webMethods BPM Rules Development Help

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Table of Contents

About this Guide

webMethods Rules Development Help describes how to create business rules. It contains information for developers who want to build, test and use business rules using the Rules Development feature of Software AG Designer.

webMethods Rules Development Help contains supporting documentation on the following main topics:

- "Working with Rules-Related Event Types" on page 199.

Document Conventions

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

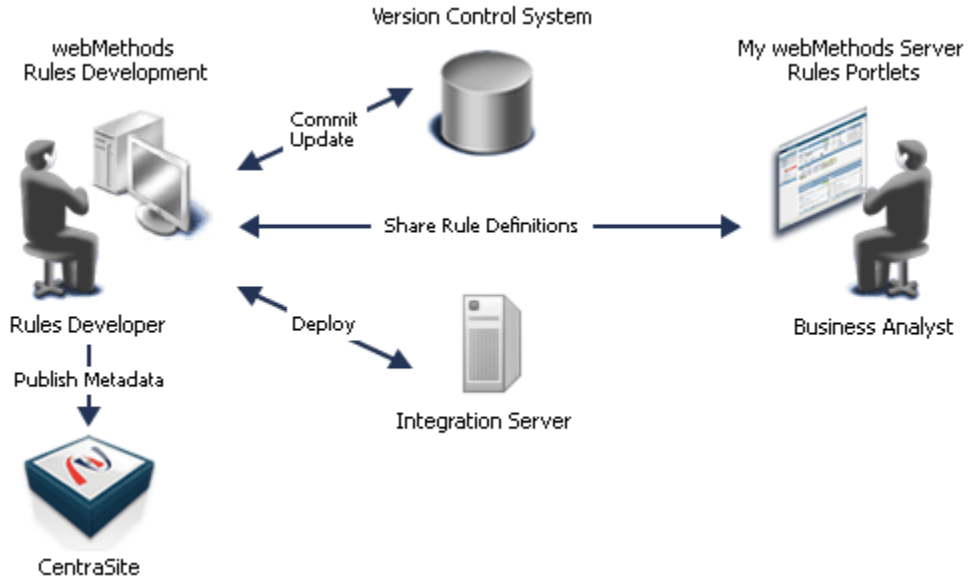
1 Rules Development Overview

webMethods Rules Development enables you to create and locally test business rules as part of a rule project.

The following types of business rules can be created:

- Decision Tables, for more information see "Working with Decision Tables" on page 99.
- Event Rules, for more information see "Working with Event Rules" on page 125.

The rule project is then exported and deployed to the Integration Server that is used as runtime environment. You can also exchange the rule project with a My webMethods Server repository, where it can be accessed and modified by business analysts. Rule projects can be added to version control, and rule project metadata can be exchanged with CentraSite.



Note: The rules that you created with webMethods Rules Development are not interchangeable or operational with any existing webMethods Blaze Rules implementations.

For an overview of the complete Rules Development process, see "Rules Development Process Overview" on page 53.

For more information about the Integration Server, see "Rule Project Exchange with the Integration Server" on page 179.

For more information about the My webMethods Server repository, see "Rule Project Exchange with the My webMethods Server Repository" on page 183.

For more information about CentraSite, see "Rule Project Exchange with CentraSite" on page 187.

Before you can get started, you must install and configure several Software AG products as described in "Before You Use Software AG Designer for Rules Development" on page 15.

Before You Use Software AG Designer for Rules Development

You must install and configure several Software AG products, before you can use Software AG Designer for Rules Development. For complete information about installation, see *Software AG Installation Guide*.

Note: If you upgraded Software AG Designer, you must upgrade all outdated rule projects before you can work with them, see *Upgrading webMethods Products*.

To create and locally test business rules using the Rules Development feature of Software AG Designer:

- Software AG Designer with the Rules Development feature must be installed.
- Software AG Designer must be configured to have network access to the Integration Server to import document types. For more information, see *webMethods Service Development Help*.

To export and deploy rule projects to the Integration Server that is used as runtime environment:

- WmBusinessRules package must be installed on the Integration Server. For more information, see *webMethods Service Development Help*.
- Software AG Designer must be configured to have network access to the Integration Server. For more information, see *webMethods Service Development Help*.
- You must have a valid license that includes the functionality you want to work with. For more information, see "About Rules Development Licenses" on page 16.

To exchange rule projects with the My webMethods Server repository:

- The Rules package 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).
- Proper user access rights to the repository must be configured on the My webMethods Server. For more information, see *Working with Business Rules in My webMethods, Installation and Configuration Information for My webMethods System Administrators*.
- Software AG Designer must be configured to have network access to the My webMethods Server repository, see "Configuring a My webMethods Server Repository Connection" on page 184.

To exchange rule project metadata with CentraSite:

- CentraSite Integration plugin must be installed. For more information, see *Software AG Installation Guide*.
- Software AG Designer must be configured to have network access to CentraSite. For more information, see *webMethods CentraSite Metadata Help*.

About Rules Development Licenses

Before you can execute rules on the Integration Server that is used as a runtime environment, you must purchase a valid license that includes the functionality you want to work with. The following table gives an overview of the different Rules Development licenses and their enabled functionality:

Functionality	Business Rules	Business Rules AddOn
Synchronous Invoke from Business Processes	yes	yes
Process Actions	no	yes
Service Actions	no	yes
New Data Actions	no	yes
External Event Rules	no	yes
Public Built-in Services	no	yes

The license expires after a time period specified by your particular purchase agreement.

The License Key

You are provided with a license key file that you place in the file system of the machine on which Integration Server will run. The license key is a special code associated with your license.

When you install Integration Server, the setup program asks you to provide the name and location of this file. For more information about installing webMethods Products, see *Installing webMethods, Install Using the Install GUI Mode*. The setup program then copies this file to *IntegrationServer_directory* \instances*instance_name* \packages \WmBusinessRules\config with the namelicenseKey.xml. If this file is inadvertently deleted, Software AG rules engine on Integration Server will not be available for use.

Viewing Licensing Information

To view licensing information for Software AG rules engine, open the licenseKey.xml file located in *IntegrationServer_directory* \instances*instance_name* \packages \WmBusinessRules\config.

Changing Licensing Information

Use the following procedure to change your license key when your license expires or you change your license to include different functionality.

Important: Before performing these steps, you must obtain a new license key file from Software AG, and the names of the old and the new license key file must be identical.

To change the license key:

1. Stop the Integration Server or the WmBusinessRules package.
2. Copy the new licenseKey.xml file to *IntegrationServer_directory* \instances *instance_name* \packages\WmBusinessRules\config.
3. Restart the Integration Server or the WmBusinessRules package.

2 Rules Development Terminology

The following terminology is used in webMethods Rules Development 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: `IF Condition THEN Result`.
Condition Value	A condition value determines a condition. It can consist of: ■ 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 `customer` data model can contain the data model elements `name` and `age`.
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 sorted into rows and columns. A column can either

Term	Explanation
	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 predefined 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	An event rule is a decision entity that specifies the reaction to 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 predefined event types that were created with the webMethods Event Type Editor, see *webMethods Event-Driven Architecture Help*.
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	A process action is an action that was mapped from an existing process and can be used in a decision entity to: ■ 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). ■ Fail one or more running process instance(s).

Term	Explanation
	■ Resume one or more suspended process instance(s). ■ Invoke a user task.
Result	A result is the right hand side part of a rule: `IF Condition THEN Result`. There are two types of results: ■ 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	A result value determines a result. There are two types: ■ Assignment result values. ■ Action result values. An assignment result value can consist of: ■ 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. An action result value determines the action status: ■ Active. ■ Inactive.
Rule	A rule is a single element that specifies a decision in a `IF Condition THEN Result` syntax.
Rule Set	A rule set is a grouping of logically related decision entities. Every rule set belongs to a rule project.
Rule Project	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, these different elements can be defined and used by all parts of the rule project.

Term	Explanation
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 Rules Development Workspace

When you start Software AG Designer the first time, you are prompted to select a workspace. You can accept the default location (c:\Documents and Settings *[Username]* \workspace), or choose a different location.

Stored in this directory are:

- Rule projects.
- Folders inside rule project folders.
- The log (in *[workspace]* \.metadata\.log).
- Preferences settings.

If you switch workspaces using **File > Switch Workspace** and choose a new directory, you will no longer see the same items as above. Each workspace contains its own set of rule projects, preferences, and local metadata.

By default, Software AG Designer prompts you for a workspace every time you start it. You can choose to have it accept a default workspace and not prompt you. You can configure this option at startup by selecting the **Use this as the default and do not ask again** check box in the Workspace Launcher window, or at any other time by going to **Window > Preferences > General > Startup and Shutdown**.

4 Rules Development Perspective

The Rules Development perspective is a collection of views that contain a particular type of information about the decision entities. Each perspective has a default set of views. You can add views to or remove them from a perspective, and move views to different locations in Software AG Designer. For more information, see "Rules Development Views" on page 27.

If you want to undo changes you make, you can reset a perspective and restore its default settings by selecting **Window > Reset Perspective ...** from the menu bar.

If you want to save changes, you can customize a perspective by selecting **Window > Save Perspective as ...** from the menu bar.

By default, Software AG Designer initially opens in the Resources perspective. To switch to the Rules Development perspective, see "Opening the Rules Development Perspective" on page 26. After the first time you run Software AG Designer, it opens in the last perspective used.

Opening the Rules Development Perspective

To open the Rules Development perspective:

1. In the menu bar, click **Window > Open Perspective > Other**.
2. In the Open Perspective dialog, select **Rules Development**.
3. Click **OK**.

The Rules Development perspective opens with its default set of views.

5 Rules Development Views

The Rules Development perspective contains a number of views, and each view contains a particular type of information about the decision entities. A view is not just for viewing information; a view often allows advanced editing and configuration as well.

You can add views to or remove them from the Rules Development perspective, and move views to different locations in Software AG Designer. All views are available from the **Window > Show View** menu.

The following views are relevant to Rules Development:

Designer View	Description
Rules Explorer view	See "Working with the Rules Explorer View" on page 29.
Rule Verification view	See "Working with the Rule Verification View" on page 32.
Navigator view	See *Software AG Designer Help*.
Package Navigator view	See *webMethods Service Development Help*.
Palette view	See "Decision Table Editor Palette View Buttons" on page 40 and "Event Rule Editor Palette View Buttons" on page 44.
Problems view	See *Workbench User Guide*.
Properties view	See *Workbench User Guide*.
Saved Search view	See *webMethods Workspace Metadata Help*. If you are working with CentraSite, also see *webMethods CentraSite Metadata Help*.
Search view	See *webMethods Workspace Metadata Help*. If you are working with CentraSite, also see *webMethods CentraSite Metadata Help*.
Results view	See *webMethods Service Development Help*.
Solutions view	For more information about working with the Rules Development feature in the Solutions view, see "Working with the Solutions View" on page 34.

Designer View	Description
	For information about Solutions view functionality for other webMethods features, see the online help for that feature.

Working with the Rules Explorer View

Right-clicking an asset in the Rules Explorer view opens the context menu. The following functions are relevant to Rules Development:

Function	Description
New > Action	Opens the New Action wizard, see "Accessing the Action Wizard" on page 77.
New > Data Model	Opens the New Data Model wizard, see "Accessing the Data Model Wizard" on page 63.
New > Decision Table	Opens the New Decision Table wizard, see "Accessing the Decision Table Wizard" on page 102.
New > Event Model	Opens the New Event Model wizard, see "Accessing the Event Model Wizard" on page 68.
New > Event Rule	Opens the New Event Rule wizard, see "Accessing the Event Rule Wizard" on page 128.
New > Rule Project	Opens the New Rule Project wizard, see "Accessing the Rule Project Wizard" on page 56.
New > Rule Set	Opens the New Rule Set wizard, see "Accessing the Rule Set Wizard" on page 95.
New > Parameter (only for decision entities)	Opens the New Parameter wizard, see "Adding a Parameter to a Decision Entity" on page 157.

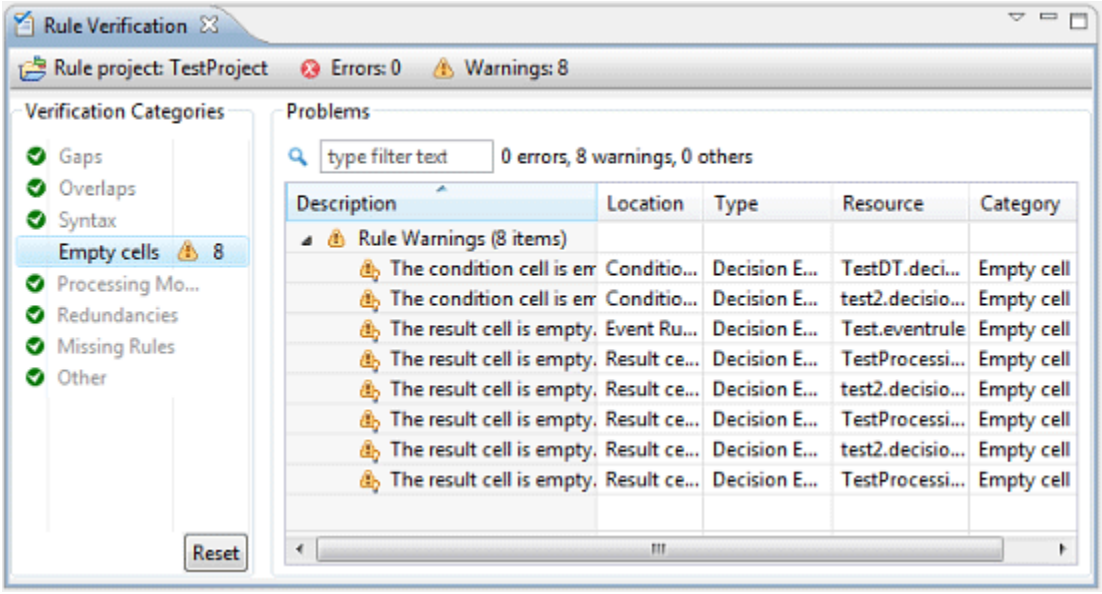
Function	Description
Show All Projects	Lists all rule projects in the Rules Explorer view.
Open (only for decision entities)	Opens the decision entity in the editor.
Hide Project	Hides the selected rule project in the Rules Explorer view.
Hide Other Projects	Hides all rule projects apart from the selected rule project in the Rules Explorer view.
Delete	Deletes the selected rule project, action, data model, event model, decision table, event rule, or rule set, see "Deleting a Rule Project" on page 58, "Deleting an Action" on page 90, "Deleting a Data Model" on page 65, "Deleting an Event Model" on page 70, "Deleting a Decision Entity" on page 159, "Deleting a Rule Set" on page 96.
Rename	Renames the selected rule project, action, data model, decision table, event model, event rule, or rule set, see "Renaming a Rule Project" on page 57, "Renaming an Action" on page 90, "Renaming a Data Model" on page 64, "Renaming an Event Model" on page 70, "Renaming a Decision Entity" on page 159, "Renaming a Rule Set" on page 96.
Import	Opens the Import wizard, see "Accessing the Import Wizard" on page 185.
Export	Opens the Export wizard, see "Accessing the Export Wizard" on page 184.
Edit (only for actions)	Opens the Edit Action dialog box, see "Modifying an Action" on page 89.
Synch Data Model (only for data models)	Opens the Synchronize Data Model with Integration Server dialog box, see "Synchronizing a Data Model with the Underlying IS Document Type" on page 64.

Function	Description
Synch Event Model (only for event models)	Opens the Synchronize Event Model with Event Type Store dialog box, see "Synchronizing an Event Model with the Underlying Event Type" on page 69.
Run As > Run Decision Table (only for decision tables)	Opens the Enter Input dialog box to test a decision table locally, see "Testing a Decision Table Locally" on page 174.
Run As > Run Event Rule (only for event rules)	Opens the Launch dialog box to test an event rule locally, see "Testing an Event Rule Locally" on page 176.
Run As > Run Rule Set (only for rule sets)	Opens the Enter Input dialog box to test a rule set locally, see "Testing a Rule Set Locally" on page 176.
Verify	Manually verifies the selected rule project, rule set or decision entity, see "Verifying Rules Manually" on page 165.
Rule Sets	Lists the associated rule sets of a decision table or event rule.
Show Dependencies > In Workspace	Lists the workspace dependencies of a selected action, data model, decision table, event model, event rule, or rule set in the Search view, see "Showing Asset Dependencies" on page 190.
Show Dependencies > In CentraSite	Lists the CentraSite dependencies of a selected action, data model, decision table, event model, event rule, or rule set in the Search view, see "Showing Asset Dependencies" on page 190.
Show References > In Workspace	Lists the workspace references of a selected action, data model, decision table, event model, or event rule in the Search view, see "Showing Asset References" on page 191.
Show References > In CentraSite	Lists the CentraSite references of a selected action, data model, decision table, event

Function	Description
	model, or event rule in the Search view, see "Showing Asset References" on page 191.
Upgrade Project (only for outdated rule projects)	Upgrades the rule project to the currently installed version of Software AG Designer.

Working with the Rule Verification View

Errors and warnings that are detected when verifying rules are logged in the Rule Verification view. The Rule Verification view opens automatically after a rule was manually verified. To add the view manually to your current perspective, click **Window > Show View > Other... > Software AG > Rule Verification**.



The left side of the view shows the **Verification Categories**. For more information about which verification categories exist, see "About Verification Categories" on page 166.

You can:

- Select one or several categories to only show the associated errors and warnings in the **Problems** table.
- Right-click a category and select **Suppress warnings** or **Restore warnings** from the context menu. In this case, the **Problems** table suppresses or restores the associated warnings.

> **Note:** This setting overwrites any warning suppression settings in the editor, see "Suppressing Warnings in Single Cells" on page 169.

- Click **Reset** to undo your selection.

The right side of the view shows a text filter and the **Problems** table.

In the **Problems** table, you can:

- Double-click the error or warning icon for a decision entity problem to open the associated decision entity in the editor.
- Click a column title to sort the entries alphabetically.

The Rule Verification view also features a pull-down menu. The menu contains the following menu items:

Menu item	Function
Categories > Gaps	When selected, the category **Gaps** is listed under **Verification Categories**.
Categories > Overlaps	When selected, the category **Overlaps** is listed under **Verification Categories**.
Categories > Syntax	When selected, the category **Syntax** is listed under **Verification Categories**.
Categories > Empty cells	When selected, the category **Empty cells** is listed under **Verification Categories**.
Categories > Processing Modes	When selected, the category **Processing Modes** is listed under **Verification Categories**.
Categories > Redundancies	When selected, the category **Redundancies** is listed under **Verification Categories**.
Categories > Missing Rules	When selected, the category **Missing Rules** is listed under **Verification Categories**.
Categories > Other	When selected, the category **Other** is listed under **Verification Categories**.
Categories > Show All	When selected, all categories are listed under **Verification Categories**. This is the default.
Columns	In the Columns dialog, you can modify the order of the **Problems** table columns and set a width for each column.

Menu item	Function
Preferences	In the Preferences dialog, you can select, which columns of the **Problems** table are shown or hidden.

Working with the Solutions View

Right-clicking **Rules** or a specific rule project in the Solutions view opens the context menu. The following functions are relevant to Rules Development:

Function	Description
New Action	Opens the New Action wizard, see "Accessing the Action Wizard" on page 77.
New Data Model	Opens the New Data Model wizard, see "Accessing the Data Model Wizard" on page 63.
New Decision Table	Opens the New Decision Table wizard, see "Accessing the Decision Table Wizard" on page 102.
New Event Model	Opens the New Event Model wizard, see "Accessing the Event Model Wizard" on page 68.
New Event Rule	Opens the New Event Rule wizard, see "Accessing the Event Rule Wizard" on page 128.
New Rule Project	Opens the New Rule Project wizard, see "Accessing the Rule Project Wizard" on page 56.
New Rule Set	Opens the New Rule Set wizard, see "Accessing the Rule Set Wizard" on page 95.
Import	Opens the Import wizard, see "Accessing the Import Wizard" on page 185.

Function	Description
Export	Opens the Export wizard, see "Accessing the Export Wizard" on page 184.
Delete	Deletes the selected rule project, see "Deleting a Rule Project" on page 58.
Rename	Renames the selected rule project, see "Renaming a Rule Project" on page 57.
Show in Rules Explorer	Lists the selected rule project in the Rules Explorer view.
Retract	Retracts metadata of the selected rule project from CentraSite, see "Retracting Rule Project Metadata from CentraSite" on page 188.
Publish	Publishes metadata of the selected rule project to CentraSite, see "Publishing Rule Project Metadata to CentraSite" on page 188.

6 Rules Development Editors

When you develop rules in Software AG Designer, you use an Eclipse editor. Rules Development's editor is also known as the rule editor.

