7

Fundamentals of Oracle SOA Suite

Objectives

After completing this lesson, you should be able to:

- Describe Service-Oriented Architecture (SOA)
- Explain how services communicate
- Describe the functionality of each type of Oracle SOA Suite 12*c* service component

Agenda

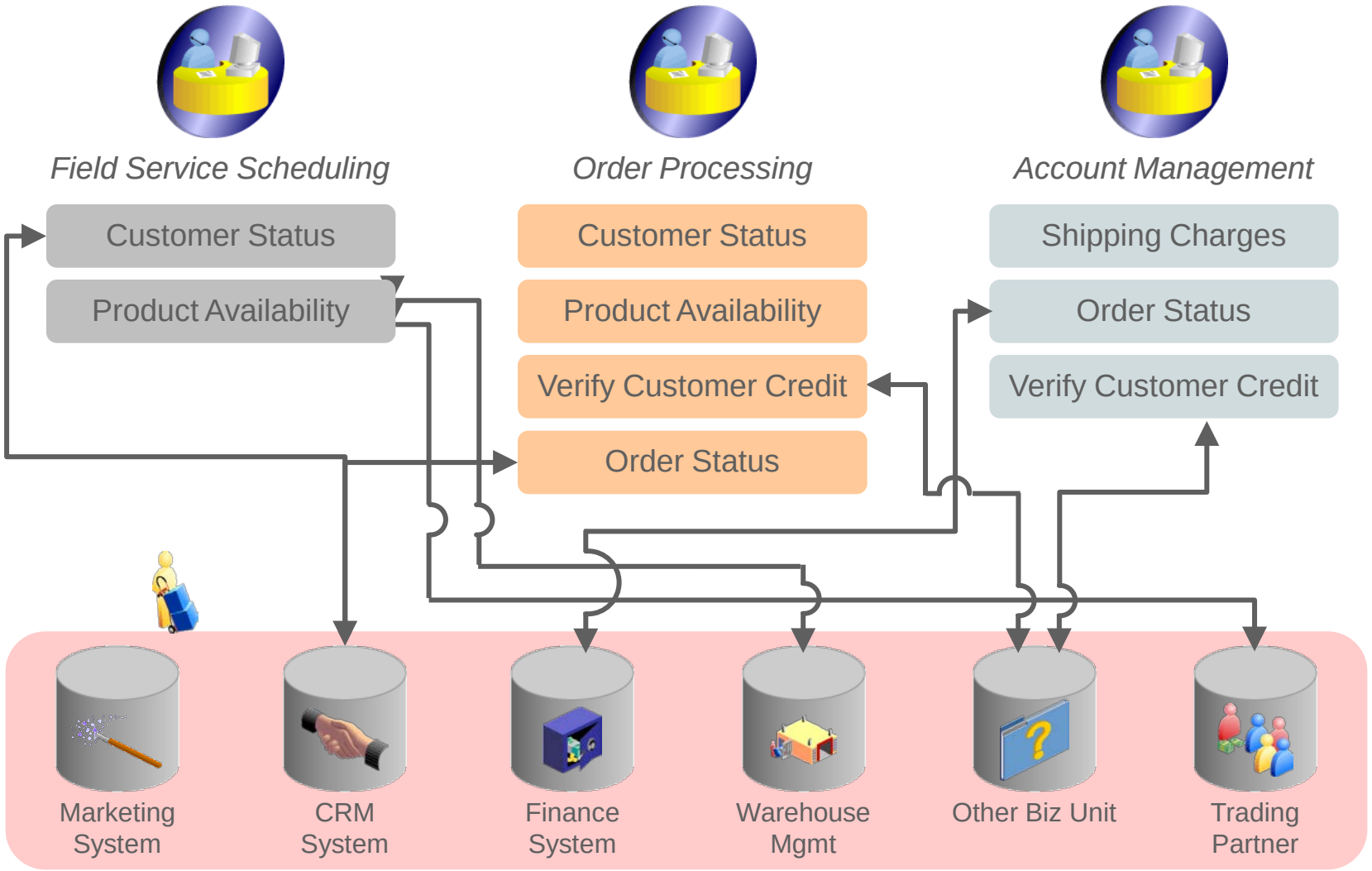
- Service-Oriented Architecture: Overview
- How Services Communicate
- Service Components in a SOA Composite Application
  - Mediator
  - BPEL Process Manager
  - Human Task
  - Business Rules
- Services and References in a SOA Composite Application
  - Web Services
  - Adapters

Understanding Composite Applications

Although details of how composite applications are created and run are generally considered to be the subject for application developers, an understanding of service-oriented architecture, composite applications, and the service components that comprise these applications will serve you, the administrator, well at various times, including when you are:

- Troubleshooting
- Performance tuning
- Managing failed messages and composite instances
- Deploying applications
- Managing the application life cycle

