



Constraint Based Configuration Model Explained

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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

Product Configuration Terminology

Common Terms Associated With Product Configuration

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.

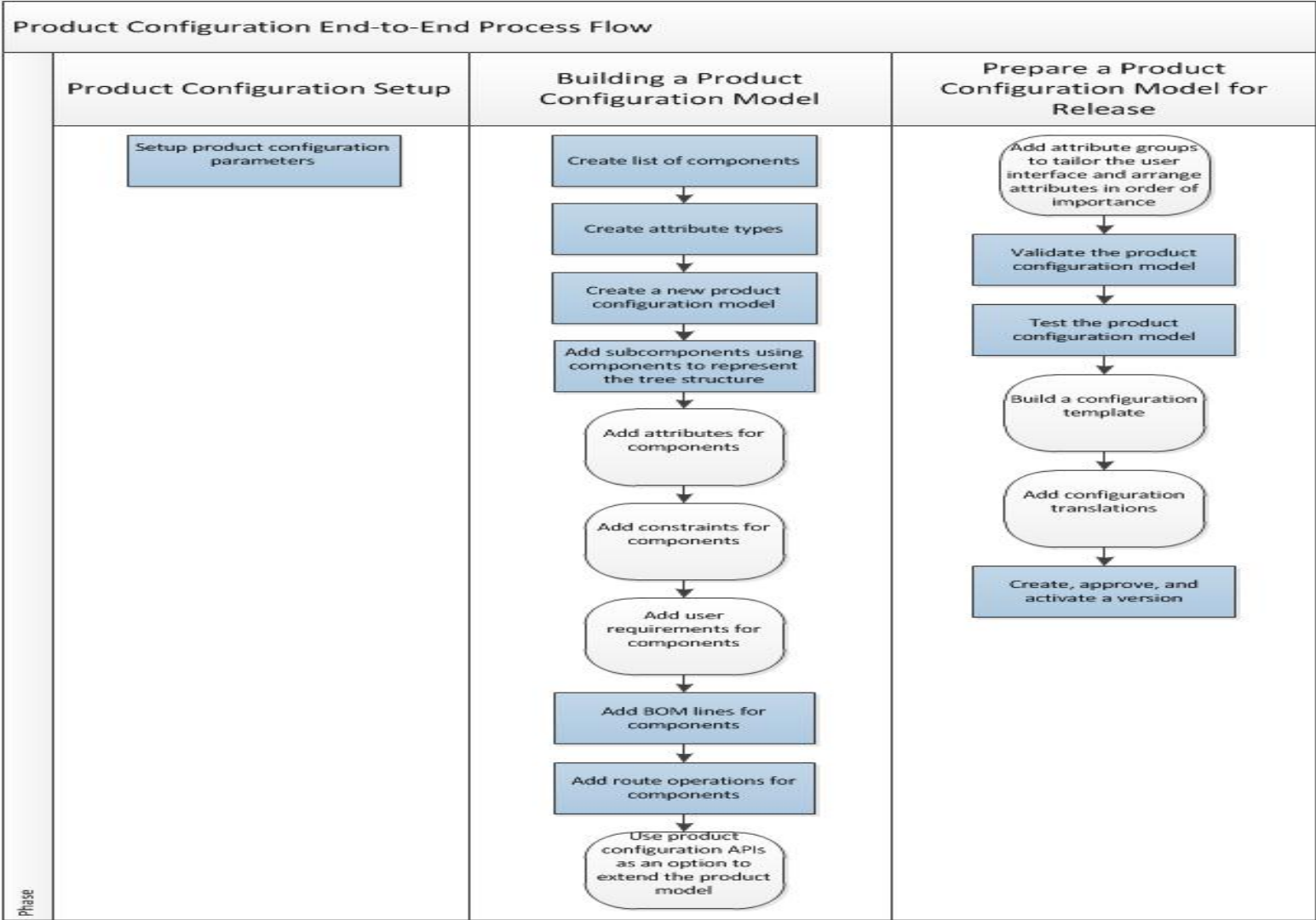
Product configuration access

4.Product configuration access: You can configure lines by using the Microsoft Dynamics AX 2012 Windows client or the Enterprise Portal.

Product Configuration Process Flow

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 are released 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

Preparing 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

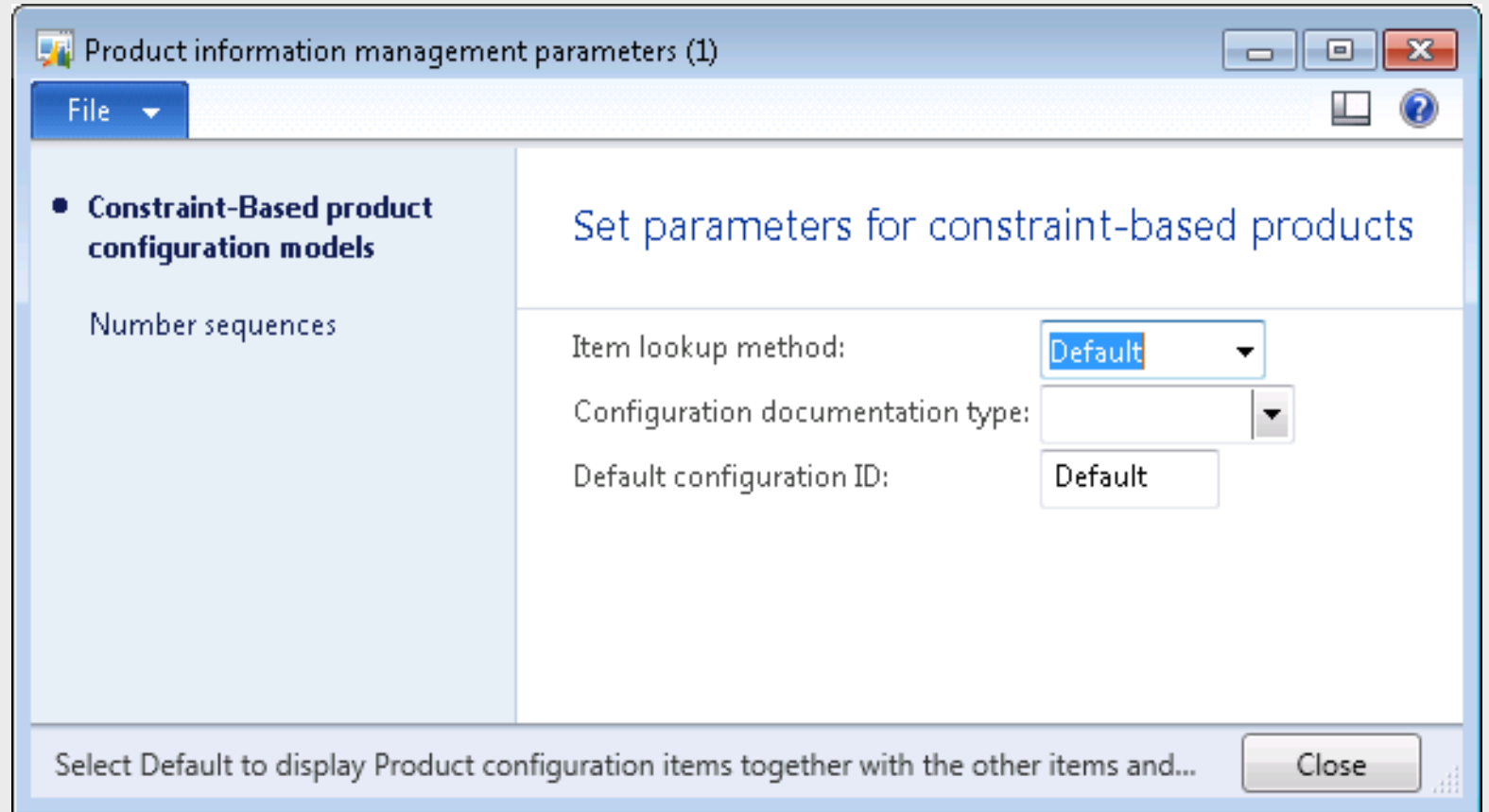
Microsoft Dynamics AX 2012 client: You can configure lines for sales quotations, sales orders, purchase orders, and production orders.

Enterprise Portal: You can configure lines for sales quotations and sales orders.

Product Information Management Parameters Form

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.



The screenshot shows a software window titled "Product information management parameters (1)". It features a "File" menu and a sidebar with a tree view containing "Constraint-Based product configuration models" and "Number sequences". The main area is titled "Set parameters for constraint-based products" and contains three fields: "Item lookup method:" with a dropdown menu showing "Default", "Configuration documentation type:" with an empty dropdown, and "Default configuration ID:" with a text box containing "Default". At the bottom, there is a status bar with the text "Select Default to display Product configuration items together with the other items and..." and a "Close" button.

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

Items that have constraint-based configuration as the **Configuration technology** can be used as components to build a product configuration model.

Configuration technology	Definition
Constraint-based configuration	Selecting constraint-based configuration lets the product be used in a product configuration model.
Dimension-based configuration	A configuration technology that is used to create product variants by selecting values for product dimensions. Any combination of the product dimensions is permitted.
Predefined variant	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.
Rule-based configuration	Variants are configured by using Product Builder when the variants are added to transaction lines.

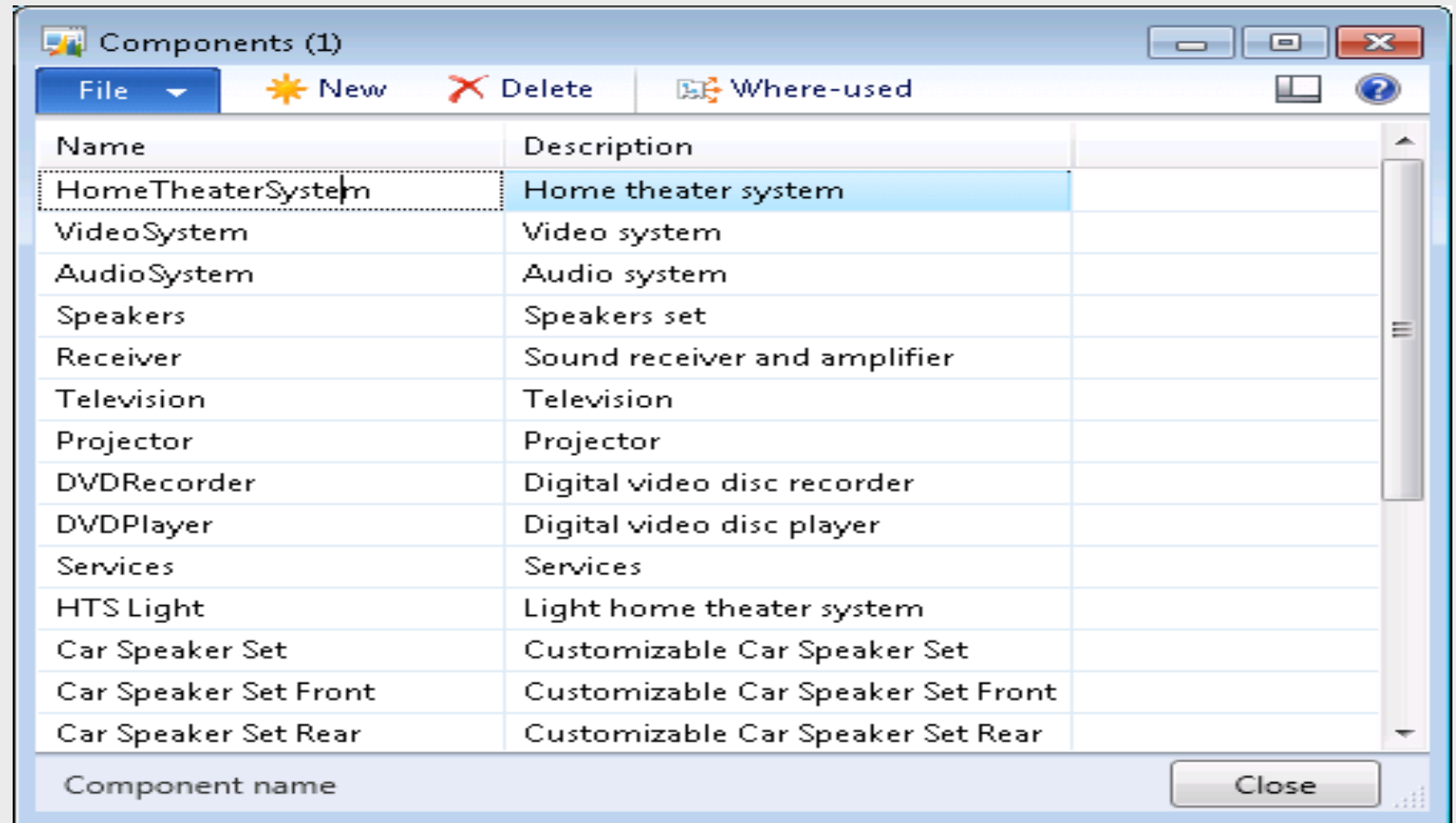
Components Form

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.