The main toolbar is the topmost toolbar in Software AG Designer, just below the menu. Most Software AG Designer toolbar buttons are always available. Some, however, are available in some perspectives but not others, and some are available based on the editor that has focus. Rules Development views usually have their own buttons as well.

The rule editor toolbar is a part of the rule editor. Rule editor toolbar buttons are always visible when a decision entity is displayed (open) in the rule editor. You can click only the buttons that are relevant to the selected decision entity.

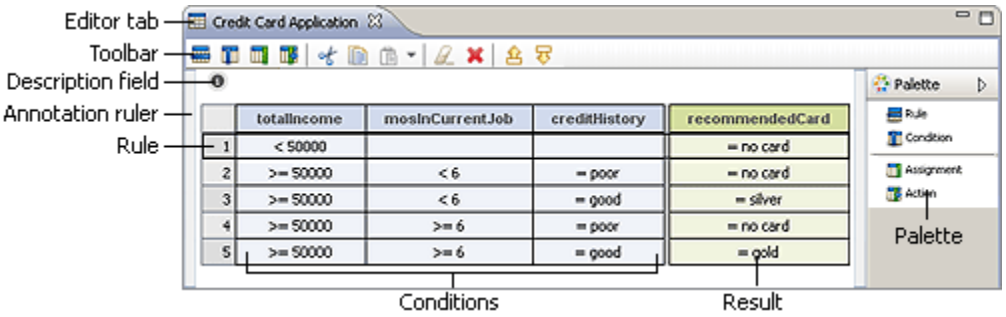
The following rule editors are available:

- Decision table editor, see "The Decision Table Editor" on page 38.
- Event rule editor, see "The Event Rule Editor" on page 43.

The rule editor opens automatically when you open a decision entity.

The Decision Table Editor

The following graphic shows the basic layout of a decision table in the editor area.



Right-clicking a cell opens a context menu, which is described in "Decision Table Editor Context Menu" on page 40.

For more information about the Palette view buttons, see "Decision Table Editor Palette View Buttons" on page 40.

For more information about the toolbar buttons, see "Decision Table Editor Toolbar Buttons" on page 38.

For more information about the keyboard shortcuts, see "Decision Table Editor Keyboard Shortcuts" on page 42.

Decision Table Editor Toolbar Buttons

The following buttons appear in the decision table editor toolbar:

Button	Description
	Inserts a new rule after the last rule.
	Inserts a new condition after the last condition.
	Inserts a new assignment result after the last result.
	Inserts a new action result after the last result.
Cut	Cuts the content of a selected cell, row or column.
Copy	Copies the content of a selected cell, row or column.
Paste	Pastes the content of the system clipboard into a selected cell, row or column.
Paste Before (dropdown menu)	Pastes the content of the system clipboard before a selected row.
Paste After (dropdown menu)	Pastes the content of the system clipboard after a selected row.
Paste Before (dropdown menu)	Pastes the content of the system clipboard before a selected condition column.
Paste After (dropdown menu)	Pastes the content of the system clipboard after a selected condition column.
Paste Before (dropdown menu)	Pastes the content of the system clipboard before a selected result column.
Paste After (dropdown)	Pastes the content of the system clipboard after a selected result column.
	Clears the content of the selected cell, row or column.
	Deletes the selected row or column.

Button	Description
	Moves a rule one row up.
	Moves a rule one row down.

Decision Table Editor Palette View Buttons

The following buttons appear in the decision table editor Palette view:

Button	Description
	Inserts a new rule by click and drop or drag and drop.
	Inserts a new condition by click and drop or drag and drop.
	Inserts a new assignment result by click and drop or drag and drop.
	Inserts a new action result by click and drop or drag and drop.

Decision Table Editor Context Menu

Right-clicking a cell opens the context menu, which features the following items:

Item	Description
Undo	Undoes the last step.
Redo	Redoes the last step.
Format Cell	Opens submenu to assign an operator.
Add Rule	Inserts a new rule after the last rule.
Add Condition	Inserts a new condition after the last condition.

Item	Description
Add Assignment	Inserts a new assignment result after the last result.
Add Action	Inserts a new action result after the last result.
Clear	Clears the content of the selected cell, row or column.
Delete	Deletes the selected row or column.
Enable Action	Sets the action status to active.
Disable Action	Sets the action status to inactive.
Enable Principal	Enables principal status of a column.
Disable Principal	Disables principal status of a column.
Move Up	Moves a rule one row up.
Move Down	Moves a rule one row down.
Cut	Cuts the content of a selected cell, row or column.
Copy	Copies the content of a selected cell, row or column.
Paste	Pastes the content of the system clipboard into a selected cell, row or column.
Paste Before	Pastes the content of the system clipboard before a selected row.
Paste After	Pastes the content of the system clipboard after a selected row.

Item	Description
Paste Before	Pastes the content of the system clipboard before a selected condition column.
Paste After	Pastes the content of the system clipboard after a selected condition column.
Paste Before	Pastes the content of the system clipboard before a selected result column.
Paste After	Pastes the content of the system clipboard after a selected result column.
Suppress Warning '...'	Suppresses a specific warning.
Show all Warnings for Decision Table	Restores all warnings.

Decision Table Editor Keyboard Shortcuts

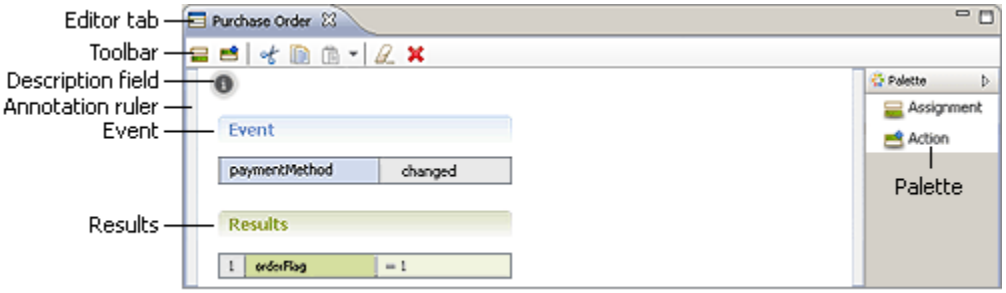
The following keyboard shortcuts can be used in the decision table editor:

Key Combination	Function
F2	Starts edit mode of the selected cell.
ESC	Stops edit mode of the selected cell.
DEL	Clears the content of the selected cell, row or column.
SHIFT+DEL	Deletes the selected row or column.
CTRL+X	Cuts the content of a selected cell, row or column.
CTRL+C	Copies the content of a selected cell, row or column.
CTRL+V	Pastes the content of the system clipboard into a selected cell, row or column.

Key Combination	Function
Arrow keys	Can be used to navigate between selected cells, rows or columns.

The Event Rule Editor

The following graphic shows the basic layout of an event rule in the editor area.



Right-clicking a cell opens a context menu, which is described in "Event Rule Editor Context Menu" on page 44.

For more information about the Palette view buttons, see "Event Rule Editor Palette View Buttons" on page 44.

For more information about the toolbar buttons, see "Event Rule Editor Toolbar Buttons" on page 43.

For more information about the keyboard shortcuts, see "Event Rule Editor Keyboard Shortcuts" on page 45.

Event Rule Editor Toolbar Buttons

The following buttons appear in the event rule editor toolbar:

Button	Description
	Inserts a new assignment result after the last result.
	Inserts a new action result after the last result.
Cut	Cuts the content of a selected value cell or result row.
Copy	Copies the content of a selected value cell or result row.

Button	Description
Paste	Pastes the content of the system clipboard into a selected value cell or result row.
Paste Before (dropdown menu)	Pastes the content of the system clipboard before a selected result row.
Paste After (dropdown menu)	Pastes the content of the system clipboard after a selected result row.
	Clears the content of the selected value cell of an assignment result.
	Deletes the selected assignment result.

Event Rule Editor Palette View Buttons

The following buttons appear in the event rule editor Palette view:

Button	Description
	Inserts a new assignment result by click and drop or drag and drop.
	Inserts a new action result by click and drop or drag and drop.

Event Rule Editor Context Menu

Right-clicking a cell opens the context menu, which features the following items:

Item	Description
Undo	Undoes the last step.
Redo	Redoes the last step.
Format Cell	Opens submenu to assign an operator.

Item	Description
Add Assignment	Inserts a new assignment result after the last result.
Add Action	Inserts a new action result after the last result.
Cut	Cuts the content of a selected value cell or result row.
Copy	Copies the content of a selected value cell or result row.
Paste	Pastes the content of the system clipboard into a selected value cell or result row.
Paste Before	Pastes the content of the system clipboard before a selected result row.
Paste After	Pastes the content of the system clipboard after a selected result row.
Clear	Clears the content of the selected value cell.
Delete	Deletes the assignment result.
Suppress Warning '...'	Suppresses a specific warning.
Show all Warnings for Event Rule	Restores all warnings.

Event Rule Editor Keyboard Shortcuts

The following keyboard shortcuts can be used in the event rule editor:

Key Combination	Function
F2	Starts edit mode of the selected cell.
ESC	Stops edit mode of the selected assignment result.

Key Combination	Function
DEL	Clears the value of the selected assignment result.
SHIFT+DEL	Deletes the selected result.
CTRL+X	Cuts the content of a selected cell or result row.
CTRL+C	Copies the content of a selected cell or result row.
CTRL+V	Pastes the content of the system clipboard into a selected cell or result row.
Arrow keys	Can be used to navigate between selected cells and rows.

7 Rules Development Preferences

Most Software AG Designer preferences are located in **Window > Preferences > Software AG**, with the preferences specific to Rules Development under **Business Rules**.

The following Rules Development preferences exist:

Preference	Description
Decision Entity Editors	See "Decision Entity Editors Preferences" on page 48.
Decision Entity Editors > Annotations	See "Annotations Preferences" on page 49.
Decision Entity Editors > Decision Tables	See "Decision Table Preferences" on page 49.
Decision Entity Editors > Event Rules	See "Event Rule Preferences" on page 50.
Decision Entity Launching	See "Decision Entity Launching Preferences" on page 50.
My webMethods Server Repositories	See "Configuring a My webMethods Server Repository Connection" on page 184.
Rule Projects	See "Rule Project Preferences" on page 51.
Rule Verification	See "Rule Verification Preferences" on page 51.
Rules Explorer View	See "Rules Explorer View Preferences" on page 52.

Decision Entity Editors Preferences

The following decision entity editors preferences exist:

For this preference ...	You can do this ...
Show vertical ruler	Click the check box to display the left-hand margin, which displays the error and warning annotations.

For this preference ...	You can do this ...
Show overview ruler	Click the check box to display the right-hand margin, which displays an overview of all annotations within the editor.

Annotations Preferences

The following annotations preferences can be selected for errors and warnings:

For this preference ...	You can do this ...
Show in vertical ruler	Click the check box to display the selected annotation type within the vertical ruler.
Show in overview ruler	Click the check box to display the selected annotation type within the overview ruler.
Color	Click the color field to specify a different color for the selected annotation type.

Decision Table Preferences

The following decision table preferences exist:

For this preference ...	You can do this ...
Default column width	Specify the default width of the decision table columns.
Maximum auto-resize column width	Specify the maximum auto-resize column width when entering long values.
Default row numbering width	Specify the width of the row number cells of the decision table.
Default row height	Specify the default height of the decision table rows.

Event Rule Preferences

The following event rule preferences exist:

For this preference ...	You can do this ...
Default event source width	Specify the default width of the **Event Source** cell.
Default type label width	Specify the default width of the **Type** label cell.
Default result numbering width	Specify the default width of the row number cells.
Default result width	Specify the default width of the **Result** cell.
Default result value width	Specify the default width of the **Result value** cell.
Default result row maximum auto-resize width	Specify the maximum auto-resize width of the **Result value** cell when entering long values.
Default row height	Specify the default height of the event rule rows.

Decision Entity Launching Preferences

The following decision entity launching preferences exist:

For this preference ...	You can do this ...
Ignore In Effect Settings	Setting this preference causes the in effect settings of decision entities to be automatically ignored when running local tests.
Prompt for Ignore In Effect	Setting this preference causes a pop-up window to ask you if the in effect settings should be ignored when running local tests.

Rule Project Preferences

The following rule project preferences exist:

For this preference ...	You can do this ...
Add new rule projects to version control system	Click the check box to automatically add a new rule project to version control.
Show new rule project in Rules Explorer view	Click the check box to show a new rule project in the Rules Explorer view.

Rule Verification Preferences

The following rule verification preferences exist:

For this preference ...	You can do this ...
Verify decision entities automatically	Setting this preference causes decision entities to be verified automatically when they are modified and saved. Note that decision entities containing errors will not be verified.
Verify associated rule sets	Setting this preference causes any associated rule sets to be verified when a decision entity is verified.
Verify master rule set	Setting this preference causes the master rule set to be verified along with other rule sets when the **Verify associated rule sets** option is checked, or when a rule project is verified with the **Verify** option of the Rules Explorer view.
Pessimistic Verification (default)	Pessimistic verification assumes that the return values from actions or functions, or the input values from parameters will possibly lead to warnings and errors. Setting this preference increases the amount of verification warnings and errors but ensures that problems that may occur at runtime are detected when verifying rules.
Optimistic Verification	Optimistic verification assumes that the return values from actions or functions, or the input values from

For this preference ...	You can do this ...
	parameters will possibly not lead to warnings and errors. Setting this preference reduces the amount of verification warnings and errors but can lead to undetected problems that may occur at runtime.
Automatically revalidate on warning suppression change	Setting this preference causes decision entities to be reverified automatically after you modified any warning suppression settings in the Rule Verification view. For more information about warning suppression in the Rule Verification view, see "Working with the Rule Verification View" on page 32.

Rules Explorer View Preferences

The following Rules Explorer view preferences exist:

For this preference ...	You can do this ...
Hide empty categories in Rules Explorer view	Click the check box to hide empty categories such as actions, data models, etc. in the Rules Explorer view.
Hide decision entities under rule sets	Click the check box to hide the decision entities that are part of a rule set in the Rules Explorer view.
Hide master rule set	Click the check box to hide the master rule set in the Rules Explorer view.

8 Rules Development Process Overview

Rules Development is a process that involves the following basic stages:

Stage 1

Create a rule project that is used as a container for all data models, rule sets, decision entities, and other elements that must be available to all parts of the rule project.

For more information, see "Working with Rule Projects" on page 55.

Stage 2

Import an IS document type and map it to a data model, which is then used to define the structure and data type used in the rule creation process.

For more information, see "Working with Data Models and Parameters" on page 59.

Stage 3 (optional)

Create an event model that you can later use in an event rule.

For more information, see "Working with Event Models" on page 67.

Stage 4 (optional)

Create an action that you can later use in a decision entity.

For more information, see "Working with Actions" on page 73.

Stage 5

Create a rule set that is used as a container for all logically related decision entities.

For more information, see "Working with Rule Sets" on page 93.

Stage 6

Create and modify decision entities.

For more information, see "Working with Decision Tables" on page 99, "Working with Event Rules" on page 125 and "Global Functions Overview" on page 149.

Stage 7 (optional)

Verify the created decision entities.

For more information, see "Rule Verification Overview" on page 163.

Stage 8 (optional)

Test the created decision entities locally.

For more information, see "Local Rule Testing Overview" on page 171.

Stage 9

Export and deploy the rule project to the Integration Server that is used as runtime environment.

For more information, see "Rule Project Exchange with the Integration Server" on page 179.

Stage 10 (optional)

Export the rule project to the My webMethods Server Repository, where it can be accessed and administered by business analysts.

For more information, see "Rule Project Exchange with the My webMethods Server Repository" on page 183.

9 Working with Rule Projects

A rule project is used as a container for different rule sets and other elements, such as data models, decision entities, actions, etc. In a rule project, these different elements can be defined and used by all parts of the rule project.

Accessing the Rule Project Wizard

You can access the New Rule Project wizard in the following ways:

To start the wizard from the menu bar of the Rules Development perspective:

- Click **File > New > Rule Project.**

To start the wizard from any other perspective:

1. Click **File > New > Other**.
2. In the Select a wizard dialog box, click **Software AG > Rules Development > Rule Project**.
3. Click **Next**.

Creating a Rule Project

To create a rule project with the New Rule Project wizard:

1. Open the New Rule Project wizard as described in "Accessing the Rule Project Wizard" on page 56.
2. Type a name for the rule project in the **Project name** field.
3. Modify the rule project info as required:

For this field ...	You can do this ...
Location	The rule project is by default stored in your workspace. To store the rule project in any other directory, clear the **Use default location** check box and click **Browse**. In the Directory dialog box, navigate to the desired location and click **OK**.
Initial rule set name	Type a name for a new rule set (optional). The new rule set is automatically created together with the rule project.

For this field ...	You can do this ...
Add new rule project to version control	The rule project is by default added to version control. Clear the check box if you do not want to add the rule project to version control. **Note:** If you add the new rule project to version control, the Share Project wizard appears after you click **Finish**. For more information about sharing projects, see *Workbench User Guide*.

4. Click **Finish**.

Note: There is a second wizard page, where you can specify the Java build settings. For more information, see *Java Development User Guide*.

A new rule project is created and saved to your workspace. The navigation tree of the new rule project appears in the Navigator view, in the Solutions view, and (if selected) in the Rules Explorer view under *[RuleProjectName]* .

Renaming a Rule Project

To rename a rule project:

1. Do one of the following:
   a. Right-click the rule project name in the Rules Explorer view and select **Rename** from the context menu.
   b. Click the rule project name in the Rules Explorer view and press F2.
2. In the Rename Resource dialog box, type a new name in the **New name** field.
3. To open a list of all changes to be performed, click **Preview**.

Important: You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid rule project.

4. Click **OK**.

The rule project is renamed. All generated data model sources and class files that were associated with the former rule project name are deleted from the file system. New versions using the new project name are automatically created. The project name is updated in all related rule files and in the Rules Explorer view.

Deleting a Rule Project

To delete a rule project:

1. Right-click the rule project name in the Rules Explorer view and select **Delete** from the context menu. Hold down SHIFT or CTRL to select multiple rule projects.
2. In the Delete Resources dialog box, do one of the following:
   a. To delete the rule project, click **OK**. If you select the **Delete project contents on disk** check box, the rule project folder is deleted from your file system. Otherwise, it is only deleted from Software AG Designer.
   b. To open a list of all changes to be performed, click **Preview**. To confirm the changes, click **OK**.

   Important: You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid rule project.

10 Working with Data Models and Parameters

The rules you create with Software AG Designer operate on the basis of Integration Server (IS) document types. An IS document type contains a set of fields that define the structure and type of data in a document. To create document types, follow the instructions as described in *webMethods Service Development Help*.

Before you can actually create and modify rules, you must map the IS document type to a data model, which is then stored in your workspace as part of the rule project. The mapped data model serves as a class or blueprint. At runtime, specific instances of this data model will be used in the rules engine.

Data Model Elements and Data Types

The properties of a data model are referred to as data model elements. They correspond to the fields of the IS document type. Each data model element has a data type that corresponds to the data type of the imported IS document field. For an overview of supported data types, see "About Data Types" on page 62.

Example

You can create a `supplier` document type with fields such as `delivery time`, `delivery history`, `discount`, etc. After you imported this document type, a `supplier` data model with the data model elements `delivery time`, `delivery history`, `discount`, etc. is created and stored under workspace*[RuleProjectName]* \Data Models.

Parameters

It can be necessary to use the same data model more than once in a decision entity. This is the case if you want to compare two or more instances that are based on the same data model with each other. To enable this, the data model is mapped to a parameter when you create a decision entity. Within one decision entity, you can use several parameters of the same data model type, but each must have a unique name.

Parameter Input/Output Type

A parameter can have a different input/output type (**I/O** type) depending on whether it is used only as a condition/event source, only as a result, or as a condition/event source and a result of a decision entity:

Parameters is used ...	I/O Type is set to ...
Only as a condition/event source	Input
Only as a result	Output
As a condition/event source and a result	Both

Achieving Inference with the Any Option

In a rule set, you can achieve inference (see "Working with Rule Sets" on page 93) with the **Any** option of the New Decision Table and New Event Rule wizards. For each parameter you can specify if the rule:

- Refers to this specific parameter (**Any** check box is cleared).
- Refers to all parameters in the rule set that are based on the same data model (**Any** check box is selected). This works only if:
  - The parameter is used as a condition of a decision table.
  - The parameter is used as an event source of an event rule.
  - The same parameter is used as a condition and result of a decision table.
  - The same parameter is used as an event source and result of an event rule.

Note: The **Any** check box can only be selected if you use a parameter of a certain data model type only once in a decision entity.

