Constraint Based Configuration Model Explained

Hope Enochs
Meet Your Presenter
Hope Enochs

- Wide range of AX knowledge; certified in AX 2012
  Trade and Logistics as well as Projects
- Over 30 years’ experience managing ERP
  implementations in multiple industries including
  manufacturing environments, wholesale, retail, service
  providers, utilities, natural gas and public sector.
- 8 of those years was spent as the Director of
  Operations for a small industry specific software
  company leading the team in the sales, development,
  implementation and on-going support of the product.
- Designed, developed and implemented a project
  management methodology that tripled the number of
  implementations using the same number of resources.
- Developed and delivered training programs for
  professional training companies including a college
  continuing education department.
Course Objectives Are:

- Explain the product configuration terminology and concepts
- Describe the product configuration process
- Product configuration setup
- Build a product configuration model
- Prepare a product configuration model for release
- Product configuration access
Session Agenda

Explain Product configuration & It’s Uses:

Product configuration is a constraint-based product configuration tool that uses the Microsoft Solver Foundation® (MSF) product technology that is designed for modeling and constraint solving.
Why Use Product Configuration?

Reasons to use a constraint-based product configuration model.

- Respond to the specialized needs of the customer.
- Reduce high costs tied to stocking and moving inventory.
- Lower records maintenance by reducing the number of products and BOMs’ managed.
- Developer license is not required to create and maintain product configuration models in Microsoft Dynamics AX 2012.

Customers can purchase items that meet their individual needs.

Instead of having one or two choices when purchasing a home entertainment system, you can configure the product specifically for a customer.
What is the Product Configuration Tool?

Save Time and Improve Customer Service!

• Flexible tool that promotes reusability for areas that require constant setup.

• Provides access to frequently selected data by using configuration templates.

• Provides a visual overview of the component structure.

• Components and attributes can be easily arranged into logical groups by using attribute groups.

Example:

You could have a popular version of a home entertainment system that includes several components (audio system and a video system) and subcomponents (receiver, speakers, DVD player, and TV). When you create a template, you can pre-define the features that each component and subcomponent include. This can save you time when you configure the product on sales orders, sales quotations, purchase orders, and production orders.
Product Configuration Terminology

Common Terms Associated With Product Configuration

- Product Configuration Model
- Attribute Types
- Attribute Group
- Attribute Value
- Expression Constraint
- Table Constraint
- Product Master
1. **Product configuration model**: Represents a generic product structure that can be differentiated to specific instances based on values selected by the user.

2. **Attribute types**: Attribute types are defined to specify the set of data types for all attributes that are used in a product configuration model.

3. **Attribute group**: An attribute group can be defined to increase the usability of the configuration user interface. A subset of attributes defined for a component can be grouped and a title is attached to the group.

4. **Attribute value**: A specific value for a product characteristic. For example, the color "red" for the attribute type named "color."

5. **Expression constraint**: A constraint type, in the form of an expression. The MSF constraint solver will be used. All constraint expressions must follow the syntax defined by MSF.

6. **Table constraint**: A constraint type specifying allowed attribute combinations. Each row in the table represents a legal combination of values. User defined table constraints consist of Attribute types. System defined table constraints represent a view on an existing table that is present in the Application Object Tree (AOT).

7. **Product master**: A product master serves as a template for models for variants. The variants of a product master can be predefined or created in sales scenarios by using product configuration.
Product Configuration Process

Product configuration consists of the following areas:

Product configuration setup
1. Product configuration setup: This includes setting up the product configuration parameters.

Building a product configuration model
2. Building a product configuration model: This is the largest and most complex area. It involves components, attribute types, product configuration model, attributes, constraints, subcomponents, user requirements, BOM lines, route operations, and product configuration APIs.

Preparing a product configuration model for release
3. Preparing a product configuration model for release: It involves customizing the configuration user interface, validating a testing a model, building configuration templates, adding configuration translations, and creating, approving, and activating versions.

Product configuration access
4. Product configuration access: You can configure lines by using the Microsoft Dynamics AX 2012 Windows client or the Enterprise Portal.
The image displays the product configuration process flow.

Product configuration access is not included in the process flow figure because it occurs after the product configuration model is built and ready to use.
Product Configuration Setup

Parameters for product configuration

✓ Item lookup method
1. The number sequence that uniquely identifies all the configurations that you create.
2. The item lookup method determines whether configurable items display together with all the other items, or if you want them to display on a separate tab.

✓ Configuration document type
1. The configuration document type lets you add a note to the order line. The note will show the results of the configuration that you just created. This includes the components, attributes, and all selections made.