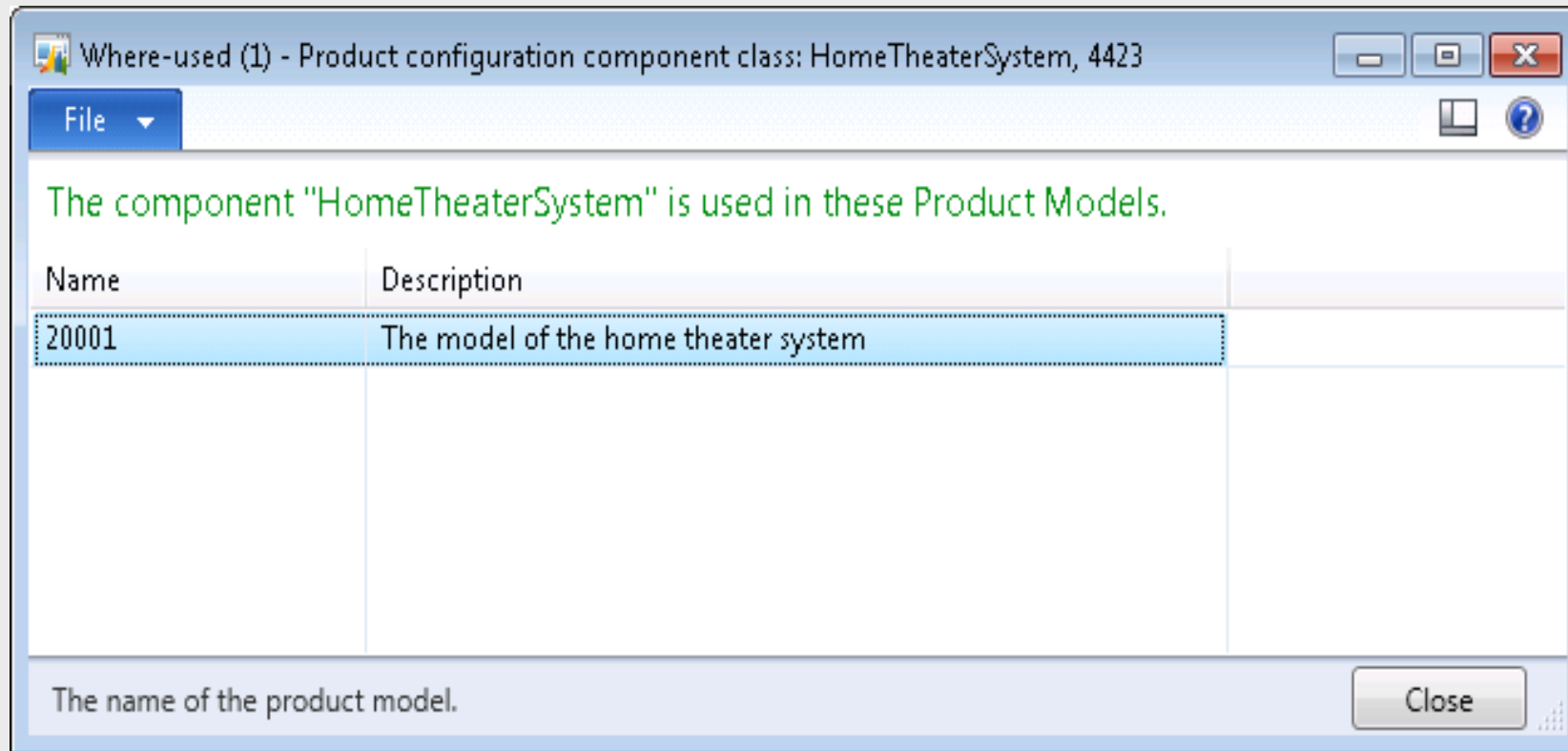
The screenshot shows a software window titled "Components (1)". It has a menu bar with "File" and buttons for "New" (star icon), "Delete" (X icon), and "Where-used" (location pin icon). Below the menu bar is a table with two columns: "Name" and "Description". The table contains the following rows:

Name	Description
HomeTheaterSystem	Home theater system
VideoSystem	Video system
AudioSystem	Audio system
Speakers	Speakers set
Receiver	Sound receiver and amplifier
Television	Television
Projector	Projector
DVDRecorder	Digital video disc recorder
DVDPlayer	Digital video disc player
Services	Services
HTS Light	Light home theater system
Car Speaker Set	Customizable Car Speaker Set
Car Speaker Set Front	Customizable Car Speaker Set Front
Car Speaker Set Rear	Customizable Car Speaker Set Rear

At the bottom of the window, there is a text input field labeled "Component name" and a "Close" button.

Where-Used Form

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



The screenshot shows a software window titled "Where-used (1) - Product configuration component class: HomeTheaterSystem, 4423". The window has a "File" menu and standard window controls. The main content area displays a green message: "The component 'HomeTheaterSystem' is used in these Product Models." Below this is a table with two columns: "Name" and "Description". The first row of the table is highlighted in blue and contains the values "20001" and "The model of the home theater system". At the bottom of the window, there is a status bar with the text "The name of the product model." and a "Close" button.

Name	Description
20001	The model of the home theater system

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 (1) - Name: 20001

File New Delete

Name

- BooleanDomain
- CarSpeakerColor
- CarSpeakerRearLeftItem
- CarSpeakerRearRightItem
- CarSpeakerTypeFront
- CarSpeakerTypeRear
- CenterChannelSpeakerConfiguration
- CenterChannelSpeakerModel
- CenterChannelSpeakerModelIIDMap
- ColorTextDomain**
- CurrencyDomain
- DateTimeDomain
- DecimalDomain
- DigitalVideoFormat
- DVDPlayerConfiguration
- DVRModel
- FeetDomain
- GigabyteDomain
- HighEndSpeakerModel
- HighEndSpeakerModelIIDMap
- HoursDomain
- HTSQuantity
- InchDomain
- IntegerDomain
- IntegerDomainHTSLight

General

Name: ColorTextDomain Value range: ☐ ColorTextDomain

Type: Text Unit of measure:

Fixed list: ☒

Values

+ Add - Remove Move up Move down Translate

Value	Solver value
Red	Red
Blue	Blue
Green	Green
Dark Blue	DarkBlue
Metallic Black	MetallicBlack
Metallic Silver	MetallicSilver
Silver	Silver
Black	Black

Name. Close

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 screenshot shows a software interface for defining a product configuration model. The title bar reads "Constraint-based product configuration model details (1) - Name: 20001, Product configuration model: 20001". The interface includes a menu bar with "File" and "Model", and a toolbar with icons for "Product configuration model New", "Duplicate", "Versions", "User interface", "Model properties", "Configuration templates", "Components", "Table constraints", "Attribute types", "Translation", "Test", "Validate", "Export product model", and "Import product model".

The main content area is titled "20001 The model of the home theater system". On the left is a tree view showing the hierarchy: HomeTheaterSystem, Audio System (Receiver, Speakers), Video System (Video player, Video recorder, Projector, Television), and Services.

The right pane is divided into several sections:

- General**: Fields for "Name" (HomeTheaterSystem) and "Description" (Home theater system).
- Attributes**: A table listing attributes with columns: Name, Solver name, Description, Attribute type, Set default, Default val..., Mandatory, and Condition.
- Constraints**: A section with "Add", "Remove", "Validate", and "Maintain table constraints" buttons. It contains a table with columns: Name, Description, Constraint type, and Expression.
- Subcomponents**, **User requirements**, **BOM lines**, and **Route operations**: These sections are currently collapsed.

The bottom status bar shows "Category description" and a "Close" button.

Name	Solver name	Description	Attribute type	Set default	Default val...	Mandatory	Condition
Apply same color configuration	applySameColor	Apply same color configuration to all components	TrueFalseDomain	<input checked="" type="checkbox"/>	True	<input checked="" type="checkbox"/>	
Color	color	Home theater system color	ColorTextDomain	<input checked="" type="checkbox"/>	Black	<input checked="" type="checkbox"/>	applySameColor
Length of power cable	powerCableLength	Length of power cable (in meters)	DecimalDomain	<input type="checkbox"/>		<input checked="" type="checkbox"/>	

Name	Description	Constraint type	Expression
ConApplySameColor	Apply same color to all co...	Expression constraint	Implies[applySameColor,color==audioSystem[color]==videoSystem[color]]
ConSetApplySameColor	Set the apply same color fla...	Expression constraint	Implies[applySameColor,applySameColor==videoSystem[applySameColor]]

Constraint-Based Product Configuration Model Details Form

Constraint-based 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.

Subcomponents

 Add

 Remove

 BOM line details

 Maintain components

<input type="checkbox"/>	Name	Solver name	Description	Component	Item number	
	Projector	projector	Projector	Projector	20005	
	Television	television	Television	Television	20004	
	Video player	videoPlayer	Digital video player	DVDPlayer	20007	
	Video recorder	videoRecorder	Digital video recorder	DVDRecorder	20006	

....

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 FastTab

Use the Attributes FastTab to add attributes to a component.

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.

Attributes

Add

Remove

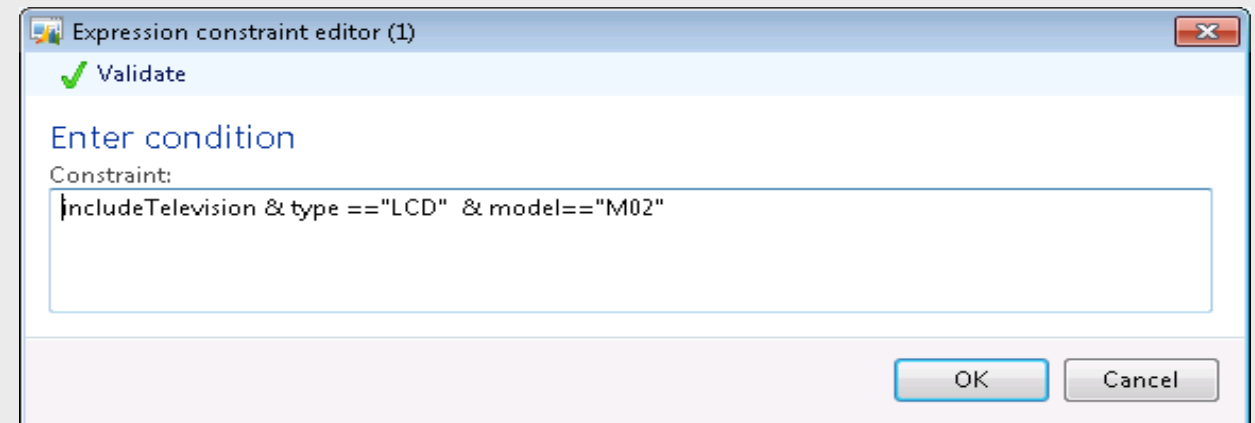
Maintain attribute types

<div></div>	Name	Solver name	Description	Attribute type	Set default	Default value	Mandatory	Condition	
<div></div>	Include video player	includeVideoPlayer	Hidden attribute (Controls inclusion of bomline from parent component)	TrueFalseDomain	<div><div></div></div>	True	<div><div></div></div>		
	Video format	videoFormat	DVD video format	DigitalVideoFormat	<div><div></div></div>	HighDefinition	<div><div></div></div>		
	Configuration	configuration	DVD configuration	DVDPlayerConfig...	<div><div></div></div>	BatchControlled	<div><div></div></div>		
	Color	color	DVD color	ColorTextDomain	<div><div></div></div>		<div><div></div></div>		

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.



Expression constraint editor (1)

✓ Validate

Enter condition

Constraint:

includeTelevision & type == "LCD" & model == "M02"

OK Cancel

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,includedvdPlayer]

In the expression, includedlcdTV and includedvdPlayer 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).

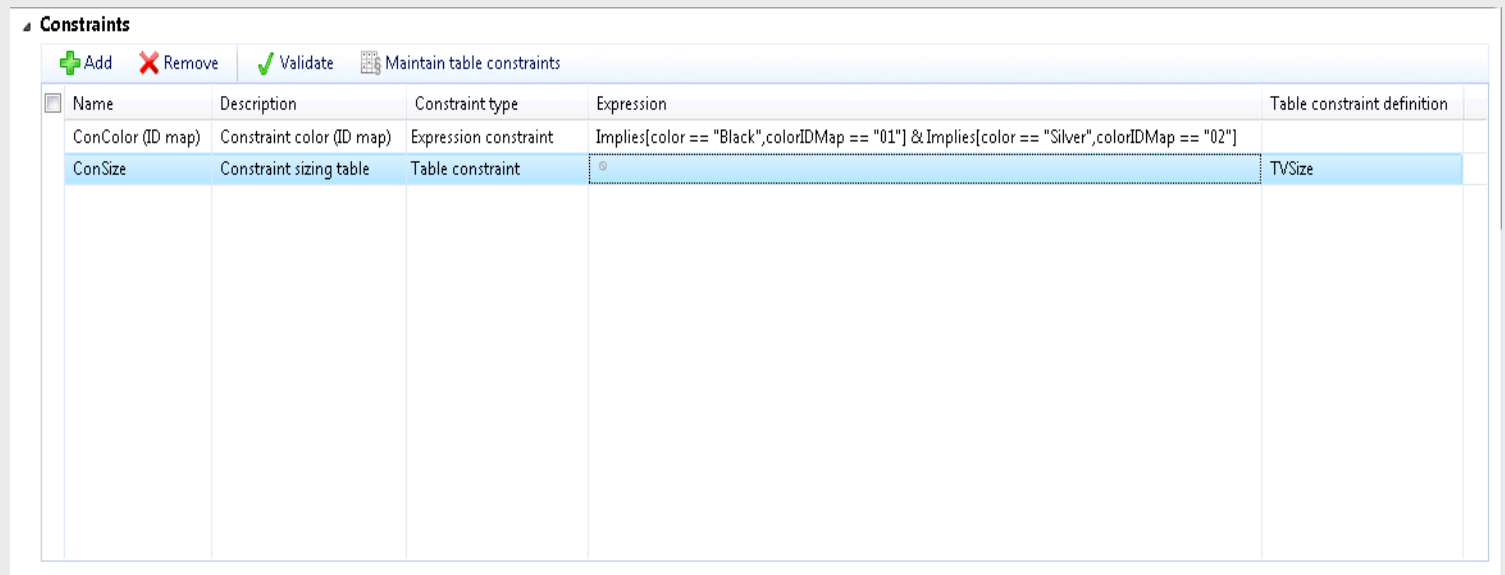
A constraint is a restriction that a product configuration model must satisfy.
Constraints are processed by using the MSF constraint solver.






