file.txt** in a temporary folder.



This file includes the customized attribute values for each tool used in the NC program.

```

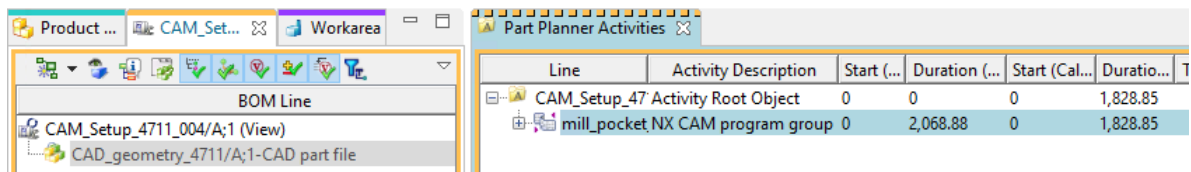
cutter_tmp_file.txt - Notepad
File Edit Format View Help
# Machine: decgnsrv2
# Date: Fri May 24 17:21:23 2019 W. Europe Daylight Time
cutter_tag|62152|cutter_name|NXT_MILL_01_00003_A|spindle_number|0|tool_librref|nxt_mill_01_00003/A|cutting_time_used|FACE_MILLING_AREA|mom_cutting_time|726.671163|pm0UserData01|
cutter_tag|62156|cutter_name|NXT_MILL_02_00002_A|spindle_number|0|tool_librref|nxt_mill_02_00002/A|cutting_time_used|FINISH_WALLS|mom_cutting_time|278.369476|pm0UserData01|NXT_M
cutter_tag|62182|cutter_name|NXT_MILL_02_00016_A|spindle_number|0|tool_librref|nxt_mill_02_00016/A|cutting_time_used|FACE_MILLING_AREA_1|mom_cutting_time|823.809479|pm0UserData01|

...

_time|726.671163|pm0UserData01|NXT_MILL_01_00003_A|pm0UserData02|1|pm0UserData03|Milling Tool-5 Parameters|pm0UserData04|nxt_mill_01_00003/A|pm0UserData05|0.375
|278.369476|pm0UserData01|NXT_MILL_02_00002_A|pm0UserData02|2|pm0UserData03|Milling Tool-5 Parameters|pm0UserData04|nxt_mill_02_00002/A|pm0UserData05|1.2598425196850394
g_time|823.809479|pm0UserData01|NXT_MILL_02_00016_A|pm0UserData02|3|pm0UserData03|Milling Tool-5 Parameters|pm0UserData04|nxt_mill_02_00016/A|pm0UserData05|0.39370078740157477
    
```

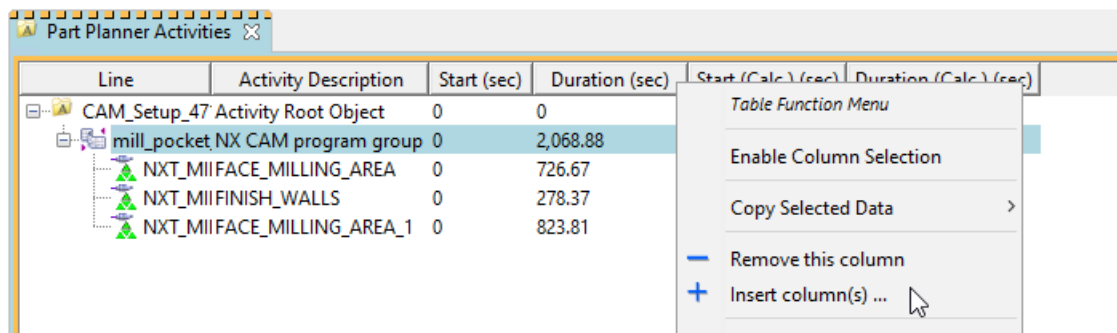
4. Review the data in Teamcenter.

- a. Open Part Planner and search for the CAM part file (CAM_Setup_4711_004).
- b. Review the data stored for the NC program in the Part Planner **Activities** panel.

