Infor LN Manufacturing User Guide for Product Configuration

Publication Information

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About this document

This document describes the processes that are available to configure complex items in LN. Setup and handling information is provided for both the PCM Configurator and the *Product Configuration (PCF) (p. 21)*.

How to read this document

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Chapter 1
Introduction Product Configuration

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How to configure product variants and generate product structures

The procedure to configure product variants and generate product variant structures is composed of a number of separate steps.

The product variant configuration process differs dependent on the module it is initiated from:

- *Product Configuration (PCF) (p. 21)* in Manufacturing
- Sales Control in Order Management
- Project Control (PCS) in Manufacturing
- Budgeting in Project
- Project Planning and Requirements (PSS) in Project

If you initiate a product variant from Product Configuration, you must define a product variant code before you start the configuration process. The product variant has the **Standard Variant** reference type.

In the other modules, LN generates a product variant code so you can start the configuration immediately. The product variant has one of the following reference types: **Sales Quotation**, **Sales Order**, **Budget**, **Project (PCS)**, **Standard Variant**, or **Project**.

The configuration process

The configuration process section consists of the following subsections:

- To configure a product variant
- To select an option value
- To validate an option value
- To validate an option set
- To validate a product variant

To configure a product variant

1. Open the Product Variants (tipcf5501m000) session, and start the details session.

2. Determine the generic item for which you want to configure a product variant.

3. Start the configuration process from the Product Variants (tipcf5501m000) details session.

4. LN reads the generic configuration structure and searches for the <u>option set</u> for the top of the product structure.

5. If the option set is found, the set is displayed in the Product Configurator (tipcf5120m000) session; go to step 6. If the option set is not found, nothing is displayed in the Product Configurator (tipcf5120m000) session; go to step 10.

6. LN reads the first option set of the generic item. Refer to subsection To read option sets.

7. Click the **Option** field of a product feature. Double click '...' to display the valid options. The options are displayed in the Options by Product Feature and Configurable Item (tipcf1110m000) session. Select the desired option value. Refer to subsection To select an option value.

8. LN validates the selected <u>option</u> value. Refer to subsection To validate an option value.

9. Repeat steps 7 and 8 for each new feature. After you selected a option for each product feature, LN validates the entire option set. Refer to subsection To validate an option set.

10. Click the next group button to prompt LN to search for the next (lower level) option set for the item.

11. LN searches for the next option set and performs the constraint section **Validation** for the components of the generic bill of material.

12. LN checks if another option set is available on this level. If Yes, go to step 5. If No, go to step 13.

13. LN validates the product variant. Refer to subsection To validate a product variant.

To read option sets

1. LN reads the product features of the generic item and searches for the first product feature (the first option set) of the generic item in the top of the structure.

2. LN checks if a product constraint is linked to the product feature. If Yes, go to step 3. If No, go to step 7.

3. LN reads the product constraint and performs the **Before Input** constraint section.

4. LN checks if the input or display of option values is allowed. If Yes, go to step 5. If No, go to step 6.

5. LN checks if there are any additional features for which steps 2 through 4 must be performed. If Yes, go to step 8. If No, go to step 7.

6. If the input of an option value is not allowed, LN initializes the option with the value defined in the **Before Input** constraint section, and continues the procedure from step 8. If input and display are not allowed for any of the options, LN disables the option field. Such option sets are called invisible option sets. Invisible option sets are option sets in which the input or display

of an option value is not allowed for any product feature. These invisible option sets are automatically initialized and subsequently validated by the product configurator.

7. Select the option values. Option values are discussed further in the To select an option value subsection.

8. LN searches for the next product feature of the first option set.

To select an option value

1. Double click the Option field of the product feature for which you want to select an option value.

2. LN checks if a product constraint is linked to that product feature. If Yes, go to step 3. If No, go to step 5.

3. LN reads the product constraint and performs the **Before Input** constraint section.

4. LN checks if the input or display of option values is allowed. If Yes, go to step 5. If No, go to step 6.

5. Zoom to the allowed options. Click '...' to display all valid features in the Options by Product Feature and Configurable Item (tipcf1110m000) session. To compose the list of allowed options, LN carries out the **Validation** constraint section of the relevant constraints for each available option. Go to step 7.

6. If the input of an option value is not allowed, LN initializes the option with the value defined in the **Before Input** constraint section. Continue the procedure from step 9.

7. Select the option value.

8. LN validates the option value selected. Refer to subsection To validate an option value.

9. Check whether another product feature is present for which options must be selected. If Yes, go to step 1. If No, go to step 10.

10. LN validates the option set. Refer to subsection To validate an option set.

To validate an option value

The option value is only validated:

- If the input of an option value is allowed for the product feature.
- If the option value is not empty.