Constraints FastTab

You can add constraints to a product configuration model by using the Constraints FastTab on the Constraint-based product configuration model details form.

Expression constraints are characterized by an expression that uses arithmetic and boolean operators and functions as shown in the Constraints FastTab figure.

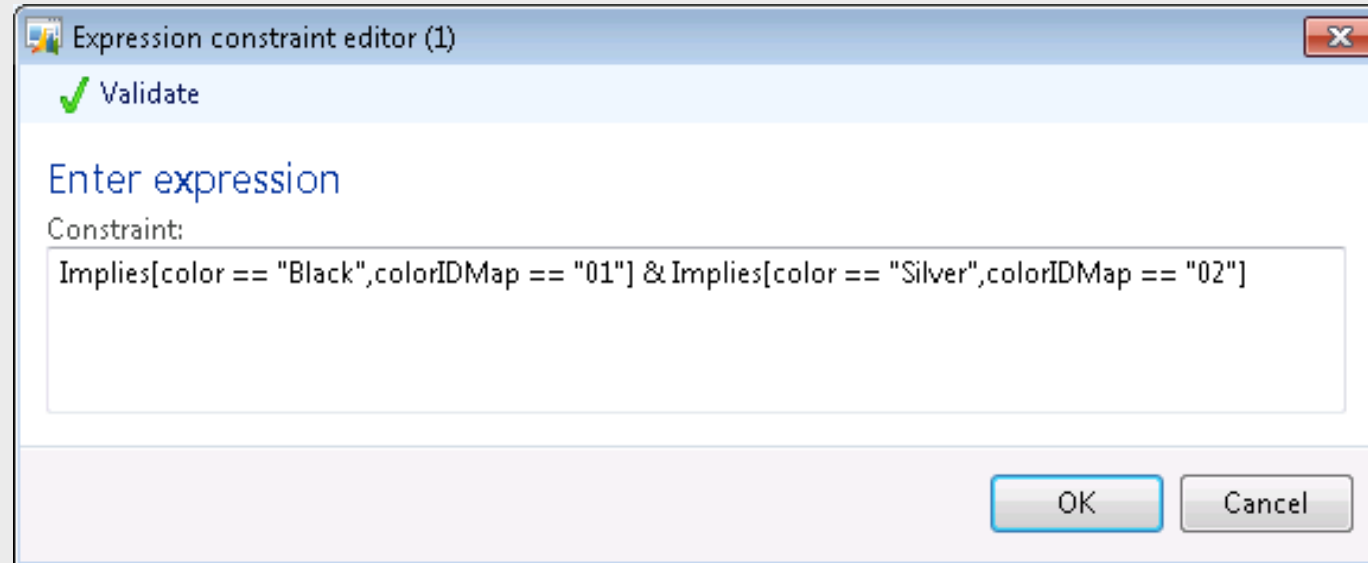
An expression constraint is written for a specific component in a product configuration model. It cannot be reused or shared with another component. However, the expression constraints for a component can reference attributes of the component's subcomponents.



			 Maintain table constraints	
<input type="checkbox"/> Name	Description	Constraint type	Expression	Table constraint definition
ConColor (ID map)	Constraint color (ID map)	Expression constraint	Implies[color == "Black",colorIDMap == "01"] & Implies[color == "Silver",colorIDMap == "02"]	
ConSize	Constraint sizing table	Table constraint		TVSize

Expression Constraints

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.



Expression constraint editor (1)

✓ Validate

Enter expression

Constraint:

Implies[color == "Black",colorIDMap == "01"] & Implies[color == "Silver",colorIDMap == "02"]

OK Cancel

Edit Table Constraint Form

The Edit Table Constraint Form figure displays the relationships on the **Allowed combinations** FastTab in the **Edit Table Constraint** form.

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.

File

Name: TVSize

Description: Television size

Type: User defined

Table fields

+ Add - Remove

Name	Attribute type
TVType	TelevisionType
TVSize	TelevisionSize

Allowed combinations

+ Add - Remove ✓ Validate

	TVType	TVSize
	LCD	42
	LCD	50
	Plasma	50
	Plasma	60
	Projection	50
	Projection	60
*		

A short description of the record.

Close

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.

New table constraint (1)

Define columns

Specify which fields to include in the constraint

Add Remove

Name	Field name	Attribute type
Color	InventColorId	ColorTextDomain
Site	InventSiteId	Site

Optional: Select a query to filter the table

Select query...

< Back Next > Cancel

User Requirements

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

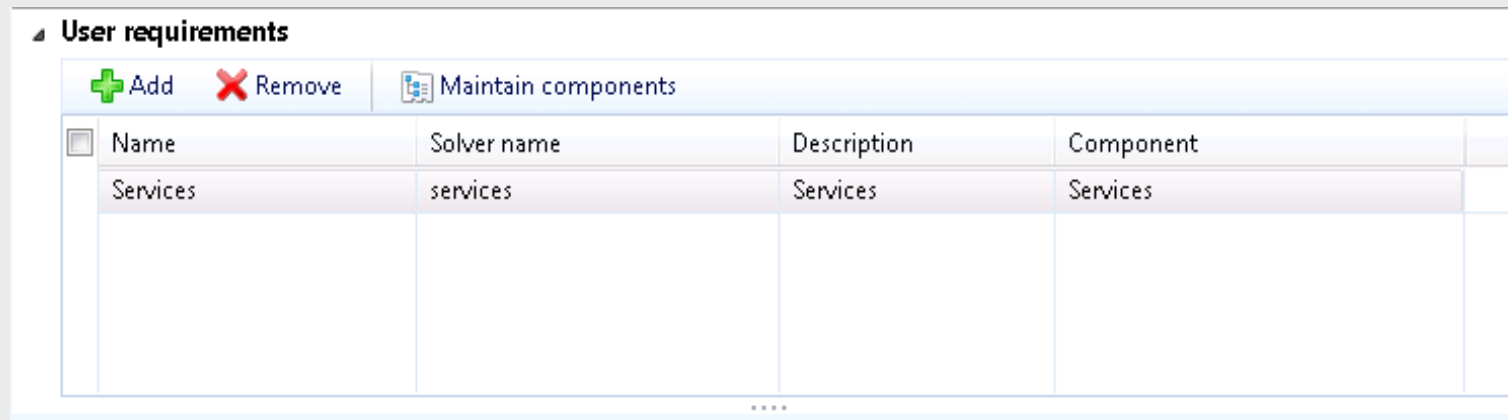
For example:

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.



User requirements			
<div>+ Add - Remove Maintain components</div>			
<input type="checkbox"/>	Name	Solver name	Description
	Services	services	Services

User Requirements FastTab

- 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.

User requirements				
<div> Add  Remove  Maintain components</div>				
<input type="checkbox"/>	Name	Solver name	Description	Component
	Services	services	Services	Services

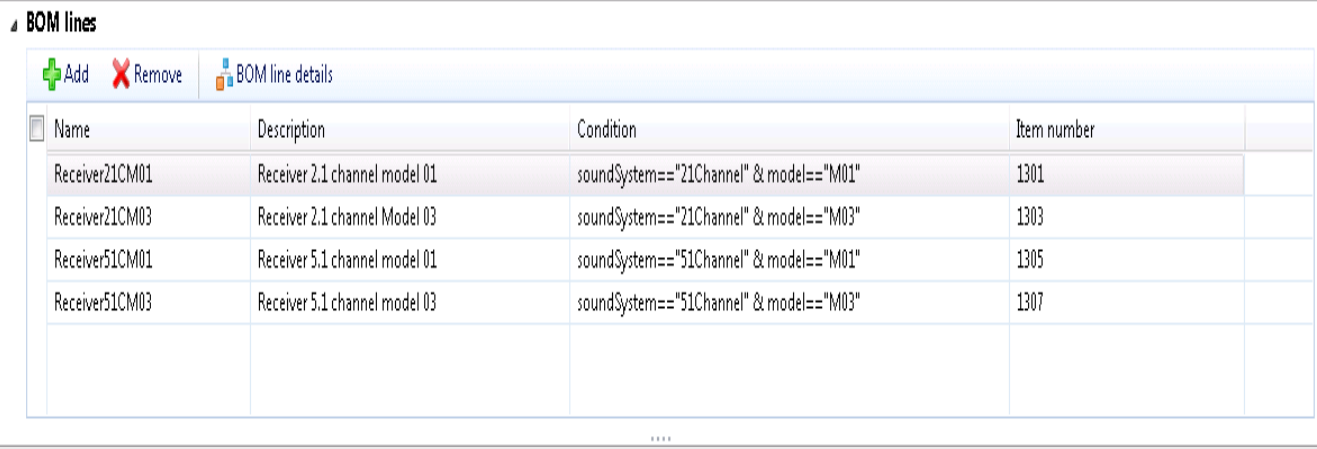
BOM Lines

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 FastTab

BOM lines are added to a product configuration model by using the BOM lines FastTab as shown in the BOM Lines FastTab figure.



BOM lines

 Add  Remove  BOM line details

<input type="checkbox"/> Name	Description	Condition	Item number	
Receiver21CM01	Receiver 2.1 channel model 01	soundSystem=="21Channel" & model=="M01"	1301	
Receiver21CM03	Receiver 2.1 channel Model 03	soundSystem=="21Channel" & model=="M03"	1303	
Receiver51CM01	Receiver 5.1 channel model 01	soundSystem=="51Channel" & model=="M01"	1305	
Receiver51CM03	Receiver 5.1 channel model 03	soundSystem=="51Channel" & model=="M03"	1307	

BOM Lines FastTab

For each BOM line, you will specify the following:

BOM lines

Add

Remove

BOM line details

<div><div></div><div>Name</div></div>	Description	Condition	Item number	
Receiver21CM01	Receiver 2.1 channel model 01	soundSystem=="21Channel" & model=="M01"	1301	
Receiver21CM03	Receiver 2.1 channel Model 03	soundSystem=="21Channel" & model=="M03"	1303	
Receiver51CM01	Receiver 5.1 channel model 01	soundSystem=="51Channel" & model=="M01"	1305	
Receiver51CM03	Receiver 5.1 channel model 03	soundSystem=="51Channel" & model=="M03"	1307	

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.

The screenshot shows a software window titled "BOM line details (1)". At the top, there is a text field for "Item number" containing "1301" and two radio buttons labeled "Value" (selected) and "Attribute". Below this is a section titled "Details" with several sub-sections:

- Subcontractor**: Includes a "Set:" checkbox, a "Vendor account:" text field, and "Value" (selected) and "Attribute" radio buttons.
- BOM**: Includes several "Set:" checkboxes and fields:
 - "Position:" text field with "Value" and "Attribute" radio buttons.
 - "Line type:" dropdown menu set to "Item" with "Value" (selected) and "Attribute" radio buttons.
 - "Calculation:" checkbox checked with "Value" (selected) and "Attribute" radio buttons.
 - "Subroute:" text field with "Value" and "Attribute" radio buttons.
 - "Sub-BOM:" text field with "Value" and "Attribute" radio buttons.
- Project**: Includes a "Set:" checkbox, "Set subproduction to Consumed:" checkbox, and "Value" (selected) and "Attribute" radio buttons.
- Valid**: Includes "Set:" checkboxes for "From date:" and "To date:" text fields, each with "Value" (selected) and "Attribute" radio buttons.
- Operation**: Includes "Set:" checkboxes for "Oper. No." text field and "End:" checkbox, each with "Value" (selected) and "Attribute" radio buttons.
- Consumption**: Includes a "Set:" checkbox, "Resource consumption:" checkbox, and "Value" (selected) and "Attribute" radio buttons.

At the bottom of the form, there are two expandable sections: "Setup" and "Dimension". At the very bottom right are "OK" and "Cancel" buttons. A footer bar at the bottom contains the text "Identification number for this item".

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.