Note: The **Any** check box is not selectable for parameters that were mapped from event models, see "Working with Event Models" on page 67.

Example

A company has a standard and a backup supplier for each item on sale. The following rules exist:

Rule 1: In case of urgent delivery, the supplier with the shortest delivery time gets the order, unless this supplier is blocked.

Rule 2: A supplier is blocked if the company has had more than two negative experiences with the supplier.

Rule 3: If both suppliers are blocked, an email is sent to the person controlling the order processing.

These three rules can be modeled in two decision tables within the same rule set.

When creating the Urgent Delivery decision table, the `supplier` data model is mapped to the two parameters `standSupp` and `backSupp`. The **Any** check box is cleared.

When creating the Negative Experience decision table, the `supplier` data model is mapped to the parameter `anySupp`. The **Any** check box is selected. In this way, the decision entity applies to all parameters within the rule set that are based on the `supplier` data model, including the `standSupp` and `backSupp` parameters.

Negative Experience Decision Table

	anySupp.negExperience	anySupp.block
1	<= 2	= false
2	> 2	= true

Urgent Delivery Decision Table

	standSupp.dtime	standSupp.block	backSupp.block	standSupp.getOrder	backSupp.getOrder	sendEmail
1	<= backSupp.dtime	= false		= true	= false	✗
2	<= backSupp.dtime	= true	= false	= false	= true	✗
3	<= backSupp.dtime	= true	= true	= false	= false	✓
4	> backSupp.dtime		= false	= false	= true	✗
5	> backSupp.dtime	= false	= true	= true	= false	✗
6	> backSupp.dtime	= true	= true	= false	= false	✓

About Data Types

The following data types are supported in Rules Development:

Icon	Data Type	Description
TF	Boolean	True or false.
	Date	Date and time.
Abc	String	String of characters.
010	Byte	Signed integer. The value must be greater than or equal to –128 but less than or equal to 127.
A	Character	A single unicode character.
64.	Double	Double-precision floating point number.
32.	Float	Standard-precision floating point number. **Note:** Floats are converted to doubles when mapping the IS document type to a data model.
32	Integer	Signed integer. The value must be greater than or equal to -2147483648 but less than or equal to 2147483647.

Icon	Data Type	Description
64	Long	Signed integer. The value must be greater than or equal to –9223372036854775808 but less than or equal to 9223372036854775807.
16	Short	Signed integer. The value must be greater than or equal to -32768 but less than or equal to 32767.

Accessing the Data Model Wizard

You can access the New Data Model wizard in the following ways:

To start the wizard from the menu bar:

1. Click **File > New > Other**.
2. In the Select a wizard dialog box, click **Software AG > Rules Development > Data Model**.
3. Click **Next**.

To start the wizard from the Solutions view:

- Right-click **Rules** or a specific rule project and select **New Data Model** from the context menu.

To start the wizard from the Rules Explorer view:

- Right-click any listed item and select **New > Data Model** from the context menu.

Creating a Data Model

Before you can create a data model, you must be connected to the Integration Server. To configure an Integration Server, follow the instructions as described in *webMethods Service Development Help*.

To create a data model with the New Data Model wizard:

1. Open the New Data Model wizard as described in "Accessing the Data Model Wizard" on page 63.
2. On the Data Model page, type a name for the data model in the **Data model name** field.
3. Select a rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.

- You can select any other rule project from the drop down list.
- To create a new rule project, click **New** and create the new rule project as described in "Creating a Rule Project" on page 56.

4. Type a description of the data model in the **Description** field (optional).
5. Click **Next**.
6. In the Data Model Document Type Selection dialog box, locate the document type on the Integration Server, select it and click **OK**.
7. Click **Finish**.

A new data model is created and saved to your workspace. It appears in the Rules Explorer view under Data Models > *[DataModelName]* .

Synchronizing a Data Model with the Underlying IS Document Type

After a data model was mapped from an IS document type, the IS document type can change. You can synchronize a data model with the underlying IS document type.

To synchronize a data model with the underlying IS document type:

1. In the Rules Explorer view, right-click the data model.
2. Select **Sync Data Model** from the context menu.
3. In the Synchronize Data Model with Integration Server confirmation dialog box, click **OK**.

> **Important:** Modifications to the fields of an IS document type may result in invalid decision entities.

Renaming a Data Model

To rename a data model:

1. Do one of the following:
   a. Right-click the data model name in the Rules Explorer view and select **Rename** from the context menu.
   b. Click the data model name in the Rules Explorer view and press F2.
2. In the Rename Resource dialog box, type a new name in the **New name** field.
3. To open a list of all changes to be performed, click **Preview**.

> **Important:** You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid data model.

4. Click **OK**.

The data model is renamed. All generated resources that were associated with the former data model name are deleted from the file system. New versions using the new data model name are automatically created. The data model name is updated in all related rule files and in the Rules Explorer view.

Deleting a Data Model

To delete a data model:

1. Right-click the data model name in the Rules Explorer view and select **Delete** from the context menu. Hold down SHIFT or CTRL to select multiple data models.
2. In the Delete Resources dialog box, do one of the following:
   a. To delete the data model, click **OK**. If you delete a data model that is used in a decision entity, you are prompted to confirm the deletion.

   > **Important:** Deleting a data model that is used in a decision entity invalidates the decision entity.

   b. To open a list of all changes to be performed, click **Preview**. To confirm the changes, click **OK**.

   > **Important:** You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid data model.

The data model and all components that are associated with it are deleted from file system.

11 Working with Event Models

You can create event rules that operate on the basis of event types that were created with the webMethods Event Type Editor, see "Working with Event Rules" on page 125 (external events). An event type is an XML schema that describes the structure of an event. To create event types, follow the instructions as described in *webMethods Event-Driven Architecture Help*.

Before you can actually create an event rule that is based on an event type, you must map the event type to an event model, which is then stored in your workspace as part of the rule project. The mapped event model serves as a class or blueprint. At runtime, specific instances of this event model will be used in the rules engine.

Parameters

When you create an event rule, the event model is mapped to a parameter. This parameter represents a specific instance of the event model.

Parameter Input/Output Type

A parameter can have a different input/output type (**I/O** type) depending on whether it is used only as a condition/event source, only as a result, or as a condition/event source and result of a decision entitiy.

Parameters is used ...	I/O Type is set to ...
Only as a condition/event source	Input
Only as a result	Output
As a condition/event source and a result	Both

Important: The **I/O** type of a parameter that was mapped from an event model must be set to **Input** or **Both.**

Accessing the Event Model Wizard

You can access the New Event Model wizard in the following ways:

To start the wizard from the menu bar:

1. Click **File > New > Other**.
2. In the Select a wizard dialog box, click **Software AG > Rules Development > Event Model**.
3. Click **Next**.

To start the wizard from the Solutions view:

- Right-click **Rules** or a specific rule project and select **New Event Model** from the context menu.

To start the wizard from the Rules Explorer view:

- Right-click any listed item and select **New >** **Event Model** from the context menu.

Creating an Event Model

To create an event model with the New Event Model wizard:

1. Open the New Event Model wizard as described in "Accessing the Event Model Wizard" on page 68.
2. On the Event Model page, type a name for the event model in the **Event model name** field.
3. Select a rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.
   - You can select any other rule project from the drop down list.
   - To create a new rule project, click **New** and create the new rule project as described in "Creating a Rule Project" on page 56.
4. Type a description of the event model in the **Description** field (optional).
5. Click **Next**.
6. On the Event Model Source Selection page, click **Browse**.
7. On the Select Event Type page, select the event type and click **OK**.
8. Click **Finish**.

A new event model is created and saved to your workspace. It appears in the Rules Explorer view under Event Models > *[EventModelName]* .

Synchronizing an Event Model with the Underlying Event Type

After an event model was mapped from an event type, the event type can change. You can synchronize an event model with the underlying event type.

To synchronize an event model with the underlying event type:

1. In the Rules Explorer view, right-click the event model.
2. Select **Sync Event Model** from the context menu.
3. In the Synchronize Event Model with Event Type Store confirmation dialog box, click **OK**.

   Important: Modifications to an event type may result in invalid decision entities.

Renaming an Event Model

To rename an event model:

1. Do one of the following:
   a. Right-click the event model name in the Rules Explorer view and select **Rename** from the context menu.
   b. Click the event model name in the Rules Explorer view and press F2.
2. In the Rename Resource dialog box, type a new name in the **New name** field.
3. To open a list of all changes to be performed, click **Preview**.

   Important: You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid event model.

4. Click **OK**.

The event model is renamed. All generated resources that were associated with the former event model name are deleted from the file system. New versions using the new event model name are automatically created. The event model name is updated in all related rule files and in the Rules Explorer view.

Deleting an Event Model

To delete an event model:

1. Right-click the event model name in the Rules Explorer view and select **Delete** from the context menu. Hold down SHIFT or CTRL to select multiple event models.
2. In the Delete Resources dialog box, do one of the following:
   a. To delete the event model, click **OK**.

> **Important:** Deleting an event model that is used in a decision entity invalidates the decision entity.

b. To open a list of all changes to be performed, click **Preview**. To confirm the changes, click **OK**.

> **Important:** You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid event model.

The event model and all components that are associated with it are deleted from file system.

12 Working with Actions

There are three types of actions:

- Service Actions, see "Working with Service Actions" on page 74.
- Process Actions, see "Working with Process Actions" on page 76.
- New Data Actions, see "Working with New Data Actions" on page 77.

Working with Service Actions

You can call an existing Integration Server service (IS service) from a decision entity if you map this IS service to a service action.

Service Action Input and Output

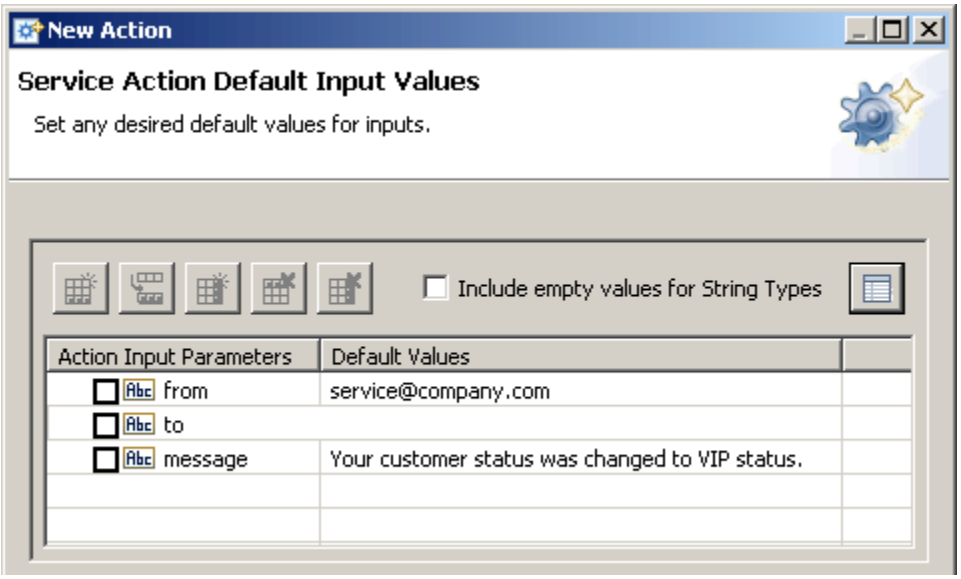
A service action can have inputs and an output. The inputs and output of a service action correspond to the inputs and output of the IS service the service action is based on. If an IS service has more than one output, you must specify in the New Action wizard, which output you want to use in the service action. Only a single simple type can be selected for a service action output. The selection cannot be a list, a table, a document, or a document reference. It can neither be a descendent of a document list or a document reference list.

Specifying Service Action Input Values

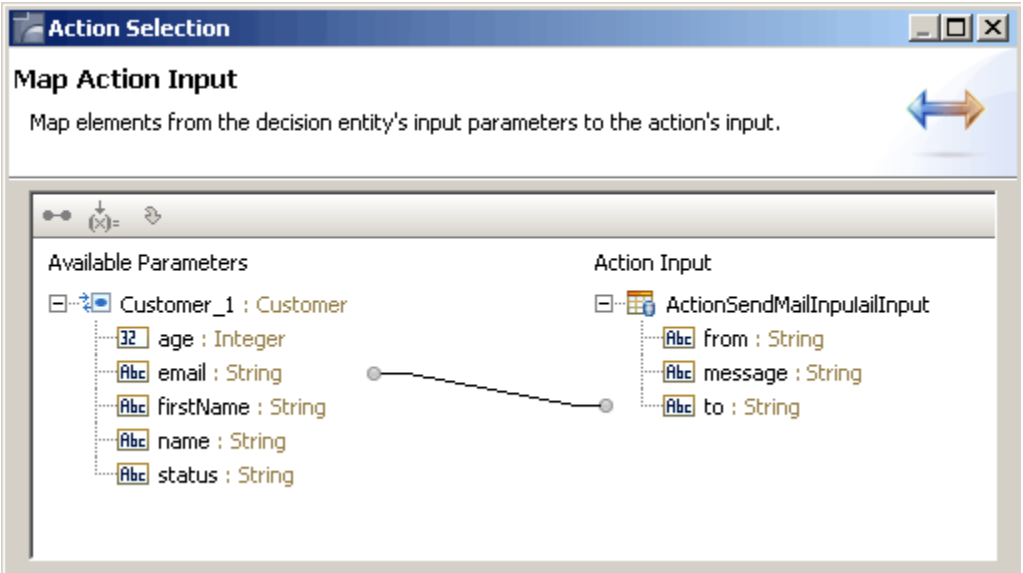
You can specify default values for the service action inputs when creating the service action. If you do not specify default input values, you must map a parameter element to the service action input, when using the service action in a decision entity.

Example

An IS service to send an email to a customer has the inputs `from`, `to` and `message`, and no output. The service action `sendMail()` that was mapped from this IS service uses the same inputs. You can specify a default input value for the inputs `from` and `message` when creating the service action, or when using the service action in the decision entity.



When using the service action in a decision entity, you can associate the element `email` of a `customer` parameter with the input `to`.



Using the Output Value from an IS Service

You can use the output value from an IS service if you use the service action that was mapped from this IS service as:

- A decision table condition value.
- A decision table assignment result value.
- An event rule assignment result value.

Executing an IS Service from a Decision Entity

You can execute an IS service from a decision entity if you use the service action that was mapped from this IS service as:

- A decision table action result.
- An event rule action result.

Working with Process Actions

You can call a process from a decision entity if you map this process to a process action. A process action is an action that affects a process as a whole. You can:

- 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).
- Fail one or more running process instance(s).
- Resume one or more suspended process instance(s).
- Invoke a user task (requiring a manual (human) decision). For more information about manual decisions, see *webMethods Process Development Help, About Manual Decisions*.

Process Action Input and Output

A process action can have inputs and an output. The inputs and output of a process action correspond to the inputs and output of the process the process action is based on. If a process has more than one output, you must specify in the New Action wizard, which output you want to use in the process action.

Specifying Process Action Input Values

You can specify default values for the process action inputs when creating the process action. If you do not specify default input values, you must map a parameter element to the process action input, when using the process action in a decision entity.

For more information about mapping, see "Working with Service Actions" on page 74, Specifying Service Action Input Values.

Using the Output Value from a Process

You can use the output value from a process if you use the process action that was mapped from this process as:

- A decision table condition value.

- A decision table assignment result value.
- An event rule assignment result value.

Executing a Process from a Decision Entity

You can execute a process from a decision entity if you use the process action that was mapped from this process as:

- A decision table action result.
- An event rule action result.

Working with New Data Actions

You can create a new instance of a data model in the rules engine if you create a new data action that is based on this data model. 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.

New Data Action Input and Output

A new data action only has inputs. The inputs of the new data action correspond to the elements of the data model the new data action is based on.

Specifying New Data Action Input Values

You can specify default values for the new data action inputs when creating the new data action. If you do not specify default input values, you must map a parameter element to the new data action input, when using the new data action in a decision entity.

For more information about mapping, see "Working with Service Actions" on page 74, Specifying Service Action Input Values.

Accessing the Action Wizard

You can access the New Action wizard in the following ways:

To start the wizard from the menu bar:

1. Click **File > New > Other**.
2. In the Select a wizard dialog box, click **Software AG > Rules Development > Action**.
3. Click **Next**.

To start the wizard from the Solutions view:

- Right-click **Rules** or a specific rule project and select **New Action** from the context menu.

To start the wizard from the Rules Explorer view:

- Right-click any listed item and select **New > Action** from the context menu.

Creating a Service Action

Before you can create a service action, you must be connected to the Integration Server. To configure an Integration Server, follow the instructions as described in *webMethods Service Development Help*.

To create a service action with the New Action wizard:

1. Open the New Action wizard as described in "Accessing the Action Wizard" on page 77.
2. On the Rule Action page, type a name for the action in the **Action name** field.
3. Select a rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.
   - You can select any other rule project from the drop down list.
   - To create a new rule project, click **New** and create the new rule project as described in "Creating a Rule Project" on page 56.
4. Type a description of the action in the **Description** field (optional).
5. Select **Service Action** from the drop down list in the **Type** field.
6. Select the **Only allow this action to run once** check box if you want the action to be executed only the first time any of its associated rules fire. This setting is global for the execution of the rule or rule set. If the action is used more than once in a decision entity or in more than one decision entity, it will still only be executed once per rules engine invoke.

   Important: You cannot select the check box for actions that deliver an output value. If you specify an output value for the action on the Service Action Output Value page, the **Only allow this action to run once** check box will be deselected.

7. Click **Next**.
8. On the New Service Action page, expand the Integration Server package you want to work with, and select the service you want to associate with the action.

9. Click **Next.**
10. On the Service Action Default Input Values page, specify default input values (optional):

For this field ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).
Action Input Parameters	This value cannot be modified.
Default Values	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177. **Note:** The input value must match the data type of the parameter element.

11. Click **Next**.
12. On the Service Action Output Value page, select the service action output (optional).
13. Click **Finish**.

A new service action is created and saved to your workspace. It appears in the Rules Explorer view under Actions > *[ActionName]* .

Creating a Process Action

Before you can create a process action, you must have installed the Process Development feature of Software AG Designer, and you must be connected to the Integration Server. To install the Process Development feature, see *Software AG Installation Guide*. To configure an Integration Server, follow the instructions as described in *webMethods Service Development Help.*

To create a process action with the New Action wizard:

1. Open the New Action wizard as described in "Accessing the Action Wizard" on page 77.
2. On the Rule Action page, type a name for the action in the **Action name** field.
3. Select a rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.

- You can select any other rule project from the drop down list.
- To create a new rule project, click **New** and create the new rule project as described in "Creating a Rule Project" on page 56.

4. Type a description of the action in the **Description** field (optional).
5. Select **Process Action** from the drop down list in the **Type** field.
6. Select the **Only allow this action to run once** check box if you want the action to be executed only the first time any of its associated rules fire. This setting is global for the execution of the rule or rule set. If the action is used more than once in a decision entity or in more than one decision entity, it will still only be executed once per rules engine invoke.

   Important: You cannot select the check box for actions that deliver an output value. If you specify an output value for the action on the Process Action Output Value page, the **Only allow this action to run once** check box will be deselected.

7. Click **Next**.
8. On the Process Action Type page, select the type of process action you want the rule to invoke.
9. To complete the process action, refer to the following topics:
   - "Starting a New Process Instance" on page 80.
   - "Joining a Running Process Instance" on page 81.
   - "Suspending Running Process Instance(s)" on page 82.
   - "Canceling Running Process Instance(s)" on page 83.
   - "Failing Running Process Instance(s)" on page 85.
   - "Resuming Suspended Process Instance(s)" on page 86.
   - "Invoking a User Task" on page 87.

Starting a New Process Instance

To create an action to start a new process instance:

1. Select the **Start a new process instance** option as described in "Creating a Process Action" on page 79.
2. Click **Next**.
3. On the Process Selection page, select a process model name to start a new instance of this model.
4. In the **Integration Server Name** list, select the Integration Server where the process is defined.

5. Click **Next**.
6. On the Document Type Selection page, select the IS document type to use as input to the process instance.
7. Click **Next**.
8. On the Process Action Default Input Values page, specify default input values (optional). These values are overwritten when data is provided from an associated process.

For this field ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).
Action Input Parameters	This value cannot be modified.
Default Values	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177. **Note:** The input value must match the data type of the parameter element.

9. Click **Next**.
10. On the Process Action Output Value page, select an output value as required.
11. Click **Finish**.

A new process action is created and saved to your workspace. It appears in the Rules Explorer view under Actions > *[ActionName]* .