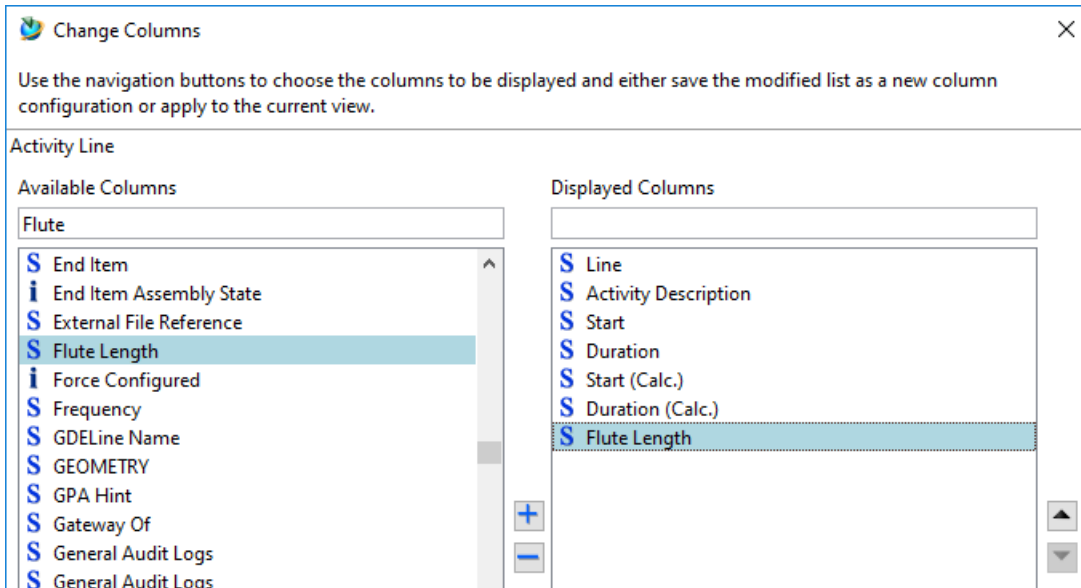


By default, the custom attributes columns are not part of the activity table.

- c. To add the custom attributes columns to the activity table, right-click on the table header and select **+ Insert column(s)...**

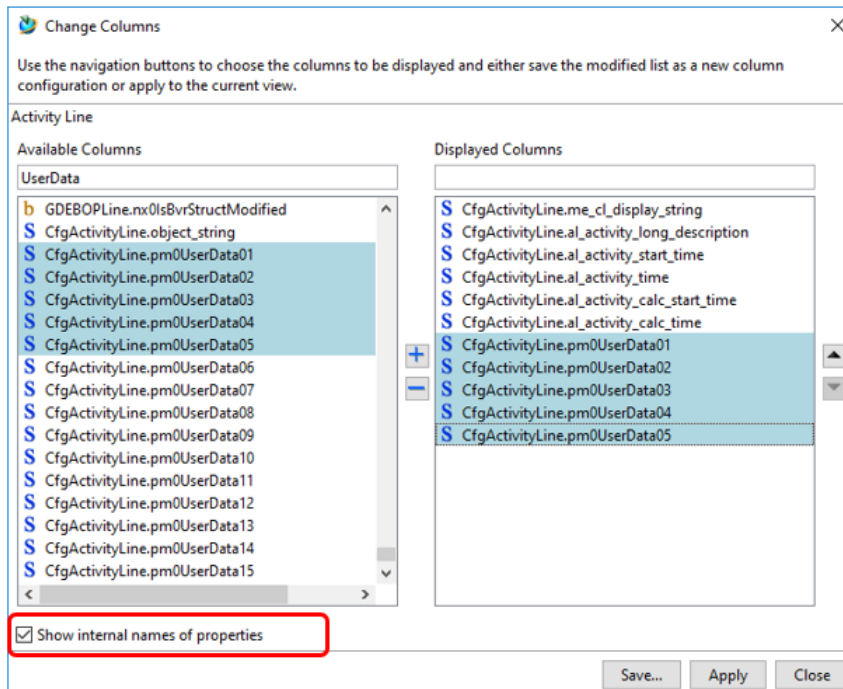


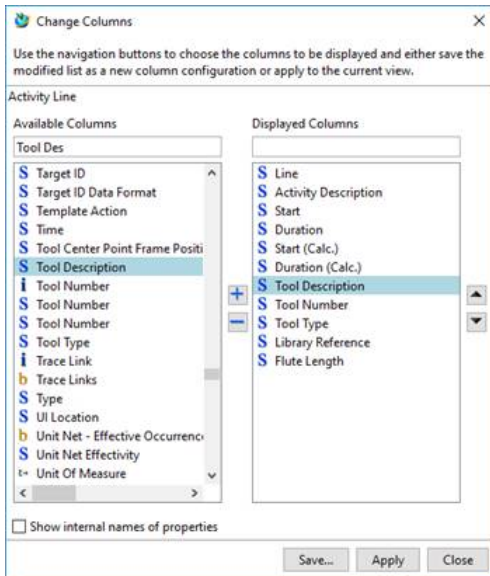
- d. In the dialog box, search for the custom attributes and add them to the **Displayed Columns** section.



