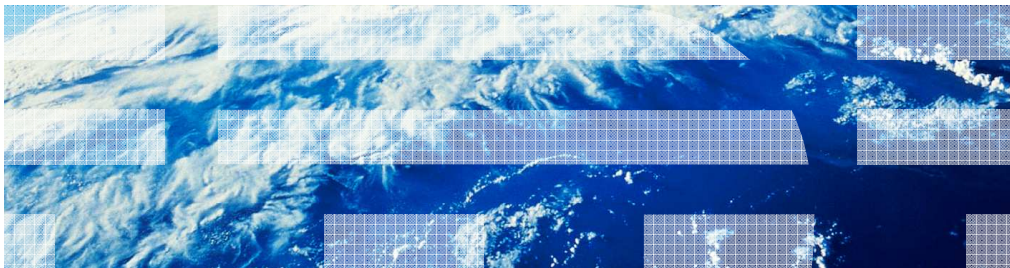




WebSphere Commerce V7 Feature Pack 2

ILOG JRules integration overview



WebSphere software

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This presentation provides an overview of the ILOG JRules integration Overview to the WebSphere Commerce V7.0 Feature Pack 2.

Agenda

- IBM WebSphere ILOG JRules overview
- Advantages to integrate with ILOG JRules
- ILOG JRules integration architecture
- Enable ILOG JRules integration with WebSphere Commerce
- Install sample rule projects into Rule Studio

This presentation first introduces the WebSphere ILOG JRule. It then discusses several benefits to integrate WebSphere Commerce with ILOG JRules. The integration architecture, key steps of integration installation and sample rule project installation topics are also covered.