✓ Default configuration ID
1. Default configuration ID: The initial name of the configuration that is applied to product variants when product variants as a standard are release together with constraint-based product masters. Basically, when you configure a sales order line, the value in this field will default to the grid on the Lines FastTab.

✓ Number sequence for constraint-based product configuration models
Building a Product Configuration Model

Building a product configuration model includes the following elements:

- Components
- Attribute types
- Product configuration model
- Attributes
- Constraints
- Subcomponents
- User requirements
- BOM lines
- Route operations
- Product configuration API

Several processes are used to build a product configuration model. Many of these processes are setup once and can be used across many product configuration models: components, attribute types, subcomponents, BOM lines, and route operations.

The product configuration API is an optional process that can extend the functionality of the product configuration model.
Preparing a Product Configuration Model for Release

Steps for preparing a product configuration model for release includes:

- Customizing the configuration user interface
- Validating a product configuration model
- Testing a product configuration model
- Building configuration templates
- Adding configuration translations
- Creating, approving, and activating versions
Preparation of a Product Configuration Model for Release

Steps for preparing a product configuration model for release includes:

1. Optional: Customizing (tailoring) the configuration user interface creates attribute groups, and lets you arrange the attribute groups and corresponding attributes to display the information more clearly to the end user.

2. Mandatory: When errors display after validating the product configuration model, all errors must be resolved before you can test the product configuration model.

3. Optional: Testing the product configuration model lets you verify the attributes for each component display as you expect when configuring the product.

4. Optional: Configuration templates do not have to be created.
Product Configuration Access

You can configure order lines for a product configuration model by using two methods:

- Microsoft Dynamics AX 2012 Windows client

- Enterprise Portal

Microsoft Dynamics AX 2012 client: You can configure lines for sales quotations, sales orders, purchase orders, and production orders.

Enterprise Portal: You can configure lines for sales quotations and sales orders.
Parameters for product configuration are setup on the Product information management parameters form.

The parameters must be setup or the system will display warning messages when you try to test the Configure line form or configure lines.
Components in Product Configuration

Guide for Using Components in AX:

✓ Generic element that can be assigned to a product configuration model
✓ Can include other components as subcomponents
✓ Can use a component multiple times in a product configuration model
✓ Can reuse a component in multiple configuration models
✓ Items must have constraint-based configuration as the Configuration technology
✓ To be used as components to build a product configuration model
Product Types

Two core types of products can be defined manually in Microsoft Dynamics AX 2012:

**Products**: These are uniquely identifiable products that do not have variations associated with them. No product dimensions can be associated with the definition. You can think of them as standard or base products.

**Product masters**: These serve as templates for models for variants. The variants of a product master can be predefined or created in sales scenarios by using product configuration. A product master is associated with one or more product dimensions, or for some configurations, one or more product attributes.

The variants of a product master can be predefined or created in sales scenarios by using product configuration.

You cannot configure an order line for an item that is not defined as a product master.
The following table explains the four configuration types that are supported in Microsoft Dynamics AX 2012.

<table>
<thead>
<tr>
<th>Configuration technology</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constraint-based configuration</td>
<td>Selecting constraint-based configuration lets the product be used in a product configuration model.</td>
</tr>
<tr>
<td>Dimension-based configuration</td>
<td>A configuration technology that is used to create product variants by selecting values for product dimensions. Any combination of the product dimensions is permitted.</td>
</tr>
<tr>
<td>Predefined variant</td>
<td>The product can be modeled based on the product dimensions, color, configuration, and size. This is the only option that can be set up directly with product variants.</td>
</tr>
<tr>
<td>Rule-based configuration</td>
<td>Variants are configured by using Product Builder when the variants are added to transaction lines.</td>
</tr>
</tbody>
</table>
Components Form

Use the Components form to create components.

You can access the Components form from several locations:

1. Product configuration models list page

2. Constraint-based product configuration model details form

3. Subcomponents FastTab

You specify a Name and Description when you create a component on the Components form.
Where-Used Form

The **Where-used** form displays the list of product configuration models that use the selected component.

The component "HomeTheaterSystem" is used in these Product Models.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20001</td>
<td>The model of the home theater system</td>
</tr>
</tbody>
</table>

The **Where-used** form can be accessed by clicking **Where-used** on the **Components** form.
Attributes for Constraint Based Configuration

Attribute Types

- Define the possible values that can be assigned to the attribute
- Specify the set of data types for all attributes that are used in a product configuration model
- Define one time and then reuse for any attribute in all product configuration models

**NOTE:** You can use decimal values, text without a fixed list, and integers without ranges in a product configuration model. However, you cannot use these data types when you write a constraint.