Problem Statement



Definition of SOA

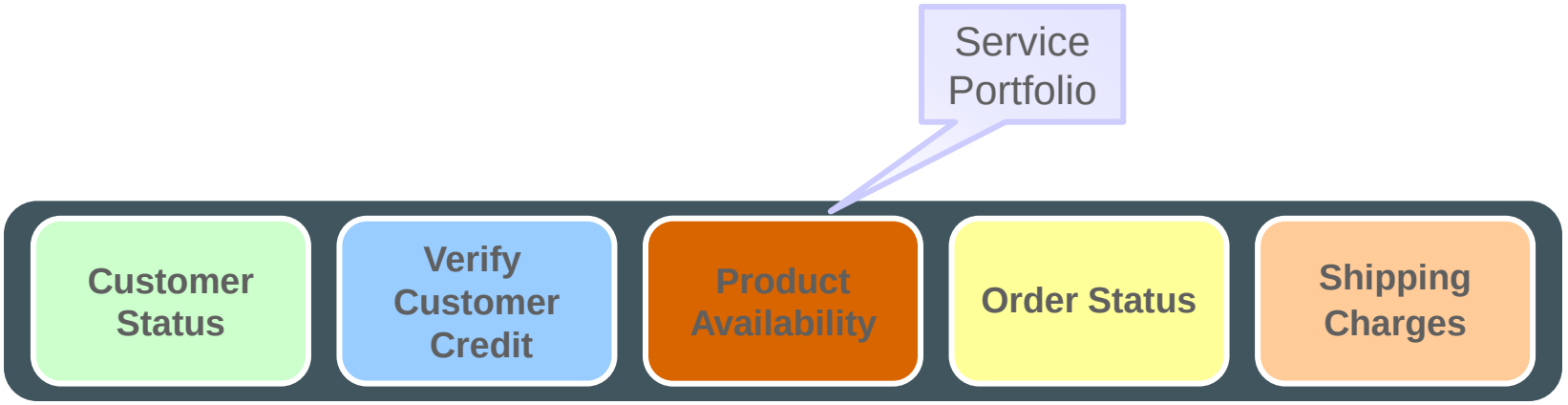
An IT strategy that organizes the discrete functions contained in enterprise applications into interoperable, standards-based services to be combined and reused quickly to meet business requirements.

