

Developing Business Rules

Objectives

After completing this lesson, you should be able to:

- Describe business rule concepts
- Describe the Oracle Business Rules architecture
- Describe the Rules Engine
- Explain the role of the Oracle Business Rules dictionary
- Create rules with the JDeveloper Rules Designer
- Integrate a simple rule with a BPEL process
- Describe the role of the Rules SDK



Agenda

- Business Rules: Introduction
- Business Rules in the Oracle SOA Suite



Business Rules: Introduction

Business rules are declarative statements that describe business policies or key business decisions. Examples of business rules include:

- Business policies such as spending policies and approval matrixes
- Constraints such as valid configurations and regulatory requirements
- Computations such as discounts and premiums
- Reasoning capabilities such as offers based on customer value

Business Rules Component

A *decision component*, which is also called a *business rule service component*, supports the use of Oracle Business Rules in a SOA composite application. Decision components can be called within a composite application:

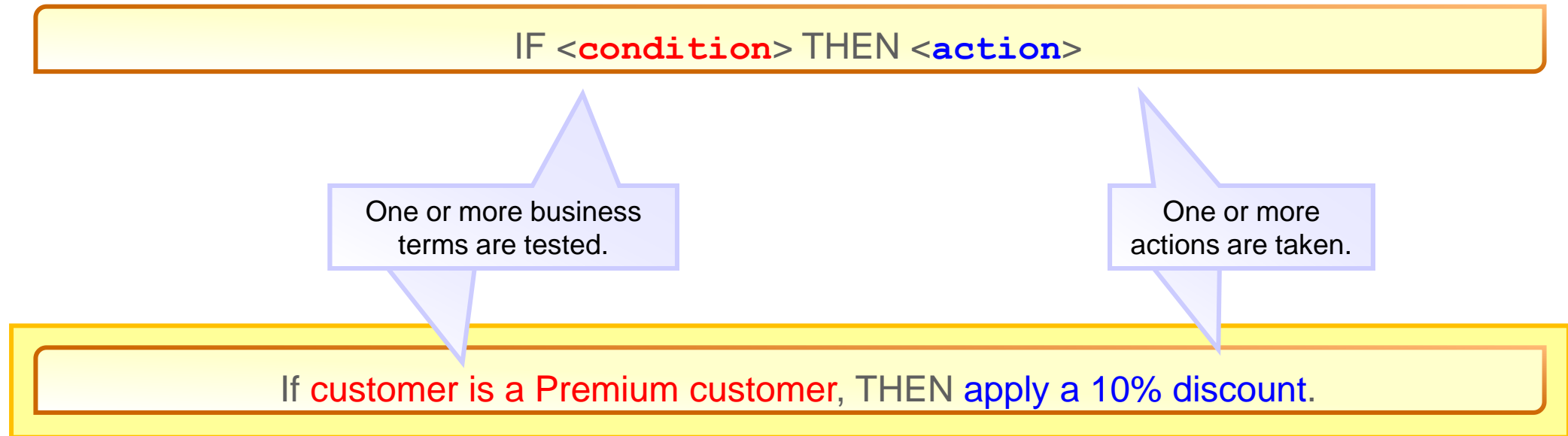
- By a BPEL component
- By a human task
- By the dynamic routing capability of Oracle Mediator
- Directly by the SOA composite client

Business Rules Use Cases

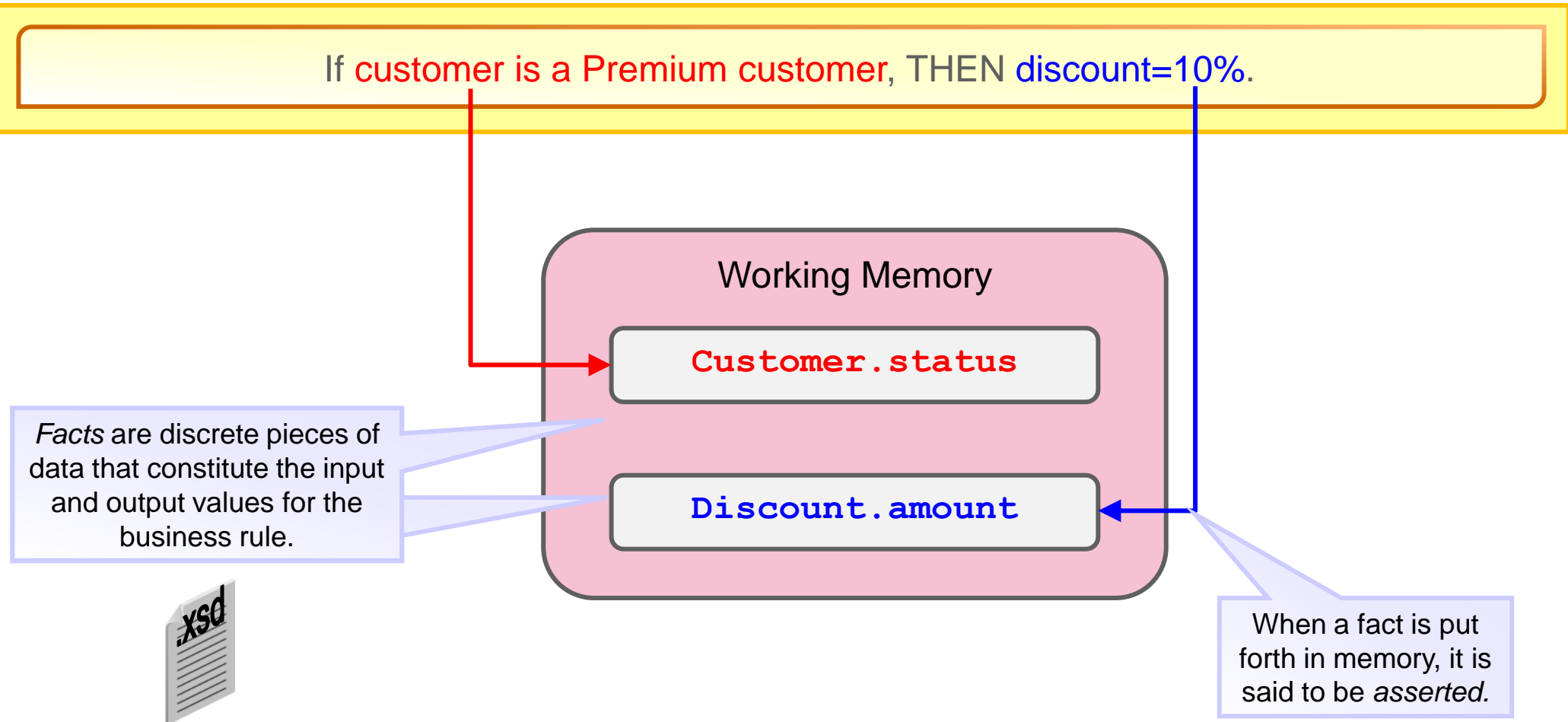
Business rules can be used in various ways in composite applications:

- Dynamic processing
 - Rules can perform routing within a business process based on service-level agreements or other guidelines.
- Externalization of business rules in a business process
 - Many conditions must be evaluated in a business process. The parameters for these conditions can be changed independently of the process.
- Data validation and constraint checks
 - Validate input documents or apply constraints on requests.
- Human task routing
 - Policy-based task assignments to specific roles or users
 - Load balancing of tasks among users

Declarative Rules



Facts

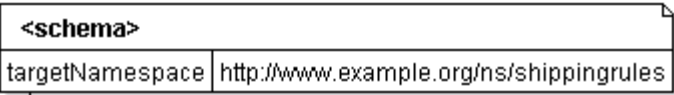


Decision Tables

A *Decision Table* provides a compact representation of all possible if/then permutations.

Decision Table	R1	R2	R3
CONDITION If shipChoice	two_day	five_day	next_day or international
ACTION Assert carrier	RedShipper	GreenShipper	BlueShipper

Value Sets



Value sets define a list of values, a range of values, or an enumeration of values for a specified type.