Joining a Running Process Instance

To create an action to join a running process instance:

1. Select the **Join a running process instance** option as described in "Creating a Process Action" on page 79.
2. Click **Next**.
3. On the Process Selection page, select a process model name to join a running instance of this model.
4. In the **Integration Server Name** list, select the Integration Server where the process is defined.
5. Click **Next**.

6. On the Document Type Selection page, select the IS document type to use as input when joining the process instance.
7. Click **Next**.
8. On the Process Action Default Input Values page, specify default input values (optional). These values are overwritten when data is provided from an associated process.

For this field ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).
Action Input Parameters	This value cannot be modified.
Default Values	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177. **Note:** The input value must match the data type of the parameter element.

9. Click **Next**.
10. On the Process Action Output Value page, select an output value as required.
11. Click **Finish**.

A new process action is created and saved to your workspace. It appears in the Rules Explorer view under Actions > *[ActionName]* .

Suspending Running Process Instance(s)

To create an action to suspend running process instance(s):

1. Select the **Suspend running process instance(s)** option as described in "Creating a Process Action" on page 79.
2. Click **Next**.
3. On the Process Selection page, select a process model name to suspend all running instances of this model.
4. Click **Next**.
5. On the Service Type Selection page, select the type of service you want to use to get the list of running processes to be suspended. You can use a predefined webMethods built-in service, or you can use a custom service you write yourself. Click **Built-in Service** or **Custom Service**.

> **Note:** If you use a custom service, you must use the output signature we provide: pub.monitor.process.actions.CustomImplOutputDoc. For more information on this service, see *webMethods Monitor Built-In Services Reference*. For information on creating your own service, see *webMethods Service Development Help*.

6. Click **Next** and do one of the following:
   - If you selected **Built-In Service** on the Service Type Selection page, click the **Add** icon and enter your service input criteria. Click **Next**.
   - If you selected **Custom Service** on the Service Type Selection page, browse to and select the Integration Server service you want to use to identify the processes to be suspended. Click **Next**.
7. On the Process Action Default Input Values page, specify default input values (optional). These values are overwritten when data is provided from an associated process.

For this field ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).
Action Input Parameters	This value cannot be modified.
Default Values	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177. **Note:** The input value must match the data type of the parameter element.

8. Click **Next**.
9. On the Process Action Output Value page, select an output value as required.
10. Click **Finish**.

A new process action is created and saved to your workspace. It appears in the Rules Explorer view under Actions > *[ActionName]* .

Canceling Running Process Instance(s)

To create an action to cancel running process instance(s):

1. Select the **Cancel running process instance(s)** option as described in "Creating a Process Action" on page 79.
2. Click **Next**.

3. On the Process Selection page, select a process model name to suspend all running instances of this model.
4. Click **Next**.
5. On the Service Type Selection page, select the type of service you want to use to get the list of running processes to be canceled. You can use a predefined webMethods built-in service, or you can use a custom service you write yourself. Click **Built-in Service** or **Custom Service**.

   Note: If you use a custom service, you must use the output signature we provide: pub.monitor.process.actions.CustomImplOutputDoc. For more information on this service, see *webMethods Monitor Built-In Services Reference*. For information on creating your own service, see *webMethods Service Development*.

6. Click **Next** and do one of the following:
   - If you selected **Built-In Service** on the Service Type Selection page, click the **Add** icon and enter your service input criteria. Click **Next**.
   - If you selected **Custom Service** on the Service Type Selection page, browse to and select the Integration Server service you want to use to identify the processes to be canceled. Click **Next**.
7. On the Process Action Default Input Values page, specify default input values (optional). These values are overwritten when data is provided from an associated process.

For this field ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).
Action Input Parameters	This value cannot be modified.
Default Values	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177. **Note:** The input value must match the data type of the parameter element.

8. Click **Next**.
9. On the Process Action Output Value page, select an output value as required.
10. Click **Finish**.

A new process action is created and saved to your workspace. It appears in the Rules Explorer view under Actions > *[ActionName]* .

Failing Running Process Instance(s)

To create an action to fail running process instance(s):

1. Select the **Fail running process instance(s)** option as described in "Creating a Process Action" on page 79.
2. Click **Next**.
3. On the Process Selection page, select a process model name to suspend all running instances of this model.
4. Click **Next**.
5. On the Service Type Selection page, select the type of service you want to use to get the list of running processes to be failed. You can use a predefined webMethods built-in service, or you can use a custom service you write yourself. Click **Built-in Service** or **Custom Service**.

   Note: If you use a custom service, you must use the output signature we provide: pub.monitor.process.actions.CustomImplOutputDoc. For more information on this service, see *webMethods Monitor Built-In Services Reference*. For information on creating your own service, see *webMethods Service Development*.

6. Click **Next** and do one of the following:
   - If you selected **Built-In Service** on the Service Type Selection page, click the **Add** icon and enter your service input criteria. Click **Next**.
   - If you selected **Custom Service** on the Service Type Selection page, browse to and select the Integration Server service you want to use to identify the processes to be failed. Click **Next**.
7. On the Process Action Default Input Values page, specify default input values (optional). These values are overwritten when data is provided from an associated process.

For this field ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).
Action Input Parameters	This value cannot be modified.
Default Values	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177.

For this field ...	You can do this ...
	Note: The input value must match the data type of the parameter element.

8. Click **Next**.
9. On the Process Action Output Value page, select an output value as required.
10. Click **Finish**.

A new process action is created and saved to your workspace. It appears in the Rules Explorer view under Actions > *[ActionName]* .

Resuming Suspended Process Instance(s)

To create an action to resume suspended process instance(s):

1. Select the **Resume suspended process instance(s)** option as described in "Creating a Process Action" on page 79.
2. Click **Next**.
3. On the Process Selection page, select a process model name to suspend all running instances of this model.
4. Click **Next**.
5. On the Service Type Selection page, select the type of service you want to use to get the list of suspended processes to be resumed. You can use a predefined webMethods built-in service, or you can use a custom service you write yourself. Click **Built-in Service** or **Custom Service**.

   Note: If you use a custom service, you must use the output signature we provide: pub.monitor.process.actions.CustomImplOutputDoc. For more information on this service, see *webMethods Monitor Built-In Services Reference*. For information on creating your own service, see *webMethods Service Development Help*.

6. Click **Next** and do one of the following:
   - If you selected **Built-In Service** on the Service Type Selection page, click the **Add** icon and enter your service input criteria. Click **Next**.
   - If you selected **Custom Service** on the Service Type Selection page, browse to and select the Integration Server service you want to use to identify the processes to be resumed. Click **Next**.
7. On the Process Action Default Input Values page, specify default input values (optional). These values are overwritten when data is provided from an associated process.

For this field ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).
Action Input Parameters	This value cannot be modified.
Default Values	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177. **Note:** The input value must match the data type of the parameter element.

8. Click **Next**.
9. On the Process Action Output Value page, select an output value as required.
10. Click **Finish**.

A new process action is created and saved to your workspace. It appears in the Rules Explorer view under Actions > *[ActionName]* .

Invoking a User Task

To create an action to start a new user task instance:

1. Select the **Manual decision** option as described in "Creating a Process Action" on page 79.
2. Click **Next**.
3. On the Select task page, select the task type you want to start with the action.
4. In the **Integration Server Name** list, select the Integration Server where the task is defined.
5. Click **Next**.
6. On the Process Action Default Input Values page, specify default input values (optional). These values are overwritten when data is provided from an associated process.

For this field ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).

For this field ...	You can do this ...
Action Input Parameters	This value cannot be modified.
Default Values	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177. **Note:** The input value must match the data type of the parameter element.

7. Click **Next**.
8. On the Process Action Output Value page, select an output value as required.
9. Click **Finish**.

A new process action is created and saved to your workspace. It appears in the Rules Explorer view under Actions > *[ActionName]* .

Creating a New Data Action

To create a new data action with the New Action wizard:

1. Open the New Action wizard as described in "Accessing the Action Wizard" on page 77.
2. On the Rule Action page, type a name for the action in the **Action name** field.
3. Select a rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.
   - You can select any other rule project from the drop down list.
   - To create a new rule project, click **New** and create the new rule project as described in "Creating a Rule Project" on page 56.
4. Type a description of the action in the **Description** field (optional).
5. Select **New Data Action** from the drop down list in the **Type** field.
6. Select the **Only allow this action to run once** check box if you want the action to be executed only the first time any of its associated rules fire. This setting is global for the execution of the rule or rule set. If the action is used more than once in a decision entity or in more than one decision entity, it will still only be executed once per rules engine invoke.
7. Click **Next**.

8. On the New Data Action page, select the data model you want to associate with the action.
9. Click **Next.**
10. On the New Data Action Default Input Values page, specify default input values (optional):

For this field ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).
Action Input Parameters	This value cannot be modified.
Default Values	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177. **Note:** The input value must match the data type of the parameter element.

11. Click **Finish**.

A new data action is created and saved to your workspace. It appears in the Rules Explorer view under Actions > *[ActionName]* .

Modifying an Action

To modify an action:

1. In the Rules Explorer view, right-click the action and select **Edit** from the context menu.
2. In the Edit Action dialog box, you can modify the description in the **Description field**.
3. You can modify the **Only allow this action to run once** check box. Select the check box if you want the action to be executed only the first time any of its associated rules fire. This setting is global for the execution of the rule or rule set. If the action is used more than once in a decision entity or in more than one decision entity, it will still only be executed once per rules engine invoke.

   Important: If you select the check box for actions that deliver an output value, the output value is removed, and any associated decision entities are rebuilt and may produce errors.

4. Click **Next**.

5. On the *[Action Type]* Default Input Values page, you can specify default input values as described in "Creating a Service Action" on page 78, Step 9 and "Creating a New Data Action" on page 88, Step 9.
6. Click **Next**.
7. On the *[Action Type]* Output Value page, you can select the action output.
8. Click **Finish**.

Important: Modifying an action that is used in a decision entity may invalidate this decision entity.

Renaming an Action

To rename an action:

1. Do one of the following:
   a. Right-click the action name in the Rules Explorer view and select **Rename** from the context menu.
   b. Click the action name in the Rules Explorer view and press F2.
2. In the Rename Resource dialog box, type a new name in the **New name** field.
3. To open a list of all changes to be performed, click **Preview**.

   Important: You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid action.
4. Click **OK**.

The action is renamed. All resources that were associated with the former action name are deleted from the file system. New versions using the new action name are automatically created. The action name is updated in all related rule files and in the Rules Explorer view.

Deleting an Action

To delete an action:

1. Right-click the action name in the Rules Explorer view and select **Delete** from the context menu. Hold down SHIFT or CTRL to select multiple actions.
2. In the Delete Resources dialog box, do one of the following:
   a. To delete the action, click **OK**. If you delete an action that is used in a decision entity, you are prompted to confirm the deletion.

> **Important:** Deleting an action that is used in a decision entity invalidates the decision entity.

b. To open a list of all changes to be performed, click **Preview**. To confirm the changes, click **Continue**.

> **Important:** You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid action.

The action and all components that are associated with it are deleted from file system.

13 Working with Rule Sets

Within a rule project, you can group several logically related decision entities (such as decision tables or event rules) in a rule set. This is useful in cases where two or more decision entities must interact with each other, and the results from one decision entity will be used as input for another decision entity.

Example

If you want to create logically-related decision entities that deal only with order processing, you can create an order processing rule set and use it as a container for all decision entities that apply to order processing.

About Rule Inference

Rule execution is based on making inferences. This means that you can draw a conclusion from a given information with the help of a rule.

In rule execution, it will often be necessary to make inferences over several steps. This means that you use the conclusion drawn from one rule (the result) as input information (the condition) for a second rule. This is called forward chaining. The following two rules illustrate this:

Example

Rule 1: IF a customer's annual order value is equal to or is 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.

If you know that a customer's annual order value equals $ 6,000, then you can infer from Rule 1 and Rule 2 that the customer is a VIP customer and will receive a bonus at the end of the year.

This kind of multi-step inferencing can be achieved if you group logically connected decision entities in a rule set and execute it.

Master Rule Set

Besides that, there is a master rule set that contains all of the decision entities that you created in a specific rule project. You cannot add decision entities to or remove decision entities from the master rule set.

About Rule Set Processing Modes

webMethods Rules Development supports two kinds of processing modes for rule sets:

- **Inferential**. The order of decision entities in a rule set does not imply order of execution.

- **Sequential**. The order of decision entities in a rule set determines the order of execution. The decision entities are executed from top to bottom.

The processing mode is selected when creating a rule set, see "Creating a Rule Set" on page 95, and it can be modified afterwards, see "Modifying the Processing Mode" on page 97.

Important: The processing mode of a rule set overwrites the processing mode of the decision tables within the rule set: In an inferential rule set, all decision tables are processed inferentially, and in a sequential rule set, all decision tables are processed sequentially, regardless of their individual processing mode.

Accessing the Rule Set Wizard

You can access the New Rule Set wizard in the following ways:

To start the wizard from the menu bar:

- Click **File > New > Rule Set**.

To start the wizard from the Solutions view:

- Right-click **Rules** or a specific rule project and select **New Rule Set** from the context menu.

To start the wizard from the Rules Explorer view:

- Right-click any listed item and select **New > Rule Set** from the context menu.

Creating a Rule Set

To create a rule set with the New Rule Setwizard:

1. Open the New Rule Set wizard as described in "Accessing the Rule Set Wizard" on page 95.
2. Type a name for the rule set in the **Rule set name** field.
3. Select a rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.
   - You can select any other rule project from the drop down list.
   - To create a new rule project, click **New** and create the new rule project as described in "Creating a Rule Project" on page 56.

4. Select a processing mode in the **Processing mode** field. The default is **Inferential**. For more information about processing modes, see "About Rule Set Processing Modes" on page 94.
5. Click **Finish**.

A new rule set is created and saved to your workspace. It appears in the navigation tree of the Rules Explorer view under Rule Sets > *[RuleSetName]* .

Renaming a Rule Set

To rename a rule set:

1. Do one of the following:
   a. Right-click the rule set name in the Rules Explorer view and select **Rename** from the context menu.
   b. Click the rule set name in the Rules Explorer view and press F2.
2. In the Rename Resource dialog box, type a new name in the **New name** field.
3. To open a list of all changes to be performed, click **Preview**.

   Important: You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid rule set.
4. Click **OK**.

The rule set is renamed. All generated resources that were associated with the former rule set name are deleted from the file system. New versions using the new rule set name are automatically created. The rule set name is updated in all related rule files and in the Rules Explorer view.

Deleting a Rule Set

To delete a rule set:

1. Right-click the rule set name in the Rules Explorer view and select **Delete** from the context menu. Hold down SHIFT or CTRL to select multiple rule sets.
2. In the Delete Resources dialog box, do one of the following:
   a. To delete the rule set, click **OK**.
   b. To open a list of all changes to be performed, click **Preview**. To confirm the changes, click **OK**.

> **Important:** You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid rule set.

The rule set and all components that are associated with it are deleted from file system.

Modifying the Processing Mode

You can modify the processing mode that you specified when creating the rule set. For more information about processing modes, see "About Rule Set Processing Modes" on page 94.

To modify the processing mode:

1. To modify the processing mode with the Properties view:
   a. Click the rule set in the Rules Explorer view.
   b. When the rule set has focus, select **Inferential** or **Sequential** in the Properties view.

   > **Note:** The Properties view displays information about assets that are currently selected in the editor or in any of the views. If you switch the focus from the asset, the displayed information in the Properties view changes accordingly.

2. To modify the processing mode with the Rules Explorer view:
   a. Right-click the rule set in the Rules Explorer view.
   b. Select **Processing mode > Inferential** or **Processing mode > Sequential** from the context menu.

14 Working with Decision Tables

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.

		Condition	Result
First rule	1	condition value	result value
Second rule	2	condition value	result value

Conditions

A condition is specified by a parameter element.

Condition Values

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 action name).
- An operator and a constant (marked by a dotted line).
- An operator and an expression.

Results

There are two types of results:

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 Values

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.

Action Result Values

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

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

Example

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 equals to or is 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:

	Order value	Credt history	VIP-Status	Bonus	sendEmail()
1	<= 5,000	= poor	= no	= no	✗
2	<= 5,000	= good	= no	= no	✗
3	>= 5,000	= poor	= no	= no	✗
4	>= 5,000	= good	= yes	= yes	✓

Tip: In decision tables, you are advised to use rules that have the same structure. Complex combinations of rules with different structures should be split into several decision entities.

About Decision Table Processing Modes

webMethods Rules Development supports three kinds of processing modes for decision tables:

- **Inferential**. The order of rules in a decision table does not imply order of execution.
- **Sequential All**. The order of rules in a decision table determines the order of execution. The rules are evaluated and executed from top to bottom.

- **Sequential First**. The order of rules in a decision table determines the order of execution. The rules are evaluated from top to bottom. If a rule fires, the evaluation and execution is stopped.

The processing mode is selected when creating a decision table, see "Creating a Decision Table" on page 102, and it can be modified afterwards, see "Modifying the Processing Mode" on page 120.

Important: The processing mode of a rule set overwrites the processing mode of the decision tables within the rule set: In an inferential rule set, all decision tables are processed inferentially, and in a sequential rule set, all decision tables are processed sequentially, regardless of their individual processing mode.

Accessing the Decision Table Wizard

You can access the New Decision Table wizard in the following ways:

To start the wizard from the menu bar:

1. Click **File > New > Other**.
2. In the Select a wizard dialog box, click **Software AG > Rules Development > Decision Table**.
3. Click **Next**.

To start the wizard from the Solutions view:

- Right-click **Rules** or a specific rule project and select **New Decision Table** from the context menu.

To start the wizard from the Rules Explorer view:

- Right-click any listed item and select **New > Decision Table** from the context menu.

Creating a Decision Table

To create a decision table with the New Decision Table wizard:

1. Open the New Decision Table wizard as described in "Accessing the Decision Table Wizard" on page 102.
2. On the Decision Table page, type a name for the decision table in the **Decision table name** field.
3. Select a rule project from the drop down list in the **Rule project** field.

- If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.
- You can select any other rule project from the drop down list.
- To create a new rule project, click **New** and create the new rule project as described in "Creating a Rule Project" on page 56.

4. Select a rule set in the **Rule sets** field (optional).
   - The master rule set check box is always selected and cannot be cleared.
   - To create a new rule set, click **New** and create the new rule set as described in "Creating a Rule Set" on page 95.
5. Select a processing mode in the **Processing mode** field. The default is **Inferential**. For more information about processing modes, see "About Decision Table Processing Modes" on page 101.
6. Click the **Process aware** check box if you want to invoke a user task from the decision table, see "Invoking a User Task" on page 87. Selecting the check box adds a `ProcessData` data model that was created from the `ProcessData` document type in pub.prt:ProcessData as an input parameter to the decision table (optional). This enables you to associate the `ProcessData` parameter to a process action input as described in "Adding an Action Result" on page 114. For more information, see *webMethods Process Development Help*.
7. Type a description of the decision table in the **Description** field (optional). After you click **Finish**, the description appears in an expandable field in the upper left corner of the editor area.
8. Click **Next**.
9. On the Decision Table Parameters page, select a data model. Hold down SHIFT or CTRL to select multiple data models.
10. Move the selected data model to the right side by double click, by drag and drop, or click .
11. To remove a data model from the **Selected parameters** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple data models.
12. Modify the parameter info as required:

Note: You cannot modify any info of a `ProcessData` parameter.

For this field ...	You can do this ...
Name	Click the name value to modify the parameter name (optional). **Note:** Each parameter name must be unique.

For this field ...	You can do this ...
Type	This value cannot be modified.
I/O	Click the I/O value to specify the input/output type as described in "Working with Data Models and Parameters" on page 59. **Note:** You must specify at least one **Input** and one **Output** parameter, or a **Both** parameter.
Any	Specify the matching type as described in "Working with Data Models and Parameters" on page 59.

13. Click **Next**.
14. On the Decision Table Conditions page, select a parameter element. Hold down SHIFT or CTRL to select multiple parameter elements.
15. Assign the selected parameter element to a condition by double click, by drag and drop, or click .
16. To remove a parameter element from the **Selected parameter elements** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple parameter elements.
17. Modify the parameter element info as required:

For this field ...	You can do this ...
Label	Click the label value to modify the parameter element name (optional). This name is used as the condition column header. **Note:** Each parameter element name for a condition column must be unique.
Conditions	This value cannot be modified.

18. To change the order in the **Selected parameter elements** list, click and in the wizard toolbar. The initial condition column order of the decision table in the editor area corresponds to the order of the parameter elements within the wizard.
19. Click **Next**.
20. On the Decision Table Assignment Results page, select a parameter element. Hold down SHIFT or CTRL to select multiple parameter elements.