1. LN checks if the options are selective (that is, a set of option values of which you can select one), or whether you must type a value yourself. If selective, go to step 2. If not selective, go to step 3.

2. If a product feature has selective options, LN checks if the selected option value is part of a set assigned to the feature. Then LN checks if the selection date falls within the validity period of the option.

3. If the product feature has no selective options, LN checks if the entered option value falls within the option value domain.

4. LN reads the product constraint and performs the constraint section **Validation**, which determines whether the selected option value is allowed.

5. LN checks if the selected option value is allowed. If Yes, go to step 6. If No, go to step 7.

6. Double click the Option field of the next product feature.

7. If you entered a value that is not allowed, you can call the constraint expression involved.

8. You can record an extensive description or explanatory text that relates to the product variant option by selecting the record in the Options by Product Feature and Configurable Item (tipcf1110m000) session, and click Text..

To validate an option set

Option set validation occurs for each product feature of the product variant option set. LN performs this step before searching for another option set and before terminating the configuration process.

1. LN reads the first product feature of the option set.

2. LN reads the product constraint and carries out the **Before Input** constraint section.

3. LN checks if the input or display of option values is allowed. If Yes, go to step 4. If No, go to step 5.

4. LN checks if the options are selective. If Yes, go to step 7. If No, go to step 8.

5. If the input of an option value is not allowed, LN initializes the option with the value defined in the **Before Input** constraint section.

6. LN performs the **Parameter Substitution** constraint section. You can give the option a fixed value in this constraint section. This value may or may not be calculated with a formula.

7. If the product feature has selective options, LN checks if the option value selected is part of a set assigned to the product feature. Then, LN checks if the selection date falls within the validity period of the option.

8. If the product feature has no selective options, LN checks if the option selected falls within the option value domain.

9. LN reads the product constraint and performs the **Validation** constraint section, which determines whether the option value selected is allowed.

10. LN checks if the option value selected is allowed. If Yes, go to step 11. If No, go to step 12.

11. LN reads the next product feature of the option set.

12. If you have selected an option value that is not allowed, you can correct the option value.

To validate a product variant

The product variant is only validated if you have selected an allowed option value for each product feature of each option set.

Note

You can validate a range of product variants in the Validate Product Variants (tipcf5200m000) session.

The generation process

After you configured a product variant, you can continue to generate the product variant using the following sessions:

- Generate (Project) Structure for Product Variant (tipcs2220m000) session.
- Generate (Budget PCS) Structure for Sales Quotations (tdsls1201m100) session.
- Generate (Project PCS) Structure for Sales Orders (tdsls4244m000) session.

The generation process is explained in the following subsections:

- To generate a product variant structure
- To generate item data
- To generate a variant routing
- To generate a purchase/sales price

To generate a product variant structure

1. Select the product variant for which you want to generate the product variant structure.
2. Click Generate to start the process.
3. LN reads the generic product structure and searches for the first item in the top of the structure.
4. LN reads the product constraint linked to the bill of material component and performs the **Validation** constraint section.
5. LN determines whether the item is part of the generic product structure. If Yes, go to step 6. If No, go to step 7.
6. LN reads the item type of the item. If the type is Generic, go to step 8. If it is another item type, go to step 7.
7. LN searches for next item on this level.
8. LN searches for the product variant and reads the selected features and options.
9. LN includes the item in the variant structure.
10. LN generates the product variant structure on the basis of the features and options selected. The following are generated consecutively: product variant item data, purchase/sales price, bill of material, and routing. Refer to the subsections below for more information.
11. LN checks if the item is a generic, purchased, or manufactured item. If the item is Manufactured, go to step 7. If the item is Purchased, go to step 12.
12. LN continues the search for the next item on the next lower level. The procedure is resumed from step 4.
13. LN generates the item data, the purchase and sales data, the bill of material and the routing of the product variant.

To generate item data

1. LN reads the first line of the generic item data.

2. LN reads the product constraint and performs the constraint section **Validation**.

3. LN determines if the item data element can be included in the variant structure. If Yes, go to step 4. If No, go to step 5.

4. LN includes the data element in the product variant structure.

5. LN reads the next line of the item data.

1. LN reads the first component of the generic bill of material.

2. LN reads the product constraint and performs the constraint section **Validation**.

3. LN determines if the component may or may not be included in the variant structure. If Yes, go to step 4. If No, go to step 5.

4. LN performs the constraint section **Parameter Substitution**. Using the formulas of this constraint section, LN calculates the length, width, number of units, and net quantity of a bill of material component.

5. LN includes the bill of material component in the product variant structure.

6. LN reads the next component.

To generate a variant routing

1. LN reads the first operation of the variant routing.

2. LN reads the product constraint and performs the constraint section **Validation**.

3. LN determines if the operation can be included in the variant structure. If Yes, go to step 4. If No, go to step 5.

4. LN performs the constraint section **Parameter Substitution**. Using the formulas of this constraint section, LN calculates the setup time and the run time for the operation.