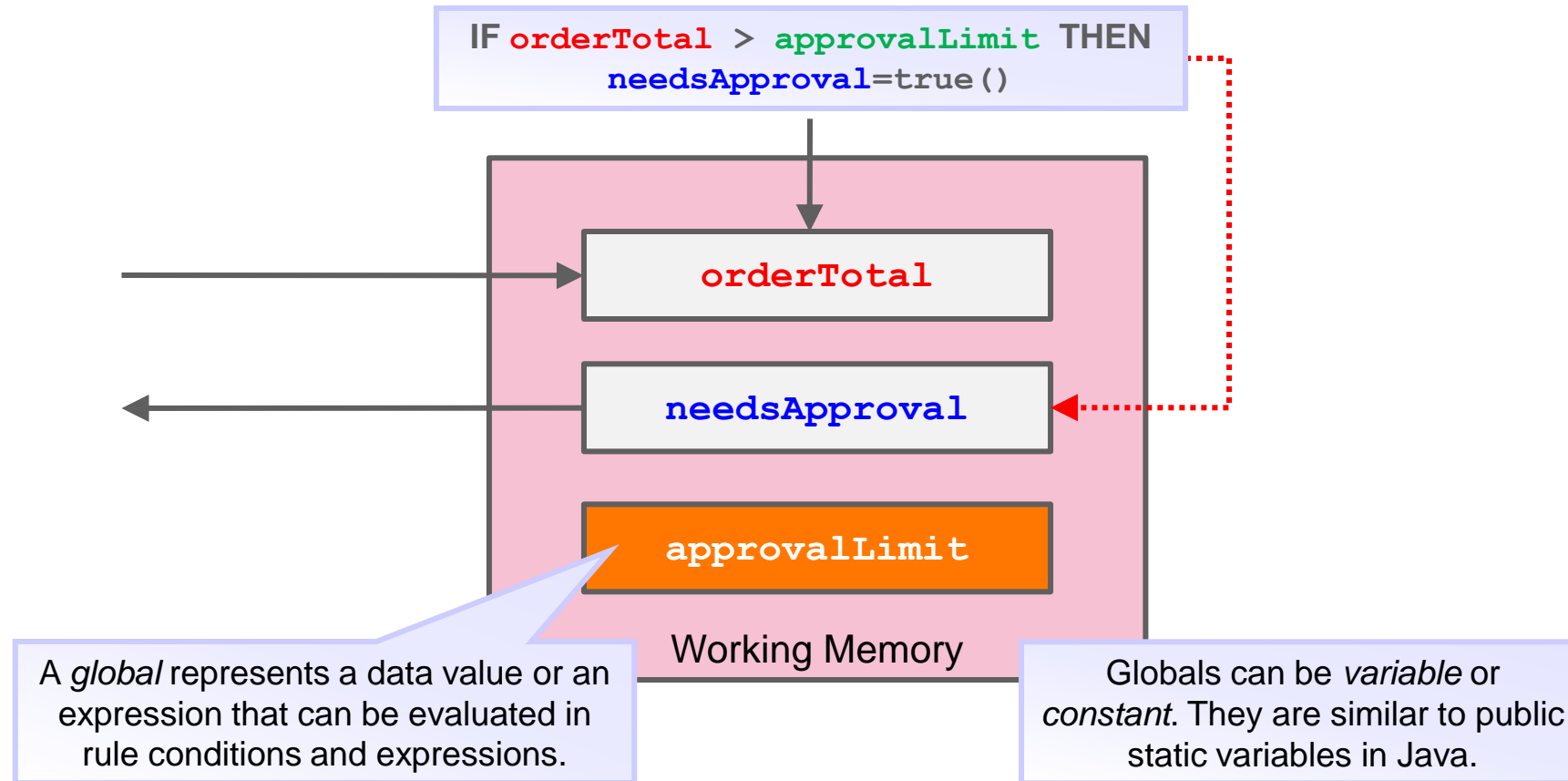
Value sets are defined as types in an XSD file. They define the possible values for `shipChoice` and `carrier`.

shipOptionType	
restricts xsd:string	
enumeration	next_day
enumeration	two_day
enumeration	five_day
enumeration	international

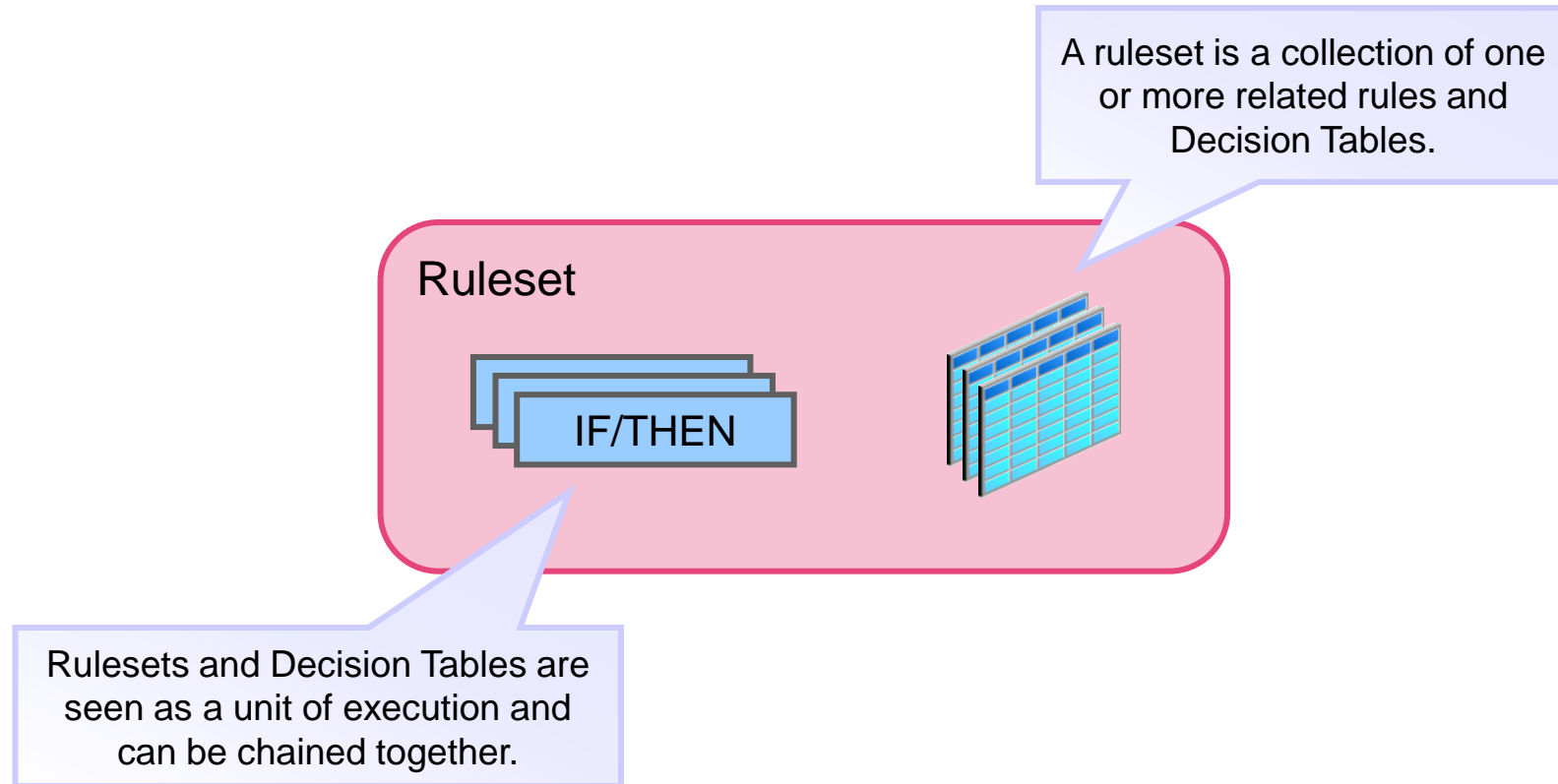
carrierType	
restricts xsd:string	
enumeration	
enumeration	
enumeration	
enumeration	

