

Working with Business Rules in My webMethods

Version 9.8

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This document applies to webMethods Business Rules Version 9.8 and to all subsequent releases.

Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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About this Guide

Working with Business Rules in My webMethods Help is for users of My webMethods who want to modify rule projects that were exported from Software AG Designer to the My webMethods Server repository.

Business rules are created with the Rules Development feature in Software AG Designer. For more information, see *webMethods Rules Development Help*.

Working with Business Rules in My webMethods Help contains supporting documentation on the following main topics:

- ["Getting Started" on page 9.](#)
- ["Rules Development Terminology" on page 11.](#)
- ["Understanding the User Interface" on page 15.](#)
- ["Modifying Rule Projects Overview" on page 27.](#)
- ["Working with Decision Tables" on page 29.](#)
- ["Working with Event Rules" on page 43.](#)
- ["Global Functions Overview" on page 51.](#)
- ["Rule Verification Overview" on page 55.](#)
- ["Hot Deploying Rule Projects to the Integration Server" on page 61.](#)
- ["Working with Expressions" on page 65.](#)

Document Conventions

Convention	Description
Bold	Identifies elements on a screen.
Narrowfont	Identifies storage locations for services on webMethods Integration Server, using the convention <i>folder.subfolder:service</i> .
UPPERCASE	Identifies keyboard keys. Keys you must press simultaneously are joined with a plus sign (+).

Convention	Description
<i>Italic</i>	Identifies variables for which you must supply values specific to your own situation or environment. Identifies new terms the first time they occur in the text.
Monospace font	Identifies text you must type or messages displayed by the system.
{ }	Indicates a set of choices from which you must choose one. Type only the information inside the curly braces. Do not type the { } symbols.
	Separates two mutually exclusive choices in a syntax line. Type one of these choices. Do not type the symbol.
[]	Indicates one or more options. Type only the information inside the square brackets. Do not type the [] symbols.
...	Indicates that you can type multiple options of the same type. Type only the information. Do not type the ellipsis (...).

Online Information

Software AG Documentation Website

You can find documentation on the Software AG Documentation website at <http://documentation.softwareag.com>. The site requires Empower credentials. If you do not have Empower credentials, you must use the TECHcommunity website.

Software AG Empower Product Support Website

You can find product information on the Software AG Empower Product Support website at <https://empower.softwareag.com>.

To submit feature/enhancement requests, get information about product availability, and download products, go to [Products](#).

To get information about fixes and to read early warnings, technical papers, and knowledge base articles, go to the [Knowledge Center](#).

Software AG TECHcommunity

You can find documentation and other technical information on the Software AG TECHcommunity website at <http://techcommunity.softwareag.com>. You can:

-
- Access product documentation, if you have TECHcommunity credentials. If you do not, you will need to register and specify "Documentation" as an area of interest.
 - Access articles, code samples, demos, and tutorials.
 - Use the online discussion forums, moderated by Software AG professionals, to ask questions, discuss best practices, and learn how other customers are using Software AG technology.
 - Link to external websites that discuss open standards and web technology.

1 Getting Started

- Installation and Configuration Information for My webMethods System Administrators 10

Before you can get started, you must have a My webMethods user account, with full permissions (read and write) for the application page you want to modify.

My webMethods provides an extremely flexible framework for granting or restricting user access to virtually every aspect of the My webMethods interface. Administrators assign permissions known as access privileges and functional privileges. Access privileges define the application pages you can display. Functional privileges define the actions you can perform in My webMethods. If this guide lists pages or menu items that you cannot access, it is likely because you do not have the access privileges to view the page. If this guide lists user interface controls (e.g. buttons) that are greyed out, it is likely because you do not have the functional privileges to perform the actions associated with the user interface controls. If you have any questions about your access privileges, consult with your My webMethods administrator.

For information about permissions management and customizing the tools, see *Administering My webMethods Server*.

Installation and Configuration Information for My webMethods System Administrators

You must install and configure several Software AG products, before you can modify rule projects that were exported from Software AG Designer to My webMethods. For complete information about installation, see *Software AG Installation Guide*.

To exchange rule projects with the Rules Development feature of Software AG Designer:

- The Business Rules User Interface must be installed on the My webMethods Server. This creates the folder in which the rule projects are stored (My webMethods Applications\ webMethods Application Data \ Rule Projects).
- There must exist at least one My webMethods Server user (other than "sysadmin") with full write access to this folder. The permissions for the folder can be set by the "sysadmin" user using the tools in the folder view.

To set up business rules user accounts in My webMethods:

- The My webMethods Server administrator must create a role for business rules users and assign **ALL** access rights to this role for the Rule Projects folder.
- The My webMethods Server administrator must add the My webMethods Server user who will be accessing the rule projects to this role. For more information about creating and managing user accounts and roles, see *Administering My webMethods Server*.
- The business rules user will not see the newly exported rule project until an administrator gives him permission to do so (see *Administering My webMethods Server, Managing Permissions in My webMethods*). This has to be done once for each rule project.

2 Rules Development Terminology

The following terminology applies to Working with Business Rules in My webMethods Help:

Term	Explanation
Business Rule	A business rule is a rule that defines or constrains an aspect of your business. It is intended to create a business structure or to influence the behavior of the business.
Condition	A condition is the left hand side part of a rule: <code>IF Condition THEN Result</code> .
Condition Value	A condition value determines a condition. It can consist of: <ul style="list-style-type: none"> ■ An operator and a literal value. ■ An operator and a parameter element. ■ An operator and an action that delivers an output value. ■ An operator and a constant.
Data Model	Business rules must be able to interact with application data from other systems. This external application data is mapped to a data model, which is then stored in your workspace as part of the rule project.
Data Model Element	A data model element is an entity of a data model. For example, a <code>customer</code> data model can contain the data model elements <code>name</code> and <code>age</code> .
Decision Entity	A decision entity is a way to display one or more rules. Decision tables, event rules, etc. are different decision entities, even though they can contain the very same rule. Some decision entities are more suited for displaying certain kinds of rules than others.
Decision Table	A decision table is a decision entity. In the decision table, the conditions and corresponding results are

Term	Explanation
	sorted into rows and columns. A column can either represent a condition (the IF part) or a result (the THEN part) of a rule. Each row in a decision table represents one individual rule.
Event Model	Event rules can operate on the basis of pre-defined event types. This event type is mapped to an event model, which is then stored in your workspace as part of the rule project.
Event Rule	<p>An event rule is a decision entity that specifies the reaction to an event. There are two types of events:</p> <ul style="list-style-type: none"> ■ Internal Events. ■ External Events. <p>Internal events are triggered by other event rules and decision tables during rule execution. External events are pre-defined event types that were created with the webMethods Event Type Editor, see <i>webMethods Event-Driven Architecture Help</i>.</p>
New Data Action	A new data action is an action that was mapped from a data model. It creates a new instance of this data model in the rules engine. In this way, a new output parameter that was mapped from this data model is introduced to the rules engine. It can then trigger other decision entities within one rule set that use this output parameter as an input.
Parameter	A parameter is an instance of a data model or an event model.
Parameter Element	A parameter element is an entity of a parameter.
Process Action	<p>A process action is an action that was mapped from an existing process and can be used in a decision entity to:</p> <ul style="list-style-type: none"> ■ Start a new process instance. ■ Join a running process instance. ■ Suspend one or more running process instance(s). ■ Cancel one or more running process instance(s).

Term	Explanation
	<ul style="list-style-type: none"> ■ Fail one or more running process instance(s). ■ Resume one or more suspended process instance(s). ■ Invoke a user task.
Result	<p>A result is the right hand side part of a rule: <code>IF Condition THEN Result</code>. There are two types of results:</p> <ul style="list-style-type: none"> ■ Assignment Result. This result type is applied, whenever you want to assign a value to a result. ■ Action Result. This result type is applied, whenever you want to execute an action from a decision entity.
Result Value	<p>A result value determines a result. There are two types:</p> <ul style="list-style-type: none"> ■ Assignment result values. ■ Action result values. <p>An assignment result value can consist of:</p> <ul style="list-style-type: none"> ■ An operator and a literal value. ■ An operator and a parameter element. ■ An operator and an action that delivers an output value. ■ An operator and a constant. <p>An action result value determines the action status:</p> <ul style="list-style-type: none"> ■ Active. ■ Inactive.
Rule	<p>A rule is a single element that specifies a decision in a <code>IF Condition THEN Result</code> syntax.</p>
Rule Set	<p>A rule set is a grouping of logically related decision entities. Every rule set belongs to a rule project.</p>
Rule Project	<p>A rule project is used as a container for different rule sets and other elements, such as data models, event models, decision entities, actions, etc. In a rule project,</p>

Term	Explanation
	these different elements can be defined and used by all parts of the rule project.
Service Action	A service action is an action that was mapped from an existing Integration Server service (IS service). Then you can execute this service from a decision entity, or use an output value from the service in a decision entity.

3 Understanding the User Interface

- The Navigation Pane 16
- The Workspace Area 17

To access the webMethods Business Rules functionality in My webMethods, log in to an instance of My webMethods where the webMethods Business Rules functionality has been installed.

