User Guide
QAD Configurator

Welcome to QAD Configurator
QAD Configurator Basics
QAD Configurator Workspace
Configurator Setup
Sales Configuration
Product Configuration
Configuration Questionnaire
Administration

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Change Summary

The following table summarizes significant differences between this document and the last published version.

Date/Version	Description	Reference
September 2013/5.4.1	Added information on Feature-Based Pricing	Page 67
March 2013/5.4	Updated information on editing comments	Page 33
	Added information on creating master comments	Page 40
	Added information on creating master comments in multiple languages	Page 41
	Added the browse shortcut keys	Page 62
	Updated information on how default values are displayed on the Questionnaire	Page 68
	Added a field *Allow User Override* in General Rule Maintenance	Page 76
	Added some notes for rule tables	Page 81
	Updated information on the date format	Page 90
	Added information on creating variant supplier items	Page 128
	Updated the picture for Configuration Questionnaire	Page 130
	Updated the default value for the field *Reprice the Configuration*	Page 133
	Updated the default value for the field *Show low level questions*	Page 133
	Added a field *Variant Item Cost Roll-Up* in Configuration Rebuild	Page 150
September 2012/5.3.1	Added more information on setting up data for a configurable item	Page 39
	Added a note about cost set	Page 49
	Added a section on Configurator Best Practices	Page 159
March 2012/5.3	Rebranded for 5.3	-
	Added a note about *Allow Net Price Change* and *Allow Manual Price List Change*	Page 44
	Added a note about *Browse Code*	Page 62
	Added system variables *sysConfigurationCmmt*, *sysConfigurationDesc*, *sysExtLaunch*, and *sysQuestLaunch*	Page 70
	Updated the number of features that form a configuration key	Page 96
	Added a *Standard Configurations* tab in Configuration Questionnaire	Page 120
	Added a note about viewing question rules	Page 131
	Updated the section of Maintaining Configurations Manually	Page 146
	Added a section of Rebuild for Multi-level Configurations	Page 148
	Added a function *Standard Configuration Maintenance*	Page 155
	Added a section of Configurator Best Practices	Page 158
September 2011/5.2.2	Rebranded for 5.2.2	-

Date/Version	Description	Reference
	Added a *Show All Options of Feature* setting for Configurable Item Maintenance	Page 49
	Added a *Customer Specific List Price* setting for Configurable Item Maintenance	Page 49
	Added a *Copy from Variable* button for Variable Maintenance	Page 61
	Added enhancement for *Browse Code*	Page 62
	Added a *Browse Code* browse for Feature Maintenance	Page 67
	Changed descriptions about a system variable *systVariantItemID*	Page 71
	Added a *Copy from Rule Table* button for Generating Rule Tables	Page 84
	Changed descriptions for Editing Rule Tables	Page 89
	Added options *Validate Orphaned Rule* and *Delete Orphaned Rule* for Cross Validation Analyzer	Page 117
	Updated the section of Using Custom Functions in Product Configuration Rules	Page 115
	Added an option *Show all options of feature* setting for questionnaire customization in Configuration Questionnaire	Page 133
	Added an *Effective Date* setting for Configuration Rebuild	Page 150

Chapter 1

Welcome to QAD Configurator

QAD Configurator is a rule-based product configuration and guided selling tool. It allows make-to-order and assemble-to-order companies to quickly and efficiently create sales orders based on specific customer requirements and ultimately manufacture and fulfill complex, customized products and services. It is an add-on module to QAD Enterprise Applications (QAD EA) and provides flexible and powerful product configuration and computer-aided order entry capabilities.

QAD Configurator is designed for manufacturing companies who produce products that are highly configurable or are routinely customized to meet the unique needs of their customers. QAD Configurator ensures complete and valid product configuration during order entry. QAD Configurator instantaneously translates customer requests into quotations, sales orders, bills of material, and routings.

QAD Configurator effectively bridges the information and knowledge gap between product engineering and sales. It allows sales personnel to access the product data maintained by engineering personnel. Sales personnel can create orders with complex configurations based on specific customer requirements without having to possess a strong technical background.

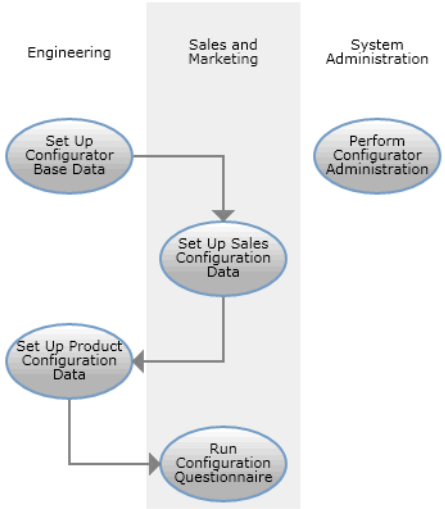
QAD Configurator General Workflow 2
Configurator process map and workflow details.

Integration With QAD Enterprise Applications 2
Integration and support for ERP domains.

Integration with QAD Trade Management 3
Integration and support for QAD Trade Management.

QAD Configurator General Workflow

Fig. 1.1
QAD Configurator Process Map



1 System Setup

Before using QAD Configurator, perform system setup including setting up data in QAD EA and configuring Configurator settings.

2 Sales Configuration

Sales personnel do the following:

- .Maintain variables and features that define configurable product characteristics.
- Designate how to present features as questions in the guided sales process—that is, the questionnaire.
- Set up sales configuration rules to ensure that data collected from the questionnaire is valid.

3 Product Configuration

Engineering personnel define product configuration rules that translate feature data collected from questionnaires into product structures and routings of configured products.

4 Guided Sales

Sales personnel run the questionnaire during order or quotation entry to configure products to meet specific customer needs. Data collected in this guided sales process identify new product configurations and translate new customer requirements into new product structures and routings.

5 Administration

Use a range of administrative functions to maintain the system for optimal performance.

Integration With QAD Enterprise Applications

QAD Configurator is integrated with the following QAD EA functions:

- Sales Quote Maintenance (7.12.1)
- Sales Order Maintenance (7.1.1)
- Item Master Maintenance (1.4.1)
- Product Structure Maintenance (13.5)
- Routing Maintenance (14.13.1)
- Item-Site Inventory Data Maintenance (1.4.16)
- Item-Site Planning Maintenance (1.4.17)
- Item-Site Cost Maintenance (1.4.18)

QAD Configurator does not use any of the standard functions of the Configured Products module in QAD EA.

Support for QAD EA Domains

QAD Configurator fully supports multiple domains in QAD EA. However, not all of its functions are domain-specific. While some Configurator functions retrieve and process data only available in the current domain, other functions work with data across domains, due to the nature of the data these functions deal with.

Configurator functions that work with item-related data, which is domain-specific itself, are domain-enabled.

The following Configurator functions are not domain-enabled since the data they work with is not associated with any specific domain and can be accessed across domains:

- Master Group Maintenance
- Question Type Maintenance
- Rule Group Maintenance
- Variable Maintenance
- Functional Groups
- General Rules

Integration with QAD Trade Management

QAD Configurator can be integrated with QAD Trade Management. If you want to integrate the Configurator variant item creation process with the QAD Trade Management product, apply the Configurator-TrM integration patch and perform some additional steps. See *Installation Guide: QAD Configurator* for details.

If Integrate with TrM in Sales Order Control is Yes, but the TrM patch is not applied, the system displays an error message when you try to create a variant item:

```
TrM Integration detected. Apply TrM Item API patch first.
```

When integrated with QAD Trade Management, the system copies TrM product data as well as product division data from the configurable item to the variant item.

Chapter 2

QAD Configurator Basics

Configurable Item, Generic Product Structure, and Generic Routing 6
Outlines the concepts of configurable items, generic product structures, and generic routings.

Variables and Features 7
Discusses variable and feature data types and options.

Sales Configuration Rules 9
Explains some of the rules and rule statement formats.

Sales Configuration Rule Grouping and Application 11
Outlines how rules are grouped and linked to different items to increase effectiveness.

Analysis of Sales Configuration Rules 12
Explains how rules apply to questionnaires, as well as how rule feature relationships and feature sequences work; describes multi-level analysis.

Configuration Keys 17
Explains how configuration keys apply to variants.

Product Configuration Rules 18
Discusses different configuration rules and processes, including selection rules, assignment rules, item number definition rules, and dynamic updates of routing operation comments.

Cost Roll-Up 21
Explains how costs are calculated and roll-ups are completed.

Element Roll-Up 21
Outlines the element roll-up process and requirements.

Cross Validation of Rules 23
Discusses the Cross Validation Analyzer function, what it checks, gives an example, and discusses Cross Validation Analyzer Report.

Questionnaire 25
Describes how questionnaire questions are generated and gives information on the configurations that result from completing a questionnaire.

Pricing 26
Discusses Configurator’s pricing functionality.

Configurable Item, Generic Product Structure, and Generic Routing

Configurable item, generic product structure, and generic routing are a set of inter-related concepts.

A **configurable item** is a virtual, non-buildable item that can be configured to form various end products—or variant items—that can be manufactured to meet specific customer requirements. As the parent item for a particular generic product structure, the configurable item identifies the complete list of child items and customer-selectable components and ties them together. A configurable item can also be the parent item of other configurable items.

A **variant item** is a configured end product created from a configurable item. As opposed to a configurable item, which is virtual and non-buildable, a variant item can be ordered and manufactured.

A **generic product structure** is an artificial grouping of all possible component items—even mutually exclusive ones—that go into a configurable item showing the quantity of each required to make an assembly.

Unlike a common product structure, a generic product structure cannot be used directly to build components or end products. It is used with QAD Configurator to simplify and facilitate order processing and fulfillment.

Note Generic product structure and generic bill of material (BOM) are used interchangeably in this book.

Example An electrical product has different power cords for use in different countries. But in each variant of the product that you configure for each country, there is only one appropriate power cord for that country. The generic product structure includes all power cords, but each variant product structure includes only one.

A **generic routing** of a configurable item includes all possible operations to build any possible variant of a configurable item. Generating a variant routing means selecting the correct operations for your configured variant from the generic routing.

Like generic product structure, generic routings are artificial and unrealistic listings of operations that cannot be directly used to manufacture products.

Example A variant routing for a product that has only one control panel includes either anodizing an aluminum control panel or electroplating a steel control panel, but not both. The generic routing, however, includes both processes.

The primary purpose of using configurable items, generic bills material, and routing is to simplify order processing and master schedule planning.

Example Suppose that a company manufactures tables with five different leg styles, three different sides and ends, and ten different tops. In total, they are making 5 x 3 x 10 = 150 different tables, each with its own product structure and routing.

When placing orders for a table, customers have to pick their desired configurations from a long list of 150 different tables. When master planning for the product, the master scheduler have to maintain 150 different product structures and routings for all table variations.

This process can be simplified by creating one configurable item and one set of generic product structure and routing for that item. Using QAD Configurator, customers can specify the table they want by selecting options for the three features—leg style, sides and ends, and top—respectively. QAD Configurator then creates a variant item for each new configuration of table customers order and automatically generates the corresponding product structure and routing.

Variables and Features

You define all the configurable aspects of your products using variables and features. **Variables** are shared configurable characteristics of products that accept certain values (options) or a range of values. By linking a variable to a configurable item, you create a feature — a configurable product characteristic specific to that configurable item. The feature inherits its properties from the variable, including ID, data type, and data format. As to options, you can choose to inherit feature options from variable options or create a set of feature options.

Example Color is defined as a variable for your products with three options: blue, red, and white. By linking this variable to a configurable item, you create a feature which inherits the three options of the Color variable. You can use the inherited options as is or define new feature options by adding new color options or removing inherited ones.

Variables and features always pertain to a certain master group. Make sure that you have selected the right master group when you maintain variables and features.

Features are domain-specific but variables are available across domains.

Variable and Feature Data Types

Variables and Features have six data types that represent different data formats and acceptable values or value ranges. After you first define the data type of a variable, it can no longer be changed either in variable maintenance. The data type of the variable cannot be changed when the variable is inherited by a feature.

Table 2.1
Variable and Feature Data Types

Data Type	Description
Numeric	Accepts numeric values that can be used in calculations. You can set the range of acceptable values by specifying a maximum value and/or a minimum value. You can also set the multiplier attribute to specify increments between acceptable values. Length, width, and weight are examples of numeric variables and features.
Text	Accepts a list of predefined text values which cannot be used in calculations. Examples include Color, with options blue, white, and red, and body type, with options saloon, coup, and hatchback. Select Free Format to accept additional user input.
Numeric List	Accepts a list of predefined numeric values or options that can be used in calculations. Examples include Engine Capacity, with options 1300, 1600, 1900, 2300, and Voltage, with options 115, 220.
Date	Accepts the current date, a fixed date, or a list of predefined date options, depending on which date format you select.

Data Type	Description
Logical	Accepts only Yes or No boolean values.
Element	An element variable is directly associated with a field in a database table. You can see a variable of the element type. But in the background, QAD Configurator changes the type so that the value of the variable can be compared to the value in the database. Comparisons require identical data types. QAD Configurator supports Element variable links to two types of entities: Internal Entities, which are defaults within QAD Configurator, and External Entities, which you have to define using External Entity Maintenance.

Variable and Feature Options

Options are predefined values for selection and are available for three types of variables: text, numeric list, and date list.

Here are some examples of variable options.

Variable	Variable Type	Options
Cloth	Text	Cotton
		Cotton/Polyester
		Nylon
Cabinet-height	Numeric List	100
		125
		150
		175

When maintaining options for a variable, you can set the default variable option or arrange the order of the variable options. In this way, more frequently chosen options appear toward the top of the list.

Feature options are based on options of the variable from which the feature is created. When maintaining a feature, you can select the variable options you want as feature options or create new options for the feature. You can also set the option and change the order of options in the list. However, these changes you make to feature options do not affect their source variable options. If you select Use Standard Options in Master Group Maintenance, all the features in this master group use the same options as those of the variables they are created from.

Example The variable Cloth has three options (Sunset Orange, Tropical Blue, and Arctic White). The Std Options field has not been set (so feature options can be included), and this variable has been linked to the Sunblind configurable item 9-100-100 to create a feature also called Cloth. The following table shows a possible configuration of using Feature Option Maintenance to change the available options.

Table 2.2
Feature Options

Variable Options		**Feature Dependent Options**		
		Configurable item: 9-100-100		
Variable	**Option**	**Feature**	**Options Available**	
Cloth	Sunset Orange	Cloth	Sunset Orange	Included
	Tropical Blue		[1]	Excluded
	Arctic White		Arctic White	Included
			Royal Blue[2]	Added

1. Tropical blue is not a possible cloth for the Sunblind 9-100-100 configurable item and has been excluded
2. The additional option of Royal Blue cloth is unique for the Sunblind 9-100-100 configurable item and has been added.

Sales Configuration Rules

The options of one feature can affect the option choices of another feature.

Example In the automobile industry, the configurable item could be a family of different models of a type of car. If a customer selects the 1.1-liter engine option, the 5-speed gearbox is not an option that can be selected. If the customer selects the Sport model, alloy wheels are automatically included. If the customer selects the cabriolet model, the sunroof is not a possible option.

In QAD Configurator, you use sales configuration rules to control all these decisions regarding which options automatically include or exclude other options.

The IF statement specifies what the condition is for which you are testing, which is also known as preposition. The THEN statement specifies what the conclusion should be when the preposition is satisfied.

You can extend your control by adding an ELSE statement to specify what happens when the IF condition does not occur. The ELSE statement is optional and specifies the alternative conclusion.

Rules that have as a conclusion the automatic selection of an option are known as inclusions.

```
IF model-type = "sport"
THEN wheel-type = "alloy"
```

The alloy wheels option is automatically included when the customer selects the sport model type.

Rules that have as a conclusion the automatic removal of an option from the available choices are known as exclusions; for example:

```
IF engine-capacity = "1.1"
THEN gearbox <> "5-speed"
```

If the customer selects the 1.1 liter engine, the gearbox can be anything other than 5-speed. The 5-speed gearbox has been excluded.

Rule Statement Formats

The statements that you can use in the basic rule structure of QAD Configurator have three possible formats: basic, advanced, and free format.

- Basic format statements take the form of a simple variable = option; for example: IF operation = manual.
- Advanced format statements take the form of variable = expression; for example: IF width < 0.5 * length.
- Free format statements take the form of a Boolean expression which is either true or false; for example: IF (width > 200 and color = arctic white).

In addition to these statement formats for rules, you can include Boolean operators such as AND and OR in the lines that specify a rule. Using these techniques, you can construct quite complex conditions for the sales configuration rules as in the following example.

```
IF variable 1 > 'value 1'
    AND variable 2 <= 'value 2'
    AND variable 3 = option x
THEN variable 4 = option y
    AND variable 5 <> option z
ELSE variable 6 = 1.5 * 'value 1'
```

The first three lines in the previous example are all part of the preposition and cause QAD Configurator to compare between the specified variables and values or options. The next two lines are the conclusion: they cause QAD Configurator to set the specified variables to include and exclude the named options when the preposition (the IF statement) is true.

The last line is the ELSE statement. It acts in the same way as the THEN statement, but specifies the option to be defined for the specified variable when the preposition (IF statement) is not satisfied.

Example Consider an example of a sunblind where the feature width specifies the width of the sunblind cloth in centimeters, and the feature cloth has three options: Sunset Orange, Tropical Blue, and Arctic White, but only the Sunset Orange cloth can be supplied in widths greater than 200 cm. To build this restriction into the QAD configuration questionnaire logic, you need to create a rule, as follows:

```
IF width > 200
THEN cloth = sunset orange
```

You do not need an ELSE statement in this case. If the cloth width is not greater than 200 cm, the customer can select any of the cloth options, without restriction.

Example The cabinet-height can range from 50 to 250 centimeters. The cabinet-pane can be made of wood, plastic, aluminum, or steel. Cabinets more than 200 cm high have steel panes, and steel panes are only for cabinets more than 200 cm high. The rule is as follows.

```
IF cabinet-height > 200
THEN cabinet-pane = steel
ELSE cabinet-pane <> steel
```

If the cabinet height is over 200 cm, the pane is steel. Otherwise, the pane can be any of the available options except steel.

The rules are the way you can translate the engineering restrictions of your product into limitations regarding customer choice of product configuration.

Sales Configuration Rule Grouping and Application

You can create as many rules as you like, but they do not automatically take effect when you configure a particular configurable item until you apply them to that item. You apply rules by linking them to specific configurable items.

To avoid the repetitive work of linking rules to configurable items one at a time, you can group rules together and apply them to configurable items all at once.

Within the group, you can use any of the available variables in constructing your rules. The rules that you create in this way are called general rules because they apply generally to the variables you specify, wherever those variables are used. The rules are not initially attached to features or configurable items. QAD Configurator provides separate functions that let you select which of the general rules you want to apply to a particular configurable item. The advantage of using general rules is that you only need to maintain a rule once, and then link it to all the configurable items to which it applies.

You can link general rules to items either directly or through rule groups, which is time-saving. If you know that a number of rules all apply in a particular set of circumstances, you can link these rules together in a rule group. You can then attach that rule group to a configurable item in a single operation, which has the same effect as linking all the rules to the item separately.

When you link a general rule to an item directly, you have the following options:

- Make the rule an item-specific rule that applies only to this item.
- Leave the rule as a general rule that can also be applied to other items.

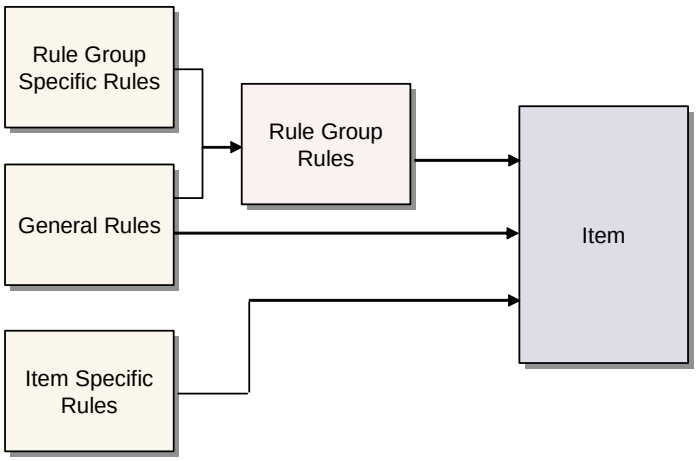
An item-specific rule is a copy of the general rule, but the general rule remains available to be applied to other items. An item-specific rule does not need to be based on a general rule. You can also create an entirely new rule using the Maintain button in Item Rule Maintenance.

Before the Analyzer can prepare the questionnaire for correct configuring of the product, you decide:

- Which rules have been linked individually to the item (both general rules and item-specific rules)
- Which rule groups have been linked to the item
- Which general rules are in each of the linked rule groups

This process is shown in the following diagram.

Fig. 2.1
Linking General Rules and Rule Group Rules to Items



- The first stage covers the definition of general rules, setting up rule group IDs and descriptions, and defining configurable items.
- The second stage covers the process of applying the rules: specifying which rules are linked to a rule group, specifying which rules are linked directly to an item, and specifying which rule groups are linked to an item.
- The final stage covers the running of the Analyzer to process all the rules that now apply to the item.

Analysis of Sales Configuration Rules

Each feature that you define for a configurable item becomes a question in the questionnaire. The rules that you define in the sales configuration process establish the relationships between features. The Analyzer analyzes the dependencies between the product features. The Analyzer:

- Extracts all features used in the sales configuration rules
- Establishes the relationships between the features (builds a question tree)
- Checks for cyclical loops in the sales configuration rules
- Establishes priorities between questions and branches of question trees
- Creates and compiles Progress source code programs to control the questionnaire logic

Run the Analyzer after you have done any one of the following:

- Added, modified, or deleted features.
- Added, modified, or deleted rules.
- Changed a parameter in Configurator Control.
- Changed feature sequences.

In any of situations 1, 2, or 3, make sure that you run the Analyzer before you start the questionnaire. The questionnaire checks if the configurable item has been analyzed, and forces you to analyze the item first whenever something significant has been changed.

In situation 4, running the Analyzer is not required. However, to make the feature sequence modifications active, run the Analyzer.

Feature Relationships

A simple example of a sales configuration rule could state the following:

```
IF variable A = option 1
THEN variable B = option 2
    AND variable C = option 3
```

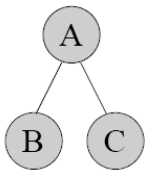
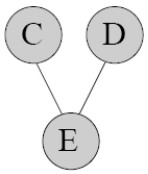
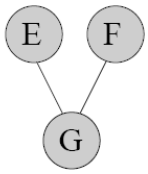
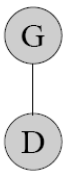
You could have another rule attached to the same item stating the following:

```
IF variable C = option 3
    AND variable D = option 4
THEN variable E = option 5
```

This relationship shows that variable E can be dependent on the options chosen for all of variables A, C, and D. So, the questionnaire presents questions relating to variables A, C, and D before the question relating to variable E.

The following table shows a development of this example, where the variables are identified by the letters A to G, and the options are represented by numbers. Each row in the table shows the relationship between different variables specified by a particular rule that has been attached to the item. The column on the right shows the relationship in graphic form.

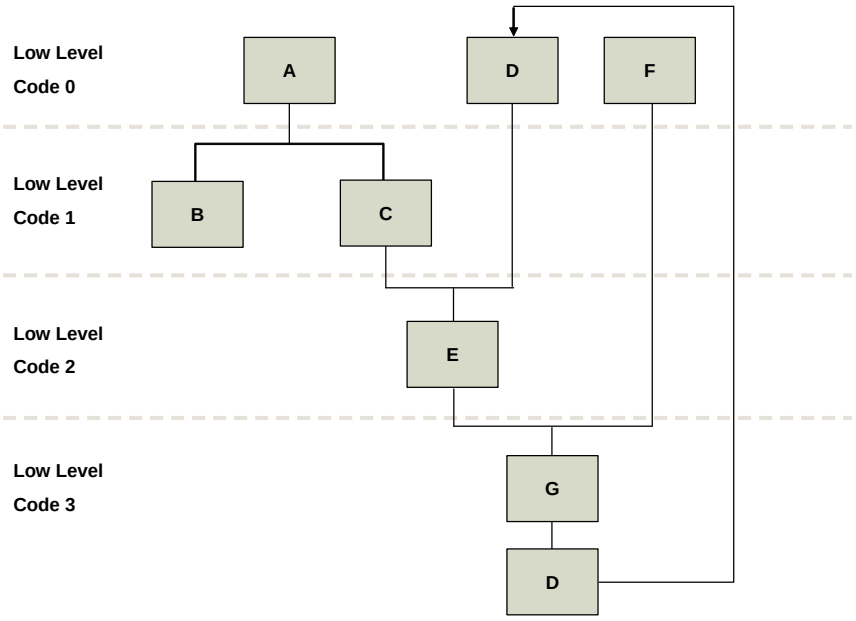
Table 2.3
Feature Relationships

Rule			
Proposition	**Conclusion**	**Description**	**Graphical Relation**
A = 1	B = 2 C = 3	Questions B and C depend on the answer to question A, so answer question A first.	
C = 3 D = 4	E = 5	Question E depends on answers to questions C and D, so answer questions C and D first.	
E = 5	G = E + F	Question G depends on answers to questions E and F. (Question E itself depends on question D.)	
G = 6	D = 4	Question D depends on the answer to question G, so answer question G before you can answer question D.	

When you run the Analyzer for this configurable item, the Analyzer does the following:

- Examines the relationships between the features that have been specified by the rules
- Builds a question tree that shows all the dependent links between the features

Fig. 2.2
Question Tree Diagram 1



The top row of the diagram shows that variables A, D, and F are independent questions that can be answered without reference to any other features. However, the final rule in the table specifies that variable D depends dependent on the answer to question G; the diagram shows that this creates a cyclical loop.

When the Analyzer finds a cyclical loop, it reports the fact in the Analyzer Report. The Analyzer also turns off the field that indicates Configurable Item Analyzed in Configurable Item Maintenance. It is impossible to use the configurable item in the questionnaire until the loop has been resolved. To complete the analysis, the Analyzer skips the relationship that caused the cyclical loop (in this example, the dependence of D on G) and continues the analysis process.

You resolve the cyclical loop by removing the rule that creates the dependence of D on G. Then the question tree is the same as in the previous example, but without the lowest level D and its loop back to the top level.

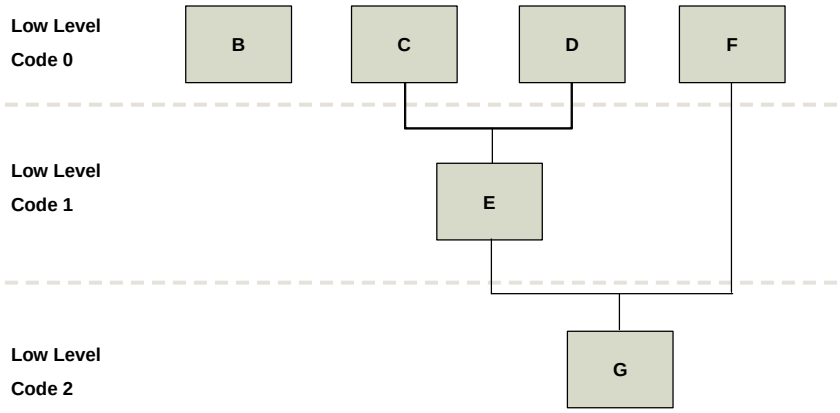
This question tree would correspond to the following list of questions in the questionnaire:

Question
A
.B
.C
D
..E
F
...G

Independent questions are not indented in the list of questions. The independent questions in this list are A, D, and F (as in the question tree). The amount of the indentation shows successive levels of dependence.

The question tree and the question list are dynamic, and change each time a question is answered. In the current example, the following diagram shows the question tree after question A has been answered.

Fig. 2.3
Question Tree Diagram 2



Because question A has been answered, questions B and C now become independent questions, along with D and F. Questions E and G move up a level, but are still not independent because of their relationships with C, D, and F.

This question tree is represented in the question list as follows:

Question
B
C
D
.E
F
..G

This example shows that there are two ways that questions can become independent and therefore, ready for answering:

- Genuinely independent questions that were never dependent on other questions
- Questions that are dependent on other questions that have been answered already, so that the result of the dependent relationship can now be established

In the previous question list, questions D and F are in the first category, while questions B and C are in the second category.

Feature Sequences

Each feature corresponds to a question in the questionnaire; customers answer the question to define the configuration of the product. You can control the sequence in which the questions are asked using Feature Sequence Maintenance, but only within the limits imposed by the logical structure of the interdependence of the features.

Example One question asks if the customer wants backup power, and another question asks about the type of the backup power. Then it would be illogical to ask about the backup power type before asking if the customer wants the backup power.

The Analyzer analyzes the relationship between the possible feature options and determines the sequence of questions. However, within the limits of the logical constraints, you can determine the order in which the questions are asked. If you specify a sequence that goes against the logical structure, the Analyzer modifies your specified sequence to account for the interdependence.

Example A product includes three features: length, width, and material. The length and width are numeric values within a range, and the material offers a choice of five different materials. However, only two of the materials are available in widths greater than 1.5 meters. Material is, therefore, dependent on the answer to width.

Without any user-controlled sequencing, the Analyzer would present the questions in the following sequence.

width
  .material
length

The indentation of material indicates that it depends on a previous independent feature, in this case, width.

Using Feature Sequence Maintenance, you could manually set the feature sequence as follows.

length
material
width

When the Analyzer processes the features and rules for your product, it determines that material depends on width and modifies the sequence.

length
width
  .material

The part of the sequence that does not affect the logical structure remains the same as you set, so length is now the first question. However, the Analyzer has changed the sequence of the width and material questions to keep the dependency of the latter on the former.

Multi-Level Analysis

The Analyzer has multi-level capabilities; it can handle configurable item product structures with lower-level component items that are themselves configurable items.

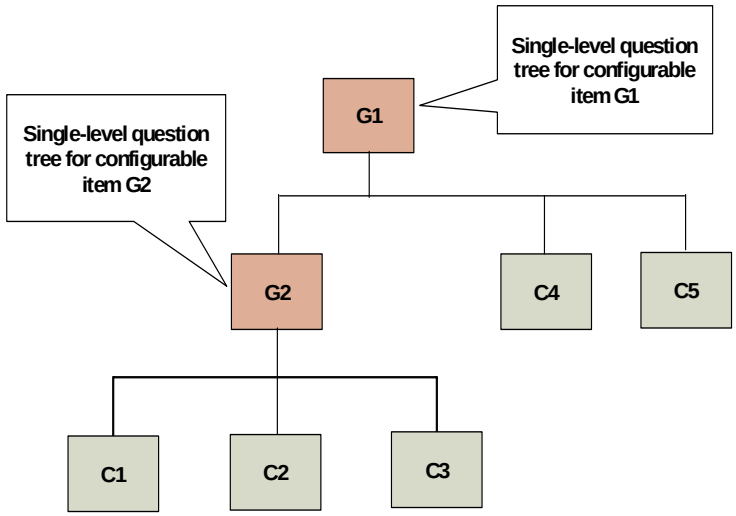
When dealing with a multi-level configurable item, the Analyzer performs the following activities:

- Collects all the features and rules on the different levels so that each question occurs only once
- Creates one tree of questions
- Checks for cyclical loops
- Creates one program for the total product structure of the top-level configurable item to control the questionnaire logic for the complete generic product structure

The lower level configurable items in a multi-level generic product structure are automatically analyzed when the higher-level configurable item is analyzed. In the following example, when configurable item G1 is analyzed, the configurable item G2 is analyzed automatically as well. You can run the questionnaire for item G2 without first analyzing it separately.

Example The top-level configurable item (G1) includes another configurable item (G2) at a lower level.

Fig. 2.4
Multi-level Analysis



In this example, features F2 and F3 occur for both configurable item G1 and configurable item G2.

When the Analyzer is run for configurable item G1, it also analyzes configurable item G2 and produces a question tree for the multi-level item.

This question tree applies when the system runs the questionnaire for the higher-level item, G1.

Configuration Keys

When all the questions in the questionnaire are answered for a product configuration, QAD Configurator defines a new configuration used by the Variant Generator, which is a part of the questionnaire, to construct a new variant item, product structure, and routing.

The step from creating a configuration to generating a new variant is only automatic if you have defined a configuration key. You can choose to save the configuration as a description of a product configuration without generating the corresponding variant. It is quite possible, therefore, that some previous use of the questionnaire has produced either a configuration or a variant that matches the specifications of your present customer’s configuration requirements.

To avoid configuration and variant redundancies, QAD Configurator uses the configuration characteristics; that is, the answers to the questions. When a configuration exists, there can also be a variant that matches your current customer's requirements. You can then decide whether to use the existing configuration or variant, or to continue with the questionnaire to create one.

To find a specific configuration, QAD Configurator needs a key to use as an index. Due to performance considerations and Progress limitations, it is not advisable to include the complete configuration description as the index. In most cases, only a subset of all the configuration elements, that is, the configuration details, is needed to uniquely describe a variant. You can use Configuration Key Maintenance to select the features that uniquely describe a variant.

Note If a feature is added to or removed from an existing configuration key, make sure that you rebuild all unique variant keys for the configurable item.

Product Configuration Rules

Product configuration rules govern how answers given to questions in the questionnaire are translated into variant items, product structures, and routings.

The output from the questionnaire is a product configuration. When a particular set of answers to the questionnaire produces a unique configuration, QAD Configurator automatically translates it into a variant item if you did not specify a configuration key. When a configuration key is defined, the system lets you choose whether to convert the configuration into a new variant item.

When you make this decision, the Variant Product Structure/Routing Generator (which is a part of the questionnaire function) converts the configuration into real components and manufacturing processes. At the end of this process, you have a variant product structure and a variant routing. The variant product structure defines components that are to be included and their respective quantities. The variant routing defines processes that are required to make the new variant item.

Note You can define in Master Group Maintenance whether a group is to use routings or not. If you select not to use routings, the Variant Product Structure/Routing Generator does not calculate operations.

To convert the configuration from the questionnaire into the necessary component selection, quantities, and routings, the Variant Product Structure/Routing Generator requires rules that specify what components and processes should be used.

The features, options, and rules in the sales configuration are used by the questionnaire to generate a product configuration.

The system follows the product configuration rules to include components from the generic product structure.

If there is no rule that applies to the component, the system always selects the component.

Example The customer selects the Sport model, which automatically includes the feature alloy wheels. To produce this feature, define which components from the generic product structure to include:

```
SELECT alloy wheels, qty 5
SELECT sport wheel nuts, qty 20
SELECT sport tyres 185/70 SR13, qty 5
```

The product configuration rules maintenance functions let you define the rules that enable the Variant Product Structure/Routing Generator to generate detailed specifications for new variant items.

Selection and assignment rules are optional. When no selection rule is available for a component or an operation, the system always selects the component or operation. When no assignment rules are available, the values from the generic product structure/routing are used.

The item number definition rule is required for each configurable item to be used to create a variant.

Selection Rules

A selection rule is a Progress expression; it is either true or false. When a selection rule is applied to an item, Variant Product Structure/Routing Generator tests the condition specified in the rule. If the condition is true, Variant Product Structure/Routing Generator selects the item.

Example A certain component might only be included in the variant product structure if:

```
color = "Sunset Orange"
and Environment-of-use = "Easy"
```

Another component might be selected if:

```
length * width / 100 > 300
```

Selection rules are similar to the expressions used in sales configuration rules, and use variables, options, values, and Boolean operators.

You can use standard rules for frequently used expressions which you want to include in a number of different selection rules.

Assignment Rules

An assignment rule is an assignment of a value to a database element in QAD EA. Although modifying component quantity is the most obvious use for assignment rules, you can also use them to assign values to any database element in pt_mstr, ps_mstr, and ro_det tables. For example:

```
pt_ord_qty = 100 + (safety-stock) / 100
pt_desc1 = "Item with color" + color
```

For a detailed review of all available data elements, refer to the *QAD EA Data Definitions* manual.

Item Number Definition Rules

An item number definition rule defines how to build up the new variant item numbers. Each variant needs a unique item number. By defining a rule for each configurable item, you enable the Variant Product Structure/Routing Generator to standardize the structure of the variant item numbers it creates from that configurable item.

In the item number definition rule, the structure of the item number consists of one or more of the following components:

- Current configurable item number: position From/To
- Master configurable item number: From/To

- Feature: position From/To
- QAD EA database element: position From/To
- Fixed text
- Character
- Alphanumeric Sequence: length, multiplier, and start value
- Numeric Sequence: number of digits, start value, and multiplier

You can combine these components in any order you want to create new variant item numbers. The maximum number of positions you can use is 18. Except for the alphanumeric and numeric sequence component, you can use the individual components more than once in an item number definition. For the numeric sequence and alphanumeric sequence components, you can add them only once—you can add a numeric sequence and an alphanumeric sequence.

Example The master configurable item number is 9-100-100. For the item number definition rule, you specify that the item number is to include the master configurable item number, followed by a character (-) and then followed by a 3-digit sequence number that starts at 001. Then the successive variant item numbers are as follows:

```
9-100-100-001
9-100-100-002
9-100-100-003...
```

Dynamic Update of Routing Operation Comments

Answers to the QAD Configurator questionnaire can be used to dynamically update the comments for operations in the variant routing.

Routing Maintenance in QAD EA has a Comments field. When this field is set to Yes, you can add comment text that is printed on shop floor documents for work orders for the item. Sometimes it is helpful to inform the shop floor of one or more answers from the questionnaire. To include information from questionnaire answers, you can refer to the QAD Configurator feature name in the comments of the applicable operation by putting the name of the feature in brackets [ ].

Example

```
Comments Operation 10 (Generic routing):
The required specifications for the product are:
Length = [length]
Width = [width]
Color = [color]
```

As soon as a new variant routing is created, the customer’s selected values (answers) for these questions are used to fill out these fields. In the previous example:

```
Comments Operation 10 (Variant routing):
The required specifications for the product are:
Length = 120
Width = 80
Color = white
```

You do not need to set up anything in QAD Configurator to make this work. It requires the definition of the routing comments for the relevant operations in the generic routing in QAD EA.

Cost Roll-Up

The system uses the existing routing cost roll-up and product cost roll-up routines in QAD EA to calculate the costs of manufacturing an item. In order to do this, QAD EA takes into account the various types of costs that appear in the product structure of the item. Because QAD Configurator adds the product structure of the items that you configure to the QAD EA database, the cost roll-up functionality is incorporated in QAD Configurator as well. Calculating the costs for an item involves adding the following five types of costs:

- Material costs
- Labor costs
- Burden costs
- Subcontract costs
- Overhead costs

The roll-up of the total costs consists of one product structure roll-up and one or more routing roll-ups.