Decision Table	R1	R2	R3
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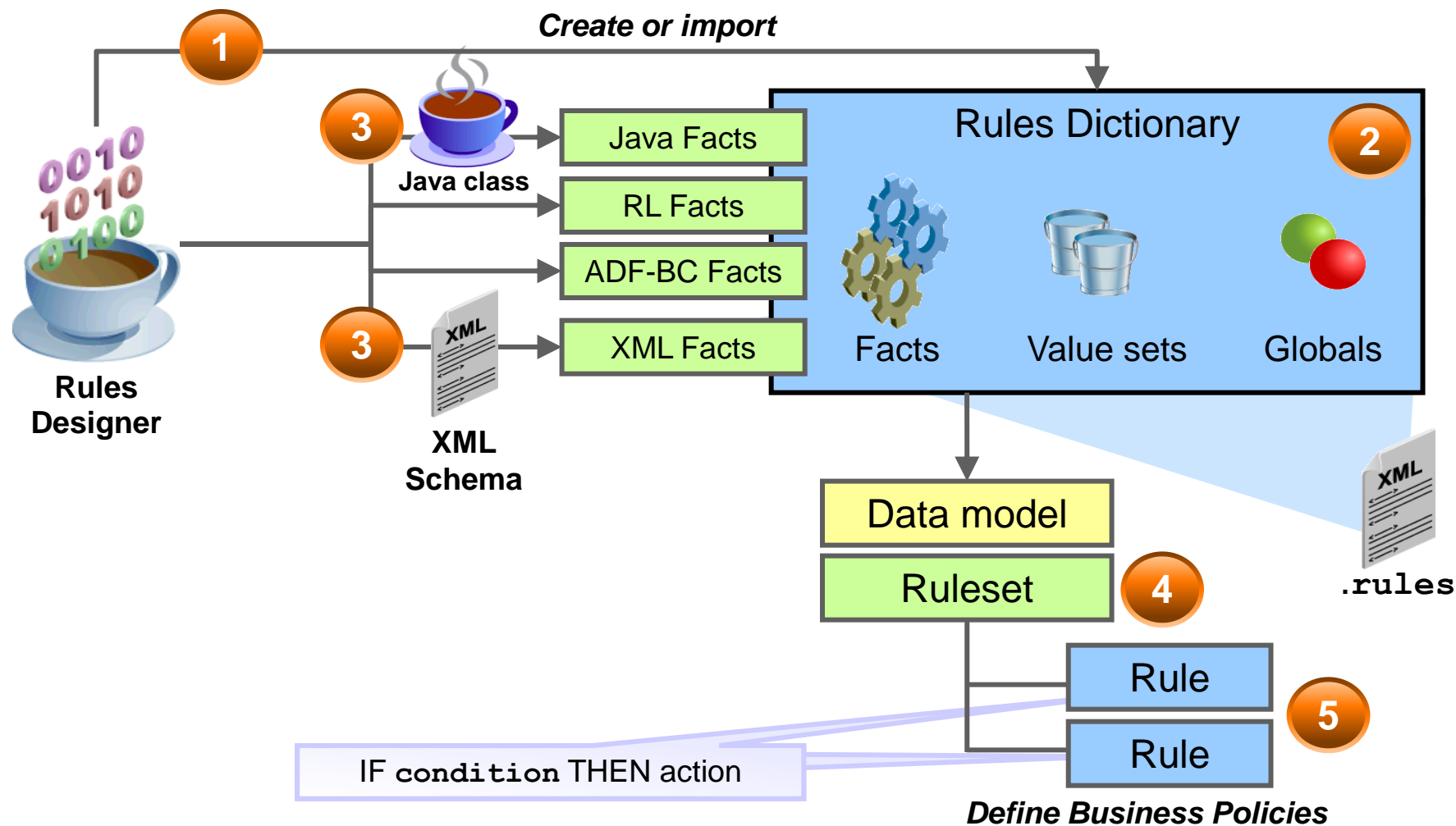
Globals



Rulesets



Rules Dictionary



Oracle Business Rules RL Language

The `goldCust` rule uses a Java class containing the customer data, `cust`.

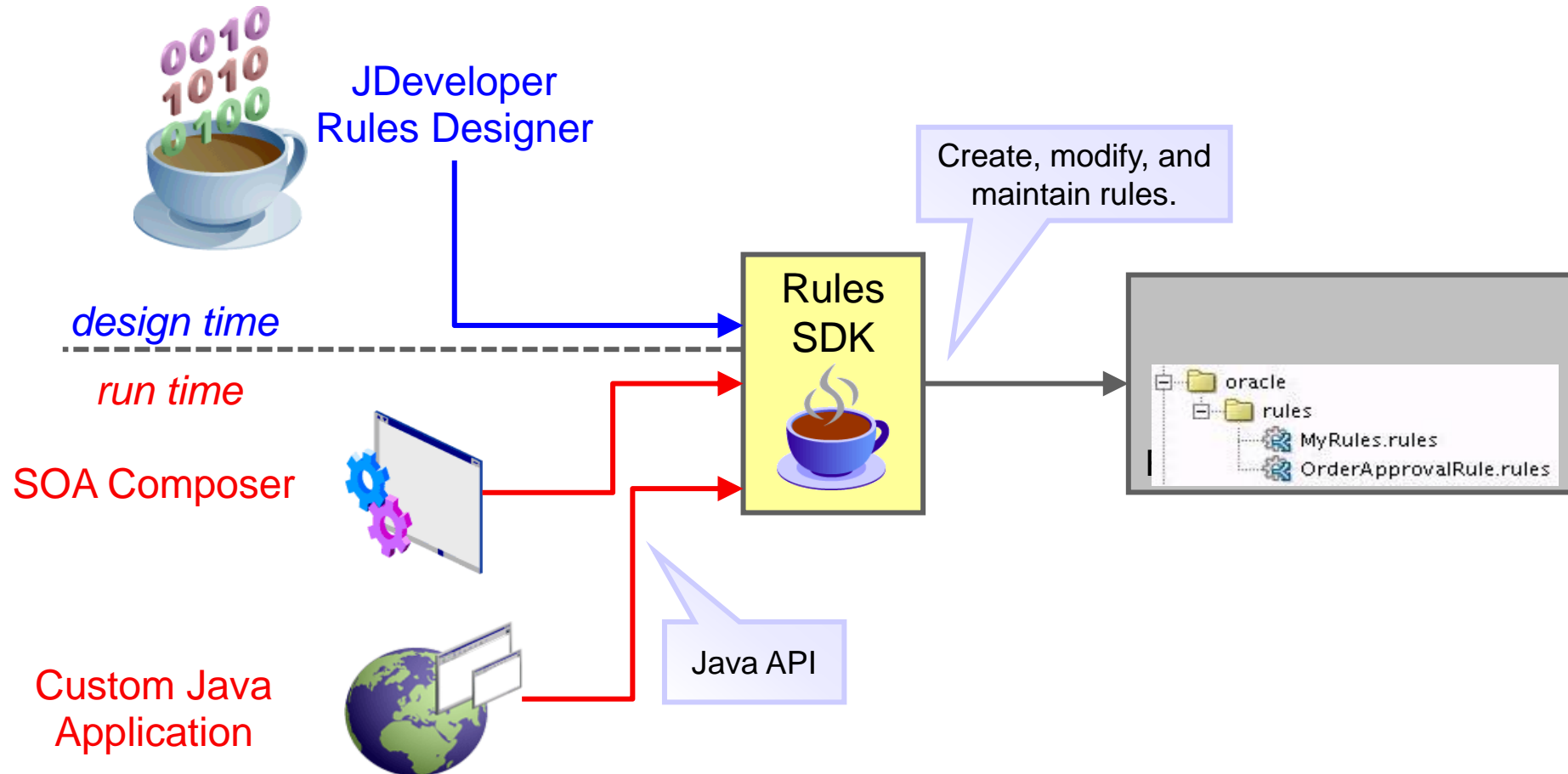
```
rule goldCust {  
    if (fact Customer cust && cust.SpentInLastMonths(3) > 500 ) {  
        assert (new GoldCustomer(cust: cust));  
    }  
}
```

An instance of the `GoldCustomer` RL class is asserted, representing a customer who spends more than \$500 in a three-month period.