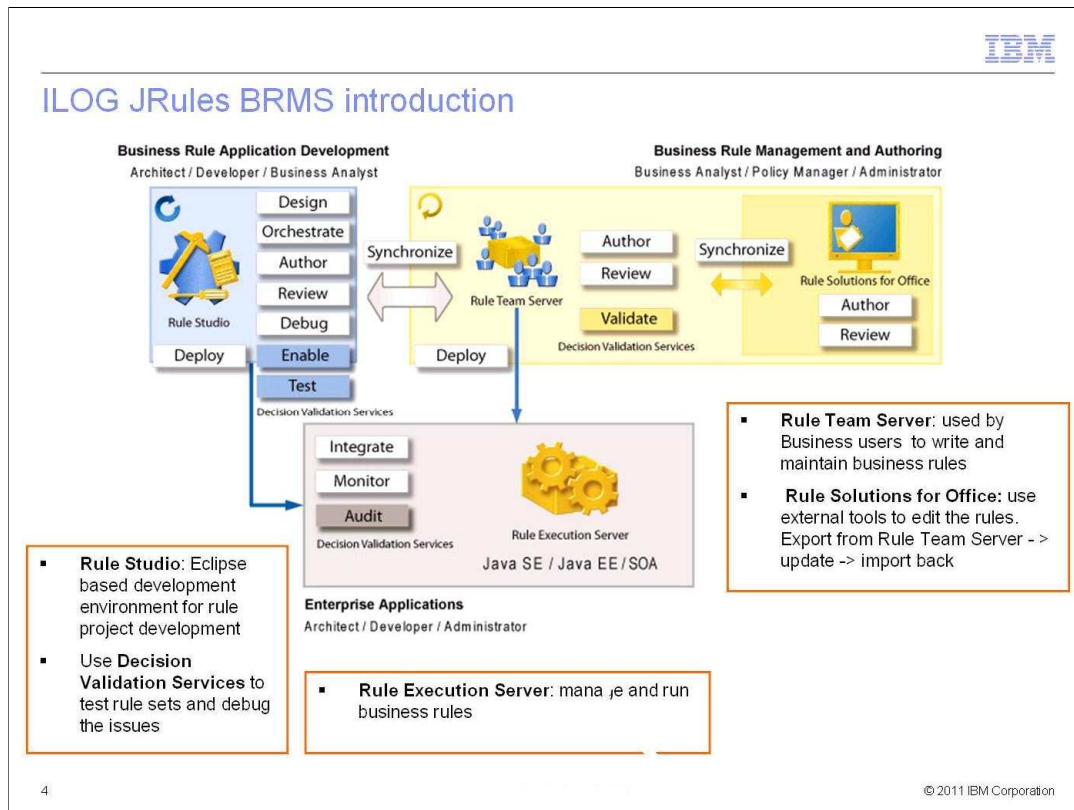
IBM WebSphere ILOG JRules

- A Business Rule Management System (BRMS) is used to **define, deploy, run, monitor and maintain** business rule
- A **business rule** is a statement of business logic that can be
 - Understood by business users
 - Invoked from an application for execution
 - Formalized by “if - then - else” statements
- Example: a business rule written in “if - then - else” statements

```
if
  currentUser belongs to member group "800000000000000501"
  and the part number of 'catalog entry' is "FUC0-0101"
then
  set 'final price' to 'Price' * 0.8;
else
  set 'final price' to 'Price' * 0.9;
```

IBM WebSphere ILOG JRules is a Business Rule Management System (BRMS) that provides control over automated business decisions with the right tools for business users, analysts, architects, and developers. A BRMS is used to define, deploy, run, monitor and maintain decision logic that is used by operational systems within an organization or enterprise.

A business rule is a statement of business logic that can be understood by business users and invoked from an application for execution. The price rule is formalized into “if - then - else” statements. The example shown here is a pricing rule that if a shopper is in a specific member group, he will get 20% discount on a specific catalog entry. If the shopper is not in this member group or if the catalog entry is not one specified in the rule, he can only get a 10% discount.



There are three areas in the implementation of ILOG JRules. Each area has modules aimed at specific user roles to perform several activities.

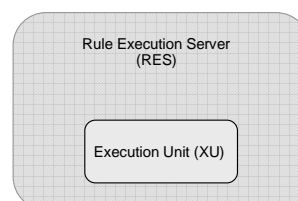
Business Rule Application Development consists of Rule Studio. Rule Studio is an Eclipse based development environment for rule project development. You can use Rule Studio for design, Java development, and rule project development. With Decision Validation Services, you can test and debug rule sets against real or fictitious scenarios.

Business Rule Management and Authoring consist of Rule Team Server and Rule Solutions for Office. Business users work with Rule Team Server to write and maintain business rules, to perform end-user testing and simulation. Rule Solutions for Office is used to author rules in an environment with which the business users are familiar. Business users export the rules, edit rules in other tools, such as Word or Excel, and import them back into Rule Team Server.

Rule Execution Server (RES) provides the ability to manage and run business rules. RES is an enterprise application and can be deployed to all common Java EE servers including WebSphere Application Server.

Rule Execution Server and Execution Unit

- Rule Execution Server (RES)
 - A rule execution engine
 - Handles rule management, performance, security and logging
 - Accessed from external application using either web services, enterprise beans, and pure Java objects (POJO)
 - An enterprise application can be deployed on a Java EE servers
- Execution Unit (XU)
 - Part of RES
 - A resource adapter that handles the low-level details of ruleset execution
 - Packaged in form of RAR, can be deployed to Java EE server



Rule Execution Server is the rule execution engine, which provides the ability to manage and run business rules. It also handles the performance, security and the logging. An external application can access Rule Execution using either web services, enterprise beans, and pure Java objects (POJO). Rule Execution Server is an enterprise application. You can deploy this application to Java EE servers such as WebSphere Application Server.

Execution Unit is a part of Rule Execution Server. It handles the low-level details of rule execution and provides management access to its resources, for example the database accessing. Execution Unit is packaged in form of Resource Adapter Archive (RAR) file, which can be installed to a Java EE server.

Advantages to integrate with ILOG JRules (1 of 2)

- Support more complex rules that are not supported by WebSphere Commerce Feature Pack 2
 - Example: Set prices according to shoppers marital status and catalog entry part number

```
definitions
  set 'person' to the user in 'current business context' ;
  set 'Price' to the price of 'catalog entry' in price list "4000000000000000002";
if
  the marital status of person is not null
  and the marital status of person is "Y"
  and the part number of 'catalog entry' is "A0000286"
then
  set 'final price' to 'Price' * 0.1;
else
  set 'final price' to 'Price' * 0.5;
```

ILOG rules provides maximum flexibility when writing rules. It supports more complex rules that are not supported by WebSphere Commerce Feature Pack 2.

The example shown here is one of the samples provided by WebSphere Commerce for the ILOG JRules integration. It sets the prices according to shoppers marital status and catalog entry part number. The case shown in the sample is not supported by Management Center Price Rule in Feature Pack 2.