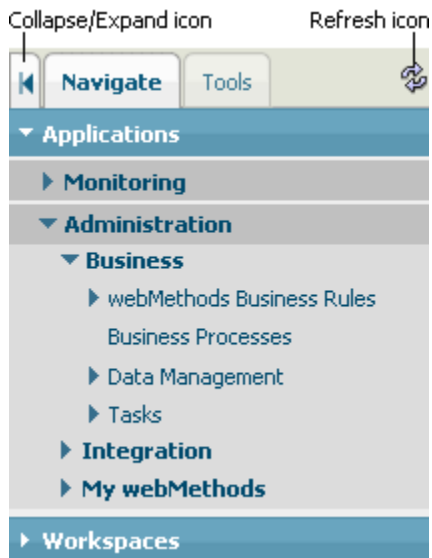
The overall layout of My webMethods is described in detail in *Working with My webMethods*. This section contains the following main topics:

- "The Navigation Pane" on page 16.
- "The Workspace Area" on page 17.

The Navigation Pane

The overall layout of the navigation pane is described in detail in *Working with My webMethods*.

The rule projects that were exported from the Rules Development feature in Software AG Designer can be accessed on the **Navigate** tab under **Applications > Administration > Business > webMethods Business Rules**.

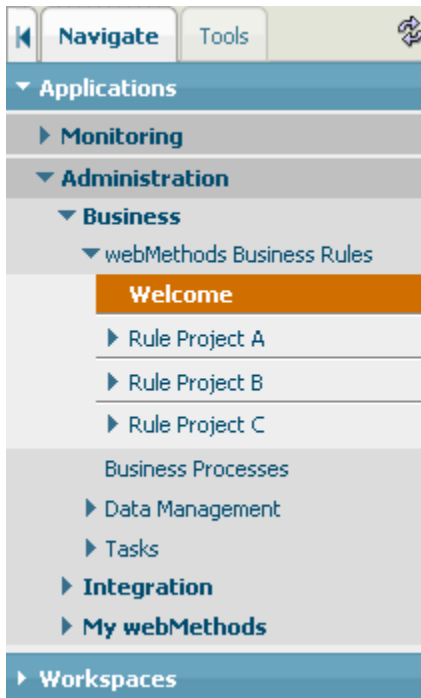


Business Rules Structure

Click **webMethods Business Rules** to open the entries for the business rules application pages.

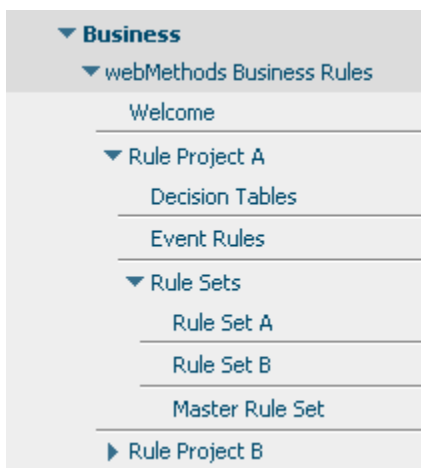
Note: You can only see the application pages you have permission for, see "[Getting Started](#)" on page 9.

The first entry is the entry for the **Welcome** page. Below, there are the entries for the rule project application pages. The entry for the application page that is currently displayed in the workspace area is highlighted.



Rule Project Subentries

Click a rule project entry to open the subentries for this rule project. These subentries are categorized into **Decision Tables**, **Event Rules** and **Rule Sets**. The **Rule Sets** entry is subcategorized into the entries for the individual rule sets used in the rule project, and the **Master Rule Set**.



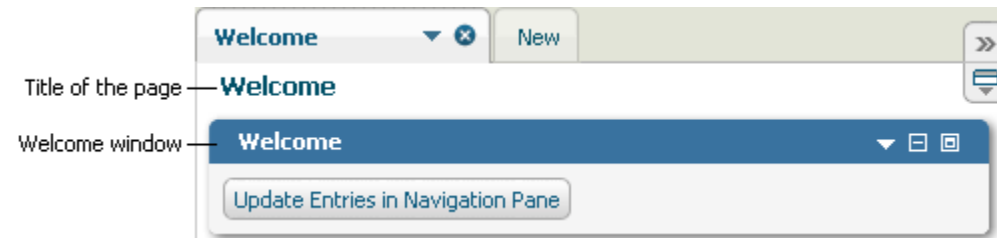
The Workspace Area

The workspace area is located on the right side of the user interface. This area contains the content of the application pages you selected from the navigation pane. There are two different types of business rules application pages:

- Welcome page, see ["The Format of the Welcome Page"](#) on page 18.
- Business rules page, see ["The Format of the Business Rules Page"](#) on page 18.

The Format of the Welcome Page

The following graphic shows the format of the Welcome page.

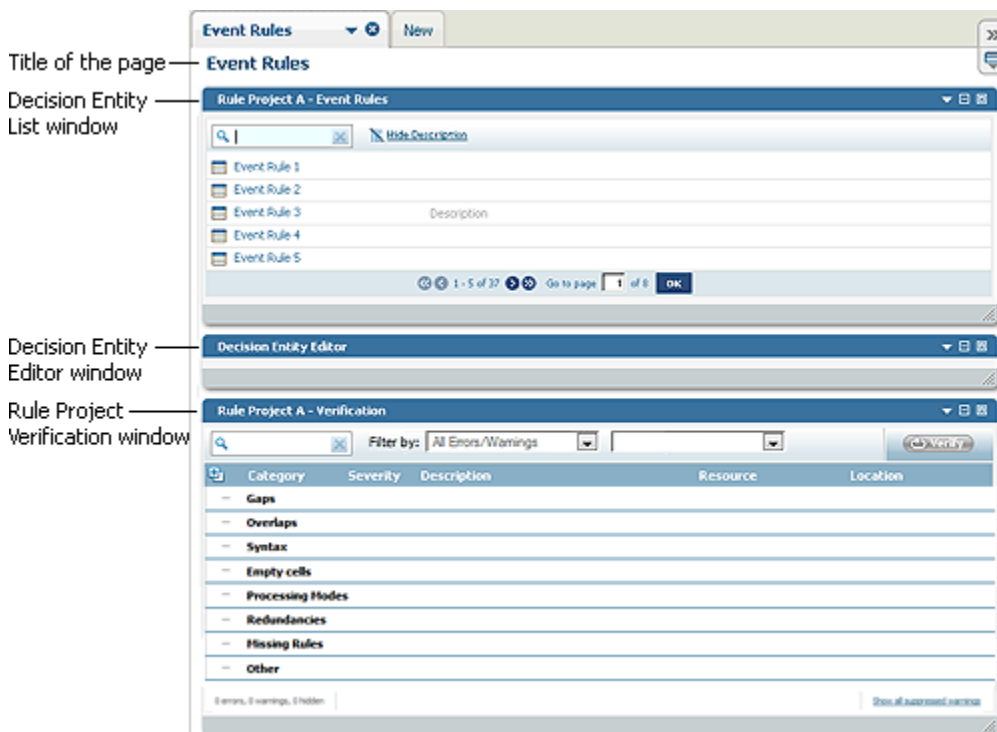


The Welcome window provides a button to update the entries for the business rules application pages on the **Navigate** tab.

Note: You can only see the application pages you have permission for, see ["Getting Started"](#) on page 9.

The Format of the Business Rules Page

The following graphic shows the format of a business rules page.



A business rules page contains the following three different windows:

Name of the Window	Description
Decision Entity List window	See "The Decision Entity List Window" on page 19.
Decision Entity Editor window	See "The Decision Entity Editor Window" on page 23.
Rule Project Verification window	See "The Rule Project Verification Window" on page 24.

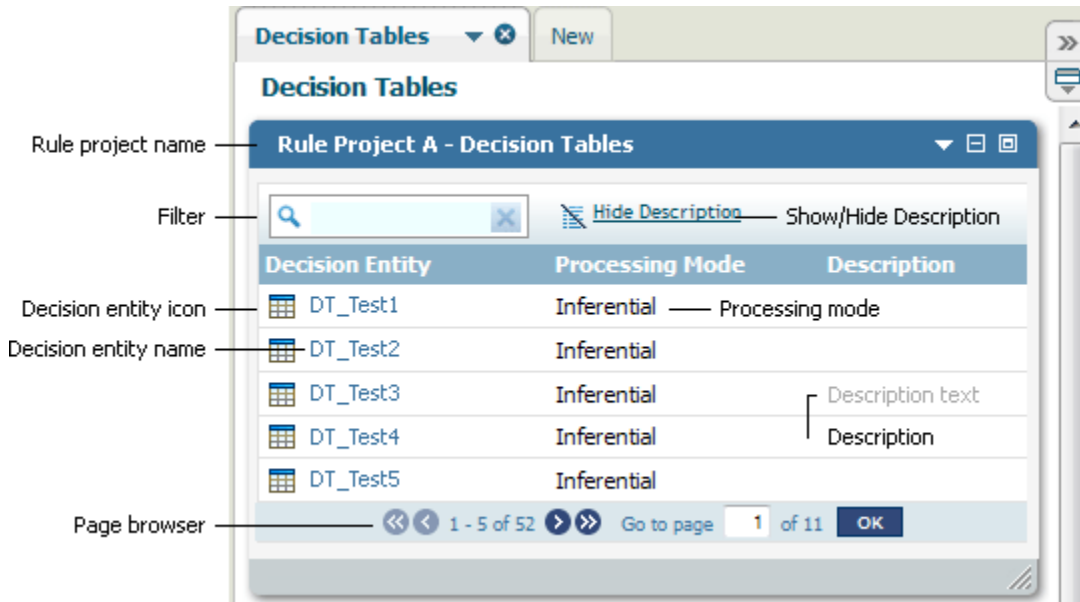
The Decision Entity List Window

The format of the Decision Entity List window depends on the business rules page that you selected from the navigation pane.