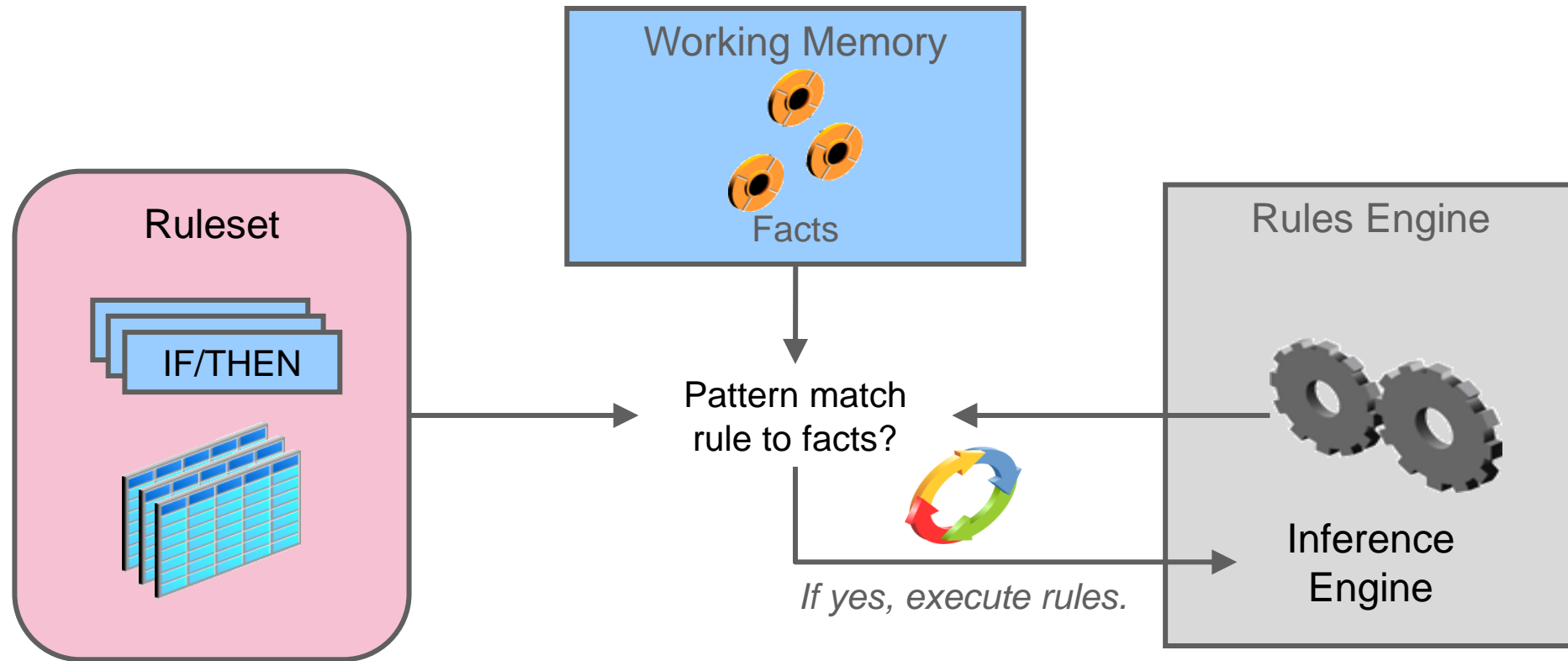
```
rule goldDiscount {  
    if (fact Order ord & fact GoldCustomer(cust: ord.customer) )  
    {  
        ord.discount = 0.1;  
        assert(ord);  
    }  
}
```

The RL fact `GoldCustomer` is used to infer that if a customer spent \$500 in the past three months, the customer is eligible for a 10% discount.

Oracle Business Rules SDK

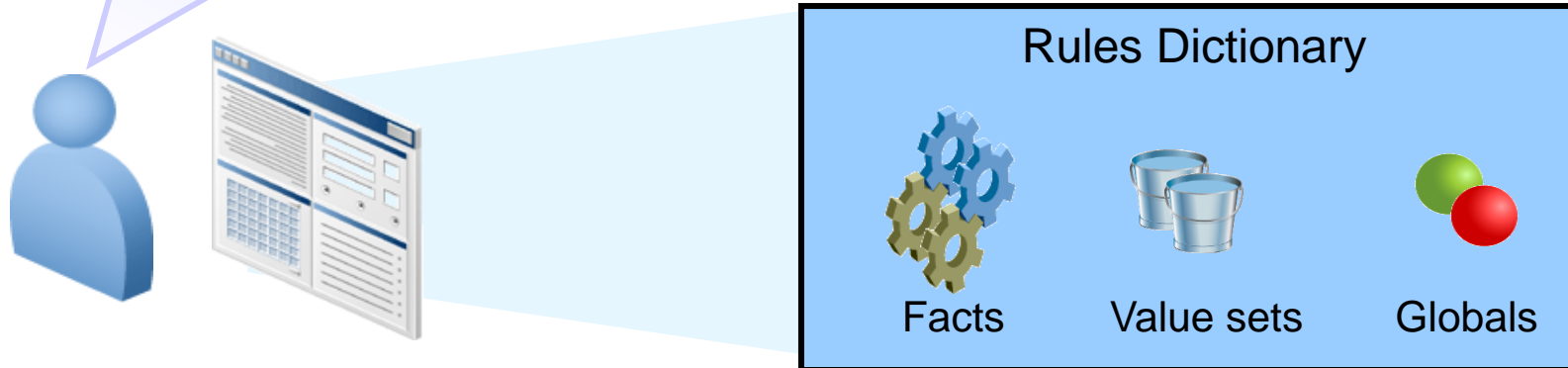


Oracle Business Rules Components



Editing Business Rules at Run Time

SOA Composer can be used to modify rules dictionaries at run time, without the need to redeploy the application.



Quiz



A _____ is a collection of one or more rules that are seen as a unit of execution.