**NOTE:** Microsoft Solver Foundation (MSF) constraint solver only supports text with a fixed list, boolean values, and integers with ranges. Currency and DateTime data types are shown in the list in the **Type** field. However, they cannot be used in a product configuration model.
Attribute Types Form

Use the Attribute types form to define the attribute types and default values that you can select when you define attributes for products and categories.
Attribute Types Form

Use the Attribute types form to define the attribute types and default values that you can select when you define attributes for products and categories.

The following list includes examples of values that might be used for the different attribute types.

• **Text**: Add list of colors that are available to select for a set of stereo speakers.
• **Boolean**: Add a true or false attribute type that can apply the same color to all stereo components, without having to select the color for each component.
• **Integer**: Add a valid range of values from zero to one for the number of televisions to include in a home entertainment system.
• **Decimal**: The length of the power cable for a home entertainment system is available in meters.
Product Configuration Models

Putting it All Together

✓ Created to represent a generic product structure

✓ Consist of one or more components tied together through subcomponent relationships.

✓ One perspective is the logical side that consists of subcomponents, user requirements, attributes, and constraints.

✓ The second perspective is the physical side that consists of BOM lines and route operations.

Adding a product configuration model is simple and consists of populating just a few fields.

However, building a product configuration model involves adding all of the elements (attributes, constraints, subcomponents, and so on) to the product configuration model.
New Product Configuration Model Form

You can create a new product configuration model by:

✓ Adding a new component for the root component.

✓ Selecting an existing component for the root component.
New Product Configuration Model Form

New product configuration made globally:

If you decide to add a new product configuration model and select an existing root component, any modifications that you make to the elements within the model, will be made globally. All other product configuration models that contain the same elements are also affected.

Specify the following values when you create a product configuration model:
1. Name
2. Description
3. Root component
4. Name
Constraint-Based Product Configuration Model Details Form

You can also use the Constraint-based product configuration model details form to create a product configuration model.
The Constraint-based product configuration model details form includes the complete definition of the product configuration model. This includes the following elements as shown in the Constraint-Based Product Configuration Model Details Form figure:

- Attributes
- Constraints
- Subcomponents
- User requirements
- BOM lines
- Route operations

The tree structure for the product configuration model displays in the left pane on the Constraint-based product configuration model details form. The root component, components, and subcomponents display in the tree structure.
Subcomponents

Adding Subcomponents

✓ Use to create a parent/child relationship between two components
✓ Use to build the structure of the product configuration model
✓ Encourage the reuse of components in multiple product configuration models

NOTE: When you add a subcomponent to a product configuration model, you can only select items that have constraint-based configuration as the configuration technology in the Released product details form. Otherwise, the item cannot be selected on the Subcomponents FastTab in the Constraint-based product configuration model details form.
Subcomponents FastTab

Use the Subcomponents FastTab to add subcomponents to a component.

Before you can add a subcomponent to a product configuration model, you must first add a record for the component on the Components form.
Attributes

You can use attributes to specify the features that you can select when a distinct product variant is configured.

- Describe the properties of the components
- Each component has one or more attributes that identify its properties
- Select from the attributes during the configuration process
- Examples: Size of TV, length of power cable, or color of speakers
Attributes can be used in constraints and conditions. When attributes are created and added to a product configuration model, the attribute's attribute types are referenced as shown in the Attributes FastTab figure.
Conditions and Expression Constraint Editor Form

Use the Expression constraint editor form to create an expression constraint or a condition that will be handled by the MSF constraint solver during the product configuration model process.

IMPORTANT: Only attributes of type boolean, text with a fixed list, and integers with a range are used by the MSF constraint solver.
Example 1 - Expression Constraint

The following expression uses a simple equal operation == to show the relationship between the left speaker and right speaker. Consider a stereo system that must have the same size speakers for the left speaker and the right speaker.

Expression: leftSpeaker[size] == rightSpeaker[size]

In the expression, leftSpeaker and rightSpeaker are the solver names of the two subcomponents, and size is an attribute of type integer with a fixed range.

Note: Expression constraints and conditions use arithmetic, boolean operators, and functions to create the constraint or condition.
Example 2 - Expression Constraint

The following expression uses the or operator Or to determine when to use a route operation named inspection for a home entertainment system product configuration model.

Expression: Or[includedLcdTV, includeddvdPlayer]

In the expression, includedLcdTV and includeddvdPlayer are the solver names of the two attributes Include LCD TV and Include DVD Player. Both attributes have a boolean attribute type of true or false.