- e. You can use the names you specified in the **MPP_ToolActivity_CustomUserData** preference or you can use the option **Show internal names of properties**.

When you use the internal name, all custom attributes are listed in one block (search **UserData**).



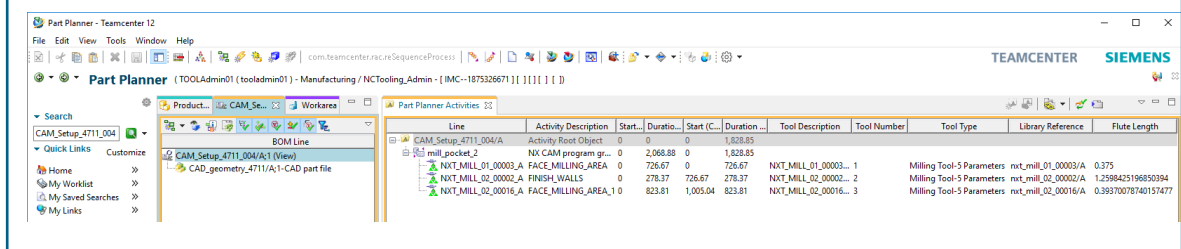


f. You can now review the custom tool attribute values that were transferred from NX CAM.

Line	Activity Description	Start...	Duratio...	Start (C...	Duration ...	Tool Description	Tool Number	Tool Type	Library Reference	Flute Length
CAM_Setup_4711_004/A	Activity Root Object	0	0	0	1,828.85					
mill_pocket_2	NX CAM program gr...	0	2,068.88	0	1,828.85					
NXT_MILL_01_00003_A	FACE_MILLING_AREA	0	726.67	0	726.67	NXT_MILL_01_00003...	1	Milling Tool-5 Parameters	nxt_mill_01_00003/A	0.375
NXT_MILL_02_00002_A	FINISH_WALLS	0	278.37	726.67	278.37	NXT_MILL_02_00002...	2	Milling Tool-5 Parameters	nxt_mill_02_00002/A	1.2598425196850394
NXT_MILL_02_00016_A	FACE_MILLING_AREA_1	0	823.81	1,005.04	823.81	NXT_MILL_02_00016...	3	Milling Tool-5 Parameters	nxt_mill_02_00016/A	0.39370078740157477

Note:

Teamcenter remembers the column settings for the activity panel, so it is necessary to add the custom properties only once. When you restart Teamcenter, you see the customized attributes directly.



Preferences for synchronizing NX CAM to Teamcenter custom user tooling data

Two preferences control the synchronization of NX CAM and Teamcenter user data.

- **MPP_ToolActivity_EnableUserData**

This preference allows you to activate or deactivate the synchronization of User Data fields defined by the **MPP_ToolActivity_CustomUserData** preference. To synchronize data, it must be set to **true**. If set to **false** (default), all entries in the User Data fields are ignored.

This is a **Site** preference. The **Type** is **Logical** with only one entry allowed (**Single**).

- **MPP_ToolActivity_CustomUserData**

This preference allows you to define up to fifteen user customizable attributes that can be synchronized between NX CAM and Teamcenter. These attributes are stored with the **MENCToolActivity** attribute of a CAM setup.

Syntax: **pm0UserData[Custom Property Number]:[MOM Variable]:[Display Name]**

- **[Custom Property Number]** – A two-digit number in the range of 01 to 15.
- **[MOM Variable]** – The Manufacturing Output Manager (MOM) variable that is set in the NX CAM TCL postprocessor.
- **[Display Name]** – The display name for the user-defined attribute in the **Activities** view table.

Two examples of user-defined tool activity attributes:

- **pm0UserData01:mom_tool_name:Tool Description**
- **pm0UserData02:mom_magazine:Magazine Position Note**

Key information for the **MPP_ToolActivity_CustomUserData** preference

- You should not change the definition of a custom attribute once it has been used to store activity data in the database. For example, if you previously defined **pm0UserData03:mom_tool_num:Tool Number**, it would not be good to change it to **pm0UserData03:mom_adj_reg:Adjust Register**, as any existing tool numbers would now show up under the **Adjust Register** column.

While you should not change the definition of a custom attribute, you can adjust the name. For example, if you noticed later that you misspelled the word *Description* in the name, you can adjust it – **pm0UserData04:mom_tool_descr:Tool Description** to **pm0UserData04:mom_tool_descr:Tool Description**.