5. LN includes the operation in the product variant structure.

6. LN reads the next operation.

To generate a purchase/sales price

1. LN reads the first line of the generic price list.

2. LN reads the product constraint and performs the constraint section **Validation**.

3. LN determines if the price list line can be included in the price structure of the product variant. If Yes, go to step 4. If No, go to step 5.

4. LN performs the constraint section **Parameter Substitution**. Using the formulas of this constraint section, LN calculates the purchase/sales price or the surcharge/discount percentage.

5. LN includes the price list line in the purchase/sales price structure of the product variant.

6. LN reads the next price list line.

To configure product variants that contain purchased configurable items

You can configure product variants that contain purchased configurable items. You can use a configurable item to create a item structure that can hold a configurable purchased sub-assembly. The purchased sub-assembly is issued at the assembly line like other assembly parts.

For more information on procuring purchased configurable items in Assembly Control module, refer to

- Procuring configured items in Assembly Control - Master Data Setup
- Procuring configured items in Assembly Control - BOM setup
- *Product variants - Purchased configurable items (p. 17)*

Product configuration without project

Configuration of parameters for various scenarios

You can configure items either in the **Product Configurator (PCF)** or the CPQ Configurator. You can select a combination of the Product Configuration and the PCM configurator parameters in the Implemented Software Components (tccom0100s000) session possible scenarios:

Parameter Setting	Scenario	Description	
■ **Product Configurator (PCF)** selected ■ **CPQ Configurator Integration** selected	1	If both parameters are selected it is possible to customize items using both **Product Configurator (PCF)** and the CPQ Configurator. In case the item is configured using CPQ, the BOM and routing can be configured using the PCF or CPQ.	This scenario is recommended if PCF is already in use, and you want to convert the configurations in use to the CPQ configurator.
Only **CPQ Configurator Integration** selected	2	CPQ Configurator is responsible for the configuration of the item, the bill of material (BOM), and routing.	In this scenario, the **Product Configurator (PCF)** functionality is disabled.
Only **Product Configurator (PCF)** selected	3	PCF is responsible for the configuration of the item, the bill of material and routing.	With this scenario the CPQ Configurator does not have to be integrated. All CPQ related functions

		are disabled and the fields/check boxes are hidden.
Neither parameter is selected	4	No configuration engine is implemented.

BOM and routing for configured items

You can maintain the bill of material (BOM) and routing for configured items using various methods, depending on the supply source:

- **Generic BOM and Routing for configured items with supply source: Job Shop**
  Generic BOM and routing are not required in the CPQ Configurator. In this situation, both BOM and routing are generated in LN.

  If you generate the customized BOM and routing in CPQ Configurator, the BOM is defined to the level of the standard manufactured or purchased components. The BOM related to the standard manufactured, and purchased components is always maintained in LN.

  The same applies to the routing for the CPQ configured items.

- **Generic BOM and Routing for configured items with supply source: Assembly**
  A generic BOM is required, but no generic routing is used.

Note

If item configuration is performed in CPQ Configurator without the (generic) assembly BOM and the related information, LN maintains the data.

Generation of customized BOMs and routings in CPQ

The Generate (Project) Structure for Product Variant (tipcs2220m000) and Generate (Project PCS) Structure for Sales Orders (tdsls4244m000) sessions can been used in combination with CPQ Configurator to trigger the retrieval of the variant structures from CPQ and the regeneration, based on the variant structure obtained from CPQ, of custom item codes and project structures.

Note

If the variant is generated in PCF, validation is performed using the Validate Product Variants (tipcf5200m000) session.

If the variant is generated in the CPQ configurator, the CPQ configurator status translates into a validation of status in LN.

Generation of customized item codes in PCM

If you use PCF, the custom item codes are generated from the Generic Item - Settings for Data Generation (tipcf3101m000) session. This is not possible for items configured with the CPQ configurator.

Note

If all the items are configured in the CPQ Configurator, the Generic Item - Settings for Data Generation (tipcf3101m000) is disabled.

The CPQ configurator allows for the redaction of configuration (items, BOM and Routing) specific documents, images and (data) files (such as pdf, docx, CAD, SVC, image, test). These documents can be used in LN for further processing.

If both configurators are active, an error message is displayed if a duplicate configuration registers during import of the data from the CPQ configurator into LN.

Generating Product Variant Structures

The structure of a product variant for a selected configured item is defined by specifying the relations between the item and the engineering modules that are used to create the item. Generic sub-items can also have related sub-items and/or engineering modules. The sub-level of the engineering modules is specified using the flattened assembly parts, defined in the Assembly BOM and Operations (tiapl2520m000) session.