When a routing roll-up has been completed on every level in the product structure and a product structure roll-up has been done for the top-level item, costs of the lower levels and costs of this level can be added. They constitute the total costs of the top-level item.

For more information on product costing, see either the Costing chapter in *User Guide: QAD Financials* or *User Guide: Costing*, depending on your product version.

Element Roll-Up

When the Variant Product Structure/Routing Generator creates a variant, the process normally includes the element roll-up calculations. The Element Roll-Up function operates only on non-cost element-related data elements, such as lead time or weight.

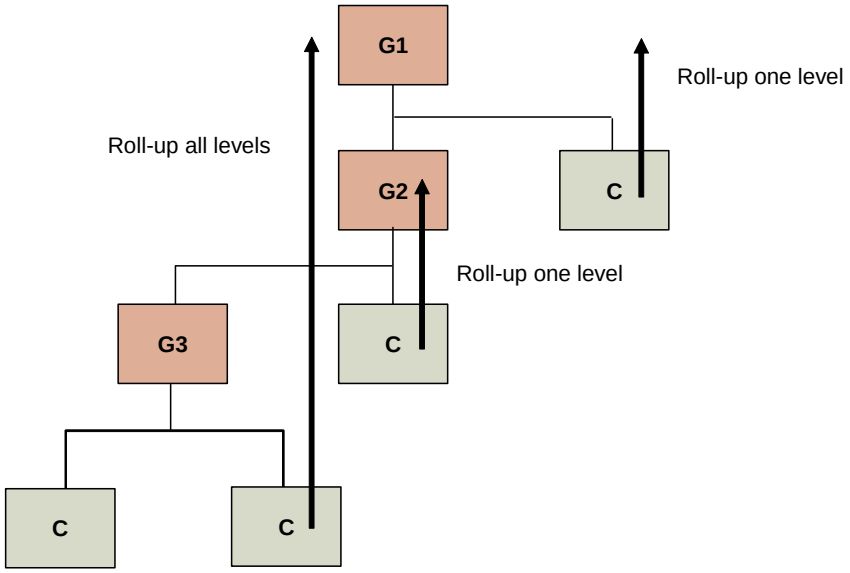
Before you run Element Roll-Up, first define the element roll-up rules for configurable items. You do this using Element Roll-Up Rule Maintenance. See “Maintaining Element Roll-Up Rules” on page 113.

Depending on whether you want to roll up component-related elements or routing-related elements, you can use Element Roll-Up Rule Maintenance to compose roll-up rules from either of the following sources:

- Product structure (ps_mstr) and/or item data (pt_mstr), both using either master data or component data
- Routing data (ro_det) and/or Work Center data (wc_mstr)

The following diagram illustrates the element roll-up process.

Fig. 2.5
Element Roll-Up Process



Roll-up rules can be simple expressions, which contain only one element; these rules are called basic rules.

Roll-up rules can also be complex expressions, which contain two or more elements; these rules are called advanced rules.

Example A basic rule that rolls up the production lead time of all components could take the following form.

```
Σ pt_mfg_lead
```

Example A more complex rule could take the following form.

```
Σ ( component:pt_abc_qty / master:pt_dec01 ) * ps_qty_per
```

Within Element Roll-Up Rule Maintenance, for a basic rule, you select the single element to roll up from a drop-down list. For an advanced rule, you compose the expression for the rule in an editor window. An advanced rule can contain any of the elements listed in the following tables.

Product Structure Roll-Up

pt_mstr	The elements of the master item (variant item number) can be used. By using the element name without prefix or by adding the prefix master, the values of the master item (pt_mstr) are selected.
	The elements of the component item (component item number) can be used. By adding the prefix component to the element name, the values of the component item (pt_mstr) are selected.
ps_mstr	The elements of the product structure (ps_mstr) can be used.

Routing Roll-Up	
pt_mstr	Only the elements of the master item (variant item number) can be used (no prefix or prefix master).
wc_mstr	The elements of the work center can be used.
ro_det	The elements of the variant routing (variant routing number = variant item number) can be used.

You cannot use variables, features, or options in element roll-up rules, and only one roll-up rule can be defined for each master item element.

Cross Validation of Rules

Because the sales configuration and the product configuration data are maintained separately, it is necessary to check discrepancies between the two sets of data. For example, variables in the product configuration rules are not used for features of a configurable item. In this situation, unknown answers can appear on the questionnaire.

You can use the Cross Validation Analyzer to check if the product configuration rules and rules match the sales configuration data (features and rules). This analyzer detects any discrepancies between the two modules and produces a report.

The Cross Validation Analyzer is a reporting function only. It does not correct any errors that it finds. To correct the errors, use Configurator maintenance functions. For example, you might add a feature to the configurable item using Feature Maintenance, or modify a product configuration selection rule.

The Cross Validation Analyzer has multi-level capabilities: it takes into account all lower-level items and components of the selected configurable item. The Cross Validation Analyzer checks any inconsistencies in the model from the current configurable item downwards. So it can also report likely errors during a cross validation of a lower level configurable item.

What the Cross Validation Analyzer Checks

You control what the Cross Validation Analyzer checks with selection flags in the Cross Validation Analyzer main window:

- Configurable item components only

  Only the components that are one level lower than the configurable item are checked, not the components on lower levels.

- Variant assignment rules

  Make sure that the variables in the assignment rules are valid features for the relevant configurable item or its child items.

- Rule syntax

  The Cross Validation Analyzer checks the syntax of all selected rules by compiling the code using the Progress Compiler.

- Variant item numbers

Checks if a variant item number exists for every configurable item in the product structure. If there are no variant item definition rules to specify the item number, QAD Configurator cannot create a variant item.

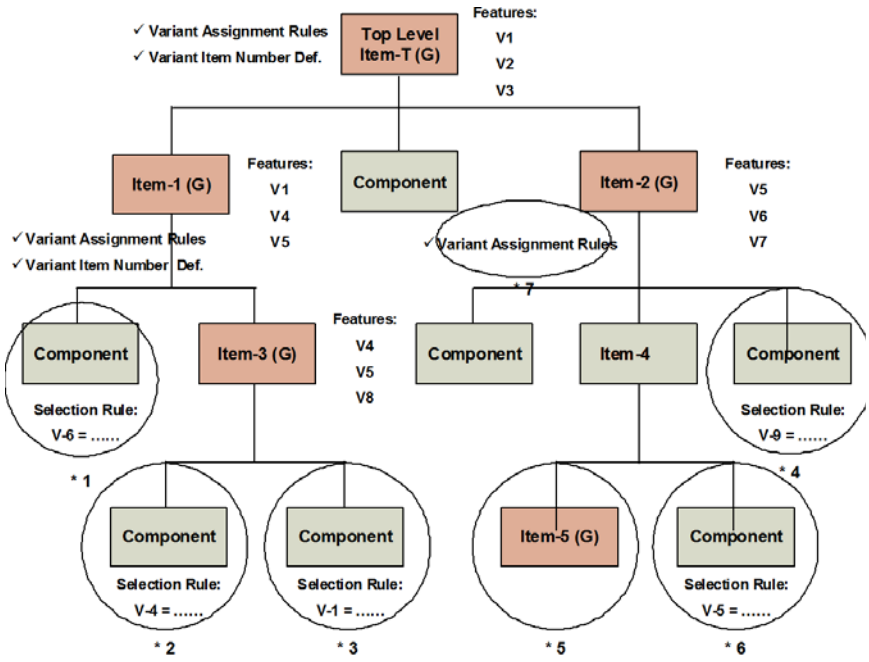
- Features

  This routine checks if all features are used properly given the configurable items in the generic product structure and the features that are defined for each of them.

Example of Using the Cross Validation Analyzer

The following diagram shows a schematic representation of an example configurable item structure. Items annotated with (G) are configurable items.

Fig. 2.6
Example Configurable Item Structure



The paragraphs below show example checks and the warnings or errors reported for the situations numbered *1 to *7 in the diagram, when analyzing the top level configurable item.

1 Warning/Error: component [name] variable V-6 not defined as feature for item [Item number].

  Feature V-6 is defined for configurable item Item-2, which is a component item of the top level Item-T. All features in the product structure are collected into the highest level, and thus the selection rules on every level can be verified. When the top-level configurable item is used to create a variant, no error occurs. However, if the Item-1 configurable item is used as the top-level item to create a variant, an error situation occurs.

2 Correct.

  The V-4 variable is defined as a feature for the next higher configurable item Item-3, so the selection rule can always be verified.

3 Warning/Error: component [name] variable V1 not defined as feature for item [name].

The V-1 feature is not defined for configurable item Item-3, but for a higher-level configurable item Item-1. When creating a variant of the top- level configurable item or of Item-1, there is no problem. But when you create a variant of Item-3, QAD Configurator cannot verify this selection rule and an error occurs.

4 Error: Variable V-9 not defined as feature for [top-level item name].

The V9 variable is used in the selection rule but is not defined as a feature for any of the configurable items in the product structure.

5 Warning/Error: Broken Chain of configurable items.

The Item-4 parent item is not a configurable item. As a result, the system handles Item-5 as a standard item and selects all its components. So, defining Item-5 as generic is meaningless. Defining lower-level items as generic requires a linked chain of configurable items up through higher levels.

6 Warning/Error: Selection rule found for non-generic component item or assignment rule found for non-generic component item in the case of an assignment rule.

The Item-4 parent item is not a configurable item. As a result, the system automatically selects every (generic) component on a lower level into the variant product structure. Selection rules on lower levels are, therefore, meaningless. Selection rules are only active if the parent item of the component is a configurable item.

7 Error: No variant item number definition found for configurable item.

It is not possible for QAD Configurator to generate a new variant in QAD EA for the top-level configurable item since it does not know how to store its findings.

Cross Validation Analyzer Report

Cross Validation Analyzer Report is displayed on the screen in the standard output window and can be printed using the standard print routine.

Questionnaire

Questionnaire is the front end guided selling module of QAD Configurator that lets you configure products for specific customers by selecting product feature options in the form of a questionnaire. Product configurations resulting from the questionnaire can be saved and used to create new variant items.

Questionnaire can be started from the QAD Configurator menu or automatically launched from Sales Order Maintenance (7.1.1) or Sales Quote Maintenance (7.12.1) when you enter a configurable item in the order line.

When you configure a product for a specific customer in Questionnaire, you are presented with a list of questions that correspond to the product’s features. As you answer each question, you select options for each feature of the product. When you finish all the questions, you have a combination of answers or feature options that is called a configuration in QAD Configurator. Each product configuration can be saved and reused later.

When a firm order is placed for a new product configuration, you convert the configuration to a variant item. The variant item has its own item number, variant product structure, and, if necessary, variant routing.

Questionnaire Questions

Each question corresponds to a configurable product feature and each option in a question corresponds to a feature option. How questions are generated and how you can answer them are determined by questionnaire-related sales configuration data. Sales configuration data include feature and option sequence, feature and option characteristics, as well as inclusions, exclusions, and interdependency rules.

The main types of questions recognized by QAD Configurator are as follows:

- Foreground questions, which require answers from the customer.
- Background questions, which can be answered by the customer, but do not need to be. If no answer is supplied, the default is used, even if there is no rule to cover the question.
- Temporary questions, which are usually answered by QAD Configurator calculating values according to the rules.

When you customize the question display, you can select which levels and types of question are shown in the display, and how many levels should be displayed. If you select only one level, only the questions currently ready to be answered are displayed. If you select two or more levels, that number of levels of dependent questions is also displayed.

Configurations

When you have finished answering the questions in the questionnaire, QAD Configurator generates a uniquely identified configuration. The configuration is an intermediate stage between answering the questions and generating the new variant item and its product structure and routing. QAD Configurator can automatically check if a configuration exists, thus preventing sales personnel from configuring the same item twice.

QAD Configurator records each configuration that is generated by the questionnaire. Whenever the system creates a variant from a configuration, the variant has a unique item number according to the item number definition rule.

To avoid configuration and variant redundancies, QAD Configurator uses the configuration characteristics; that is, the answers to the questions. When a configuration exists, there can also be a variant that matches your current customer’s requirements. You can then decide whether to use the existing configuration or variant, or to continue with the questionnaire to create one.

Pricing

When you define a configuration in the questionnaire, Configurator calculates its price in real time.

In many situations, the price of a configuration is equal to the sum of the prices of its components. Now suppose that each component is only chosen if a certain option is selected as an answer (a one-to-one relationship between the options and the components). Then instead of associating a price with the component you can also associate a price with the relevant option and sum the prices of the options. Configurator uses this method.

To link a price to an option, define a pricing part for that option. Configurator uses the price and price lists (if any) of this pricing part to find the best net price and the best list price of the feature option. Any item can serve as a pricing part.

If there is a one-to-one relationship between the options and the components, all Configurator has to do is to sum the prices associated with the selected options. But sometimes, selecting a certain option leads to selecting more than one unit of some component. In this case, you can include the number of the component in the price of the configuration.

For numeric features, you can use the value of this feature as the number of units of the component; select Qty Based check box in Variable Maintenance or Feature Maintenance. If you do not select Qty Based, the quantity is one.

For other types of features, the Quantity Based check box is not available. In these cases, you can set the pricing quantity (pricing_qty) attribute of a feature.

The pricing functionality offers many more possibilities for defining the price of a configuration:

- The pricing part of an option does not have to be the component that is selected if you choose that option. In other words, you can associate with an option any price you want, by specifying a dummy item and using that item as a pricing part for the option.
- If a pricing part is not the component that is selected when you choose an option, then the number of units is not the number of units of the actual component, but the number of units of the item that serves as the pricing part. The pricing quantity only helps you find a price in a price list and does not even have to refer to a number of units that is selected in the variant product structure. This means that you can force the price of a configuration to go up when a certain option is selected, even if you do not want the choice to result in the selection of a component.
- If some components are always selected (independent of the answers given), you can define a separate price list containing the total price of this collection of items. Then you link the price list to a dummy item. Later this dummy item can be used as a pricing part. Its price can always be included in the configuration price, for instance by having a rule that makes sure that the relevant option of this dummy feature is always selected.
- If more than one different component is selected, you can create price lists containing the prices of the relevant collection of components. Then you can link the price lists to the pricing part.

Apart from a pricing part and a pricing quantity, also provide a pricing unit of measure for best price calculation. The pricing quantity of (a pricing part associated with) an option is always expressed in terms of the pricing unit of measure that you enter in Configurator. For instance, if the unit of measure for an item or in a price list is gram and the unit of measure as entered in Configurator is kilogram, then a pricing quantity of 2 in the questionnaire means a quantity of 2 kilograms.

To enter pricing part, quantity based, and unit of measure correctly, you should first enter the data in Variable Maintenance and Feature Maintenance. In general the data as entered in Feature Maintenance is used, but there are two exceptions to this rule:

- If Std Options is selected in Feature Maintenance, the data from the variable option is used.
- If the feature is a logical and the answer in the questionnaire is equal to no, then Configurator uses 0 as the price for the feature. If the answer is yes then Configurator uses the pricing information as specified in Feature Maintenance.

Note The price of the configuration as shown in the questionnaire is always the price of one unit of the configuration.

Chapter 3

QAD Configurator Workspace

Workspace Overview 30
Gives context for how Configurator relates to other QAD programs.

Accessing QAD Configurator Functions 30
Describes different methods of accessing Configurator functions and illustrates the Configurator process map.

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Describes the functions of the Applications Toolbar.

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Maintaining Records 31
Explains how to modify records by creating, viewing, editing, cycling through, or deleting them.

Editing Comments 33
Explains how to use the Comment Editor toolbar.

Using the Rule Assistant 33
Explains how to use the Rule Assistant to compose valid rules.

Using Browses and Browse Collections 34
Describes how to use the configuration browse, view the Variables and Features browse and Configurations browse collections, and customize the configuration browse.

Workspace Overview

Integrated with QAD EA, QAD Configurator is embedded in the application area of the QAD .NET user interface. QAD Configurator is consistent with the rest of the QAD EA applications in terms of look and feel and navigation. For information on the .NET user interface, see *User Guide: QAD User Interfaces*.

This section describes some common UI features specific to QAD Configurator.

Accessing QAD Configurator Functions

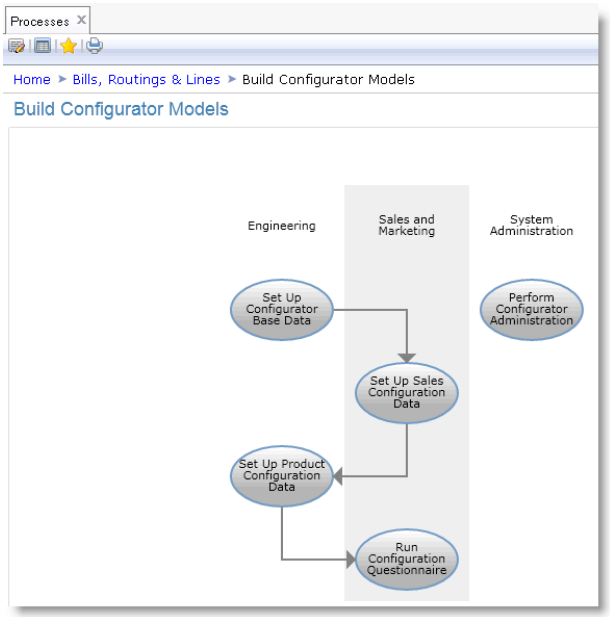
You can access QAD Configurator functions by using either the Menu Search field or the menu tree in the Applications pane in the QAD .NET user interface.

After you install QAD Configurator, QAD Configurator functions are grouped under Customer Management|Configurator by default in QAD 2008.1 Enterprise and later. For earlier versions of QAD EA, QAD Configurator functions can be found under Distribution|Configurator.

You can also access Configurator functions using Configurator process maps. By linking related subprocesses and activities together in the form of interactive workflow diagrams, process maps tie up all the functions sequentially. You can drill down a process map by clicking a subprocess icon to access lower-level functions.

The Configurator process maps are integrated into the Supply Chain View and Vertical Industry View process maps in the QAD .NET UI.

Fig. 3.1
Configurator Process Map



When you select a configurable item in the order line in Sales Order Maintenance or Sales Quote Maintenance in the QAD EA .NET UI environment, the Questionnaire module launches automatically.

Application Toolbar

Like other QAD EA applications, QAD Configurator's application toolbar resides at the top of the application area and provides access to the most common functions.

Fig. 3.2
QAD Configurator Application Toolbar

Action. Use the following action commands to cycle through records in a record maintenance screen:

- First Record
- Previous Record
- Next Record
- Last Record

Print. Print out the current screen.

Print Preview. Preview the current screen before printing.

Delete. Delete the current record on a record maintenance screen.

Note The Delete button is only enabled in edit mode.

Group. Displays the current master group. You can specify another master group by clicking the Browse button next to it.

Selecting a Master Group

When executing QAD Configurator functions, make sure that you are in the right master group. Your current master group is displayed on the right of the toolbar and all the data you work with is associated with it.

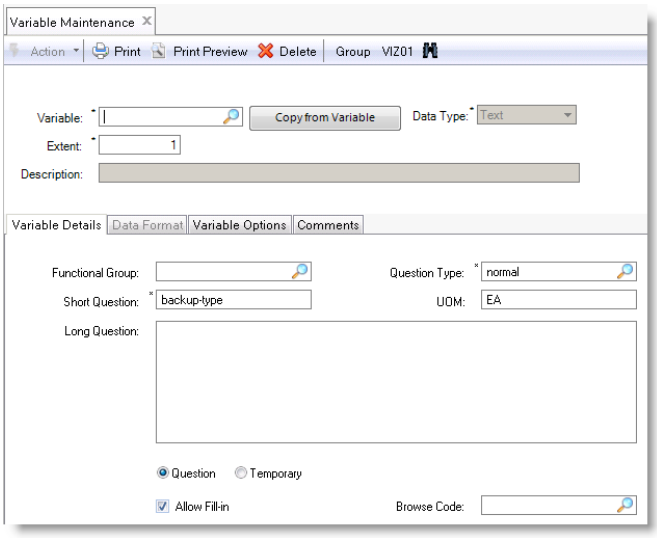
To specify another master group:

Click the Browse button next to the current master group on the toolbar and select the group you want from the browse window.

Maintaining Records

Record maintenance functions such as Variable Maintenance, Question Type Maintenance, and Master Group Maintenance let you create, view, edit, or delete records in a consistent manner.

Fig. 3.3
Example of Record Maintenance Functions



To create a record:

- When you first access a record maintenance function, enter a new record ID in the record ID field, which is typically the first field on the screen. Then press Enter or Tab to edit the new record.
- When you have a record opened or created for editing, click the New button in the bottom-right corner of the screen. Or directly enter a new record ID in the record ID field, which is typically the first field on the screen, then press Enter or Tab. The system asks you whether to save the current record.

To view a record:

Enter an existing record ID in the record ID field. Or click the Browse button next to the record ID field and select an existing record from the browse window. The specified record is loaded for viewing.

To edit a record:

Enter an existing record ID in the record ID field or click the Browse button next to the record ID field and select an existing record from the browse window. Then press Enter or Tab to enter edit mode.

To cycle through records:

Use the Action commands on the toolbar or place the cursor in the record ID field and press the Up and Down arrow keys to navigate through records.

To delete a record:

When the record is in edit mode, click the Delete button on the toolbar.

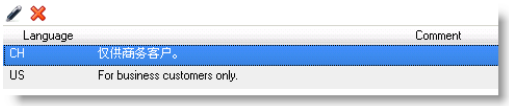
Note The Delete button on the toolbar is disabled in record view mode.

Editing Comments

In QAD Configurator, several record maintenance functions provide the Comment tab. You can create comments in multiple languages. A use case is that you have one configuration model maintained in different user languages.

Multiple language comments can also be used for variable and feature options of the type Text, Numeric List, and Logical. In this way, for variant items, the option values in item master comments can be shown in different languages. See “(Optional) Creating Item Master Comments for Multiple languages” on page 41.

Fig. 3.4
Comment Editor



To add or edit a comment:

Click the Edit button on the Comment Editor toolbar; then select a language and enter text in the Comment box.

To delete a comment:

Select the comment in the list and click the Delete button on the Comment Editor toolbar or press the Delete key.

Note You can only add one comment for each language.

Using the Rule Assistant

When you edit rules in most rule maintenance functions, you can use the Rule Assistant to assist you in composing valid rules.

Fig. 3.5
Rule Assistant

Click the Down arrow to expand the Rule Assistant panel. To add an element to the Rule box, select it from the drop-down list and click the Plus sign + to the right.

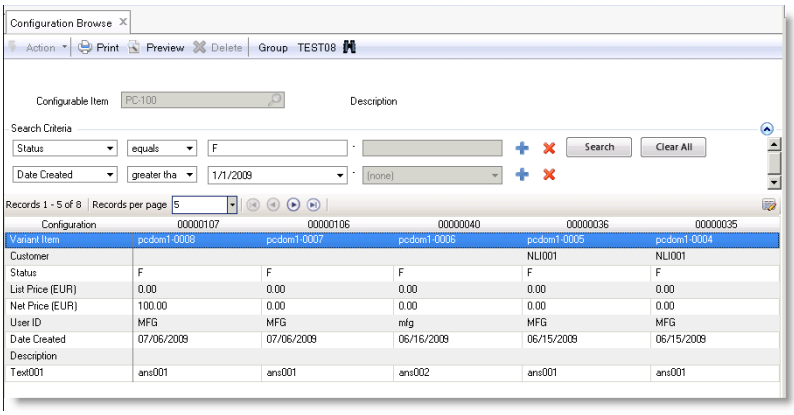
Note The available fields and options vary depending on the type of rule you are editing.

Using Browses and Browse Collections

Use the following menu-level browses and browse collections to easily view, filter and sort configurations, variables, and features:

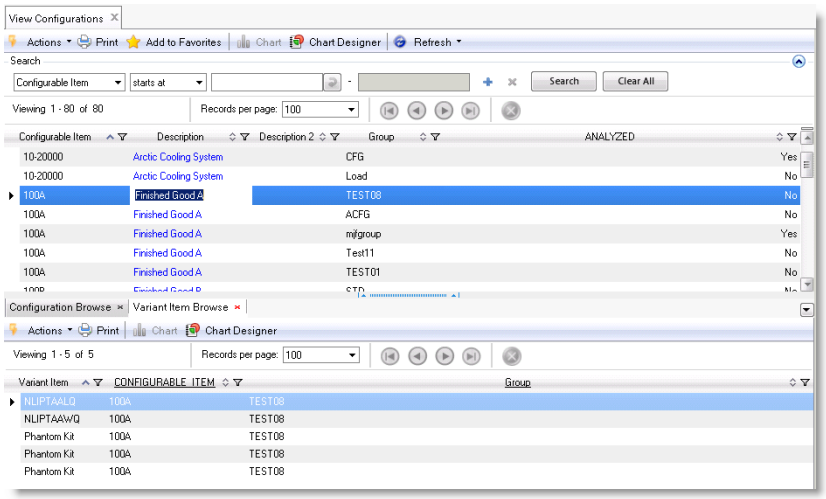
- Configuration browse
- View Variables and Features browse collection
- View Configurations browse collection
- View Configuration Details browse collection

Fig. 3.6
Configuration Browse



In a browse collection, a main browse drives the fields selected in the other browses and programs. The QAD .NET UI displays the other browses and programs in the lower part of a horizontal split-screen, with the main browse located in the upper part.

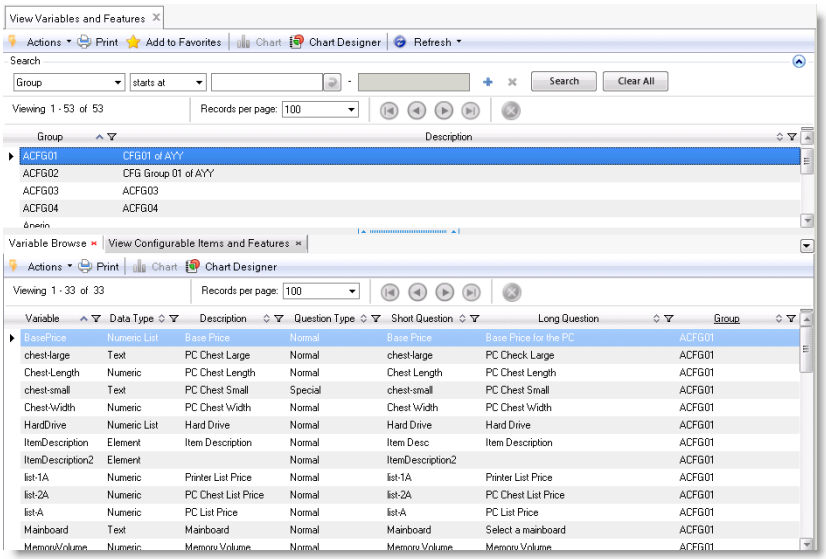
Fig. 3.7
View Configurations Browse Collection



The View Configurations browse collection includes a Configurable Item browse with a Configuration browse and a Variant Item browse.

If you click a record in Configurable Item, the associated browses automatically have the data for that selected item. You can click the Configuration Browse tab to see existing configurations for that configurable item, or click the Variant Item Browse tab to see existing variant items created from it.

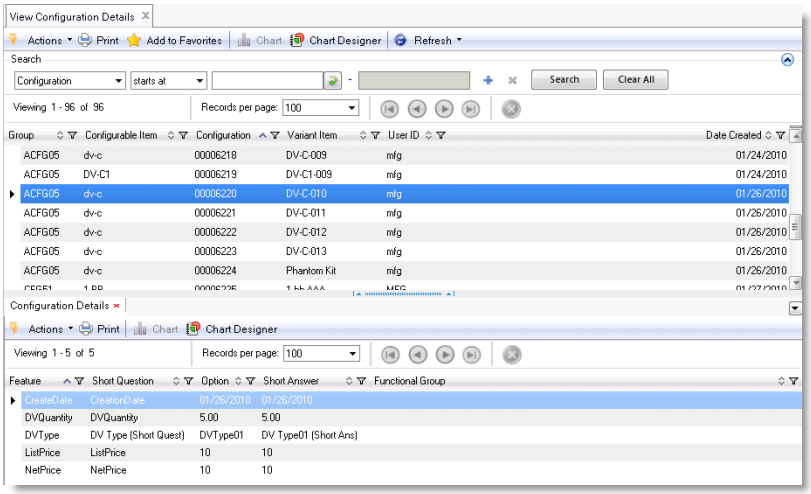
Fig. 3.8
View Variables and Features Browse Collection



The View Variables and Features browse collection includes a Master Group browse with a Variable browse and a View Configurable Items and Features browse collection.

If you click a record in Master Group, the associated browses automatically have the data pertaining to that group. You can click the Variable Browse tab to see existing variables under the group. You can also click the View Configurable Items and Features tab to see configurable items, related configurations and variant items.

Fig. 3.9
View Configuration Details Browse Collection



The View Configuration Details browse collection includes a View Configurable Items browse and a Configuration Details browse.

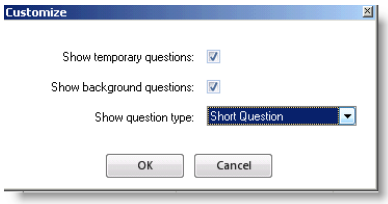
If you click a record in View Configurable Items, the associated browse automatically has the data pertaining to that item.

Customizing the Configuration Browse

To customize the Configuration Browse, click the Customize icon beneath the search box to the right. You can specify whether to show temporary questions and background questions and whether to display long or short questions in the Configuration Browse.

Note You cannot hide temporary or background questions when they are used as filter criteria in the search box.

Fig. 3.10
Customize the Configuration Browse



Chapter 4

Configurator Setup

Setting Up Data in QAD EA 38
Explains how to set up data in QAD EA with sections on creating items, product structures, and generic routings.

Setting Up QAD Configurator 42
Explains how to configure system settings, addresses master groups and how to maintain them, and explains how to maintain configurable items, copy configurable item data, and maintain external entities.

Setting Up Data in QAD EA

QAD Configurator is designed to work with QAD EA. It does not maintain a separate database of item data, product structure, or routings. To use QAD Configurator, define which items in QAD EA are to be used as configurable items by QAD Configurator.

Make sure that QAD EA contains all the item, product structure, and routing details for the products you intend to configure using QAD Configurator.

If you are setting up QAD Configurator to configure a new product range, create the following:

- All the item details in QAD EA Item Master Maintenance
- All the bills of material in QAD EA Product Structure Maintenance
- All the possible operations in QAD EA Routing Maintenance

If you did not disable the item-site data creation feature during system installation, make sure that you create item-site records for all the sites in which variant items are manufactured or sold. Use the following QAD EA functions:

- Item-Site Inventory Data Maintenance (1.4.16)
- Item-Site Planning Maintenance (1.4.17)
- Item-Site Cost Maintenance (1.4.18)

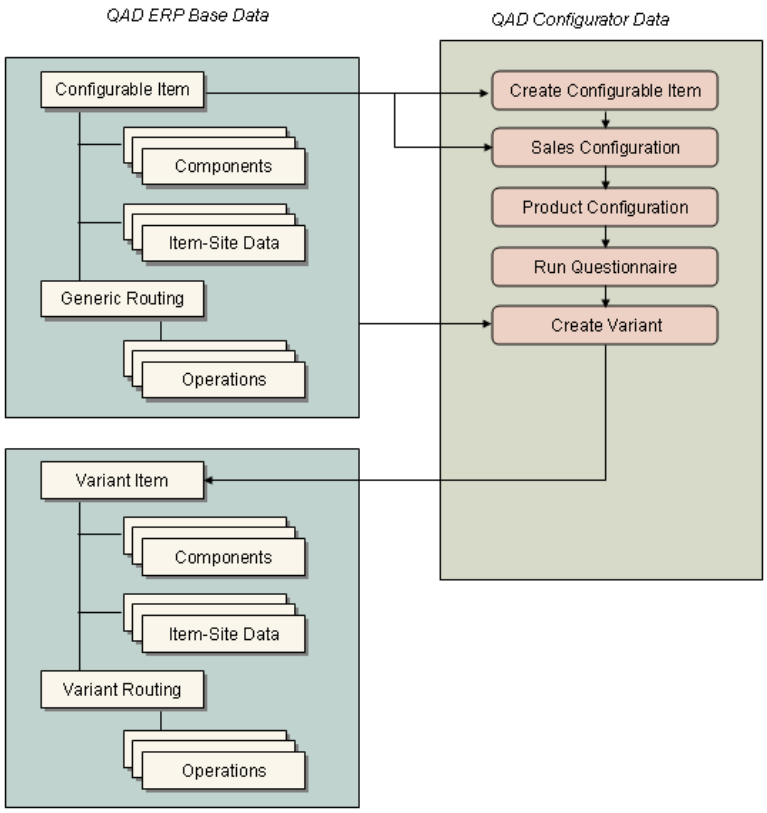
Create or modify records of other QAD EA elements, such as sites and work centers relating to the product range you want to configure.

Note The item details and the product structure details are necessary for QAD Configurator set these up in QAD EA before you use QAD Configurator. However, use of generic routings is optional in QAD Configurator. You can set up QAD Configurator so that it does not generate variant routings when you configure a variant item. In this case, you do not have to set up the generic routings in QAD EA for your product family.

When all the correct product-related data are present in QAD EA, you can define the parent item for the product as a configurable item in QAD Configurator. It is necessary as the first step in the sales configuration process for the product, because all the QAD Configurator programs make reference to the configurable item.

The following figure illustrates the relationship between QAD EA and QAD Configurator.

Fig. 4.1
Relationship between QAD EA and QAD Configurator



The parent item, generic product structure, and generic routing information from QAD EA is used in QAD Configurator by way of the configurable item. When you use QAD Configurator to create a variant item, QAD EA can use the resultant variant product structure and variant routing for manufacturing.

Creating Items

Make sure that all items in the generic product structure exist in QAD EA before you start using QAD Configurator. If you are setting up QAD Configurator to configure products that exist in the QAD EA database, make sure that all the item data is correct and up-to-date. If you are setting up QAD Configurator to configure a new configurable item, create all the related item records in QAD EA first.

When you set up data for a configurable item using Item Master Maintenance (1.4.1), it is recommended that you leave the following fields blank.

Drawing. Leave this general data field blank. During variant item creation, you can use Variant Item Data Rule to assign a specific value to the field.

Revision. Leave this general data field blank. During variant item creation, you can use Variant Item Data Rule to assign a specific value to the field.

Article Number. Leave this inventory data field blank. During variant item creation, you can use Variant Item Data Rule to assign a specific value to the field.

Ship Weight. Leave this shipping data field blank. During variant item creation, it can be automatically calculated by Element Roll-Up.

Net Weight. Leave this shipping data field blank. During variant item creation, it can be automatically calculated by Element Roll-Up.

Volume. Leave this shipping data field blank. During variant item creation, it can be automatically calculated by Element Roll-Up.

Run Time. Leave this item planning data field blank. During variant item creation, it can be automatically calculated by Routing Cost Roll-Up.

Setup Time. Leave this item planning data field blank. During variant item creation, it can be automatically calculated by Routing Cost Roll-Up.

Routing Code. Leave this item planning data field blank.

Note If there is a value for this field, the created variant item might have an unexpected routing instead of the routing created by Configurator.

BOM/Fomula. Leave this item planning data field blank.

Note If there is a value for this field, the created variant item might have an unexpected BOM instead of the product structure created by Configurator.

Price. Leave this field blank. The price of a configurable item can be dynamic; unless you want the price to be a fixed one, leave the field blank.

GL and Current Costs. Leave this item cost data field blank. During variant item creation, it can be automatically calculated if Variant Item Cost Roll-Up is enabled in Configurable Item Maintenance.

For more information about creating and modifying item details in Item Master Maintenance, refer to the QAD EA documentation.

(Optional) Creating Item Master Comments

With the Configurator, master comments can be used to add configuration descriptions to an item. The configuration descriptions can be printed on documents such as sales quotes, sales orders, invoices, or packing lists.

Note For sales orders or sales quotations to have master comments, make sure that you set the Comment field to Yes in Sales Order Maintenance (7.1.1) or Sales Quote Maintenance (7.12.1).

For a configurable item, the master comments can be defined with feature names to show feature options.

Example Master comment for a configurable item 01040 (an industrial ultrasound device) is defined as follows:

```
This ultrasound device operates with the frequency of [Freq].
```

Freq is the feature name for the device's frequency. When you select the frequency option 10 MHz in the Configuration Questionnaire and a new variant item is created, the master comment for the variant item is shown as:

```
This ultrasound device operates with the frequency of 10MHz.
```

Note If the feature is the array data type, shown in brackets [ ], put the feature name followed by a colon and then the array element, such as [Freq:1].

(Optional) Creating Item Master Comments for Multiple languages

For a configurable item, the item master comments can be shown in different languages.

1. In Master Comment Maintenance, create comment descriptions for a configurable item in multiple languages. The descriptions can include item feature names.

Example For a configurable item 01040 (an industrial ultrasound device), a comment in Germany is created for the device's display type:

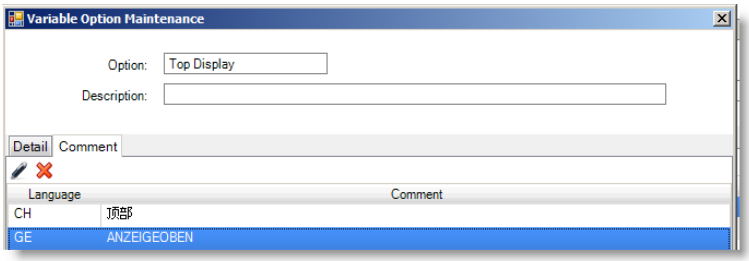
```
ANZEIGETYPE: [U-Type]
```

2. In Feature Maintenance or Variable Maintenance, create multiple language comments for the feature options that are used in the preceding step. Only features of type Text or Logical need comments in multiple languages as translation.

Example The feature *U-Type*, which is used in the preceding step, has a feature option of Top Display. Create a comment in German for the option Top Display:

```
ANZEIGEOBEN
```

Fig. 4.2
Option Comment in Multiple Languages



In this way, for variant items, item master comments can be shown in different languages.