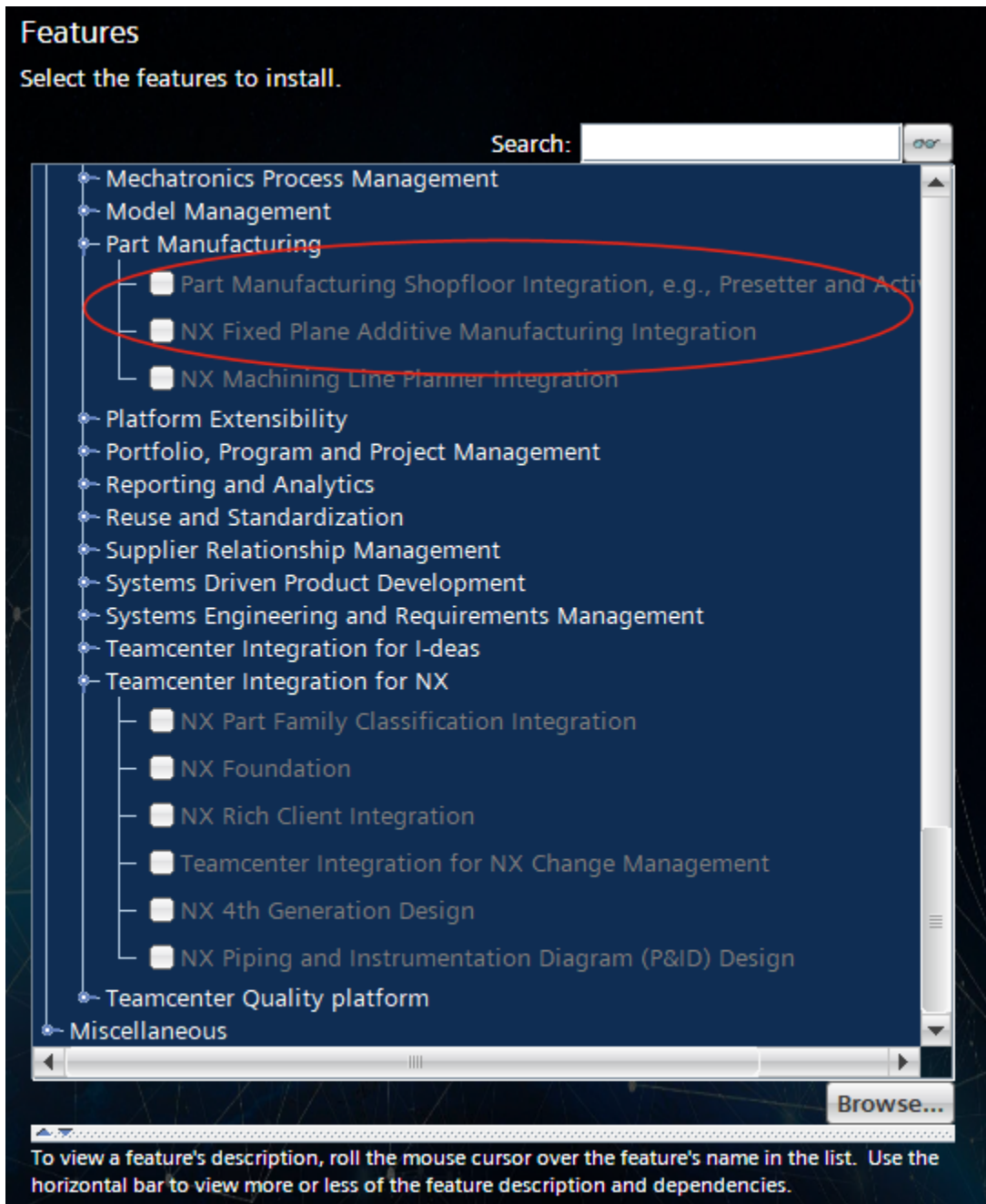
- **[Custom Property Number]** must be in the range **pm0UserData01** to **pm0UserData15** (01–15) and can only be used once. If a number is listed twice, the first entry is used and the second is ignored. Also, the settings **must** have two digits; single digit entries are ignored (for example, **pm0UserData7** is ignored).

- [MOM Variable] cannot contain spaces. If spaces are used, the definition for the attribute is ignored, for example, **pm0UserData05:post ver:Post Version**. Also, the identifiers **must** be unique for all entries.
- By default, all property-unique identifiers in the OOTB preference are set to **[MOM Variable]**, which indicates the property is not in use. You **must** modify the OOTB definition to use this specific custom property. Modifying only some of the properties allows you to use a subset of custom attributes. For example, if you define properties 01–10 only, 11–15 are ignored.
- [Display Name] cannot contain a : (colon). For example, if you defined **pm0UserData05:post_ver:Post Version:Date**, it is displayed as **Post Version** and not **Post Version:Date**.