The product variant structure is created:

- When the product variant is specified and saved based on the relation between the main item and the generic sub items.
- When you run the current session, the product variant structure is created, based on the relation between the main item or generic items and the engineering modules.

The Generate Product Variant Structures (tiapl3210m000) only creates product variant structures if the following conditions are met:

- Your current company is defined as the master company in the Assembly Planning Parameters (tiapl0500m000) session.
- The **External Product Variant Structure** check box is cleared in the Assembly Planning Parameters (tiapl0500m000) session.
- The **Planned Offline Date** of the product variant, specified in the Product Variants (Assembly) (tiapl3500m000) session, is within the time fence that is specified in the Assembly Planning Parameters (tiapl0500m000) session.
- The **Product Variant Structure generated** check box on the product variant, in the Product Variants (Assembly) (tiapl3500m000) session, is cleared.
- The **To Be Deleted** check box in the Product Variants (Assembly) (tiapl3500m000) session, is cleared.

- The **Assembly Line** field, in the Product Variants (Assembly) (tiapl3500m000) session has the **Assembly Line Structure Status** set to **Actualized**. The **Assembly Line Structure Status** is displayed in the Assembly Lines (tiasl1530m000) session.

The bill of material (BOM) relations to the engineering modules are copied from the item's template, which is specified in the Generic Bill of Material (tiapl2510m000) session. The information that is retrieved from the generic BOM is selected, based on the effectivity unit of the product variant, and the effective and expiry dates. The date range is evaluated against the **Product Configuration Date**, specified in the details of the Product Variants (Assembly) (tiapl3500m000) session.

If the product variant structures are generated, a completion report is created, and the **Product Variant Structure generated** check box on the product variant is selected, specified in the details of the Product Variants (Assembly) (tiapl3500m000) session.

You can also generate product variant structures for configurable items. You can use a configurable item to create an item structure that contains a configurable purchased sub-assembly.

For more information on procuring purchased configurable items in Assembly Control, refer to

- Procuring configured items in Assembly Control - Master Data Setup
- Procuring configured items in Assembly Control - BOM setup
- *Product variants - Purchased configurable items (p. 17)*

Generic items can be configured using a contract deliverable. The product variant resulting from the configuration is stored on contract deliverable for possible reuse. The generic item linked to a contract deliverable can be modified to a customized item before the deliverable status is set to **Active**.

To configure a customized item, the **Customize** must be **Yes** with **With PCS** set to **No**.

The **Inherit Project Peg** and **Mandatory Project Peg** check boxes are available for generic items in the Items (tcibd0501m000) session if:

- The **Default Supply Source** is **Job Shop**
- The **Customize** field is set to **Yes** and the **With PCS** set to **No**

Note

Customized items that have a PCS project are not supported.

Product variant structures are also generated by the following sessions:

- Calculate Assembly Part Requirements (tiapl2221m000)
- Refresh and Freeze Assembly Orders (tiapl3203m000)

Purging Product Variants

Product variants are only deleted if the following conditions are met:

- Your current company is defined as master company in the Assembly Planning Parameters (tiapl0500m000) session.

- The **To Be Deleted** check box on the product variant is selected, which is displayed in the details of the Product Variants (Assembly) (tiapl3500m000) session.
- No references to a corresponding sales order exist, which is the case when the sales order is deleted, or when the product variant originates from a pseudo order. If no references to a sales order exist, the **Reference Order**, **Reference Position**, and **Alternative Sales Quotation** fields are empty (value 0). These fields are displayed in the details of the Product Variants (Assembly) (tiapl3500m000) session.

Note

In addition to the product variants, the following data is also deleted:

- Product variant structures
- Links between the product variants and the assembly lines, which are displayed in the Product Variant - Assembly Lines (tiapl3520m000) session.

Click Make Job to add the current session to a job to run the session in batch mode.

Product variants - Purchased configurable items

This topic explains the following functionality that pertains to purchased configurable items:

- Compare any configured item of the variant.
- Define product variant purchase price structure.

Compare variants

You can compare two product variants to check the following:

- The inventory of a configured purchased subassembly.
- The possibility of using inventory of a matching configuration rather than order a new configured item.

Note

You can consider two configured items as interchangeable if all the options are the same.

You can compare the following configured items of a product variant:

- The configured end item
- Any configurable child

To compare the configured items of a product variant , you can use the Option List ID. The configurable items are compared at the option set level. Two configured items that are created by a variant are considered as interchangeable if they have the same Option List ID.

The Option List ID is used for the following types of transactions:

- Manufactured assembly item transactions
- Purchased configured item transactions
- Inventory transactions

Variant numbers and Option list IDs

The matching of demand and supply of purchased configurable items is based on the Option List ID.