Selected Application Page	Decision Entities in the Decision Entity List Window
Decision tables	List of all decision tables used in a rule project.
Event rules	List of all event rules used in a rule project.
Rule set	List of all decision entities used in the rule set.
Master rule set	List of all decision entities used in a rule project (except external event rules).

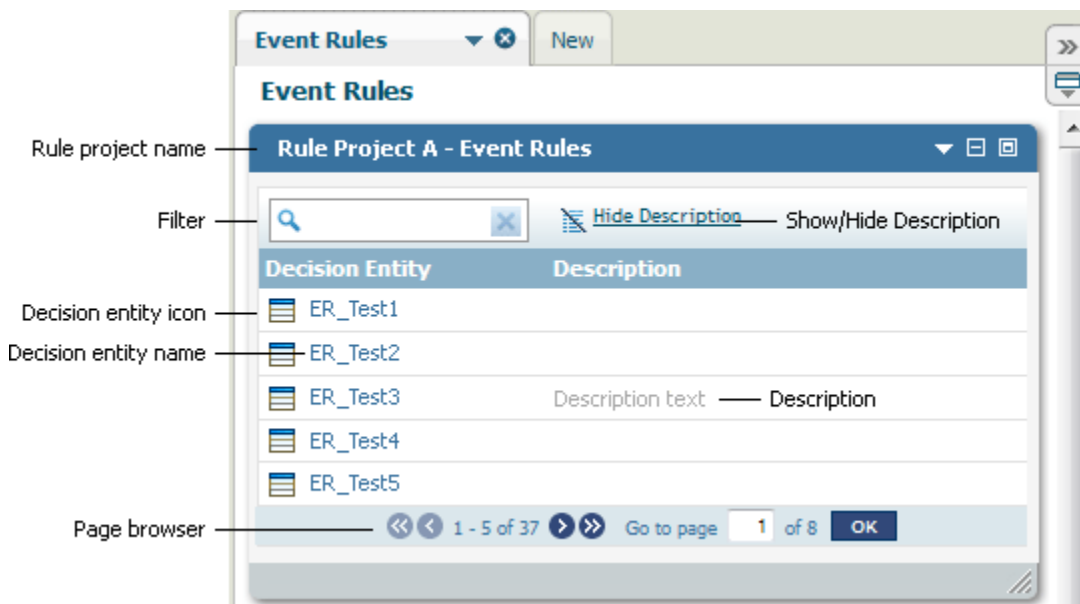
Interface for Decision Tables

The following graphic shows the format of the Decision Entity List window, if you select **Decision Tables** from the navigation pane.



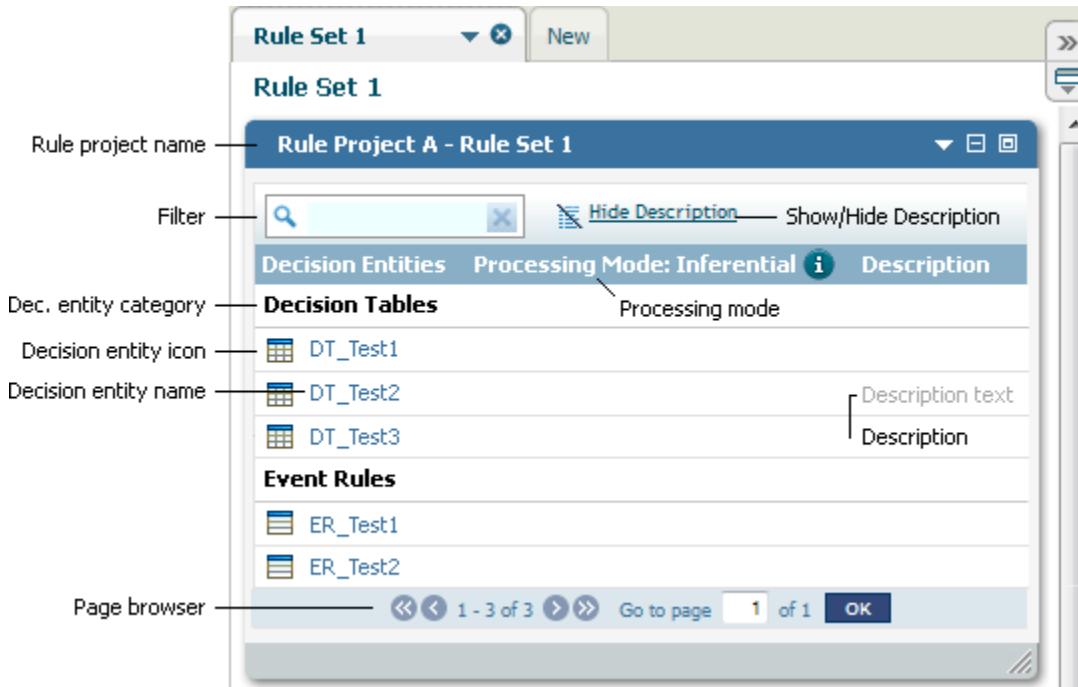
Interface for Event Rules

The following graphic shows the format of the Decision Entity List window, if you select **Event Rules** from the navigation pane.



Interface for Rule Sets


The following graphic shows the format of the Decision Entity List window, if you select **Rule Sets >[YourRuleSetName]** from the navigation pane.





Note: The decision entities of a rule set are sorted by the categories **Decision Tables** and **Event Rules**. The order of the decision entities within a category corresponds to the order that was determined by the rule developer when creating the rule set in Software AG Designer.

Overview of Functions

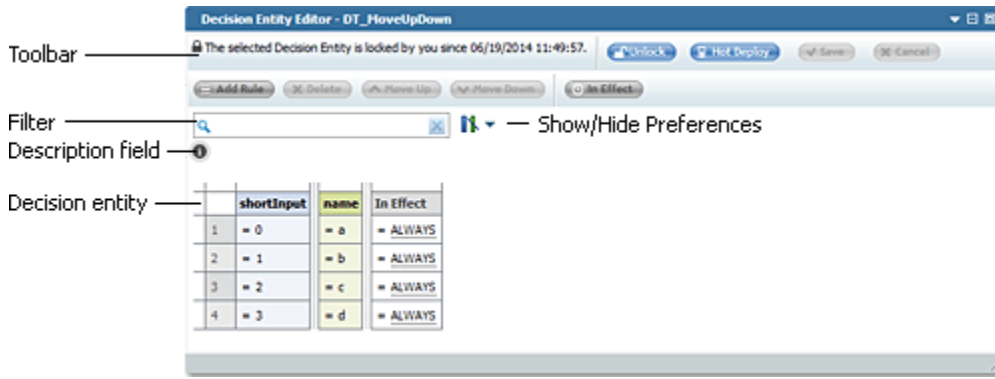
The following table explains the different functions of the Decision Entity Editor window:

Function	Explanation
Rule project name	The name of the rule project that the selected decision entities or rule set belong to followed by the type of decision entity or the rule set name.
Filter	The input field of the text filter. To automatically filter the list of decision entities, type your filter text in the input field. To delete the filter text, click  .
Show/Hide Description	The button to suppress or restore the descriptions entered by the rule developer. To hide the descriptions, click Hide Description . To restore them, click Show Description . To modify a description, see

Function	Explanation
	"Modifying the Description of a Decision Entity" on page 53.
Decision entity category (only applicable for rule sets)	The category that the decision entities are sorted by in a rule set: Decision Tables or Event Rules .
Decision entity icon	The icon that specifies the type of decision entity:  (decision table) or  (event rule).
Decision entity name	The name of the decision entity. Clicking a decision entity name opens the decision entity in the Decision Entity Editor window where it can be modified as described in "Modifying a Decision Table" on page 31 and "Modifying an Event Result" on page 46 .
Processing mode (only applicable for decision tables and rule sets)	<p>The processing mode specified by the rule developer: Inferential (order of decision entities does not correspond to order of execution), Sequential All (order of decision entities corresponds to order of execution; rules are executed from top to bottom) or Sequential First (order of decision entities corresponds to order of execution; rules are executed from top to bottom; execution stops when first rule fires).</p> <p>For rule sets, the processing mode is shown in the table header, above the list of decision entities. For decision tables, the processing mode of each decision table is shown in the same row along with the name and description.</p> <p>For more information about processing modes, see <i>webMethods Rules Development Help</i>.</p>
Description	The description of the decision entity entered by the rule developer.
Page browser	The buttons and input field of the page browser. Use the backward and forward arrows to browse through the list of decision entities. To jump to a page, type the page number in the Go to page input field and click OK .