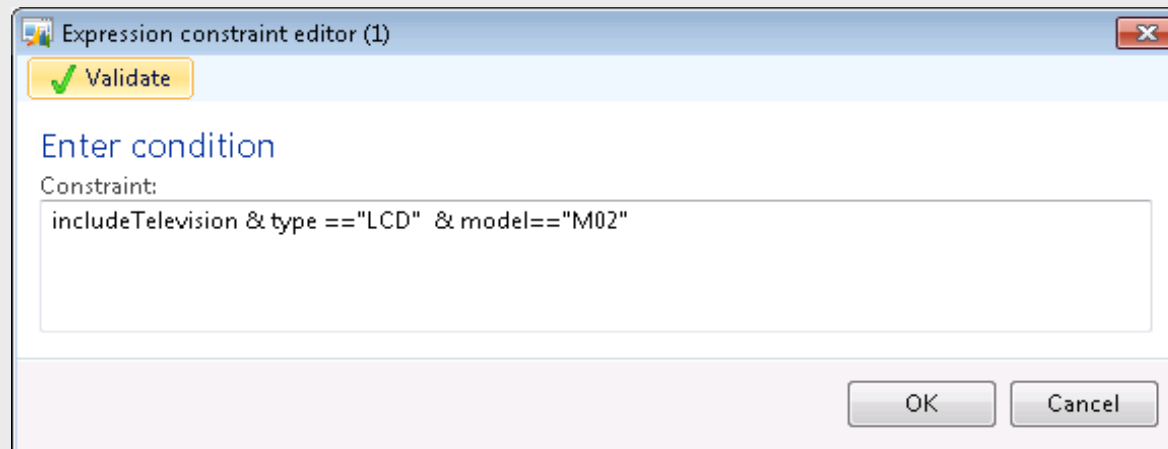
The screenshot shows the 'BOM line details (1)' window. At the top, there is a dropdown for 'Item number' set to '1301' and two radio buttons: 'Value' (selected) and 'Attribute'. Below this are several sections, each with a 'Set:' checkbox and a corresponding field, followed by 'Value' and 'Attribute' radio buttons:

- Subcontractor**: Set: ☐ Vendor account: [text field] Value Attribute
- BOM**:
 - Set: ☐ Position: [text field] Value Attribute
 - Set: ☒ Line type: Item Value Attribute
 - Set: ☒ Calculation: ☒ Value Attribute
 - Set: ☐ Subroute: [text field] Value Attribute
 - Set: ☐ Sub-BOM: [text field] Value Attribute
- Project**: Set: ☐ Set subproduction to Consumed: ☐ Value Attribute
- Valid**:
 - Set: ☐ From date: [text field] Value Attribute
 - Set: ☐ To date: [text field] Value Attribute
- Operation**:
 - Set: ☐ Oper. No. [text field] Value Attribute
 - Set: ☐ End: ☐ Value Attribute
- Consumption**: Set: ☐ Resource consumption: ☐ Value Attribute

At the bottom, there are two tabs: 'Setup' and 'Dimension'. The 'Setup' tab is active. At the very bottom, there are 'OK' and 'Cancel' buttons, and a label 'Identification number for this item'.

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.



Expression constraint editor (1)

Validate

Enter condition

Constraint:

includeTelevision & type == "LCD" & model == "M02"

OK Cancel

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.

Route operations

 Add  Remove  Route operation details

<input type="checkbox"/>	Name	Description	Condition	Operation	
	Packing	Packing		KtInPk_HTS	
	SpeakerAssembly	Standard and high end speaker assembly		Assem_Spk	
	SpeakerInspection	Home theater system inspection		Insp_HTS	

Route Operations Fast Tab

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				
<div> Add  Remove  Route operation details</div>				
<input type="checkbox"/>	Name	Description	Condition	Operation
	Packing	Packing		KtInPk_HTS
	SpeakerAssembly	Standard and high end speaker assembly		Assem_Spk
	SpeakerInspection	Home theater system inspection		Insp_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.

The screenshot shows the 'Route operation details (1) - Name: Packing, Packing' window. The 'Operation' field is set to 'KtdnPk_HTS'. The form is divided into several sections: 'Details', 'Route', 'Setup', 'Consumption calculation', 'Cost categories', 'Times', and 'Resource requirements'. Each section contains various fields with 'Set' checkboxes and radio buttons for 'Value' or 'Attribute' assignments.

- Details:** Includes fields for 'Oper. No.' (10), 'Next' (0), 'Priority' (Primary), and 'Link type'.
- Route:** Includes fields for 'Property', 'Route group' (10), and 'Route type' (Standard).
- Setup:** Includes fields for 'Formula' (Standard), 'Factor' (0.00), and 'Costing resource'.
- Consumption calculation:** Includes fields for 'Formula' (Standard), 'Factor' (0.00), and 'Costing resource'.
- Cost categories:** Includes fields for 'Setup category' (HTSSetup), 'Run time category' (HTSProc), and 'Quantity category' (HTSQty).
- Times:** Includes a field for 'Times'.
- Resource requirements:** Includes a field for 'Resource requirements'.

At the bottom, there are 'OK' and 'Cancel' buttons, and a status bar that reads 'Identify the route group.'

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.

Route Operations Details Form FastTabs

The Route operations details form how-to:




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.

Route operations

 Add  Remove  Route operation details

<input type="checkbox"/>	Name	Description	Condition	Operation
<input type="checkbox"/>	Packing	Packing	includeIcdTV	KtInPk_HTS
<input type="checkbox"/>				

Product Configuration APIs

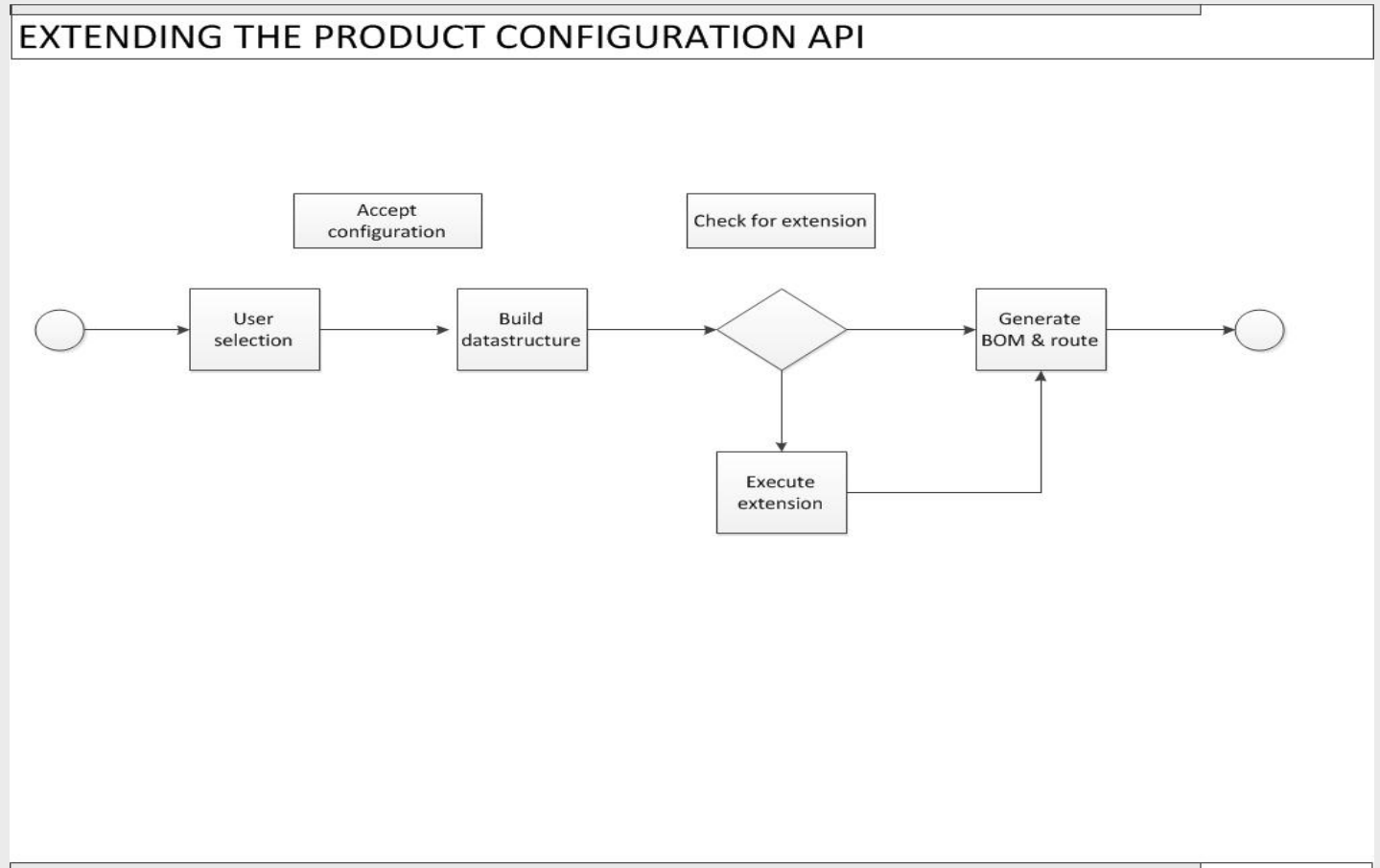
Microsoft Dynamics AX 2012 includes product configuration Application Programming Interfaces (APIs). The APIs can be used by developers to extend the capabilities of a product configuration model.

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

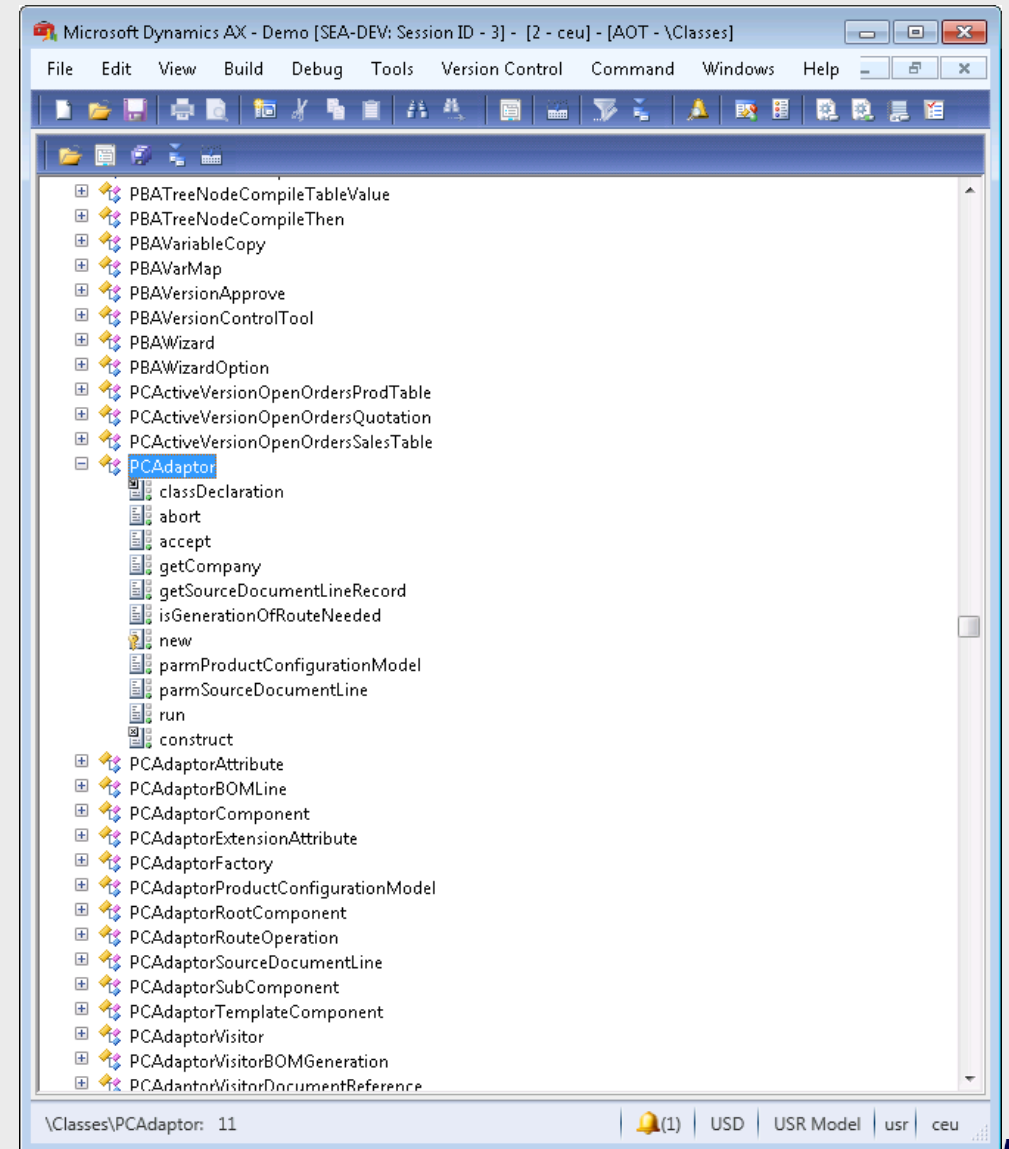
The API is executed when you complete a configuration session, after you configure a product.