- a. Fact
- b. Ruleset
- c. Dictionary

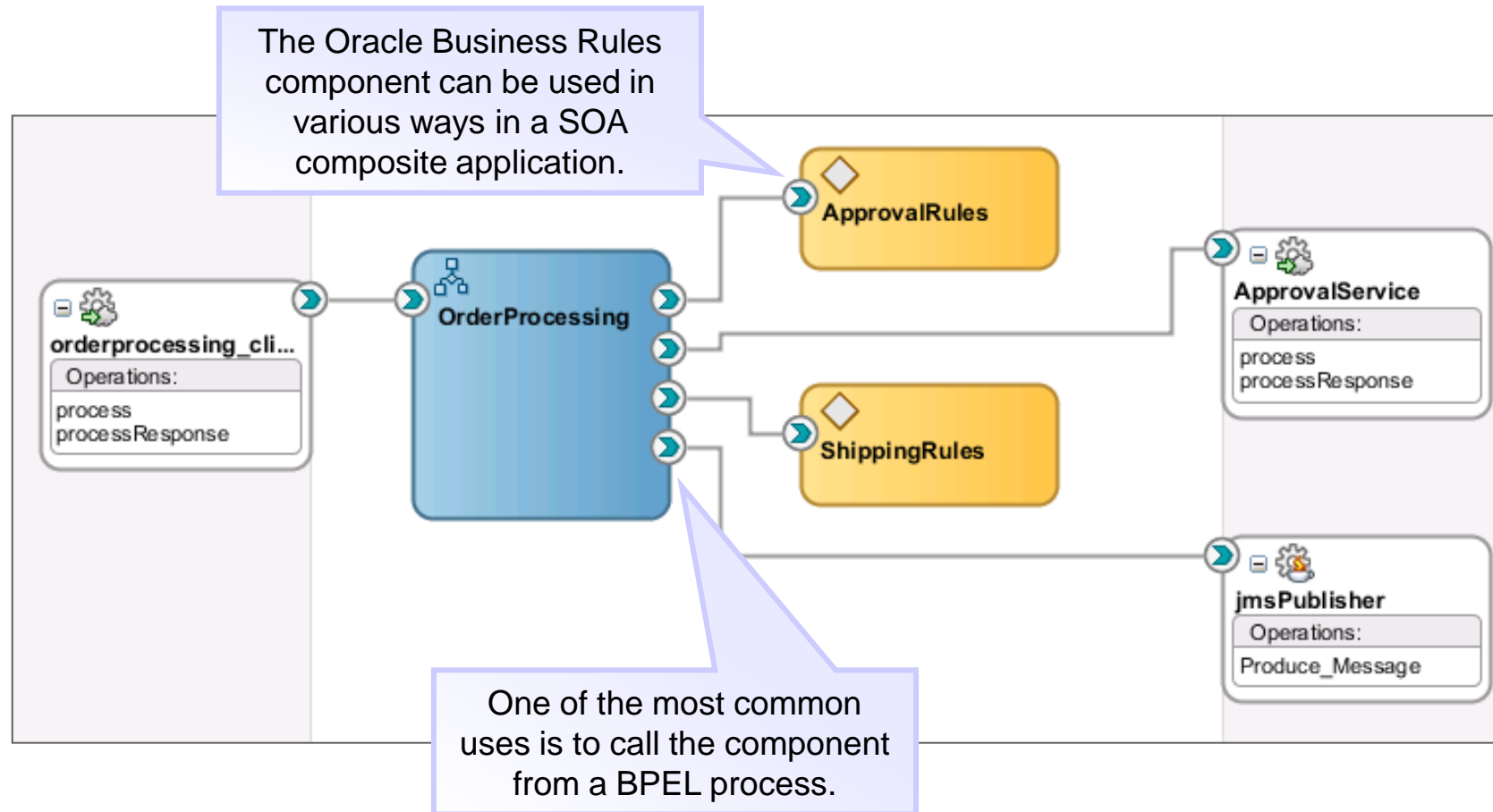


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Business Rules Component: Overview



Creating a Business Rules Service Component

Create or import a dictionary.

Create Business Rules

Business Rule
A business rule defines or constrains one aspect of your business that is intended to assert business structure or influence the behavior of your business.

General Advanced

☒ Create Dictionary ☐ Import Dictionary

Specify the name and package for the dictionary that will be created.

Name: OracleRules1

Package: orderprocessing

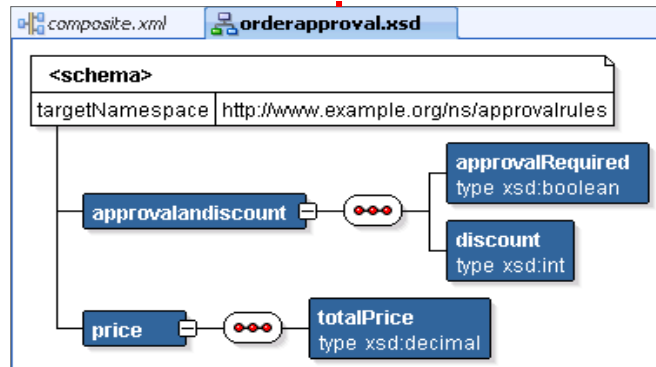
Project: pp/fmw12c/domains/myWork/mywork/BPELProjects/OrderProcessing/OrderProcessing.jpr

Inputs/Outputs:

Direction	Name	Type
Input	price	{http://www.example.org/ns/a...
Output	approvalanddiscount	{http://www.example.org/ns/a...

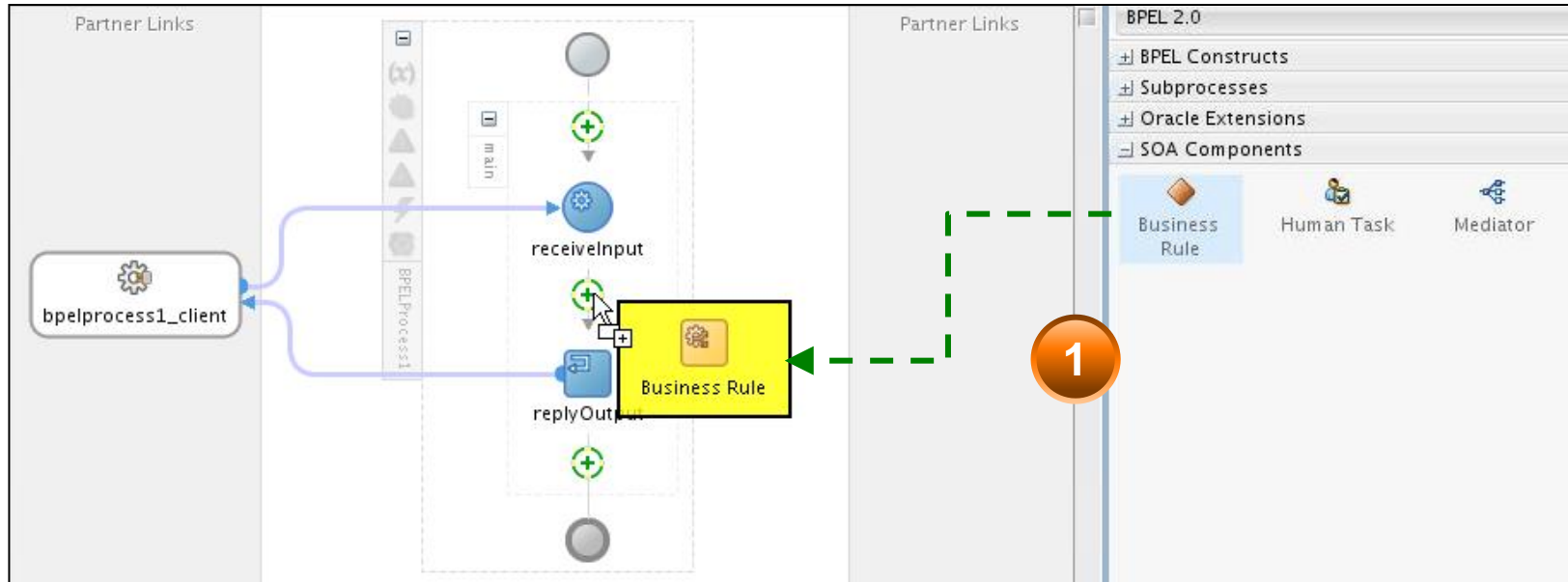
☐ Expose as Composite Service

Help OK Cancel



Specify the initial XML fact structures and the default Decision service input and output message structures.

Adding a Business Rule to a BPEL Process



Configuring a Business Rule in a BPEL Process

The image shows two dialog boxes from the Oracle BPEL Studio interface. The 'Edit Rule' dialog is on the left, and the 'Decision Fact Map' dialog is on the right. Callout boxes provide instructions on how to configure the business rule.

Edit Rule Dialog:

- Dictionary:** ApprovalRules
- Service:** ApprovalRulesService
- Operation:** COMBO_ITEM_PATTERN_FUNC
- Assign Input Facts / Assign Output Facts:** This section is highlighted with a red box. It contains a 'Copy Rules' table with 'From' and 'To' columns, and icons for adding, editing, deleting, and moving rules.