21. Assign the selected parameter element to an assignment result by double click, by drag and drop, or click .
22. To remove a parameter element from the **Selected parameter elements** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple parameter elements.
23. Modify the parameter element info as required:

For this field ...	You can do this ...
Label	Click the label value to modify the parameter element name (optional). This name is used as the result column header. **Note:** Each parameter element name for an assignment result must be unique.
Results	This value cannot be modified.

24. To change the order in the **Selected parameter elements** list, click and in the wizard toolbar. The initial assignment result column order of the decision table in the editor area corresponds to the order of the parameter elements within the wizard.
25. On the Decision Table Action Results page, select an action. Hold down SHIFT or CTRL to select multiple actions.
26. Assign the selected action to an action result by double click, by drag and drop, or click .
27. To remove an action from the **Selected actions** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple actions.
28. Modify the action info as required:

For this field ...	You can do this ...
Label	Click the label value to modify the action name (optional). This name is used as the action result column header. **Note:** Each name for an action result must be unique.
Action	Click the action name, then click the pencil button to specify action inputs as described in "Adding an Action Result" on page 114, Step 5.

For this field ...	You can do this ...
Status	Click the current symbol to switch between **active** and **inactive**.

29. To change the order in the **Selected actions** list, click and in the wizard toolbar. The initial action result column order of the decision table in the editor area corresponds to the order of the actions within the wizard.
30. Click **Finish**.

A decision table with filled in condition and result column headers is created and saved to your workspace. It appears in the editor area and under Decision Tables > *[DecisionTableName]* in the Rules Explorer view. The selected parameters appear under Decision Tables > *[DecisionTableName]* > *[ParameterName]* in the Rules Explorer view.

Note: The order of columns and rows in a decision table does not imply order of evaluation and execution.

Modifying a Decision Table

The decision table editor supports the following actions:

- Adding, modifying, cutting, copying, pasting and deleting conditions and results.
- Adding, modifying, cutting, copying, pasting and clearing condition values or result values.
- Adding, cutting, copying, pasting, reordering and deleting rules.
- Modifying the processing mode.
- Enabling and disabling principal status of conditions and results.
- Monitoring the in effect date of rules.

Adding an Operator

To add an operator:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Right-click the cell you want to modify.
3. Select **Format Cell** from the context menu.
4. Select an operator as specified in "About Condition Operators" on page 122 or "About Result Operators" on page 123.

If you do not add an operator before entering a literal value, parameter element, action, or constant, the operator **=** is automatically assigned.

Important: Adding only an operator without entering a literal value, parameter element, action, or constant results in a semantically invalid cell. Any resulting problems appear in the Problems view.

Modifying an Operator

To modify an operator:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Right-click the cell you want to modify.
3. Modify the operator as described in "Adding an Operator" on page 106.

Adding a Literal Value

To add a literal value:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Click the cell you want to modify.
3. Modify the value info as required:

Note: The literal value must match the data type as specified in "About Data Type Assignment" on page 123.

For this data type ...	You can do this ...
Boolean	Select **true** or **false** from the drop down list.
Date	a. Click the icon. b. Select a date from the calendar. c. To select a time of day, click the icon (optional). **Note:**The default time is 00:00:00 PM. d. Drag and drop the clock hands. e. To switch between **AM** and **PM**, click the current symbol in the clock. f. Click ✔.

For this data type ...	You can do this ...
Byte Character Double Float Integer Long Short	Type the literal value.
String	Type the literal value.

4. Press ENTER.

Modifying a Literal Value

To modify a literal value:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Click the cell you want to modify.
3. Modify the value info as described in "Adding a Literal Value" on page 107.

   or

   Press DEL to delete the value.
4. Press ENTER.

Adding a Condition or Result Value

To add a condition or result value:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Click the cell you want to modify.
3. Click the (in conditions) or (in results) icon.
4. In the *[Value Type]* Modification dialog box, modify the value info as required.

For this field, button, or tab ...	You can do this ...
Operator select field	Select an operator as specified in "About Condition Operators" on page 122 or respectively "About Result Operators" on page 123.

For this field, button, or tab ...	You can do this ...
	Note: If you select a range operator, the dialog box splits so that you can specify a literal value, parameter element, action, or constant for each side of the range.
Literal value tab	Enter a literal value in the **Enter value** field as described in "Adding a Literal Value" on page 107, Step 3. The literal value is then displayed above the tab row. **Note:** The literal value must match the data type as specified in "About Data Type Assignment" on page 123.
Parameter element tab	Expand the parameter and select a parameter element from the list. The parameter element is then displayed above the tab row. To filter the list of parameter elements, enter a filter text in the search field above the parameter element list. **Note:** The data type of the parameter element must match the data type as specified in "About Data Type Assignment" on page 123.
Add parameter button	Add a new parameter as described in "Adding a Parameter to a Decision Entity" on page 157.
Action tab	Select an action. The action is then displayed above the tab row. To filter the list of actions, enter a filter text in the search field above the action list. **Note:** The data type of the action output value must match the data type as specified in "About Data Type Assignment" on page 123. To specify action input values, click the pencil icon in the right corner and proceed as described in "Adding an Action Result" on page 114, Step 5.
Add Action button	Add a new action as described in "Creating a Service Action" on page 78, "Creating a Process

For this field, button, or tab ...	You can do this ...
	Action" on page 79, and "Creating a New Data Action" on page 88.
Constant tab	Select a constant as specified in "About Data Type Assignment" on page 123 and "About Constants" on page 161. The constant is then displayed above the tab row.
Expression tab	Add an expression as described in "Adding an Expression" on page 195.
Clear Cell button	Clear the condition or result values.

5. Click **OK**.

Modifying a Condition or Result Value

To modify a condition or result value:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Click the cell you want to modify.
3. Click the (in conditions) or (in results) icon.
4. Modify the condition or result value as described in "Adding a Condition or Result Value" on page 108.

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 150.
2. Select the cell, the row (click the row number) or the column (click the column header cell) you want to clear. Hold down SHIFT or CTRL to select multiple rows or columns.
3. Do one of the following:
   a. Right-click and select **Clear** from the context menu.
   b. Click in the toolbar.
   c. Press DEL.

Adding a Condition

To add a condition:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click any cell and select **Add Condition** from the context menu.
   b. Click **Condition** in the Palette view. Drag and drop, or click and drop it either before or after an existing condition.
   c. Click in the toolbar.
3. In the Parameter Element Selection dialog box, select a parameter element from the list of available parameters.

   Note: Each parameter element must be unique in the decision table.

   To add a new parameter, click **Add Parameter**. In the Create Parametersdialog box, proceed as described in "Adding a Parameter to a Decision Entity" on page 157 and specify the parameter as input or input/output parameter. The added parameter is then selectable in the **Parameter Element Selection** dialog box.
4. Click **OK**.

If you add a condition with the context menu or the toolbar, it is inserted after the last condition. Otherwise it is inserted in the place where you drop the cursor.

Adding a Condition from the Rules Explorer View

To add a condition from the Rules Explorer view:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Select either a parameter element, or a data model element:

Parameter Element	You can only select an element of a parameter that is used in the decision table and specified as input or input/output.
Data Model Element	You can select any data model element. If no parameter specified for the decision table contains this element, a new input/output parameter is created automatically and listed in the Rules Explorer view. If one or more parameters specified for the decision table contain this element, a Parameter Selection

dialog box prompts you to select the parameter this element should be associated with. The dialog box lists only the parameters that contain this element and are specified as input or input/output parameters.

The Parameter Selection dialog box enables you to add a new parameter as described in "Adding a Parameter to a Decision Entity" on page 157. Added parameters that contain the selected element and are specified as input or input/output parameters are then selectable in the Parameter Selection dialog box.

3. Drag and drop the parameter element or data model element either before or after an existing condition.

   Note: You can drag and drop only one parameter element or data model element at a time.

Adding an Assignment Result

To add an assignment result:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click any cell and select **Add Assignment** from the context menu.
   b. Click **Assignment** in the Palette view. Drag and drop, or click and drop it either before or after an existing result.
   c. Click in the toolbar.
3. In the Parameter Element Selection dialog box, select a parameter element from the list of available parameters.

   Note: Each parameter element must be unique in the decision table.

   To add a new parameter, click **Add Parameter**. In the Create Parametersdialog box, proceed as described in "Adding a Parameter to a Decision Entity" on page 157 and specify the parameter as input/output parameter. The added parameter is then selectable in the **Parameter Element Selection** dialog box.
4. Click **OK**.

If you add an assignment result with the context menu or the toolbar, it is inserted after the last result. Otherwise it is inserted in the place where you drop the cursor.

Adding an Assignment Result from the Rules Explorer View

To add an assignment result from the Rules Explorer view:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Select either a parameter element, or a data model element:

Parameter Element	You can only select an element of a parameter that is used in the decision table and specified as input/output.
Data Model Element	You can select any data model element. If no parameter specified for the decision table contains this element, a new input/output parameter is created automatically and listed in the Rules Explorer view. If one or more parameters specified for the decision table contain this element, a Parameter Selection dialog box prompts you to select the parameter this element should be associated with. The dialog box lists only the parameters that contain this element and are specified as input/output parameters. The Parameter Selection dialog box enables you to add a new parameter as described in "Adding a Parameter to a Decision Entity" on page 157. Added parameters that contain the selected element and are specified as input/output parameters are then selectable in the Parameter Selection dialog box.

3. Drag and drop the parameter element or data model element either before or after an existing result.

> **Note:** You can drag and drop only one parameter element or data model element at a time.

Reassigning a Parameter Element to a Condition or Assignment Result

To reassign a parameter element to a condition or assignment result:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:

a. Drag an element from any parameter that is already used in the decision table from the Rules Explorer view and drop it on the respective condition or assignment result.

b. Drag an element from any data model from the Rules Explorer view and drop it on the respective condition or assignment result. The data model is automatically mapped to a parameter, and the newly created parameter is listed in the Rules Explorer view under the entry of the decision table that you modified.

The new parameter element is assigned to the condition or assignment result.

Adding an Action Result

To add an action result:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click any cell and select **Add Action** from the context menu.
   b. Click **Action** in the Palette view. Drag and drop, or click and drop it either before or after an existing result.
   c. Click in the toolbar.
   d. Click an action in the Rules Explorer view. Drag and drop it either before or after an existing result.
3. In the Action Selection dialog box, modify the info as required:

For this field ...	You can do this ...
Label	Click the label value to modify the action name.
Status	Enable (click ✓) or disable (click ✗) the action for all associated result values. **Note:** You can modify the action status of the individual result values as described in "Modifying the Status of an Action Result Value" on page 116.
Select Action	Select an action. It then appears in the **Label** field, where you can modify its name.

4. To specify action inputs, click **Next**. Otherwise, click **Finish**.
5. Do one of the following:

If you want to add a new data action:

a. On the Select Output Parameter page, select an output parameter from the list of available parameters or create a new output parameter by entering a parameter name in the **Name** field.

b. Click **Next.**

c. Specify action inputs as described for process and service actions.

If you want to add a process or service action:

To ...	You can do this ...
Associate an element of an available input parameter with an action input	a. Click an element of an available input parameter. b. Click the action input you want to associate with the parameter element. c. Click in the toolbar. or a. Click an element of an available input parameter. b. Drag and drop the cursor on the action input you want to associate with the parameter element. **Note:** For more information about how to associate lists and tables, see *webMethods Service Development Help*.
Enter a default value for an action input.	a. Click the action input. b. Click in the toolbar. c. Enter a default value as described in "Creating a Service Action" on page 78, Step 9.

Note: The specified action inputs are the default values for all associated result values. You can modify the action input for a result value as described in "Modifying the Input of an Action Result Value" on page 116.

6. Click **Finish**.

If you add an action result with the context menu or the toolbar, it is inserted after the last result. Otherwise it is inserted in the place where you drop the cursor.

Modifying an Action Result

To modify an action result:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Click the action result you want to modify.
3. Click the action result again and wait for the pencil icon to appear.
4. Click .
5. In the Action Selection dialog box, modify the info as described in "Adding an Action Result" on page 114.

> **Important:** Any modification of an action result is applied to all associated result values.

Modifying the Status of an Action Result Value

To modify the status of an action result value:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click any action result value and select **Enable Action** or **Disable Action** from the context menu.
   b. Click the current status symbol of the action result value.

Modifying the Input of an Action Result Value

To modify the input of an action result value:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Click the icon behind the action result value.
3. Modify the action input info as described in "Adding an Action Result" on page 114, Step 5.

Renaming a Condition or Result

To rename a condition or result:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Double-click the condition or result column header and type a new name.

> **Note:** The names for columns of the same type (conditions, assignment results, action results) must be unique.

3. Click anywhere in the editor to remove the focus from the condition or result column header.

The condition or result is renamed.

Adding a Rule

To add a rule:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click any cell and select **Add Rule** from the context menu.
   b. Click **Rule** in the Palette view. Drag and drop, or click and drop it either before or after an existing rule.
   c. Click in the toolbar.

If you add a rule with the context menu or the toolbar, it is inserted after the last rule. Otherwise it is inserted in the place where you drop the cursor.

Cutting, Copying and Pasting a Rule within the Same Decision Table

You can cut or copy and paste one or more rules within the same decision table. This only applies if the rules do not contain any errors.

Keep the following points in mind when pasting:

- At least one or more target rules must be selected.
- The number of the selected target rules must be less than or equal to the number of the source rules.
- The selected target rules must be contiguous.

To cut or copy and paste rules within the same decision table:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Select the source rule(s).
3. Do one of the following:
   a. Select **Cut** or **Copy** from the toolbar.
   b. Right-click and select **Cut** or **Copy** from the context menu.
   c. Press CTRL+X (cut) or CTRL+C (copy).

4. Select the target rule(s).
5. Do one of the following:
   a. Select **Paste**, **Paste Before** (only if you selected a single target rule) or **Paste After** (only if you selected a single target rule) from the toolbar.
   b. Right-click and select **Paste**, **Paste Before** (only if you selected a single target rule) or **Paste After** (only if you selected a single target rule) from the context menu.
   c. Press CTRL+V (paste).

   Note: Pasting is disabled if any of the above listed criteria is not met.

If you selected the **Paste** option, the target rule(s) are overwritten with the values from the source rule(s). If you selected the **Paste Before** option, the source rule(s) are inserted before the selected target rule. If you selected the **Paste After** option, the source rule(s) are inserted after the selected target rule.

Cutting, Copying and Pasting a Rule from One Decision Table to Another

You can cut or copy and paste one or more rules from one decision table to another. This only applies if the rules do not contain any errors.

In addition to the criteria specified in "Cutting, Copying and Pasting a Condition Value or Result Value within the Same Decision Entity" on page 152 and "Cutting, Copying and Pasting a Condition Value or Result Value from One Decision Entity to Another" on page 153, keep the following points in mind when pasting:

- At least one or more target rules must be selected.
- The number of the selected target rules must be less than or equal to the number of the source rules.
- The selected target rules must be contiguous.
- The number of columns in the target decision table must match the number of columns in the source decision table.
- The data types of the condition or results in the target decision table must be compatible with the data types of the condition or results in the source decision table.

To cut or copy and paste rules from one decision table to another:

1. Open the decision tables as described in "Opening a Decision Entity" on page 150.
2. Select the source rule(s) in the source decision table.

3. Do one of the following:
   a. Select **Cut** or **Copy** from the toolbar.
   b. Right-click and select **Cut** or **Copy** from the context menu.
   c. Press CTRL+X (cut) or CTRL+C (copy).
4. Select the target rule(s) in the target decision table.
5. Do one of the following:
   a. Select **Paste**, **Paste Before** (only if you selected a single target rule) or **Paste After** (only if you selected a single target rule) from the toolbar.
   b. Right-click and select **Paste**, **Paste Before** (only if you selected a single target rule) or **Paste After** (only if you selected a single target rule) from the context menu.
   c. Press CTRL+V (paste).

   Note: Pasting is disabled if any of the above listed criteria is not met.

If you selected the **Paste** option, the target rule(s) are overwritten with the values from the source rule(s). If you selected the **Paste Before** option, the source rule(s) are inserted before the selected target rule. If you selected the **Paste After** option, the source rule(s) are inserted after the selected target rule.

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 "About Decision Table Processing Modes" on page 101.

To reorder rules:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click one or several contiguous row numbers and select **Move Up** or **Move Down** from the context menu.
   b. Click one or several contiguous row numbers and select **Move Up** or **Move Down** from the toolbar.
   c. Click one or several contiguous row numbers, and drag and drop the rules at the requested position.

   Note: You cannot drop a rule on itself.

The rule order is modified as requested.

Deleting a Rule, a Condition, or a Result

To delete a rule, a condition, or a result:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Select the rule (click the row number), condition, or result (click the column header cell). Hold down SHIFT or CTRL to select multiple rules, conditions, or results.
3. Do one of the following:
   a. Right-click and select **Delete** from the context menu.
   b. Click in the toolbar.
   c. Press SHIFT+DEL.

Note: You cannot delete the only existing rule, condition or result. In this case, the **Delete** icons in the context menu and the toolbar are disabled.

Modifying the Processing Mode

You can modify the processing mode that you specified when creating the decision table. For more information about processing modes, see "About Decision Table Processing Modes" on page 101.

To modify the processing mode:

1. To modify the processing mode with the Properties view:
   a. Open the decision table in the editor as described in "Opening a Decision Entity" on page 150.
   b. When the editor has focus, select **Inferential** or **Sequential all** or **Sequential first** in the Properties view.

      Note: The Properties view displays information about assets that are currently selected in the editor or in any of the views. If you switch the focus from the asset, the displayed information in the Properties view changes accordingly.
2. To modify the processing mode with the Rules Explorer view:
   a. Right-click the decision table in the Rules Explorer view.
   b. Select **Processing mode > Inferential**, **Processing mode > Sequential first** or **Processing mode > Sequential all** from the context menu.

Note: If the decision table contains any unsaved changes, you are asked to save the decision table before the processing mode is modified.

Enabling Principal Status of a Condition or Result

A principal is a user or group on My webMethods Server. A business analyst who works with decision tables that were exported from webMethods Rules Development to the My webMethods Server repository can assign a principal to a condition or result value. This is only possible if the rules developer annotated the condition or result column as principal when creating the decision table with webMethods Rules Development. The condition or result column must be of data type string, and the condition or result values must not contain parameter elements, actions, constants or functions. Once a condition or result column was annotated principal, you can only assign literal values to the condition and result values.

To annotate a condition or a result as principal:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Make sure, the condition or result you want to annotate as principal is of data type string, and the condition or result values do not contain parameter elements, actions, constants or functions.
3. Right-click the respective column header and select **Enable Principal** from the context menu.
4. Save your changes to the decision table.

Disabling Principal Status of a Condition or Result

You can disable the principal status of a condition or result. In this case, the business analyst who modifies the decision table in the My webMethods Server repository can no longer assign a principal to a condition or result value of this column.

To disable principal status:

1. Open the decision table as described in "Opening a Decision Entity" on page 150.
2. Right-click the respective column header and select **Disable Principal** from the context menu.
3. Save your changes to the decision table.

Monitoring the In Effect Date of Rules

As a default, the rules of a decision table are always in effect. With the Business Rules User Interface in My webMethods, you can specify an in effect date at rule level or at decision table level. For more information about specifying in effect dates, see *Working with Business Rules in My webMethods*.

The Rules Development feature of Software AG Designer only allows you to monitor the in effect dates of the rules in a decision table.

To monitor the in effect date of rules:

1. Open the decision table as described in "Opening a Decision Entity" on page 150. If an effect date is set for any of the rules, a clock icon appears in the upper left corner of the decision table.
2. Move the pointer over the clock icon. If one rule has an in effect date set, the tooltip indicates the row number of the rule. If multiple rules have an in effect date set, the tooltip indicates the number of rules with an in effect date.
3. To see the in effect date, move the pointer over the row number(s) of the rule(s).

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 Character Double Float Long Integer Short	=	(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)

Data Type(s)	Operator	Definition
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)
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 a condition or assignment 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 ...	Data type of action output must be ...	Constant must be ...
Boolean	Boolean	Boolean	Boolean	NULL
Date	Date	Date	Date	NULL

Data type of the parameter element for the condition or result is ...	Literal value must be ...	Data type of assigned parameter element must be ...	Data type of action output must be ...	Constant must be ...
String	String	String	String	NULL or EMPTY_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.	Any numeric data type. Numeric data types with a greater value are truncated.	NULL

Important: Integer values are converted to Java doubles before being assigned to parameter elements. The conversion might introduce imprecision due to truncation or rounding. As the conversion to a Java double only handles up to 15 significant digits, it is highly recommended not to use integers with more than 15 digits in conjunction with decimal point parameter elements.