AOT Form

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:

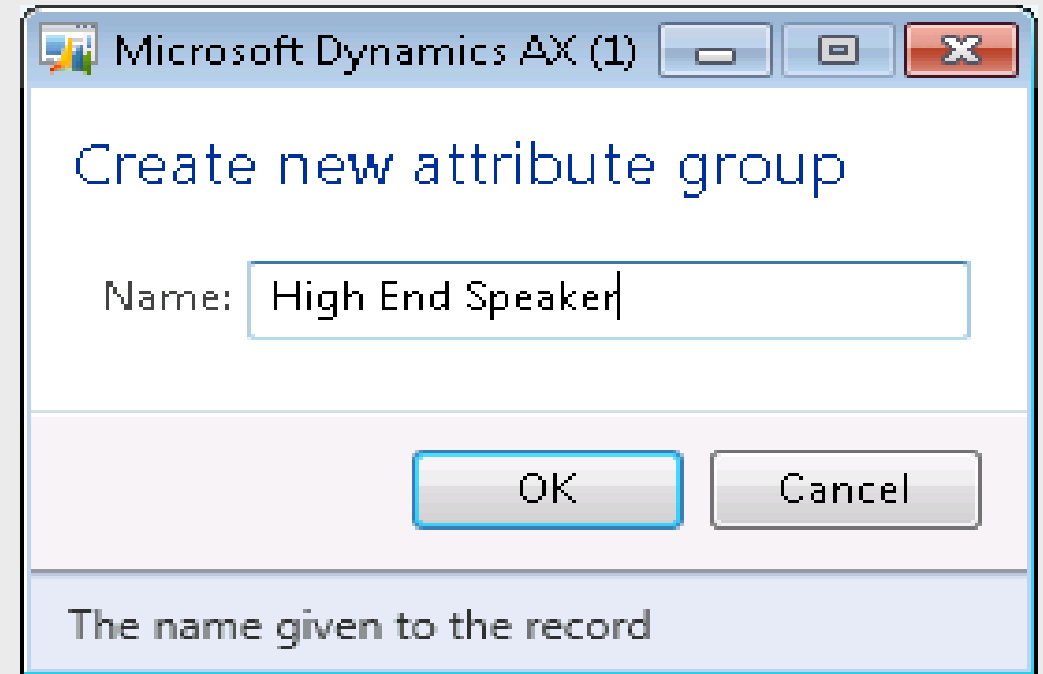
- ✓ Attribute groups: An attribute group is used to group the attributes for a root component or subcomponent in a product configuration model. You can group similar attributes to display together to help the user better understand the product features.
- ✓ Arranging attribute groups and subcomponents: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

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.

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.



Microsoft Dynamics AX (1)

Create new attribute group

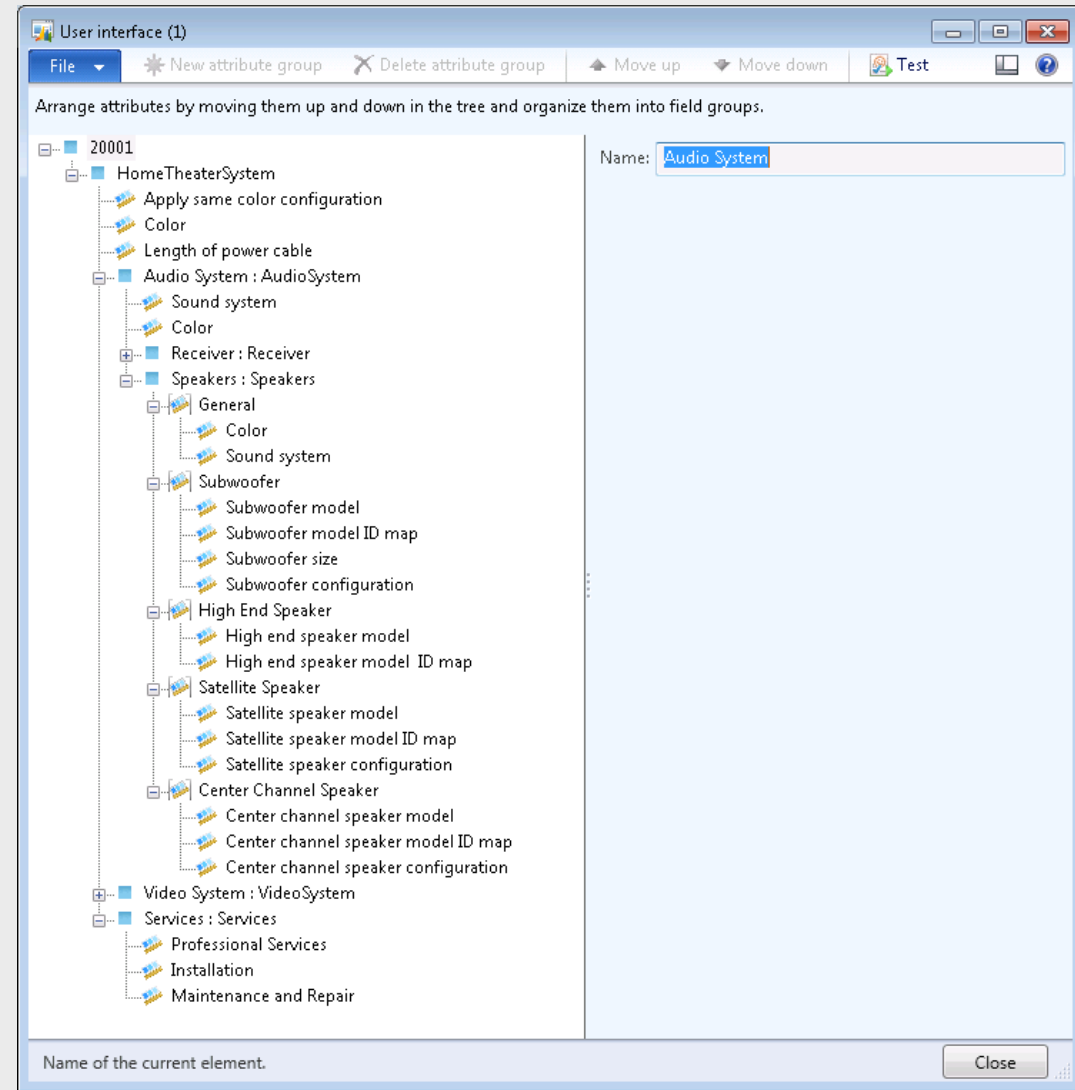
Name: High End Speaker

OK Cancel

The name given to the record

User Interface Form

The User interface form provides a full view of the product configuration model tree structure.



User Interface Form

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.

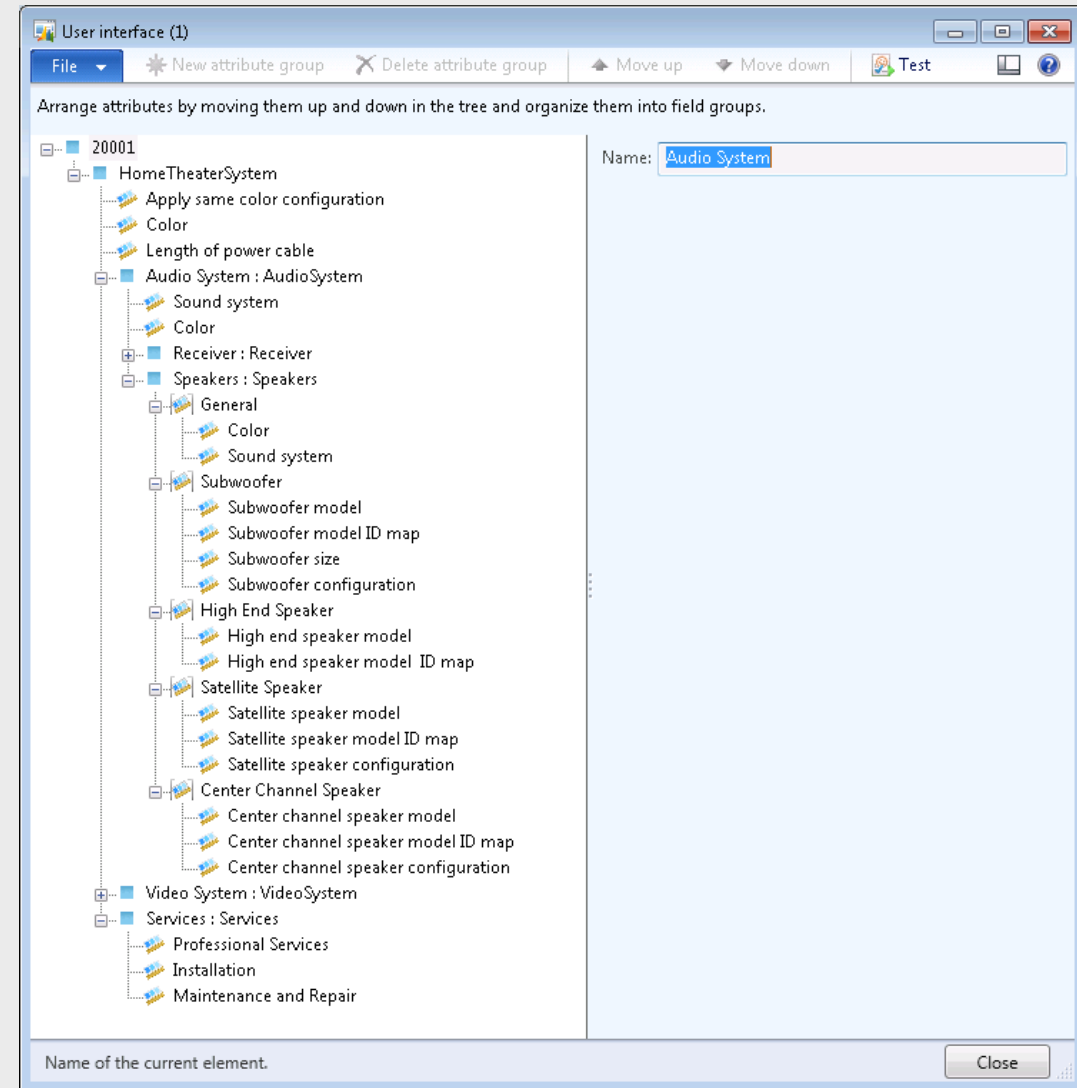
Test: Clicking **Test** lets you test the **Configure line** form and verify the attribute groups display correctly on the **Configure line** form.

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.

The screenshot shows a software window titled "Configure line (1)". At the top, it displays "Test product model: 20001" and "20001 The model of the home theater system". Below this is a "Load template" button. On the left is a tree view with the following structure:

- HomeTheaterSystem
 - Audio System
 - Receiver
 - Speakers**
 - Video System
 - Video player
 - Video recorder
 - Projector
 - Television
 - Services

The "Speakers" section is expanded, showing several sub-sections with dropdown menus:

- General**
 - Color: Metallic Black
 - Sound system: 5.1 channel
- Subwoofer**
 - Subwoofer model: Model 00
 - Subwoofer size: 12
 - Subwoofer configuration: 01
- High End Speaker**
 - High End Speaker Model: Mahogany 16 inches
- Satellite Speaker**
 - Satellite speaker model: Model 02
 - Satellite speaker configuration: 01
- Center Channel Speaker**
 - Center channel speaker model: Model 01
 - Center channel speaker model ID map: 1151
 - Center channel speaker configuration: 01

At the bottom right of the form are three buttons: "Next", "OK", and "Cancel".

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.*

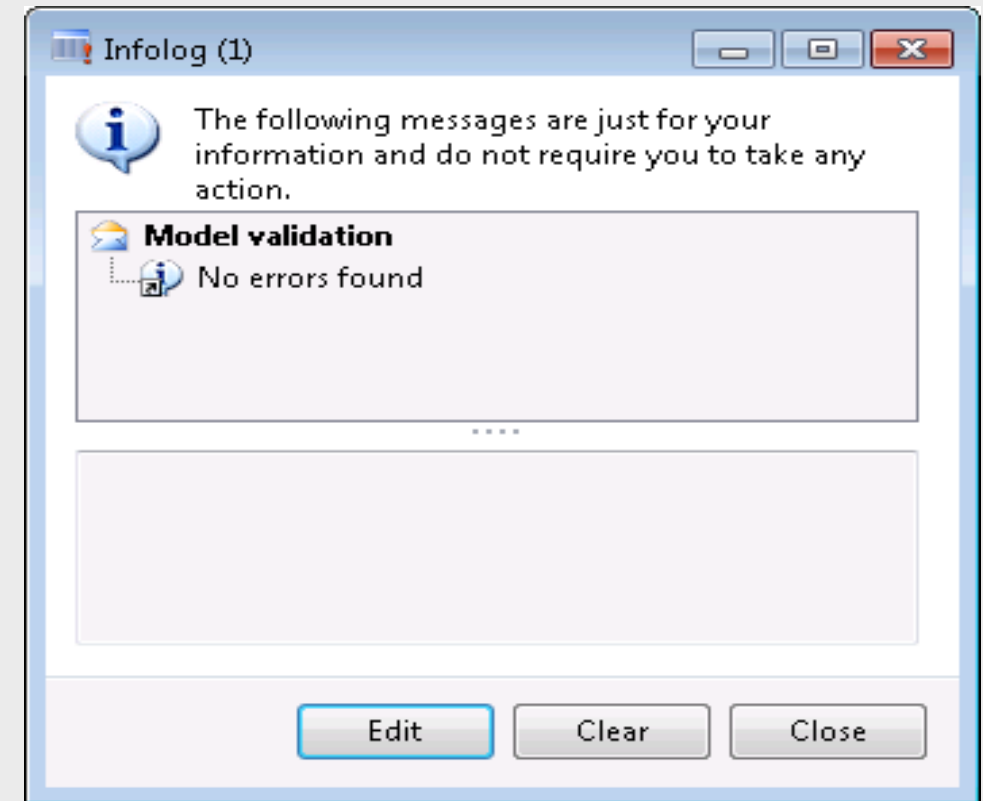
There are several methods of validation that can be performed while you are creating a product configuration model.