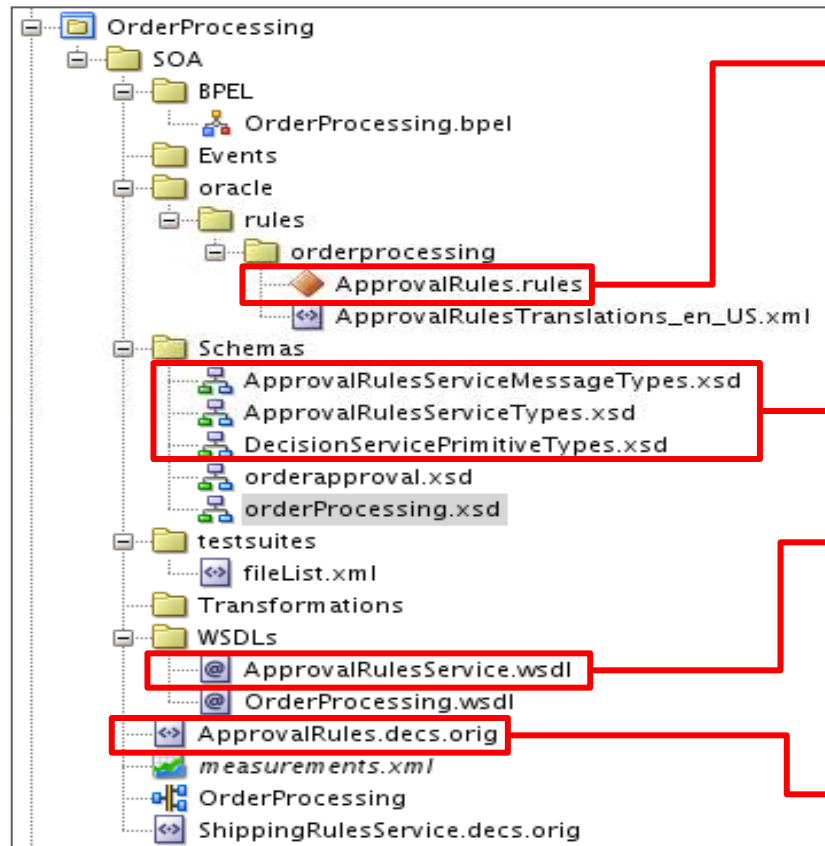
Decision Fact Map Dialog:

- From:** Variable. The tree view shows a variable named 'client:BPELProcess1Request' with a payload of 'client:process <anonymous>' and an output variable 'client:BPELProcess1Response'. The XPath is '\$inputVariable.payload/client:input'.
- To:** Business Rule Facts. The tree view shows a variable named 'ns1:callFunctionStatelessMessage' with a payload of 'ns1:callFunctionStateless callF' and a parameter list containing 'ns3:price <anonymous>'. The XPath is '\$dsIn.payload/ns1:parameterList/ns3:price'.

Callout Boxes:

- Select a dictionary.** Points to the 'Dictionary' dropdown in the 'Edit Rule' dialog.
- Select the operation.** Points to the 'Operation' dropdown in the 'Edit Rule' dialog.
- Map BPEL variable values to input and (if the business rule is synchronous) output facts.** Points to the 'Copy Rules' table in the 'Edit Rule' dialog.

Examining Business Rules Component Files



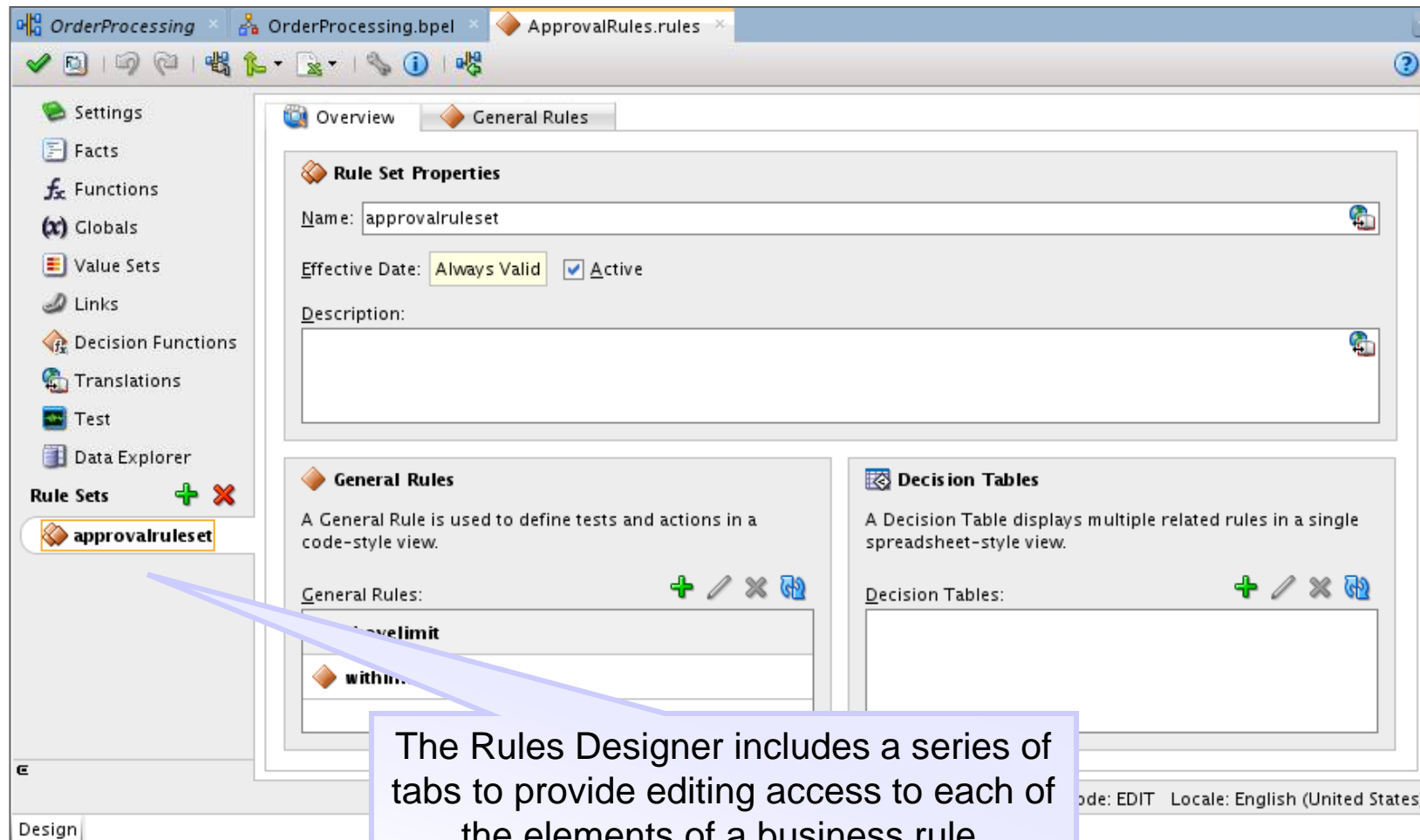
The Business Rules dictionary contains the ruleset definitions, rule, facts, and globals.

The Decision Service XML Schema defines the structures for the input and output facts.

The Decision Service WSDL document defines the basic stateless and stateful web service operations that can be invoked.

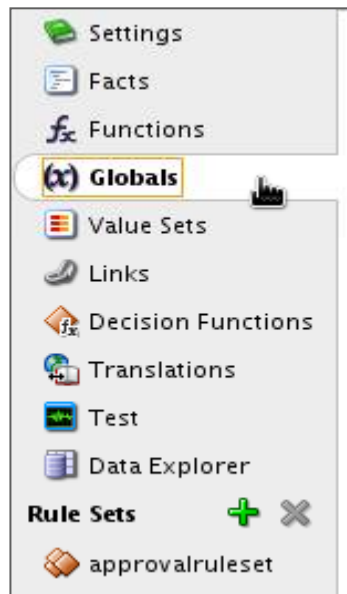
The Business Rules metadata defines the mapping of the Decision service operations to the Decision functions.