15 Working with Event Rules

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

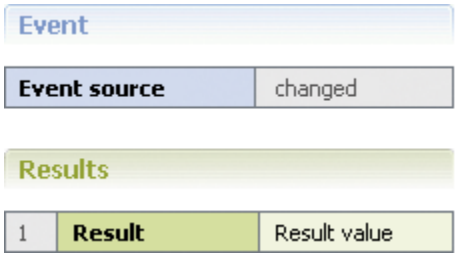
- Internal Events.
- External Events.

Internal Events are triggered by other event rules and decision tables during rule execution. External events are predefined 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

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 occurres. `Occurred` type event rules have the following syntax: `WHENEVER an Event Source OCCURRED THEN Result.`

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 Values

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.

Action Result Values

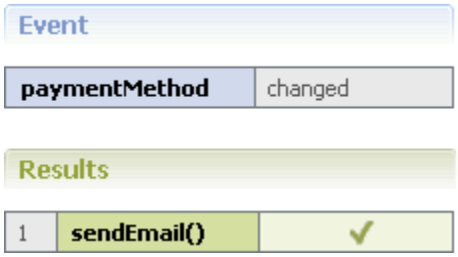
The action result value expresses the action status. There are two types:

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

Example

The following rule can be modeled in an event rule:

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



Accessing the Event Rule Wizard

You can access the New Event Rule wizard in the following ways:

To start the wizard from the menu bar:

1. Click **File > New > Other**.
2. In the Select a wizard dialog box, click **Software AG > Rules Development > Event Rule**.
3. Click **Next**.

To start the wizard from the Solutions view:

- Right-click **Rules** or a specific rule project and select **New Event Rule** from the context menu.

To start the wizard from the Rules Explorer view:

- Right-click any listed item and select **New > Event Rule** from the context menu.

Creating an Internal Event Rule

To create an internal event rule with the New Event Rule wizard:

1. Open the New Event Rule wizard as described in "Accessing the Event Rule Wizard" on page 128.
2. On the Event Rule page, type a name for the event rule in the **Event rule name** field.
3. Click the **Internal event** radio button.
4. Select a rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.
   - You can select any other rule project from the drop down list.
   - To create a new rule project, click **New** and create the new rule project as described in "Creating a Rule Project" on page 56.

5. Select a rule set in the **Rule sets** field.
   - The master rule set check box is always selected and cannot be cleared.
   - To create a new rule set, click **New** and create the new rule set as described in "Creating a Rule Set" on page 95.
6. Type a description of the event rule in the **Description** field (optional). After you click **Finish**, the description appears in an expandable field in the upper left corner of the editor area.
7. Click the **Process aware** check box if you want to invoke a user task from the event rule, see "Invoking a User Task" on page 87. Selecting the check box adds a`ProcessData` data model that was created from the `ProcessData` document type in pub.prt:ProcessData as an input parameter to the event rule (optional). This enables you to associate the `ProcessData` parameter to a process action input as described in "Adding an Action Result" on page 143. For more information, see*webMethods Process Development Help*.
8. Click **Next**.
9. On the Event Rule Parameters page, select the data model. Hold down SHIFT or CTRL to select multiple data models.
10. Move the selected data model to the right side by double click, by drag and drop, or click .
11. To remove a data model from the **Selected parameters** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple data models.
12. Modify the parameter info as required:

Note: You cannot modify any info of a `ProcessData` parameter.

For this field ...	You can do this ...
Name	Click the name value to modify the parameter name (optional). **Note:** Each parameter name must be unique.
Type	This value cannot be modified.
I/O	Click the I/O value to specify the input/output type as described in "Working with Data Models and Parameters" on page 59. **Note:** You must specify at least one **Input** and one **Output** parameter, or a **Both** parameter.

For this field ...	You can do this ...
Any	Specify the matching type as described in "Working with Data Models and Parameters" on page 59.

13. Click **Next**.
14. On the Event Rule Event page, select a parameter element.
15. Assign the selected parameter element to an event source by double click, by drag and drop, or click **Move Right**.

    Note: Every parameter element you assign overwrites any previously assigned parameter element.

16. To remove the assigned parameter element, select it and click **Remove**.
17. Modify the parameter element info as required:

For this field ...	You can do this ...
Name	Click the name value to modify the parameter element name (optional). **Note:** Each parameter element name must be unique.
Parameter Element	This value cannot be modified.
Type	This value cannot be modified.

18. Click **Next**.
19. On the Event Rule Assignment Results page, select the parameter element. Hold down SHIFT or CTRL to select multiple parameter elements.

    Note: If you only want to create action results, skip this page and click **Next**.

20. Assign the selected parameter element to a result by double click, by drag and drop, or click .
21. To remove a parameter element from the **Selected parameter elements** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple parameter elements.
22. Modify the parameter element info as required:

For this field ...	You can do this ...
Label	Click the label value to modify the parameter element name (optional). This name is used as the assignment result column header. **Note:** Each parameter element name for an assignment result must be unique.
Parameter Element	This value cannot be modified.

23. To change the order in the **Selected parameter elements** list, click and in the wizard toolbar. The initial assignment result row order of the event rule in the editor area corresponds to the order of the parameter elements within the wizard.
24. Click **Next**. If you only want to create assignment results, click **Finish**.
25. On the Event Rule Action Results page, select the action. Hold down SHIFT or CTRL to select multiple actions.
26. Assign the selected action to a result by double click, by drag and drop, or click .
27. To remove an action from the **Selected actions** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple actions.
28. Modify the action info as required:

For this field ...	You can do this ...
Label	Click the label value to modify the action name (optional). This name is used as the action result column header. **Note:** Each name for an action result must be unique.
Action	Click the action name, then click the pencil button to specify action inputs as described in "Adding an Action Result" on page 143, Step 5.
Status	Click the current symbol to switch between **active** and **inactive**.

29. To change the order in the **Selected actions** list, click and in the wizard toolbar. The initial action result row order of the event rule in the editor area corresponds to the order of the actions within the wizard.
30. Click **Finish**.

An event rule is created and saved to your workspace. It appears in the editor area and under Event Rules > *[EventRuleName]* in the Rules Explorer view. The selected parameters appear under Event Rules > *[EventRuleName]* > *[ParameterName]* in the Rules Explorer view.

Creating an External Event Rule

To create an external event rule with the New Event Rule wizard:

1. Open the New Event Rule wizard as described in "Accessing the Event Rule Wizard" on page 128.
2. On the Event Rule page, type a name for the event rule in the **Event rule name** field.
3. Click the **External event** radio button.
4. Select a rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.
   - You can select any other rule project from the drop down list.
   - To create a new rule project, click **New** and create the new rule project as described in "Creating a Rule Project" on page 56.
5. Select a rule set in the **Rule sets** field.
   - The master rule set check box cannot be selected.
   - To create a new rule set, click **New** and create the new rule set as described in "Creating a Rule Set" on page 95.
6. Type a description of the event rule in the **Description** field (optional). After you click **Finish**, the description appears in an expandable field in the upper left corner of the editor area.
7. Click **Next**.
8. On the Event Rule Parameters page, select the event model you want to assign to the event source. You can also select a data model if you want to use a new data action in an action result.
9. Move the selected event model and data model to the right side by double click, by drag and drop, or click .
10. To remove an event model or data model from the **Selected parameters** list, select it and click , or press DEL.
11. Modify the parameter info as required:

For this field ...	You can do this ...
Name	Click the name value to modify the parameter name (optional). The name of the parameter that was mapped from the event model cannot be modified. **Note:** Each parameter name must be unique.
Type	This value cannot be modified.
I/O	Click the I/O value to specify the input/output type as described in "Working with Data Models and Parameters" on page 59 and "Working with Event Models" on page 67. **Note:** The input/output type of the parameter that was mapped from the event model must be set to **Input** or **Both**. The input/output type of a parameter that was mapped from a data model is automatically set to **Output** and cannot be modified.
Any	This value cannot be modified.

12. Click **Next**.
13. On the Event Rule Assignment Results page, select the parameter element. Hold down SHIFT or CTRL to select multiple parameter elements.

    Note: If you only want to create action results, skip this page and click **Next**.

14. Assign the selected parameter element to a result by double click, by drag and drop, or click .
15. To remove a parameter element from the **Selected parameter elements** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple parameter elements.
16. Modify the parameter element info as required:

For this field ...	You can do this ...
Label	Click the label value to modify the parameter element name (optional). This name is used as the assignment result column header.

For this field ...	You can do this ...
	Note: Each parameter element name for an assignment result must be unique.
Parameter Element	This value cannot be modified.

17. To change the order in the **Selected parameter elements** list, click and in the wizard toolbar. The initial assignment result row order of the event rule in the editor area corresponds to the order of the parameter elements within the wizard.
18. Click **Next**. If you only want to create assignment results, click **Finish**.
19. On the Event Rule Action Results page, select the action. Hold down SHIFT or CTRL to select multiple actions.
20. Assign the selected action to a result by double click, by drag and drop, or click .
21. To remove an action from the **Selected actions** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple actions.
22. Modify the action info as required:

For this field ...	You can do this ...
Label	Click the label value to modify the action name (optional). This name is used as the action result column header. **Note:** Each name for an action result must be unique.
Action	Click the action name, then click the pencil button to specify action inputs as described in "Adding an Action Result" on page 143, Step 5.
Status	Click the current symbol to switch between **active** and **inactive**.

23. To change the order in the **Selected actions** list, click and in the wizard toolbar. The initial action result row order of the event rule in the editor area corresponds to the order of the actions within the wizard.
24. Click **Finish**.

An event rule is created and saved to your workspace. It appears in the editor area and under Event Rules > *[EventRuleName]* in the Rules Explorer view. The selected parameters appear under Event Rules > *[EventRuleName]* > *[ParameterName]* in the Rules Explorer view.

Configuring an External Event Rule

Before you can use an external event rule on the Integration Server, you must:

- Create an external event rule and include it in one of your rule sets as described in "Creating an External Event Rule" on page 132.
- Export the rule project the rule set is part of to the Integration Server as described in "Exporting a Rule Project to the Integration Server" on page 180.
- Configure the messaging infrastructure. For more information, see *Administering webMethods Integration Server Help, Configuring Integration Server for JMS Messaging*.
- Create a JMS trigger on the Integration Server to receive any events on a JMS topic as described in *webMethods Service Development Help, Creating a JMS trigger*. In the **Service** field on the **Message routing** tab, select wm.businessrules.eda:jmsTriggerService to route events to this service. At runtime, the service in the wmBusinessRules package receives events from the JMS trigger and distributes them to any rule set that includes an event rule for the given event type.

Modifying an Event

The event rule editor supports the following actions:

- Reassigning an event source.

Note: You cannot modify the event source of an external event rule.

Reassigning an Event Source

To reassign an event source:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. In the Rules Explorer view, select either a parameter element, or a data model element:

Parameter Element	You can only select an element of a parameter that is used in the event rule and specified as input or input/output.
Data Model Element	You can select any data model element. If no parameter specified for the event rule contains this element, a new input/output parameter is

created automatically and listed in the Rules Explorer view.

If one or more parameters specified for the event rule contain this element, a Parameter Selection dialog box prompts you to select the parameter this element should be associated with. The dialog box lists only the parameters that contain this element and are specified as input or input/output parameters.

The Parameter Selection dialog box enables you to add a new parameter as described in "Adding a Parameter to a Decision Entity" on page 157. Added parameters that contain the selected element and are specified as input or input/output parameters are then selectable in the Parameter Selection dialog box.

3. Drag and drop the parameter element or data model element on the event source cell of the event.

> **Note:** You can drag and drop only one parameter element or data model element at a time.

The newly assigned element overwrites the existing element.

Modifying an Event Rule Result

The event rule editor supports the following actions:

- Reassigning a result.
- Adding, cutting, copying, pasting and deleting results.
- Adding, cutting, copying, pasting and modifying result values.
- Clearing result values.

Reassigning a Result

To reassign a result:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. In the Rules Explorer view, select either a parameter element, or a data model element:

Parameter Element	You can only select an element of a parameter that is used in the event rule and specified as input/output.
Data Model Element	You can select any data model element. If no parameter specified for the event rule contains this element, a new input/output parameter is created automatically and listed in the Rules Explorer view. If one or more parameters specified for the event rule contain this element, a Parameter Selection dialog box prompts you to select the parameter this element should be associated with. The dialog box lists only the parameters that contain this element and are specified as input/output parameters. The Parameter Selection dialog box enables you to add a new parameter as described in "Adding a Parameter to a Decision Entity" on page 157. Added parameters that contain the selected element and are specified as input/output parameters are then selectable in the Parameter Selection dialog box.

3. Drag and drop the parameter element or data model element on the result cell of the assignment result.

   Note: You can drag and drop only one parameter element or data model element at a time.

The newly assigned element overwrites the existing element in the result cell. The content of the result value cell is cleared.

Adding an Operator

To add an operator:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Right-click the value cell you want to modify.
3. Select **Format Cell** from the context menu.
4. Select an operator as specified in "About Result Operators" on page 146.

   If you do not add an operator before entering a literal value, a parameter element, an action, or a constant the operator **=** is automatically assigned.

Important: Adding only an operator without entering a literal value, a parameter element, an action, or a constant results in a semantically invalid cell. Any resulting problems appear in the Problems view.

Modifying an Operator

To modify an operator:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Right-click the value cell you want to modify.
3. Modify the operator as described in "Adding an Operator" on page 137.

Adding a Literal Value

To add a literal value to an assignment result:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Click the value cell you want to modify.
3. Modify the value info as required:

Note: The literal value must match the data type as specified in "About Data Type Assignment" on page 146.

For this data type ...	You can do this ...
Boolean	Select **true** or **false** from the drop down list.
Date	a. Click the icon. b. Select a date from the calendar. c. To select a time of day, click the icon (optional). **Note:**The default time is 00:00:00 PM. d. Drag and drop the clock hands. e. To switch between **AM** and **PM**, click the respective symbol. f. Click ✔.
Byte Character	Type a literal value.

For this data type ...	You can do this ...
Double Float Integer Long Short	
String	Type a literal value.

4. Press ENTER.

Modifying a Literal Value

To modify a literal value of an assignment result:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Click the value cell you want to modify.
3. Modify the value info as described in "Adding a Literal Value" on page 138.

   or

   Press DEL to delete the value.
4. Press ENTER.

Adding a Result Value

To add a result value with the cell editor:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Click a value cell.
3. Click the icon.
4. In the Result Value Modification dialog box, modify the value info as required.

For this field, button, or tab ...	You can do this ...
Operator select field	Select an operator as specified in "About Result Operators" on page 146. **Note:** If you select a range operator, the dialog box splits so that you can specify a literal value, parameter element, action, or constant for each side of the range.

For this field, button, or tab ...	You can do this ...
Literal value tab	Enter a literal value in the **Enter value** field as described in "Adding a Literal Value" on page 138, Step 3. The literal value is then displayed above the tab row. **Note:** The literal value must match the data type as specified in "About Data Type Assignment" on page 146.
Parameter element tab	Expand the parameter and select a parameter element from the list. The parameter element is then displayed above the tab row. To filter the list of parameter elements, enter a filter text in the search field above the parameter element list. **Note:** The data type of the parameter element must match the data type as specified in "About Data Type Assignment" on page 146.
Add parameter button	Add a new parameter as described in "Adding a Parameter to a Decision Entity" on page 157.
Action tab	Select an action. The action is then displayed above the tab row. To filter the list of actions, enter a filter text in the search field above the action list. **Note:** The data type of the action output value must match the data type as specified in "About Data Type Assignment" on page 146. To specify action input values, click the pencil icon in the right corner and proceed as described in "Adding an Action Result" on page 143, Step 5.
Add Action button	Add a new action as described in "Creating a Service Action" on page 78, "Creating a Process Action" on page 79, and "Creating a New Data Action" on page 88.
Constant tab	Select a constant as specified in "About Data Type Assignment" on page 146 and "About

For this field, button, or tab ...	You can do this ...
	Constants" on page 161. The constant is then displayed above the tab row.
Expression tab	Add a new expression as described in "Adding an Expression" on page 195.
Clear Cell button	Clear the condition or result values.

5. Click **OK**.

Modifying a Result Value

To modify a result value with the cell editor:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Click the value cell you want to modify.
3. Click the icon.
4. Modify the result value as described in "Adding a Result Value" on page 139.

Clearing a Result Value

To clear a result value:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click the value cell and select **Clear** from the context menu.
   b. Click the value cell and then click in the toolbar.
   c. Click the value cell and the press DEL.

Adding an Assignment Result

To add an assignment result:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click any result and select **Add Assignment** from the context menu.

b. Click **Assignment** in the Palette view. Drag and drop, or click and drop it either before or after an existing result.

c. Click in the toolbar.

3. In the Parameter Element Selection dialog box, select a parameter element from the list of available parameters.

   Note: Each parameter element must be unique in the event rule.

   To add a new parameter, click **Add Parameter**. In the Create Parameters dialog box, proceed as described in "Adding a Parameter to a Decision Entity" on page 157 and specify the parameter as input/output parameter. The added parameter is then selectable in the **Parameter Element Selection** dialog box.

4. Click **OK**.

If you add an assignment result with the context menu or the toolbar, it is inserted after the last result row. Otherwise it is inserted in the place where you drop the cursor.

Adding an Assignment Result from the Rules Explorer View

To add an assignment result from the Rules Explorer view:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Select either a parameter element, or a data model element:

Parameter Element	You can only select an element of a parameter that is used in the event rule and specified as input/output.
Data Model Element	You can select any data model element. If no parameter specified for the event rule contains this element, a new input/output parameter is created automatically and listed in the Rules Explorer view. If one or more parameters specified for the event rule contain this element, a Parameter Selection dialog box prompts you to select the parameter this element should be associated with. The dialog box lists only the parameters that contain this element and are specified as input/output parameters. The Parameter Selection dialog box enables you to add a new parameter as described in "Adding a Parameter to a Decision Entity" on page 157. Added parameters that contain the selected element and are specified as input/output

parameters are then selectable in the Parameter Selection dialog box.

3. Drag and drop the parameter element or data model element either before or after an existing result.

> **Note:** You can drag and drop only one parameter element or data model element at a time.

Adding an Action Result

To add an action result:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click any cell and select **Add Action** from the context menu.
   b. Click **Action** in the Palette view. Drag and drop, or click and drop it either before or after an existing result.
   c. Click in the toolbar.
   d. Click an action in the Rules Explorer view. Drag and drop it either before or after an existing result.
3. In the Action Selection dialog box, modify the info as required:

For this field ...	You can do this ...
Label	Click the label value to modify the action name.
Status	Enable (click ✓) or disable (click ✗) the action for the associated result value. **Note:** You can modify the action status of a result value as described in "Modifying the Status of an Action Result Value" on page 145.
Select Action	Select an action. It then appears in the **Label** field, where you can modify its name.

4. To specify action inputs, click **Next**. Otherwise, click **Finish**.
5. Do one of the following:

   If you want to add a new data action:

a. On the Select Output Parameter page, select an output parameter from the list of available parameters or create a new output parameter by entering a parameter name in the **Name** field.

b. Click **Next.**

c. Specify action inputs as described for process and service actions.

If you want to add a process or service action:

To ...	You can do this ...
Associate an element of an available input parameter with an action input	a. Click an element of an available input parameter. b. Click the action input you want to associate with the parameter element. c. Click in the toolbar. or a. Click an element of an available input parameter. b. Drag and drop the cursor on the action input you want to associate with the parameter element. **Note:** For more information about how to associate lists and tables, see *webMethods Service Development Help*.
Enter a default value for an action input.	a. Click the action input. b. Click in the toolbar. c. Enter a default value as described in "Creating a Service Action" on page 78, Step 9.

Note: The specified action inputs are the default values for the associated result value. You can modify the action input for a result value as described in "Modifying the Input of an Action Result Value" on page 145.

6. Click **Finish**.

If you add an action result with the context menu or the toolbar, it is inserted after the last result. Otherwise it is inserted in the place where you drop the cursor.

Modifying an Action Result

To modify an action result:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.

2. Click the action result you want to modify.
3. Click the action result again and wait for the pencil icon to appear.
4. Click .
5. In the Action Selection dialog box, modify the info as described in "Adding an Action Result" on page 143.

Modifying the Status of an Action Result Value

To modify the status of an action result value:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Do one of the following:
   a. Right-click the action result value and select **Enable Action** or **Disable Action** from the context menu.
   b. Click the current status symbol of the action result value.

Modifying the Input of an Action Result Value

To modify the input of an action result value:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Click the icon behind the action result value.
3. Modify the action input info as described in "Adding an Action Result" on page 143, Step 5.

Deleting a Result

To delete a result:

1. Open the event rule as described in "Opening a Decision Entity" on page 150.
2. Select the result (click the row number). Hold down CTRL to select multiple results.
3. Do one of the following:
   a. Right-click and select **Delete** from the context menu.
   b. Click in the toolbar.
   c. Press SHIFT+DEL.