The Decision Entity Editor Window

The following graphic shows the format of the Decision Entity Editor window.








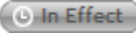

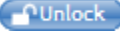


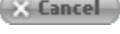
Overview

The Decision Entity Editor window shows the decision entity that you selected from the Decision Entity List window. You can modify this decision entity as described in ["Modifying a Decision Table" on page 31](#) and ["Modifying an Event Result" on page 46](#).


Decision Entity Editor Toolbar

The following buttons appear in the toolbar:

Button	Description
Filter (decision tables only)	Filters the displayed rules of a decision table, see "Filtering Rules" on page 37 .
 (decision tables only)	Drop down menu to show all hidden condition or result columns, or to open show/hide user preference dialog, see "Setting Viewing Preferences for Conditions or Results" on page 37 .
 (decision tables only)	Inserts a new rule after the last rule in a decision table, see "Adding a Rule" on page 35 .
 (decision tables only)	Deletes the selected row(s) of a decision table, see "Deleting a Rule" on page 35 .
 (decision tables only)	Moves the selected row(s) of a decision table up, see "Reordering Rules" on page 36 .

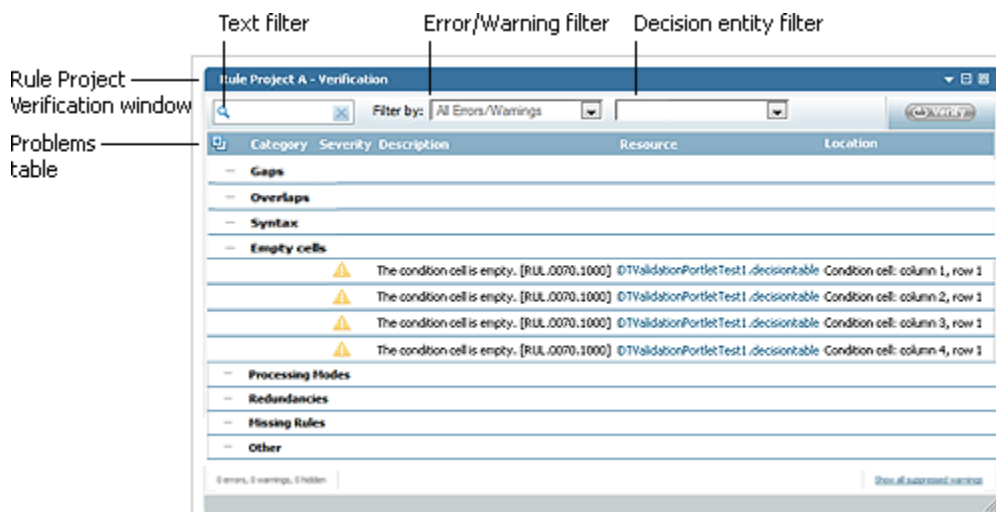
Button	Description
 (decision tables only)	Moves the selected row(s) of a decision table down, see "Reordering Rules" on page 36 .
 (decision tables only)	Specifies the in effect date of a decision table, see "Specifying the In Effect Date of a Decision Table" on page 38 .
	Locks the decision entity, see "Locking a Decision Entity" on page 52 .
	Unlocks a locked decision entity, see "Locking a Decision Entity" on page 52 .
	Hot deploys the rule project the displayed decision entity is part of, see "Hot Deploying a Rule Project" on page 63 .
	Saves the changes to the decision entity, see "Saving Changes to a Decision Entity" on page 53 .
	Discards the changes to the decision entity.

Decision Entity Description


Clicking the  button opens the description field that shows the description entered by the rule developer. To modify a description, see ["Modifying the Description of a Decision Entity" on page 53](#).

The Rule Project Verification Window

Errors and warnings that are detected when verifying rules are logged in the Rule Project Verification window. The following graphic shows the format of this window.



The upper part of the Rule Project Verification window contains the filters and the **Verify** button. The following filters exist:

For this filter ...	You can do this ...
Text filter	Type a filter text in the input field to filter the entries in the problems table. To delete the filter text, click  .
Error/Warning filter	Select All Errors/Warnings to see all errors and warnings in the problems table, or select All Errors to see only errors in the problems table, or select All Warnings to see only warnings in the problems table.
Decision entity filter	After you verified a rule set, select a decision entity to see only the errors and warnings that are associated with this decision entity in the problems table.

The middle part of the Rule Project Verification window contains the problems table. The table lists all errors and warnings sorted by verification categories. For more information about verification categories, see "[About Verification Categories](#)" on page 57.

If you click a link in the **Resource** column of the problems table, the respective decision entity opens in the Decision Entity Editor window, and it is highlighted in the Decision Entity List window.

On the left side of the lower part is the number of errors, warnings and hidden warnings. Hidden warnings are warnings that were suppressed by the filters. On the right side of the lower part is a link to show or hide warnings that were suppressed when creating the decision entities in Software AG Designer. For more information

about warning suppression, see ["Showing or Hiding Suppressed Warnings"](#) on page 57.

4 Modifying Rule Projects Overview

Modifying rule projects with My webMethods involves the following stages:

- Stage 1** Log in to My webMethods. Ask your My webMethods administrator to assign the needed access privileges.
For more information, see ["Getting Started" on page 9](#).
- Stage 2** Modify the rule project.
For more information, see ["Working with Decision Tables" on page 29](#), ["Working with Event Rules" on page 43](#), and ["Global Functions Overview" on page 51](#).
- Stage 3 (optional)** Hot deploy the rule project.
For more information, see ["Hot Deploying Rule Projects to the Integration Server" on page 61](#).

5 Working with Decision Tables

- Modifying a Decision Table 31

A decision table is a decision entity. It is a compact way to depict a complex set of rules in a `IF Condition THEN Result` syntax.

Decision Table Structure

In a decision table, the conditions and corresponding results are sorted into rows and columns. A column can either represent a condition (blue color) or a result (green color) of a rule. There can be more than one condition and more than one result. Each row in a decision table represents one individual rule.

Decision Table in the Decision Entity Editor

		Condition	Condition	Result	In Effect
First rule	1	condition value	condition value	result value	= Always
Second rule	2	condition value	condition value	result value	= Always

Condition

A condition is specified by a parameter element.

Condition Value

A condition value can consist of:

- An operator and a literal value.
- An operator and a parameter element (marked by a dotted line).
- An operator and an action that delivers an output value (marked by a dotted line and () behind the name).
- An operator and a constant (marked by a dotted line).
- An operator and an expression (marked by a dotted line).

Result

There are two types of results:

Result	Description
Assignment Result	An assignment result is specified by a parameter element. This result type is applied, whenever you want to assign a value to a result.
Action Result	An action result is specified by an action. This result type is applied, whenever you want to execute an action from a decision table.

Assignment Result Value

An assignment result value can consist of:

- An operator and a literal value.
- An operator and a parameter element (marked by a dotted line).
- An operator and an action that delivers an output value (marked by a dotted line and () behind the name).
- An operator and a constant (marked by a dotted line).
- An operator and an expression (marked by a dotted line).

Action Result Value

The action result value expresses the action status. There are two types:

- ✓ (action is enabled).
- ✗ (action is disabled).

The following rules can be modeled in a decision table:

Rule 1: IF a customer has a good credit history and the annual order value is equal to or larger than \$ 5,000, THEN this customer is a VIP customer.

Rule 2: IF a customer is a VIP customer, THEN he/she will receive a bonus at the end of a year and will be notified of this by email.

The corresponding decision table uses two conditions, two assignment results and one action result:

Decision Table Example

	Order Value	Credit History	VIP-Status	Bonus	sendEmail()	In Effect
1	<= 5,000	= poor	= no	= no	✗	= Always
2	<= 5,000	= good	= no	= no	✗	= Always
3	>= 5,000	= poor	= no	= no	✗	= Always
4	>= 5,000	= good	= yes	= yes	✓	= Always

Modifying a Decision Table

The Decision Entity Editor supports the following actions for decision tables:

- Adding and modifying condition values or result values.

- Clearing condition values or result values.
- Adding and deleting rules.
- Reordering rules.
- Assigning a principal to condition values or result values.
- Setting viewing preferences for conditions or results.
- Filtering rules.
- Specifying the in effect date at decision table or rule level.

Important: You must lock the decision table, before you modify it. Otherwise you cannot save the changes you made. For more information, see "[Locking a Decision Entity](#)" on page 52.

Adding an Operator and a Literal Value


To add an operator and a literal value:

1. Open the decision table as described in "[Opening a Decision Entity](#)" on page 52.
2. Lock the decision table as described in "[Locking a Decision Entity](#)" on page 52.
3. Click the cell you want to modify.
4. Select an operator as specified in "[About Condition Operators](#)" on page 39 or "[About Result Operators](#)" on page 39.

Important: Adding only an operator without entering a literal value results in a semantically invalid cell.