Advantages to integrate with ILOG JRules (2 of 2)

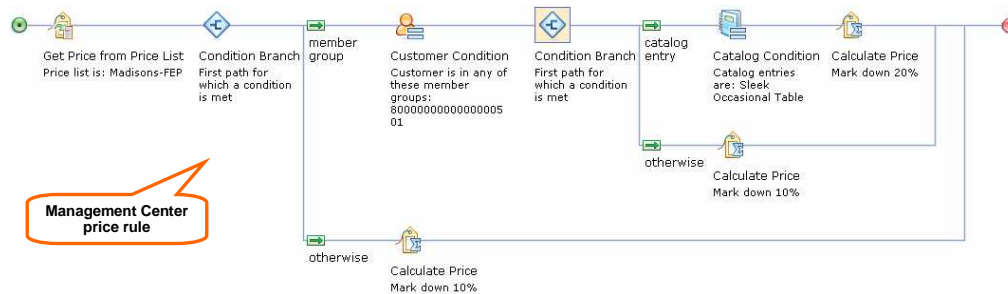
- Business rule is written in a natural-language-like representation, syntax is concise and understood easily by business users
- Sample: Set the prices according to customer's member group and the catalog entry's part number

```

if
  currentUser belongs to member group "800000000000000501"
  and the part number of 'catalog entry' is "FUCO-0101"
then
  set 'final price' to 'Price' * 0.8;
else
  set 'final price' to 'Price' * 0.9;

```

ILOG JRules's rule



Management Center price rule

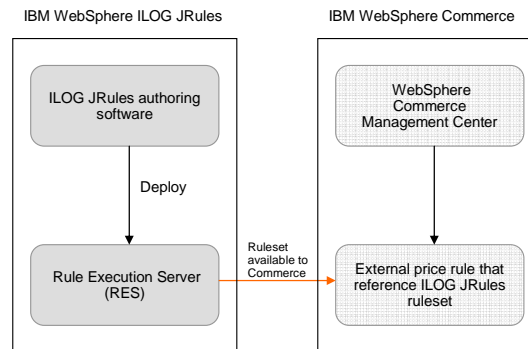
ILOG JRules uses verbalization language, which like a nature language and can be understood by business users easily. The syntax of the rule is also very concise. You can compare the same pricing rule written in ILOG JRules verbalization language and the Management Center internal price rule and see how concise it is when you use the verbalization language for the rule.

Workflow of using ILOG JRules for WebSphere Commerce Pricing

- Create external business ruleset and deploy it from an ILOG JRules authoring software
 - Create business ruleset
 - Create a rule flow to orchestrate rule execution
 - Deploy rule application project to the RES

- Create an external price rule from Management Center to reference the ILOG JRules ruleset

- Assign external price rule to a store default contract or a business contract



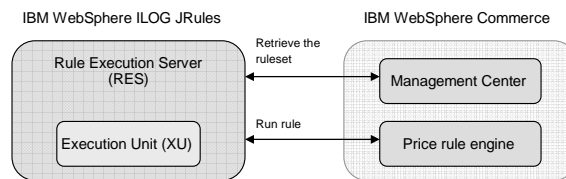
The high level workflow to use WebSphere ILOG JRules as WebSphere Commerce store price rule engine is shown here. You first use ILOG JRules authoring software to create your business ruleset. You create a rule flow to specify the order that the rules are executed. A rule flow is a way to organize the sequence in which rules are processed by the rule engine. You then deploy your rule application project to the Rule Execution server to make your ruleset available to WebSphere Commerce.

You then create an external price rule in WebSphere Commerce Management Center to reference the ILOG JRules ruleset. To do this, you need to use the Management Center's search feature to get all the ILOG JRules rules deployed on the Rule Execution Server, and add your target rule into the Management Center's external rule.

Finally, you assign the external price rule to a store's contract.

ILOG JRules integration architecture

- Management Center retrieves the available rules from Rule Execution Server
- WebSphere Commerce price rule engine invokes Rule Execution Server to run the rules
- Rule Execution Server only contains ruleApps
- Rule Execution Server use ILOG JRule XOM to retrieve WebSphere Commerce data at runtime. For example:
 - Price list
 - Catalog entry
 - Customer data



During price rule authoring, the Management Center fetches the ILOG JRules ruleset from Rule Execution Server to create an external price rule.