Editing the Rules Dictionary



Defining Globals

Assign the global a name, a data type, a value set (optional), and a value.

A screenshot of the 'Edit Global - Variable1' dialog box. It contains the following fields and controls:

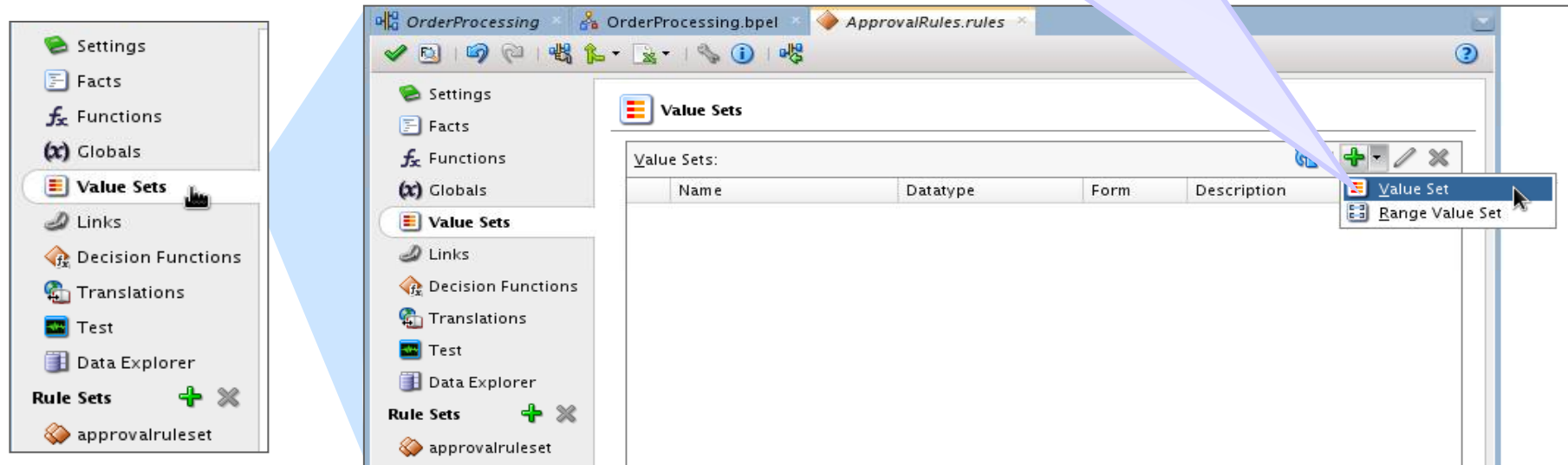
- Name:** Variable 1
- Type:** double
- Value Set:** (empty dropdown)
- Value:** 4000
- ☐ Constant
- ☒ Final
- Description:** (empty text area)
- Buttons:** Help, OK, Cancel

Specify Constant and/or Final if appropriate.

Use Expression Builder to define a value.

Defining Value Sets

A value set can be a list of values, or it can be a list of ranges that defines a list of value ranges by range endpoints.



Defining a Ruleset

Test Condition and Action refer to previously defined facts and globals.

The screenshot displays the Oracle Rules Designer interface. The main window is titled "General Rules" and shows a rule named "abovelimit" with a description field. The rule is defined as follows:

```
IF
  price.totalPrice > approval_limit
  <insert test>
THEN
  assert new approvalanddiscount ( <edit properties> approvalRequired : true , discount : 0 )
  <insert action>
```

A red line connects the `approval_limit` variable in the test condition to the `approvalRequired` property in the action. Another red line connects the `approvalanddiscount` object in the action to the `approvalanddiscount` object in the schema diagram.

A dropdown menu is open, showing a list of actions. The "assign new" action is selected, and its properties are shown in a "Properties" panel:

- Kind: literal

The schema diagram, titled "orderapproval.xsd", shows the following structure:

```
<schema>
  targetNamespace http://www.example.org/ns/approvalrules
  <!-- ... -->
  <complexType name="approvalanddiscount">
    <sequence>
      <element name="approvalRequired" type="xsd:boolean"/>
      <element name="discount" type="xsd:int"/>
    </sequence>
  </complexType>
  <complexType name="price">
    <sequence>
      <element name="totalPrice" type="xsd:decimal"/>
    </sequence>
  </complexType>
```

Defining a Decision Table

<schema>
targetNamespace http://www.example.org/ns/shippingrules

shippinginfo = **shipChoice**
type shipOptionType

shippingcompany = **carrier**
type carrierType

shipOptionType
restricts xsd:string

enumeration	next_day
enumeration	two_day
enumeration	five_day
enumeration	international

carrierType
restricts xsd:string

enumeration	RED_SHIPPER
enumeration	GREEN_SHIPPER
enumeration	BLUE_SHIPPER
enumeration	none

Each condition row requires a value set from which to draw values.

		R1	R2	R3
Conditions				
C1	shippinginfo.shipChoice	NEXT_DAY,INTERNATIONAL	TWO_DAY	FIVE_DAY
Conflict Resolution				
Actions				
A1	assert new shippingco... carrier:CarrierType)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		CarrierType.BLUE_SHIPPER	CarrierType.RED_SHIPPER	CarrierType.GREEN_SHIPPER

Decision Functions

Edit Decision Function

Name:

Rule Firing Limit:

☒ Rule Firing Limit Is Error

☒ Will Be Invoked As A Webservice Service Name:

☒ Check Rule Flow

☒ Stateless

Description:

Inputs Initial Actions Outputs Rule Sets & Decision Functions

	Name	Fact Type	Tree	List	Description
	price	price	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Help OK Cancel

Quiz



Which of the following components can execute business rules? (Select all that apply.)

- a. Mediator components
- b. Clients of the composite application
- c. BPEL components
- d. Database adapter components
- e. Human task components