Note: You cannot delete the only existing result. In this case, the **Delete** icons in the context menu and the toolbar are disabled.

About Result Operators

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

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 assignment result:

Data type of the parameter element for the result is ...	Literal value must be ...	Data type of assigned parameter element must be ...	Data type of action output must be ...	Constant must be ...
Boolean	Boolean	Boolean	Boolean	NULL
Date	Date	Date	Date	NULL
String	String	String	String	NULL or EMPTY_STRING
Numeric (Byte, Character, Double, Float,	Same data type or numeric data type	Any numeric data type. Numeric	Any numeric data type. Numeric	NULL

Data type of the parameter element for the result is ...	Literal value must be ...	Data type of assigned parameter element must be ...	Data type of action output must be ...	Constant must be ...
Integer, Long, Short)	with a smaller value.	data types with a greater value are truncated.	data types with a greater value are truncated.	

Important: Integer values are converted to Java doubles before being assigned to parameter elements. The conversion might introduce imprecision due to truncation or rounding. As the conversion to a Java double only handles up to 15 significant digits, it is highly recommended not to use integers with more than 15 digits in conjunction with decimal point parameter elements.

16 Global Functions Overview

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

- Opening a decision entity.
- Closing a decision entity.
- Saving a decision entity.
- Saving a copy of a decision entity.
- Saving a copy of a decision entity.
- Cutting, copying and pasting a condition or result value within the same decision entity.
- Cutting, copying and pasting a condition or result value from one decision entity to another.
- Cutting, copying and pasting a condition or result within the same decision entity.
- Cutting, copying and pasting a condition or result from one decision entity to another.
- Adding a parameter to a decision entity.
- Deleting a parameter of a decision entity.
- Renaming a decision entity.
- Deleting a decision entity.
- Modifying the description of a decision entity.
- Adding a decision entity to a rule set.
- Removing a decision entity from a rule set.
- Reordering decision entities within a rule set.

Opening a Decision Entity

To open a decision entity:

1. Open the decision entity from the menu bar or from the Rules Explorer view:

Menu bar	a. Click **File > Open File**. b. In the Open File dialog box, navigate to your workspace directory. c. Double click *[RuleProjectName]* \Decision Tables for decision tables. or

Double click *[RuleProjectName]* \ Event Rules for event rules.

d. Click the .decisiontable file.

or

Click the .eventrule file.

e. Click **Open**.

Rules Explorer view

Double click the decision entity.

or

Right-click and select **Open** from the context menu.

The decision entity appears in the editor area.

Closing a Decision Entity

Keep the following points in mind when closing decision entities:

- You do not need to close decision entities when you exit Software AG Designer. Software AG Designer remembers which decision entities were open and displays them when you restart it.
- If you close a decision entity without saving the changes made to it, Software AG Designer prompts you to save the changes.

To close a decision entity:

- To close a single decision entity: In the menu bar, click **File > Close**.
- To close all decision entities: In the menu bar, click **File > Close All**.
- To close the editor: Click the close button in the tab of the editor.

Saving a Decision Entity

To save a decision entity, do one of the following:

- In the menu bar, click **File > Save.**

  or

- Press CTRL+S.

Saving a Copy of a Decision Entity

A decision entity can only be stored within the rule project it is part of.

To save a copy of a decision entity:

1. Click **File >** **Save as** in the menu bar.
2. In the Save As dialog box, type a name in the **File name** field.

   The file name extension is automatically added.
3. Select a rule set in the **Rule Sets** field.
   - The master rule set check box is always selected and cannot be cleared.
   - To create a new rule set, click **New** and create the new rule set as described in "Creating a Rule Set" on page 95.
4. Click **OK**.

A copy of the decision entity is stored as a .decisiontable or .eventrule file under workspace*[RuleProjectName]* \Decision Tables or workspace*[RuleProjectName]* \Event Rules.

Note: The file in the editor is now the file you specified in the Save As dialog box.

Cutting, Copying and Pasting a Condition Value or Result Value within the Same Decision Entity

You can cut or copy a single condition value or result value and paste it into another condition value or result value of the same decision entity.

Keep the following points in mind when pasting:

- The NULL constant can be pasted into any condition value or result value.
- The EMPTY STRING constant can only be pasted into a condition value or result value of data type string.
- When pasting a literal value into a condition value or result value, the data type of the literal value must be compatible with the data type of the condition value or result value. The Paste option is disabled in case of precision loss. This can occur if you try to paste a literal value of the data type double with non-zero mantissa into a condition value or result value of the data type integer.
- When pasting a parameter element into a condition value or result value, the data type of the parameter element must be compatible with the data type of the condition value or result value. Note that there can be precision loss at runtime.

- When pasting an action into a condition value or result value, the data type of the action's output value must be compatible with the data type of the condition value or result value. Note that there can be precision loss at runtime.
- When pasting a function into a condition value or result value, the data type of the function's return value must be compatible with the data type of the condition value or result value. Note that there can be precision loss at runtime.
- When pasting into an assignment result value, the operator will be set to =.
- When pasting a numeric condition value into a string condition value, the operator does not change if the operator in the system clipboard is = or !=. Otherwise, it is set to =.
- A range condition value can only be pasted into a value that supports range conditions.

To cut or copy and paste a condition value or result value within the same decision entity:

1. Open the decision entity as described in "Opening a Decision Entity" on page 150.
2. Select the source value.
3. Do one of the following:
   a. Select **Cut** or **Copy** from the toolbar.
   b. Right-click and select **Cut** or **Copy** from the context menu.
   c. Press CTRL+X (cut) or CTRL+C (copy).
4. Select the target value.
5. Do one of the following:
   a. Select **Paste** from the toolbar.
   b. Right-click and select **Paste** from the context menu.
   c. Press CTRL+V (paste).

   Note: Pasting is disabled if any of the above listed criteria is not met.

Cutting, Copying and Pasting a Condition Value or Result Value from One Decision Entity to Another

You can cut or copy a single condition value or result value and paste it into a condition or result value of another decision entity.

In addition to the criteria specified in "Cutting, Copying and Pasting a Condition Value or Result Value within the Same Decision Entity" on page 152, keep the following points in mind when pasting:

- If a parameter element has been copied to the system clipboard, the Paste option is disabled, unless the parameter the parameter element is part of exists within the target decision entity. The fully qualified parameter name must match exactly.
- If an action has been copied to the system clipboard, the Paste option is disabled, unless an identical action exists within the rule project of the target decision entity, and all parameters used in the action mapping exist in the target decision entity. The fully qualified parameter names must match exactly.
- If a function has been copied to the system clipboard, the Paste option is disabled, unless all input parameters of the function exist within the target decision entity. The fully qualified parameter names must match exactly.

To cut or copy and paste a condition value or result value from one decision entity to another:

1. Open the decision entities as described in "Opening a Decision Entity" on page 150.
2. Select the source value in the source decision entity.
3. Do one of the following:
   a. Select **Cut** or **Copy** from the toolbar.
   b. Right-click and select **Cut** or **Copy** from the context menu.
   c. Press CTRL+X (cut) or CTRL+C (copy).
4. Select the target value in the target decision entity.
5. Do one of the following:
   a. Select **Paste** from the toolbar.
   b. Right-click and select **Paste** from the context menu.
   c. Press CTRL+V (paste).

   Note: Pasting is disabled if any of the above listed criteria is not met.

Cutting, Copying and Pasting a Condition or Result within the Same Decision Entity

You can cut or copy and paste conditions (decision tables) or results (decision tables and event rules) within the same decision entity. This only applies if the values of the conditions and results do not contain any errors.

Keep the following points in mind when pasting:

- At least one or more target conditions or results must be selected.

- The number of the selected target conditions or results must be equal to the number of the source conditions or results.
- The selected target conditions or results must be contiguous.

To cut or copy and paste a condition or result within the same decision entity:

1. Open the decision entity as described in "Opening a Decision Entity" on page 150.
2. Select the source condition(s) or result(s).
3. Do one of the following:
   a. Select **Cut** or **Copy** from the toolbar.
   b. Right-click and select **Cut** or **Copy** from the context menu.
   c. Press CTRL+X (cut) or CTRL+C (copy).
4. Select the target condition(s) or result(s).

   Note: You can select one or more conditions or one or more results but not both conditions and results.

5. Do one of the following:
   a. Select **Paste**, **Paste Before** (only if you selected a single target condition in a decision table), **Paste Before** (only if you selected a single target result in a decision table), **Paste Before** (only if you selected a single target result in an event rule), **Paste After** (only if you selected a single target condition in a decision table), **Paste After** (only if you selected a single target result in a decision table), or **Paste After** (only if you selected a single target result in an event rule) from the toolbar.
   b. Right-click and select **Paste**, **Paste Before** (only if you selected a single target condition in a decision table), **Paste Before** (only if you selected a single target result in a decision table), **Paste Before** (only if you selected a single target result in an event rule), **Paste After** (only if you selected a single target condition in a decision table), **Paste After** (only if you selected a single target result in a decision table), or **Paste After** (only if you selected a single target result in an event rule) from the context menu.
   c. Press CTRL+V (paste).

   Note: Pasting is disabled if any of the above listed criteria is not met. **Paste Before** and **Paste After** is disabled if you try to paste duplicate parameter elements as conditions or results.

If you selected the **Paste** option, the target condition(s) or result(s) are overwritten with the values from the source condition(s) or result(s). Only the cells within the selected column(s) are affected. The condition or result header information is left untouched. If you selected any of the **Paste Before** options, the source condition(s) or result(s) are inserted before the selected target condition or result. If you selected any of the **Paste After** options, the source condition(s) or result(s) are inserted after the selected target condition or result.

Cutting, Copying and Pasting a Condition or Result from One Decision Entity to Another

You can cut or copy and paste conditions (decision tables) or results (decision tables and event rules) from one decision entity to another. This only applies if the values of the conditions and results do not contain any errors. A condition or result of a decision table can also be cut or copied and pasted to a result of an event rule. A result of an event rule can also be cut or copied and pasted to a condition or result of a decision table.

In addition to the criteria specified in "Cutting, Copying and Pasting a Condition or Result within the Same Decision Entity" on page 154, keep the following points in mind when pasting:

- If a condition or result containing a parameter element has been copied to the system clipboard, the Paste option is disabled, unless the parameter the parameter element is part of exists within the target decision entity. The fully qualified parameter name must match exactly.
- If a condition or result containing an action has been copied to the system clipboard, the Paste option is disabled, unless an identical action exists within the rule project of the target decision entity, and all parameters used in the action mapping exist in the target decision entity. The fully qualified parameter names must match exactly.
- If a condition or result containing a function has been copied to the system clipboard, the Paste option is disabled, unless all input parameters of the function exist within the target decision entity. The fully qualified parameter names must match exactly.

To cut or copy and paste a condition or result from one decision entity to another:

1. Open the decision entities as described in "Opening a Decision Entity" on page 150.
2. Select the source condition(s) or result(s).

   Note: You can select one or more conditions or one or more results but not both conditions and results.

3. Do one of the following:

   a. Select **Cut** or **Copy** from the toolbar.

b. Right-click and select **Cut** or **Copy** from the context menu.

c. Press CTRL+X (cut) or CTRL+C (copy).

4. Select the target condition(s) or result(s).

5. Do one of the following:

a. Select **Paste**, **Paste Before** (only if you selected a single target condition in a decision table), **Paste Before** (only if you selected a single target result in a decision table), **Paste Before** (only if you selected a single target result in an event rule), **Paste After** (only if you selected a single target condition in a decision table), **Paste After** (only if you selected a single target result in a decision table), or **Paste After** (only if you selected a single target result in an event rule) from the toolbar.

b. Right-click and select **Paste**, **Paste Before** (only if you selected a single target condition in a decision table), **Paste Before** (only if you selected a single target result in a decision table), **Paste Before** (only if you selected a single target result in an event rule), **Paste After** (only if you selected a single target condition in a decision table), **Paste After** (only if you selected a single target result in a decision table), or **Paste After** (only if you selected a single target result in an event rule) from the context menu.

c. Press CTRL+V (paste).

> **Note:** Pasting is disabled if any of the above listed criteria is not met.

If you selected the **Paste** option, the target condition(s) or result(s) are overwritten with the values from the source condition(s) or result(s). Only the cells within the selected column(s) are affected. The condition or result header information is left untouched. If you selected any of the **Paste Before** options, the source condition(s) or result(s) are inserted before the selected target condition or result. If you selected any of the **Paste After** options, the source condition(s) or result(s) are inserted after the selected target condition or result.

Adding a Parameter to a Decision Entity

To add a parameter to a decision entity:

1. Right-click the decision entity in the Rules Explorer view and select **New** > **Parameter** from the context menu.

> **Note:** You are prompted to save unsaved changes, or to cancel the procedure. If you confirm, the decision entity is saved, even if you cancel the procedure at a later stage.

2. In the New Parameter dialog box, select a data model. Hold down SHIFT or CTRL to select multiple data models.
3. Move the selection to the right side by double click, by drag and drop, or click .
4. To remove a data model from the **Selected parameters** list, select it and click , or press DEL. Hold down SHIFT or CTRL to select multiple data models.
5. Modify the parameter info as required:

For this field ...	You can do this ...
Name	Click the name value to modify the parameter name (optional). **Note:** Each parameter name must be unique.
Type	This value cannot be modified.
I/O	Click the I/O value to specify the input/output type as described in "Working with Data Models and Parameters" on page 59. **Note:** You must specify at least one **Input** and one **Output** parameter, or a **Both** parameter.
Any	Specify the matching type as described in "Working with Data Models and Parameters" on page 59.

6. Click **Finish**.

The parameters are created and listed under the decision entity folder in the Rules Explorer view.

Deleting a Parameter of a Decision Entity

To delete a parameter of a decision entity:

1. Right-click the parameter in the Rules Explorer view and select **Delete** from the context menu.

> **Note:** You are prompted to save unsaved changes, or to cancel the procedure. If you confirm, the decision entity is saved, even if you cancel the procedure at a later stage.

2. In the Confirm Parameter Delete dialog box, click **Yes** to confirm the deletion, or **No** to end the procedure and discard the changes.

> **Note:** You cannot delete the only parameter of a decision entity, or a parameter that is used in the only existing condition or result of a decision entity.

The parameter and all components that are associated with it are deleted from the file system.

Renaming a Decision Entity

To rename a decision entity:

1. Do one of the following:
   a. Right-click the decision entity name in the Rules Explorer view and select **Rename** from the context menu.
   b. Click the decision entity name in the Rules Explorer view and press F2.
2. In the Rename Resource dialog box, type a new name in the **New name** field.
3. To open a list of all changes to be performed, click **Preview**.

> **Important:** You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid decision entity.

4. Click **OK**.

The decision entity is renamed. All generated resources that were associated with the former decision entity name are deleted from the file system. New versions using the new decision entity name are automatically created. The decision entity name is updated in all related rule files and in the Rules Explorer view.

Deleting a Decision Entity

To delete a decision entity:

1. Right-click the decision entity name in the Rules Explorer view and select **Delete** from the context menu. Hold down SHIFT or CTRL to select multiple decision entities.
2. In the Delete Resources dialog box, do one of the following:

a. To delete the decision entity, click **OK**.

b. To open a list of all changes to be performed, click **Preview**. To confirm the changes, click **OK**.

> **Important:** You are advised to avoid clearing any of the items on the list. Leaving out a step in the procedure will likely result in a semantically invalid decision entity.

The decision entity and all components that are associated with it are deleted from the file system.

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 150.
2. In the editor area, click .
3. Click the description text and type a new text.
4. To accept the changes, click anywhere in the editor area and remove the focus from the text. To discard the changes, press ESC.

Adding a Decision Entity to a Rule Set

You can add a decision entity to a rule set when you create the decision entity.

To add a decision entity to a rule set at a later point:

1. In the Rules Explorer view, select the decision entity.
2. Do one of the following:

   a. Drag and drop the decision entity on a rule set. The decision entity is automatically inserted in the right category (**Decision Tables** or **Event Rules**) behind the last decision entity.

   b. Drag and drop the decision entity on a rule set category. The decision entity is inserted behind the last decision entity.

   c. Drag and drop the decision entity within a rule set category on the place where you want to insert it.

> **Note:** You cannot add an internal event rule to a rule set that is processed sequentially. For more information about rule set processing modes, see "About Rule Set Processing Modes" on page 94.

Removing a Decision Entity from a Rule Set

To remove a decision entity from a rule set:

1. In the Rules Explorer view, right-click the decision entity in the rule set folder.
2. Select **Remove from Rule Set**.

Reordering Decision Entities within a Rule Set

You can determine a specific order for decision entities within a rule set. In inferential processing, this does not affect the order of execution. In sequential processing, the order of decision entities corresponds to the order of execution. For more information about processing modes, see "About Rule Set Processing Modes" on page 94.

To reorder decision entities within a rule set:

1. Select one decision entity or several contiguous decision entities in the Rules Explorer view.
2. Do one of the following:
   a. Right-click and select **Move Up** or **Move Down** from the context menu.
   b. Drag and drop the decision entity or decision entities at the requested position.

The decision entity order is modified as requested.

About Constants

There are two types of predefined constants:

- EMPTY_STRING.
- NULL.

They can be used in decision table condition values, decision table assignment result values and event rule assignment result values.

If EMPTY_STRING is assigned to a parameter element in a decision table condition value, the condition is fulfilled if the parameter element contains an empty string as a value in a parameter instance at runtime.

If NULL is assigned to a parameter element in a decision table condition value, the condition is fulfilled if:

- The parameter element is missing in a parameter instance at runtime.

- The parameter element exists and contains null as a value in a parameter instance at runtime.
- The superordinated parameter element is missing in a parameter instance at runtime.

Example

You work with a `customer` parameter that contains the parameter elements `name`, `age` and `address`, and the parameter element `address` contains the subordinated parameter elements `street`, `street_number`, `zip` and `city`. You assign the constant NULL to the parameter element `customer.address.zip` in a decision table condition value.

	Customer.address.zip
1	= NULL

Then the condition is fulfilled if:

- The parameter element `zip` is missing in a specific instance of the `customer` parameter at runtime.
- The parameter element `zip` exists but contains null as a value in a specific instance of the `customer` parameter at runtime.
- The superordinated parameter element `address` is missing in a specific instance of the `customer` parameter at runtime.

17 Rule Verification Overview

webMethods Rules Development supports two kinds of verification:

- **Automatic Verification** is performed on decision entities when they are saved or modified and can reflect both errors and warnings. For more information, see "About Automatic Verification" on page 164.
- **Manual Verification** is performed on-demand on rule project, 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 165.

For more information about verification categories, see "About Verification Categories" on page 166.

About Automatic Verification

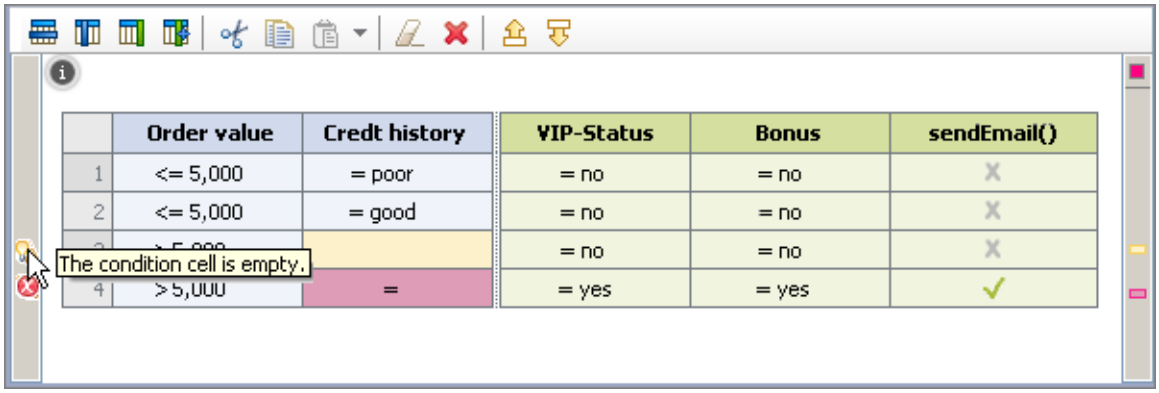
Automatic verification is performed when you save or modify a decision entity and can reflect both errors and warnings.

Note: Errors prevent the decision entity from executing.