Example When you select the option Top Display in the Configuration Questionnaire and a new variant item is created, the item master comment in Germany is shown as:

```
ANZEIGETYPE: ANZEIGEOBEN
```

Creating Generic Product Structure

Make sure that the multi-level or single-level generic product structures for the products you want to configure exist in QAD EA. Also ensure that all possible components that could be configured for a product exist. Use Product Structure Maintenance (13.5) to check.

Refer to the QAD EA documentation for details on creating and modifying product structure details.

Creating Generic Routings

QAD Configurator requires the existence of the items and generic product structures in QAD EA for the products you want to configure, but the generic routings are optional. If you want to use QAD Configurator to configure routings, make sure that the generic routings exist in QAD EA. Generic routing means all possible processes for the variant item manufacturing. Using Routing Maintenance (14.13.1) for creating and modifying generic routings. For more details on generic routings, refer to the QAD EA documentation.

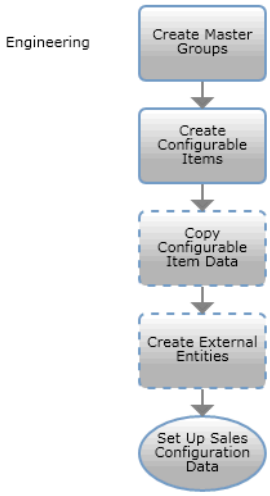
Note Before you start creating the routings, create departments, work centers, and standard operations information.

Setting Up QAD Configurator

Setting up QAD Configurator involves the following general steps:

1. Configure Configurator system settings
2. Set up master groups
3. Maintain configurable items
4. Copy configurable item data (optional)
5. Maintain external entities (optional)

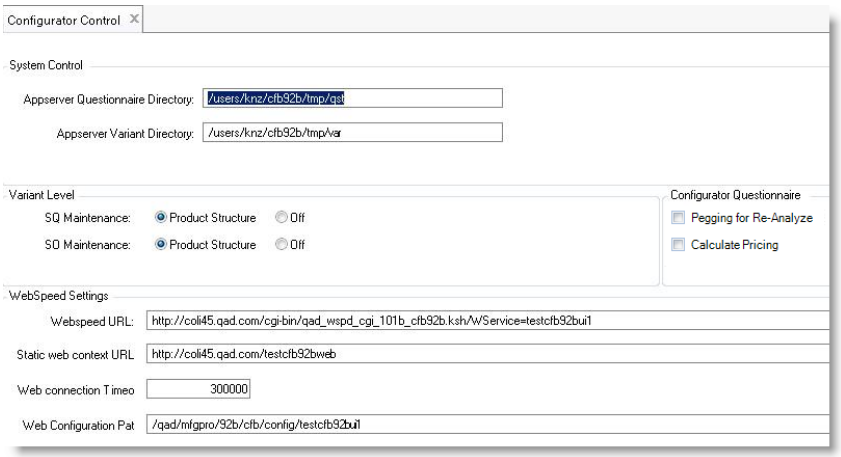
Fig. 4.3
Configurator Base Data Setup Process



Configuring System Settings

Use Configurator Control to configure the QAD Configurator system settings.

Fig. 4.4
Configurator Control



AppServer Questionnaire Directory. Specify where to store the questionnaire files on the AppServer. These files are generated by the Analyzer and contain the inclusion and exclusion logic for features and options. Map the remote directory on the AppServer to a local drive first.

AppServer Variable Directory. Specify where to store the Variant Product Structure Generator files on the AppServer; the questionnaire uses these files. These files contain the variant product structure and variant routing information. Map the remote directory on the AppServer to a local drive first.

SQ/SO Maintenance. Use these options to select the type of entry that QAD Configurator uses to store sales quote and sales order information.

Select Product Structure if you want the system to create item product structures when creating configurations; otherwise, select Off.

Pegging for Re-analyze. If you select this option, whenever a rule changes at some level of the product structure, QAD Configurator does re-analysis of the relevant configurable item and all higher level configurable items.

Keep this option selected, unless the analysis time is too much.

WebSpeed URL. Enter the WebSpeed Workshop URL in the following format:

`http://`*`WebSpeedServerHostName`*`/cgi-bin/wspd_cgi.ksh/WService=`*`WebSpeedBrokerName`*

Static Web Context URL. Enter the URL address in the format of `http://server_ip/alias_name` where the scripts, images, and styles folders are published. alias_name is the Apache server Alias configuration that points to *`ConfiguratorWebSpeedInstallDir`*`/cpd/htdocs`

Web Connection Timeout. Specify the amount of time allowed to try to connect to the web server before the system stops trying.

Web Configuration Path. Specify the path where the `AppServerConnection.xml` file is to be stored. First create the directory for storing the configuration file under *`ConfiguratorWebSpeedInstallDir`*, and then give it read and write permissions.

About Master Groups

When you have a large quantity of manufacturing data in your QAD EA database, you can simplify data management and access in QAD Configurator by classifying the data into different master groups. You can base master groups on product family or product type. Master groups are not domain-specific.

When you have several master groups, make sure that you are in the right master group when you work with such data as configurable items, variables, features, and rules. Data created in one master group exclusively pertains to that group and cannot be accessed from other master groups.

A variable in one group cannot be accessed in another group. Likewise, all the sales configuration rules and product configuration rules you set up in a group only apply to that group.

QAD Configurator provides a built-in master group STD and it cannot be deleted.

Example The arctic cooling system is a part of a product family covering industrial and domestic heating, cooling, and humidity control equipment. Despite major differences in the component parts included in its generic product structure, many of the variables are common to the entire range:

- Electrical voltage
- Usage, from domestic through heavy industrial
- Paint color for the equipment housing

So, you can set up a master group called ENVCON (Environmental Control) to include all these products.

Now, whenever you work on sales configuration activities for any of the products in this range, you first make sure that you have selected the ENVCON group. In this way, all the variables that have already been used within this group are available to you.

When you create a group, you can also set up various defaults and settings that control the way QAD Configurator operates within this group only. For example, you can set up the default number of digits and decimals that are used for numeric variables and features created in the group; you can select a default rounding method; you can specify whether single-level or multi-level product structures are used; and you can specify whether you require QAD Configurator to generate variant routings for products configured in this group.

In this way, you can customize the way QAD Configurator operates in a different manner for each group of products. If variant routings are required for some products but not for others, you can create one group with the routings option selected and another with it deselected. You can create as many different groups as you need.

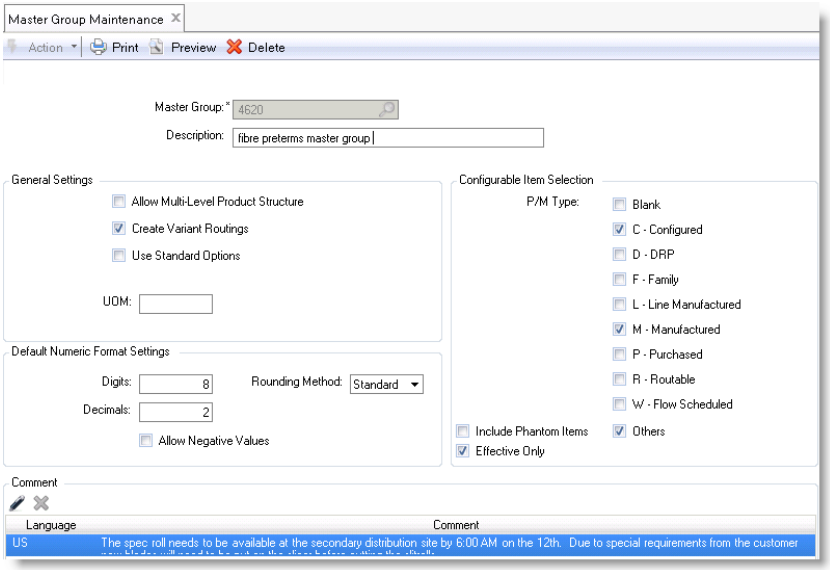
You create and maintain groups using Master Group Maintenance.

Maintaining Master Groups

Use Master Group Maintenance to create, view, edit, or delete master groups.

Master groups can simplify and streamline the configuration process. They categorize product data based on products’ common characteristics. Rules and default settings are also for a group of products.

Fig. 4.5
Master Group Maintenance



Master Group. Enter a name that uniquely identifies a master group in the current domain.

In the General Settings pane, specify the general settings associated with variant configuration and generation in this group.

Allow Multi-Level product structure. Select this option unless all product structures are single-level.

Enable Routing Calculation. Select this option unless you do not want QAD Configurator to calculate variant routings when generating variant items.

Use Standard Options. Specify whether new feature options can be created in addition to the options inherited from variable standard options when maintaining feature options.

Select this option to allow only variable standard options to be used as feature options. Clear this option to allow new feature options to be defined in addition to the standard options.

UOM. Specify the default unit of measure for variables and features in this group.

In the Default Numeric Format Settings pane, specify the default formats for numeric variables and features in this group. You can change the formats when defining specific numeric variables and features later in Variable Maintenance and Feature Maintenance.

Digits. Specify a value that defaults to the Digits field in Variable Maintenance when you create a numeric variable.

Rounding Method. Specify the rounding method to be used by numeric variables and features.

Standard: Rounds a decimal value to a specified number of fractional digits using the standard midpoint rounding method. A value is rounded up when it is equal or greater than the midpoint value and is rounded down when it is less than the midpoint value. For example, 3.1415 is rounded up to 3.142 when it is rounded to three decimal digits but is rounded down to 3.14 when it is rounded to two decimal digits.

Up: Always round up a decimal value to a specified number of fractional digits. For example, both 3.141 and 3.148 are rounded up to 3.15 when they are rounded to two decimal digits.

Down: Always round down a decimal value to a specified number of fractional digits. For example, both 3.141 and 3.148 are rounded down to 3.14 when they are rounded to two decimal digits.

Decimal. Specify the number of fractional digits for numeric variables and features.

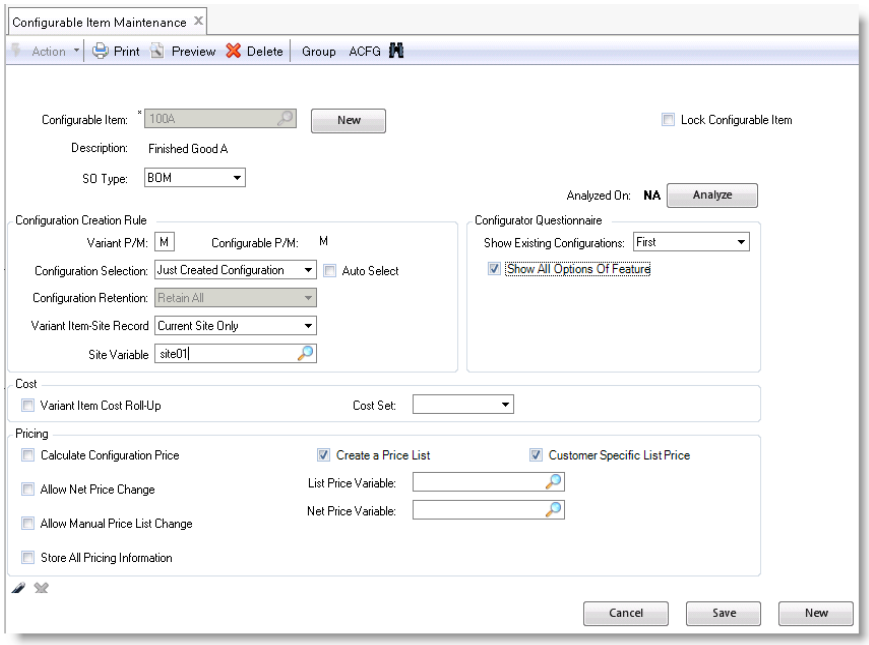
Allow Negative. Specify whether negative values are allowed for numeric variables and features. Select this option to permit variable and feature values to be smaller than zero; otherwise, clear this option.

In the Configurable Item Selection pane, specify the default settings for the variant product rule filter in Variant Product Structure Rule Maintenance. These options are used to filter component items in the product structure when you define variant item product structure rules for a configurable item. See “Maintaining Variant Item Product Structure Rules” on page 105 for details.

Maintaining Configurable Items

Use Configurable Item Maintenance to create, view, edit, or delete configurable items in QAD Configurator. You can also define some default settings for variant items created from a configurable item. Adding a configurable item in QAD Configurator is a process of selecting a parent item in QAD EA and defining it as a configurable item.

Fig. 4.6
Configurable Item Maintenance



Configurable Item. Select a configurable item to view, modify, or delete. Click the New button to add a new configurable item.

Note In QAD 2008.1 Enterprise and later, configurable items cannot have item replacement records and cannot be memo items.

Description. The field displays the item description from the QAD EA item details.

Lock Configurable Item. Select this option to lock the configurable item so that it cannot be configured in the questionnaire; clear the check box to unlock it.

SO Type. Designate the configurable item as a product structure, a physical or a phantom kit. The default type is BOM.

Note If the configurable item has been designated as a planning item, you cannot change its SO type to Physical or Phantom.

BOM: One sales order or quote line is created for the variant item.

Physical: A physical kit is used in situations where the kit is pre-assembled and can be placed in inventory. If a configurable item is designated a physical kit, the following applies:

- A final assembly item is generated and retained.
- A standard product structure is generated and retained.
- The first line of the quote or sales order is the top-level kit. The system designates this line as a memo line. The pricing for the entire kit appears on this line.
- Each level-one component of the kit has its own quote or sales order line. The line-item quantity is the quantity defined in the kit product structure. The price for each component is $0.00.
- Pricing for the kit can use all standard pricing methods including QAD Configurator feature/options based pricing.

Phantom: A phantom kit is used in situations where the kit is assembled and shipped using the QAD EA pick list and is never in inventory. For a phantom kit:

- No final assembly item or product structure is retained.
- Each component of the kit has its own quote or sales order line. The line-item quantity is the quantity defined in the generic product structure or product configuration rule. Pricing for each individual component can be turned on or off in Variant Product Structure Rule Maintenance; for example, a free user manual when a system is purchased.
- Pricing for the kit can use all standard pricing methods including QAD Configurator feature/options based pricing.

Analyzed. This field indicates whether the configurable item has been processed by the QAD Configurator Analyzer. If it has been analyzed, the other two fields show the date and time the configurable item was last analyzed. You can click the Analyze button to force reanalysis of this configurable item.

Variant P/M. Specify the default P/M type of variant items created from the current configurable item.

Configurable P/M. Displays the P/M type of the current configurable item.

Configuration Selection. specify the method to be used to select a configuration in the questionnaire for variant items created from this configurable item. When you have finished answering questions in the questionnaire, QAD Configurator displays a browse window showing all the configurations that have the same answers for the configuration key features. It can also highlight one particular configuration in the browse window. You can then select either the highlighted configuration, or another configuration from the list. The options for the selection method are as follows:

- Just created configuration: QAD Configurator always highlights the configuration you have created, regardless of the other existing configurations.

- Select last matching: QAD Configurator highlights the most recently created matching configuration.
- Select first matching: QAD Configurator highlights the oldest matching configuration.

Auto Select. Specify whether variant item number is selected automatically by QAD Configurator or manually by the user.

Configuration Retention. Specify how QAD Configurator handles generated variant items.

Variant Item-Site Record/Site Variable. Specify for each configurable item, whether to create item-site data along with item master records when the system generates variants from the configurable item, and if so, which sites to use to create item-site data.

Note When the item-site data creation feature is disabled during system installation, these two fields are grayed. For information about switching off the item-site data creation feature, see *Installation Guide: QAD Configurator.*

- None: The variants are non-site-specific and there is no variant item-site data.
- Current site only: The system generates variant item-site data to a particular site.

  If you choose this option, make sure that you specify a valid site variable for creating item-site data in the Configurator questionnaire. A valid site variable is a site associated with the configurable item as defined in Item-Site Planning Maintenance (1.4.17) in QAD EA.

  When you access the questionnaire from a sales order or sales quote, the site variable defaults from the site in the sales order or quote header. However, if the header site is not valid, the site variable then defaults from the default site of the configurable item;. When you access the stand-alone questionnaire function, the site variable defaults from the default site of the configurable item.
- All sites: The system generates variant item-site data to all the sites that are defined in Item-Site Planning Maintenance.

When you create new variant items at the end of the configuration process, the system creates the following variant item data. The variant item data depends on the Variant Item-Site Record option you choose for the current configurable item.

	None	**Current Site Only**	**All Sites**
Item master	Yes	Yes	Yes
Product structure	Yes	Yes	Yes
Routing	Yes	Yes	Yes
Cost data (if cost roll-up is selected)	Yes	Yes	Yes
Item-site planning data		Yes (specific to the specified site)	Yes (specific to all the sites associated with the configurable item)
Item-site inventory data		Yes (specific to the specified site)	Yes (specific to all the sites associated with the configurable item)
Item-site cost data (if cost roll-up is selected)		Yes (specific to the specified site)	Yes (specific to all the sites associated with the configurable item)

If the Variant Item-Site Record option is Current Site Only, when you reload an existing configuration with variant items, the system checks whether a different site variable has been specified than the one previously used to generate the existing variant items. If so, the system creates additional variant item-site data specific to the new site variable.

Note Configurable items on multiple levels of a product structure cannot share the site variable.

Show Existing Configurations. Specify whether and how to display existing configurations in the Configurator questionnaire:

- First: Display existing configurations on launching the questionnaire.
- Second: Display the new configuration on launching the questionnaire.
- On request: When launching the questionnaire, display a message asking the user whether to show existing configurations.
- No: Hide the Existing Configurations tab in the questionnaire.

Show All Options of Feature. Specify whether to show all feature options. If this setting is selected, the excluded options, which are not available to select, can be seen as dimmed. If this setting is not selected, you cannot see the excluded options.

Variant Item Cost Roll-Up. Indicate whether the cost roll-up function is to be applied to this item.

Cost Set. Specify the cost set to use in cost roll-up calculations. This field only applies when cost roll-up is in use. Note that the system does not let you roll up an average GL cost set.

Calculate Configuration Price. Select the check box if you want to use pricing for this configurable item. If you do not select this check box, there is a Pricing column in the questionnaire, but no pricing information appears. The remaining pricing fields on this screen apply only when you select the Use Pricing check box.

Allow Net Price Changes. Select the check box if you want to change the calculated net price for a specific component that is selected in the questionnaire.

Note This setting does not apply for the integration of the Configurator questionnaire with QAD CSS (an add-on product for QAD EA).

Allow manual price list changes. Select the check box if you want to update the manual price list of a selected component while running the questionnaire.

Note This setting is for internal use; it does not work for questionnaire shown in QAD CSS.

Store All Pricing Info. Specify how much pricing information is stored by QAD Configurator. If you select this check box, QAD Configurator stores the pricing information of all the components that can be selected in the questionnaire. If you have performance concerns, do not select this check box; then only the pricing information of the actual option chosen is in QAD Configurator.

Create a Price List. Specify whether you want the system to create price lists for generated variant items. If you select this option, make sure that you specify list price and net price variables to store price information.

Customer Specific List Price. This setting only applies when Create a Price List is selected. By default, this setting is selected when Create a Price List is selected. This setting is to control whether the price list for list price, created by the system, is customer-specific or not.

- If this check box is selected, the price list for list price, which is created by the system, is based on the current customer.
- If this check box is not selected, the created price list for list price is general, not customer specific.

Whether the check box is selected or not, the created price list for net price is always customer-specific.

List Price Variable. Specify the variable to store the list price. List price represents the unit price before applicable discounts or markups are applied. This value is used by the system to calculate the net price. The list price is posted to the Sales account during invoice post. If there is a difference between the net price and list price, the difference is posted to the Sales Discount account.

Net Price Variable. Specify the variable to store the net price. The net price represents what the customer pays. It prints on all formal documents and helps calculate taxes, sales margins, and commission amounts. Any difference between the list and net price is posted to the Sales Discount account during invoice post.

The following table lists the effects of different combinations of choices for Auto Select, Configuration Selection, and Configuration Retention.

Table 4.1
Field Combination Effects

Configuration Selection	Auto Select	Configuration Retention	Effect
Just Created	Yes	Retain all Configurations and Disabled	QAD Configurator always creates a variant and keeps all configurations.
Just Created	No	Retain all Configurations and Disabled	The Configuration Selection browse is opened and the Just Created Configuration is highlighted. The variant part number selected and accepted in the browse is returned to the SO line. The variant part number is assigned to the new configuration and this new configuration is returned to pcsod_det. If the new configuration is selected and accepted, it creates a variant from this configuration and this configuration is returned to pcsod_det.
First matching	Yes	No Duplicates	The first matching configuration (if available) is selected. This variant part number is automatically returned to the SO line (bypassing the Configuration Selection browse). The new configuration is deleted and the selected configuration is returned to pcsod_det.

Table 4.1 — *Field Combination Effects* (Page 1 of 4)

Configuration Selection	Auto Select	Configuration Retention	Effect
First matching	Yes	No Customer Duplicates	The first matching customer-configuration or first matching configuration (if available) is selected. This variant part number is automatically on the SO line (bypassing the Configuration Selection browse). If a customer-configuration match was found, the new configuration is deleted and the existing resid is returned to pcsod_det. If a configuration match were found for a different customer, the matching variant part number is assigned to the new configuration and the new configuration is assigned to pcsod_det.
First matching	Yes	Retain All Configurations	The first matching configuration (if available) is selected. This variant part number is automatically on the SO line (bypassing the Configuration Selection browse). The variant part number is assigned to the new configuration and this new configuration is returned to pcsod_det.
First matching	No	No Duplicates	The Configuration Selection browse is opened and the first matching configuration (if available) is highlighted. The variant part number selected and accepted in the browse is returned to the SO line. The new configuration is deleted and the selected configuration is returned to pcsod_det.
First matching	No	No Customer Duplicates	The Configuration Selection browse is opened and the first matching customer-configuration or, if not available, the first matching configuration (if available) is highlighted. The variant part number selected and accepted in the browse is returned to the SO line. If a customer-configuration match was found, the new configuration is deleted and the existing resid is returned to pcsod_det. If a configuration match were found for a different customer, the matching variant part number is assigned to the new configuration and the new configuration is assigned to pcsod_det.

Table 4.1 — *Field Combination Effects* (Page 2 of 4)

Configuration Selection	Auto Select	Configuration Retention	Effect
First matching	No	Retain All Configurations	The Configuration Selection browse is opened and the first matching configuration (if available) is highlighted. The variant part number selected and accepted in the browse is returned to the SO line. The variant part number is assigned to the new configuration and this new configuration is returned to pcsod_det. If the new configuration is selected and accepted, the system creates a variant from this configuration and this configuration is returned to pcsod_det.
Last matching	Yes	No Duplicates	The last matching configuration (if available) is selected. This variant part number is automatically on the SO line (bypassing the Configuration Selection browse). The new configuration is deleted and the selected configuration is returned to pcsod_det.
Last matching	Yes	No Customer Duplicates	The last matching customer-configuration or last matching configuration (if available) is selected. This variant part number is automatically on the SO line (bypassing the Configuration Selection browse). If a customer-configuration match was found, the new configuration is deleted and the existing resid is returned to pcsod_det. If a configuration match were found for a different customer, the matching variant part number is assigned to the new configuration and the new configuration is assigned to pcsod_det.
Last matching	Yes	Retain All Configurations	The last matching configuration (if available) is selected. This variant part number is automatically on the SO line (bypassing the Configuration Selection browse). The variant part number is assigned to the new configuration and this new configuration is returned to pcsod_det.

Table 4.1 — *Field Combination Effects* (Page 3 of 4)

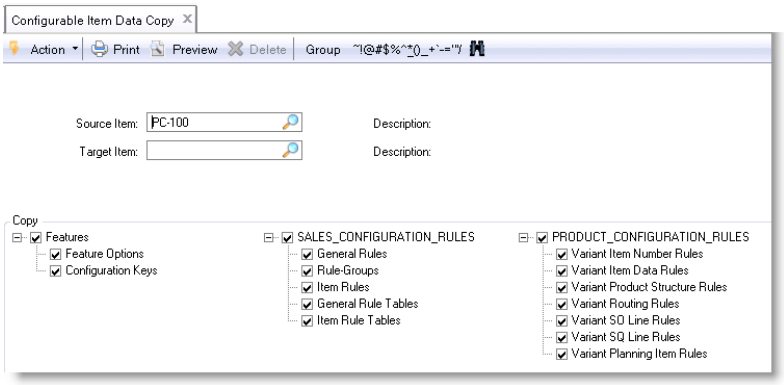
Configuration Selection	Auto Select	Configuration Retention	Effect
Last matching	No	No Duplicates	The Configuration Selection browse is opened and the last matching configuration (if available) is highlighted. The variant part number selected and accepted in the browse is returned to the SO line. The new configuration is deleted and the selected configuration is returned to pcsod_det.
Last matching	No	No Customer Duplicates	The Configuration Selection browse is opened and the last matching customer-configuration or, if not available, the last matching configuration (if available) is highlighted. The variant part number selected and accepted in the browse is returned to the SO line. If a customer-configuration match was found, the new configuration is deleted and the existing resid is returned to pcsod_det. If a Configuration match were found for a different customer, the matching variant part number is assigned to the new configuration and the new configuration is assigned to pcsod_det.
Last matching	No	Retain All Configurations	The Configuration Selection browse is opened and the last matching configuration (if available) is highlighted. The variant part number selected and accepted in the browse is returned to the SO line. The variant part number is assigned to the new configuration and this new configuration is returned to pcsod_det. When the new configuration is selected and accepted, the system creates a variant from the configuration and this configuration is returned to pcsod_det.

Table 4.1 — *Field Combination Effects* (Page 4 of 4)

Copying Configurable Item Data

When you want to set up the sales configuration data for a configurable item, you can copy them from an existing configurable item, and then modify them for the new configurable item.

Fig. 4.7
Configurable Item Data Copy



To copy a configurable item data:

1. Specify the source and target configurable items for the duplication.
2. Specify the sales configuration elements that you want to copy to the new item in the Copy pane.

   Note When the target item is a kit, you cannot select variant planning item rule to copy.
3. Click OK.

When you confirm the copy, the system displays a message prompting whether to run the Analyzer for the new configurable item. You cannot use the item in the questionnaire until it has been analyzed. But you can change the sales configuration elements that you copied before running the Analyzer.

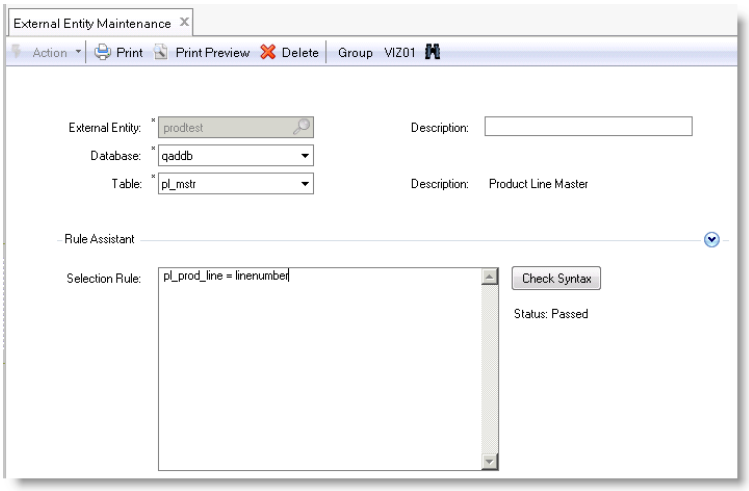
Maintaining External Entities

Use External Entity Maintenance to create, view, edit, or delete external entities for use in QAD Configurator.

An external entity is a reference to a table in a database. It lets you establish a link between a question in the questionnaire and customer or item-related data in the QAD EA database. It uses a condition to set the answer to the question. When a variable is linked to an external entity, the questionnaire looks up the assigned value of the feature in the specified field of a particular record in the specified database table. The correct record is determined by the selection rule defined for the external entity.

Note You can update the records in referenced tables by defining external entity rules. For more information, please refer to “Maintaining External Entity Rules” on page 114.

Fig. 4.8
External Entity Maintenance



In the Database and Table fields, use the drop-down lists to select the database and table containing the external entity; then select a field from the table.

To edit a selection rule:

You can either manually type the rule by directly typing the statements in the Rule box or use the Rule Assistant to assist you in the process. See “Using the Rule Assistant” on page 33.

Click Check Syntax to validate the rule syntax. If syntax errors are found, error messages display and the status becomes Failed.

Click Save to save the rule. On saving the rule, the system performs a syntax check on the rule. If syntax errors are found, error messages display.

Chapter 5

Sales Configuration

Sales Configuration Overview ***59***
Discusses the sales configuration process.

Maintaining Question Types ***59***
Explains how to use Question Type Maintenance.

Maintaining Functional Groups ***60***
Explains how to use Functional Group Maintenance.

Maintaining Variables and Features ***60***
Explains how to use Variable Maintenance, Feature Maintenance, and Feature Sequence Maintenance, as well as how to use system variables.

Maintaining Sales Configuration Rules ***72***
Explains how to maintain general rules.

Grouping Sales Configuration Rules ***77***
Explains how to maintain general rules in rule groups, and maintain rule-group-specific rules.

Applying Sales Configuration Rules ***79***
Explains how to link general rules and rule groups to configurable items and how to maintain item-specific rules.

About Sales Configuration Rule Table ***80***
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Maintaining Item Rule Tables ***91***
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Accelerating Rule Tables ***92***
Discusses how the Rule Table Accelerator works and why you should use it.

Sales Configuration Rules Report ***94***
Explains how to use Sales Configuration Rule Report.

Analyzing Sales Configuration Rules ***94***
Explains how to use Configuration Analyzer and how analysis results are handled in the system.

Maintaining Questions Sequence 96
Explains how to use Questionnaire Sequence Maintenance.

Maintaining Configuration Keys 96
Explains how to use Configuration Key Maintenance and address it to pricing.

Where-Used Report 97
Explains how to use Where-Used Report.

Sales Configuration Overview

In the sales configuration process, sales personnel maintain variables and features that define configurable product characteristics, designate how to present features as questions in the guided sales process – questionnaire, as well as set up sales configuration rules to ensure data collected from the questionnaire is valid.

Fig. 5.1
Sales Configuration Process

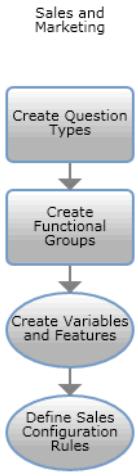
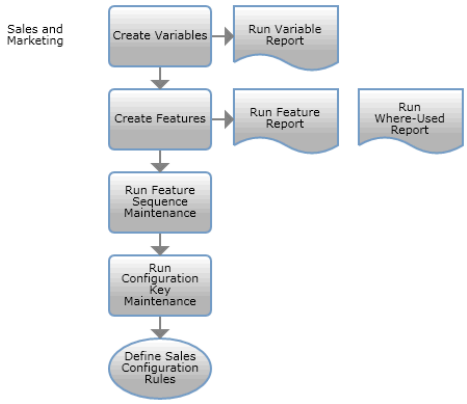


Fig. 5.2
Variable/Feature Maintenance Sub-Process

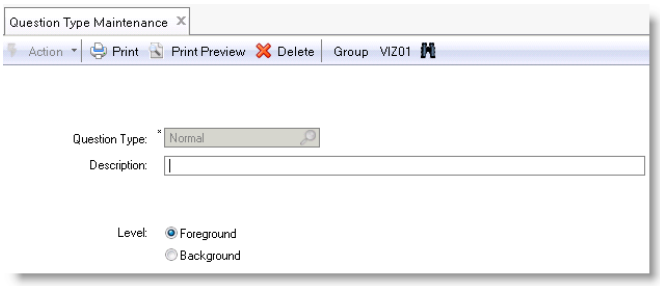


Maintaining Question Types

You can group or classify questions into different types in order to manage them more efficiently. Use Question Type Maintenance to create, view, edit, or delete question types.

Note Question types are non-domain-specific.

Fig. 5.3
Question Type Maintenance



Foreground: Questions always appear in the questionnaire and are manually answered by the user.

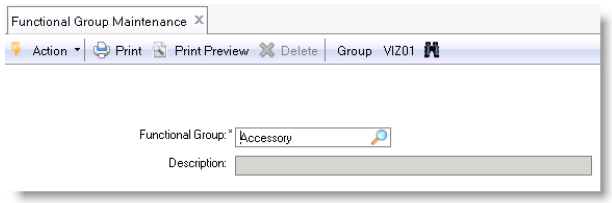
Background: Questions can be answered automatically by the system according to configuration rules, but can also be answered manually by the user if required. You can suppress Background questions so that they do not display in the questionnaire.

Maintaining Functional Groups

Use Functional Group Maintenance to create, view, edit, or delete functional groups.

Functional groups are used to categorize variants and features by their functions. For example, you can group features of a computer product into hardware, software, and accessories.

Fig. 5.4
Functional Group Maintenance

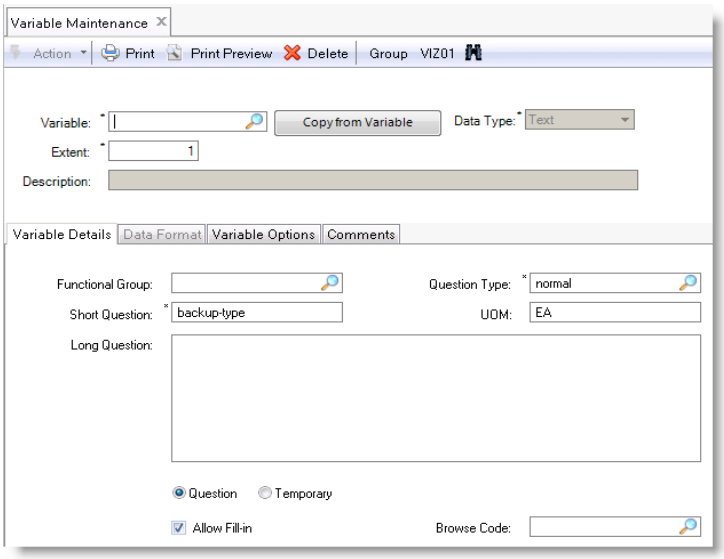


Maintaining Variables and Features

Maintaining Variables

Use Variable Maintenance to create, view, edit, or delete variables.

Fig. 5.5
Variable Maintenance



Variable . Enter a variable ID that uniquely identifies a variable in the current master group.

Note Enter a variable ID and press Enter or Tab first before you can edit other fields in the screen.

Note You cannot use spaces in variable IDs. Use hyphens or underline characters instead, such as pane-color or environment_of_use.

Note You cannot use Progress keywords as variable IDs.

Copy From Variable. To create a variable, you can also copy from existing variables. Enter the variable ID first, click the Copy From Variable button, and select a variable whose details you want to copy.

Data Type. Select a variable data type from the drop-down list. The default data type is numeric. Data type determines the content under the Data Format tab and whether the Variable Options tab appears in the lower pane of the screen.

Note Once you have selected a data type, you cannot change it even if you have not saved the variable yet.

Extent. Specify the number of times or instances the variable can be used in a questionnaire.

For example, you want to collect requirements regarding the colors of body, interior, and seats of a car in the questionnaire, there are two ways you can define variables:

- Create three variables: body-color, interior-color, and seat-color.
- Or, create one variable color with an extent of 3, and then use it three times in questionnaire and different them by assigning an extent number to each instance:

  color[1] = body

  color[2] = interior

  color[3] = seats

However, these relationships are not so obvious when the variable instances display as questions in the questionnaire. Use extent numbers correctly when creating rules that involve variables with multiple extents.

Variable Details

Use the settings under Variable Details to specify how to generate the variable-related questions. You can further modify these settings at the feature level.

Functional Group. Assign the variable to a functional group. Functional groups are used to categorize variables and features and are maintained in Functional Group Maintenance.

Question Type. Specify the question type for the variable. Question types are defined in Question Type Maintenance.

Short Question. Enter a brief question to display in the questionnaire to prompt for answers relating to this variable.

Long Question. Enter a longer question to display in the questionnaire.

You can customize the questionnaire to display either short or long questions.

UOM. Enter the unit of measure for the variable. This field sets the default for the same field in Variable Options Maintenance.

This field is only enabled when data type is numeric, numeric list, or text

Allow Fill-In. Specify whether to display an additional text field for the question related to this variable in the questionnaire so that the question respondent can type in a free-format answer or select an answer from an associated browse, if any.

This field is only enabled for text, date, and numeric list variables. For temporary questions, this field is always dimmed.

Browse Code. This field is only available when variable data type is text and you have selected Allow Fill-In.

You can associate the variable with an existing browse, so that the question respondent can select a value from the browse instead of manually typing in an answer in the questionnaire.

You can specify as many as five parameters for the browse in the questionnaire; the parameter can be a variable, a feature, or even a constant. The shortcut keys to bring up the browse in the questionnaire are Alt+B.

Browses are created and maintained in Browse Maintenance. For information about creating browses, see QAD Enterprise Applications user guides.

Note This setting does not apply for the integration of the Configurator questionnaire with QAD CSS (an add-on product for QAD EA). QAD CSS does not support .NET UI browses.

Question or Temporary.

Question. If you select this option, users answer the variable-related question on the questionnaire.

Temporary. If you select this option, the system stores the information that does not need answers from users. By default, the temporary information does not show on the questionnaire. If you want to see the information, select *Show temporary questions* on the questionnaire customization screen.

Example Area is the product of length and width. You can define a variable called area as temporary, which is calculated from answers to the variables length and width. Then you can use the value of the area variable as a factor in other rules.

When variable data type is numeric, or date (current or fixed), the Pricing Part Information pane is available under Variable Details.

Pricing Part. Enter an existing item number in QAD EA to associate it with the answer to this question for pricing calculation.

Note There is no validation for the value that you enter in this field. You can specify an item for the variable here in QAD Configurator first and then create it in QAD EA.

Qty Based. If the type of the variable is numeric, you can select this check box. When you have selected Qty Based, the pricing engine uses feature quantity entered in the questionnaire. See “Pricing” on page 26 for more pricing information.

UOM. Enter the unit of measure of the item that is specified in the Pricing Part field. The pricing engine uses it in price calculation.

Variable Data Format

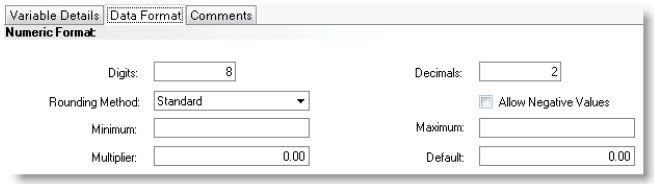
Different variable data types have different data formats.