5. Enter a literal value in the input field as required:

Note: The literal value must match the data type as specified in "[About Data Type Assignment](#)" on page 40.

For this data type ...	You can do this ...
Boolean	Select true or false from the drop down list.
Date	<ol style="list-style-type: none"> a. Click the  icon. b. Select the date. c. Enter a time of day (optional).

Note:The format and time zone of displayed date and time values can be configured in

For this data type ...	You can do this ...
	the My Profile settings. The webMethods Business Rules functionality only supports hours, minutes and seconds.
Byte Character Double Float Integer Long Short	Type the literal value.
String	Type the literal value.

6. Press ENTER, or click anywhere in the Decision Entity Editor window to remove the focus from the cell.

Modifying an Operator

To modify an operator:

1. Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the decision table as described in ["Locking a Decision Entity" on page 52](#).
3. Click the operator you want to modify.
4. Select a new operator as specified in ["About Condition Operators" on page 39](#) or ["About Result Operators" on page 39](#).



Modifying a Literal Value

To modify a literal value:

1. Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the decision table as described in ["Locking a Decision Entity" on page 52](#).
3. Click the literal value you want to modify.
4. Do one of the following:
 - a. Type a new literal value as described in ["Adding an Operator and a Literal Value" on page 32](#), Step 4.
 - b. Press DEL to delete the literal value.
5. Press ENTER.

Adding a Condition or Result Value with the Cell Editor

To add a condition or result value with the cell editor:



1. Open the decision table as described in "Opening a Decision Entity" on page 52.
2. Lock the decision table as described in "Locking a Decision Entity" on page 52.
3. Click the cell you want to modify.
4. Click the  (in conditions) or  (in results) icon.
5. In the [Value Type] Modification dialog box, modify the value info as required:

For this field or option ...	You can do this ...
Select an operator	<p>Select an operator as specified in "About Condition Operators" on page 39 or respectively "About Result Operators" on page 39.</p> <p>Note: If you select a range operator, the dialog box splits so that you can specify a literal value or parameter element for each side of the range.</p>
Select an option > Literal	<p>Enter a literal value in the Enter value field as described in "Adding an Operator and a Literal Value" on page 32, Step 4.</p> <p>Note: The literal value must match the data type as specified in "About Data Type Assignment" on page 40.</p>
Select an option > Parameters	<p>Expand the parameter and select a parameter element from the list. The parameter element is then displayed above the parameter element list. To filter the list of parameter elements, enter a filter text in the search field above the parameter element list.</p> <p>Note: The data type of the parameter element must match the data type as specified in "About Data Type Assignment" on page 40.</p>
Select an option > Expression	<p>Add an expression as described in "Adding an Expression" on page 68.</p>

6. Click .

Modifying a Condition or Result Value with the Cell Editor

To modify a condition or result value with the cell editor:

1. Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the decision table as described in ["Locking a Decision Entity" on page 52](#).
3. Click the cell you want to modify.
4. Click the  (in conditions) or  (in results) icon.
5. Modify the condition or result value as described in ["Adding a Condition or Result Value with the Cell Editor" on page 34](#).


Clearing a Condition or Result Value

To clear a condition or result value:

1. Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the decision table as described in ["Locking a Decision Entity" on page 52](#).
3. Click the operator of the cell you want to clear.
4. Select **Clear** from the context menu.

Adding a Rule

To add a rule:


1. Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the decision table as described in ["Locking a Decision Entity" on page 52](#).
3. Click  in the upper left corner of the Decision Entity Editor window.

The new rule is inserted after the last rule.

Deleting a Rule

To delete a rule:

1. Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the decision table as described in ["Locking a Decision Entity" on page 52](#).
3. Select the rules you want to delete by clicking the row number. To deselect a rule, click the row number again.



4. Click  in the upper left corner of the Decision Entity Editor window.

Note: If you delete the only rule of a decision table, an empty rule is automatically inserted.

Reordering Rules

You can determine a specific order for rules. In inferential processing, this does not affect the order of execution. In sequential processing, the order of rules corresponds to the order of execution. For more information about processing modes, see *webMethods Rules Development Help*.

To reorder rules:




1. Open the decision table as described in "Opening a Decision Entity" on page 52.
2. Lock the decision table as described in "Locking a Decision Entity" on page 52.
3. Select one or more contiguous rules by clicking the row number. To deselect a rule, click the row number again.
4. Click  or  in the upper left corner of the Decision Entity Editor window.

The rule order is modified as requested.

Assigning a Principal to a Condition or Result Value

A principal is a user or group on My webMethods Server. You can assign a principal to a condition value or result value of a string type condition or result. This is only possible, if the rules developer who created the decision table with the Rules Development feature in Software AG Designer annotated the condition or result column as principal. For more information, see *webMethods Rules Development Help*.





To assign a principal to a condition or result value:


1. Open the decision table as described in "Opening a Decision Entity" on page 52.
2. Lock the decision table as described in "Locking a Decision Entity" on page 52.
3. Click the condition value cell or result value cell you want to modify.
4. Click  (in conditions) or  (in results).
5. In the Select Principals window, select one or more principals, and click . For more information on the Select Principals window, see *Working with My webMethods Help*.

Setting Viewing Preferences for Conditions or Results

You can specify which condition columns or result columns of a decision table should be displayed. These preferences only apply to your user account.

To set viewing preferences for a decision table:

1. Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
2. Click  > **Show/hide columns for current user**.
3. In the Show/Hide Decision Table Columns dialog, select the conditions or results to be displayed from the **Available** list on the left side.
4. Click  to move the selection to the **Selected** list on the right side.
5. To hide conditions or results, select the conditions or results to be hidden from the **Selected** list on the right side and click  .
6. Click  .

Only the conditions or results in the **Selected** list are displayed. A dotted line between conditions or results indicates hidden columns. To restore all hidden conditions or results, click  > **Show all hidden columns**.

Important: Restoring all hidden columns discards the viewing preferences for a decision table.

Filtering Rules


You can specify which rules of a decision table should be displayed.

Note: Any selected rules are deselected when you modify the filter.

To filter the rules to be displayed:

1. Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the decision table as described in ["Locking a Decision Entity" on page 52](#).
3. Do one of the following:
 - a. In the toolbar, enter a text in the filter and press ENTER.

Important: When filtering rules with the text filter, the data in hidden columns is ignored. If any hidden column contains filtered data, a warning message is displayed.

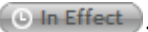

- b. In the toolbar, click  in the filter and select a user, group or role from the drop down list.

- To restore all rules, click  in the filter.

Specifying the In Effect Date of a Decision Table

As a default, the rules of a decision table are always in effect. You can specify the in effect date at rule level or at decision table level. If you specify the in effect date at rule level, it only applies to this rule. If you specify the in effect date at decision table level, it applies to all rules of this decision table.

To specify the in effect date of a decision table:




- Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
- Lock the decision table as described in ["Locking a Decision Entity" on page 52](#).
- In the toolbar, click .
- In the Edit in effect dates dialog box, select **Always in effect** (default), **Never in effect**, or **Date and time frame in effect**. If you click **Date and time frame in effect**, select an operator as described in ["About In Effect Operators" on page 40](#) and specify a date and time (optional). Click .

The decision table is now marked with a clock icon in the upper left corner. If you move the pointer over the clock icon, a tooltip indicates the specified in effect date.

Specifying the In Effect Date of a Rule

As a default, the rules of a decision table are always in effect. You can specify the in effect date at rule level or at decision table level. If you specify the in effect date at rule level, it only applies to this rule. If you specify the in effect date at decision table level, it applies to all rules of this decision table.

To specify the in effect date of a rule:

- Open the decision table as described in ["Opening a Decision Entity" on page 52](#).
- Lock the decision table as described in ["Locking a Decision Entity" on page 52](#).
- In the **In Effect** column, select the rule you want to edit.
- Do one of the following:
 - Click the  icon and select a date. Enter a time (optional).
 - Click the  icon. In the Edit in effect dates dialog box, select **Always in effect** (default), **Never in effect**, or **Date and time frame in effect**. If you click **Date and time frame in effect**, select an operator as described in ["About In Effect Operators" on page 40](#) and specify a date and time (optional). Click .