The matching of the demand and supply of a manufactured assembly end item is based on the product variant. Example the demand for the manufactured assembly end item is generated when a product variant is created for a new sales order. The Option List ID for this variant matches with a redundant variant which is in stock. An assembly order is created to meet this demand is created as the variant numbers differ.

The variants numbers and Option List IDs are used in the following processes:

- Create assembly planning (Calculate Assembly Part Requirements (tiapl2221m000)
- Generate assembly orders
- Generate warehouse outbound advice.

Product variant purchase price structure

You can set up the purchase price for a configured item. The purchase price depends on the options of a configured item. You can calculate the purchase price of a variant during the configuration process. You can do so, after you calculate the sales price. If you update the variant, you are prompted to re-calculate the sales price.

To re-calculate the sales price, the configuration date is used as the reference date for price list validation. You can set the configuration date in the Sales Parameters (tdsls0500m000) session in the Sales package. The **Configuration Date (PCS)** can be:

- **Order Date**
- **System Date**
- **Delivery Date**

To calculate the purchase price for a set of variants, you can use the Calculate Product Variant Purchase Price Structure (tipcf5235m000)

To calculate the purchase price for the current variant, you can use the following sessions:

- Product Variants (tipcf5501m000)
- Product Variant Purchase Price Structure (tipcf5535m000)

The purchase price for the schedule is retrieved from the Generic Price Lists (tipcf4101m000) session and is based on the value selected in the **Purchase Price Date Type** field in the Pricing Parameters (tdpcg0100m000) session. Allowed values

- **Order Date**
- **System Date**
- **Delivery Date**

Important!

The purchase price structure is used for analysis only.

Note

Since different dates are used as reference date for sales price/purchase price calculation, the price on the schedule can differ from the price displayed in the variant data.

Chapter 2
PCF

2

Product Configuration (PCF)

In a traditional production control system, the product structure generally consists of:

- Item data, such as delivery time and standard cost.
- Data that relates to the structure of items, such as bills of material.
- Data about operations, such as routings.

This system may be adequate for companies that produce a limited number of products. However, if a large number of variants of the finished products are produced, they are usually only assembled or manufactured when the customer's order has been received. In such cases, the traditional information system may encounter problems with the quantity, complexity, and manageability of the product data, and the need for timely availability of the information.

Almost any company that assembles to order deals with product variants, which makes it impossible to define the product structure for all the versions of all finished products in advance. The answer to this problem is configuration management. This can be translated into a well conceived, modular, product design with proper validation and design support functions provided by the information system to enhance the level of logistical control.

In the *Product Configuration (PCF) (p. 21)* module, a product model is created that defines all the <u>features</u> of the product model. You can define the desired product variant if you select the options of the features. The translation of your requirements into the product structure of the variant is controlled by a set of decision rules and <u>constraints</u>. These constraints indicate the components and operations that are or are not used in a specific version.

Performance aspects

The settings in this session could affect system performance and database growth. For more information, refer to PCF without PCS.

Configurator (introduction)

This topic describes in short the working of Product Configuration (PCF) in LN.

Why a product configurator is useful

The competitive power of a company is determined more and more by the speed of a company to meet customer requirements. Today's business must be capable to deliver a customer specific product within the delivery time of a standard product.

In a traditional production control system, the product structure generally consists of:

- Item data, such as delivery time and standard cost.
- Data relating to the structure of items, such as bills of material.
- Data about operations, such as routings.

Product data defined like this may be adequate for companies producing only one or just a few products. However, if a large number of variants of the finished product is produced, assembling or manufacturing of a product is usually only started when the customer's order has been received. In such cases, the traditional information system may run into problems with respect to quantity, complexity, and manageability of the product data. Also the timely availability of the information can be problematic.

Almost every company that assembles to-order deals with product variants. In that case, you cannot define the product structures for all versions of all finished products in advance. The answer to this problem is configuration management. Configuration management must be translated into a well thought-out, modular, product design with proper validation and decision support functions provided by the information system to enhance the level of logistic control. LN offers such an application, Product Configuration (PCF).

The following sections provide an overview of how to set up Product Configuration (PCF), and subsequently, how to work with it.

To set up product configuration

Before setting up product configuration in LN, you must define items of the **Generic** type in the Item Base Data module, the so-called generic items.

A generic item can have various features linked to it. The product features are the basis for a procedure to define the product specifications. For every feature you can define various options, which reflect the choices you can make with regard to a specific feature. For example, for a feature COLOR, you could define the options red, yellow, and blue. By using constraints, certain selections can be excluded or made mandatory. A combination of options chosen for a generic item, reflects a product variant. You can view, define and maintain configuration data for a generic item in one single session: Configurable Item - Structure (tipcf3100m100).