During price rule execution, WebSphere Commerce price rule engine sends the request with the initial input data to the Rule Execution Server for rule execution. The Rule Execution Server only contains the ruleApps information, all other WebSphere Commerce data required for rule execution is fetched using ILOG JRules Execution Object Model XOM. In WebSphere Commerce, this data is represented by the existing Service Data Objects (SDOs). These SDOs are used as the XOM that WebSphere ILOG JRules requires.



Required ILOG JRules products for the price rule integration

- IBM WebSphere ILOG JRules (JRules Core) V 7.1 or higher
 - Rule Studio
 - Rule Execution Server – for samples and tutorials
- Rule Execution Server Java EE add-on on WebSphere Application Server
- Optional ILOG JRules products
 - IBM WebSphere Rule Team Server
 - IBM WebSphere ILOG Decision Validation Services
 - IBM WebSphere ILOG Rule Solutions for Office

- Feature Pack 2 does not include ILOG JRules software
- Separate license needed for ILOG JRules software

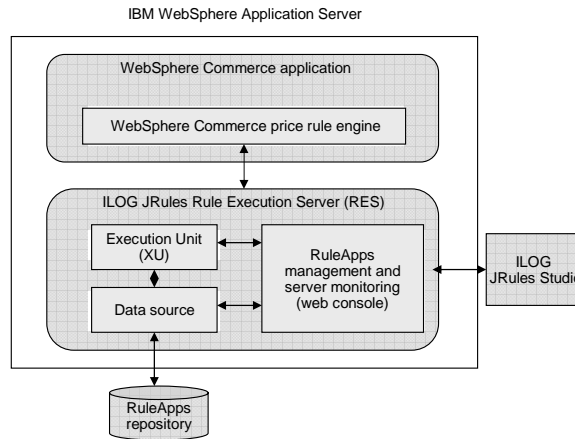
In order to use the external price rule solution, you must have IBM WebSphere ILOG JRules (JRules Core) V 7.1 or above installed. Rule Studio and Rule Execution Server modules are installed during ILOG JRules installation. The Rule Execution Server installed on the ILOG JRules local machine is for sample and tutorials only. To integrate with WebSphere Commerce, you need to install the Rule Execution Server on the WebSphere Commerce server.

Rule Execution Server Java EE add-on on WebSphere Application Server contains the WebSphere Application Server specific code which allows you to use RES, RTS and DVS with WebSphere Application Server.

The ILOG JRules software is not included in WebSphere Commerce Version 7 Feature Pack 2. You must purchase the license separately.

A single-node topology or a development environment

- Deploy Rule Execution Server (RES) Management EAR, ILOG JRules Execution Unit (XU) RAR and WebSphere Commerce application on same JVM
- Create a dedicated data source and database schema if database is chosen for the repository
- Install ILOG JRules Rule Studio on a separate machine to reduce any impacts on performance



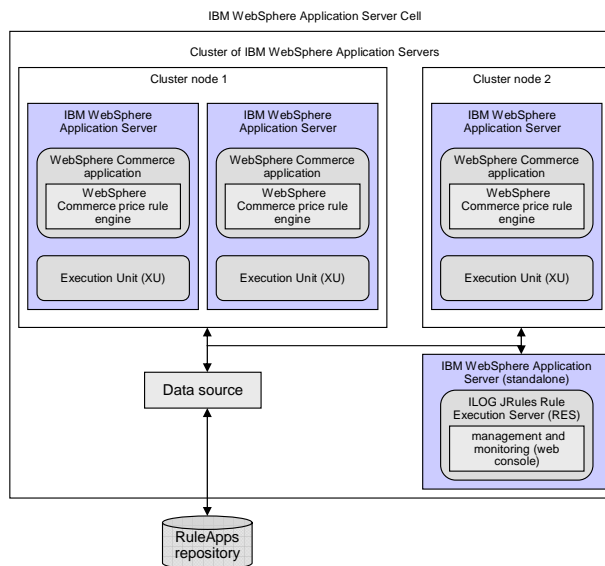
For a single-node topology or a development environment, you install Rule Execution Server (RES) Management EAR and ILOG JRules Execution Unit (XU) RAR on the same WebSphere application server as WebSphere Commerce application.

ILOG JRules supports two types of repository: file, and database. If you choose database as ruleApps repository, you need to create a dedicated data source and database schema for ILOG JRules Execution Server.

You should install the ILOG JRules authoring software on a separate machine to reduce any impacts on performance to your production server.