About Condition Operators

The following operators can be assigned to the different data types of decision table conditions:

Data Type(s)	Operator	Definition
Boolean	=	(Equals; default operator)
	!=	(Does not equal)
Date	=	(Equals; default operator)
	!=	(Does not equal)
	<	(Less than)
	<=	(Less than or equal)
	>	(Greater than)
	>=	(Greater than or equal)
	< ... <=	(Less than ... less than or equal)
	<= ... <=	(Less than or equal ... less than or equal)
< ... <	(Less than ... less than)	
<= ... <	(Less than or equal ... less than)	
Byte	=	(Equals; default operator)
Character	!=	(Does not equal)
Double	<	(Less than)
Float	<=	(Less than or equal)
Integer	>	(Greater than)
Long	>=	(Greater than or equal)
Short	< ... <=	(Less than ... less than or equal)
	<= ... <=	(Less than or equal ... less than or equal)
	< ... <	(Less than ... less than)
	<= ... <	(Less than or equal ... less than)
String	=	(Equals; default operator)
	!=	(Does not equal)

About Result Operators

The following operators can be assigned to the different data types of decision table assignment results:

Data Type(s)	Operator	Definition
Boolean	=	(Equals; default operator)

Data Type(s)	Operator	Definition
Date	=	(Equals; default operator)
Byte Character Double Float Integer Long Short	=	(Equals; default operator)
String	=	(Equals; default operator)

About In Effect Operators

The following operators can be assigned when specifying an in effect date:

In Effect	Operator	Definition
In Effect	!=	(Does not equal)
	<	(Less than)
	<=	(Less than or equal)
	>	(Greater than)
	>=	(Greater than or equal)
	< ... <=	(Less than ... less than or equal)
	<= ... <=	(Less than or equal ... less than or equal)
	< ... <	(Less than ... less than)
	<= ... <	(Less than or equal ... less than)

About Data Type Assignment

The following data types can be assigned to a parameter element that was specified for a condition or result:

Data type of the parameter element for the condition or result is ...	Literal value must be ...	Data type of assigned parameter element must be ...
Boolean	Boolean	Boolean
Date	Date	Date

Data type of the parameter element for the condition or result is ...	Literal value must be ...	Data type of assigned parameter element must be ...
String	String	String
Numeric (Byte, Character, Double, Float, Integer, Long, Short)	Same data type or numeric data type with a smaller value.	Any numeric data type. Numeric data types with a greater value are truncated.

6 Working with Event Rules

■ Modifying an Event Result	46
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An event rule is a decision entity that specifies the results triggered by an event. There are two types of events:

- Internal Events.
- External Events.

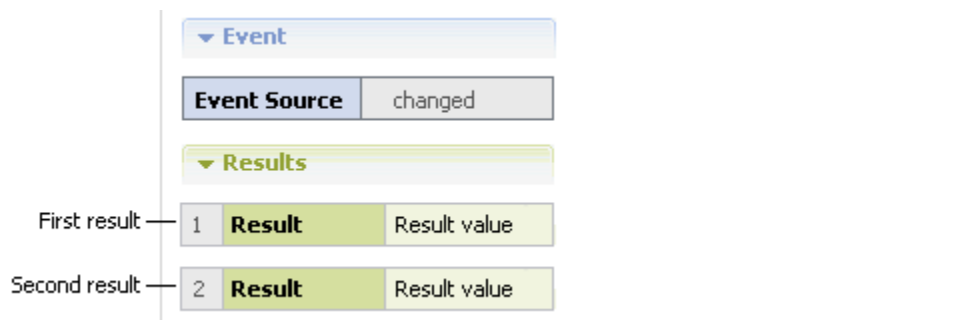
Internal events are triggered by other event rules and decision tables during rule execution. External events are pre-defined event types that were created with the webMethods Event Type Editor, see *webMethods Event-Driven Architecture Help*.

Important: To work properly, internal and external event rules must be part of a rule set.

Event Rule Structure

An event rule consists of an event (blue color) and one or more results (green color).

Event Rule in the Decision Entity Editor



Event

The event consists of an event source that is specified by a parameter element and a type. The following types are supported:

Event	Type	Description
Internal Event	changed	This type triggers one or more results whenever the event source changes. The change must be triggered by other event rules or decision tables. Changed type event rules have the following syntax: WHENEVER an Event Source CHANGED THEN Result.
External Event	occurred	This type triggers one or more results whenever the external event has

Event	Type	Description
		<p>occurred. Occurred type event rules have the following syntax:</p> <pre>WHENEVER an Event Source OCCURRED THEN Result.</pre>

Results

There are two types of results:

Result	Description
Assignment Result	An assignment result is specified by a parameter element. This result type is applied, whenever you want to assign a value to a result.
Action Result	An action result is specified by an action. This result type is applied, whenever you want to execute an action from an event rule.

Assignment Result Value

An assignment result value can consist of:

- An operator and a literal value.
- An operator and a parameter element (marked by a dotted line).
- An operator and an action that delivers an output value (marked by a dotted line and () behind the action name).
- An operator and a constant (marked by a dotted line).
- An operator and an expression (marked by a dotted line).

Action Result Value

The action result value expresses the action status. There are two types:

- ✓ (action is enabled).
- ✗ (action is disabled).

The following rule can be modeled in an event rule using an action result:

Rule WHENEVER a permitted payment method changes for a customer,
THEN this customer is notified of this by email.

Event Rule Example

▼ Event	
paymentMethod	changed
▼ Results	
1	sendEmail () ✓

Modifying an Event Result

The Decision Entity Editor supports the following actions for event rule results:

- Adding and modifying result values.
- Clearing result values.

Important: You must lock the event rule, before you modify it. Otherwise you cannot save the changes you made. For more information, see ["Locking a Decision Entity" on page 52](#).

Adding an Operator and a Literal Value

To add an operator and a literal value:

1. Open the event rule as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the event rule as described in ["Locking a Decision Entity" on page 52](#).
3. Click the cell you want to modify.
4. Select an operator as specified in ["About Result Operators" on page 49](#).

Important: Adding only an operator without entering a literal value results in a semantically invalid cell.

5. Enter a literal value in the input field as required:
6. Press ENTER, or click anywhere in the Decision Entity Editor window to remove the focus from the cell.

Modifying an Operator

To modify an operator:

1. Open the event rule as described in ["Opening a Decision Entity" on page 52](#).

2. Lock the event rule as described in ["Locking a Decision Entity" on page 52](#).
3. Click the operator you want to modify.
4. Select a new operator as specified in ["About Result Operators" on page 49](#).


Modifying a Literal Value

To modify a literal value:

1. Open the event rule as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the event rule as described in ["Locking a Decision Entity" on page 52](#).
3. Click the literal value you want to modify.
4. Do one of the following:
 - a. Type a new literal value as described in ["Adding an Operator and a Literal Value" on page 46, Step 4](#).
 - b. Press DEL to delete the literal value.
5. Press ENTER.

Adding a Result Value with the Cell Editor

To add a result value with the cell editor:

1. Open the event rule as described in ["Opening a Decision Entity" on page 52](#).
2. Lock the event rule as described in ["Locking a Decision Entity" on page 52](#).
3. Click the cell you want to modify.
4. Click the  icon.
5. In the Result Value Modification dialog box, modify the value info as required:


For this field or option ...	You can do this ...
Select an operator	Select an operator as specified in "About Result Operators" on page 49 .
	Note: If you select a range operator, the dialog box splits so that you can specify a literal value or parameter element for each side of the range.
Select an option > Literal	Enter a literal value in the Enter value field as described in "Adding an Operator and a Literal Value" on page 46, Step 4 .

For this field or option ...	You can do this ...
	<p>Note: The literal value must match the data type as specified in "About Data Type Assignment" on page 49.</p>
<p>Select an option > Parameters</p>	<p>Expand the parameter and select a parameter element from the list. The parameter element is then displayed above the parameter element list. To filter the list of parameter elements, enter a filter text in the search field above the parameter element list.</p> <p>Note: The data type of the parameter element must match the data type as specified in "About Data Type Assignment" on page 49.</p>
<p>Select an option > Expression</p>	<p>Add an expression as described in "Adding an Expression" on page 68.</p>

6. Click .

Modifying a Result Value with the Cell Editor

To modify a result value with the cell editor:

1. Open the event rule as described in ["Opening a Decision Entity"](#) on page 52.
2. Lock the event rule as described in ["Locking a Decision Entity"](#) on page 52.
3. Click the cell you want to modify.
4. Click the  icon.
5. Modify the result value as described in ["Adding a Result Value with the Cell Editor"](#) on page 47, Step 4.

Clearing a Result Value

To clear a result value:

1. Open the event rule as described in ["Opening a Decision Entity"](#) on page 52.
2. Lock the event rule as described in ["Locking a Decision Entity"](#) on page 52.
3. Click the operator of the cell you want to clear.
4. Select **Clear** from the context menu.

About Result Operators

The following operators can be assigned to the different data types of an event rule assignment result:

Data Type(s)	Operator	Definition
Boolean	=	(Equals; default operator)
Date	=	(Equals; default operator)
Byte Character Double Float Integer Long Short	=	(Equals; default operator)
String	=	(Equals; default operator)

About Data Type Assignment

The following data types can be assigned to a parameter element that was specified for an event result:

Data type of the parameter element for the result is ...	Literal value must be ...	Data type of assigned parameter element must be ...
Boolean	Boolean	Boolean
Date	Date	Date
String	String	String
Numeric (Byte, Character, Double, Float, Integer, Long, Short)	Same data type or numeric data type with a smaller value.	Any numeric data type. Numeric data types with a greater value are truncated.

7 Global Functions Overview

■ Opening a Decision Entity	52
■ Locking a Decision Entity	52
■ Saving Changes to a Decision Entity	53
■ Modifying the Description of a Decision Entity	53

My webMethods supports the following functions that apply to all decision entities:

- Opening a decision entity.
- Saving changes to a decision entity.
- Modifying the description of a decision entity.
- Locking a decision entity.