Multi-language support enables you to define the characteristic features of a product in several languages. For each feature you can define one or more options in several languages. You can state whether options can be freely selected or are bound to a specific domain.

You can define purchase and selling prices for each generic item. On the basis of the selling prices stated for the generic item, LN calculates the selling prices of the product variants. Purchase prices come in when generic items are purchased, for instance as part of a generic subassembly or finished product.

Refer to How to define a product model

To use the product configurator in LN

When product configuration is set up, you can configure a product for a customer by selecting an option for every feature of the product. The translation of customer requirements results into a product variant. The process can be controlled by a set of decision rules, the constraints. The constraints indicate which components and operations can or cannot be used in a specific version.

The product configurator can be triggered from several places in LN, as indicated in the table below. Dependent on where a product variant is configured, the product variant receives a reference type, which can be viewed in the Product Variants (tipcf5501m000) session.

Configurator triggered where?	Session where configurator is triggered	Reference type
In Product Configuration (PCF), Manufacturing	■ Product Variants (tipcf5501m000)	**Standard Variant**
In Project Control (PCS), Manufacturing	■ Generate (Project) Structure for Product Variant (tipcs2220m000)	**Project (PCS)** or **Budget**, dependent on whether the product variant applies to a project or budget.
On a sales quotation line, Sales	■ Sales Quotations Overview (tdsls1500m000)	**Sales Quotation**
On a sales order line, Sales	■ Sales Orders (tdsls4100m000)	**Sales Order**
In Project Technical Calculation (PTC), Project	■ Element Budget (Material) (tpptc1510m000) ■ Activity Budget (Material Lines) (tpptc2510m000)	**Project**
In Requirements Planning, Project	■ Planned PRP Warehouse Order (tppss6115m000)	**Project**

For more information, refer to

- How to use a product model in a sales quotation
- How to use a product model in a sales order

To generate a (project) structure

After product variants are created, a product structure must be based product variant. A generic product structure is generated in the following sessions, dependent on where the product variant is configured:

- Generate (Budget PCS) Structure for Sales Quotations (tdsls1201m100)
- Generate (Project PCS) Structure for Sales Orders (tdsls4244m000)
- Generate (Project) Structure for Product Variant (tipcs2220m000)

The structure generally consists of data about:

- Product features.
- Product options.
- Product constraints.
- Generic item data.
- Generic bill of material.
- Generic routing.

If the **Customized** field in Items (tcibd0501m000) session for the generic item on which the product variant is based is set to **Yes**, a PCS project must created to generate the project structure. If the if the **Customized** field is set to **No**, a project is not required.

Chapter 3
CPQ Configurator

3

CPQ Configurator set up

The CPQ Configurator is an interactive configurator which is integrated with LN. The configuration information required to handle the manufacturing process is stored in LN.

To set up the CPQ Configurator, complete the following steps:

1. **Implemented Software Components (tccom0100s000)**
   To enable the interactive configurator functionality, select the **Configurator Integration (CPQ)** check box.

2. **CPQ Configurator Profiles (tipcf0120m000)**
   Specify the profile used for the CPQ configurator. The profile defines the language and the view of the model of the configurator.

3. **CPQ Configurator User Profiles (tipcf0125m000)**
   - Specify the default profile as part of the user profile. The user profile overrides the profile defined in the CPQ Configurator Settings (tipcf0111m000) session.
   - Before starting sales order configuration LN checks for the confirmation of the user. When you start the CPQ Configurator, by default the profile defined in the user profile or Item settings is executed. The authorized user can override the default profile, by selecting a different profile from the list of profiles defined in the CPQ Configurator Profiles (tipcf0120m000) session. You can use either the defaulted, or manually changed profile to start the CPQ configurator.

4. **CPQ Configurator Settings (tipcf0111m000)**
   To enable the CPQ configurator settings for the company, item group or the item, select the **Configured by CPQ Configurator** check box. You can define the **Specific Settings** such as, **Currency**, **Application URL** and **Profile**. It is very important that the settings defined in LN must be in sync with the settings of the CPQ Configurator.

To configure an item using the **CPQ Configurator Integration**, complete the following steps:

1. **Sales Order Lines (tdsls4101m000)**
   Create a sales order line, select the configurable item and confirm the configuration of the product. The <u>CPQ Configurator</u> starts in new web user interface page and the options defined for the model in the configurator are displayed.
   Apart from the sales order lines in the Sales package, the product variant can configured using below sessions:
   - Sales Quotation Lines (tdsls1501m000)
   - Product Variants (tipcf5501m000)
   - Product Variants (tipcf5600m000)
   - Element Budget (Material) (tpptc1510m000)
   - Activity Budget (Material) (tpptc2110m000)
   - Estimate Lines (tpest2100m000).
   - Planned PRP Warehouse Orders (tppss6815m000)

2. **CPQ configurator Web UI**
   You can view product features, options, images of options and the final images of models as defined in the <u>CPQ Configurator</u> during and after configuration.
   - You can select the required options to configure the end product. The final price of the item is calculated once you have finished configuration.
   - If you save the data and close the configurator, a product variant is created.