Note The Data Format pane is disabled for the text and logical data types.

Numeric Data Format

Numeric data format applies to numeric and numeric list data types. The default values for these numeric settings are defined for the group in Master Group Maintenance, but you can change them for individual variables.

Fig. 5.6
Numeric Format



Digits. Specify the maximum number of digits for numeric variables and features. The value defaults from Master Group Maintenance.

Decimals. Specify the number of fractional digits for numeric variables and features.

Rounding Method. Specify the rounding method to be used by numeric variables and features.

Standard: Rounds a decimal value to a specified number of fractional digits using the standard midpoint rounding method. A value is rounded up when it is equal or greater than the midpoint value and is rounded down when it is less than the midpoint value. For example, 3.1415 is rounded up to 3.142 when it is rounded to three decimal digits but is rounded down to 3.14 when it is rounded to two decimal digits.

Up: Always round up a decimal value to a specified number of fractional digits. For example, both 3.141 and 3.148 are rounded up to 3.15 when they are rounded to two decimal digits.

Down: Always round down a decimal value to a specified number of fractional digits. For example, both 3.141 and 3.148 are rounded down to 3.14 when they are rounded to two decimal digits.

Allow Negative Values. Specify whether negative values are allowed for numeric variables and features. Select this option to permit variable and feature values to be smaller than zero; otherwise, clear this option.

Minimum. Specify the minimum value allowed. Leaving it blank means there is no lower boundary.

Maximum. Specify the maximum value allowed. Leaving it blank means there is no upper boundary.

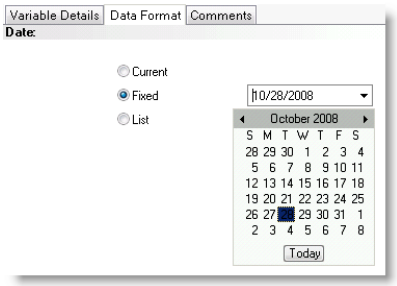
Multiplier. Specify a fixed incremental value.

Default. Specify the default value for the variable.

Date Format

The date format settings display when the variable data type is date.

Fig. 5.7
Date Format



Current. The value of the variable defaults to the date on which the questionnaire is answered.

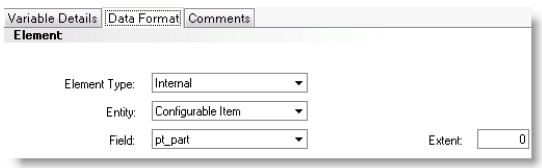
Fixed. The variable value is a fixed date. Specify a default value using the date selection calender to the right.

List. When you select this option, the Variable Option tab is enabled to allow you to specify date options for the variable.

Element Format

Element format settings apply to element type variables. Use the settings to link the variable to a database entity field.

Fig. 5.8
Element Data Format



Element Type. Specify whether you want to associate the variable with an internal or external entity field.

Internal: The Entity option list displays all the tables in the QAD Configurator database.

External: The Entity option list displays all the external entities defined in External Entity Maintenance.

Entity. Select an entity to associate the variable with.

Field. Select a field to link the variable to.

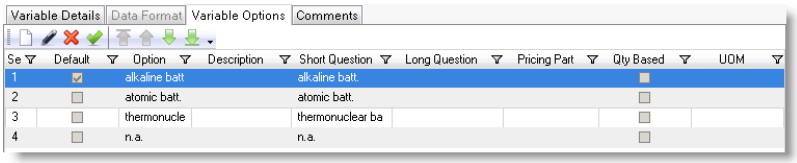
Extent. This value is 1 when the selected field is of the array data type in the database. In this case, specify the index number of the field in the array you want to link the variable to. Do not modify the Extent field when its value defaults to 0.

Note The lower boundary of the array index range is 1.

Variable Options

The Variable Options tab displays when the variable data type is text, numeric list, logical, or date with the List date format. Use this tab to maintain options, or selectable values of the variable.

Fig. 5.9
Variable Options List



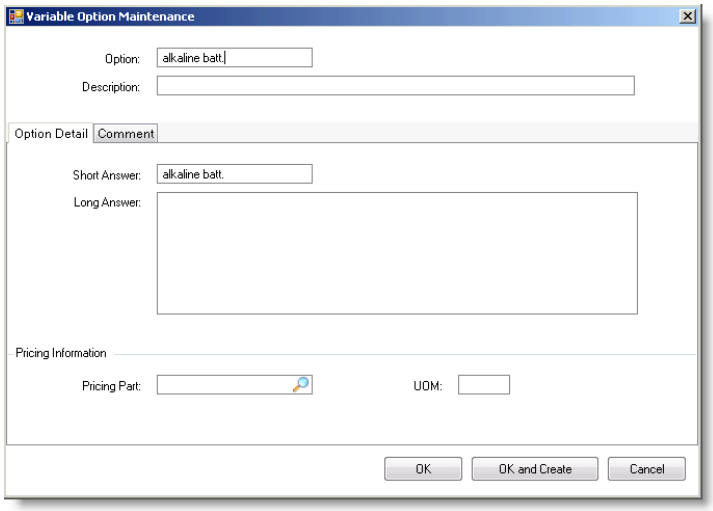
The toolbar at the top of the variable options gives you access to all the variable option maintenance functions including creating, modifying, deleting options, as well as setting the default option and arranging the order of options.

Maintaining Variable Options

To create a variable option, click the Create button on the toolbar. To modify an existing variable option, select the option in the list and click the Modify button on the toolbar or double-click the option in the list.

Enter variable option information in the Variable Option Maintenance dialogue box.

Fig. 5.10
Variable Options Maintenance



Option. Enter a selectable value as a variable option. What you can enter in this field is determined by the variable data type and data format. For example, if the variable data type is numeric list and the numeric data format is defined as a positive 1-digit number with no decimals, you can only enter a number between 0 and 9.

Short Answer. Optionally enter a short answer that represents the option in the questionnaire.

Long Answer. Optionally enter a long answer that represents the option in the questionnaire.

Note You can choose whether to display option value, short answer, or long answer when customizing the questionnaire.

Pricing Part. Enter an existing item number in QAD EA to associate it with the answer to this question for pricing calculation.

Note There is no validation of the value you enter in this field. You can specify an item for the variable here in QAD Configurator first and then create it in QAD EA.

Qty Based. Select this option to use the answer to this question as the item quantity in pricing calculation.

UOM. Enter the unit of measure of the item specified in the Pricing Part field. The pricing engine uses it in price calculation.

Setting the Default Option

The first option you create automatically becomes the default option. As you create more options, you can change the default option by selecting another option and click the Set Default button on the toolbar. Text or numeric list type Variable/Feature can be defined with no default value.

Changing the Order of Variable Options

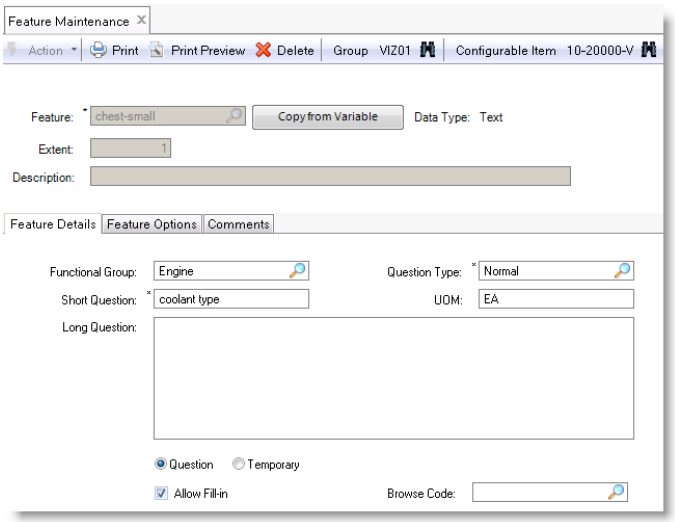
To change the order in which to display variable options, use the Move to Top, Move Up, Move Down, and Move to Bottom buttons on the toolbar to arrange the position of the options in the list. To move multiple options around, press and hold down Ctrl to select nonconsecutive options or press and hold down Shift to select a range of consecutive options and use the Move buttons on the toolbar.

However, the order here is not necessarily the final one in the questionnaire. You can make further changes in Feature Maintenance to include or exclude some options, add new feature options, and rearrange their order.

Maintaining Features

Use Feature Maintenance to create, view, edit, or delete features.

Fig. 5.11
Feature Maintenance



Select a group and a configurable item using the binocular buttons on the toolbar. If you select a group that contains no configurable item in it, the system displays an error message and disables the Feature Maintenance screen.

To create a feature, either click the New button at the bottom or click the Copy From Variable button next to the Feature field; then select a variable to associate it with the current configurable item as a feature.

To edit an existing feature, enter the feature ID in the Feature field.

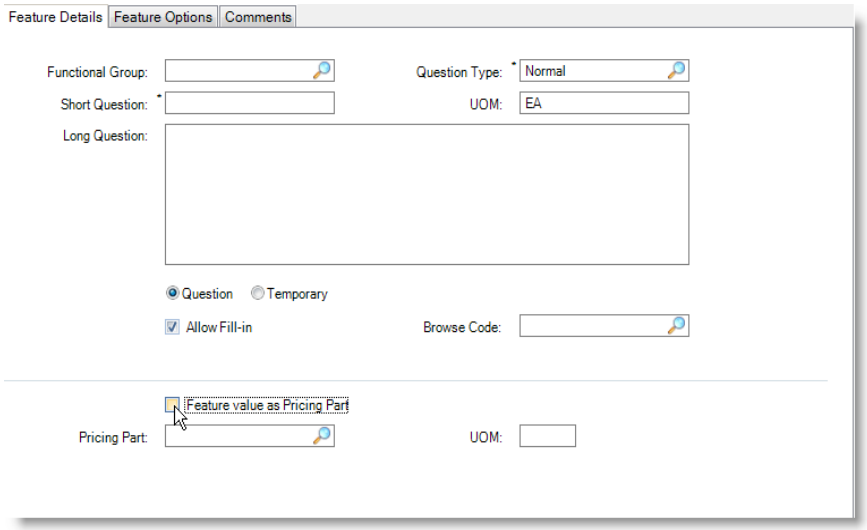
You cannot delete feature when it is used in any variant planning item rule.

Feature Details

All the feature details inherit from the selected variable details. You can change this information for the feature. See “Variable Details” on page 62.

When the feature data type is text and you have selected Allow Fill-in, you can use Feature-Based Pricing to calculate pricing for a feature rather than for a feature option.

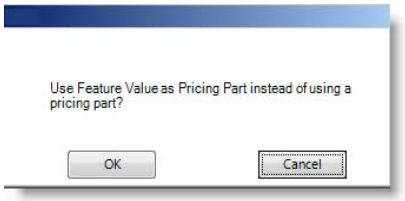
Fig. 5.12
Feature Value as Pricing Part



For feature-based pricing, you can use either the Pricing Part field or the Feature Value as Pricing Part check box:

- To use the Pricing Part field, enter an existing item number from QAD EA.
- To use the Feature Value as Pricing Part check box, you select it and then the system dynamically uses the feature answer on the questionnaire as the pricing part.
  - When there already exists a pricing part and you select the Feature Value as Pricing Part check box, the system prompts you to confirm your action.

Fig. 5.13
Feature Value as Pricing Part or Existing Pricing Part



  - Click OK to use the answer on the questionnaire as the pricing part.
  - Click Cancel to use the Pricing Part field.

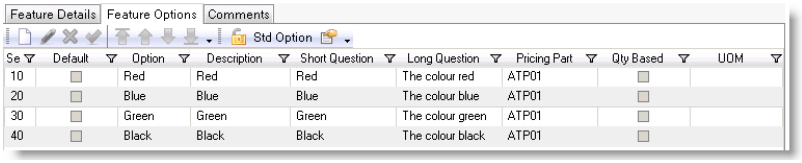
For more pricing information, see “Pricing” on page 26.

Feature Options

Feature options inherit from the options of the selected variable. To include a variable option as a feature option, select its check box on the left and then clear the check box to exclude it from the feature options.

If you set the Use Standard Options option to Yes for the current group in Master Group Maintenance, you can only use variable standard options as feature options. If you set this value to no, you can modify the variable standard options for the feature or add new options.

Fig. 5.14
Feature Options List



If you click the Standard Options button on the toolbar, only the variable options are available for this feature. You cannot exclude any of the variable options or add new options for this feature. Click this button again if you want to modify the standard variable options for the feature.

You can set default values for features, and then default values are on the Questionnaire. But the questions on the Questionnaire are not answered automatically. To automatically answer the questionnaire, click the Answer All button to answer all the questions using their default options.

Note Besides setting the default values in Feature Maintenance, you can also define default values using rules in General Rule Maintenance.

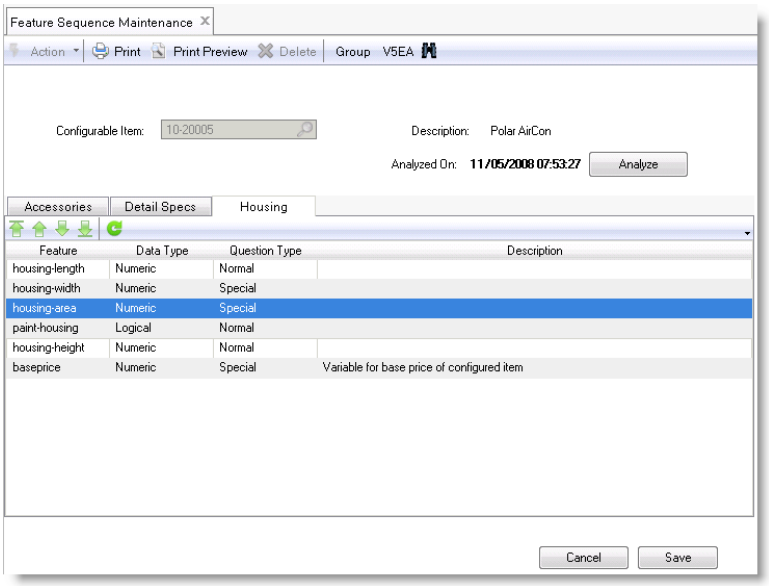
You can modify feature options in the same way as you modify variable options. See “Variable Options” on page 65.

Maintaining Feature Sequence

Use Feature Sequence Maintenance to set the sequence of feature-associated questions on the questionnaire. The extent to which you can control the sequence is determined by the dependencies among feature options. When the Analyzer processes the sales configuration for a configurable item, it imposes a sequence for the questions so that questions that depend on answers to other feature questions are asked after the questions on which they depend. However,

within the constraints of the logical structure of the questions, you can arrange the sequence of feature questions in any way you want. If you specify a sequence that ignores the logical structure, the Analyzer rearranges the sequence so that the logical requirements are satisfied.

Fig. 5.15
Feature Sequence Maintenance



To change the order of functional groups:

Drag and drop the functional group tab your desired position.

To change the order of features:

Use the Move to Top, Move Up, Move Down, Move to Bottom, and Reverse Order buttons on the toolbar to arrange the position of the features in the list. To move multiple features around, press and hold down Ctrl to select nonconsecutive features or press and hold down Shift to select a range of consecutive features and use the buttons on the toolbar.

When you have finished rearranging the feature list sequence, click OK to save the new sequence. The system then prompts you to run the Analyzer to activate the question sequence in the questionnaire.

Using System Variables

You can use the following exposed system variables when defining sales and product configuration rules.

Variable	Description	Comment
sysDomainID	Current domain ID	Used in both sales and product configuration rules.
sysGroupID	Current master group ID in Configurator	
sysConfigurableItemID	Current configurable item ID	
sysUserID	Current QAD EA log-in user ID	
sysUserLanguage	Current QAD EA user language code	
sysConfigurationID	Configuration ID	• When used in sales configuration rules, the variable contains the reloaded configuration ID for reloaded configurations and is blank for new configurations. • When used in product configuration rules, the variable contains the current configuration ID.
sysVariantItemID	Variant item number	• When used in sales configuration rules, the variable contains the variant item number for reloaded configurations and is blank for new configurations. • When used in External Entity Rules, the variable contains the variant item number regardless of whether the configurations are new or reloaded.
sysConfigurationDesc	Current configuration description	• When used in sales configuration rules, the variable can be assigned for the configuration description. Write only. • When used in product configuration rules, the variable contains the current configuration description.
sysConfigurationCmmt	Current configuration comment	• When used in sales configuration rules, the variable can be assigned for the configuration comment. Write only. • When used in product configuration rules, the variable contains the current configuration comment.

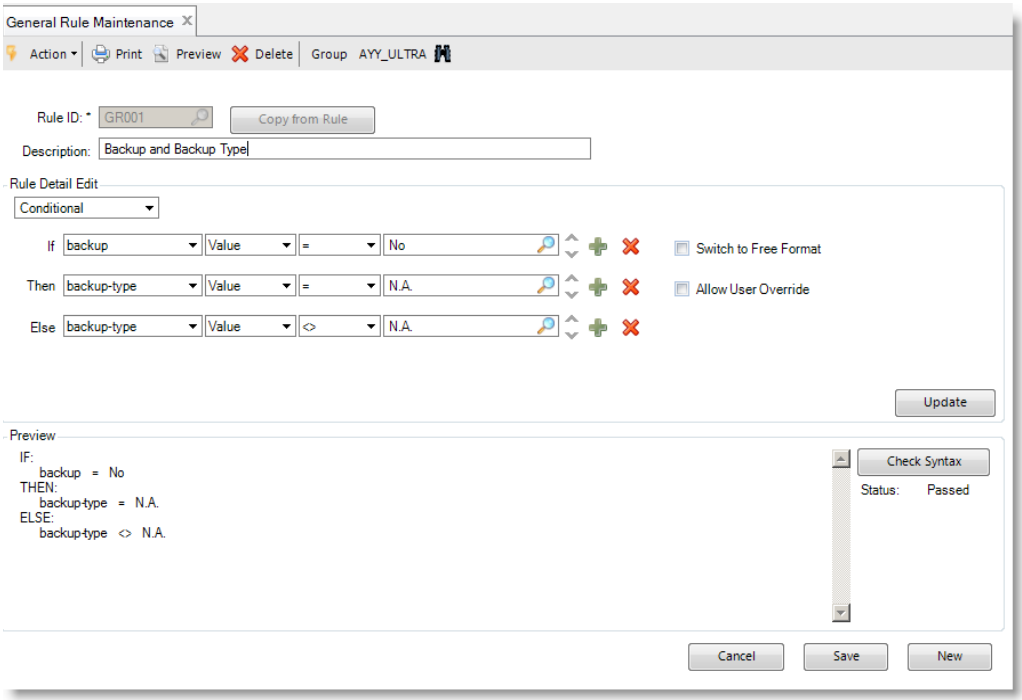
Variable	Description	Comment
sysExtLaunch	Who to launch Configuration Questionnaire	• If the value is EA, Configuration Questionnaire is launched from QAD Enterprise Applications. • If the value is a CSS, Configuration Questionnaire is launched from QAD CSS.
sysQuestLaunch	Where to launch Configuration Questionnaire	• If the value is SQ, Configuration Questionnaire is launched from Sales Quote. • If the value is SO, Configuration Questionnaire is launched from Sales Order. • If the value is CSS, Configuration Questionnaire is launched from QAD CSS. • If the value is SA, the Configuration Questionnaire is a stand-alone questionnaire function.

Maintaining Sales Configuration Rules

Maintaining General Rules

Use General Rule Maintenance to create, view, edit, or delete general sales configuration rules.

Fig. 5.16
General Rule Maintenance



When creating a rule, you can either build it from scratch, or copy from an existing one and modify it. To copy from an existing rule, click the Copy From Rule button next to the Rule ID field and select the rule you want to copy from in the pop-up browse window to bring it in. You can then proceed to make modifications to the duplicated rule.

Composing Rules

To compose conditional and assignment rules:

1. In the Rule Editor pane, select a conditional rule type. If you select Conditional, If, Then, and Else statements display; If you select Assignment, only an Assign statement displays.
2. Edit rule statements. For the IF conditional statements, you can convert them to free format and edit the conditions manually. A conditional rule has at least an If Statement and an Else statement.
3. To add a new statement after an existing one, click the + sign next to the statement; To delete an existing statement, click the X sign next to it.
4. To change the order of the statements, click the Move Up or Move Down signs next to the statement to move it up or down.
5. Click the Update button to display the rule you are composing in the Preview pane.

   Note Once you click the Update button, you cannot modify existing statements in the current rule. However, you can still delete existing statements and add new ones.
6. Click the Check Syntax button to check whether the rule syntax is correct. If the rule is valid, you can see the status Passed under the button. Otherwise, a Rule Check Configuration window pops up displaying detailed error messages.

   Note The syntax check function only checks the rule in the Preview pane. Any changes you make in the Rule Editor pane are not validated.
7. Click Save to save the rule.

Composing Statements in Basic Format

To compose a conditional statement:

1. Select a variable from the Variable drop-down list. Only variables pertaining to the current master group are available for selection.
2. Select a variable attribute from the Attribute drop-down list. Variable attributes differ for different types of variables in different statements.

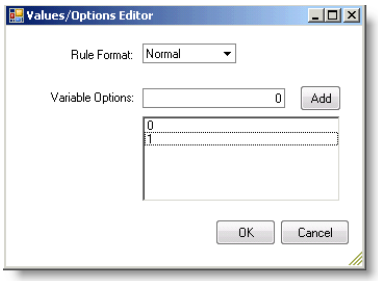
Statement	Variable Data Type	Available Attributes
IF	numeric, numeric list	Value, Min, Max, Default, Multiplier
IF	text, date, logical, element	Value, Default
THEN, ELSE, ASSIGN	numeric, numeric list	Value, Min, Max, Default, Multiplier, Show
THEN, ELSE, ASSIGN	text, date, logical, element	Value, Default, Pricing Qty, Show

3 Select an operator from the Operator drop-down list. Available operators differ for numeric and non-numeric variables in different statements.

Statement	Variable Data Type	Available Operators
IF	numeric, numeric list	=, <>, <, >, <=, >=
IF	text, date, logical, element	=, <>
THEN, ELSE, ASSIGN	numeric, numeric list	=, <>
THEN, ELSE, ASSIGN	text, date, logical, element	=, <>

4 Click the icon next to the Values/Options field. A Values/Options window displays.

Fig. 5.17
Values/Options Window (Basic Rule Format)



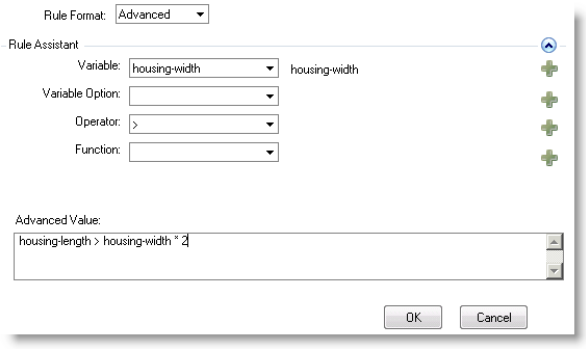
5 If you are composing a simple conditional statement that does not involve additional expressions or calculations (for example, color = red), use the Basic rule format.

Enter a value or select an option or multiple options in the Values/Options window, which differs for different variable types in basic mode.

- When variable data type is numeric, specify a valid numeric value.
- When variable data type is text, numeric list, date list, or logical, select an option or multiple options in the list box. Multiple options represent the OR relationship among selected values.
- For text, numeric list and date list type variables, when Allow Fill-in is selected, you can enter a value and use the Add button to add new options to the option list; then select the options you want.
- For element, current date, and specified date type variables, you can only specify value using the Advanced rule format.

6 If you are composing a more complex conditional statement that involves expressions or calculations (for example, If Length > Width * 2), select the Advanced rule format.

Fig. 5.18
Values/Options Window (Advanced Rule Format)



Enter an expression in the advanced format value input box either manually or with the help of the drop-down lists above the input box. You can include any valid combination of available variables, variable options, operators, and functions in the expression. Here is an example of a valid advanced-format expression:

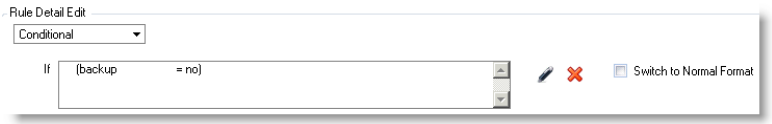
```
round((Width * Length)/12)
```

7 Click OK to close the window and return your specified values to the Value field in the conditional statement. You have completed composing the conditional statement.

Composing IF Statements in Free Format

If you are composing complex conditional statements that involve expressions or calculations, you can use the free format. To convert all IF statements to free format and manually edit the conditions, select the Free Format check box next to the first IF statement. Then the system converts all conditions that you have composed to free format. You can also go back from free format to basic format, but all changes in the IF statement are no longer there.

Fig. 5.19
Free Format



Free-format expressions take the form of a Boolean expression, either true or false. You can use all the basic Boolean operators, brackets, ANDs, and ORs, as well as variable names and option names. Option names for text variables are in double quotes, but this does not apply to date list variable options or numeric list variable options.

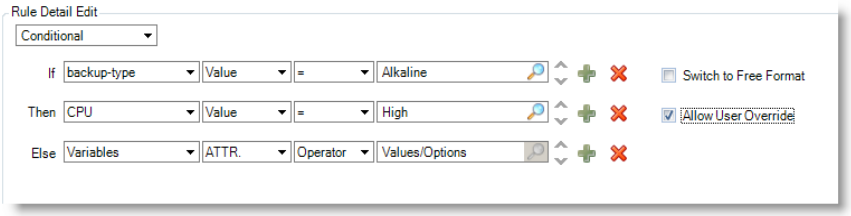
The free-format mode is applicable only to the IF statement of the rule. A rule can contain only one free-format block, which defines the whole of the IF statement. You cannot combine a free-format IF line with further AND lines for the IF statement in basic or advanced format.

The process of composing a free-format expression consists of entering the details of the expression into the expression editor window. The expression can contain any combination of values, variable options, and Boolean operators with correct Progress syntax. The word IF is there automatically (as for basic and advanced expressions).

Allowing Users to Overwrite Sales Configuration Rules

You can control whether rule assignment can be overwritten by question respondents. If Allow User Override is selected, the system allows the rule assignment to be overwritten when users answer questions in the Questionnaire.

Fig. 5.20
Allow User Override



Example A sales configuration rule is defined as follows and the field Allow Users Override is selected:

```
IF: backup-type = Alkaline
THEN: CPU = High
```

When answering questions in the Questionnaire, the user selects Alkaline for the backup-type option; according to the rule, the CPU option is automatically selected as High. But since now the rule assignment allows user override, the user can still select other CPU options, such as Standard.

By default, Allow Users Override is not selected.

Composing Pricing Rules

You can compose pricing rules using the Pricing Qty attribute of text, date, logical, and element type variables in THEN, ELSE, and ASSIGN statements. Pricing rules are used to set the quantity to be used by the QAD pricing engine for non-numeric features.

Example

```
IF:
   salesprice <> 0.00
THEN:
   pump:pricing_qty = pricing
ELSE:
   pump:pricing_qty = 0
```

The variable pricing is a numeric feature, which gives the quantity of variant items to be configured. This quantity is important because prices for components can differ depending on the number sold. When users answer one of the first questions on the questionnaire, the pricing variable gets its value. The pricing variable is one subset of independent questions.

The previous rule states that if the user is selecting a feature option for the feature pump, the pricing engine calculates prices based on the value of pricing entered in the questionnaire. Pricing rules differ from ordinary rules in that the right side of the equation contains a feature instead of an option. In this example, the system uses the value of the feature pricing as the pricing quantity for the pump.

Using the value of feature pricing in the right side of the THEN part of the rule is only possible in advanced mode.

Defining Warning Messages

When constructing sales configuration rules, you can define warning messages to display when a particular rule condition is met during the questionnaire entry process.

To define a warning message:

1. Define a logical type variable.
2. Create a sales configuration rule and assign the following function to the variable:

   ```
   showMessageBox(title, message)
   ```

   Where *title* is the title of the warning message box and *message* is the warning message you want to display.
3. Attach the rule to an item. When the system processes the rule in the questionnaire, there is a warning message.

Using Custom Functions in Sales Configuration Rules

The system lets you easily define and maintain custom functions in the `pcfunc.i` file and use them in sales configuration rule definitions. Custom functions are called and executed when the system processes general rules and item rules containing them.

Note Custom functions cannot be called from rule tables.

To use a custom function:

1. Edit the `pcfunc.i` file to define your custom function using Progress. Here is a sample function that converts time from minutes to seconds:

   ```
   function CovertTime returns integer (input Hours as integer):
   return Hours*60
   end function.
   ```
2. Define a rule in General/Item Rule Maintenance in the advanced mode and assign the custom function to a variable/feature; for example:

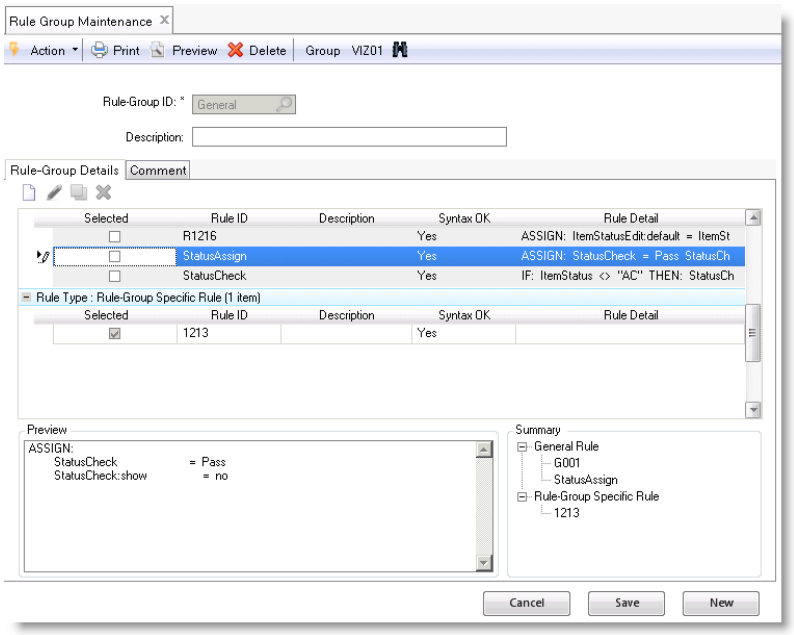
   ```
   If TimeUnit = “Minutes” Then Duration = ConvertTime (Hours)
   ```

   Where TimeUnit, Duration, and Hours are all defined variables or features.
3. Use Check Syntax to validate both the rule and the custom function.
4. When you launch the questionnaire for the configurable item, if you set TimeUnit to Minutes and Hours to 2, Duration is 120.
5. Whenever there are any changes to the custom function in `pcfunc.i`, analyze the configurable item using Configuration Analyzer to make the changes effective.

Grouping Sales Configuration Rules

Use Rule Group Maintenance to create sales configuration rule groups, link general rules to rule groups, and create rule-group-specific rules.

Fig. 5.21
Rule Group Maintenance



Maintaining General Rules in Rule Groups

To maintain general rules in a rule group:

1. Enter a rule group ID in the Rule Group ID field.
2. All general rules in the current master group are displayed in the general rule list. Click a rule record to view its full statements in the Preview pane.
3. Select the check box next to a rule ID to link it to the current rule group. Clear the check box next to a rule ID to remove the rule from the current rule group. You can see selected rules are grouped under the General Rule node in the Summary pane.
4. Click Save.

Maintaining Rule-Group-Specific Rules

To create a rule-group-specific rule:

1. Enter a rule group ID in the Rule Group ID field.
2. In the Rule Group Details pane, click the New button on the toolbar.
3. A General Rule Maintenance window displays. Create a rule or load an existing rule; then click OK. See “Maintaining General Rules” on page 72.
4. The rule is added to the current rule group as a rule-group-specific rule. You can see the rule display in the rule-group-specific rule list as well as under the Rule-Group-Specific Rules Node in the Summary pane.
5. Click Save.

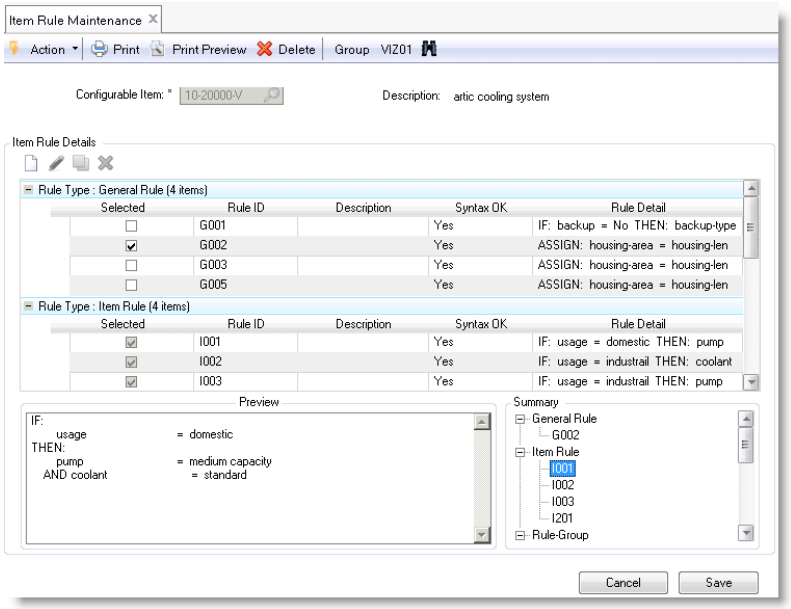
To remove a rule-group-specific rule from the current group:

Select the rule in the rule-group-specific rule list and click the Delete button on the toolbar in the Rule Group Details pane.

Applying Sales Configuration Rules

Use Item Rule Maintenance to link general rules and rule groups to items and create item-specific rules.

Fig. 5.22
Item Rule Maintenance



Applying General Rules and Rule Groups to Configurable Items

To apply general rules and rule groups to a configurable item:

1. Enter an existing configurable item ID in the Configurable Item field.
2. All general rules and rule groups in the current master group are listed in the Item Rule Details pane. Click a rule record to view its full statements in the Preview pane.
3. Select the check box next to a rule ID or rule group ID to link it to the current configurable item. Clear the check box next to a rule ID or rule group ID to remove the link between it and the current configurable item. You can see selected rules and rule groups grouped under the General Rule node and the Rule Group node respectively in the Summary pane.
4. Click Save.

Maintaining Item-Specific Rules

To create an item-specific rule:

1. Enter an existing configurable item ID in the Configurable Item field.
2. In the Item Rule Details pane, click the New button on the toolbar.
3. A General Rule Maintenance window displays. Create a rule or load an existing one; then click OK. See “Maintaining General Rules” on page 72.
4. The rule is applied to the current configurable item as an item-specific rule. You can see the rule display in the item-specific rule list as well as under the Item-Specific Rules Node in the Summary pane.
5. Click Save.

To remove an Item-specific rule:

Select the rule in the item-specific rule list and click the Delete button on the toolbar in the Rule Group Details pane.

About Sales Configuration Rule Table

Rule tables are used as an easy way to enter one or more straightforward rules. Each rule in a rule table specifies an IF-THEN relationship between variables. You cannot enter rules containing ELSE clauses in a rule table.

A rule table consists of rows and columns. The intersection of a row and a column is called a cell. Row numbers display on the left.

Fig. 5.23
Rule Table

	IF region:Value	IF usage:Value	IF power-converter:Value	THEN pump:Value
1	Western Europe	industrail	standard	medium capacity
2	UK	domestic	smart	high capacity
3	Western Europe	domestic	standard	medium capacity
4	UK	industrail	smart	high capacity
5	USA	industrail	smart	high capacity
6	UK	domestic	standard	low capacity

The variables that are involved in the relationships in the table are shown above the columns. Because a rule generally consists of a number of clauses, the type of clause to which the variable belongs is shown as well. Each row of the table corresponds to a single rule. The cells on a particular row specify the values of the variables that make up the rule.

Suppose you have the following two rules.

```
Rule A:
if coolant = standard
    and usage = industrial
then pump = high capacity
    and power-converter = standard

Rule B:
if coolant = standard
    and usage = domestic
then pump = medium capacity
```

```
and power-converter = standard
```

The part of the rule table containing these rules would look like this:

	coolant IF	usage IF	pump THEN	power-converter THEN
1	standard	industrial	high capacity	standard
2	standard	domestic	medium capacity	standard

Rule A corresponds to row 1 in the rule table, and rule B to row 2.

A rule table can contain one or more conditions (IF variables) and one or more results (THEN variables); the only restriction is that the total number of variables cannot exceed 20. The various clauses that are specified in a table are linked in an AND relationship, as you can see in the previous example. A variable can appear both in the IF clause and in the THEN clause of a single rule table.

- An empty cell in an IF clause means that any feature option is OK for the condition.
- An empty cell in a THEN clause means that the feature remains as is.
- A rule table works only when all features in the IF clauses have values.
- Search of a rule table is by the sequence of display. The search stops at the first match; then the system evaluates no further rows.

Apart from its actual value, a variable can also have an extent, a minimum value, a maximum value, and a default value. So, specify not only the variable-ID and the extent of the variable you want to use in a certain clause of a rule, but also the type of value you are testing for (condition) or manipulating (result). The various types of value are called attributes of the variable. Attributes are displayed after variable IDs in the rule table header. A particular variable, is therefore, characterized by the combination of its ID, its extent, and its attribute. It is in fact this combination that can be used only once in a clause; the same variable with another attribute can be used in the same clause without any problem.

Example

	coolant IF (value)	housing-height IF (value)	housing-height THEN (max)	housing-width THEN (min)
1	standard	200	400	100
2	standard	300	400	200

Rules in a table can only be built from the variables that appear in the table. However, a rule in a table need not use every variable that is available in the table. In other words, a column relating to a variable can have empty cells for one or more rules (rows) in the table.

Note The rule table functions only check the syntax of the values in the cells. It is possible to enter values that are not in the list of options, and values that are outside the range between the minimum value and the maximum value of a variable. In addition, in the case of item-specific rule tables, it is possible to use variables that are not defined as features for the item. In this way, it is possible to define rule tables for future models.

You can move through the cells of a table in the following way. To move one cell to the right, press the Tab key. To move one cell to the left, press the Tab key while holding down the Shift key. To move one cell up or down, use the up arrow and down arrow cursor keys on the keyboard. Continuing down through a column reveals the rows beyond the originally displayed 12.