Important: You must lock the decision entity, before you modify it. Otherwise you cannot save the changes you made. For more information, see "[Locking a Decision Entity](#)" on page 52.

Opening a Decision Entity

To open a decision entity:



1. On the **Navigate** tab, do one of the following:
 - a. Click **[RuleProjectName] > Decision Tables** (for decision tables).
 - b. Click **[RuleProjectName] > Event Rules** (for event rules).
 - c. Click **[RuleProjectName] > Rule Sets > [RuleSetName]** (for all decision entities of a rule set).
2. In the Decision Entity List window, click the decision entity name.

The decision entity opens in the Decision Entity Editor window. The order of rules corresponds to the order specified by the rule developer in Software AG Designer.

Locking a Decision Entity


You must lock a decision entity, before you modify it. Otherwise you cannot save the changes you made.


To lock a decision entity:

1. Open the decision entity as described in "[Opening a Decision Entity](#)" on page 52.
2. Click  **Lock** in the upper right corner of the Decision Entity Editor window.
3. Modify and save the decision entity.
4. To make the decision entity available to others for modification, click  **Unlock** in the upper right corner of the Decision Entity Editor window.

Saving Changes to a Decision Entity



To save changes to a decision entity:

1. Open the decision entity as described in "[Opening a Decision Entity](#)" on page 52.
2. Lock the decision entity as described in "[Locking a Decision Entity](#)" on page 52.
3. Modify the decision entity.
4. Click  in the upper right corner of the Decision Entity Editor window.

Note: You cannot save a decision entity that contains errors. In this case, an error message is displayed, and the decision entity is not saved until you fix the error and click the  button again.

Modifying the Description of a Decision Entity

To modify the description of a decision entity:

1. Open the decision entity as described in "[Opening a Decision Entity](#)" on page 52.
2. Lock the decision entity as described in "[Locking a Decision Entity](#)" on page 52.
3. In the Decision Entity Editor window, click .
4. Type a new description.
5. Click .

8 Rule Verification Overview

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■ Verifying Rules Manually	56
■ Showing or Hiding Suppressed Warnings	57
■ About Verification Categories	57

My webMethods supports two kinds of verification:





- **Automatic Verification** is performed on decision entities when they are opened or saved after modification and can reflect both errors and warnings. For more information, see ["About Automatic Verification" on page 56](#).
- **Manual Verification** is performed on-demand on rule set or decision entity level. It is designed to detect potential logic problems in decision entities and only creates warnings. For more information, see ["Verifying Rules Manually" on page 56](#).

For more information about verification categories, see ["About Verification Categories" on page 57](#).

About Automatic Verification

Automatic verification is performed on decision entities when they are opened or saved after modification and can reflect both errors and warnings.

Representation of Warnings and Errors in the Decision Entity List Window



Decision tables with errors or warnings are marked by a  (error) or  icon (warning). Event rules with errors or warnings are marked by a  (error) or  icon (warning).

Representation of Warnings and Errors in the Decision Entity Editor Window

The respective cell of the decision entity in the Decision Entity Editor window is marked red (error) or yellow (warning).

Representation of Warnings in the Rule Project Verification Window

The warnings and errors appear in the Rule Project Verification window in the verification categories **Syntax**, **Empty cells**, **Processing Modes** or **Other**. For more information about verification categories, see ["About Verification Categories" on page 57](#).

Errors are marked by a  icon, warnings are marked by a  icon.

If you click a link in the **Resource** column of the problems table, the respective decision entity opens in the Decision Entity Editor window, and it is highlighted in the Decision Entity List window.

Verifying Rules Manually



Manual Verification is performed on-demand on rule set or decision entity level. It is designed to detect potential logic problems in decision entities and only creates warnings.

Keep the following points in mind when verifying rules:

- Rules can be verified on rule set or decision entity level.
- If you verify a rule set, all of its decision entities are combined and tested as a single entity.
- Decision entities with errors cannot be verified.
- Only conditions with more than one value are considered, and each condition value is processed independently.
- Condition values containing a parameter element or an action are not considered.
- There can be multiple warnings for one condition value.
- Event rules are not considered, as they do not have condition values.
- Condition values of the data type date are not considered.

To verify rules manually:

1. Click  in the upper right corner of the Rule Project Verification window.

The warnings appear in the problems table of the Rule Project Verification window and are sorted by verification categories. For more information about verification categories, see "[About Verification Categories](#)" on page 57. If the warning can be associated with a decision entity, the respective decision entity is marked by a  icon (decision table) or  icon (event rule) in the Decision Entity List window.

Showing or Hiding Suppressed Warnings

Warnings can be suppressed when creating decision entities in Software AG Designer. You can make these suppressed warnings visible or hide them again in the Rule Project Verification window.

To show or hide suppressed warnings:

1. Click **Show all suppressed warnings** in the lower right corner of the Rule Project Verification window.
2. To hide the warnings again, click **Hide all suppressed warnings** in the lower right corner of the Rule Project Verification window after the page has been reloaded.

The warnings are shown or hidden in the Rule Verification window, in the Decision Entity List window and in the Decision Entity window.

About Verification Categories

The following verification categories exist:

Gaps

Explanation A gap warning is reported if a value or a range of values for one condition is not explicitly tested in a decision entity or a rule set.

Example

	Order value
1	< 5,000
2	> 5,000

A gap warning is reported, because the value = 5,000 is not tested for the condition *Order value*.

Action If the gap is not intended, specify the missing value or range of values for the condition.

Overlaps

Explanation An overlap warning is reported if the same value or range of values for one condition is tested multiple times in a decision entity or a rule set.

Example

	Order value
1	<= 5,000
2	>= 5,000

An overlap warning is reported, because the value = 5,000 is tested multiple times for the condition *Order value*.

Action If the overlap is not intended, modify the rules so that the condition value is only tested once.

Syntax

Explanation A syntax warning is for instance reported if data is lost due to truncation.

Example

ByteVar
= LongVar

A syntax warning is reported, because a result value of the data type `long` is assigned to a result of the data type `byte` and is therefore truncated.

Action If the data loss is not tolerable, assign a value of the correct data type.

Empty cells

Explanation An empty cell warning is reported if a condition value or a result value is not specified.

Example

	Order value
1	
2	> 5,000

An empty cell warning is reported, because the condition value for the first rule is not specified.

Action If the empty cell is not intended, specify the missing value.

Processing Modes

Explanation A processing mode warning is reported if the processing mode of a decision table within a rule set differs from the processing mode of this rule set, because the processing mode of the rule set overwrites that of the decision table.

Example Differences in processing modes can occur if you add an inferential decision table to a sequential rule set or vice versa; or if you modify the processing mode of a rule set or of a decision table within this rule set.

Action If the different processing mode is not intended, set the same processing mode for the decision table and rule set.

Redundancies

Explanation A redundancy warning is reported if parts of one rule, or rules of one decision table, or rules of several decision tables within one rule set are dispensable.

Example

	order.value	country	discount
1	> 500		= 4
2	> 500	= Germany	= 4

A redundancy warning is reported, because as in the first rule no value is specified for the condition *country*, any value applies to this rule. This makes the second rule superfluous.

Action If the redundancy is not intended, delete the dispensable rules or parts of rules.

Missing Rules

Explanation A missing rule warning is reported if a probable combination of conditions is not explicitly tested in a decision entity or a rule set.

Example

	gender	olderThan45
1	= male	= true
2	= male	= false
3	= female	= true

A missing rule warning is reported, because the condition combination *gender=female AND olderThan45=false* is not explicitly tested.

Action If the missing rule is not intended, specify the missing combination(s) of conditions.

Other

Explanation All warnings and errors that do not fit into the other categories.

9 Hot Deploying Rule Projects to the Integration Server

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The Software AG rules engine executes the rules that were created with the Rules Development feature in Software AG Designer. The rules engine exists on the Integration Server as part of the WmBusinessRules package.

You can deploy your modified rules to the Integration Server, which is used as a target runtime environment. There these rules can be accessed and used by multiple business processes. For more information, see *webMethods Process Development Help*.

My webMethods supports the deployment of rule projects to a single or multiple Integration Server(s) using the hot deploy command as described in ["Hot Deploying a Rule Project" on page 63](#).

Before you can hot deploy a rule project, you must be connected to the Integration Server(s). To configure an Integration Server connection, follow the instructions as described in ["Configuring an Integration Server Connection" on page 62](#).

Note: You can also use Command Central to configure an Integration Server connection.

Configuring an Integration Server Connection

Before you can hot deploy a rule project, you must configure the Integration Server connection(s).

If you use a cluster or a non-clustered group of Integration Servers (Integration Servers that share the same database components), you only need to configure the connection to one of the Integration Servers of the group.

To configure an Integration Server connection:

1. On the **Navigate** tab, click **Administration > My webMethods > System Settings > webMethods Business Rules Settings**.
2. In the workspace area, click **Add Integration Server**.
3. Modify the Integration Server info as required:


For this field ...	You can do this ...
Logical Name	Type a name for the Integration Server.
IS Host	Type the Integration Server address.
IS Port	Type the Integration Server port.
IS Username	Type your Integration Server user name.