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.

Infolog Form with No Errors

Validation displays No errors found.

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.

Configure Line Form Test

Testing a 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.

The screenshot shows a software window titled "Configure line (1)". Inside, the "Test product model: 20001" is displayed, with a description "The model of the home theater system". Below this is a "Load template" section. A tree view on the left shows the configuration structure: "HomeTheaterSystem" (expanded) contains "Audio System" (expanded) with "Receiver" and "Speakers", and "Video System" (expanded) with "Video player", "Video recorder", "Projector", "Television", and "Services". To the right of the tree, under the "HomeTheaterSystem" header, there are two fields: "Apply same color configuration:" with a dropdown menu set to "false", and "Length of power cable:" with a red dashed underline indicating it is a mandatory field. At the bottom right, there are "Next", "OK", and "Cancel" buttons.

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

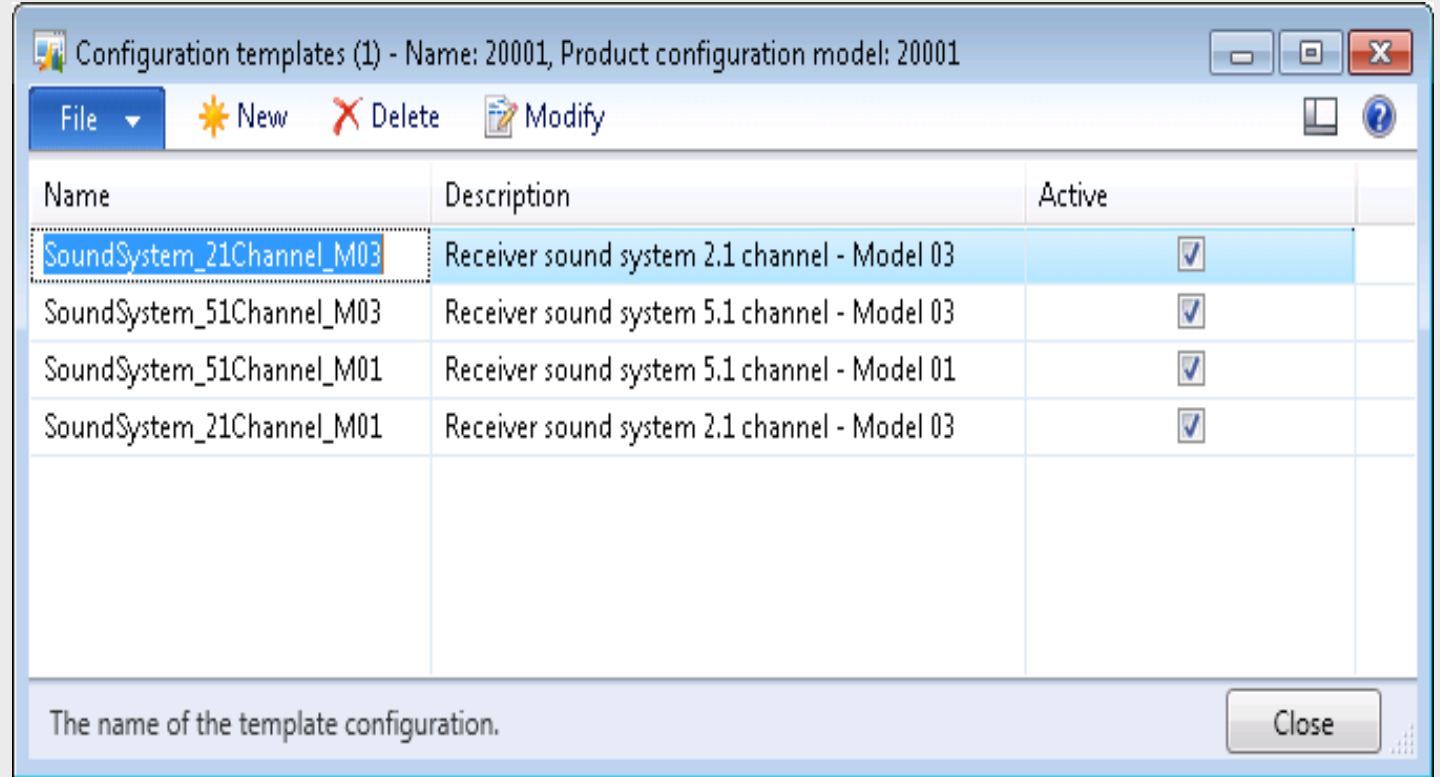
Promoting specific product attribute combinations could be a response to a sales campaign that places focus on a certain set of product features.

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.

Configuration Templates Form

The Configuration templates form is used to create and modify configuration templates for product configuration models.



Configuration templates (1) - Name: 20001, Product configuration model: 20001

File New Delete Modify

Name	Description	Active
SoundSystem_21Channel_M03	Receiver sound system 2.1 channel - Model 03	<input checked="" type="checkbox"/>
SoundSystem_51Channel_M03	Receiver sound system 5.1 channel - Model 03	<input checked="" type="checkbox"/>
SoundSystem_51Channel_M01	Receiver sound system 5.1 channel - Model 01	<input checked="" type="checkbox"/>
SoundSystem_21Channel_M01	Receiver sound system 2.1 channel - Model 03	<input checked="" type="checkbox"/>

The name of the template configuration.

Close

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 in to other languages is an important option to have.

Translation Form

The Translation form lets you create translated text for all available languages.

Translation (1) - Name: 20001, Product configuration model: 20001

Product configuration model: 20001

Language: es-mx

Element type	Component	Original text	Translated
Product configuration model	HomeTheaterSystem	20001	<input type="checkbox"/>
Component	HomeTheaterSystem		<input type="checkbox"/>
Attribute	HomeTheaterSystem	Apply same color configuration	<input type="checkbox"/>
Attribute	HomeTheaterSystem	Color	<input type="checkbox"/>
Attribute	HomeTheaterSystem	Length of power cable	<input type="checkbox"/>
Sub component	HomeTheaterSystem	Audio System	<input type="checkbox"/>
Component	AudioSystem		<input type="checkbox"/>
Attribute	AudioSystem	Sound system	<input type="checkbox"/>
Attribute	AudioSystem	Color	<input type="checkbox"/>
Sub component	AudioSystem	Receiver	<input checked="" type="checkbox"/>
Component	Receiver		<input type="checkbox"/>
Attribute	Receiver	Receiver sound system	<input type="checkbox"/>
Attribute	Receiver	Model	<input type="checkbox"/>
Attribute	Receiver	Configuration	<input type="checkbox"/>
Attribute	Receiver	Color	<input type="checkbox"/>
Sub component	AudioSystem	Speakers	<input type="checkbox"/>
Component	Speakers		<input type="checkbox"/>
Attribute	Speakers	High End Speaker Model	<input type="checkbox"/>
Attribute	Speakers	High end speaker model ID map	<input type="checkbox"/>
Attribute	Speakers	Subwoofer model	<input type="checkbox"/>
Attribute	Speakers	Subwoofer model ID map	<input type="checkbox"/>
Attribute	Speakers	Subwoofer size	<input type="checkbox"/>
Attribute	Speakers	Subwoofer configuration	<input type="checkbox"/>
Attribute	Speakers	Satellite speaker model	<input type="checkbox"/>
Attribute	Speakers	Satellite speaker model ID map	<input type="checkbox"/>

Category name

Element type: Sub component

Component: AudioSystem

Translation

Name

Original text: Receiver

Translated text: Receptor

Description

Original text: Receiver

Translated text: Receptor

Close

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.

Element type	Component	Original text	Translated
Product configuration model	HomeTheaterSystem	20001	<input type="checkbox"/>
Component	HomeTheaterSystem		<input type="checkbox"/>
Attribute	HomeTheaterSystem	Apply same color configuration	<input type="checkbox"/>
Attribute	HomeTheaterSystem	Color	<input type="checkbox"/>
Attribute	HomeTheaterSystem	Length of power cable	<input type="checkbox"/>
Sub component	HomeTheaterSystem	Audio System	<input type="checkbox"/>
Component	AudioSystem		<input type="checkbox"/>
Attribute	AudioSystem	Sound system	<input type="checkbox"/>
Attribute	AudioSystem	Color	<input type="checkbox"/>
Sub component	AudioSystem	Receiver	<input checked="" type="checkbox"/>
Component	Receiver		<input type="checkbox"/>
Attribute	Receiver	Receiver sound system	<input type="checkbox"/>
Attribute	Receiver	Model	<input type="checkbox"/>
Attribute	Receiver	Configuration	<input type="checkbox"/>
Attribute	Receiver	Color	<input type="checkbox"/>
Sub component	AudioSystem	Speakers	<input type="checkbox"/>
Component	Speakers		<input type="checkbox"/>
Attribute	Speakers	High End Speaker Model	<input type="checkbox"/>
Attribute	Speakers	High end speaker model ID map	<input type="checkbox"/>
Attribute	Speakers	Subwoofer model	<input type="checkbox"/>
Attribute	Speakers	Subwoofer model ID map	<input type="checkbox"/>
Attribute	Speakers	Subwoofer size	<input type="checkbox"/>
Attribute	Speakers	Subwoofer configuration	<input type="checkbox"/>
Attribute	Speakers	Satellite speaker model	<input type="checkbox"/>
Attribute	Speakers	Satellite speaker model ID map	<input type="checkbox"/>

Creating, Approving, and Activating Versions

Almost There!

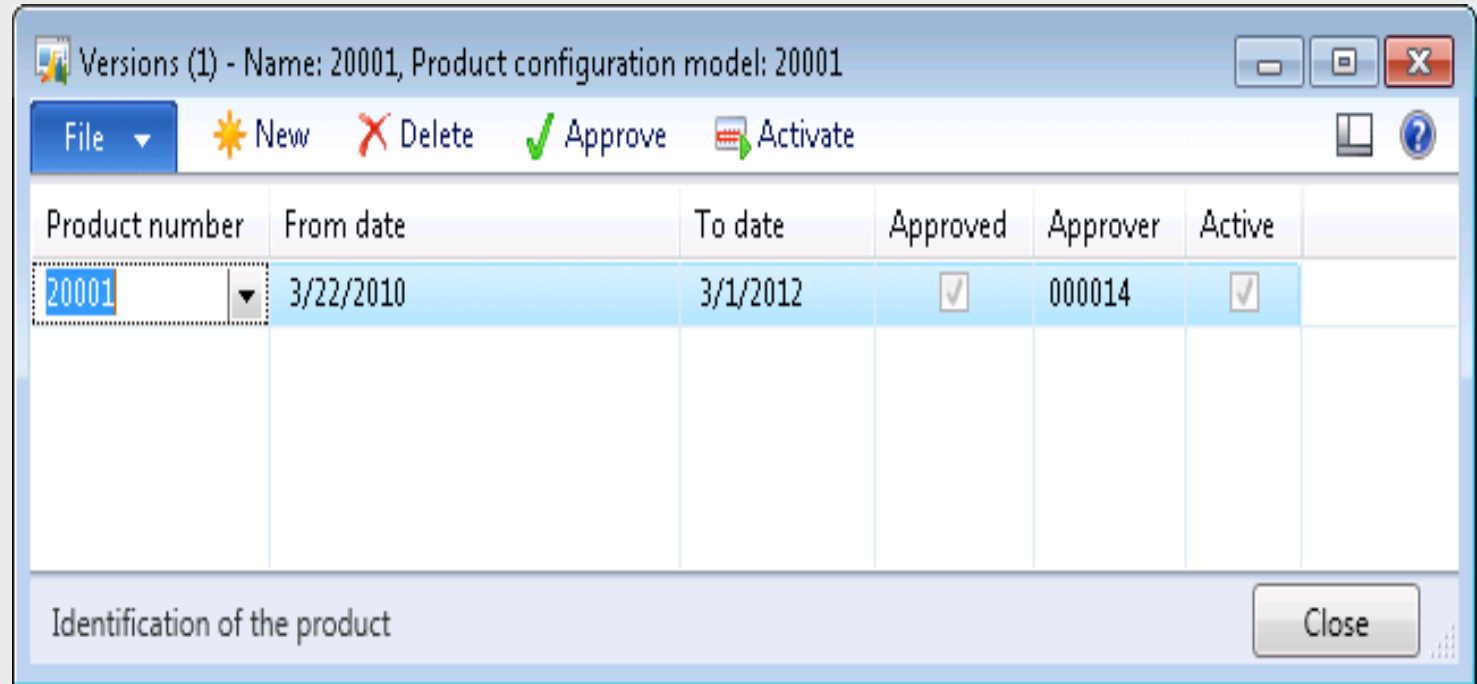
- ✓ The most important step in the preparing a model for release process is to create a version for the product configuration model.
- ✓ To configure an order line, an approved and activated version of the product configuration model must exist.
- ✓ A version represents the relationship between the product 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.