Clustered environment

- Deploy Execution Unit (XU) RAR to each server of the cluster nodes
- Deploy Rule Execution Server management on stand-alone server outside the cluster



For multiple-node topology or a clustered environment, you should deploy ILOG JRules Execution Unit RAR to each server of the cluster nodes, the same application server that WebSphere Commerce application installed.

The Rule Execution Server management module should be installed on a stand-alone server of the cell outside the cluster. There is no need to have a failover mechanism for Rule Execution Server management module.

Install Rule Execution Server on WebSphere Application Server

- Follow document below to install Rule Execution Server

<ILOGJRulesInstallDir>/doc/j2ee/WebSphere/doc/Installing_JRules_WebSphere.pdf

(Section **Rule Execution Server** > **Installing Rule Execution Server on WebSphere Application Server 7.0**)

- Key steps
 - Create a new database for RES
 - SQL scripts are provided under <InstallDir>/executionserver/databases
 - Creating the new JDBC provider and data source
 - Deploying the Rule Execution Server MBeans descriptors on WebSphere Application Server
 - Deploy the Execution Unit (XU) resource adapter on WebSphere Application Server
 - Activating security on WebSphere 7.0 (Skip this step for Commerce Developer)
 - Deploying the Rule Execution Server Management EAR

To integrate the ILOG JRule with WebSphere Commerce, you start with Rule Execution Server installation. The instruction can be found in the document list here.

The key steps list here are the required steps that have to be done in order to integrate with ILOG JRule with WebSphere Commerce.

Deploying the ILOG JRules JAR files required for connectivity

- Deploy following two **rule session** JAR files to WebSphere Commerce

jrules-res-session-ejb3-WAS7.jar
jrules-res-session-WAS7.jar

Note: The jar files can be found in <LogJRulesInstallDir>/executionserver/applicationserver/WebSphere7/

- WebSphere Commerce Developer
 - Copy the two jar files directly to the destination directory <workspace_dir>/WC/lib/jrules
 - Re-publish the server
- Runtime server
 - Deploy two JAR files to WC.ear using WebSphere Application Server enterprise application update feature
 - Deploy jrules-res-session-ejb3-WAS7.jar as a **single module**
 - Deploy jrules-res-session-WAS7.jar as a **single file**
- **Rule session:** a runtime connection between WebSphere Commerce and a rule engine. It is used to **execute** the rule in the rule engine

To allow WebSphere Commerce to communicate with the Rule Execution Server, you need to deploy two rule session JAR files to WebSphere Commerce. A rule session is a runtime connection between WebSphere Commerce server and Rule Execution server to consume rule engine resources.

On your development machine, copy the two JAR files directly into the destination directory shown in the slide. On the runtime server, these two JAR files need to be deployed using WebSphere Application Server enterprise application update feature. The first JAR file needs to be deployed as a single module. The second JAR file needs to be deployed as a single file. The details on how to deploy files as partial update can be found in WebSphere Commerce Information Center.

Configuring the registry and proxy for the ILOG JRules rule engine (1 of 2)

- Update *WC.ear/properties/ExternalRuleEngineConfiguration.properties* file
 - Enable=false to Enable=true
 - remove the all comment flag

```
Enabled=false  
#RuleEngineIdentifier=ILogJRules  
#RuleEngineProxyClass=com.ibm.commerce.ruleengine.external.jrules.ILogJRulesProxy  
#RuleEngineConfigurationFile=ILogJRulesConfiguration.properties  
|
```



```
-  
Enabled=true  
RuleEngineIdentifier=ILogJRules  
RuleEngineProxyClass=com.ibm.commerce.ruleengine.external.jrules.ILogJRulesProxy  
RuleEngineConfigurationFile=ILogJRulesConfiguration.properties  
|
```

To enable WebSphere Commerce to use ILOG JRule as the external rule engine, you need to update the *ExternalRuleEngineConfiguration.properties* file. You need to change the *Enabled* value from *false* to *true* and remove all the *#* characters from the other three lines so that they are no longer commented out.