Representation of Warnings and Errors in the Editor Area

Warnings and errors are highlighted in the editor area:

	Decision entity	Left editor margin Right editor margin	
Error	The background of the respective condition or result value cell is highlighted in red.	The left editor margin is marked by an icon.	The right editor margin is marked by an icon. If you click the icon, the focus of the editor jumps to the corresponding rule.
Warning	The background of the respective condition or result value cell is highlighted in yellow.	The left editor margin is marked by an icon.	The right editor margin is marked by an icon. If you click the icon, the focus of the editor jumps to the corresponding rule.



Representation of Warnings and Errors in the Problems View

The warnings and errors appear in the Problems view. If you double-click a warning or an error in the Problems view, the respective decision entity opens in the editor, and the corresponding cell is brought into view and selected.

Representation of Warnings and Errors in the Rules Explorer View

The respective decision entity is marked by an icon (error) or icon (warning) in the Rules Explorer view.

Representation of Warnings in the Rule Verification View

The warnings and errors appear in the Rule Verification view in the verification categories **Syntax**, **Empty cells**, **Processing Mode**and **Other**. For more information about verification categories, see "About Verification Categories" on page 166.

Verifying Rules Manually

Manual verification is performed on-demand on rule project, 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 project, rule set or decision entity level.
- If you verify a rule project, only the rule sets are considered, but not the individual decision entities contained in the rule sets.
- 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. Right-click one or multiple rule project(s), rule set(s) or a decision entity(s) in the Rules Explorer view.
2. Select **Verify** from the context menu.

The warnings appear in the Problems view and in the Rule Verification view sorted by verification categories. For more information about verification categories, see "About Verification Categories" on page 166. If you verified a decision entity, you can double-click the warning, and the associated decision entity opens in the editor area.

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.

Suppressing Warnings in Single Cells

To suppress warnings in single cells:

1. Open the decision entity in the editor as described in "Opening a Decision Entity" on page 150.
2. Right-click the cell.
3. Select **Suppress Warning '...'** from the context menu.
4. Save the decision entity.

The warning is hidden in the cell, in the Rule Verification view and in the Problems view. To unhide all warnings, right-click any cell and select **Show all Warnings for Decision Table** or **Show all Warnings for Event Rule** from the context menu.

Important: Any warning suppression or restoration settings in the Rule Verification view overwrite the warning suppression or restoration settings in the editor. For more information, see "Working with the Rule Verification View" on page 32.

18 Local Rule Testing Overview

Rules can be tested locally in Software AG Designer, before they are exported and deployed to the Integration Server or the My webMethods Server repository. Rules are tested on the basis of test input values that you can specify for each decision entity. These test input values can be stored on your computer and be loaded anytime for other test configurations. You can also create and store launch configurations for testing decision tables, event rules and rule sets.

webMethods Rules Development supports the following functions:

- Creating a launch configuration for local testing.
- Testing a decision table locally.
- Testing an event rule locally.
- Testing a rule set locally.
- Terminating a running test.

Creating a Launch Configuration for Local Testing

To create or modify a launch configuration for local testing:

1. Click **Run** > **Run Configurations** in the menu bar.
2. In the Run Configurations dialog box, do one of the following:
   a. Select an existing run configuration for a decision entity or rule set from the list on the left side.
   b. Create a new run configuration for a decision entity or rule set by clicking **Decision Table**, **Event Rule** or **Rule Set** in the list on the left side and then clicking in the toolbar.
3. Modify the info as required:

   Decision Tables:

For this tab ...	And this field ...	You can do this ...
Decision Entity tab	**Project**	Browse to the rule project the decision table is part of.
	Decision Entity	Browse to the decision table.
	Input	Type test input values as described in "Testing a Decision Table Locally" on page 174, Step 3.

For this tab ...	And this field ...	You can do this ...
	Prompt for data at launch	Click the check box if you want to view or modify the input data before running the decision table.
Logging tab	**Setting**	Set a log level in the **Log level** field. The log level entries are sorted from **All** (everything is reported) to **Fatal** (only fatal errors are reported). To deactivate logging, select **Off**. The logging results appear in the Console view.

Event Rules:

For this tab ...	And this field ...	You can do this ...
Decision Entity tab	**Project**	Browse to the rule project the event rule is part of.
	Event Rule	Browse to the event rule.
	Decision Entity	Browse to the decision table that provides the input that triggers the event rule.
	Prompt for decision entity at launch	Click the check box if you want to view or modify the selected decision table before running the event rule.
	Input	Type test input values as described in "Testing a Decision Table Locally" on page 174, Step 3.
	Prompt for data at launch	Click the check box if you want to view or modify the input data before running the event rule. **Note:** This check box is automatically selected and disabled if the **Prompt for decision entity at launch** check box is selected.

For this tab ...	And this field ...	You can do this ...
Logging tab	**Setting**	Set a log level in the **Log level** field. The log level entries are sorted from **All** (everything is reported) to **Fatal** (only fatal errors are reported). To deactivate logging, select **Off**. The logging results appear in the Console view.

Rule Sets:

For this tab ...	And this field ...	You can do this ...
Rule Set tab	**Project**	Browse to the rule project the rule set is part of.
	Rule set	Browse to the rule set.
	Input	Type test input values as described in "Testing a Decision Table Locally" on page 174, Step 3.
	Prompt for data at launch	Click the check box if you want to view or modify the input data before running the rule set.
Logging tab	**Setting**	Set a log level in the **Log level** field. The log level entries are sorted from **All** (everything is reported) to **Fatal** (only fatal errors are reported). To deactivate logging, select **Off**. The logging results appear in the Console view.

4. Click **Apply**.
5. To run the test immediately, click **Run**. Otherwise click **Close**.

Testing a Decision Table Locally

To test a decision table locally:

1. Right-click the decision table in the Rules Explorer view.

2. Select **Run As > Run Decision Table** from the context menu.

> **Note:** If the decision table contains unsaved changes, you are prompted to save them.

3. In the Enter Input dialog box, specify test input values for the decision table:

For this field or button ...	You can do this ...
Include empty values for String Types	Select the check box if you want to use an empty string (a string with a zero-length).
Name	This value cannot be modified.
Value	Type the input value where admissible. Restrictions are described in "About Entering Input Values" on page 177. **Note:** The input value must match the data type of the parameter element.
Load...	To load a stored input value file: a. Click **Load...**. b. In the Open dialog box, locate the stored file. c. Click **Open**. **Note:** There are restrictions as described in "About Loading Input Values" on page 177.
Save...	To save provided input values: a. Click **Save...**. b. In the Save As dialog box, select the target directory. c. Type a file name in the **File Name** field. d. Click **Save**. **Note:** There are restrictions as described in "About Saving Input Values" on page 177.
Clear	Click this button to delete the provided input values.

4. Click **OK**.

The decision table is now run locally on your computer. The result of this operation appears in the Results view.

Testing an Event Rule Locally

To test an event rule locally:

1. Right-click the event rule in the Rules Explorer view.
2. Select **Run As > Run Event Rule** from the context menu.

   Note: If the event rule contains unsaved changes, you are prompted to save them.

3. In the Launch *[EventRuleName]* dialog box, select a decision table that provides the input that triggers the event rule.

   Note: You can select only valid decision tables.

4. Click **Next**.
5. On the Enter Input page, type test input values for the decision table as described in "Testing a Decision Table Locally" on page 174, Step 3.
6. Click **Finish**.

The event rule is now run locally on your computer. The result of this operation appears in the Results view.

Testing a Rule Set Locally

To test a rule set locally:

1. Right-click the rule set in the Rules Explorer view.
2. Select **Run As > Run Rule Set** from the context menu.

   Note: If any of the decision entities that are part of the rule set contain unsaved changes, you are prompted to save them.

3. In the Enter Input dialog box, type test input values for the decision tables of the rule set as described in "Testing a Decision Table Locally" on page 174, Step 3.
4. Click **OK**.

The rule set is now run locally on your computer. The result of this operation appears in the Results view.

Terminating a Running Test

To terminate a running test:

1. Click ■ in the Progress view.

The local test run is terminated, and an error message appears in the Results view.

About Entering Input Values

You cannot enter input values for the following data types:

- Document lists that have no defined content.
- Objects constrained as a `byte []`.
- Unconstrained objects (objects of unknown type).

For further information about entering input values for string lists, string tables, documents, document references, document lists, document reference lists and objects lists, see *webMethods Service Development Help*.

About Loading Input Values

Keep the following points in mind when loading input values:

- You can load only parameter elements that match the name and type displayed in the Enter Input dialog box. Parameter elements that exist in the file but not in the dialog box are ignored. In the case of objects without constraints or objects defined as `byte []`, the values in the file are not used.
- Values from the file replace those already in the **Value** cell.
- Values that exist in the **Value** cell, but not in the file, are set to null.

About Saving Input Values

Keep the following points in mind when saving input values:

- Empty parameter elements (parameter elements that do not have a value) are saved only if the **Include empty values for String Types** check box is selected.
- You can store the file in any directory that is accessible to the computer on which Software AG Designer is running.
- The data is saved in XML format.

19 Rule Project Exchange with the Integration Server

Software AG rules engine executes the rules that you created with webMethods Rules Development. The rules engine exists on the Integration Server as part of the WmBusinessRules package.

You can export and deploy rule projects 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*.

webMethods Rules Development supports the deployment of rule projects to a single Integration Server using the export command.

You can delete exported rule projects from the Integration Server using the services in the WmBusinessRules package.

Exporting a Rule Project to the Integration Server

Before you can export a rule project to the Integration Server, you need a valid rules runtime license, and you must be connected to the Integration Server. To obtain a rules runtime license, consult with your Integration Server system administrator. To configure an Integration Server, follow the instructions as described in *webMethods Service Development Help.*

To export a rule project to the Integration Server:

1. Open the Export dialog box as described in "Accessing the Export Wizard" on page 184.
2. In the Export dialog box, select **Software AG > Rule Project to Integration Server runtime**.
3. Click **Next**.
4. On the Export Rule Project to Integration Server Runtime Environment page, select the rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.
   - You can select any other rule project from the drop down list.
5. Define the export target for the rule project in the **Integration Server** field.
   - If you configured a default Integration Server, it appears in this field.
   - You can select any other preconfigured Integration Server from the drop down list.
6. Click **Finish**.

The rule project is now exported to the Integration Server. The export status appears in a progress dialog.

Important: Every exported rule project overwrites any previously exported version of this rule project.

20 Rule Project Exchange with the My webMethods Server Repository

A rule project can be exported to and imported from the My webMethods Server repository. Business analysts can access the rule projects in the repository with My webMethods and modify the rule projects as needed.

Exported rule projects are stored under My webMethods Applications\webMethods Application Data\Rule Projects in the My webMethods Server repository. Before you can export the rule project, you must be connected to the repository and have full permissions (write/delete) for the Rule Projects folder.

To configure a My webMethods Server repository connection, follow the instructions as described in "Configuring a My webMethods Server Repository Connection" on page 184. To get full permission, consult with your My webMethods Server system administrator.

Configuring a My webMethods Server Repository Connection

To configure a My webMethods Server repository connection:

1. Click **Window > Preferences > Software AG > Business Rules > My webMethods Server Repositories** in the menu bar.
2. Click **Add Server**.
3. In the **Add My webMethods Server Repository** dialog box, type a name in the **Name** field.
4. Type the My webMethods Server address in the **Host** field.
5. Type the content repository port in the **Port** field.

   Note: The default repository port is `10999`. The default port can be changed on the My webMethods Server by a system administrator.

6. Type your My webMethods Server user name in the **User** field.
7. Type your My webMethods Server user password in the **Password** field.
8. Click **OK**.

The new My webMethods Server repository connection appears in the Preferences dialog box. To modify it, click **Edit Server**. To remove it, click **Remove Server**.

Accessing the Export Wizard

You can access the Export wizard in the following ways:

To start the wizard from the menu bar:

- Click **File > Export**.

To start the wizard from the Solutions view or from the Rules Explorer view:

- Right-click any listed item and select **Export** from the context menu.

Accessing the Import Wizard

You can access the Import wizard in the following ways:

To start the wizard from the menu bar:

- Click **File > Import**.

To start the wizard from the Solutions view or from the Rules Explorer view:

- Right-click any listed item and select **Import** from the context menu.

Exporting a Rule Project to the My webMethods Server Repository

Before you can export a rule project, you must have configured a My webMethods Server repository as described in "Configuring a My webMethods Server Repository Connection" on page 184.

To export a rule project to the My webMethods Server Repository:

1. Open the Export dialog box as described in "Accessing the Export Wizard" on page 184.
2. In the Export dialog box, select **Software AG > Rule Project to My webMethods Server repository**.
3. Click **Next**.
4. On the Export Rule Project to My webMethods Server Repository page, select the rule project from the drop down list in the **Rule project** field.
   - If you opened the wizard from a specific rule project in the Solutions view or from the Rules Explorer view, the name of this rule project appears in the **Rule project** field.
   - You can select any other rule project from the drop down list.
5. Select the export target from the drop down list in the **My webMethods Server** field.
6. Click **Finish**.

The rule project is exported to the My webMethods Server repository. The export status appears in a progress dialog.

Importing a Rule Project from the My webMethods Server Repository

To import a rule project from the My webMethods Server repository:

1. Open the Import dialog box as described in "Accessing the Import Wizard" on page 185.
2. In the Import dialog box, click **Software AG > Rule Project from My webMethods Server repository**.
3. Click **Next**.
4. On the Import Rule Project from My webMethods Server Repository page, select the My webMethods Server from the drop down list in the **My webMethods Server** field.

   Note: This list is empty if you have no configured repositories. For more information, see "Configuring a My webMethods Server Repository Connection" on page 184.

5. Select a remote rule project from the drop down list in the **Remote rule project** field.

   Note: An identically named rule project must exist in your local workspace.

6. Click **Finish**.

The remote rule project is now imported to the workspace. The import status appears in a progress dialog.

Important: The imported rule project overwrites the rule project in your local workspace.

Note: If you import an outdated rule project from the My webMethods Server repository, it will be automatically upgraded to the current version of Software AG Designer.

21 Rule Project Exchange with CentraSite

You can exchange rule project metadata with CentraSite. CentraSite stores metadata about each Software AG Designer asset in its repository. Metadata is data that describes the assets in webMethods components. An asset is any object you create and work with in a webMethods component.

To exchange rule project metadata with CentraSite, you must have installed the CentraSite Integration plugin as described in *Software AG Installation Guide*, and you must have a CentraSite connection as described in *webMethods CentraSite Metadata Help.*

Rules Development supports the following functions:

- Publishing rule project metadata to CentraSite.
- Retracting rule project metadata from CentraSite.

Publishing Rule Project Metadata to CentraSite

Before you can publish rule project metadata to CentraSite, you must have installed the CentraSite Integration plugin as described in *Software AG Installation Guide*, and you must have a CentraSite connection as described in *webMethods CentraSite Metadata Help.*

To publish rule project metadata to CentraSite:

1. In the Solutions view, right-click the rule project and select **Publish** from the context menu.
2. In the Publish Assets dialog box, select the rule project you want to publish.
3. Click **OK**.

The rule project metadata is now published to CentraSite.

Retracting Rule Project Metadata from CentraSite

Before you can retract rule project metadata from CentraSite, you must have installed the CentraSite Integration plugin as described in *Software AG Installation Guide*, and you must have a CentraSite connection as described in *webMethods CentraSite Metadata Help.*

To retract rule project metadata from CentraSite:

1. In the Solutions view, right-click the rule project and select **Retract** from the context menu.
2. In the Retract Assets dialog box, select the rule project you want to retract.
3. Click **OK**.

The rule project metadata is now retracted from CentraSite.

22 Working with webMethods Search

To locate assets, asset references, or assets dependencies, Software AG Designer searches the metadata associated with assets. You can choose to search only the workspace index, only CentraSite, or both the workspace index and CentraSite.

Before you can search CentraSite, you must:

- Install the CentraSite Integration plugin as described in *Software AG Installation Guide.*
- Configure a CentraSite connection as described in *webMethods CentraSite Metadata Help.*
- Have published your rule projects to CentraSite as described in "Publishing Rule Project Metadata to CentraSite" on page 188.

Rules Development supports the following functions:

- Showing asset dependencies.
- Showing asset references.

You can also perform basic and advanced searches as described in *webMethods CentraSite Metadata Help, Performing webMethods Basic Searches* and *Performing webMethods Advanced Searches*.

Showing Asset Dependencies

You can search the workspace index or CentraSite to locate asset dependencies. Dependencies are assets that use (depend on) the selected asset.

Before you can search CentraSite, you must:

- Install the CentraSite Integration plugin as described in *Software AG Installation Guide.*
- Configure a CentraSite connection as described in *webMethods CentraSite Metadata Help.*
- Have published your rule projects to CentraSite as described in "Publishing Rule Project Metadata to CentraSite" on page 188.

To show asset dependencies:

1. In the Rules Explorer view, right-click the action, data model, decision table, event model, event rule, or rule set.
2. Select **Show Dependencies > In Workspace**, or **Show Dependencies > In CentraSite** from the context menu.

The dependent assets appear in the Search view.

Showing Asset References

You can search the workspace index or CentraSite to locate asset references. References are assets that are used by (referred to by) the selected asset.

Before you can search CentraSite, you must:

- Install the CentraSite Integration plugin as described in *Software AG Installation Guide.*
- Configure a CentraSite connection as described in *webMethods CentraSite Metadata Help.*
- Have published your rule projects to CentraSite as described in "Publishing Rule Project Metadata to CentraSite" on page 188.

To show asset references:

1. In the Rules Explorer view, right-click the action, data model, decision table, event model, or event rule.
2. Select **Show References > In Workspace**, or **Show References > In CentraSite** from the context menu.

The assets used by the selected asset appear in the Search view.

23 Working with Expressions

An expression may contain function calls, literals, parameter refernces, 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. webMethods Rules Development 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 195.

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`.

	Customer.city
1	= 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`.

	Customer.city
1	= 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.

	Customer.city
1	= contains(%"Order.city"%.toUpper())

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()
```

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 Problems view, and in the Rule Verification view 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 an expression:

1. For decision tables, execute steps 1 to 3 as described in "Adding a Condition or Result Value" on page 108. For event rules, execute steps 1 to 3 as described in "Adding a Result Value" on page 139.
2. In the *[Value Type]* Modification dialog box, select an operator as specified in "About Condition Operators" on page 122 (for decision table conditions), "About Result Operators" on page 123 (for decision table assignment results) or "About Result Operators" on page 146 (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 or by right-clicking it and selecting **Move right** from the context menu. 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.
   b. Right-click a function and select **Move right** from the context menu.
   c. Enter the function manually in the **Enter Function Call** field.
6. To specify the input parameters of the function, do one of the following:
   a. Select a parameter element from the list in the pop-up window that opens after you selected a function. The list contains input and/or input/output parameter references whose types are compatible with the argument selected for the function.
   b. Click the **Parameters** tab, expand a parameter in the list and select 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 function argument, an error will be displayed.
   c. Enter the input parameters manually in the **Enter Function Call** field.

> **Note:** To specify an empty string as input parameter, enter `""`.

7. To chain functions, enter the period character after a function and select a second function by double-clicking it in the pop-up window that opens after you typed the period character. For more information about chaining functions, see "Working with Expressions" on page 193.
8. To nest functions, enter a function instead of an input parameter. 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 193.
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 193.
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 193.
11. To insert a date/time value within an expression, place the cursor where you want the date/time value to be inserted. Click the calendar icon on the right side of the **Expression** tab toolbar. In the pop-up dialog, select a date and time from the calendar and clock controls. Click **OK**. The date/time value is inserted in the cursor position.
12. Click **OK**.

24 Working with Rules-Related Event Types

webMethods Rules Development provides a set of predefined event types that allow you to monitor rules-related events on the Integration Server or on the My webMethods Server. Before you can subscribe to these events, you must configure the settings of the Integration Server and My webMethods Server as described in "Configuring the Integration Server" on page 200 and "Configuring the My webMethods Server" on page 200.

For more information about the subscription of events, see *Implementing Event-Driven Architecture with Software AG Products*.

For more information about the individual rules-related event types, see *webMethods Business Rules Reference*.

Configuring the Integration Server

Before you can subscribe to event types that monitor rules-related events on the Integration Server, you must configure the settings of the Integration Server.

To enable the publication of rules-related events on the Integration Server:

1. Open *sag_install_folder* \profiles\IS_default\configuration\wrapper.conf.
2. Add the following entry: `wrapper.java.additional.109=-DRulesAuditingEDAOnOff=On`.

Configuring the My webMethods Server

Before you can subscribe to event types that monitor rules-related events on the My webMethods Server, you must configure the settings of the My webMethods Server.

To enable the publication of rules-related events on the My webMethods Server:

1. Open *sag_install_folder* profiles\MWS_default\configuration\custom_wrapper.conf.
2. Add the following entry: `wrapper.java.additional.109=-DRulesAuditingEDAOnOff=On`.