The route operation for inspection is used only when the LCD TV or the DVD player is selected to be in home entertainment system. Otherwise, if you do not select the LCD TV or the DVD player, there is nothing to inspect.
Constraints

Constraints: Describe the restrictions of the product configuration model, and how they are used to make sure that only valid values are selected when the product configuration model is configured.

Expression constraints: Use expression constraints to express relations between attributes to make sure that compatible values are selected when you configure a product.

Table constraints: A constraint type that specifies allowed attribute combinations.

User-defined: A user-defined table constraint is static and consists of columns that represent attribute types.

System defined: A system defined table constraint represents a view on an existing table or table view that is present in the Application Object Tree (AOT).
Expression constraints are characterized by an expression that uses arithmetic and boolean operators and functions as shown in the Constraints FastTab figure.

An expression constraint is written for a specific component in a product configuration model. It cannot be reused or shared with another component. However, the expression constraints for a component can reference attributes of the component’s subcomponents.
Expression constraints are written as declarative constraints, and use MSF constraint solver to solve the constraints. You must use Optimization Modeling Language (OML) syntax when you write the constraints as shown in the Expression Constraint Editor Form figure.
A user-defined table constraint is a type of matrix that can be used to describe the set of combinations for the attribute values that are defined by attribute types.

For example, if televisions are produced, the matrix for the user-defined table constraint might have columns for the TV type and TV size.
New Table Constraint Form

System-defined table constraints bind columns of a table to attributes for components in a product configuration model as shown in the New Table Constraint Form figure.
User Requirements

User requirements can represent the soft requirements for a product where you know more about the product than the customer.

For example:
Contoso Entertainment Systems offers services to customers that can help them use or more fully enjoy the products that they purchase. When a customer buys a home entertainment system, he might not understand how to set it up because of the complexity of having several components. After years of use, maintenance and repair issues might occur. Or, the customer might want to refine his system to increase the overall performance.

This type of service can be added as a user requirement to the product configuration model.
User Requirements FastTab

User requirements do not have their own level in the generated BOM. They are mapped to components. However, you cannot associate them with a product master item. Other than that, they resemble subcomponents as shown in the User Requirements FastTab figure.
When you add a user requirement to a product configuration model, you must add attributes and BOM lines to the corresponding component to represent the user requirement.

You might have constraints that you want to use in multiple configuration models, or have BOMs or operations that you want to use across several models.

The BOM and route operations of user requirements are pulled up into the parent item in kind of a phantom BOM way.

A phantom BOM is a BOM structure that is not an item. It represents the recipe of something that you do not intend to store as a unit.
BOM Lines

Bill of Material Lines

✓ Are included in the product configuration model to identify the manufacturing BOM for each component
✓ Can reference an item or a service, and all item properties can be set to a fixed value or mapped to an attribute
✓ Are held together in a BOM structure that is created for the subcomponent and the item that is represented
✓ Conditions for BOM lines can be used in a product configuration model to include or exclude a specific BOM line when you configure a product
BOM lines are added to a product configuration model by using the BOM lines FastTab as shown in the BOM Lines FastTab figure.
For each BOM line, you will specify the following:

**Name**: Name of the BOM line.

**Description**: Description of the BOM line.

**Condition**: Adding a condition to the BOM line is optional. The field contains a drop-down to access the **Expression constraint editor** form. The form lets you write a condition for the selected BOM line. The expression entered must follow MSF syntax. You can validate the expression syntax that you enter is correct by clicking **Validate**. Performing this action passes the condition to MSF constraint solver.

**Item number**: Reference to the item number that represents the BOM line.
BOM Line Details Form

Use the BOM line details form to select the item that will represent the BOM line.
BOM Line Details Form

Use this form to set up value assignments for BOM line fields. The **Item number** field at the top of the form is used to indicate whether the value of the selected line is determined by an item number or by an attribute as shown in the BOM Line Details Form figure.