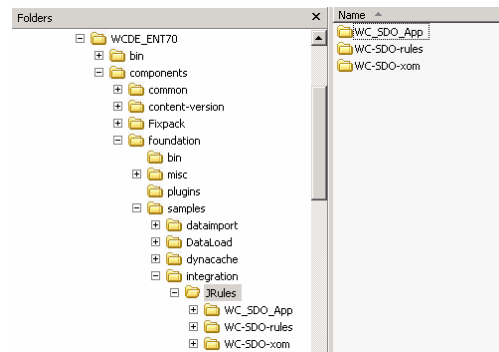
In `ILogJRulesConfiguration.properties` file, you need to select a rule session that you want to run the rule in the rule engine. POJO and EJB3 are supported rule sessions for ILOG JRules integration.

You also need to specify the JMX connection information. JMX connection is used by the WebSphere Commerce to retrieve the ruleset information from the Rule Execution Server. WebSphere Commerce uses the ruleset information to create external rule in Management Center.

Sample ILOG JRules rule projects for WebSphere Commerce pricing

- Provides a set of ILOG JRules projects that you can import into Rule Studio
 - WC_SDO_App is the ruleApp project
 - WC-SDO-xom is the XOM project
 - WC-SDO-rules is the rule project which contains predefined sample price rules

- Sample ILOG JRules projects can be found in directory below:
 - Runtime:
WC_installdir/components/foundation/samples/integration/JRules
 - Developer:
WCDE_installdir/components/foundation/samples/integration/JRules



Feature pack 2 provides a set of ILOG JRules projects. You can import them into the Rule Studio to test the ILOG JRules integration, or you can use them as the starting point to create your own rule projects. The sample projects can be found in the directory shown in the screen capture here.

Import sample rule projects into Rule Studio

The screenshot shows the Eclipse IDE interface. On the left, the 'Import' dialog is open, with 'Existing Projects into Workspace' selected. An arrow points from this selection to the 'Rule Explorer' on the right. The 'Rule Explorer' shows a project named 'WC-SDO-xom' with a 'lib' directory containing a list of JAR files. A second arrow points from the list of JAR files to the text instructions.

- Import sample projects into Rule Studio as Existing Projects
- Copy required JAR files for WC-SDO-XOM project
 - Copy `j2ee.jar` from `WASInstallDir/lib`
 - Copy `org.eclipse.emf.commonj.sdo.jar` from `WASInstallDir/plugins`
 - Copy all other JAR files from WC `.ear/` or `[workspace]WC/`

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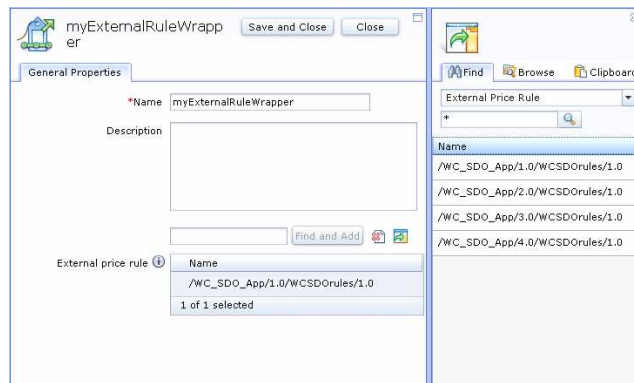
ILOG JRules integration overview

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The sample rule projects are imported into the Rule Studio as existing projects. After the rule projects are imported, you need to copy several JAR files from WebSphere Commerce to the WC-SDO-xom project's lib directory. The JAR files' names and the directories from WebSphere Commerce are shown here.

Create an external price rule in Management Center to reference an ILOG JRules ruleset

- Create an external price rule to reference an ILOG JRules rule
 - Use external rule directly in a contract
 - Or nest the external price rule in another WebSphere Commerce price rule



There are two ways to use the ILOG JRules rules in WebSphere Commerce. First you can create an external price rule to reference an ILOG JRules rule. You can assign the external price rule directly to a store contract. You can also nest the external price rule in another WebSphere Commerce price rule, and use nested rules with other price rule elements in WebSphere Commerce price rules.

Reference

- ILOG JRules products and how to install them

http://publib.boulder.ibm.com/infocenter/brjrules/v7r1/topic/com.ibm.websphere.ilog.jrules.doc/Content/Business_Rules/Documentation/_pubskel/JRules/ps_JRules_Global198.html

- ILOG JRules tutorials and demos

http://publib.boulder.ibm.com/infocenter/brjrules/v7r0/topic/ilog.rules.jrules.doc/Content/Business_Rules/Documentation/_pubskel/JRules/ps_JRules_Global1636.html

This slide contains some useful references for understanding ILOG JRules product.



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