MPP_ToolActivity_CustomUserData is a **Site** preference. The **Type** is **String** with multiple entries allowed (**Multiple**).

Installing NX CAM to Teamcenter custom user tooling data synchronization

Before you can use NX CAM - Teamcenter user data synchronization, you must activate the **Part Manufacturing Shopfloor Integration, e.g., Presetter and Activity User Data** feature in the **Part Manufacturing** group in the Teamcenter Environment Manager.



The feature is available only after the **NX Foundation** is installed. Then you can select the **Part Manufacturing Shopfloor Integration, e.g., Presetter and Activity User Data** option.

Features

Select the features to install.

Search:

- Mechatronics Process Management
- Model Management
- Part Manufacturing
 - Part Manufacturing Shopfloor Integration, e.g., Presetter and Activ
 - NX Fixed Plane Additive Manufacturing Integration
 - NX Machining Line Planner Integration
- Platform Extensibility
- Portfolio, Program and Project Management
- Reporting and Analytics
- Reuse and Standardization
- Supplier Relationship Management
- Systems Driven Product Development
- Systems Engineering and Requirements Management
- Teamcenter Integration for I-deas
- Teamcenter Integration for NX
 - NX Part Family Classification Integration
 - NX Foundation
 - NX Rich Client Integration
 - Teamcenter Integration for NX Change Management
 - NX 4th Generation Design
 - NX Piping and Instrumentation Diagram (P&ID) Design
- Teamcenter Quality platform
- Miscellaneous

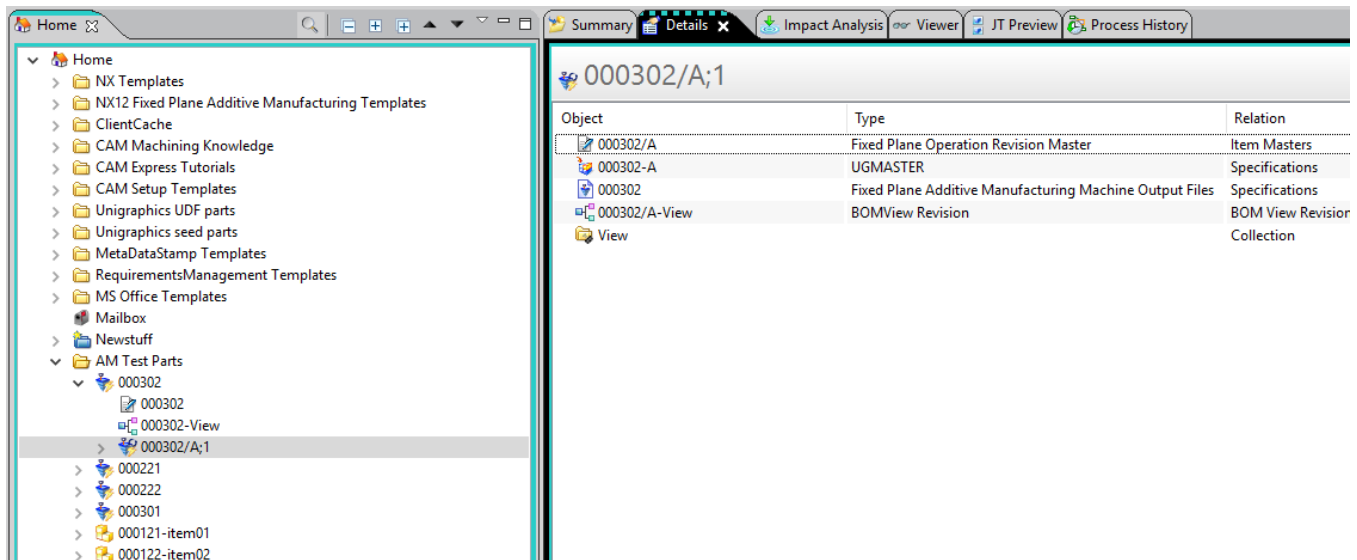
[Browse...](#)

To view a feature's description, roll the mouse cursor over the feature's name in the list. Use the horizontal bar to view more or less of the feature description and dependencies.

11. NX fixed plane Additive Manufacturing Integration

Using NX fixed plane Additive Manufacturing Integration

The image below shows a fixed plane Additive Manufacturing operation with added geometry and 3D printer files, generated in the NX Additive Manufacturing application. When you save the NX part, printer files are imported into the Teamcenter database as datasets under the fixed plane Additive Manufacturing activity.