- The BOM line details form contains three FastTabs:
- **Details** FastTab: You can set the values for the Subcontractor, BOM, Project, Valid, Operation, and Consumption group fields based on a value or an attribute.
- If attribute is selected, then you can select the value for the attribute when you configure the product.
- A value can also be selected, depending on a constraint.
- This behavior is the same for all fields.
  1. **Item number**: Select the **Value** field option on the top of the BOM line details form to filter by item number in the **Item number** field.
  2. If you select the **Attribute** field option on the top of the form, then select the attribute in the **Item number** field.
- **Setup** FastTab: You can set the values for the Consumption calculation, Rounding-up, and Measurement group fields based on a value or an attribute.
- **Dimension** FastTab: You can set the values for the Inventory dimensions group fields based on a value or an attribute.
Expression Constraint Editor Form

Optionally, to specify that the BOM line is included only under a certain condition, in the Condition field, click the arrow to open the Expression constraint editor form. In the Constraint field, enter the expression constraint that defines the condition that must be met.
Route Operations

Route operations are included in product configuration models to identify the manufacturing routes for the subcomponents.

- Like a production BOM, a route must be approved before it can be used, and it must also be marked as active.
- An operation in a route is attached to a specific resource or capabilities that the resource must own.
- A route can be defined and attached to more than one item exactly like an operation can be defined and attached to more than one route.
- A route only contains operations and does not depend on BOM components.

A production route in Microsoft Dynamics AX brings together a sequence of steps or operations which defines a manufacturing process.
Route Operations Fast Tab

Add route operations to a product configuration model by using the **Route operations FastTab** on the **Constraint-based product configuration model details form.**

<table>
<thead>
<tr>
<th>Route operations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Add</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Condition</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packing</td>
<td>Packing</td>
<td></td>
<td>kIC vz LTS</td>
</tr>
<tr>
<td>SpeakerAssembly</td>
<td>Standard and high-end speaker assembly</td>
<td>Assem_Spk</td>
<td></td>
</tr>
<tr>
<td>SpeakerInspection</td>
<td>Home theater system inspection</td>
<td></td>
<td>Imp_LTS</td>
</tr>
</tbody>
</table>

...
The definition of route operations resemble how BOM lines are defined for a product configuration model.

However, route operations are not mapped to an item number as shown in the Route Operations FastTab figure.

Instead they are mapped to an operation.

### Route Operations Fast Tab

- **Packing**
  - Description: Packing
  - Condition: KDGrp_HTS
  - Operation: KDGrp_HTS
- **SpeakerAssembly**
  - Description: Standard and high-end speaker assembly
  - Condition: Assem_Spk
- **SpeakerInspection**
  - Description: Home theater system inspection
  - Condition: IMDK_HTS
  - Operation: IMDK_HTS
Route Operation Details Form

You can use the Route operation details form to set up value assignments for route operation fields. The Operation field at the top of the form can be used to indicate whether the value of the selected line is determined by a selected operation or by an attribute.
Route Operations Details Form FastTabs

The Route operations details form contains four FastTabs:

✓ Details FastTab: You can set the values for the Operation group and Route group fields based on a value or an attribute. If attribute is selected, then you can select the value for the attribute during the product model configuration process. This behavior is the same for all fields except for fields on the Resource requirements FastTab.

✓ Setup FastTab: You can set the values for the Consumption calculation group fields and Cost categories group fields based on a value or an attribute.

✓ Times FastTab: You can set the values for the Times group fields and Overlap group fields based on a value or an attribute.

✓ Resource requirements FastTab: Enter the resource requirements for the operation. These requirements can include the resource type, resource group, or the individual resource that is needed. You can also define requirements according to the capabilities the resource must have to perform the operation.
You can access the Route operation details form through

1. Product information management > Common > Product configuration models list page.
2. Select the product configuration model.
3. Click Edit in the Maintain group of the Action Pane to open the Constraint-based product configuration model details form.
4. Click the Route operations FastTab and select the existing route operation.
5. Click the Route operation details button in the Route operations FastTab to open the Route operation details form.
Route Operation with Condition

To specify that the route operation is included only under a certain condition, in the **Condition** field, click the arrow to open the **Expression constraint editor form**. In the **Constraint** field, enter the expression constraint that defines the condition that must be met.
Product Configuration APIs

Microsoft Dynamics AX 2012 includes product configuration Application Programming Interfaces (APIs). The APIs can be used by developers to extend the capabilities of a product configuration model.

The key areas of the product configuration API include the following:

- The main purpose is to modify the configured BOM structure, the route, or to writeback to the order line.
- The API provides support for all data types.
Extending The Product Configuration API

The API is executed when you complete a configuration session, after you configure a product.
The key classes of the API include the following as shown in the AOT Form figure:

1. PCAdaptor
2. PCAdaptorProductConfigurationModel
3. PCAdaptorComponent
4. PCAdaptorSubComponent
5. PCAdaptorSourceDocumentLine
6. PCAdaptorAttribute
7. PCAdaptorBOMLine
8. PCAdaptorRouteOperation
PCAdaptor Classes

The PCAdaptor class provides the following:

- An entry point to extend and overwrite the run method.
- Access to the data structure that matches the elements within the product configuration model.
- You can extend from the PCAdaptor class and use the PCAdaptorExtensionAttribute to create the relation between an adaptor class and a product configuration model.