The two Rule Table Maintenance functions, General Rule Table Maintenance and Item Rule Table Maintenance, are used in the same way as the basic Rule Maintenance functions.

- You can create a general rule table and link it to one or more items afterward without modifying it.
- You can link a general rule table to an item and modify it to make it specific for that item.
- You can create an item-specific rule table without using a general rule table as a basis.

Rule Table Shortcut Keys

You can use shortcut keys to navigate around in a rule table.

Press Ctrl+F to perform the search function within a rule table.

Press Ctrl+G to go to a specified row and column in a rule table.

Rule Table Limitations

The number of rows in a rule table is currently limited to 9999, which is the maximum number that can be displayed in the Rule Table Maintenance programs. The number of columns (variables) in a rule table is currently limited to 20. Any mix of condition and result variables, that is, IF and THEN columns, is valid as long as you use at least one condition and one result variable.

Cells have the following limitations:

- Progress statements and operators are not allowed.
- An empty range, specified by only a colon (:) is not allowed.
- Ranges and exclusions are not allowed for logical variables.
- Rule tables cannot handle empty dates, even for an empty cell.
- For a result variable, lists and exclusions are allowed only if the variable is of the type text, numeric, or date list and only if the attribute of the variable is value.

Interpolation

Interpolation is a method by which the system can determine values for result variables that lie between the specific values that you specify in the rule table.

This method only works for rule tables with two numerical conditions (IF clauses) and one numerical result (THEN clause) that have the interpolation switch turned on. Only when real numerical values are entered for the conditions and the result, interpolation works. It cannot handle complex formats such as ranges, lists, and exclusions. If both conditions exist in the rule table, interpolation returns the specified result, but if one or both of the conditions cannot be found, simple linear interpolation is used to calculate the result.

For such numerical value rules, the rule table only defines the measure points. The following table shows Production-densities (result) for a given Density (condition 1) and Width (condition 2).

Note This is a table of values, not an example of a rule table.

Table 5.1
Production Density

	Width		
Density	**1000**	**1500**	**2000**
0.8	25	30	40
1.0	32	35	40
2.0	36	42	48

Example If the Density is 0.8 and the Width is 1500, the production density would be 30. However, if the Density was 0.9 and the Width was 1250, there is no specified value in the rule table. Without interpolation, the rule could not provide the required result.

The next table is similar to the previous one, but expanded with interpolated values for production density.

- **Bold** values represent the measure points from the previous table.
- *Italic* values represent condition-values and calculated result-values that do not exist in the rule table.

Table 5.2
Production Density

	Width				
Density	**1000**	*1250*	**1500**	*1600*	**2000**
0.8	**25**	*27.5 (a)*	**30**	*32*	**40**
0.9	*28.5 (b)*	*30.5 (d)*	*32.5 (c)*	*34*	*40*
1.0	**32**	*33.5 (e)*	**35**	*36*	**40**
1.2	*34*	*36.25*	*38.5*	*39.6*	*44*
2.0	**36**	*39*	**42 (f)**	*43.2*	**48**

The letters (a) to (f) identify particular cases that are explained later.

Interpolation Process

The system first determines the closest range (from/to) for both Density and Width. The nearest values are determined by searching in the rule table. For sample values, the ranges are as follows:

	Density			Width		
Case	**Value**	**From**	**To**	**Value**	**From**	**To**
(a)	0.8	0.8	0.8	1250	1000	1500
(b)	0.9	0.8	1.0	1000	1000	1000
(c)	0.9	0.8	1.0	1500	1500	1500
(d)	0.9	0.8	1.0	1250	1000	1500
(e)	1.0	1.0	1.0	1250	1000	1500
(f)	2.0	2.0	2.0	1500	1500	1500

If the given Density equals the From value of Density and the given Width equals the From value of Width (case f), the result can be taken from the rule table without any calculation. The same is true if the given values equal the To values.

If only the given Density equals the From value or to value of Density (cases a and e), the system uses interpolation rules to calculate the Width.

If only the given Width equals the From value or to value of Width (cases b and c), the system uses interpolation rules to calculate the Density.

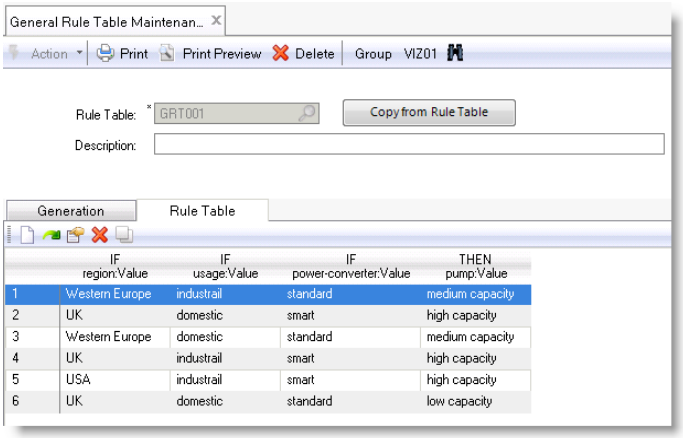
If the given Density is unequal to the From or To value of Density and the given Width is unequal to the From or To value of Width (case d), it is necessary for the system to calculate two extra points based on either the given Density or the given Width, representing the closest range for either Density or Width. Interpolation rules then provide the calculated result.

If the given value for Density or Width is outside the scope of the rule table, it is not possible to calculate a result because the system only handles interpolation, and not extrapolation.

Maintaining General Rules Using General Rule Tables

Use General Rule Table Maintenance to create, view, edit, or delete Rule Tables. Rule tables provide an easy way to maintain simple rules.

Fig. 5.24
General Rule Table Maintenance



Generating Rule Tables

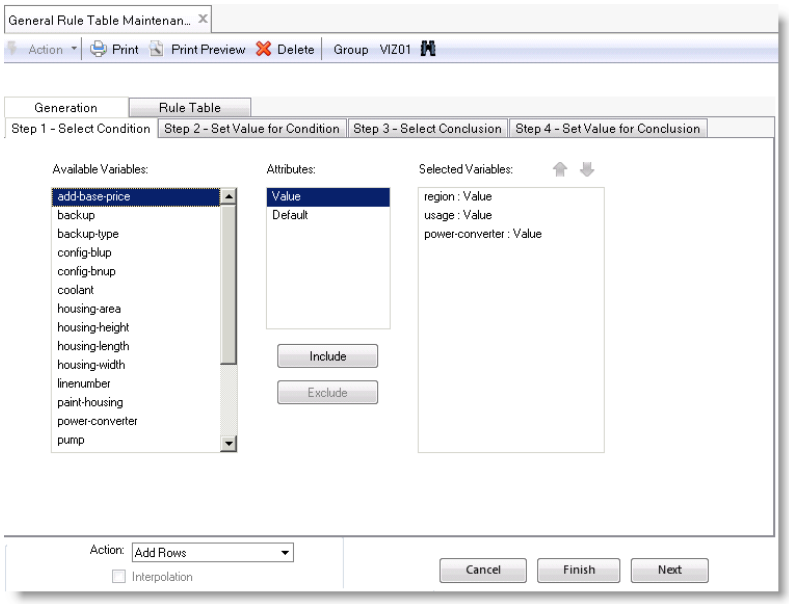
To generate a rule table, you can copy an existing rule table or create a rule table from scratch.

To generate a rule table by copying existing rule tables, click the Copy from Rule Table button, and select a rule table whose rules you want to copy. After the new rule table is generated, you can edit the table to get the rules that you need.

To create a rule table from scratch, follow the generation wizard:

1 Select variables and attributes for the IF conditional statements.

Fig. 5.25
Rule Table Generation - Step 1



To select a variable into the rule table, click the variable in the Available Variables list box; then double-click the variable's attribute you want in the Attributes list box to move the variable:attribute combination into the Selected Variables list box.

To remove a selected variable from the rule table, double-click it in the Selected Variables list box.

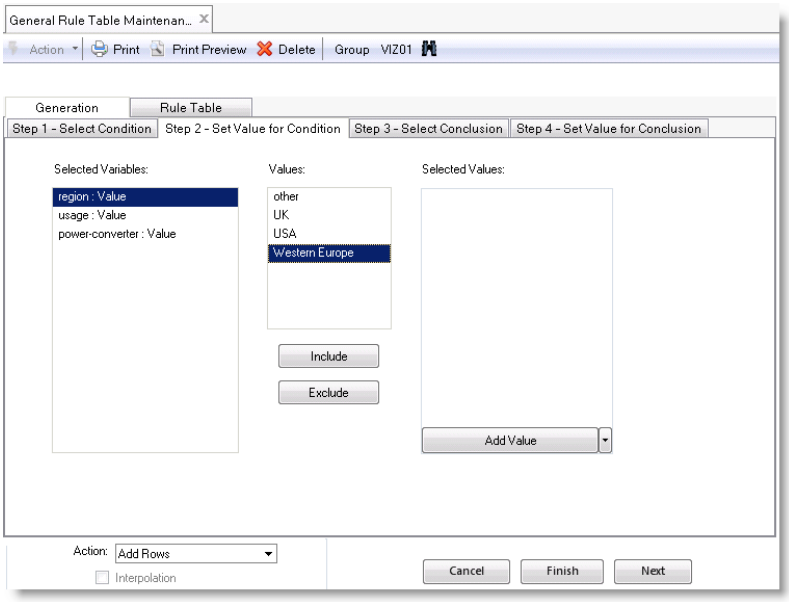
You can also select multiple variables and click the Select or Deselect buttons to add them into or remove them from the Selected Variables list. However, when you select multiple variables in the Available Variables list box, only common attributes shared by all the selected variables are available for selection in the Attributes list box.

To change the order of variables in the Selected Variables list box, use the Up and Down arrows above the list box.

When you have selected all the variables you want, click Next.

2 Set values for the variables for the IF conditional statements.

Fig. 5.26
Rule Table Generation - Step 2



To set the value for a variable as a condition, click the variable in the Selected Variables list box and then choose the following actions:

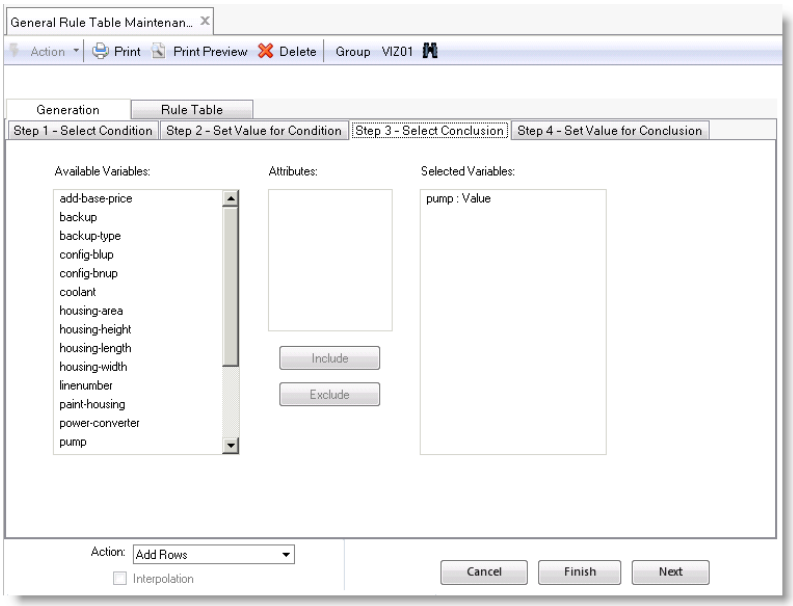
- If the variable has options, they display in the Values list box. To select an option as the value for the variable, double-click the option.
- To specify a new value for the variable, click the Add Value button and enter a valid value in the Assigned Values list box.
- To specify an empty value for the variable, click the Down arrow next to the Add Value button and select Add Empty Value.

The values you specify display under the variable node in the Assigned value list box.

After you finish assigning values, click Next.

3 Select variables for the THEN statements.

Fig. 5.27
Rule Table Generation - Step 3



To select a variable into the rule table, click the variable in the Available Variables list box; then double-click the variable's attribute you want in the Attributes list box to move the variable:attribute combination into the Selected Variables list box.

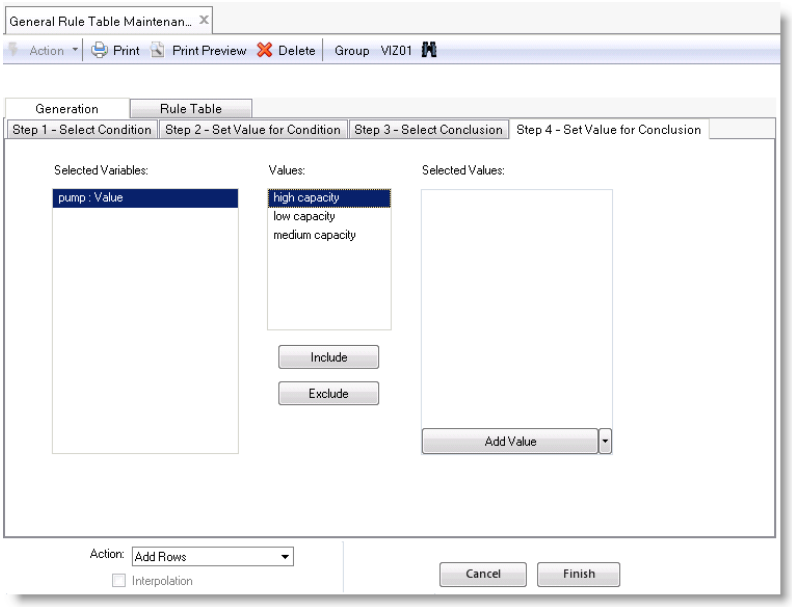
To remove a selected variable from the rule table, double-click it in the Selected Variables list box.

You can also select multiple variables and click the Select or Deselect buttons to add them into or remove them from the Selected Variables list. However, when you select multiple variables in the Available Variables list box, only common attributes shared by all the selected variables are available for selection in the Attributes list box.

When you have selected all the variables you want, click Next.

4 Set values for the variables for the THEN statements.

Fig. 5.28
Rule Table Generation - Step 4



To assign a value to a variable in a THEN statement, click the variable in the Selected Variables list box and then choose the following actions:

- If the variable has options, they display in the Values list box. To select an option as the value for the variable, double-click the option.
- To specify a new value for the variable, click the Add Value button and enter a valid value in the Assigned Values list box.
- To specify an empty value for the variable, click the Down arrow next to the Add Value button and select Add Empty Value.
- When Delete Rows is selected, the Add All Values command is enabled. To delete all records with empty variable values, click the Down arrow next to the Add Value button and select Add All Values.

The values you specify display under the variable node in the Assigned value list box.

5 Specify a rule table behavior: add, override, or delete rows.

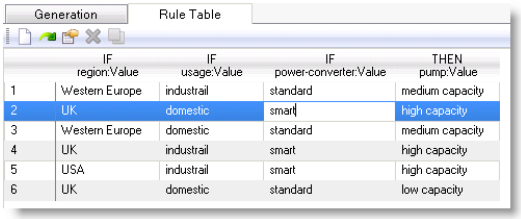
6 When applicable, you can select the Interpolation check box to allow interpolation in the rule table.

7 Click Finish to generate the rule table.

Editing Rule Tables

After a rule table is generated, edit it to maintain the general rule.

Fig. 5.29
Editing Rule Table



To insert a row into the rule table, click the New button on the toolbar under the Rule Table tab.

To delete a row, click the Delete button.

Entering Data in Rule Table Cells

To enter a value in a cell:

First select the cell by positioning the cursor in it. You can then either enter the required expression in the cell, or use the option selection window.

Make sure that the expressions you enter in a cell of the rule table conform to the format rules that were defined for the rule tables. The exact choice of formats for a certain cell depends on the type of clause you are specifying and on the type of variable for which you are entering the expression. The following table lists all possible formats and their meaning.

Note [..] is used to exclude certain values from a range. Applying this information to the first five entries in the table helps you understand the meaning of the entries in the other rows.

Table 5.3
Rule Table Formats

Entry	**Meaning**
value1	value1
value1|value2|value3	value1 or value2 or value3
value1:value2	>= value1 and <= value2
:value1	<= value1
value1:	>= value1
[value1]	not value1
[value1|value2|value3]	not value1 and not value2 and not value3
[value1:value2]	< value1 or > value2
[:value1]	> value1
[value1:]	< value1
[value1]:value2	> value1 and <= value2
[value1]:[value2]	> value1 and < value2
value1:[value2]	>= value1 and < value2
:[value1]	< value1
[value1]:	> value1
[[value1]:value2]	<= value1 or > value2
[[value1]:[value2]]	<= value1 or >= value2

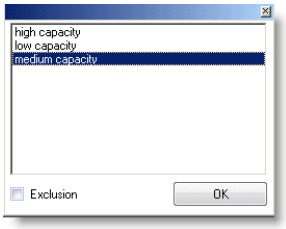
Entry	Meaning
[value1:[value2]]	< value1 or >= value2
[:[value1]]	>= value1
[[value1]:]	<= value1

Note In the case of result variables, you can only use lists and exclusions if the type of the variable is text, numeric list, or date list and its attribute is value at the same time.

Using the Option Selection Window

The option selection window displays the options of the variable associated with the cell you are editing in the rule table to help you enter values for the variable. To bring up the option selection window, click the Options icon on the toolbar.

Fig. 5.30
Option Selection Window



Numeric/Element. There is an extra fill-in field. Entering a value creates the condition/result variable = value.

Text/Numeric List. There is an extra fill-in field in which you can enter a value. The options of the variable are shown in a list. Entering a value creates the condition/result variable = value.

Date. There is an extra fill-in field, in which you can enter a date. Use the date format on your operating system. Entering a value creates the condition/result variable = value.

Logical. There is an extra check box in the window. The variable, extent, and attribute to which it refers are shown next to it. Select the check box to enter the condition or result variable = yes in the table; deselect it to enter variable = no in the table. The variable is shown above the column; the cell contains yes or no.

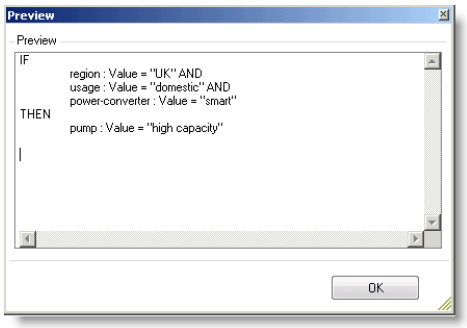
Select the Exclusion check box to indicate that you want to enter a condition or result of the type Variable <> value (the variable is NOT equal to the value you enter in the cell). This check box is dimmed in the case of THEN variables (except for the following types of THEN variables: text, numeric, date list, provided that their attribute is value) and in the case of an IF variable of the type logical, because using exclusions in these clauses would be meaningless.

Previewing Rules

To preview the rule defined by the selected row in the rule table:

Click the Preview button on the toolbar.

Fig. 5.31
Rule Preview



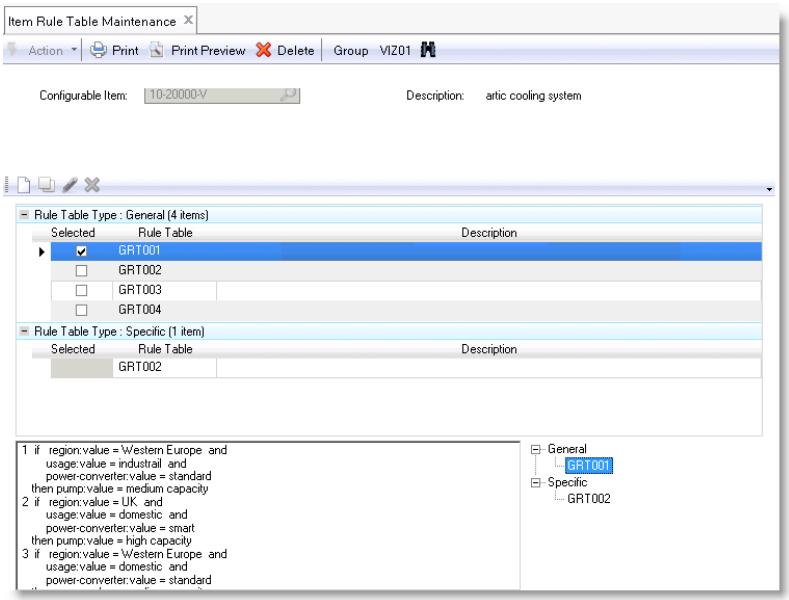
Accelerating Rule Tables

Click the Accelerator button if you want to prepare the table for accelerated searching. See “Accelerating Rule Tables” on page 92.

Maintaining Item Rule Tables

Use Item Rule Table Maintenance to link general rule tables to items and create item-specific rule tables.

Fig. 5.32
Item Rule Table Maintenance



Linking General Rule Tables to Configurable Items

To link rule tables to a configurable item:

1. Enter an existing configurable item ID in the Configurable Item field.
2. All general rule tables in the current master group are listed. Click a rule table record to view its defined rule in the Preview pane.
3. Select the check box next to a rule table ID to link it to the current configurable item. Clear the check box next to a rule table ID to remove the link between it and the current configurable item. You can see selected rule tables grouped under the General Rule Table node in the Summary pane.
4. Click Save.

Maintaining Item-Specific Rule Tables

To create an item-specific rule table:

1. Enter an existing configurable item ID in the Configurable Item field.
2. Click the New button on the toolbar.
3. A Rule Table Maintenance window displays. Create a rule or load an existing rule; then click OK. See “Maintaining General Rules Using General Rule Tables” on page 84.
4. The rule table is applied to the current configurable item as an item-specific rule table. You can see the rule table display in the item-specific rule table list as well as under the Item-Specific Rule Tables Node in the Summary pane.
5. Click Save.

To remove an Item-specific rule table:

Select the rule table in the item-specific rule table list and click the Delete button on the toolbar.

Accelerating Rule Tables

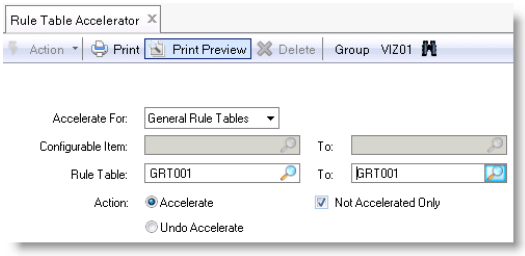
Use Rule Table Accelerator to make an indexed search on one or more rule tables possible.

When you Use Rule Table Accelerator for a rule table, the Accelerator stores additional information needed for the indexed search in the database. Suppose that you want to delete a rule table. With Rule Table Accelerator, the table deletion is faster.

Note The additional information becomes obsolete when the search mode for the rule table changes from indexed to sequential. The change happens whenever the data in the rule table have changed.

When a rule table has been accelerated, the system automatically uses an indexed search when searching the table. Rule Table Accelerator can also be used to undo the actions that made such an indexed search possible. In that case, any obsolete information is deleted from the database and then the system can only perform a sequential search.

Fig. 5.33
Rule Table Accelerator



Rule Table Accelerator can operate on general rule tables or on item rule tables but it cannot accelerate both types of tables at the same time. Select general rule tables if you want to accelerate one or more general rule tables. Select item rule tables if you want to accelerate one or more item rule tables.

When you are accelerating item rule tables, also specify from which configurable items you want to accelerate the tables. You can specify one configurable item or a range of configurable items.

To indicate which tables you want to accelerate, specify a range by entering tables IDs in the From/To fields of the table ID frame. You can enter a value either by entering it directly in the field or by clicking the Browse button next to the field and selecting the required configurable item or table ID in the displayed list.

If you select both one or more configurable items and a range of table IDs, only the tables that satisfy both conditions are accelerated or de-accelerated.

Select Accelerate if you want to accelerate one or more tables. If you want to switch from an indexed search to a sequential search, select Undo Acceleration. If you have undone an acceleration for a certain table and you want to use an indexed search on it, run Rule Table Accelerator—using Accelerate—for that table first.

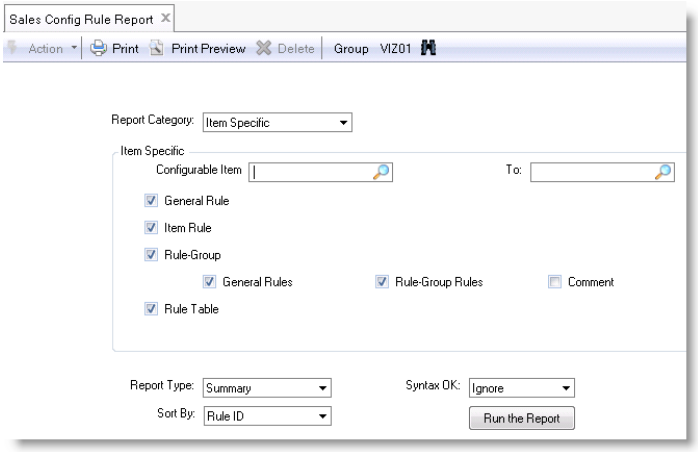
Select the Not Accelerated Only check box if you only want to accelerate rule tables that have not yet been accelerated. Deselect this check box if you want to accelerate all rule tables that meet the criteria in the rule tables frame and the table ID frame.

Click Save to start the rule table accelerating process.

Sales Configuration Rules Report

Use Sales Configuration Rule Report to generate reports on sales configuration rules.

Fig. 5.34
Sales Configuration Rule Report



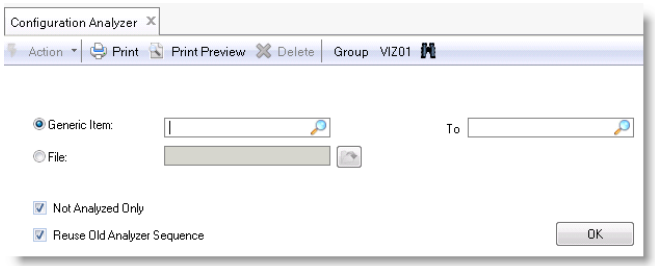
To run a sales configuration rules report:

1. Select a report category.
2. Specify the range of data and information you want to see on the report.
3. Specify additional report options, including report detail level, syntax options, and sorting options.
4. Click Run Report.
5. The report displays. Click Print to print the report; Click Save to save it to a file; click Close to close the report.

Analyzing Sales Configuration Rules

Use Configuration Analyzer to analyze sales configuration rules.

Fig. 5.35
Configuration Analyzer



Configurable Item. Specify a configurable item or a range of configurable items to analyze.

File. Specify an ASCII file that contains the item numbers of the configurable items you want to analyze.

Not Analyzed Only. Select this check box to only analyze configurable items that have not been analyzed; otherwise, clear this check box.

Reuse Old Analyzer Sequence. Select this check box to reuse the sequences established by past analysis; otherwise, clear this check box.

Click OK to start analyzing.

When the analysis is complete, the system displays a report specifying the analyzed details of the selected configurable items. The report includes lower level configurable items within the configurable items you select, and gives details of the feature lists for the questionnaire. The report also identifies whether any configurable items were encountered for which no features or rules have been entered. You can print or save the report.

If no problems were encountered during the analysis, QAD Configurator updates the status of the analyzed configurable items by modifying the Analyzed fields in Configurable Item Maintenance.

If problems were encountered during the analysis, the status of the configurable item remains No in the Analyzed field.

Results of the Analysis

The Analyzer creates Progress source and object code to be run by the questionnaire. This source and object code contains the Inclusion and Exclusion logic as defined by the rule maintenance functions and the rule tables.

The object code files are stored in the directory that was defined as the questionnaire object directory in Configurator Control.

Each configurable item has a unique 6-digit object code number (pcpt_rcode). This code is used to create the object code file names and directories specific to that configurable item.

Example Consider a configurable item, G1, with an object code number 000100. The directory structure for the object code files looks like this:

```
c:\mfg84gus\mfgdemo\qu000100.r
 \qu000100\qu0001.r
 \qu000100\qu0002.r
 ....
```

The first line specifies the configurable item control program; the following lines specify the feature/rule files 0001 to 9999.

For performance reasons, a maximum of 10 features are included in each feature/rule file; then a new file is created. These feature/rule files are stored together in the directory with the object code number preceded by qu.

The control program takes care of the process of finding the correct feature/rule file for the questionnaire.

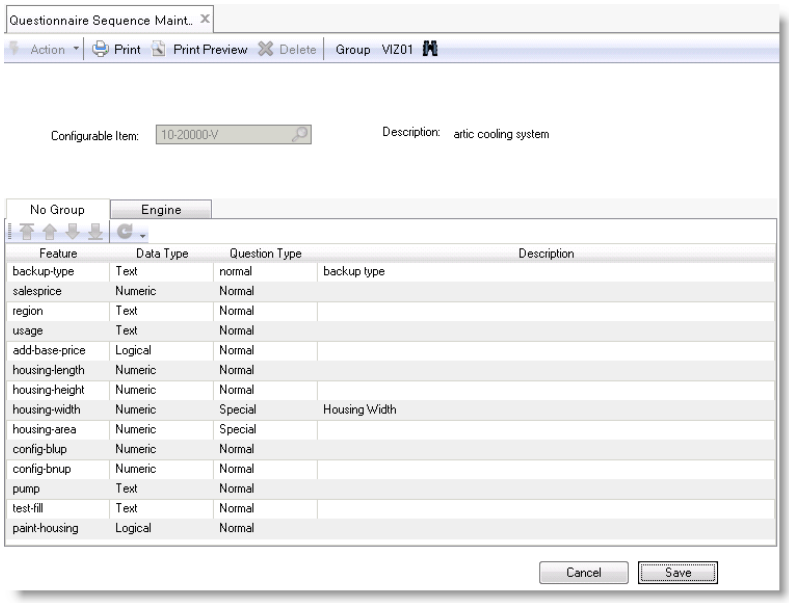
The feature/rule object files (`.r` files) for a configurable item can be deleted, for example, using the Windows File Manager/Explorer, without any problem. The QAD Configurator Analyzer creates them or refreshes them automatically when they are next needed.

When there is any doubt about the validity of the object codes, you should always delete them and run the Analyzer again to rebuild them.

Maintaining Questions Sequence

The sequence in which questions are presented in the questionnaire is determined by the Analyzer. Questionnaire Sequence Maintenance lets you manually rearrange the questions.

Fig. 5.36
Questionnaire Sequence Maintenance



To arrange the question sequence in the questionnaire:

Select a configurable item and use the commands on the toolbar to change the order of the item's features in the feature list. If there are multiple feature groups, click the function group tabs to switch among them.

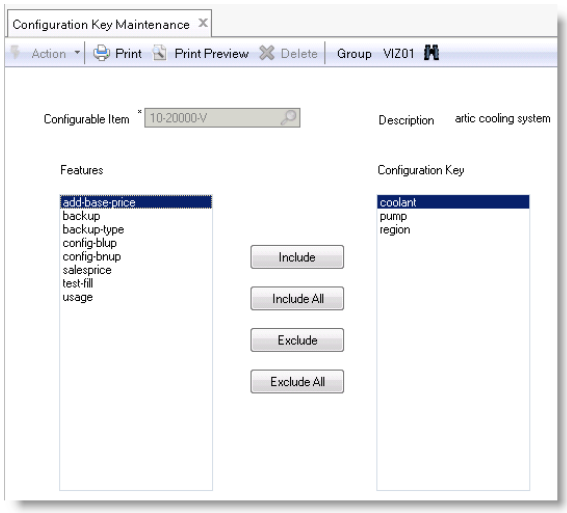
Maintaining Configuration Keys

Use Configuration Key Maintenance to specify key features for configurable items that identify unique configurations.

To identify unique configurations, and thus unique variant items, specify features that determine whether a particular configuration is unique.

You can specify up to twenty features for a configurable item that together form a configuration key. When you run the questionnaire for this item, QAD Configurator examines the options chosen for the configuration key features for previous configurations. The system compares them with the equivalent options chosen for the current configuration. In this way, you can avoid duplication of configurations and variants.

Fig. 5.37
Configuration Key Maintenance



To specify configuration keys for a configurable item:

1. Specify a configurable item in the Configurable Item field.
2. To set a feature as a configuration key, select it in the Features list box and click Include to move it to the Configuration Keys list box. Click Include All to set all available features as configuration keys.

   To remove a configuration key, select it in the Configuration list box and click Exclude to move it to the Feature list box. Click Exclude All to remove all configuration keys.
3. Click Save.

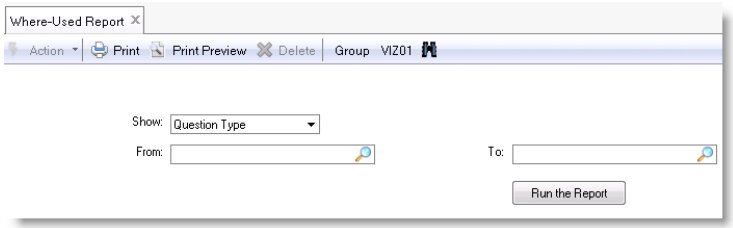
Configuration Key Maintenance and Pricing

In models where pricing is used, it is recommended that you include the customer and all features that are used in pricing rules as key features. This is because prices can vary depending on the customer and quantities of components ordered.

Where-Used Report

The Where-Used Report provides information on where variables are used in QAD Configurator; that is, which configurable items in which groups use each variable.

Fig. 5.38
Where-Used Report



To run a where-used report:

1. Specify the element you want in the report:
   - Question type
   - Rule group
   - Variable
   - Feature
   - Rule
   - Configurable item

   Note If you choose Configurable item, planning items appear in a separate section of the report.
2. Specify an ID or a range.
3. Run the report. The report opens and you can print or save it.

Chapter 6

Product Configuration

Product Configuration Overview ***100***
Outlines the product configuration process.

Maintaining Product Configuration Rules ***101***
Explains how to maintain variant item number rules, variant item data rules, variant item product structure rules, variant routing rules, variant sales order line rules, and variant sales quote line rules.

Maintaining General Product Structure Rules ***112***
Explains how to use General Product Structure Rule Maintenance.

Running Product Configuration Rule Report ***116***
Explains how to use Element Roll-Up Rule Maintenance.

Maintaining External Entity Rules ***114***
Explains how to use External Entity Rule Maintenance.

Using Custom Functions in Product Configuration Rules ***115***
Describes the system's rules for allowing the user to define and maintain custom functions and use them in product configuration rules.

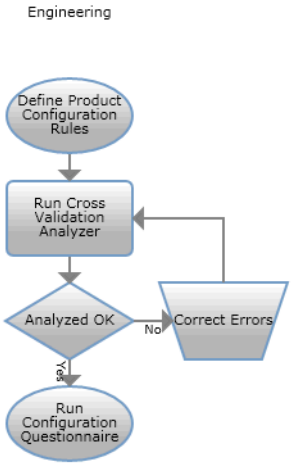
Running Product Configuration Rule Report ***116***
Explains how to run Product Configuration Rule Report.

Cross-Validating Rules ***117***
Explains how to use Cross-Validation Analyzer.

Product Configuration Overview

In the product configuration process, engineering personnel define product configuration rules that translate feature data collected from questionnaires into product structures and routings of configured products.

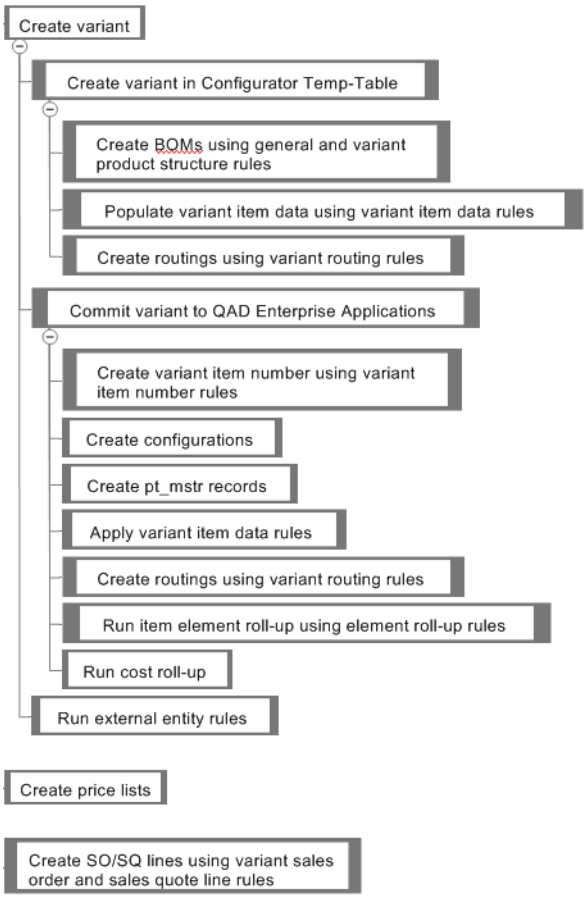
Fig. 6.1
Product Configuration Process



Product configuration rules include the following rules that the system runs and applies at different stages of the variant creation process during order entry, as illustrated in the diagram below:

- Variant item number rules
- Variant item data rules
- Variant planning item rules
- Variant product structure rules
- Variant routing rules
- Variant sales order line rules
- Variant sales quote line rules
- General product structure rules
- Element roll-up rule
- External entity rules

Fig. 6.2
Variant Item Creation and Sales Order/Quote Generation Process



Maintaining Product Configuration Rules

Maintaining Variant Item Number Rules

Use Variant Item Number Rule Maintenance to define how QAD Configurator assigns item numbers to new variant items. Define rules for each configurable item from which you intend to create variant items. The configurable items are items for which you run the questionnaire, and all lower level configurable items in the product structure. Variants of these lower-level items are created in the same process.