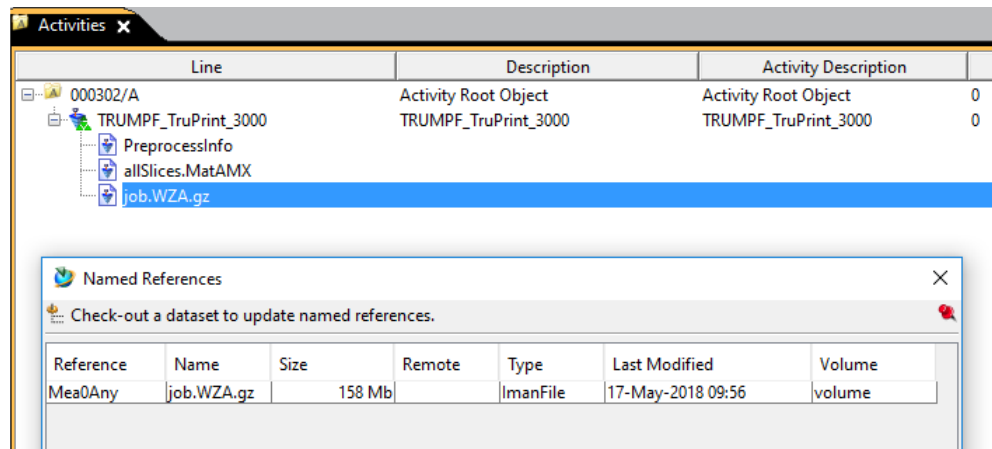


The fixed plane Additive Manufacturing operation can be sent to Manufacturing Process Planner or Part Planner, where the operation structure can be seen.

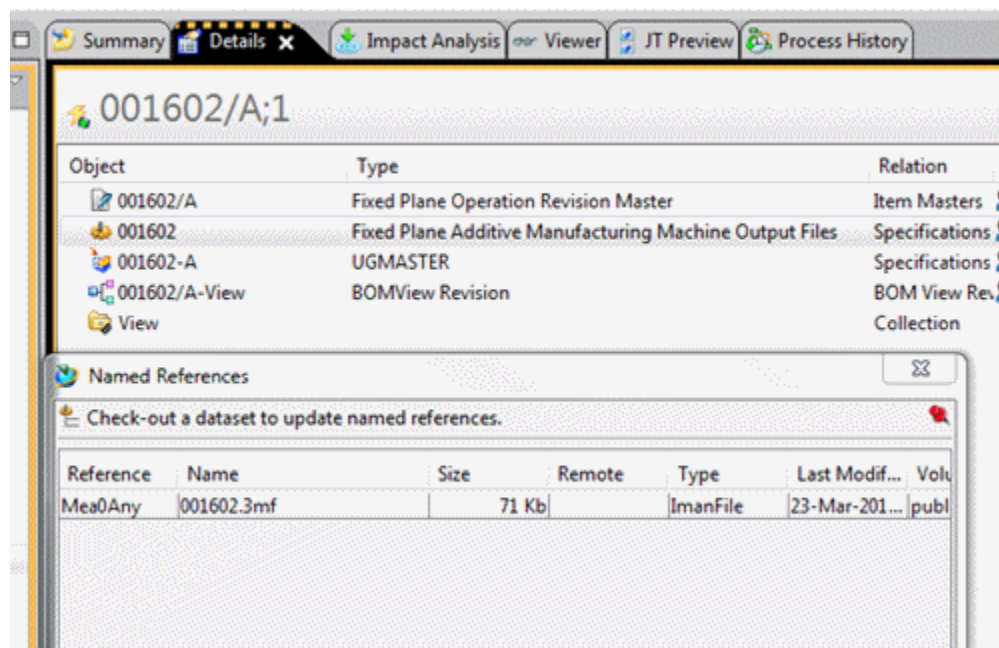
The screenshot shows a BOM table in the Manufacturing Process Planner or Part Planner interface. The table has columns for BOM Line, Quantity, Occurrence Type, Item Description, and EOC - Effective Occ... The table contains two rows of data.

BOM Line	Quantity	Occurrence Type	Item Description	EOC - Effective Occ...
000302/A;1 (View)			000302	True
000122/A;1-item02		METarget	AMTarget1	True

When you open an operation revision in the **Activities** tab, the datasets under the fixed plane Additive Manufacturing Activity can be seen. Every named reference contains an output file.