     If the features and options you have selected are not available in LN, they are created after configuration is finished.

     Note that options and features that are selected are created in LN. Options that are crated in <u>CPQ Configurator</u>, but not selected for the item modeled are not integrated.

3. **Product Variants (tipcf5501m000)**
   Review the status of the product variant in the **CPQ Configurator Status** field. Review the **CPQ Configurator Variant** field, the check box must be checked for the variants created using the CPQ configurator.

Note

The sales price and quantity is calculated by the <u>CPQ Configurator</u>.

The product variant created in the <u>CPQ Configurator</u> and the features, options, option sets (PCF levels) of the product variant are stored in LN. You can configure, reconfigure, modify or delete the product variant. After the product variant is created, you can continue with the standard sales and manufacturing process if required.

Appendix A
Glossary

<div style="text-align:right">A</div>

assembly part

A component used on an assembly line.

An assembly part forms the link between Configurator and Enterprise Planning. Configurator generates the requirements for assembly parts and Enterprise Planning plans the production or purchase of the item.

bill of material (BOM)

A list of all parts, raw materials, and subassemblies that go into a manufactured item and show the quantity of each of the parts required to make the item. The BOM shows the single-level product structure of a manufactured item.

company

A working environment in which you can carry out logistic or financial transactions. All the transaction data is stored in the company's database.

Depending on the type of data that the company controls, the company is:

- A logistic company.
- A financial company.
- A logistic and a financial company.

In a multisite structure, some of the database tables can be unique for the company and the company can share other database tables with other companies.

configurable item

An item that has features and options and must be configured before any activities can be performed on it. If the configurable item is generic, a new item is created after configuration. If the item is manufactured or purchased, the configuration is identified by item code and option list ID.

- **Manufactured** items with the default supply source set to **Assembly** and **Generic** items are always configurable.
- **Purchased** items with a purchase schedule in use can be configurable.
- Configurable **Purchased** items can be used within Assembly Control only.

constraint

In LN, a means to check, restrict, or compel to avoid or perform some action.

In the Product Configuration module, a constraint is every possible decision rule or calculation conceivable that can be carried out during the definition of the product variants. You can use constraints in the product model for product features, generic BOMs, routings, price lists, and item data. You can use a constraint editor to define constraints.

Among other things, constraints allow you to indicate under which conditions certain combinations of options are acceptable, mandatory, or not acceptable for product features. You can also indicate which bill of material components and/or operations must be included or excluded, what the purchase or sales price structure for a product variant is, and so on.

In the Product Classification module, a constraint consists of one or more constraint lines that define the conditions under which certain return values or calculation results are included in the classification code during item classification.

constraint

A set of decision rules (constraints) that control the translation of the customer requirements into the product structure of the variant. These constraints indicate which components and operations will be used in a specific product variant.

contract deliverable

A contract deliverable is a tangible or intangible item that is produced or purchased as a result of a contract.

CPQ Configurator

An application, integrated with LN to configure an item. The integration can be used only as part of the web user interface.

See: Configure Price Quote

effectivity unit

A reference number, for example a sales order line or a project deliverable line, that is used to model deviations for a unit effective item.

engineering module

In Assembly Planning, a system, or, in other words, a logical unit of assembly parts, that is typically not manufactured as a separate physical unit.

For example, the electrical system of a car is the logical unit of all parts required for the electrical system. It is, however, not manufactured as a separate physical unit, but integrated in the dashboard, doors, and so on.
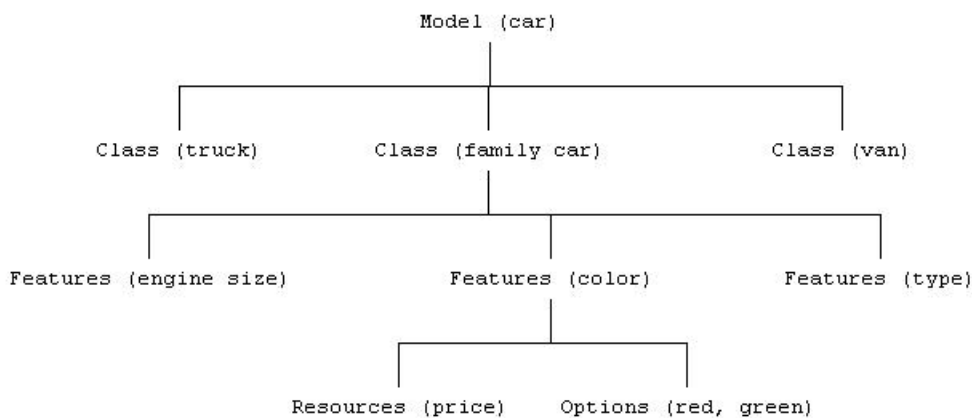
An engineering module has no routings, assembly lines, options, and so on, and is for design and planning purposes only. In the bill of materials (BOM), the engineering module is the top layer of the nonconfigurable section of the BOM.

feature

A characteristic of a configuration class. It can be any kind of property that can hold a certain value. An example of a feature is color.