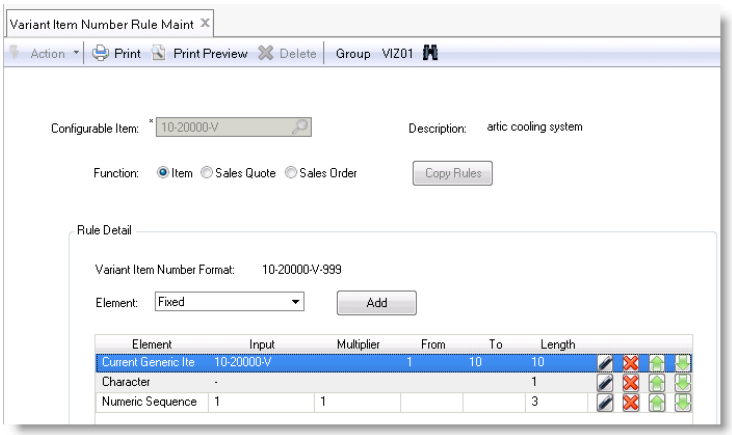
A variant item number rule can be a combination of the following elements:

- Fixed: a string of characters that does not vary with variant item
- Character: a separator between elements of the number, such as a hyphen (-)
- Current Configurable Item: the number of the current configurable item
- Master Configurable Item: the number of the top level configurable item
- Field: QAD EA database element field name
- Feature: a selected feature for the variant item

- Alphanumeric Sequence: alphabetically sequenced character, incremented for each variant item.
- Numeric Sequence: a sequential number, incremented for each variant item

Every component except alphanumeric sequence and numeric sequence can be used more than once in a rule, provided that the total length of the number does not exceed 18 character positions.

Fig. 6.3
Variant Item Number Rule Maintenance



To edit a variant item number rule:

1 Specify a configurable item in the Configurable Item field.

2 Select from three different variant item number rules. Each Function option represents the point from which a variant item can be created: item (the Variant Product Structure/Routing Generator), sales quote, or sales order. Each configurable item can have up to three different variant item numbering rules.

3 To copy from an existing rule, click the Copy button. In the Copy Rule window, specify a configurable item and select a function option; then click OK. The system copies the selected rule to the current rule.

4 Edit the rule element list in the Rule Details pane.

- To add an element to the list, select an element from the Element drop-down list and click OK. In the pop-up window, supply the value and parameters and click OK. You cannot add more than one numeric sequence and alphanumeric sequence element to a format.

Table 6.1
Variant Item Number Definition Parameters

Component	Parameters to complete in the subsidiary window
Fixed	Fixed string of characters.
Character	Separator to use between elements of the number. The default is a hyphen (–), but you can specify another separator if necessary.
Current Configurable Item	Position from and position to; the specified positions are copied from the current configurable item number.

Component	Parameters to complete in the subsidiary window
Master Configurable Item	Position from and position to; the specified positions are copied from the top level configurable item number.
Field	The QAD EA database element field name; the position from and the position to; the character values in the specified positions are copied from the specified field.
Feature	The feature; the position from and the position to: the character values in the specified positions are copied from the value selected for this feature in the questionnaire for the variant item.
Alphanumeric Sequence	Length, multiplier (increment), and start value.
Numeric Sequence	Length, multiplier (increment), and start value.

- To remove an element from the list, select it in the list and click the Remove button.
- To adjust the order of elements in the list, click use the Up and Down arrows.

5 After you make changes to the rule elements, the resulting variant item number format appears in real time above the element list. It uses character 9 to represent numbers and x to represent alphabetical characters. Review the format.

6 Click Save to save the current rule.

Example A variant item number definition rule consists of the following elements:

- Current Configurable Item: positions 1 to 5
- Character: –
- Feature: color, positions 1 to 3
- Character: /
- Numeric Sequence: length 3, multiplier 1, start value 1

If the current configurable item is 3-100-150, and the color selected for the first variant item is tropical blue, then the first variant item number is:

```
3-100-tro/001
```

If the color for the second variant item is sunset orange, then the second variant item number is:

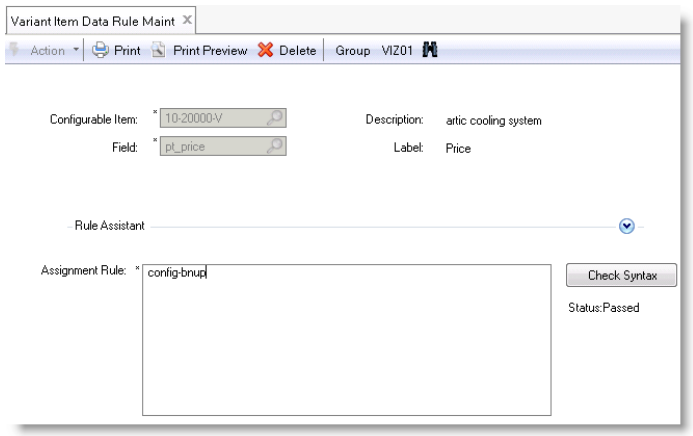
```
3-100-sun/002
```

Maintaining Variant Item Data Rules

Use Variant Item Data Maintenance to assign values to database fields in newly created variant items. You do this by defining assignment rules for the configurable item, which specify how the values are to be assigned to the database fields. When the Variant Product Structure/Routing Generator creates a variant item for that particular configurable item, it applies the assignment rules defined for that item in order to assign the required database values to the specified fields.

After a variant item has been created by QAD Configurator, you can carry out any further maintenance of the database field values for the new item using the QAD EA Item Master Maintenance function.

Fig. 6.4
Variant Item Data Rule Maintenance



Maintaining Variant Planning Item Rules

Use Variant Planning Item Rule Maintenance to define variant planning item selection rules for non-kit configurable items. Variant planning items are used to consume forecast when confirmed sales orders are created for variant items. For configurable items that are physical or phantom kits, when you generate variant items from them, the system adds components of their variant items to the mrp_det table so that they also consume forecasts upon sales order confirm.

When you create a variant item by either creating a new configuration or modifying an existing one, the system runs the variant planning item rule to add the variant item to the product structure of the planning item as a component with the following values:

- Structure Type = “P” (planning)
- Forecast Percent = zero to prevent MRP from generating planned orders for the components of the variant item from the forecast of the planning item.
- Quantity Per = 1

As Structure Type is P, the system consumes the forecast of the planning item with the variant item order quantity on the sales order line.

When the variant is put on a sales order line and confirmed, the forecast of the planning item, if set up, is consumed by the variant order quantity.

For a multi-level product structure, there can be multiple configurable items with their own planning items and selection rules.

1 Specify an existing configurable item and press Enter. The item cannot be a physical or phantom kit. The system validates the item number and displays an error message when:
   - The item does not exist.
   - The item is not a configurable item.
   - The configurable item is a physical or phantom kit.

2 Click the New icon to create a planning item and define selection rule for it. The selection rule in Variant Planning Item Rule Maintenance is optional and if it is left blank, the system always adds variant items to the planning bill of the specified planning item.

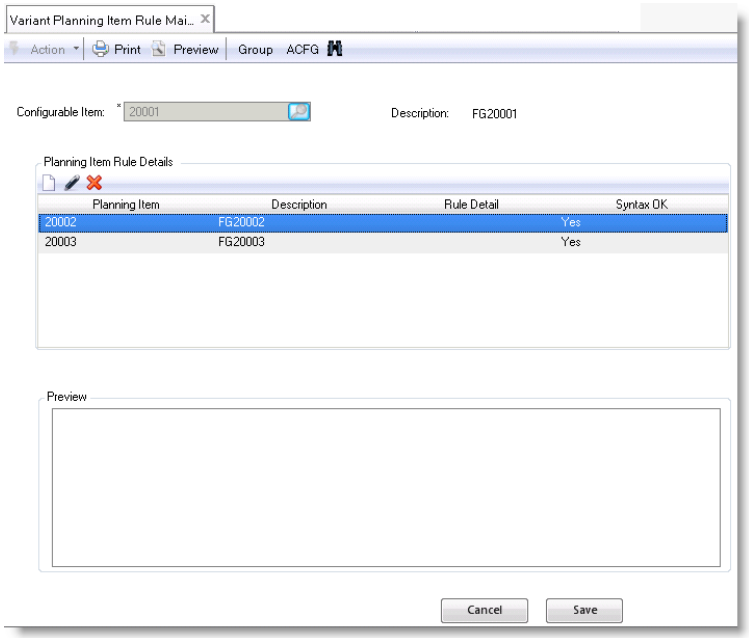
To edit a selection rule:

You can either manually type the rule by directly typing the statements in the Rule box or use the Rule Assistant to assist you in the process. See “Using the Rule Assistant” on page 33.

Click Check Syntax to validate the rule syntax. If syntax errors are found, error messages appear. The Status becomes Failed.

Click Save to save the rule. On saving the rule, the system performs a syntax check on the rule. If syntax errors are found, error messages display.

Fig. 6.5
Variant Planning Item Rule Maintenance

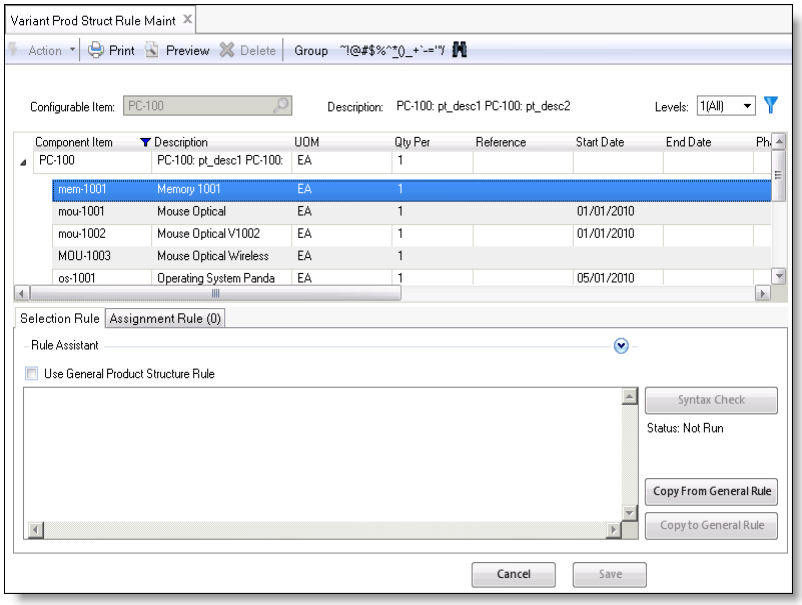


Maintaining Variant Item Product Structure Rules

Use Variant Product Structure Rule Maintenance to define selection and assignment rules for component items in the generic product structure.

If no selection rule has been defined for a component in the generic product structure, the system always selects the component into the variant product structure, unless its parent item is excluded from the variant product structure by its selection rules.

Fig. 6.6
Variant Product Structure Rule Maintenance



To select a component item in a configurable item product structure:

1 Specify a configurable item number in the Configurable Item field. The item's description displays next to the configurable item number.

2 If the configurable item has a multi-level product structure, do one of the following to view its child components:

- Select the number of levels you want to expand the product structure in the Levels drop-down list.
- Click the left arrow next to a parent component to display its sub-components.

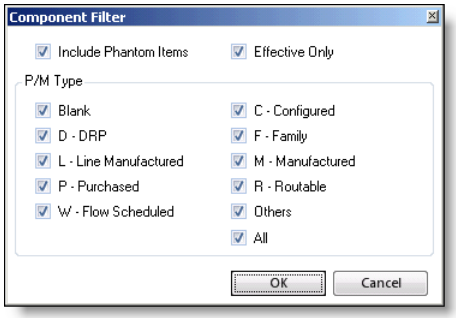
If a component already has selection and assignment rules defined, they are displayed in the Selection Rule and Assignment Rule columns respectively in the product structure table.

3 You can filter the components in the generic product structure.

To filter the components:

Click the Filter icon next to the Levels drop-down list; then specify in the Filter window which type of components you want to display in the generic product structure.

Fig. 6.7
Variant Product Structure Rule Filter



P/M Type. Select the type of items to display as defined in QAD EA. See QAD EA documentation for descriptions of these item types.

Include Phantom Items. Clear this check box to exclude phantom items when displaying specified P/M types of items; otherwise, select this check box.

Effective Only. Select this check box to filter items using their effective start and end dates.

Effective Start Date <= Today <= Effective End Date

The system always displays items with no effective start and end dates.

Note The default filter settings are defined in Master Group Maintenance.

Click OK to apply the filter.

4 Click the component whose selection rule or assignment rule you want to edit.

Defining Selection Rules

Define selection rules under the Selection Rule Tab. When defining a selection rule, you may have three options:

- Create a selection rule from scratch
- Use a general selection rule. General selection rules are defined in General Product Structure Rules Maintenance.
- Create a selection rule based on a general selection rule.

To edit a selection rule:

You can either manually enter the rule by directly typing the statements in the Rule box or use the Rule Assistant to assist you in the process. See “Using the Rule Assistant” on page 33.

Click Syntax Check to validate the rule syntax. If syntax errors are found, error messages display and the status becomes Failed.

Click Save to save the rule. On saving the rule, the system performs a syntax check on the rule. If syntax errors are found, error messages display.

To use a general selection rule:

Select Use General Product Structure Rule above the Selection Rule box. When a general selection rule is found, it displays in non-editable mode in the Selection Rule box after you confirm to overwrite the existing selection rule. If no general selection rule has been defined for this item, the system informs you that no general selection rule is available.

To copy from a general selection rule:

Click the Copy from General Rule button to duplicate the general selection rule into the Selection Rule box. If no general selection rule has been defined for this item, the system informs you that no general selection rule is available.

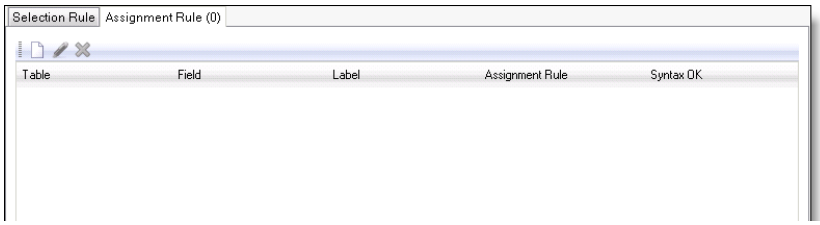
To copy a selection rule to the general selection rule:

Click the Copy to General Rule button. If no general selection rule has been defined for the item, the current selection rule is duplicated to the general selection rule. If a general selection rule exists for the item, the system notifies you that you cannot overwrite the existing general selection rule. The general selection rule you create this way can be maintained in General Product Structure Rule Maintenance.

Defining Assignment Rules

Define assignment rules under the Assignment Rule tab. The Assignment Rule tab displays the number of assignment rules for your reference. You can define multiple assignment rules for a component.

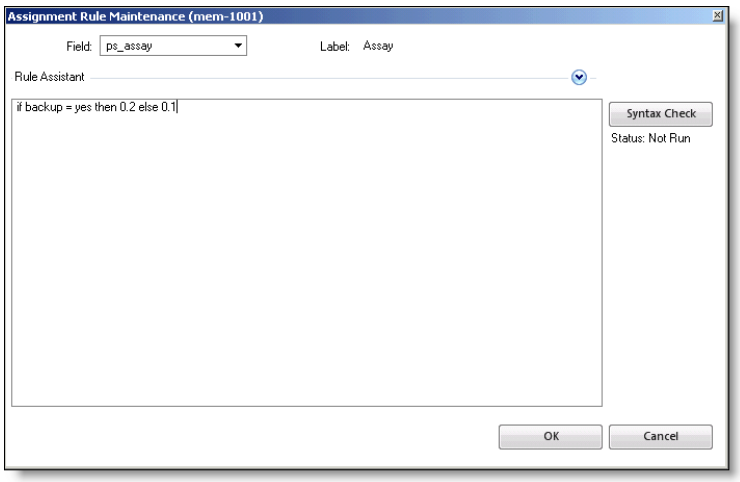
Fig. 6.8
Assignment Rule List



To create an assignment rule:

1 Click the New button on the toolbar above the assignment rule list. The Assignment Rule Maintenance window displays.

Fig. 6.9
Assignment Rule Maintenance



2 Specify a field to which to apply the assignment rule from the Field list, which contains all the fields in the product structure table (ps_mstr) in QAD EA.

3 Compose the assignment rule with the assistance of the Rule Assistant. See “Using the Rule Assistant” on page 33.

4 Click Check Syntax to validate the rule syntax. If syntax errors are found, error messages display and the status becomes Failed. The assignment rule can still be saved without having to pass the syntax check.

5 Click OK to save the rule and close the window.

To specify the assignment rule for multiple fields:

Use the drop-down list located next to the Field field to move from field to field for specifying the assignment rules.

To open an existing assignment rule for editing:

Double-click the assignment rule in the assignment rule list or select it and click the Modify button on the toolbar.

To delete an existing assignment rule:

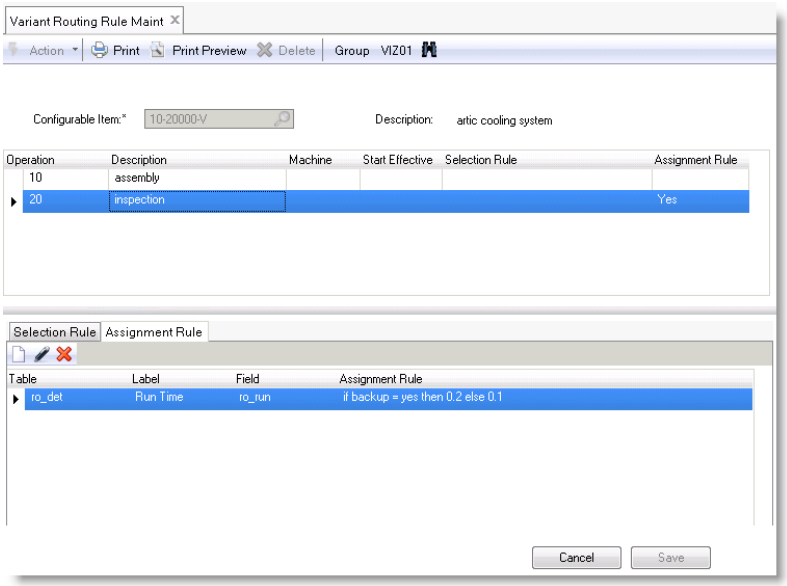
Select the assignment rule in the assignment rule list and click the Delete button on the toolbar.

Maintaining Variant Routing Rules

Use Variant Routing Rule Maintenance to define selection and assignment rules for operations in the generic routing.

If no selection rule has been defined for an operation in the generic routing, the variant product structure always includes the operation.

Fig. 6.10
Variant Routing Rule Maintenance



To select an operation of a generic routing:

1 Specify a configurable item number in the Configurable Item field. The item's description displays next to the configurable item number. The routing table below lists all the operations in the item's generic routing.

   If an operation already has selection and assignment rules defined, they display in the Selection Rule and Assignment Rule columns respectively in the generic routing table.

2 Click the operation whose selection rule or assignment rule you want to edit.

Defining Selection Rules

Define selection rules under the Selection Rule Tab.

To edit a selection rule:

1 Type the rule in the Selection Rule box. Use the Rule Assistant to assist you in the process. See "Using the Rule Assistant" on page 33.

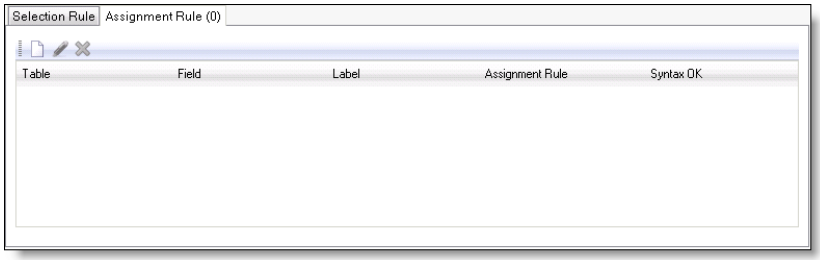
2 Click Check Syntax to validate the rule syntax. If syntax check is successful, Status changes from Not Run to Passed. If syntax errors are found, error messages display and Status changes from Not Run to Failed.

3 Click Save to save the rule. On saving the rule, the system performs a syntax check on the rule. If syntax errors are found, error messages display.

Defining Assignment Rules

Define assignment rules under the Assignment Rule tab. You can define multiple assignment rules for an operation.

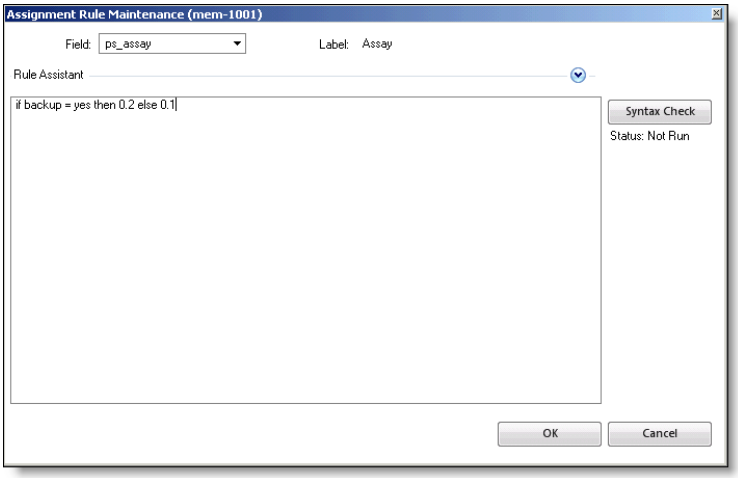
Fig. 6.11
Assignment Rule List



To create an assignment rule:

1 Click the New button on the toolbar above the assignment rule list. The Assignment Rule Maintenance window displays.

Fig. 6.12
Assignment Rule Maintenance



2 Specify a field to which to apply the assignment rule from the Field list, which contains all the fields in the routing detail table (ro_det) in QAD EA.

3 Compose the assignment rule with the assistance of the Rule Assistant. See “Using the Rule Assistant” on page 33.

4 Click Check Syntax to validate the rule syntax. If syntax errors are found, error messages display and the status becomes Failed.

5 Click OK to save the rule and close the window; click OK and Create to save the rule and create another rule. On saving the rule, the system performs a syntax check on the rule. If syntax errors are found, error messages display.

To view or edit an existing rule:

Double-click the assignment rule in the assignment rule list or select it and click the Modify button on the toolbar.

To delete an existing assignment rule:

Select the assignment rule in the assignment rule list and click the Delete button on the toolbar.

Maintaining Variant Sales Order Line Rules

Use Variant SO Line Rule Maintenance to define assignment rules for a configurable item to assign values to sales order details fields of newly created variant item records.

Note Make sure that data are valid for the correct business logic in Sales Order Maintenance. You can only assign values to those sales order details fields that do not have default values or calculation logic, such as sod_qty_ord. If you use assignment rules fields such as sod_site and sod_price, QAD EA business logic overwrites them.

To define a sales order line rule:

1 Specify a configurable item in the Configurable Item field.

2 Specify a sales order details field with a `sod` prefix in the Field field.

3 Compose the assignment rule with the assistance of the Rule Assistant. See “Using the Rule Assistant” on page 33.

4 Click Check Syntax to validate the rule syntax. If syntax errors are found, error messages display and the status becomes Failed.

Maintaining Variant Sales Quote Line Rules

Use Variant SQ Line Rule Maintenance to define assignment rules for a configurable item to assign values to sales quote details fields of newly created variant item records.

Note To ensure data validity for the correct business logic in Sales Quote Maintenance, you can only assign values to those sales quote details fields that do not have default values or calculation logic, such as qod_desc. If you use assignment rules fields such as sod_site and sod_price, QAD EA business logic overwrites them.

To define rules for a sales quote line:

1 Specify a configurable item in the Configurable Item field.

2 Specify the details field with a `qod` prefix in the Field field.

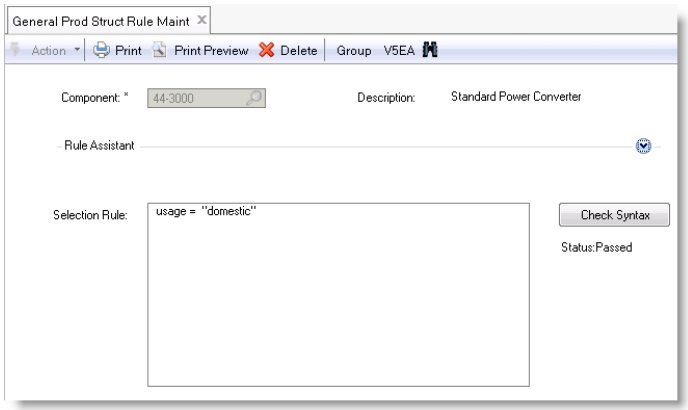
3 Compose the assignment rule with the assistance of the Rule Assistant. See “Using the Rule Assistant” on page 33.

4 Click Check Syntax to validate the rule syntax. If syntax errors are found, error messages display and the status becomes Failed.

Maintaining General Product Structure Rules

Use General Product Structure Rule Maintenance to define general selection rules for selecting components into variant product structures that are not specific to configurable items.

Fig. 6.13
General Product Structure Rule Maintenance



To edit a selection rule:

1 Specify a component item number in the Component field.

2 Type the rule in the rule box. Use The Rule Assistant to assist you in composing the rule. See “Using the Rule Assistant” on page 33.

Note When using the Rule Assistant General Product Structure Rule Maintenance, an “Unknown Answer” option is available in the Variable Option list. This element translates into /* Unknown Answer */ in the selection rule statement and is used to accept user-provided values that are not valid configurable item features into the selection rule.

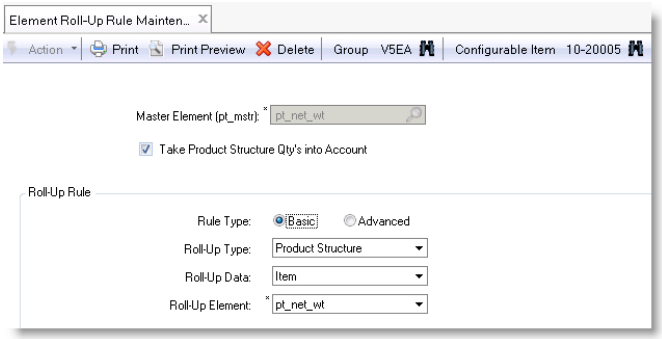
3 Click Check Syntax to validate the rule syntax. If syntax check is successful, Status changes from Not Run to Passed. If syntax errors are found, error messages display and Status changes from Not Run to Failed.

4 Click Save to save the rule. On saving the rule, the system performs a syntax check on the rule. If syntax errors are found, error messages display.

Maintaining Element Roll-Up Rules

Use Element Roll-Up Rule Maintenance to define rules for rolling up non-cost-related data elements when generating variant items.

Fig. 6.14
Element Roll-Up Rule Maintenance



Master Element (pt_mstr). Specify the database field in the item master table (pt_mstr) to which you want to roll up data elements. Whenever the system creates a variant item and rolls up data elements, the system stores the rolled-up value to this field of the variant item record in the item master table. An item master table field uniquely identifies an element roll-up rule.

Take Product Structure Quantities into Account. Select this check box if you want QAD Configurator to automatically correct rolled-up values to take into account required component quantities as defined in the product structure (ps_qty_per).

Rule Type. Select whether you want to edit a simple rule in basic mode or a more complex rule in advanced mode.

Roll-Up Type. Select Product Structure to roll up component-related data or select Routing to roll up routing-related data.

To edit a simple rule:

Specify a field data to roll up in a simple rule.

Roll-Up Data. Select a table.

If you selected the Product Data roll-up type, you can choose from the item master table (pt_mstr) or the product structure master table (ps_mstr) from the drop-down list.

If you selected the Routing roll-up type, you can choose from the work center master table (wc_mstr) or the routing operation detail (ro_det) table.

Roll-Up Element. Select the field whose data you want to roll up.

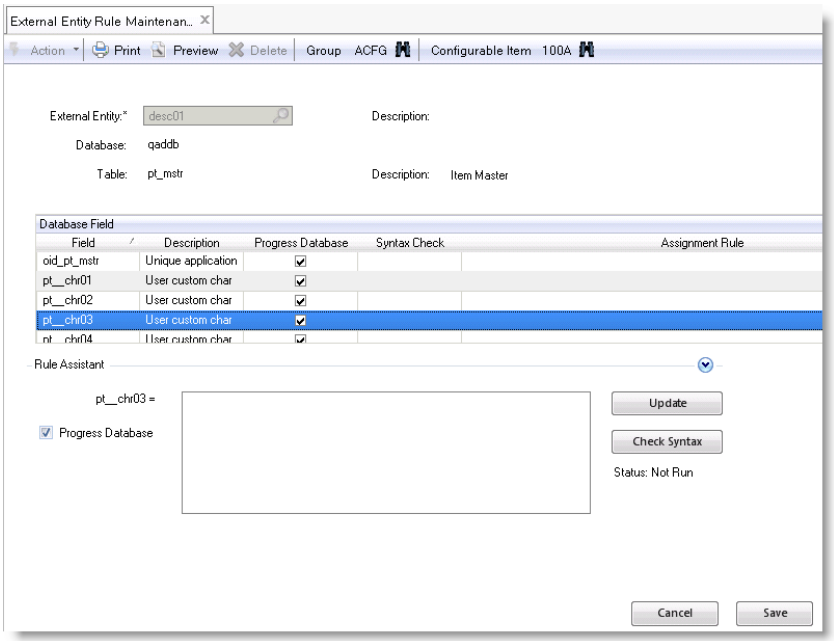
To edit an advanced rule:

1. Type the rule in the rule box. Use The Rule Assistant to assist you in composing the rule. See “Using the Rule Assistant” on page 33.
2. Click Check Syntax to validate the rule syntax. If syntax check is successful, Status changes from Not Run to Passed. If syntax errors are found, error messages display and Status changes from Not Run to Failed.
3. Click Save to save the rule. On saving the rule, the system performs a syntax check on the rule. If syntax errors are found, error messages display.

Maintaining External Entity Rules

Use External Entity Rule Maintenance to assign values to fields in databases defined as external entities. For information on defining external entities, see “Maintaining External Entities” on page 54.

Fig. 6.15
External Entity Rule Maintenance



To assign values to entity fields:

1. Specify a previously defined external entity. Its database and table information is displayed below.
2. Click a field in the Database Field list to select it.
3. In the Progress Database column, specify whether your QAD EA is running on the Progress database.

   Select the check box when QAD EA runs on the Progress database. The system assigns values to the selected field in the Progress database based on assignment rule without any truncation.

   Clear the check box when you are using a database other than Progress. If the value string exceeds the maximum length allowed for that field, the system automatically truncates values assigned to the selected field.
4. Edit the assignment rule for the selected field.

   a. Type the rule in the rule box. Use The Rule Assistant to assist you in composing the rule. See “Using the Rule Assistant” on page 33.

      Define variables as Features of the given item. Otherwise, the system prompts you to convert the variables to Features; select Yes to map the variables to the features.

   b. Click Check Syntax to validate the rule syntax. If syntax check is successful, Status changes from Not Run to Passed. If syntax errors are found, error messages display and Status changes from Not Run to Failed.

   c. Click Update to display the rule and its syntax check status in the Database Field list. On updating the rule, the system performs a syntax check on the rule. If syntax errors are found, error messages appear.
5. Repeat steps 2 through 4 to define rules for multiple fields.
6. Click Save to save all the changes.

Using Custom Functions in Product Configuration Rules

The system lets you easily define and maintain custom functions in the `pccop.i` file and use them in the following product configuration rules:

- Variant item data rules (assignment rules)
- Variant product structure rules (selection rules and assignment rules)
- Variant routing rules (selection rules and assignment rules)
- Variant SO line rules (assignment rules)
- Variant SQ Line rules (assignment rules)
- External entity rules (assignment rules)
- General product structure rules (selection rules)

Custom functions are called and executed when the system processes the rules containing them.

To use a custom function:

1 Edit the `pccop.i` file to define your custom function using Progress. Here is a sample function:

```
function AddDesc return character (input cName as character):
     return "This is a new variant of item " + cName.
end function.
```

2 When defining product configuration rules, you can use the custom function by passing parameters to it; for example, assign the following to the pt_desc1 field of a particular configurable item:

```
AddDesc(“A01”)
```

3 Use Check Syntax to validate both the rule and the custom function.

4 When the system applies the rule to the variant item generation process, the function is executed and returns a value. In the previous example, the description of the new variant item would be “This is a new variant of item A01.”

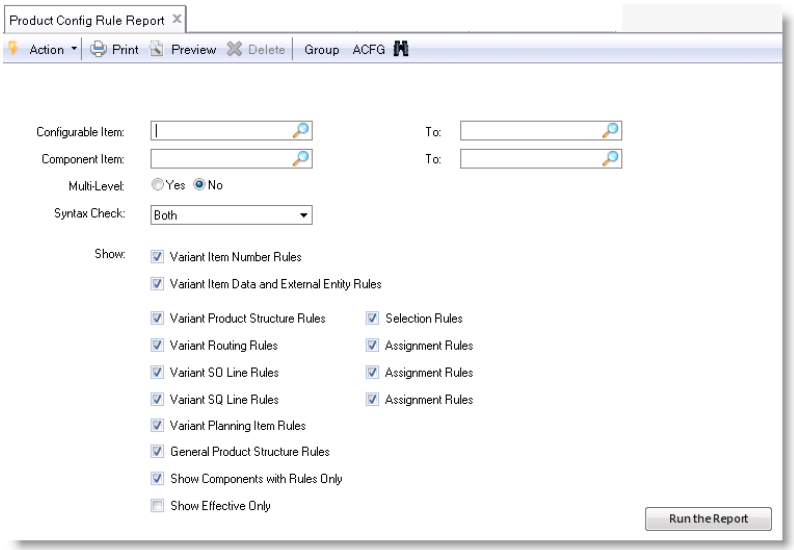
5 Whenever there are any changes to the custom function in `pccop.i`, you need to run Batch Compiler for the configurable item to make the changes effective.

Running Product Configuration Rule Report

Run Product Configuration Rule Report to view detailed product configuration rule information.

This function lets you generate reports that display any types of product configuration rules associated with a specific range of configurable items and components. You can also choose whether to show validated rules or rules that have failed validation, or both. The tool helps you manage and analyze product configuration rules.

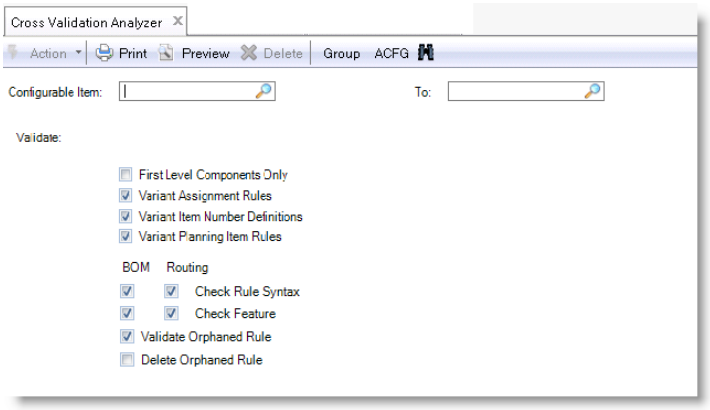
Fig. 6.16
Product Configuration Rule Report



Cross-Validating Rules

Use Cross Validation Analyzer to check if the product configuration rules and rules match features and rules in sales configuration. This analyzer detects any discrepancies between the two modules and produces a report.

Fig. 6.17
Cross Validation Analyzer



To perform a cross validation:

Configurable Item/To. Specify a configurable item or a range of configurable items for which you want to run rule cross validation. When the field is blank, the system checks all configurable items.

First Level Component Only. Select this option if you want to only perform cross-validation only for the first-level components in a generic product structure. Otherwise, the system performs cross-validation for all levels of components in the generic product structure.

Variant Assignment Rules. Specify whether to check variant assignment rules.

Variant Item Number Definitions. Specify whether to check if a variant item number exists for every configurable item in the generic product structure.

BOM, Routing, Rule Syntax, Features. Select the rules and/or features you want to check for.

Only when you have selected the Routings field in Master Group Maintenance for the group, the routing checks are available.

Validate Orphaned Rule, Delete Orphaned Rule. Select these two options if you want to validate and delete the orphaned rules. Currently these two options are only for product structure (BOM) rules and not for routing rules.

Click OK to run the Cross Validation Analyzer. When the analysis is complete, you can see an analysis report.

Chapter 7

Configuration Questionnaire

Launching Questionnaire 120
Describes the contents of the questionnaire window.

Navigating in Questionnaire 120
Describes the default organization of the questionnaire UI.

Exiting Questionnaire 122
Explains how to exit the questionnaire module.

Variant Item Configuration Workflow 123
Illustrates the workflow and describes the steps required to configure a variant item.

Using Standard/Existing Configurations 125
Explains how to use the Existing Configurations tab, browse through configurations, search for configurations, order an existing variant item, create a variant item from existing configurations, load an existing configuration, and create a configuration.

Configuring Item 130
Describes the Configure Item screen and details how to answer questions, review answer summaries, edit comments, and customize the questionnaire.

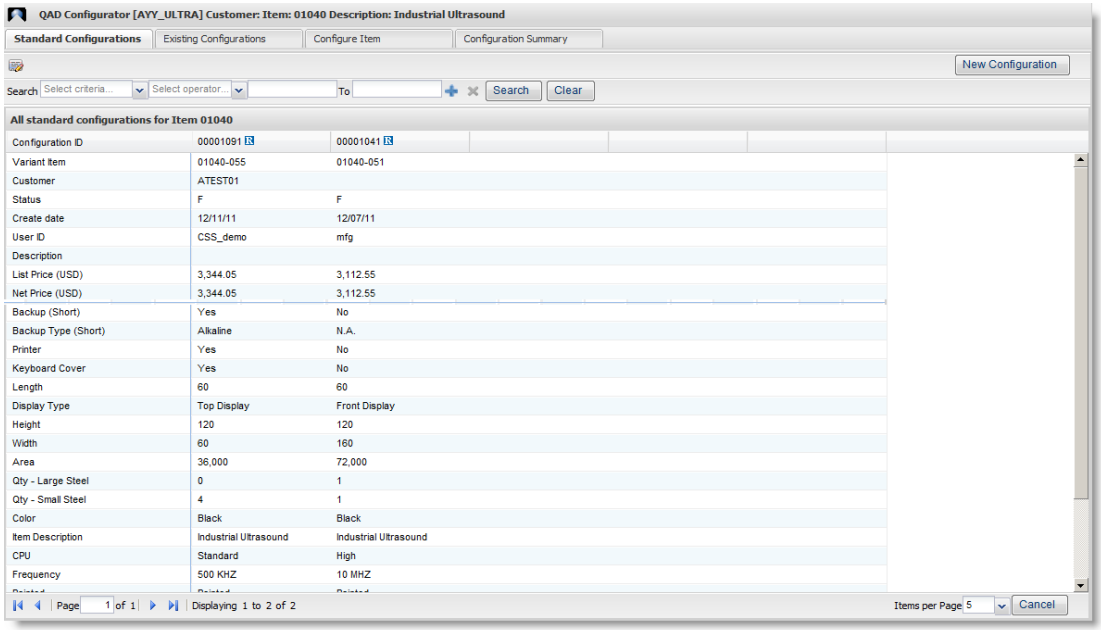
Reviewing and Submitting Configuration 134
Explains how to use the Configuration Summary Screen, review current configurations, view similar configurations, and submit configurations.