Versions Form

Use the **Versions** form to create different versions of a product configuration model.



The screenshot shows a software window titled "Versions (1) - Name: 20001, Product configuration model: 20001". The window has a menu bar with "File" and a toolbar with icons for "New", "Delete", "Approve", and "Activate". Below the toolbar is a table with the following columns: "Product number", "From date", "To date", "Approved", "Approver", and "Active". The first row of the table contains the following data: "20001" (with a dropdown arrow), "3/22/2010", "3/1/2012", a checked checkbox, "000014", and a checked checkbox. Below the table is a section labeled "Identification of the product" with a "Close" button.

Product number	From date	To date	Approved	Approver	Active
20001	3/22/2010	3/1/2012	<input checked="" type="checkbox"/>	000014	<input checked="" type="checkbox"/>

Identification of the product Close

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.

The screenshot shows a software window titled "Configure line (1)". The main area is divided into three sections:

- Configure selected item:** Displays the item number "20001" and the description "The model of the home theater system". Below this is a "Load template" button and a tree view showing the product structure:
 - HomeTheaterSystem
 - Audio System
 - Receiver
 - Speakers
 - Video System
 - Video player
 - Video recorder
 - Projector
 - Television
 - Services
- HomeTheaterSystem configuration:** Contains two fields:
 - "Apply same color configuration:" with a dropdown menu set to "false".
 - "Length of power cable:" with a text input field containing the value "5".
- Attribute details:** A panel on the right showing:
 - "Length of power cable" and "Length of power cable (in meters)" with a small icon.
- Price and ship date:** A panel on the right showing:
 - "Price:" with a small icon and the value "3,394.74".
 - "Ship date:" with a small icon and the value "4/24/2012".

At the bottom of the window are three buttons: "Next", "OK", and "Cancel".

Sales Order Form

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

The screenshot displays the SAP Sales Order Form for 'Sales order: SO-101258, Forest Wholesales'. The 'Product and supply' menu is open, showing options like 'New', 'Product model', 'View', 'Quality management', and 'Requirements'. The 'Sales order lines' table shows a single line for 'Home Theatre...' with a quantity of 1.00. The 'Line details' section includes fields for 'Product dimensions', 'Storage dimensions', 'Item reference', 'Tracking dimensions', and 'Product model number'. The 'General' tab is selected at the bottom.

Type	Item number	Product name	Sales category	Quantity	Unit	Configuration	Size	C
	20001	Home Theatre...		1.00	ea	Default		

Line details

Product dimensions
Configuration: Default
Size:
Color:
Tracking dimensions
Batch number:
Serial number:
Storage dimensions
Site: 2
Warehouse: 21
Location:
Pallet ID:
Product model number
Product model number:
Item reference
Reference type:
Reference number:
Reference lot:
BOM/route
Sub-BOM:
Subroute:
General / Setup / Address / Product / Packing / Delivery / Price and discount / Project / Foreign

Product and supply related actions

Latest sales orders

Sales order	Status	Creai
SO-101258	Open order	4/1
SO-101255	Open order	4/1
SO-101254	Open order	4/1
SO-101253	Open order	4/1
SO-101252	Open order	4/1
...

Related information

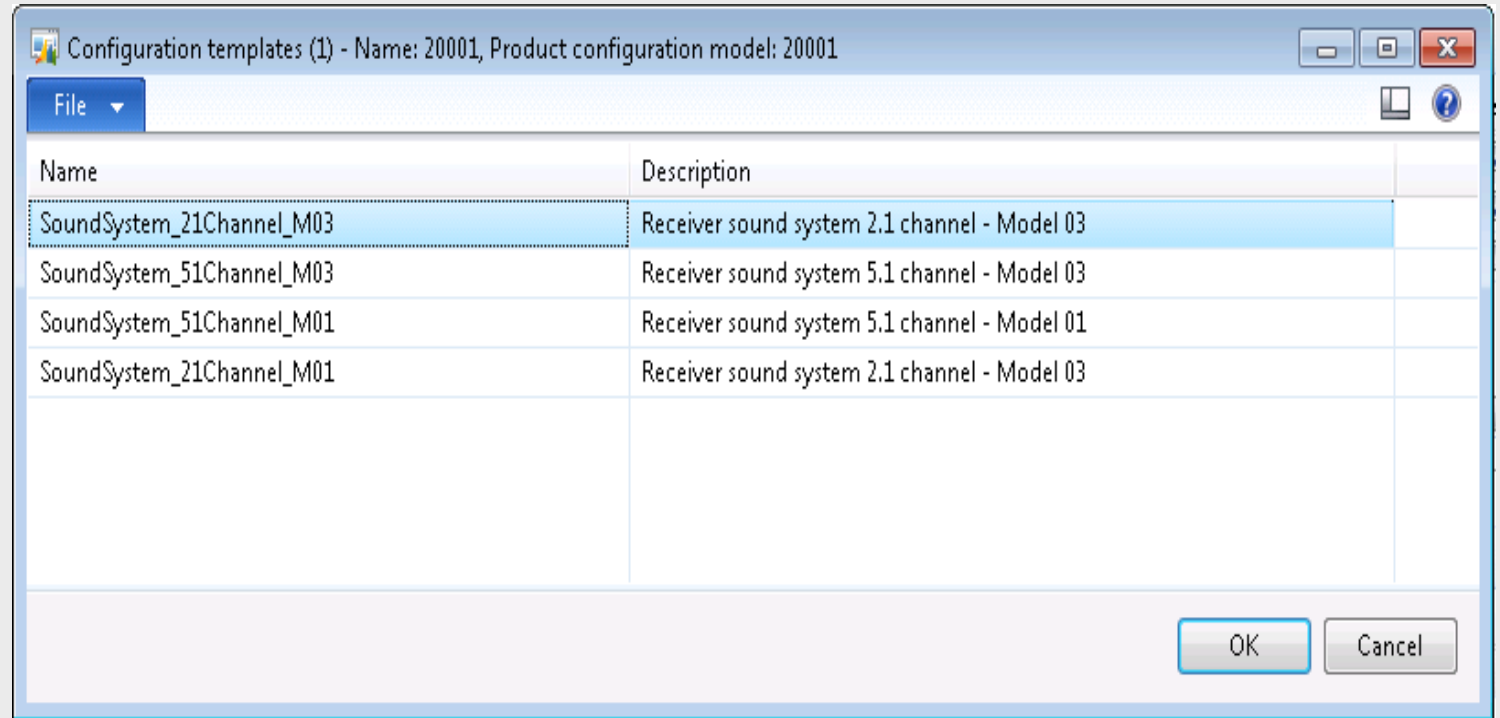
Configure Line Form Options

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.



Configuration templates (1) - Name: 20001, Product configuration model: 20001

Name	Description
SoundSystem_21Channel_M03	Receiver sound system 2.1 channel - Model 03
SoundSystem_51Channel_M03	Receiver sound system 5.1 channel - Model 03
SoundSystem_51Channel_M01	Receiver sound system 5.1 channel - Model 01
SoundSystem_21Channel_M01	Receiver sound system 2.1 channel - Model 03

OK Cancel

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.

Sales order (1 - ceu) - Sales order: SO-101240, Basketball Stadium

Sales order header

Sales order lines

Type	Item number	Product name	Sales category	Quantity	Unit	Configuration	Size	Color	Site	Warehouse	Batch number
	20001	Home Theater System / Home Theater Syst...		1.00	ea	000035_203			2	21	

Line details

Product dimensions

Configuration: 000035_203

Size:

Color:

Storage dimensions

Site: 2

Warehouse: 21

Location:

Pallet ID:

Item reference

Reference type:

Reference number:

Reference lot:

Tracking dimensions

Batch number:

Serial number:

Product model number

Product model number:

BOM/route

Sub-BOM: BOM_00000078

Subroute: RTE_00000034

Related information

Sales order	Status	Creation date
SO-101240	Open order	5/21/2010
SO-100691	Invoiced	7/1/2007
SO-100188	Invoiced	7/1/2006

General | Setup | Address | Product | Packing | Delivery | Price and discount | Project | Foreign trade | Financial dimensions

Descriptive name of configuration

USD | ceu | Close

Sales Order Form

The Configuration field

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** 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.

The screenshot displays the 'Sales order (1 - ceu) - Sales order: SO-101240, Basketball Stadium' window. The 'Sales order lines' grid shows a single line with the following details:

Type	Item number	Product name	Sales category	Quantity	Unit	Configuration	Size	Color	Site	Warehouse	Batch number
	20001	Home Theater System / Home Theater Syst...		1.00	ea	000035_203			2	21	

The 'Line details' section provides further information:

- Product dimensions:** Configuration: 000035_203, Size: , Color: .
- Storage dimensions:** Site: 2, Warehouse: 21, Location: , Pallet ID: .
- Item reference:** Reference type: , Reference number: , Reference lot: .
- Tracking dimensions:** Batch number: , Serial number: .
- Product model number:** Product model number: .
- BOM/route:** Sub-BOM: BOM_00000078, Subroute: RTE_00000034.

The bottom of the window shows a 'Descriptive name of configuration' field and a status bar with 'USD | ceu' and a 'Close' button.

Configuration Dimensions Per Company

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

The screenshot shows a software window titled "Configuration dimensions per company (1) - Configuration: 000035_203". The window is divided into two main sections. On the left, there is a list of configuration IDs under the heading "20001". The list includes: 000033_203, 000035_203 (which is highlighted), 000037_203, 000043_203, 000044_203, 000045_203, 000250_203, 000262_203, and Default. On the right, there is a form for editing the selected configuration. The form has three fields: "Configuration:" with the value "000035_203", "Name:" with an empty text box, and "Description:" with a large empty text area. At the bottom of the window, there is a status bar with the text "Descriptive name of configuration" and a "Close" button.

Configuration	Name
000033_203	
000035_203	
000037_203	
000043_203	
000044_203	
000045_203	
000250_203	
000262_203	
Default	

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.

BOM	Name	Site	Item group	Approved by	Approved
BOM_00000078	Product model no. 20001 (HomeTheaterSys...	2	HTS	000014	<input checked="" type="checkbox"/>
BOM_00000079	Product model no. 20001 (audioSystem)	2	HTS	000014	<input checked="" type="checkbox"/>
BOM_00000080	Product model no. 20001 (receiver)	2	Receivers	000014	<input checked="" type="checkbox"/>
BOM_00000081	Product model no. 20001 (speakers)	2	Speakers	000014	<input checked="" type="checkbox"/>
BOM_00000082	Product model no. 20001 (videoSystem)	2	HTS	000014	<input checked="" type="checkbox"/>
BOM_00000083	Product model no. 20001 (television)	2	Television	000014	<input checked="" type="checkbox"/>
BOM_00000084	Product model no. 20001 (videoPlayer)	2	DVD Player	000014	<input checked="" type="checkbox"/>
BOM_00000085	Product model no. 20001 (videoRecorder)	2	DVR	000014	<input checked="" type="checkbox"/>
BOM_00000086	Product model no. 20001 (HomeTheaterSys...	2	HTS	000014	<input checked="" type="checkbox"/>
BOM_00000087	Product model no. 20001 (audioSystem)	2	HTS	000014	<input checked="" type="checkbox"/>
BOM_00000088	Product model no. 20001 (receiver)	2	Receivers	000014	<input checked="" type="checkbox"/>

Item number	Configuration	Size	Color	Site	From date	To date	From qty.	Active	Approved by	Approved
20001	000035_203			2			0.00	<input checked="" type="checkbox"/>	000014	<input checked="" type="checkbox"/>

Route Details Form

Use the Route details form to create, update, and approve routes.

The screenshot shows a web application window titled "Route details (1 - ceu)". The interface includes a menu bar with "File" and "Route", and a toolbar with icons for Edit, Route, Delete, New, Approve, Refresh, Export to Microsoft Excel List, and Attachments. Below the toolbar, the route details are displayed for "RTE_00000034 : Product model no. 20001 (HomeTheat...".

General

Route number: RTE_00000034
Name: Product model no. 20001 (HomeT
Item group: HTS
Approved by: 000014
Approved: ☒

Versions

Item number	Configuration	Size	Color	Site	From date	To date	From qty.	Active	Approved by	Approved
20001	000035_203			2			0.00	<input checked="" type="checkbox"/>	000014	<input checked="" type="checkbox"/>

The bottom of the window features a status bar with navigation icons, a "Route identification" label, and a "Close" button.

Create Production Order Form

Click
Configure
production to
access the
Configure
line form.