The PCAdaptorAttribute class is used mainly for reading values.

The PCAdaptorBOMLine and PCAdaptorRouteOperation class parm methods are used to modify inclusion and field values.
Customizing the Configuration User Interface

There are several options that are available to use to further customize how and when subcomponents and attributes display on the Configure line form.

The options include the following:

- **Attribute groups**: An attribute group is used to group the attributes for a root component or subcomponent in a product configuration model. You can group similar attributes to display together to help the user better understand the product features.

- **Arranging attribute groups and subcomponents**: You can arrange attribute groups and subcomponents to display in a specific order on the Configure line form. Ordering the attribute groups can help organize the attributes in a logical sequence that display when testing the user interface or configuring an order line.

- **Hiding attributes**: Attributes can be hidden and not display in an attribute group on the Configure line form when testing or configuring an order line.
An attribute group is used to group the attributes for a root component or subcomponent in a product configuration model.

Components can frequently contain a greater number of attributes to correctly describe the product, and it is easy to organize them.

Create New Attribute Group Form

To create an attribute group, you must specify a name for the attribute group in the Name field on the Create new attribute group form.
User Interface Form

The User interface form provides a full view of the product configuration model tree structure.
The User interface form lets you arrange attribute groups and subcomponents in the tree structure to customize how they display by using the following options.

**New attribute group**: Adds a new attribute group.  
**Delete attribute group**: Deletes an attribute group.  
**Move up**: Lets you move an attribute group up in the tree structure within the selected component or subcomponent. You can also move subcomponents up in the tree structure.  
**Move down**: Lets you move an attribute group down in the tree structure within the selected component or subcomponent. You can also move subcomponents down in the tree structure.  
**Test**: Clicking Test lets you test the Configure line form and verify the attribute groups display correctly on the Configure line form. When attributes are not selected to be hidden, the attributes will display under the attribute group. The attribute group will be shown as a FastTab that can be expanded on the Configure line form.

**TIP**: **New attribute group** is available only when a root component or subcomponent is selected in the tree structure.  
**TIP**: **Delete attribute group** is available only when an attribute group is selected in the tree structure.
Configure Line Form

Clicking Test lets you test the configuration and verify the attribute groups display correctly on the Configure line form.
Hiding Attributes

You can hide attributes to not display on the Configure line form.

✓ Hide attributes to reduce the number of attributes on the Configure line form

✓ Hide specific attributes that are less important to the customer
Hiding Attributes

How To hide attributes to not display on the Configure line form.

**Hide attribute:** Select the **Hide attribute** check box to hide the attribute from displaying on the **Configure line** form.

When you click **Test** on the **User interface** form to verify the organization of the attribute groups and attributes, the hidden attribute will not display on the **Configure line** form.

**Condition:** Create the condition that you want the attribute to be hidden.

**Validate:** Select **Validate** to confirm the syntax of the condition follows MSF standards.
Test the User Interface

Test the user interface to:

✓ Verify that the attribute groups that you created display on the Configure line form in the order that you planned.
✓ Verify that the attributes within the attribute groups display in logical order on the Configure line form.
✓ Verify that any attributes that you designate as hidden do not display on the Configure line form.

To test the product configuration model, click Test on the User interface form to display the Configure line form.
Validating and Testing a Product Configuration Model

After you add information to the product configuration model, it is time to check that the information is correct and that it displays in a logical and understandable format.

- The two operations that are performed at this point are as follows:
- **Validate**: Validating checks that the constraints for the product configuration model are valid.
- **Test**: Testing displays the **Configure line** form and lets you visually inspect the configuration experience and select the values for all the defined attributes. The purpose with testing is to let the product designer verify that the complete configuration experience is in order, e.g. attribute values, constraints, default values, mandatory and hidden attributes, and so on.
Validating and Testing a Product Configuration Model Notes

NOTE: We recommend that you validate the product configuration model before you test it. If you test the product configuration model first, and errors are present, the system displays a generic infolog message that does not help you resolve the error.

There are several methods of validation that can be performed while you are creating a product configuration model.

1. The lowest level of validation is performed for a single expression constraint. Typically, the product designer performs this validation to verify the syntax of an expression constraint is correct. Also, a condition for a BOM line or a route operation can be validated in isolation. Multiple attributes can be referenced in one constraint. The validation for the expression constraint will consider the whole expression and determine whether it is valid.