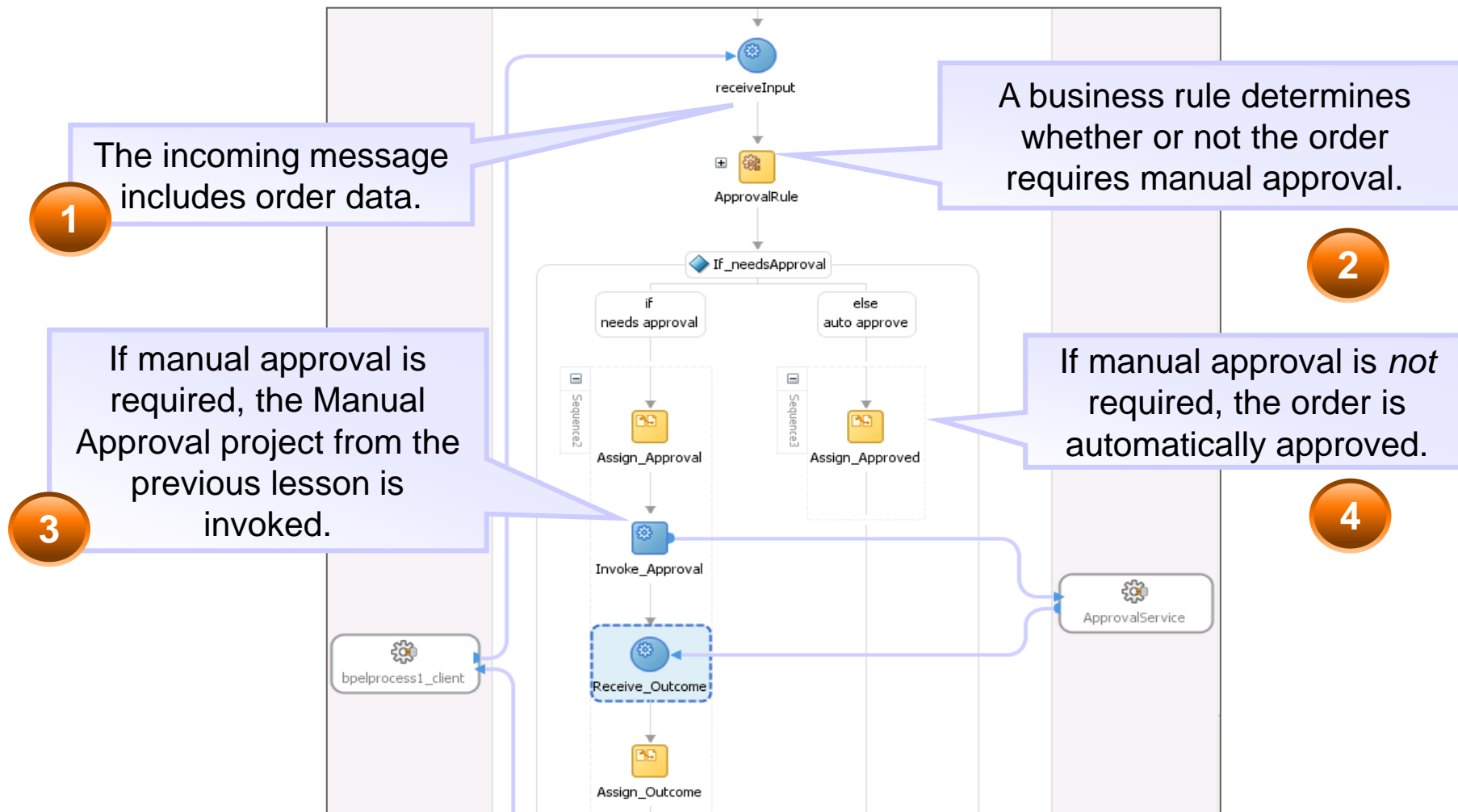
Summary

In this lesson, you should have learned how to:

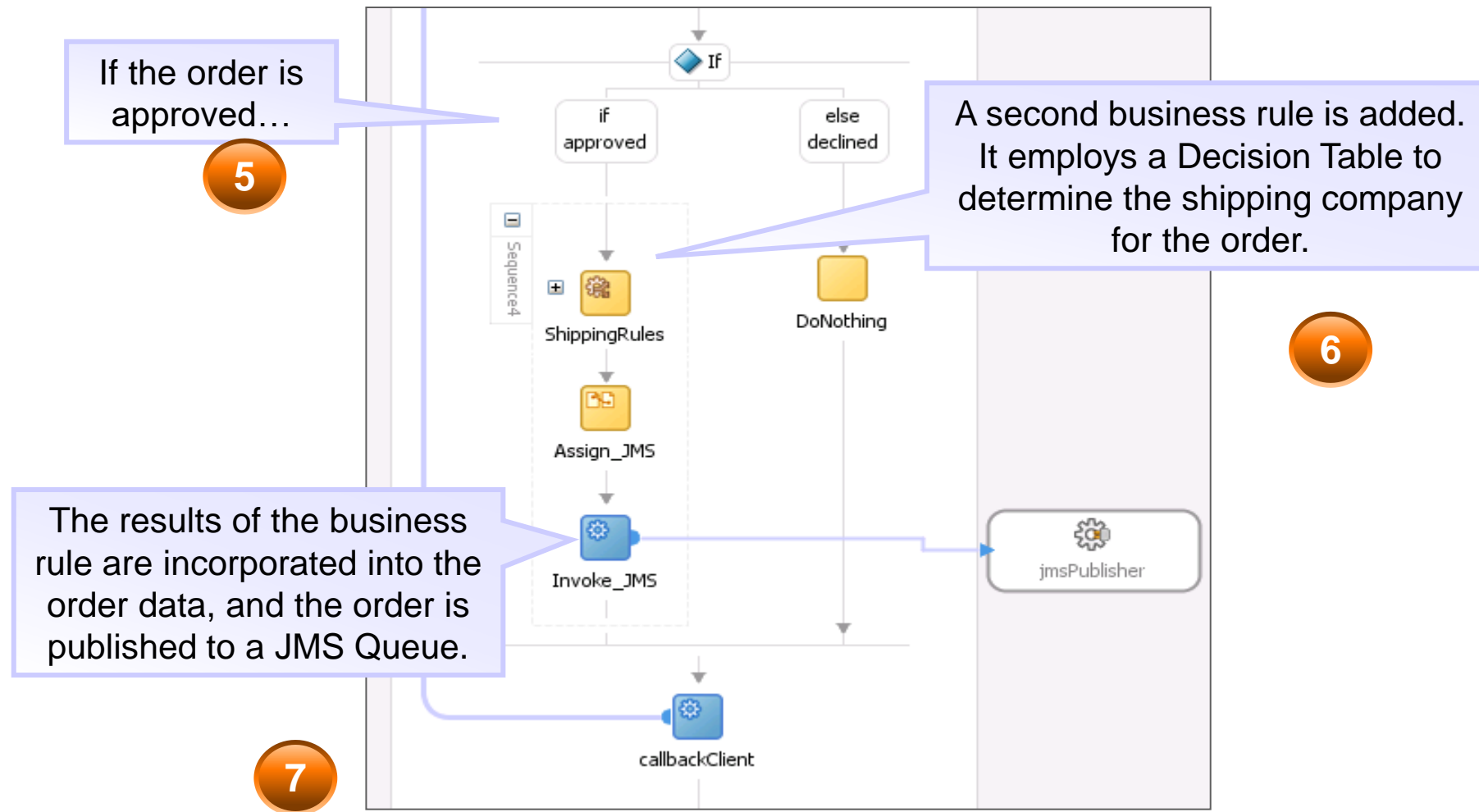
- Describe business rules concepts
- Describe the Oracle Business Rules architecture
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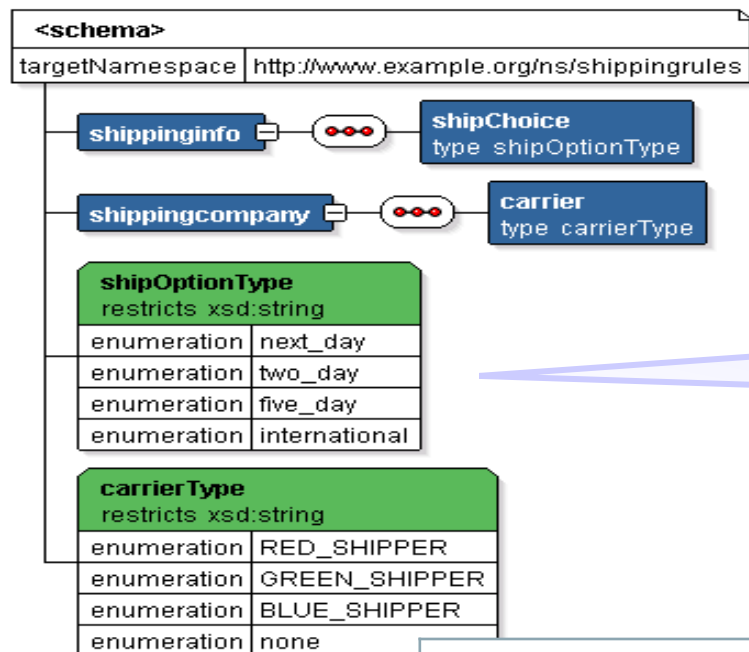
Practice 12-1 to 12-3 Overview



Practice 12-4 to 12-6 Overview



Practice 12-4 to 12-6 Overview



Decision Table	R1	R2	R3
CONDITION If shipChoice	two_day	five_day	next_day or international
ACTION Assert carrier	RedShipper	GreenShipper	BlueShipper