Launching Questionnaire

There are two ways you can launch questionnaire.

- Use Configuration Questionnaire.
- Select a configurable item in the order line in Sales Order Maintenance (7.1.1) or Sales Quote Maintenance (7.12.1). The Questionnaire window is automatically launched. Selecting a variant item in the order line does not trigger the product configuration process.

Fig. 7.1
Questionnaire Window



The title bar of the Configuration Questionnaire window displays the following information:

Group. The group that the configurable item you are configuring belongs to. Groups are defined using QAD Configurator's Master Group Maintenance function.

Customer. Shows which customer you are configuring the item for. It is the same customer ID in the Sold-To field in the header of the sales order or sales quote from which Questionnaire was launched.

Item. Shows the configurable item that you are configuring. It is the same configurable item number that you selected in Sales Order Maintenance (7.1.1) or Sales Quote Maintenance (7.12.1).

Navigating in Questionnaire

The Configuration Questionnaire user interface organizes task-oriented information under the following tabs:

- Standard Configurations
- Existing Configurations

- Configure Item
- Configuration Summary

By default, when the Questionnaire window is launched, you see the Existing Configurations screen first. The Configure Item and Configuration Summary tabs are disabled; after you reload a configuration or create a configuration, you can then switch to these two tabs. However, by using the Show Existing Configurations option in Configurable Item Maintenance, you can specify whether you want to see the Existing Configurations screen first.

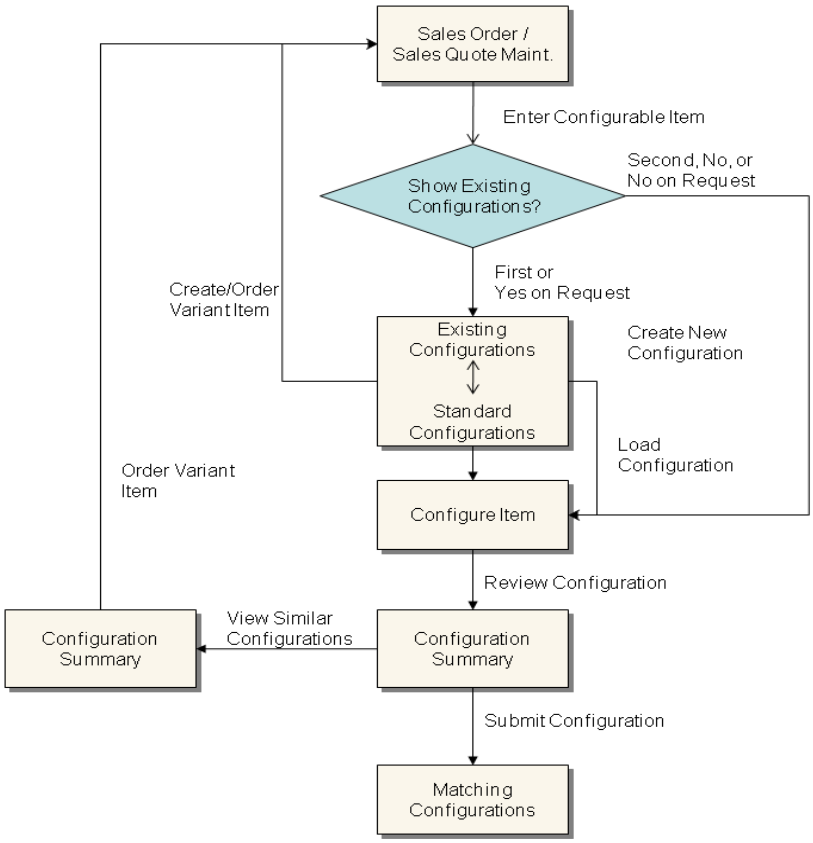
Show Existing Configurations. Specify whether and how to display existing configurations in the questionnaire:

- First: Display existing configurations on launching the questionnaire.
- Second: Display the new configuration on launching the questionnaire.
- On request: When launching the questionnaire, display a message asking the user whether to show existing configurations.
- No: Hide the Existing Configurations tab in the questionnaire.

The Standard Configurations screen shows the standard configurations, which are configurations recommended by the manufacturer to make it easier for a customer to order configured items. For example, standard configurations can be popularly ordered configurations in the past, or some particular configurations that a marketing campaign wants to promote. See “Maintaining Standard Configurations” on page 155 for more information about standard configurations.

The following diagram depicts all possible navigation flows of screens in your configuration process. Squares represent Questionnaire screens, lines represent actions that trigger flows among screens, and the diamond represents the Show Existing Configurations setting that changes your flow. As the figure shows, the configuration process is not linear. You can take actions that skip some steps or revert to a previous step. When you perform an action that endangers the current configuration process and current configuration data, the system gives you a warning message.

Fig. 7.2
Questionnaire Screen Navigation



Exiting Questionnaire

You exit the Questionnaire module when you either complete or cancel the configuration process. When you have gone through all the configuration steps and successfully submitted your configuration, the Questionnaire window closes and a variant item number is returned to the Item Number field in the order line in Sales Order Maintenance or Sales Quote Maintenance. This could be an existing variant item number or a newly created variant item number, depending on the configuration you submitted.

You can cancel at any point in the configuration process by clicking the Cancel button in the Questionnaire screen. A confirmation window appears.

Fig. 7.3
Exit Confirmation

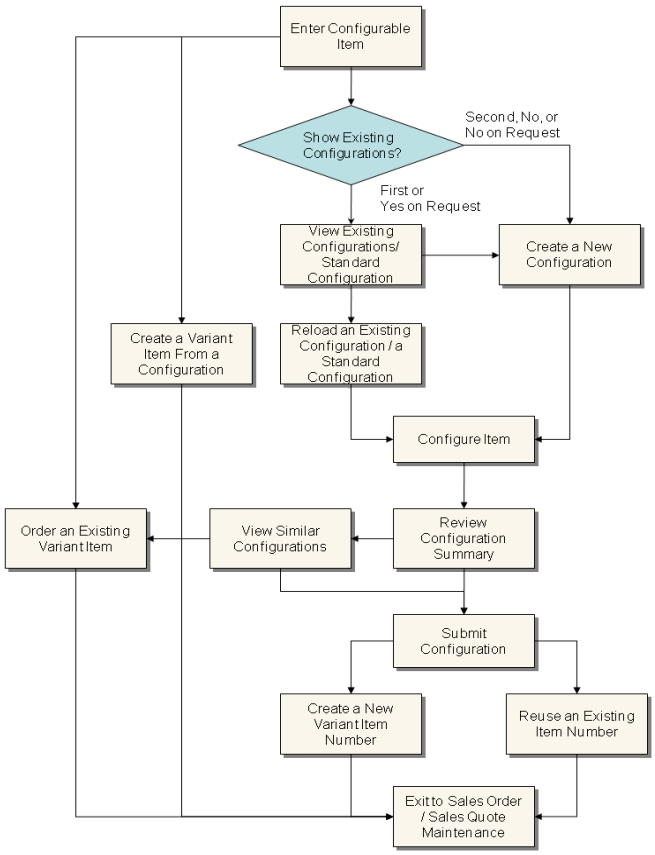
When you cancel the configuration process, the Questionnaire window closes and no item number is returned. You then either select a different item in the order line in Sales Order Maintenance or Sales Quote Maintenance or launch the Questionnaire window again if you continue with the original configurable item number.

Note Do not exit Questionnaire by clicking the Close Window button (X) in the upper right corner of the Questionnaire window or pressing Alt+F4. You are not prompted to confirm the exit this way and may lose your changes to the configuration.

Variant Item Configuration Workflow

The following diagram outlines the variant item configuration workflow.

Fig. 7.4
General Item Configuration Workflow



A typical configuration workflow is as follows:

1. View standard configurations in the Standard Configurations screen or existing configurations in the Existing Configurations screen.

   Before you start configuring an item for a customer, you can browse through standard configurations in the Standard Configurations screen or existing configurations in the Existing Configurations screen; there might be existing variant items associated with the current configurable item and you can use these configurations or modify them to get a similar configuration to meet your specific requirements.

   If you find a variant item that exactly matches your requirements, you can directly submit it to add it to the sales order line and skip all the subsequent configuration steps.

   If you find a configuration that exactly matches your requirements, but no variant item has been created from it, you can create a variant item based on this configuration and add it to the sales order line.

   If you find a configuration that partially matches your requirements, reload the configuration into the questionnaire and then customize the configuration in the Configure Item screen. After the customization, you can proceed to review and submit the configuration to create a variant item from it.

   If a saved configuration is unfinished, you can load it to complete the configuration.

   Of course, if there is no configuration that you can reuse, you need to create a configuration from scratch.

2. Configure a variant item in the Configure Item screen.

   Whether you reload an existing configuration or create one from scratch, you customize your configuration in the Configure Item screen. You do this by answering a list of questions that correspond to the current configurable item features. When you finish answering the questions, you have created a configuration and you can proceed to review and submit it.

3. Review and submit configuration in the Configuration Summary screen.

   After you have completed the Questionnaire questions, review the complete configuration summary information to make sure that everything is correct.

   If you find errors in your answers, you can always go back to the Configure Item screen to correct your answers. Unanswered questions and answers that conflict with variable rules prevent successful submission of your configuration.

   You can view similar configurations by filtering existing configurations using your configuration as a criterion. You can then choose to order a similar variant item, create a variant item from a similar configuration, or continue with your own configuration.

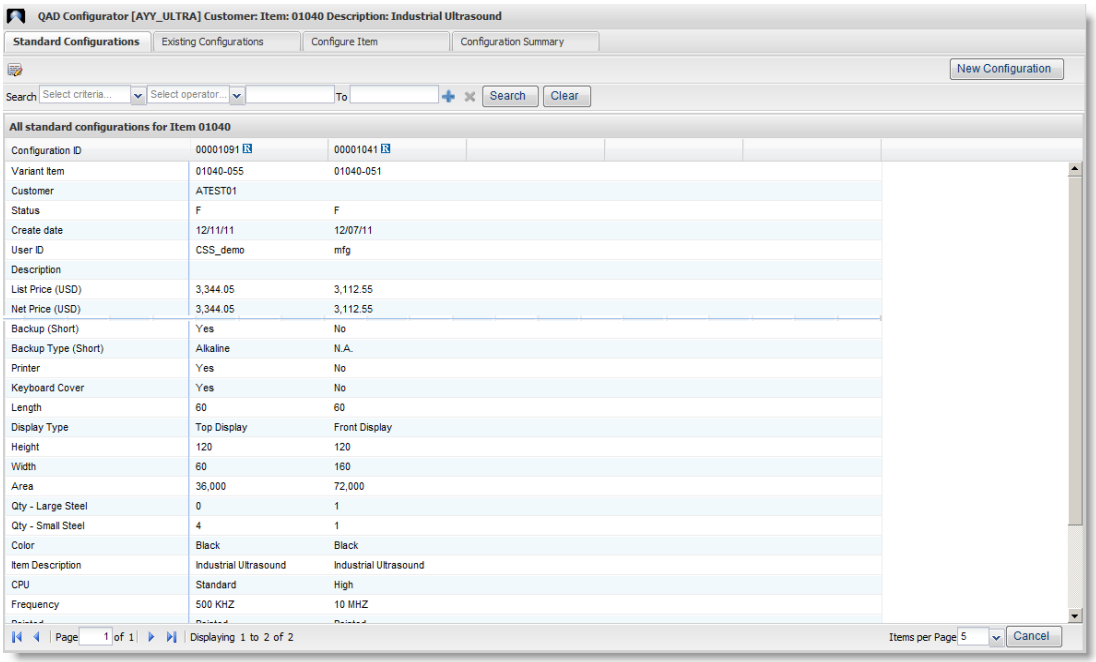
   Unless you set the Show Existing Configurations option to No in Configurable Item Maintenance, the system finds existing configurations that match the configuration based on configuration keys. You can choose either to create a variant item using your configuration or associate an existing item number with your configuration.

Using Standard/Existing Configurations

Before you start configuring an item for a customer, you can browse through standard configurations in the Standard Configurations screen or existing configurations in the Existing Configurations screen; there might be existing variant items associated with the current configurable item and you can use these configurations or modify them to get a similar configuration to meet your specific requirements.

Note Whether and how the Existing Configurations tab is displayed in the questionnaire is controlled by the Show Existing Configurations option in Configurable Item Maintenance. This section assumes that the Show Existing Configurations option is set to First. For details about this option, see “Maintaining Configurable Items” on page 46.

Fig. 7.5
Viewing Standard Configurations in Standard Configuration Screen



Note Now that QAD CSS and QAD Configurator are integrated, there can be configurations created by CSS users. For example, in Figure 7.5, CSS_demo in the User ID field indicates that the configuration is created by a CSS user. The prefix CSS_, as in CSS_demo, can be modified in the `cssUserPrefix.i` file under the *`ConfiguratorWebSpeedInstallDir/src/webconf`* directory. After you compile the Configurator WebSpeed files, the prefix modification takes effect.

Browsing Standard / Existing Configurations

For standard configurations in the Standard Configurations screen or existing configurations in the Existing Configurations screen, the key attributes and all item features are displayed for each configuration.

Configuration ID. Configuration ID uniquely identifies a configuration stored in the system.

Variant Item Number. Variant item number uniquely identifies a variant item created in the system. A configuration ID is associated with a variant item number only when a variant item has been created from the configuration.

Customer. Specifies which customer this configuration was created for.

Status. Specifies the status of the configuration.

O: The configuration has not been completed yet—that is, not all required questions in the Questionnaire have been answered. You can load and proceed with the configuration. Unfinished configurations cannot be used to create variant items.

F: The configuration has been completed. You can load the configuration to modify it or directly create a variant item from it.

Note Standard configurations are completed configurations, so the status for standard configurations is always F.

List Price. Displays the configuration's list price as calculated by Configurator when the configuration was created. You can reprice it when you load the configuration to bring the configuration list price up-to-date.

Net Price. Displays the configuration's net price as calculated by Configurator when the configuration was created. You can reprice it when you load the configuration to bring the configuration's net price up-to-date.

Create Date. Shows when the configuration was created.

User ID. Shows which QAD Configurator user created this configuration.

Description. Provides a brief description of the configuration.

Item Features. All features of the current configurable item are listed along with their values.

By default, five configuration records are displayed on each page. You can use the Item Per Page value at the bottom of the screen. If the configuration display exceeds the screen size, use the horizontal scroll bar at the bottom of the grid to view all configuration records.

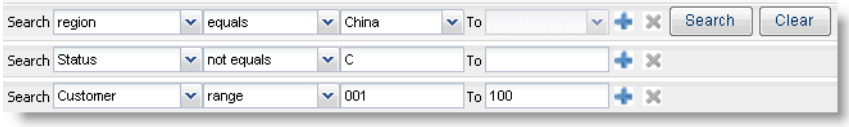
If there are multiple pages, use the navigation controls at the bottom of the screen to page through the records or jump to a specific page.

The existing configurations grid provides flexible ways to display configuration records and lets you easily compare configurations. You can change the position of a configuration record by dragging and dropping its configuration ID column header. This way, you can place configurations of interest side by side for easy feature comparison. You can also sort configuration attributes and features by clicking on the column header displaying the configuration ID.

Searching for Configurations

The Questionnaire .NET UI provides extensive, configurable search capabilities that let you create both simple and complex queries.

Fig. 7.6
Configurations Search Box



1. Initially, one search condition displays. Choose the attribute or feature that you want to search from the drop-down list.
2. Choose a search operator from the drop-down list. The search operators include the following:
   - equals
   - no equals
   - greater than
   - less than
   - is null
   - is not null
   - range
   - starts at
   - contains
3. If you choose the Range operator, enter a beginning value of the range in the first search box. Optionally, enter an ending value of the range in the second search box.
4. Click Search.
5. To refine your search further, click the plus (+) icon to add another search row. You can add as many rows as needed, each with different search values and operators. When you specify several criteria, note that multiple criteria for the same field are treated as a logical AND condition.
6. To remove a search criteria row, click the delete (X) icon.

Ordering an Existing Variant Item

If you find an existing variant item that exactly matches your specific configuration requirements, you can directly order the variant by clicking the Submit icon next to the variant item number. This closes the Questionnaire window and returns the variant item number to the item number field in the Sales Order Maintenance or Sales Quote Maintenance order line.

Existing variant items are configuration records that have variant item numbers and are marked with the F status.

Run SO/SQ Line Rules for Ordering Existing Variant Items

SO/SQ Line rule is executed both when creating a new variant item and ordering an existing variant item. Selecting an existing variant item sets default values for the line fields.

The following list describes the cases when the SQ/SO Line rule is executed:

- When the user clicks the “Order” icon on existing configuration lists
- When the user clicks the “Order” icon on the similar configuration lists
- When the user clicks the “Order” icon on the save variant item pop-up window
- When the program finds a matching variant item and selects it automatically, due to the auto-selection clause setting

Check and Recreate Price List for Ordering Existing Variant Items

If you order an existing variant item from Configurator, the system first checks whether there are any valid price lists. If there is none, Configurator creates a price list to make sure that the correct price is provided to the SO/SQ line.

To enable this function, set Create Price List in Configurable Item Maintenance to Yes.

Creating a Variant Item

If there is a configuration that you can reuse but no variant item has been created from it (no variant item number is displayed in the variant item field), you can create a variant item from it and order the new variant item by clicking the Create Variant icon next to the Configuration ID. This closes the Questionnaire window and returns the newly created variant item number in the item number field to the Sales Order Maintenance or Sales Quote Maintenance order line.

The system creates new variant items only from completed configurations (status F). For incomplete configurations with a status of O, complete them first before item creation.

Creating a Variant Supplier Item

In the Enterprise Material Transfer (EMT) process, supplier item is the cross-reference to convert Primary Business Unit (PBU) SO line items into Secondary Business Unit (SBU) SO line items. In other words, to support EMT, supplier items need to be set up at the PBU so that EMT purchase orders transmitted to the SBU reference the correct item numbers.

If the item is configurable, you can create a variant supplier item.

1 In Configurable Item Maintenance, make sure that the following fields are selected correctly for the configurable item.

Variant Item-Site Record. Select Current Site Only or All Sites.

- When you want to create the supplier item on a particular site, select Current Site Only. Otherwise, select All Sites.

Site Variable. If you have selected Current Site Only, specify a valid site variable.

Note A valid value for the site variable is a site associated with the configurable item as defined in Item-Site Planning Maintenance (1.4.17).

2 Use Supplier Item Maintenance (1.19) to a create supplier-item relationship.

Item Number. Enter the configurable item number.

Supplier. If you have specified a site variable in Configurable Item Maintenance, enter the

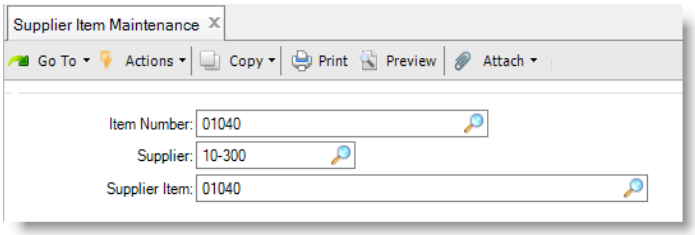
same site code as your answer for the variable on the questionnaire. If you did not specify any particular site in Configurable Item Maintenance, leave the field Supplier blank here.

Example You have specified a site variable *supsite* in Configurable Item Maintenance. For the variable *supsite*, there is a question *Supplier Site* on the questionnaire. If the answer for the question *Supplier Site* is 10-300, enter 10-300 as the supplier site in Supplier Item Maintenance. The system creates the supplier item for supplier site 10-300.

Example You selected All Sites in Configurable Item Maintenance. Leave the Supplier field in Supplier Item Maintenance blank. The system creates the supplier item for all suppliers.

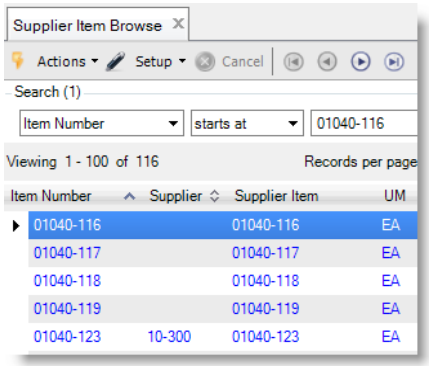
Supplier Item. Enter the configurable item number. In a simple EMT scenario, PBU and SBU are in different sites but are within the same domain, and the item number is the same for both business units.

Fig. 7.7
Supplier Item Maintenance



3 Use Configuration Questionnaire to create a variant item. When the system creates a variant item, the system populates the configurable item in the supplier-item relationship with the new variant item. For example, when the system has created variant items for the configurable item 01040, the variant supplier items are there as well.

Fig. 7.8
Supplier Item Browse



Reloading a Configuration

You can reload a configuration in the Standard Configurations screen or Existing Configurations screen, and modify it in the Questionnaire. To reload an existing configuration, click the Reload Configuration icon next the Configuration ID. This directs you to the Configure Item screen, which displays all the configuration questions and answers.

- If you reload a finished configuration with a status of F, the system creates a duplicate of the existing configuration with a new configuration ID. All the questions and answers in the Questionnaire are the same, but the configuration is a new copy of the original configuration.

  Note Standard configurations are always finished configuration with a status of F.

- If you reload an incomplete configuration with a status of O, the system loads the original configuration with the same configuration ID.

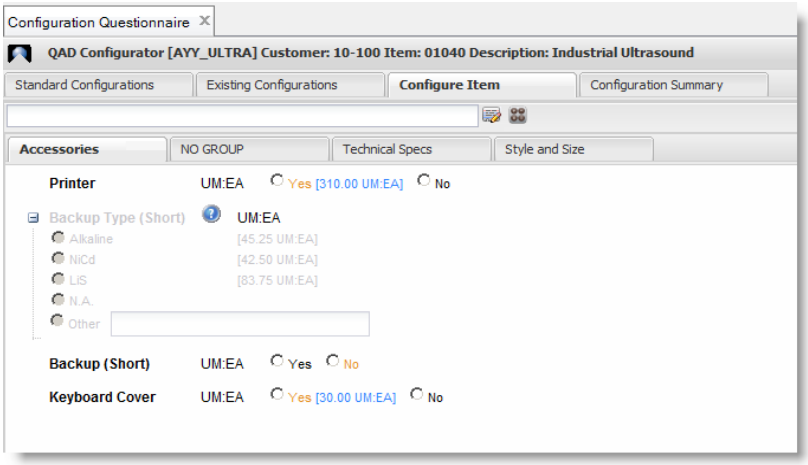
Creating a New Configuration

To create a configuration from scratch, click the New Configuration button in the Existing Configurations screen to go to the Configure Item screen.

Configuring Item

Whether you reload a configuration or create one from scratch, you customize your configuration in the Configure Item screen. You do this by answering a list of questions that correspond to the current configurable item features.

Fig. 7.9
Configure Item Screen



Answering Questions

In the Configure Item screen, questions are grouped under corresponding functional group tabs. You can switch among different functional group tabs to view and answer questions. If no functional group is defined, all questions are listed under a single tab.

By default, ten levels of foreground questions are displayed in the short question format. You can customize the questionnaire settings to display temporary and background questions as well, and show questions in the long question format. You can also specify how many dependency levels of questions to display in the questionnaire.

For multiple levels of questions, since higher-level questions depend on lower-level questions, the system disables lower-level questions until the customer answers higher-level questions.

Default answers are highlighted but are not automatically selected or entered for foreground questions.

If there is a value range for the answers, the beginning and end values of the range appear next to the question. You can use them as reference to provide valid answers.

To reset questions, click the Reset button to revert all the questions to the unanswered state.

To automatically answer the questionnaire, click the Answer All button to answer all the questions using their default options.

Errors occur when you provide an invalid value for an answer or when your answer violates option dependency rules. When this happens, an alert icon appears next to the question and the message bar displays relevant error messages. Fix all errors to complete the questionnaire.

Reviewing Answer Summary

The hideable Summary panel lets you review at a glance all the answers you have provided so far in the process of answering questions.

At the top, the Summary panel displays the current configuration ID and item price information. Item price is updated each time you answer a question. You can customize the Questionnaire settings to specify which type of price information you want to see.

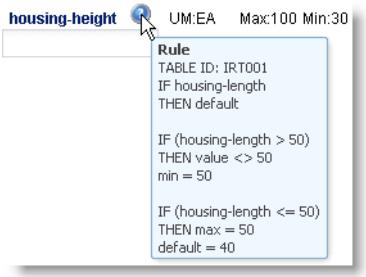
The summary panel includes a running summary of questions and answers you have supplied for each functional group. You can click a question in the panel to access it, making it easy to locate a question and navigate in the questionnaire.

Viewing Question Rules

If a question has rules, a question mark icon displays next to it. Move your cursor over it to view its rules.

Note The configuration questionnaire shown in QAD CSS does not display the question mark. Therefore, if question rules are needed to be shown, the question rules need to be in the question description.

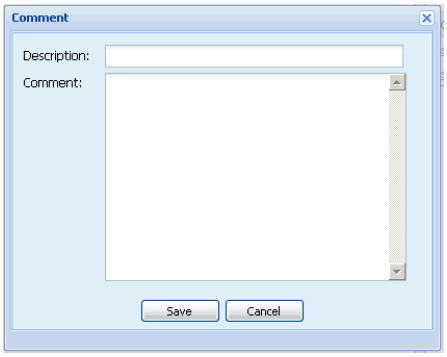
Fig. 7.10
Question Help



Editing Comments

To view or edit a comment for a configuration, click the Edit Comment button. In the Comment widow, edit the comment description or details. You can search for configurations in the Existing Configurations screen based on the comment description.

Fig. 7.11
Comment Window



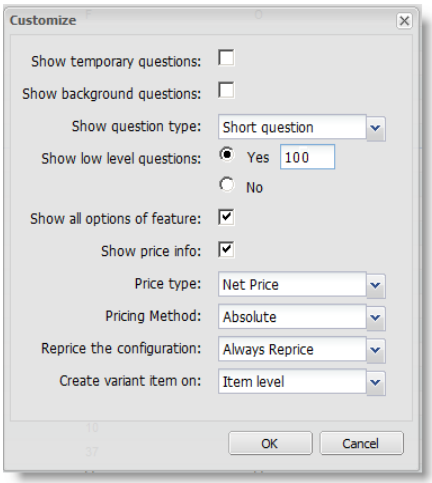
Customizing the Questionnaire

You can customize whether to display certain elements in the questionnaire and how they are displayed.

To customize the questionnaire, click the Customize icon next to the message bar in the Configure Item screen. A Customize screen displays. Change the settings and click OK to save your changes.

Note Display settings only apply to the Questionnaire window you are currently working in. Your customized settings are not saved when you exist Questionnaire.

Fig. 7.12
Customize Screen



Show temporary questions. Specify whether to show temporary questions in the questionnaire. Temporary questions are automatically answered by QAD Configurator according to rules. The default is No.

Show background questions. Specify whether to show background questions in the questionnaire. Background questions are those that always have default answers and do not need to be answered by the user. However, users can manually answer background questions and override default answers. The default is No.

Show question type. Specify whether to display long questions and answers or short questions and answers in the questionnaire. Short questions and answers are displayed by default.

Show low level questions. Specify whether to show low-level questions in the questionnaire. Question levels are determined by question dependencies. A lower level question depends on the answers to a higher-level question and cannot be answered before the higher-level question is answered.

- Yes: Low-level questions appear on the questionnaire. You can specify the number of levels to display. The default is 100.
- No: Only the first-level questions appear.

Show all options of feature. Specify whether to show all feature options. If this setting is selected, the excluded options, which are not available to select, can be seen as dimmed. If this setting is not selected, you cannot see the excluded options. Select the setting if you want to facilitate diagnosing configuration errors. The default value of the option is inherited from the setting of the current configurable item in Configurable Item Maintenance.

Show price info. Specify whether to show price information for the item being configured. Price is not displayed by default.

Note If your transaction currency is different from the domain currency, the system converts the price from the domain currency and displays it in the transaction currency.

Price type. Choose the type of the price to be calculated for the item being configured.

Pricing method. Specify the method to use to calculate and display the price of the configuration.

Absolute: The item price is calculated by adding up the prices of all the components in the item based on configuration answers.

Relative: The item price is displayed as a price variance relative to the default item price.

Reprice the configuration. Specify whether to reprice the configuration when you load an existing one. A configuration's price is the cumulative sum of the prices of all its components. Since component prices may change over time, repricing a configuration recalculates the price based on the most current component prices.

When a configuration is repriced, existing price lists are updated. The system does not expire existing price lists and create new ones.

- Always Reprice: By default, the configuration price is always recalculated based on current component prices.
- Prompt for Reprice: When you load an existing configuration, you are prompted to reprice the configuration.
- Don't Reprice: The configuration price is not recalculated; the original price stored as part of the configuration is used.

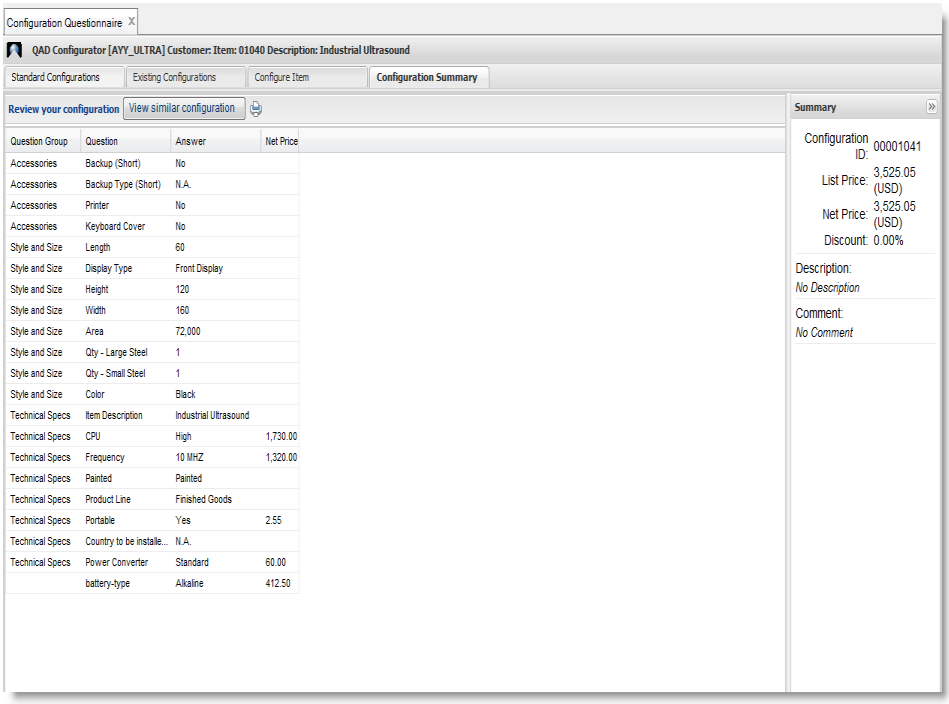
Create variant item on. Specify whether you want to create variant items on the item level.

After you complete all the questions, click the View Summary button or the Configuration Summary tab to proceed to the next step in the item configuration process.

Reviewing and Submitting Configuration

The Configuration Summary screen lets you review the answers you have provided so far, save your configuration, and view similar configurations, and finally create and order a variant item based on your configuration.

Fig. 7.13
Configuration Summary Screen



Reviewing Current Configuration

The configuration summary table displays question group (functional group), question (feature), answer (selected feature option), and net price of components calculated based on selected feature options for each question. The hideable Summary panel on the right displays general information about the configurable item you are configuring.

All the questions or features of the configurable item you are configuring are displayed in the configuration grid. Unanswered questions show Select an Option in the Answer column.

When you review your answers, you can always click the Back button or the Configure Item tab to return to the questionnaire to change your answers.

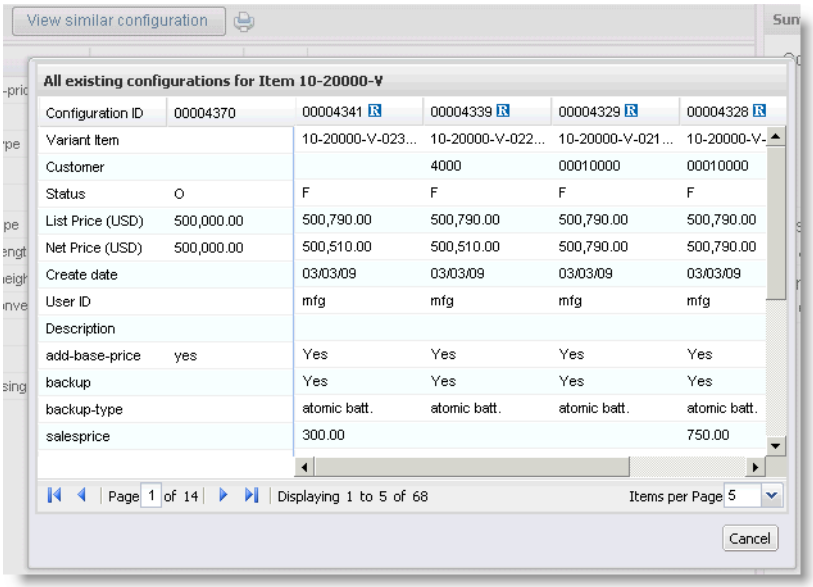
To jump to a specific question in the questionnaire, click the answer in the configuration grid.

Viewing Similar Configurations

When you have completed or partially completed the questionnaire, you can view existing configurations that are similar to the configuration you have created so far. The system searches for similar configurations by filtering existing records using your answers as search criteria. If no answer is provided to a question, the corresponding feature is not used to compare configurations. If none of the questions are answered, all existing configurations associated with the current configurable item are considered similar configurations.

To use this feature, click the View Similar Configurations button in the Configuration Summary screen. A Similar Configurations window displays.

Fig. 7.14
Similar Configurations Window



Your current configuration is displayed on the left of the screen with all the configurable item questions and the answers you have provided. On the right of the screen, all similar configurations with identical feature options to the answers you have answered are displayed in a comparison table.

Submitting Configuration

Submitting configuration is the final step in the item configuration process. After you have gone through all the questions in the questionnaire and created a configuration based on your answers, you submit the configuration. The system saves it as a new variant item or a matching one and returns the variant item to the order line in Sales Order Maintenance or Sales Quote Maintenance.

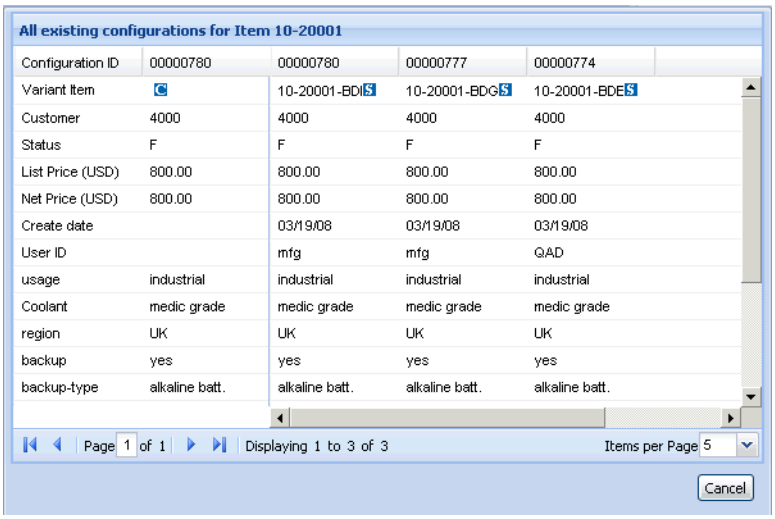
To submit your completed configuration, click the Save Configuration button at the bottom of the Configuration Summary screen.

If the configuration you are submitting was loaded from an incomplete configuration in the previous step, the system prompts you to update the original configuration or to create one. If you choose to update the original configuration, it is overwritten by your current configuration. If you choose to create a configuration, a new configuration record is created with a new configuration ID.

The Matching Configurations window displays when the current configuration is submitted.

Note If Auto Select is set to Yes in Configurable Item Maintenance, the Matching Configurations window does not display and the Questionnaire window closes. Different combinations of configuration-selection, auto-select, and configuration-retention values determine how the system behaves when a configuration is submitted and how variant items are created.

Fig. 7.15
Matching Configurations



Your current configuration is displayed on the left of the screen with all the configurable item questions and the answers you have provided. On the right of the screen, the system displays all matching configurations with identical configuration keys. Compare matching configurations with your current one to make sure you do not create redundant variant items with identical configurations.

Depending on displayed data, you can perform one of the following actions in the Matching Configurations screen:

- Create a variant item from the current configuration.

  Click the C (Create variant item) icon in the Variant Item field of the current configuration to create a variant item. After a brief display of the variant item creation process bar, the Questionnaire window closes and the newly created variant item number is returned to the Item Number field in Sales Order Maintenance or Sales Quote Maintenance.

  Note If you set up variant planning item rules and if changes to the configuration lead to changes to the variant planning item, the system attaches the new variant item to the new planning item as a component and consumes its forecast.

- Assign an existing variant item to the current configuration.

Click the S (Select the variant item) icon next to a matching variant item number to save the current configuration and associate it with that variant item number. The Questionnaire window closes and the newly assigned variant number is returned to the Item Number field in Sales Order Maintenance or Sales Quote Maintenance.

Note If you set up variant planning item rules and if changes to the configuration lead to changes to the variant planning item, the system attaches the re-assigned variant item to the original planning item and consumes its forecast. Once attached to a planning item, an existing variant item is always associated with the planning item unless you perform a configuration rebuild.

Chapter 8

Administration

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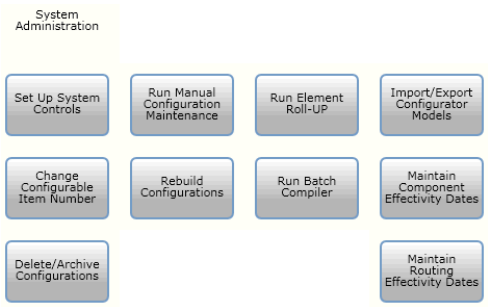
Administration Functions Overview

QAD Configurator provides you with a host of system administration tools. You can use these tools to effectively maintain the system and keep it running with high performance and stability on a day-to-day basis.