For this field ...	You can do this ...
IS Password	Type your Integration Server password.


- Click **Save**.

Hot Deploying a Rule Project

To hot deploy a rule project:

- Open any decision entity that is part of the rule project as described in "[Opening a Decision Entity](#)" on page 52.
- Click  in the upper right corner of the Decision Entity Editor window.

Note: You cannot hot deploy a decision entity that contains unsaved changes or errors. In this case, the **Hot Deploy** button is disabled.

- In the Hot Deployment Confirmation dialog box, click  to deploy the decision entity and all other components of the rule project to the Integration Server runtime.

Note: All decision entities of the rule project are verified before the rule project is deployed. If the rule project contains any errors, an error dialog box informs you in which rule sets the errors occur. You must eliminate all errors before you can retry to hot deploy the rule project.

The Hot Deployment Results dialog box lists the results of the operation. To see a detailed list of successfully and unsuccessfully deployed rule projects, click **See Details**.

10 Working with Expressions

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An expression may contain function calls, literals, parameter references, the mathematical operators `+`, `-`, `*`, `/`, groups of parentheses, or combinations of all of these. You can assign an expression to a decision table condition, a decision table assignment result or an event rule assignment result. Any referenced data element in a condition must exist and have a non-null value in order for the condition to be evaluated. To assign the expression, you can use the operators `=` or `!=` for conditions in decision tables, and `=` for assignment results in decision tables and event rules. For expressions returning numeric values, you can also use range operators.

Note: If you use a boolean function in a condition that is not of data type boolean, the return value of the function is not compared to the condition, but it is compared against the value `True`. You cannot use a boolean function in a result that is not of data type boolean, as the return value of a function that is used in a result must match the data type that was specified for the result.

The most powerful component of expressions are function calls. My webMethods provides a set of predefined functions that you can use within expressions to perform simple or even complex functionality for a decision table condition, a decision table assignment result or an event rule assignment result with a minimal amount of effort. A function call can require arguments. These arguments can be manually entered literal values, they can be mapped to existing parameter elements, they can be the return values of other function calls or they can be mathematical expressions involving parameter references and/or other function calls.

Five categories of functions exist:

- Date Functions.
- Conversion Functions.
- List and Range Functions.
- Math Functions.
- String Functions.

For more information about the individual functions, see *webMethods Business Rules Reference*.

For detailed information about how to add expressions and specify their components, see ["Adding an Expression" on page 68](#).

Example of a Simple Function

As an example of a simple function, you can check if the input values for a `Customer.city` parameter start with the string `New`.

```
startsWith("New")
```

Example of a Chained Function

You can call multiple functions by chaining them. As an example of a chained function, you can check if the trimmed input values for a `Customer.city` parameter end with the string `York`.

```
trim().endsWith("York")
```

Example of a Nested Function

You can nest functions. In this case, the return value of the inner function serves as input parameter for the outer function. As an example of a nested function, you can check if the input values for a `Customer.city` parameter contains the upper case value of an `Order.city` parameter.

```
Contains("%Order,city"%.toUpperCase())
```

Example of a Mathematical Operation

You can perform mathematical operations on the return value of functions or parameter references. As an example of a mathematical operation, you can compute the area of a rectangle:

```
%"Shapes_1.Rect_Height"% * %"Shapes_1.Rect_Width"%"
```

Example of Parentheses Groups

You can nest sub-expressions in parentheses. As an example of an expression using parentheses, you can compute the perimeter of a rectangle:

```
(2* %"Shapes_1.Rect_Height"%) + (2 * %"Shapes_1.Rect_Width"%)
```

Example of an Expression Using a Combination of Components

You can combine the different components of expressions. As an example of an expression using combined components, you can compute the area of a circle rounded and turn the result into a string:

```
round(pi() * pow((%"Shapes_1.Circle_Diameter"% / 2),2.0)).toString()
```

Syntax Overview

To make a reference to a parameter element, use `%fullyqualifiedparametername%`, for example `startsWith("%customer.name"%)`.

To specify a date, use single quotes `'2015/02/12 12:00 AM'`, for example `diffInDays('2015/02/12 12:00 AM')`.

To specify a string array, use single curly braces `{}`, for example `inList({"gold","silver"})`.

To specify a string table, use double curly braces `{{}}`, for example `inRange({{"a","c"}, {"f","h"}}, null)`.

To specify a date array, use single curly braces {} and a single quote, for example `inRange('2015/02/02 12:00 AM', '2015/02/12 12:00 AM', {'2015/02/04 12:00 AM', '2015/02/05 12:00 AM'})`.

To specify a date table, use double curly braces {}, and use single quotes for values, for example `inRange({'2015/02/03 12:00 AM', '2015/02/06 12:00 AM'}, {'2015/02/16 12:00 AM', '2015/02/20 12:00 AM'}, null)`.

To specify a double table and double array, use single curly braces {} and double curly braces {}, for example `inRange({{10.0, 40.0}, {50.0, 70.0}}, {60.0, 65.0})`.

Example of specifying parameter references inside an array and table: `inRange({{10, %"datatypeTest_1.eInteger"%}, {30, 40}}, {35, %"datatypeTest_1.eLong"%})`.

Adding an Expression

You can assign an expression to a decision table condition, a decision table assignment result or an event rule assignment result. Expressions are automatically verified as they are added. Problems appear in the Rule Project Verification window in the **Syntax** category.

Note: Escaping is supported. A typed in value such as `\n` is interpreted as a single new line character.

To add a function:

1. For decision tables, execute steps 1 to 3 as described in ["Adding a Condition or Result Value with the Cell Editor" on page 34](#). For event rules, execute steps 1 to 3 as described in ["Adding a Result Value with the Cell Editor" on page 47](#).
2. In the *[Value Type]* Modification dialog box, select an operator as specified in ["About Condition Operators" on page 39](#) (for decision table conditions), ["About Result Operators" on page 39](#) (for decision table assignment results) or ["About Result Operators" on page 49](#) (for event rule assignment results).
3. Select the **Expression** tab. There are two sub-tabs for entering functions and parameters. To filter the functions by the data type of their return values and source elements, select a data type from the drop down list in the **Type** select field. To filter the functions by filter text, enter the filter text in the input field below the **Type** select field.
4. A function always operates on the parameter element that was specified for the condition or result (default). You may specify a different source element for the function by selecting a parameter element that is used within the decision entity or by selecting a function that returns a value of a compatible data type. To specify a different parameter element as source element for the function, click the **Parameters** tab, expand a parameter in the list and select a parameter element. Move the parameter element to the right by double-clicking it. Insert the period character as

separator after the parameter element name. To select a function to be provided as a source element to another function, see Step 7.

5. To select a function, do one of the following:
 - a. Double-click a function. If the function has input parameters, the Function Argument dialog pops up. Specify the input parameters as described in Step 6, and click **OK**.
 - b. Enter the function manually in the **Enter/edit expression** field. Press CTRL+SPACE for auto-complete.
6. To specify the input parameters of the function, do one of the following in the Function Argument dialog:
 - a. Enter a literal value.
 - b. Select a parameter element from the list in the pop-up window that opens after you click . The list contains input and/or input/output parameter references whose types are compatible with the input parameter selected for the function. After you close the dialog by clicking **OK**, the input parameter is inserted in the **Enter/edit expression** field, where you can modify it. To add a parameter element, select the input parameter you want to replace with the parameter element in the **Enter/edit expression** field, click the **Parameters** tab, expand a parameter in the list and double-click a parameter element. The list contains all parameters and their elements that are used in the decision table or event rule regardless of their data type. If the data type of the selected parameter element is not compatible with the data type of the input parameter, an error is displayed.
 - c. Enter the input parameters manually in the **Enter/edit expression** field inside %" %%. Use the syntax as described in ["Working with Expressions" on page 65](#), Syntax Overview.

Note: To specify an empty string as input parameter, enter "" in the **Enter/edit expression** field, or select **EMPTY STRING CONSTANT** from the parameter picker in the Function Argument dialog.

7. To chain functions, do one of the following:
 - a. Enter the period character after a function, press CTRL+SPACE. In the pop-up dialog, double-click a second function.
 - b. Enter the period character, select the **Functions** tab, and double-click a function in the list. In the Function Argument dialog, enter the input parameters and click **OK**. For more information about nesting functions, see ["Working with Expressions" on page 65](#).
8. To nest functions, enter a function instead of an input parameter in the **Enter/edit expression** field. The return value of the inner function then serves as input parameter of the outer function. For more information about nesting functions, see ["Working with Expressions" on page 65](#).
9. To perform mathematical operations on the return value of functions or parameter references, place the cursor where you want the operator to be inserted, and type it

- in. The mathematical operators $+$, $-$, $*$ and $/$ are supported. For more information about performing mathematical operations, see ["Working with Expressions" on page 65](#).
10. To nest sub-expressions in parentheses, place the cursor where you want the open parenthesis to be inserted, and type it in. Do the same for the closed parenthesis. For more information about nesting sub-expressions, see ["Working with Expressions" on page 65](#).
 11. Click **OK**.