When you import **Additive Manufacturing** printer files, all output files are imported into datasets under a fixed plane Additive Manufacturing activity. There is one exception, in which the output file with extension **.3mf** is attached to a revision object. You can see this when the revision object is opened in the **Named References** dialog box.



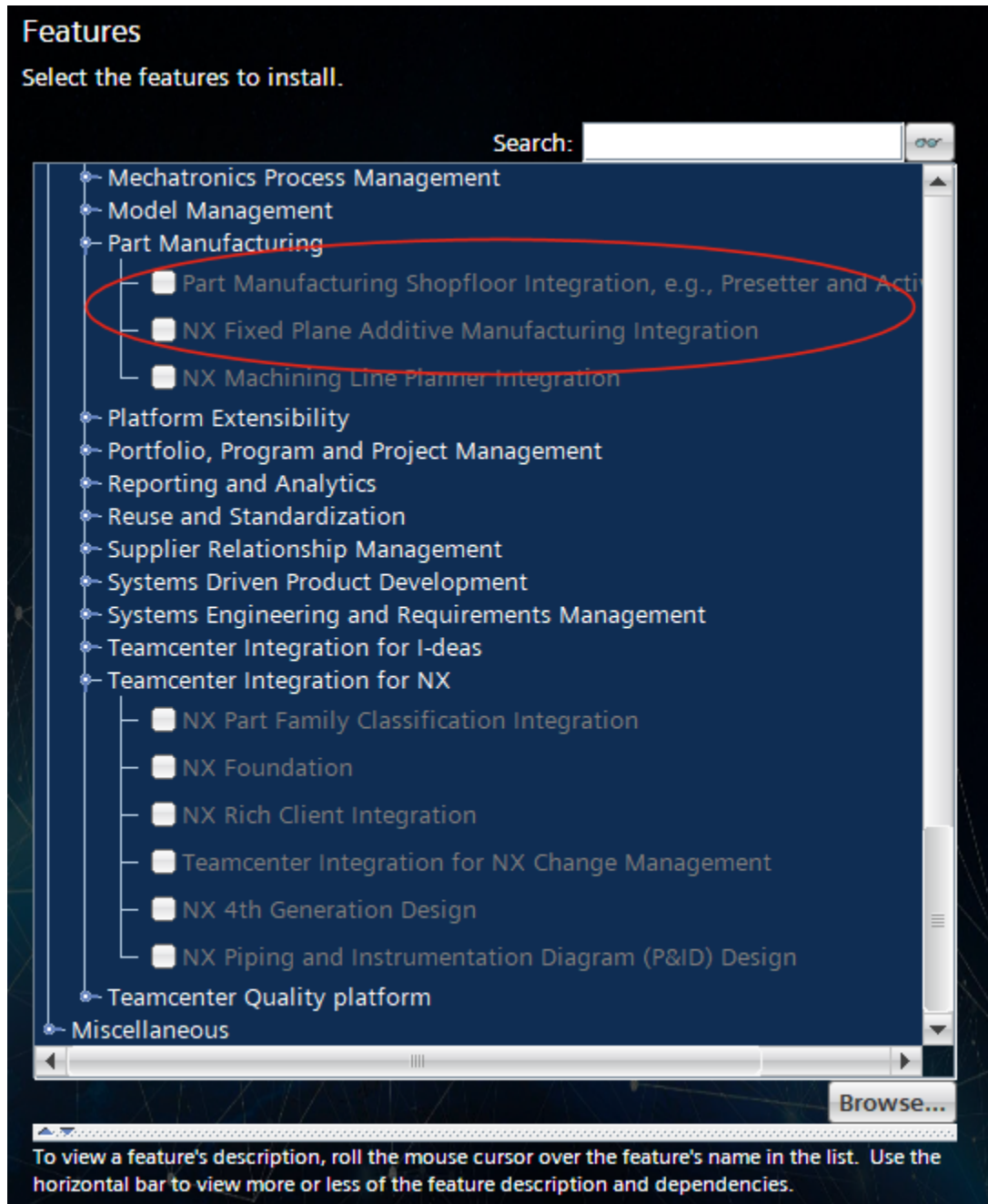
Note:

Before you can use NX fixed plane Additive Manufacturing Integration, it must be installed.

Installing NX Fixed Plane Additive Manufacturing Integration

Before you can use NX Additive Manufacturing Integration with Teamcenter, the **NX Fixed Plane Additive Manufacturing Integration** application in the **Part Manufacturing** group must be activated

in the Teamcenter Environment Manager. By default the **NX Fixed Plane Additive Manufacturing Integration** feature is not selectable.