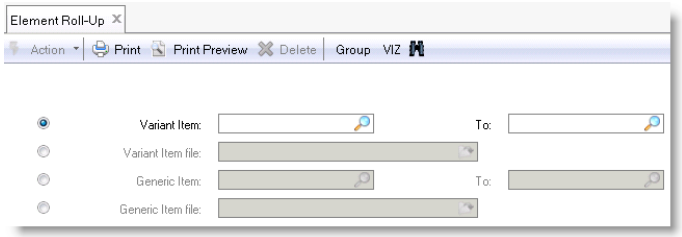
Fig. 8.1
Configurator Administration Functions



Performing Element Roll-Up

Use Element Roll-Up to roll up non-cost-related data elements. This function can be either automatically performed during variant item generation or manually executed from the menu.

Fig. 8.2
Element Roll-Up



Variant Item. Specify a variant item or a range of variant items to roll up.

Variant Item File. Specify a previously created ASCII file that contains the item numbers of all the configurable items you want to roll up.

Configurable Item. Specify a configurable item or a range of configurable items to roll up.

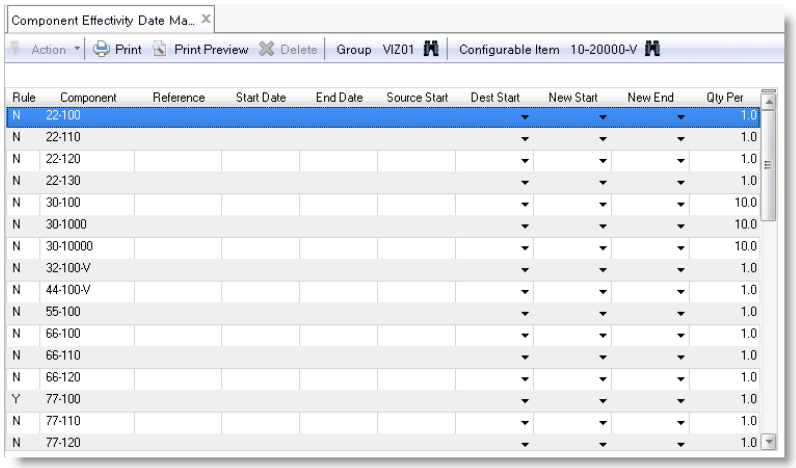
Configurable Item File. Specify a previously created ASCII file that contains the item numbers of all the configurable items you want to roll up.

Click OK to start the element roll-up process and generate an element roll-up report, which you can view, save, and print.

Maintaining Component Effective Dates

Use Component Effectivity Date Maintenance to update component effective dates in the QAD EA production database when engineering changes occur. This functionality is required when components have been added to the QAD EA production database with start or end effective dates that prevent the selection of these components.

Fig. 8.3
Component Effectivity Date Maintenance



The function displays all the components of the selected configurable item along with their reference, start, and end effective dates in the source database.

To update the effective dates of a component:

Specify the destination start date, new start date and new end date by clicking the Down arrow next to these column heads.

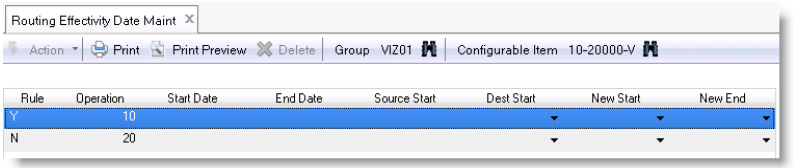
Click the Save button to save the changes. The Rule column changes to Y to indicate that there is an active rule for this component.

To remove a rule, select the component and click Delete Rule.

Maintaining Routing Effective Dates

Use Routing Effectivity Date Maintenance to update operation effective dates in the production database when engineering changes occur. This functionality is required when operations have been added to the QAD EA production database with start or end effective dates that prevent the selection of these operations.

Fig. 8.4
Routing Effectivity Date Maintenance



The function displays all the operations of the selected configurable item with their effective dates in the source database.

To update the effective dates of an operation:

Specify the destination start date, new start date, and new end date by clicking the Down arrow next to these column heads.

Click the Save button to save the changes. The Rule column changes to Y to indicate that there is an active rule for this component.

To remove a rule, select the operation and click Delete Rule.

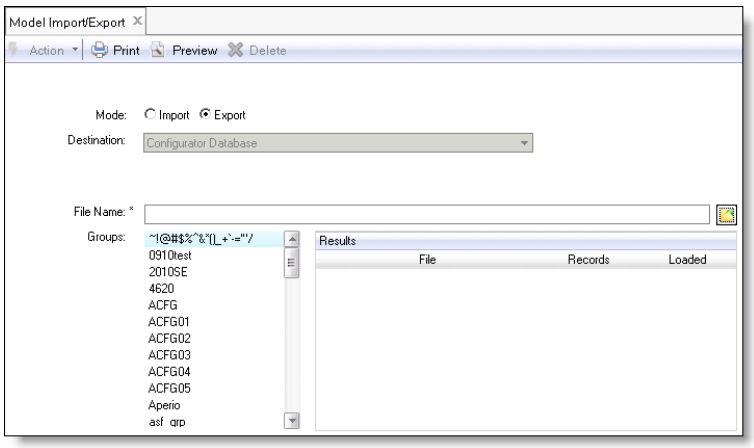
Importing and Exporting Data

Use Model Import/Export to create data packages and load QAD EA and QAD Configurator data.

Creating Data Package

Select Export to create a data package file that contains all QAD EA and QAD Configurator records associated with the selected configurable item.

Fig. 8.5
Model Export



File Name. Specify the name and location of the package (`.pkg`) file. You can select an existing file using the Browse button and then the system overwrites the existing file.

Groups. Select the groups you want to include in the package.

The package includes the tables listed in the following two tables.

Table 8.1
QAD Configurator Tables Associated with a Configurable Item

Table	Description
agd_det	Generic Product Structure Assignment Rule table
agpd_det	Part Master table
agqd_det	Holds the rules for the fields to be set in Sales Quote Detail
agrd_det	Generic Routing Assignment Rule table

Table	Description
agr_mstr	Routing Master table
agsd_det	Holds all the rules for fields to be set in the sod_det table
ag_mstr	Generic Product Structure Master table
ans_mstr	Structure of (questionnaire) features per configurable item
cee_mst	External Entity Master table
een_mstr	Element Entity Master table
effc_mstr	Component Effectivity Update Master table
effr_mstr	Routing Operation Effectivity Update Master table
eru_mstr	Element Roll-Up Master table
fea_mstr	Feature Master table
fed_det	Feature Detail table
fg_mstr	Functional Group Master table
fod_det	Rule Detail table
for_mstr	Rule Master table
fpg_mstr	Xref Rule table for part or rule groups
ftb_mstr	Rule/Rule table Master table
grp_mstr	Master Group table
pcpt_mstr	Configurable Item Master table
prg_mstr	Item – Rule Group Master table
prid_det	Option Priority/Default Detail table
pri_mstr	Option Priority/Default Master File
ptn_mstr	Part Number Master table
qst_mstr	Question Type Master table
rea_mstr	Product Configuration Rule table
rg_mstr	Rule Group Master table
tb_det	Detail Rule table
tb_find	Search Logic table for Rule tables
tb_mstr	Master table for Rule tables
tb_pack	Cell expressions for Rule tables
tb_xref	Expression to column Xref for Rule tables
tpt_mstr	Xref table for Item and Rule table
vad_det	Variable Detail table (Options)
var_mstr	Variable Master table

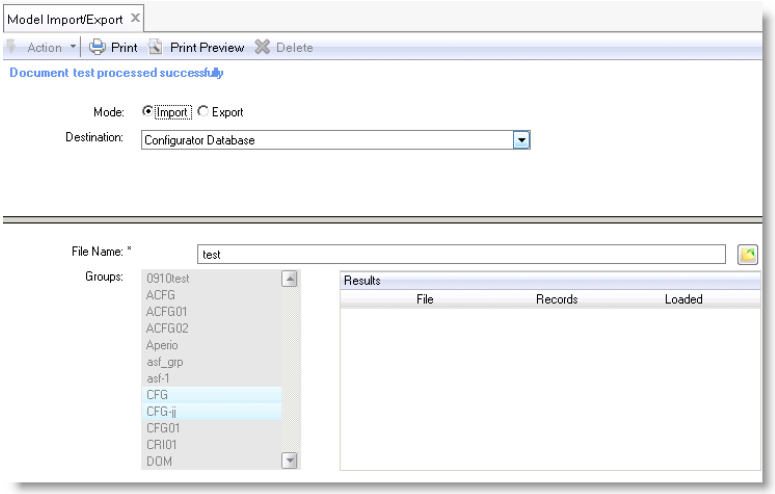
Table 8.2
QAD EA Tables Associated with a Configurable Item

Table	Description
pt_mstr	Item Master Table
ps_mstr	Product Structure Master Table
ro_det	Routing Detail Table

Loading QAD EA and QAD Configuration Data

Select Import to load data from data package files into the QAD EA and QAD Configurator databases respectively.

Fig. 8.6
Model Import



File Name. Specify the name and location of the package (`.pkg`) file to load data from.

Destination. Select a database to load the data to. Select the ERP database first when importing a model.

The load process first deletes all associated item, product structure, and routing records in the database, and then loads data from the package file to ensure exact data duplication.

Before deleting associated records and loading data into the QAD Configurator database, the load process also performs these steps:

1. Configurable item locking. The system locks the configurable items in question, so that no one can start a questionnaire while the load is in process. If the user tries to start a questionnaire in a group that is being loaded, a message displays showing that the configurable item is currently unavailable.
2. QAD EA data comparison. The QAD EA data is compared against the data in the data package. Item masters, product structures, and routings are all checked to ensure data consistency. If any differences such as missing item masters, components, or operations are detected, an error report is generated and the process stops. Correct any discrepancies.

Active User Check. Once the data comparison has passed, the system determines if there are any users currently processing questionnaires within the groups being loaded. If active users are found, the Active User Manager displays showing which users are currently active and prompting to cancel the load or wait until no user is active. If you choose to wait, when all users have completed their questionnaires, the load process automatically continues.

Comment Handling. The comment information of the following programs is included in the package during Model Import/Export transactions:

- Master Group Maintenance

- Configurable Item Maintenance
- Variable Maintenance
- Variable Option Maintenance
- Feature Maintenance
- Feature Option Maintenance
- Rule Group Maintenance

Deleting and Archiving Configurations

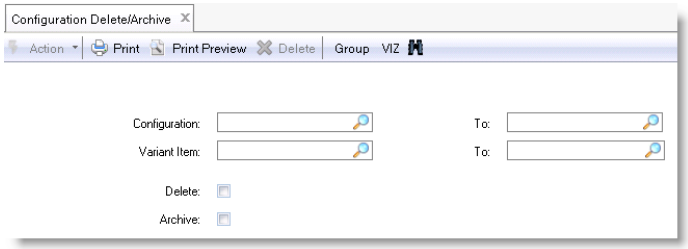
Use Configuration Delete/Archive to archive and/or delete existing configurations.

Each time you complete the questions in the questionnaire and click OK, QAD Configurator generates a new configuration in the database, containing all the answers to the questions for the configurable item. The configuration is created even if no variant is generated. As a consequence, the configuration table in the QAD Configurator database can grow rapidly.

You can use Configuration Delete/Archive to archive one or more configurations to a file for later use, or permanently delete configurations from the set of configurations available in QAD Configurator.

The variant product structure generator in the questionnaire uses configurations to create variant items. After you delete a configuration, this configuration is no longer available for creating a variant or for selection with the unique configuration key.

Fig. 8.7
Configuration Delete/Archive



- Enter the configuration IDs of the particular configurations to be transferred or deleted.

and

- Specify the variant numbers that correspond with the particular configurations to be transferred or deleted.

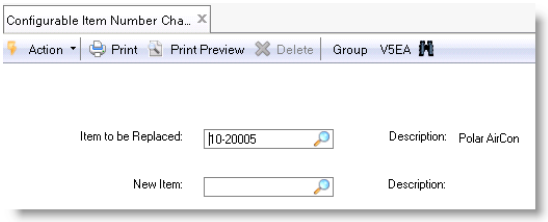
Warning If you do not enter any configuration IDs or variant numbers, the system archives and/or deletes all the available configurations in the group.

Changing Configurable Item Numbers

Use Configurable Item Number Change to manually update configurable item numbers in Configurator to be in sync with changes in QAD EA.

Note In QAD 2008.1 Enterprise and later, configurable items cannot have item replacement records and cannot be memo items.

Fig. 8.8
Configurable Item Number Change



Maintaining Configurations Manually

Use Manual Configuration Maintenance to manually enter and maintain configurations.

A configuration consists of answers to all the questions relating to the configurable item.

QAD Configurator uses configurations in two ways:

- For creating a variant from the configurable item
- For selecting existing variants with the same configuration description

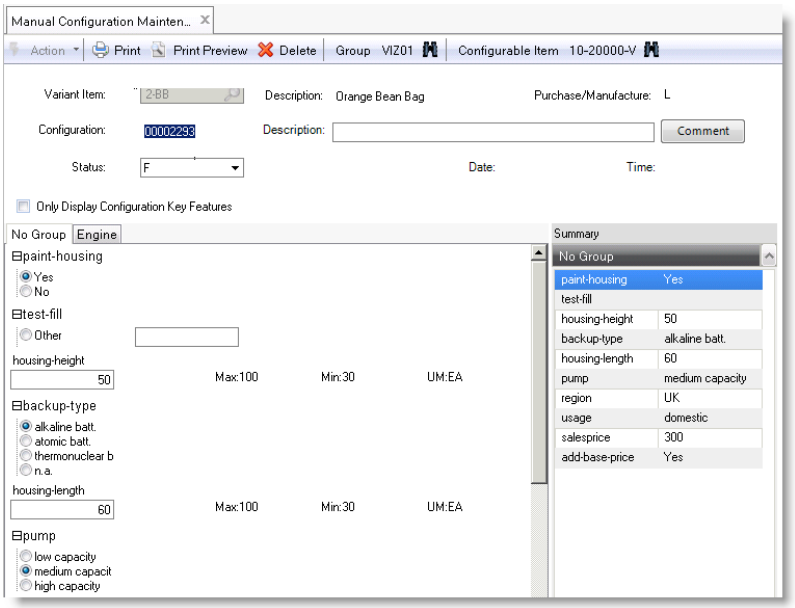
Selecting existing variants reduces the number of variant items that are created in the QAD EA item, product structure, and routing tables.

When you run the questionnaire and answer the questions with the same answers as in a previous configuration, QAD Configurator does not create a variant. The Configurator uses the existing configuration and thus limits the number of variants being created. This can significantly reduce the effort and the time involved in creating the variant product structure.

It is possible that there can be items in the QAD EA item and product structure tables that are valid variants. But these items were not created using the QAD Configurator questionnaire and variant creator. These variants do not have a configuration description—that is, a configuration—in QAD Configurator and can never be selected as an existing variant. Using Manual Configuration Maintenance, you can create this configuration description afterwards and link it to the item in QAD EA.

Note Make sure that the variant that is linked to the manually created configuration is an item in QAD EA. The variant cannot be a configurable item in QAD Configurator, because a configurable item can never be a variant of another configurable item.

Fig. 8.9
Manual Configuration Maintenance



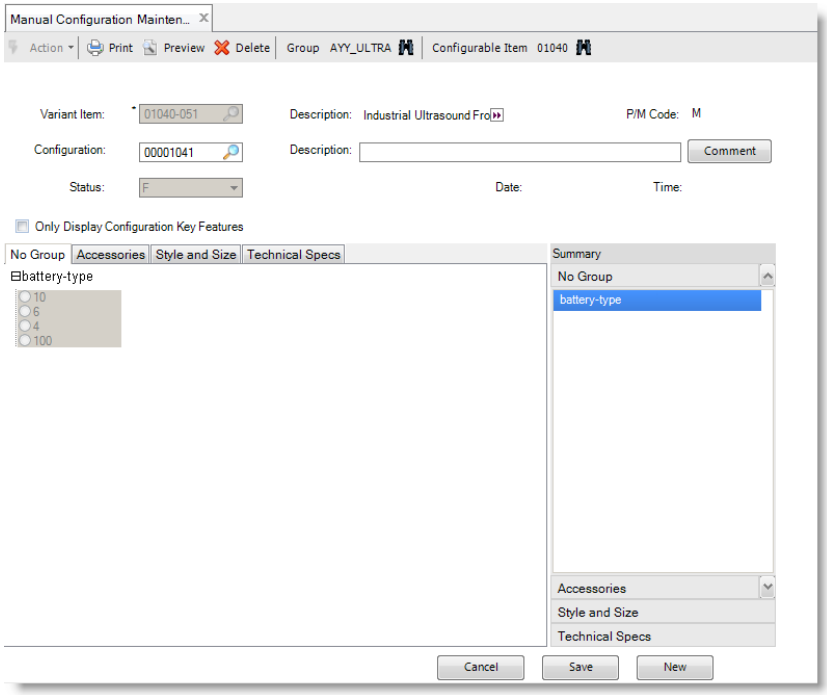
The variant field shows the variant item number for the manually maintained configuration that has been most recently accessed. The configuration ID, status, date, and time are shown in the frame below this field. Details of the questionnaire answers that make up the configuration are shown in the feature/option list window.

To select another configuration to maintain, you can either use the navigation buttons in the button area, or you can click the Browse button to the right of the Variant field. The system displays a screen where you can select the required variant item, using filter fields in the top part of the screen to narrow the search.

When you have selected a manually maintained configuration, you can modify it by changing the answers to the questionnaire questions in much the same way as when using the questionnaire. If you no longer require the configuration, you can delete it by clicking the Delete button. The system displays a message prompting you to confirm the deletion.

For variant items created from questionnaire configurations, you can browse the configuration, modify descriptions, and add comments.

Fig. 8.10
For Variant Item Created from Questionnaire Configuration

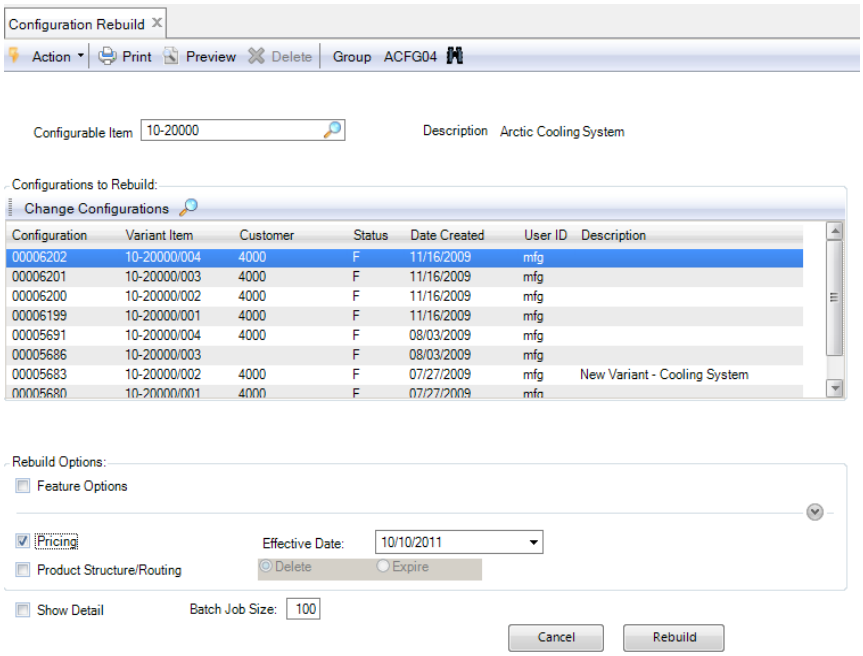


Rebuilding Configurations

Use this function to update one or more existing configurations and variant items which are repeatedly ordered and need adjustments for one of the following reasons:

- Changes to the configuration details; for example, a new feature has been added or an option has changed
- Pricing changes, including changes in the Sales Configuration pricing rules
- Engineering changes to item data, product structure, or routing, including changes in the Product Configuration rules

Fig. 8.11
Configuration Rebuild



1 Select a configurable item. If the configurable item has not been analyzed yet, the system prompts you to analyze it first.

2 A Configuration Browse window is displayed. Use the search box to filter records and look up the configurations you want to modify. Click OK to select all the configurations displayed in the browse.

3 Selected configurations are displayed in the Configurations to Rebuild list. You can click the Change Configurations icon to bring up the browse window to change your selections. For information on using the Configuration Browse, see “Using Browses and Browse Collections” on page 34.

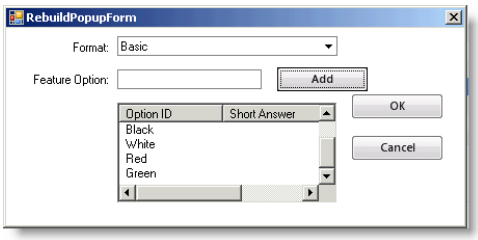
4 To make batch changes to features in all the selected configurations, select Feature Options. In the expanded box, specify changes to be applied to features of the selected configurations across the board during the rebuild process.

Important Use caution if you try to update features that are a part of the configuration key. This may lead to multiple variants associated with the same configuration key.

a Under the Add/Update tab, specify changes to apply to the configurations by selecting features of the configurable item and assigning values to them. To assign a value to a feature, click the Browse icon to bring up a pop-up window that lets you designate values in either the basic format or the advanced format.

- In the basic format, for features with defined options, select an option from the option list and click OK to assign the value to the feature. For features that allow fill-ins, including those associated with browse codes, you can add a feature option or browse code to the option list. Then select it as the new value for the feature. The system validates the new value during the rebuild process and displays an invalid option error when invalid values or undefined browse codes are found.

Fig. 8.12
Rebuild Feature Options



- In the advanced format, you can directly type feature values.

b Under the Delete tab, specify variables to delete from the configurations. You can only delete variables that are no longer defined as features attached to configurable items.

5 If you want to reprice the configurations, select the Pricing check box. When you select this option, the system updates the list price and net price of the configurations, as well as related price lists.

Note In the Effective Date drop-down list, you can select or manually enter a date for the updated price lists to take effect. The effective date is no earlier than the current date.

6 If you want to update the product structures and routings of the variant items, select the Product Structure/Routing check box. Then specify whether you want to obsolete or delete the old product structures and routings.

- Delete: Old product structure and routing records are removed from the system. New records are created without date information.
- Expire and Effective Date: Old product structure and routing records are marked as expired but are still retained in the system. You can manually enter the effective date for the new records; the End Date for old records is one day before the Effective Date for the new records. By default, the Effective Date is Today.

Note When expiring old product structure/routing records and creating new ones, the system keeps the records effective in the future intact.

7 By using Variant Item Cost Roll-Up in Configuration Rebuild, you can control whether to rebuild configurations with cost roll-up.

- Yes. In rebuilding a variant item, the system does the cost roll-up, recalculating the variant item cost.
- No. By default, in rebuilding a variant item, the system does not modify any cost data of the variant item. This is often the case when costs are frozen for a certain period, typically a financial year, but the configuration changes within that period.

8 If you selected the Pricing and Product Structure/Routing options, you can select Show Detail to display detailed change information in the rebuild report.

9 Click Rebuild. The system displays the number of configurations and variant items to rebuild and tells you that the rebuild process may take a long time. Click OK to start the rebuild process.

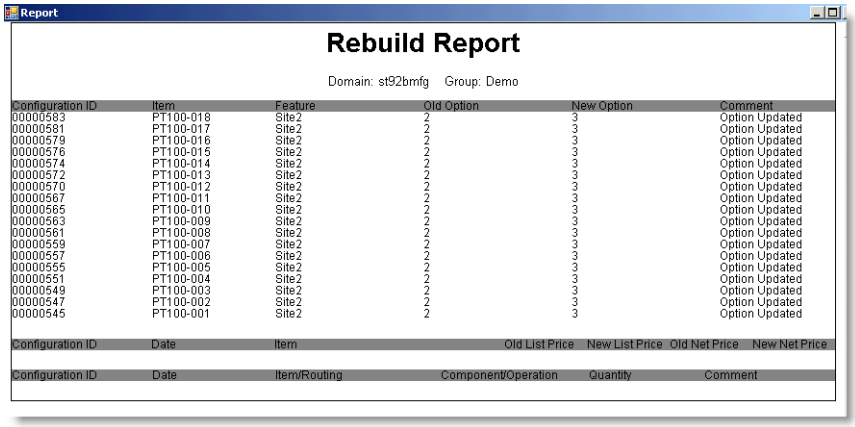
Note The rebuild process may take a long time depending on the number of configurations and variants to rebuild and the complexity of the configurations.

10 Depending on your selected rebuild options, the system performs a number of batch updates to the configurations and variants including changing feature values, repricing configurations, and re-creating product structures and routings.

Note Currently, the system does not create new variants during configuration rebuild even if new variant item numbers should be generated from the changes. In such cases, the system displays a warning message informing you that the configuration changes warrant new variant item numbers. You can manually assign new numbers to affected variant items in Item Number Change (1.4.13).

11 When the rebuild process is complete, the system displays a rebuild report. The report summarizes all the updates made to the configurations and variants, including changes to features, product structures, routings, and price information. You can print and save the report.

Fig. 8.13
Rebuild Report



The system runs the following product configuration rules when rebuilding a configuration:

- Variant item data rule
- Variant product structure rule
- Variant routing rule

Currently, the system does not process sales configuration rules during configuration rebuilds.

Note The rebuild process does not update product structures and routings for kit type configurable items—either physical kit or phantom kit.

If errors occur during the rebuild process, the system displays error messages that show affected variant item numbers and invalid options.

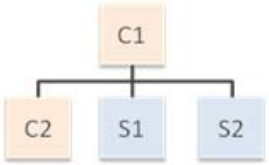
If the configuration rebuild process causes the planning item to be changed, the system removes the association between the variant items and the old planning item. Then the system associates the variant items and with the new planning item. The changes are displayed in the result report.

Rebuild for Multi-level Configurations

A multi-level configurable product structure enables the modularization of product structures. Rather than one huge BOM that lists all possible components of a configured variant item, the product structure is divided into sub-assemblies that are configurable themselves and may have their own routings.

For example, as shown in Figure 8.14, C1 is a configurable item of the SO Type BOM. C2 is a component of C1 while C2 is also a configurable item itself.

Fig. 8.14
Multi-level Configurations



Here are some scenarios where multi-level configurations are used, including information about how the Configuration Rebuild performs.

Scenario 1: Configurable Sub-assembly

In this scenario, a configured subassembly is selected or created, depending on whether there exists a matching configured variant item.

Fig. 8.15
Configurable Sub-assembly

Item C2, a configurable sub-assembly, has a configurable product structure.

- If there is a configuration key for C2, either an existing variant is selected or a new variant is created. As shown in Figure 8.15, C2-1 is selected or C2-2 is created.
  - In Configurable Item Maintenance, set Configuration Selection to First Matching or Last Matching, if you want the system to select an existing variant.
  - In Configurable Item Maintenance, set Configuration Selection to Just Created, if you want the system to create a variant.
- If there is no configuration key defined for C2, a new C2 variant, C2-2, is created.

In rebuilding the configuration for C1, the top-level configurable item, the system searches for a matching configuration for C2 according to the configuration key.

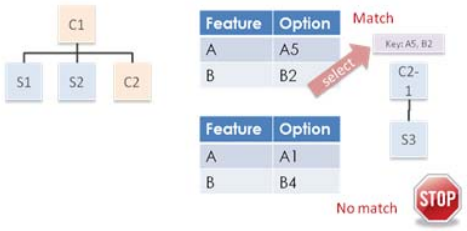
- If there is a match, the system uses the variant item, attaching it to the product structure of C1.
- If there is no match, the system deletes the entire variant product structure and rebuilds the multi-level structure according to the updated configuration and current rule set.

Note In rebuilding C1, when a matching configuration is found for C2, the system does not run product configuration rules. If there are any rule changes or feature value changes that could cause item data changes, lower-level configurations need to build first.

Scenario 2: Pre-configured Sub-assembly

In this scenario, all C2 sub-assemblies have been pre-configured and each has a configuration attached to it. The pre-configuration can be the result of the Configurator variant item creation process, or can come from Manual Configuration Maintenance, where you manually attach configurations to standard items after item creation. For more information about manually maintaining configurations, see “Maintaining Configurations Manually” on page 146.

Fig. 8.16
Pre-configured Sub-assembly



The system compares the relevant features of the new configuration with the configuration key defined for C2:

- If there is a match, C2 sub-assembly is selected.
- If there is no match, the system terminates the creation of C1 and reports an error.

In this scenario, the configurable item C2 does not have a configurable product structure since there is no new configured variant item created. C2 serves as a placeholder.

In rebuilding the configuration for C1, the top-level configurable item, the system searches for a matching configuration for C2 according to the configuration key.

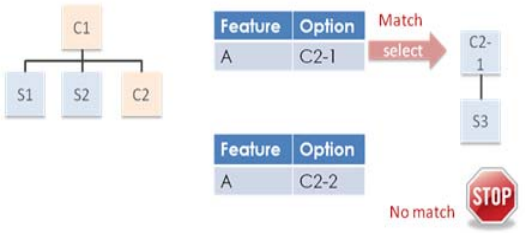
- If there is a match, the system uses the variant item, attaching it to the product structure of C1.
- If there is no match, the system reports an error in the rebuild report.

Note In rebuilding C1, when a matching configuration is found for C2, the system does not run the Variant Item Data Rule. If there are any rule changes or feature value changes that could cause item data changes, lower-level configurations need to build first.

Scenario 3: Item Number Selection

In this scenario, C2 has a huge number of variations and the possible component items might have very dynamic life cycles. Additionally, the possible component items are standard items not created by the Configurator.

Fig. 8.17
Item Number Selection



Without a configuration key, the actual item wanted is selected explicitly by its item number. Use Variant Item Number Rule Maintenance to set the variant item number as the number of an existing standard item based on a single feature. Typically, an option list or item browse in the Questionnaire is used to manually select the wanted standard item.

In this scenario, C2 does not have a configurable product structure since there is no new configured variant item created. C2 serves as a placeholder.

In rebuilding the configuration for C1, the top-level configurable item, the system searches for a matching configuration for C2 according to the variant item number rule.

- If there is a match, the system uses the variant item, attaching it to the product structure of C1.
- If there is no match, the system reports an error in the rebuild report.

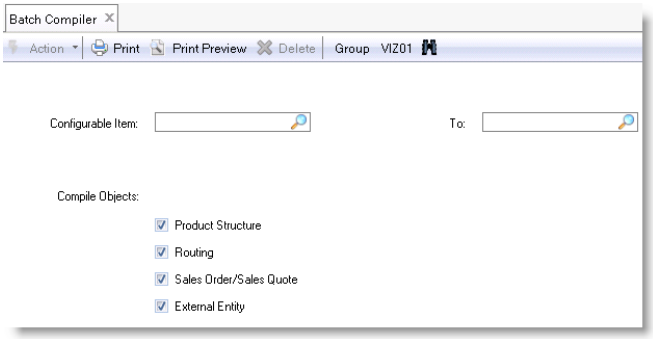
Note In rebuilding C1, when a matching configuration is found for C2, the system does not run the Variant Item Data Rule. If there are any rule changes or feature value changes that could cause item data changes, lower-level configurations need to build first.

In Scenario 2 and Scenario 3, C2 serves as a placeholder. A configurable item placeholder can appear multiple times in the product structure, if each placeholder gets the same item. But the system does not support the situation where a placeholder configurable item appears multiple times in the product structure while each placeholder has a different item. The reason is that for a placeholder configurable item, there is only one variant item number rule and one configuration key. If you want different configurable items in the product structure, define different configurable items with configuration keys and variant item number rules.

Running Batch Compiler

Use Batch Compiler to compile the Progress source code for selection and assignment rules for one or more selected configurable items (including planning items). Recompiling the code after significant changes have been made—for example, after re-creation of the database—can save considerable time in subsequent Variant Creation processes.

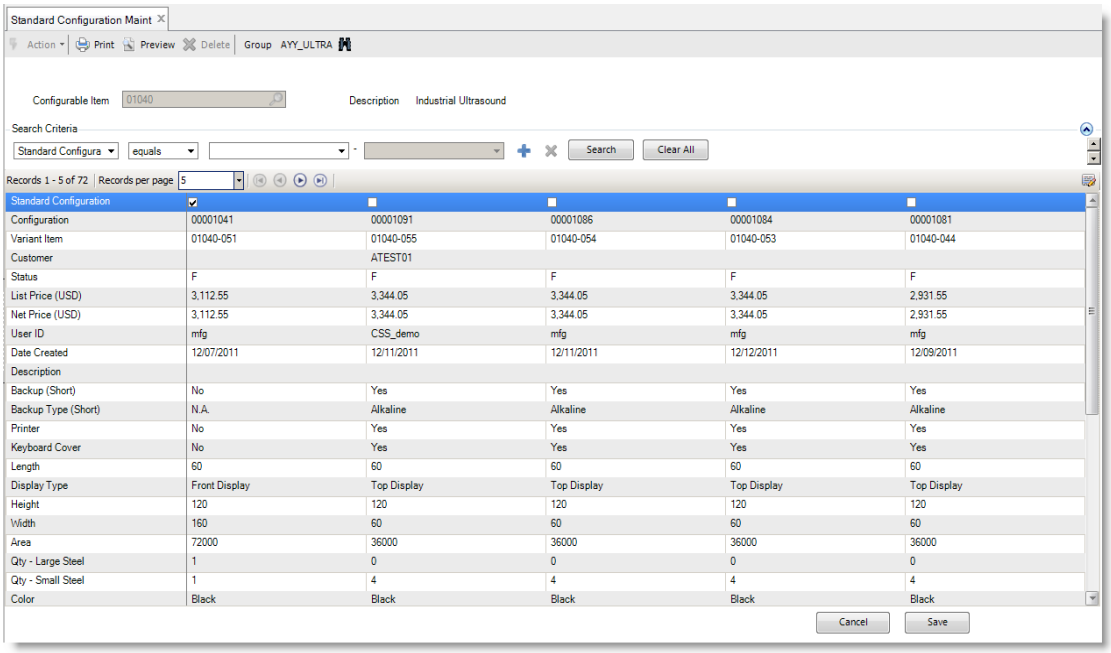
Fig. 8.18
Batch Compiler



Maintaining Standard Configurations

You can use Standard Configuration Maint (50.4.10) to get standard configurations that are shown in the Standard Configurations screen of the Questionnaire. To set an existing configuration to a standard configuration, select the check box above the configuration ID of the existing configuration.

Fig. 8.19
Standard Configuration Maintenance



To use Standard Configuration Maintenance,

1. Select a group using the binocular button on the toolbar.
2. Specify a configurable item in the Configurable Item field; the system displays all available configurations of the configurable item for you to choose.
3. Browse through all available configurations; you can also use the search capabilities to search for configurations that meet your search criteria.

4 Select the check box above a Configuration ID to set the configuration as standard. You can set one or more standard configurations.

5 Click Save.

After you have standard configurations, the next time you use Standard Configuration Maintenance, the standard configurations are shown first, followed by non-standard configurations.

Note Standard configurations are not customer-specific.

Using Configurator Metrics

Configurator offers you a set of metrics to help you gauge how effectively you are using Configurator on a daily basis. The metrics reveal opportunities for improvement and help you make the best use of the product. This visual management tool lends at-a-glance insight into your performance level in using Configurator by graphically representing the following KPIs (Key Performance Indexes):

- Configurator Model Completeness
- Configurator Rules Completeness
- Configurator Operational Performance

Chapter 9

Configurator Best Practices

Using Placeholder Component ***158***
Describes a scenario of broad product structures and gives a solution.

Using Base Price for Configurable Items in Questionnaire ***158***
Describes how to use base price for configurable items in the Questionnaire.

Populating Fields in Variant Item-Site Planning Records ***158***
Describes how to update item-site planning records for each variant item with specific settings.

Dealing with a Large Number of Feature Options ***159***
Describes a solution for improving questionnaire performance when a product feature has a large number of options.

Using Placeholder Component

In this scenario, the business is faced with broad product structures; the product structures include a huge number of possible component items (or non-configured sub-assemblies) on one or more levels.

To deal with the situation, you can create a multilevel configuration with a placeholder configurable item where a component is then inserted.

1. Associate a placeholder component with the wanted product structure.
2. Make the placeholder component a configurable item of type BOM.
3. Define a feature that has the item number of the to-be-associated component.
4. Set up Variant Item Number Rule with element Feature and select the feature that you defined in the previous step.
5. Assign the item number to the new feature, which can be an item browse, a manual entry, an external entity lookup, or any other lookup or calculation.

See “Rebuild for Multi-level Configurations” on page 151 to see more information about multilevel configuration.

Using Base Price for Configurable Items in Questionnaire

The business scenario is that a configurable item has a base price; certain selected options are then added to the price.

In this situation, you can create a feature that retrieves the base price.

1. Define a feature, such as Model.
2. Add an option, which can be the item number or description of the configurable item.
3. Add the configurable item as a pricing part for the feature; you can either set up a price in the item master or a price list for the item.
4. Write an item rule of type Assignment that selects this option.

Populating Fields in Variant Item-Site Planning Records

In this scenario, item-site planning records that are created by Configurator for each variant item need to be updated with specific settings—for example, minimum order quantities.

To deal with the situation, you can create an external entity that populates variant item-site planning records.

1. Set up a configurable item that creates variant item-site records.
   - If you want to create item-site records for all sites defined for the configurable item, set Variant Item Site Record to All Sites.

- If you want to create only one item-site record, set Variant Item Site Record to Current Site Only and create a variable/feature you reference in Site Variable.

2. Create an external entity to select the ptp_det record with the following selection rule (based on your setup in the previous step)
   - ptp_domain = sysDomainID, ptp_part = sysVariantItemID, ptp_site = *`your site`*
   - ptp_domain = sysDomainID, ptp_part = sysVariantItemID, ptp_site = *`site variable`*
3. Create an external entity rule that assigns values to your wanted ptp_ field.

Dealing with a Large Number of Feature Options

In this business scenario, an item has many features and each feature has a huge number of options, for example, 100 options for one feature. If you put all those options on the questionnaire, there might be system performance issues.

In this case, you do not need to list all the feature options on the questionnaire. Instead, you can define the features as the fill-in type and let question respondents type in free-format answers or select answers from the associated browse, if any.

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