2. Validation can also be done for a user-defined table constraint definition. In this case the user can verify that the values entered for each field are inside the domain of the corresponding attribute types.

3. Finally, validation can be done for a complete product configuration model to verify the complete syntax is correct, and that all naming and modeling conventions are respected.
NOTE: If the MSF constraint solver detects errors in the product configuration model during validation, the errors should be resolved before you continue. However, the product designer is free to continue working on the model, but no configuration can be completed before the issue is resolved.
Testing a Product Configuration Model

After you create a product configuration model, you can test that it performs as expected by simulating the process that occurs when the product is configured.

- The test will reflect any changes that are made by using the User interface form.
- You can verify that the attribute values are correct, and that the attribute descriptions guide the user in selecting the correct values.
- Finally, upon completing a test session, the system tries to create the BOM and the route that corresponds to the selected attribute values.
- The BOM and route only exist temporarily, and are deleted when the process closes.

The process closes some seconds after the user clicks **OK** on the **Configure line** form. The length of time is completely dependent on the size and complexity of the product configuration model.
TIP: If errors are detected in the production configuration model, the system displays an error message on the Infolog form. The Infolog form displays the following message text: Failed to parse OML data. This error message will not help you resolve the error. It is more helpful to first validate the product configuration model to determine the cause of the error.

NOTE: All mandatory fields are highlighted in the color red on the Configure line form. You must specify a value for all mandatory fields when testing and configuring a product configuration model before you click OK. If all mandatory fields do not contain values and the user clicks OK, the system displays an Infolog form with the text: The configuration is not finished. Not all fields have a value.
Building Configuration Templates

Building configuration templates

✓ Configuration template is a completely or partly configured product configuration model
✓ Configuration template is created to reduce the work needed to configure products
✓ One or more configuration templates can be created for a product configuration model to either speed up the configuration process or promote specific product attribute combinations

Promoting specific product attribute combinations could be a response to a sales campaign that places focus on a certain set of product features.
Your company could have excess inventory for components with specific attributes that it wants to sell quickly.
You can create a configuration template that uses the attributes of these components to help the order entry team with the increased demand that is expected.
The Configuration templates form is used to create and modify configuration templates for product configuration models.
Adding Configuration Translations

With the translation functionality included in the product configuration feature, you can create translated text for:

✓ Name and description of product configuration models
✓ Components
✓ Subcomponents
✓ Attributes
✓ Attribute groups
✓ Configuration templates

The product configuration feature lets you provide translated text for product configuration models.

Many companies manufacture, sell, and support their products in countries/regions throughout the world.
Global trade accounts for increased company revenue in every sector of the market.
To take advantage of today’s global marketplace, translating product information into other languages is an important option to have.
The Translation form lets you create translated text for all available languages.
Translation Form

To display the translated text values for the product configuration model on the Configure line form, you must change the language setting for your user in Microsoft Dynamics® AX 2012 to the language that your translations are translated.

If you are using the Enterprise Portal, you must also change the language setting for your user.

For each element that is translated, the following fields display on the Translation form:

1. **Product configuration model**: This is a filter field. Select the product configuration model that you want to create translated text for.
2. **Language**: Language is a filter field. Select the language that you are creating translated text for. You can click the + button when you want to add translations for a new language.
3. **Element type**: The type of element that is translated. Values for this field include the following:
   - Product configuration model
   - Component
   - Subcomponent
   - Attribute
   - Attribute group
   - Configuration template
4. **Component**: The Component field is a reference field that displays the component that the translatable element belongs to.
5. **Original text**: Displays the original text of the selected element type and component combination.
6. **Translated**: When this check box is selected, the text that is selected is translated.
7. **Translation**: On the Translation FastTab, you can enter translated text for the name and description of the selected element.
8. **Name**: In the Original text field, the name of the selected element displays in the system language. In the Translated text field, enter the translated text for the selected element's name.
9. **Description**: In the Original text field, the description of the selected element is shown in the system language. In the Translated text field, enter the translated text for the selected element's description.
The most important step in the preparing a model for release process is to create a version for the product configuration model.

To configure an order line, an approved and activated version of the product configuration model must exist.

A version represents the relationship between the product configuration model and a product master.

A product configuration model that has an active version can be configured from a sales order, sales quotation, purchase order, and production order.

**NOTE**: The **Configure line** form will not display when you try to configure an order line if the product configuration model version is not approved and activated.
Use the Versions form to create different versions of a product configuration model.
Versions

Working with Versions

✓ **Create a version**: You can use a version to select a product on an order line. You can then use a version to create a distinct product configuration that has a BOM and a route.