Create production order (1 - ceu) - New Record

BOM Route **Configure production**

Identification
Production: D_00005219
Item number: 20001
Name: Home Theater System

Inventory dimensions
Configuration: Default
Site: 2
Warehouse: 21

Production
Type: Standard
Quantity: 1.00
Delivery: 4/3/2012
Time: 10:00 am

BOM/route
BOM date: 4/3/2012
BOM number:
Route number:

Groupings
Pool:
Production group:

Setup
Ledger: Item and category
Reservation: Manual

Project
Project ID:
Activity number:
Posting method: None

Finished item
Category:
Line property:
Sales currency:
Unit:

Create Cancel

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.

Sales Site

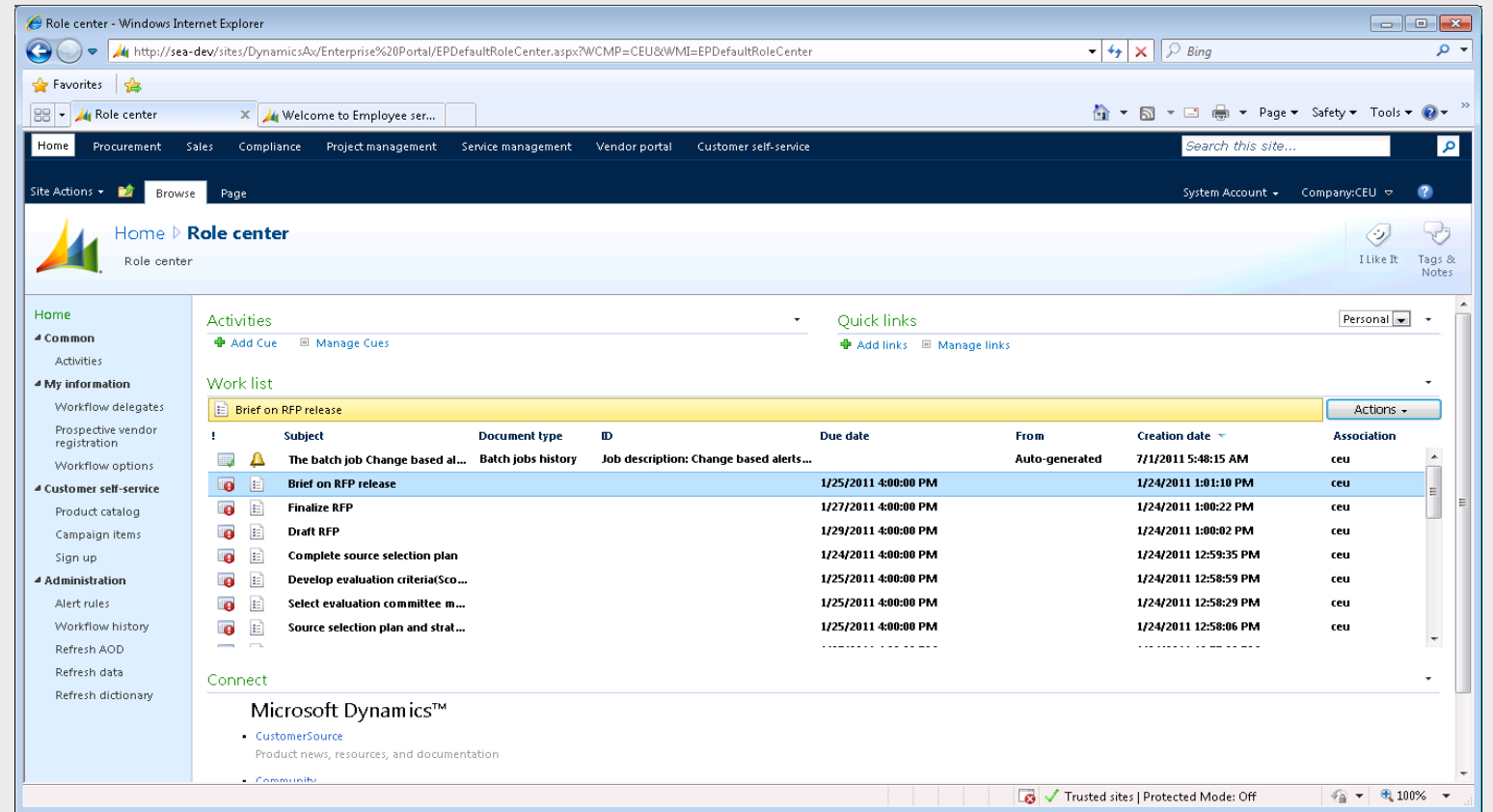
Sales Access

- ✓ 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.

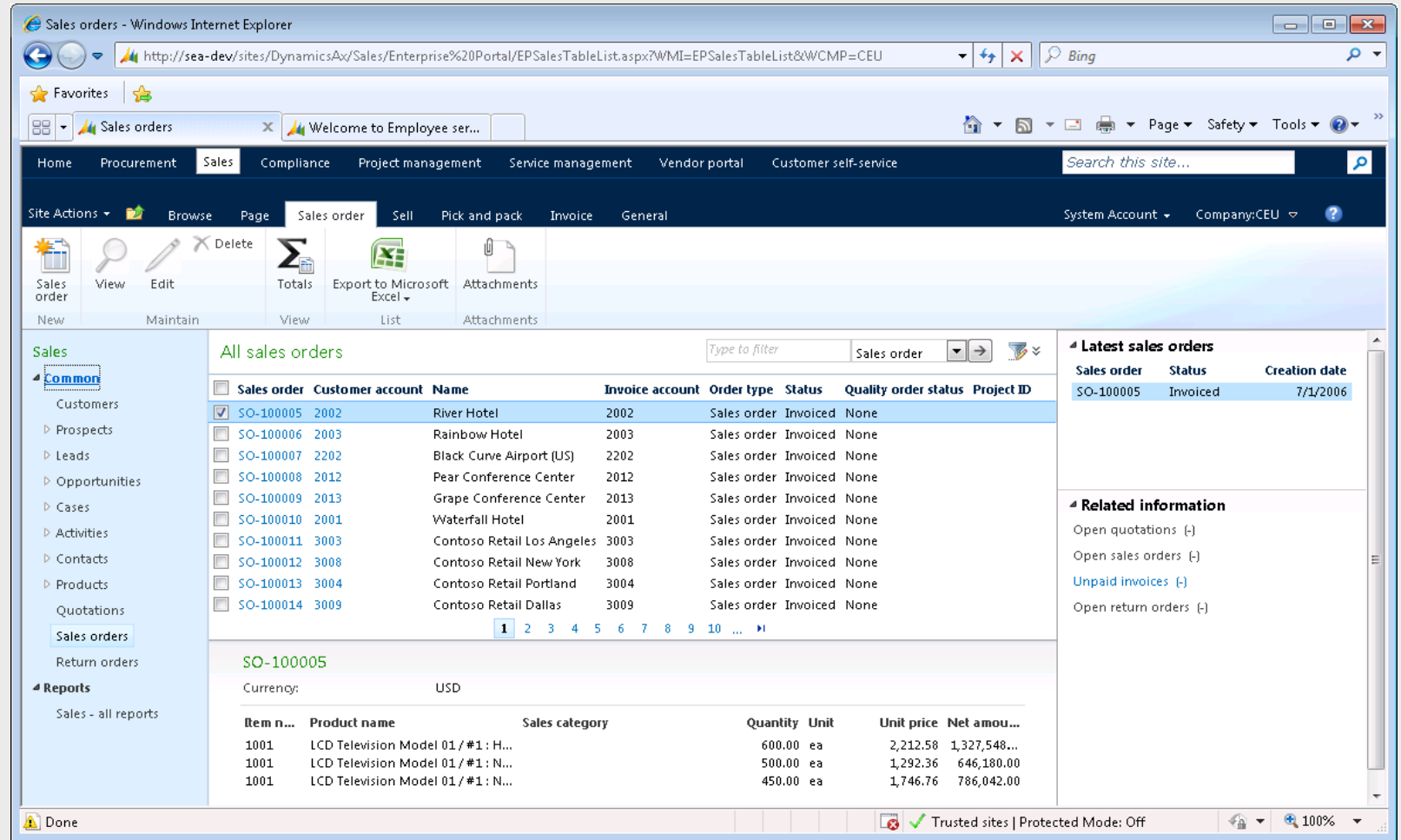
Home Role Center Page

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.



The screenshot displays the Dynamics AX Sales website interface within a Windows Internet Explorer browser. The address bar shows the URL: `http://sea-dev/sites/DynamicsAX/Sales/Enterprise%20Portal/EPSalesTableList.aspx?WMI=EPSalesTableList&WCMP=CEU`. The page features a navigation menu with tabs for Home, Procurement, Sales, Compliance, Project management, Service management, Vendor portal, and Customer self-service. The 'Sales' tab is active, and the 'Sales order' sub-tab is selected. The main content area displays a table of sales orders with columns: Sales order, Customer account, Name, Invoice account, Order type, Status, Quality order status, and Project ID. The table lists 14 sales orders, with the first one (SO-100005) selected. A sidebar on the left contains a 'Sales' section with a 'Common' link and a 'Reports' section with a 'Sales - all reports' link. A right sidebar shows 'Latest sales orders' and 'Related information' sections. The bottom status bar indicates 'Trusted sites | Protected Mode: Off'.

Sales order	Customer account	Name	Invoice account	Order type	Status	Quality order status	Project ID
SO-100005	2002	River Hotel	2002	Sales order	Invoiced	None	
SO-100006	2003	Rainbow Hotel	2003	Sales order	Invoiced	None	
SO-100007	2202	Black Curve Airport (US)	2202	Sales order	Invoiced	None	
SO-100008	2012	Pear Conference Center	2012	Sales order	Invoiced	None	
SO-100009	2013	Grape Conference Center	2013	Sales order	Invoiced	None	
SO-100010	2001	Waterfall Hotel	2001	Sales order	Invoiced	None	
SO-100011	3003	Contoso Retail Los Angeles	3003	Sales order	Invoiced	None	
SO-100012	3008	Contoso Retail New York	3008	Sales order	Invoiced	None	
SO-100013	3004	Contoso Retail Portland	3004	Sales order	Invoiced	None	
SO-100014	3009	Contoso Retail Dallas	3009	Sales order	Invoiced	None	

Item n...	Product name	Sales category	Quantity	Unit	Unit price	Net amou...
1001	LCD Television Model 01 / #1 : H...		600.00	ea	2,212.58	1,327,548...
1001	LCD Television Model 01 / #1 : N...		500.00	ea	1,292.36	646,180.00
1001	LCD Television Model 01 / #1 : N...		450.00	ea	1,746.76	786,042.00

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.

Configure selected item

Page

Configuration templates

Load template

Price and ship date

Calculated price per unit: 3394.74

Confirmed ship date: 4/26/2012

Product configuration model

HomeTheaterSystem

- Audio System
 - Receiver
 - Speakers
- Video System
 - Video player
 - Video recorder
 - Projector
 - Television
- Services

Services

Professional Services:

Installation:

Maintenance and Repair:

OK

Configure Selected Item Page FastTabs

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.

Name	Description
SoundSystem_21Channel_M01	Receiver sound system 2.1 channel - Model 03
SoundSystem_21Channel_M03	Receiver sound system 2.1 channel - Model 03
SoundSystem_51Channel_M01	Receiver sound system 5.1 channel - Model 01
SoundSystem_51Channel_M03	Receiver sound system 5.1 channel - Model 03

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 Edit

Save and close Close Totals Commit View

Customer

Customer account: 1101 Pool: 10
Invoice account: 1101 Currency: USD
Contact: Language: en-us
Tax exempt number: Site:
Sales taker: Julia Funderburk Warehouse:

Lines

Add line Remove

Item number	Site	Warehouse	Product number	Quantity	Unit	Unit price	Discount percent	Discount	Net amount
20001	2	21	20001: 000283_203 : :	1.00	ea	3,394.74	0.00	0.00	3,394.74

Delivery address

Main warehouse, Gate 2

Save and close Close

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 order

Page Edit

Save and close Close Totals Commit View

Customer

Customer account: 1101 Pool: 10
Invoice account: 1101 Currency: USD
Contact: en-us
Tax exempt number: Site:
Sales taker: Julia Funderburk Warehouse:

Lines

Add line Remove

Item number	Site	Warehouse	Product number	Quantity	Unit	Unit price	Discount percent	Discount	Net amount
20001	2	21	20001:000283_203	1.00	ea	3,394.74	0.00	0.00	3,394.74

Delivery address Main warehouse, Gate 2

Save and close Close

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.

New sales quotation

Page Create

Save and close Close Commit

Sales quotation

Customer account: 1101 Type: Resale USD

Prospect: Expiration date: 5/4/2012

Invoice account: 1101 Site:

Contact: Warehouse:

Tax exempt number: Currency: USD

Sales taker: Julia Funderburk

Language: en-us

Lines

Add line Remove

Item number	Site	Warehouse	Product number	Quantity	Unit	Unit price	Discount percent	Discount	Net amount
20001	2	21	20001: Default: :	1.00	ea	0.00	0.00	0.00	0.00

Delivery address Main warehouse, Gate 2

Save and close Close