Class features can be:

- Mandatory
- Persistent (can be saved)
- Private (cannot be used outside the configuration model)
- Active (is in use)
- Explicit (derived from)

```
                        Model (car)
                             |
       ┌─────────────────────┼─────────────────────┐
       |                     |                     |
  Class (truck)      Class (family car)       Class (van)
                             |
            ┌────────────────┼────────────────┐
            |                |                |
 Features (engine size)  Features (color)  Features (type)
                             |
                    ┌────────┴────────┐
                    |                |
           Resources (price)   Options (red, green)
```

Note

You can link as many features as you like to a class. You can link only one option to a feature.

feature

Characteristics which can be combined and subsequently be linked to configurable items to compose a product variant. An example of a feature is color.

generic BOM

Set of components, per generic item, from which product variants can be composed. The generic bill of material forms the basis for the variant bill of material which arises during the configuration/generation of a product variant. For each BOM line (component) a constraint rule may apply.

generic item

An item that exists in multiple product variants. Before any manufacturing activities are performed on a generic item, the item must be configured to determine the desired product variant.

Example

Generic item: electric drill

Options:

- 3 power sources (batteries, 12 V or 220 V)
- 2 colors (blue, gray).

A total of 6 product variants can be produced with these options.

main item

The end result of a production order.

A main item is either be changed to an end item (for delivery to a warehouse), or delivered directly to the customer in bulk.

master company

In a multicompany situation, a master company is used to synchronize data in all companies. Data that is entered or generated in the master company, for example, the line structure, can be replicated to the other companies. The master company can either be one of the companies of the assembly lines, or a separate company.

option

Options per product feature are aspects that specify the product feature. For instance 'red' can be an option of the feature 'color'.

option set

Identifies a set with product features and options for a configurable item within the product structure.

product variant

A unique configuration of a configurable item. The variant results from the configuration process and includes information such as feature options, components, and operations.

Example

Configurable item: electric drill

Options:

- 3 power sources (batteries, 12 V or 220 V)
- 2 colors (blue, gray).

A total of 6 product variants can be produced with these options.

product variant identification code

The unique identification of a product variant.

Product variant codes make it possible to generate various variants for a configurable item. Specially if a customer wants information about options and prices without any obligation. In the implementation stage of the product model, it is also used to execute system tests.

product variant structure

The structure of the product variant, which consists of one configurable end item that is related to several configurable sub-items and/or engineering modules.

Configurable sub-items can also have their own configurable sub-items and/or engineering modules. The configurable items represent the product and the subassemblies of the product. The engineering modules are used for assembly items and represent logical units that may not constitute independent products, such as an electrical system. The product variant structure is generated by LN and, dependent on the options, holds a part of the bill of material.

project

A collection of manufacturing and purchasing actions that are performed especially for a particular customer order. A project is initiated to plan and coordinate the production of these items.

For a standard-to-order production, the project is only used to link the item with the customer order. Otherwise, a project can include:

- Customized item data (BOMs and routings)
- Project planning (activity planning)

A budget is a special type of project. A budget is used to plan and estimate, not to carry out production.

routing

The sequence of operations required to manufacture an item.

For each operation, the task, machine, and work center are specified, as well as information about setup time and cycle time.

segment schedule

A schedule that indicates when assembly parts are required. Based on the offline date of the assembly order, and the segment for which the assembly parts are required, the segment schedule indicates when the parts must be delivered to the line. Segment schedules are used for a rough calculation of assembly part requirements, when high volumes are processed, and the performance of the calculation is critical.

time fence

The date until which an item's supply plan and planned orders are frozen.

The time fence is expressed as a number of working days or working hours from the date you carry out the simulation.

As a rule, Enterprise Planning does not regenerate the supply plan or the planned orders within the time fence. However, you can overrule this behavior when you run a master-plan simulation or order simulation.

The time fence is meant to prevent:

- Disturbance of orders that have already started (at the shop-floor level).
- Generation of planned orders with start dates in the past (that is, orders that are late).

Usually, the lead time of an item's production process is a reasonable value for the time fence.

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