✓ **Approve a version**: You must approve a version before you can activate the version.

✓ **Activate a version**: Before you can use an approved product configuration model version to configure a line, you must activate the version.

✓ **Modify a version**: Change effective dates or the approver.

✓ **Delete a version**: A version can be deleted at any time.

**IMPORTANT**: A version of a product configuration model that is not approved and activated cannot be used to configure an order line.
Configure Line Form

Use the Configure line form to configure a product from a sales order, sales quotation, purchase order, and production order.
Sales Order Form

Click Product and Supply > Configure line on the Sales order form to access the Configure line form.
Configure Line Form Options

Several buttons are available for you to use on the Configure line form:

- **Load template**: Click **Load template** to open the **Configuration templates** form. Only existing templates for the product configuration model that are active will display.
- **Next**: Click **Next** to select the next component or subcomponent in the left pane tree structure. After the system advances to the component or subcomponent, you can select the attributes.
- **Cancel**: Click **Cancel** to cancel changes that you make on the Configure line form.
- **OK**: Click **OK** to accept the configuration changes and close the Configure line form.
- **Price**: Click **Price** in the **Price and ship date** group to calculate the price for the product that is based on the selected product configuration.
- **Ship date**: Click Ship date in the **Price and ship date** group to calculate the required ship date based on the selected product configuration.
Configuration Templates Form

When you configure an order line, you can use the Configuration templates form to select a configuration template with the attribute values selected.
Sales Order Form

Review the BOM and route structure values by clicking the Line details FastTab on the Sales order form. Select the Product tab and review the values in the Sub-BOM and Subroute fields in the BOM/route group.
The Configuration field in the grid no longer displays the default value from the Product information management parameters form. The Configuration field now displays a unique configuration ID number that is generated from the Constraint-based product configuration name number sequence code as shown in the Sales Order Form figure. This configuration ID number can be tracked to identify your item in the inventory system.
Configuration Dimensions Per Company

Review all configuration IDs that exist for the configured item on the Configuration dimensions per company form.
Bills of Materials Form

Use the Bills of materials form to create or change a BOM, to define a configuration group route, or to associate an existing BOM with specific item numbers.
Route Details Form

Use the Route details form to create, update, and approve routes.
Create Production Order Form

Click
Configure production to access the Configure line form.
Product Configuration on EP

Enterprise Portal provides:

✓ Access to the Microsoft Dynamics AX 2012 application from a web browser.
✓ External users, and users who do not require the rich user interface that the client application offers, the ability to configure lines.

For example, a sales team member who is visiting a customer site can create a sales order for the customer by using the Enterprise Portal. The sales team member does not have to enter the customer's order information in a separate document and wait until he is in the office to create sales orders. He can use the Enterprise Portal to complete his work.
Can use the Sales website in the Enterprise Portal to configure a sales quotation line and sales order line for a product configuration model

Can be useful when you have an organization with many employees who do not have to access Microsoft Dynamics AX 2012 regularly

You can activate users in the Enterprise Portal with access restricted to only the tasks that they have to complete. This can also be helpful when the employees in your organization are in many locations.
Home Role Center Page

When you access the Enterprise Portal, the Home Role center page appears.
Sales Website Page

You can use the Sales website to maintain customers, cases, sales quotations, sales orders, customer returns, and many more.
Configure Selected Item Page

You can use the Configure selected item page to configure a product from a sales order and a sales quotation in the Enterprise Portal.
The **Configure selected item page consists of three FastTabs:**

- **Configuration templates:** Use to load a configuration from a template.
- **Price and ship date:** Use to calculate a price and ship date based on the configuration.
- **Product configuration model:** Shows a tree structure that contains the product configuration model component structure.
Configuration Templates Page

When you configure a line, use the Configuration templates page to select a configuration template with the attribute values already selected.
New Sales Order Page

Click the Configure line icon located to the right side of the Net amount column in the Lines FastTab to open the Configure selected item page.
New Sales Order Page

After you click **OK** on the **Configure selected item** page, you can review the **Product number** field in the **Lines FastTab** on the **New sales order** page.

The **Product number** field no longer displays the default value from the **Product information management parameters** form next to the product number.

The **Product number** field now displays a unique configuration ID number that is generated from the **Constraint-based product configuration name** number sequence code.
New Sales Quotation Page

Click the Configure line icon located to the right side of the Net amount column in the Lines FastTab to open the Configure selected item page.