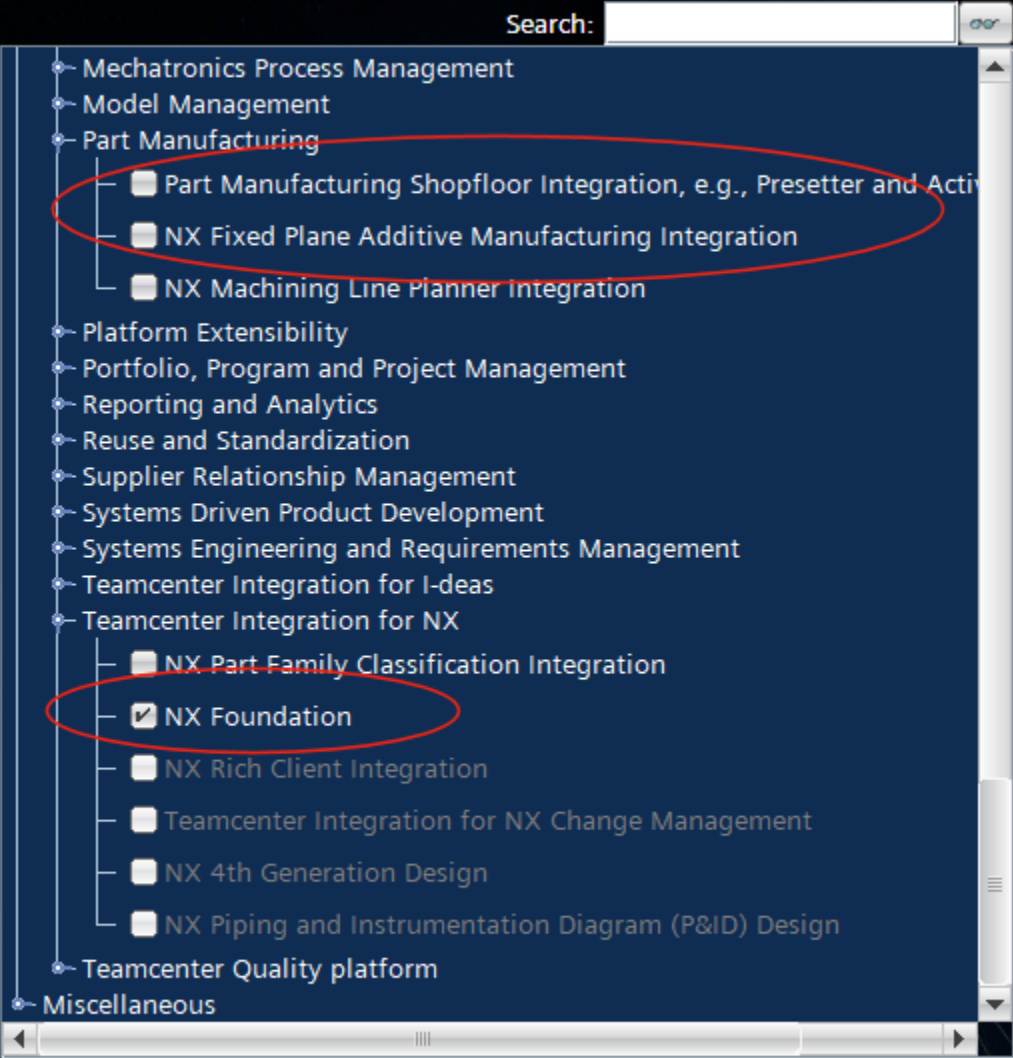


You select **NX Foundation** to enable the **NX Fixed Plane Additive Manufacturing Integration** option, and can then select it.

Features

Select the features to install.

Search:



- Mechatronics Process Management
- Model Management
- Part Manufacturing
 - Part Manufacturing Shopfloor Integration, e.g., Presetter and Activ...
 - NX Fixed Plane Additive Manufacturing Integration
 - NX Machining Line Planner Integration
- Platform Extensibility
- Portfolio, Program and Project Management
- Reporting and Analytics
- Reuse and Standardization
- Supplier Relationship Management
- Systems Driven Product Development
- Systems Engineering and Requirements Management
- Teamcenter Integration for I-deas
- Teamcenter Integration for NX
 - NX Part Family Classification Integration
 - NX Foundation
 - NX Rich Client Integration
 - Teamcenter Integration for NX Change Management
 - NX 4th Generation Design
 - NX Piping and Instrumentation Diagram (P&ID) Design
- Teamcenter Quality platform
- Miscellaneous

[Browse...](#)

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