Building a Service Portfolio

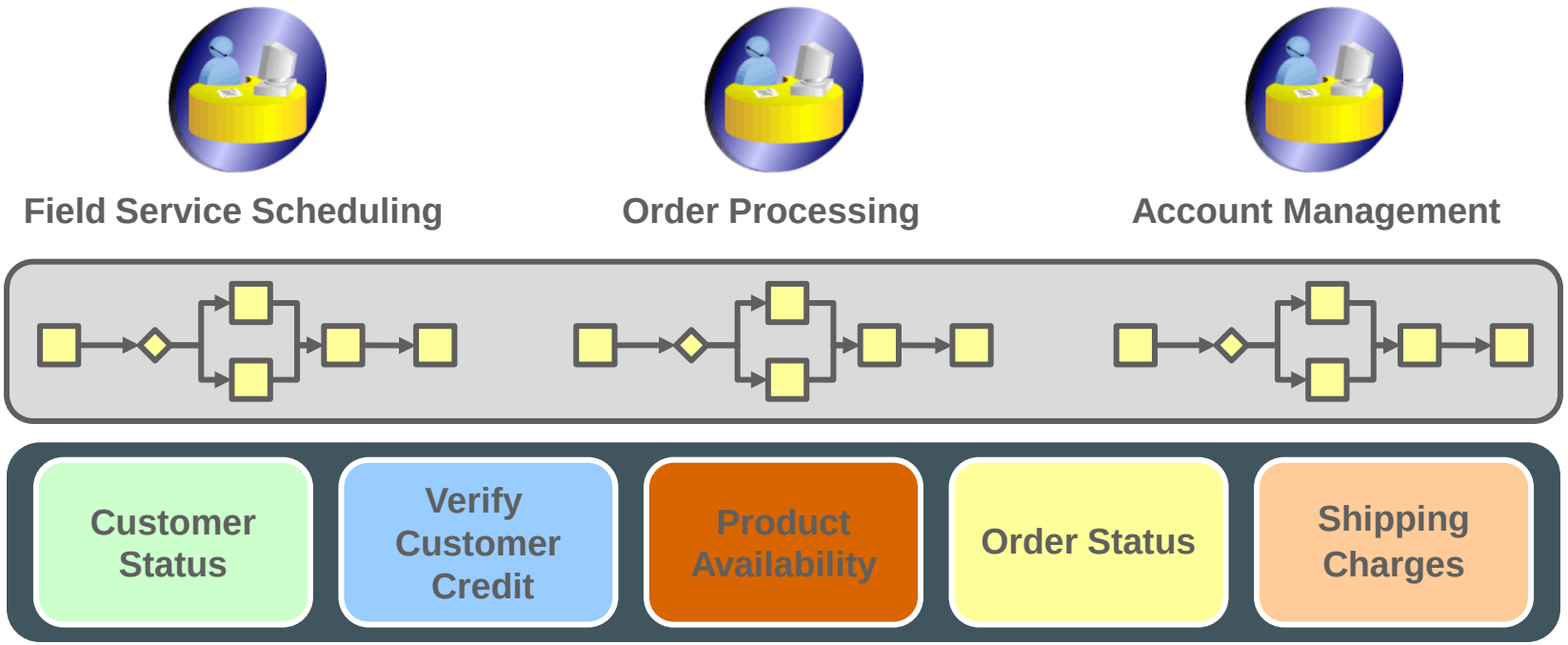
Field Service Scheduling

Order Processing

Account Management



Assembling Services as Composite Applications



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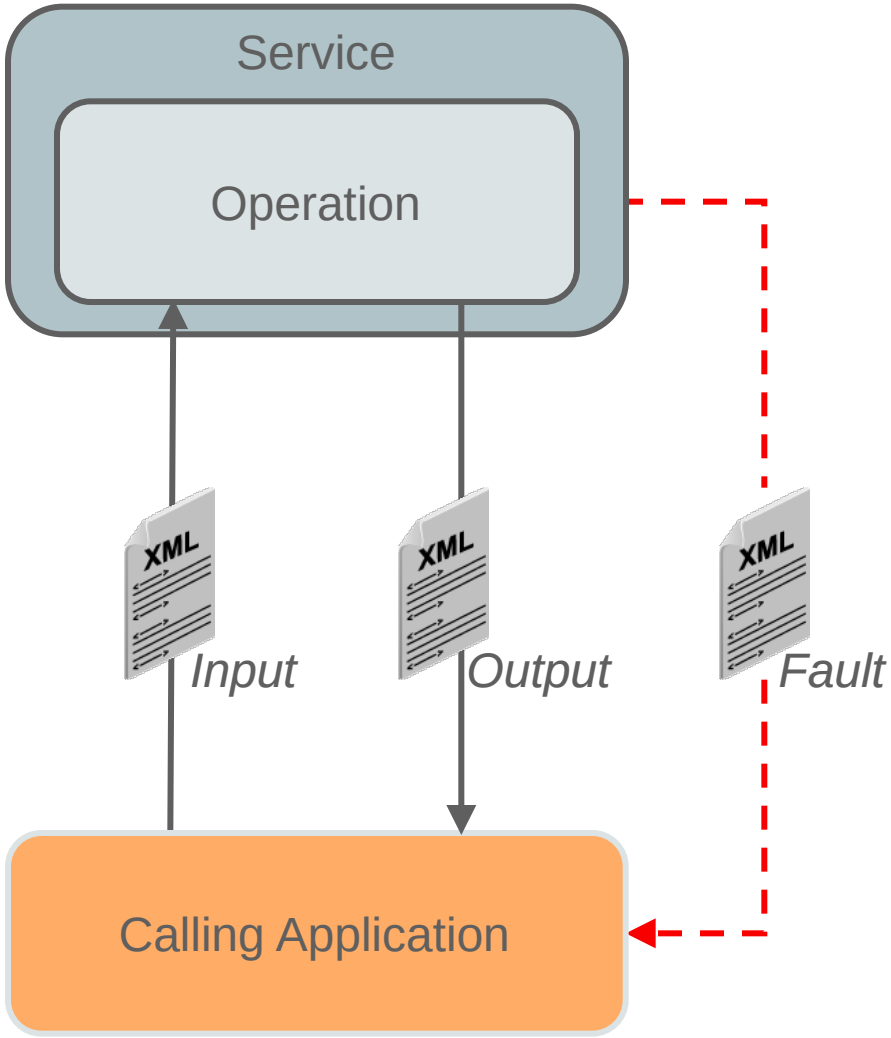
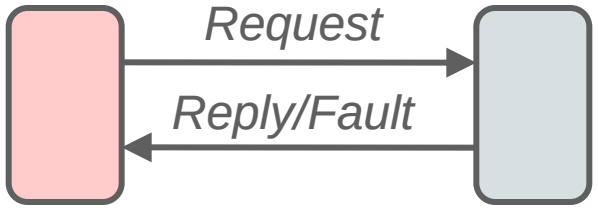
How Services Communicate

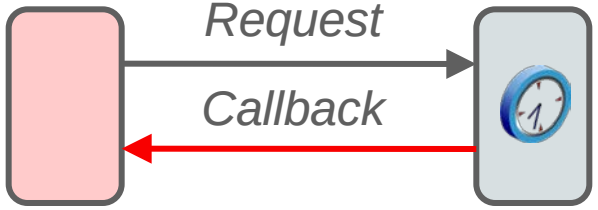


Synchronous and Asynchronous Interactions

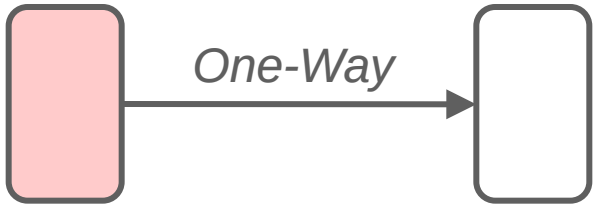
Synchronous request/response
- Real-time response or error feedback
- Client in waiting mode



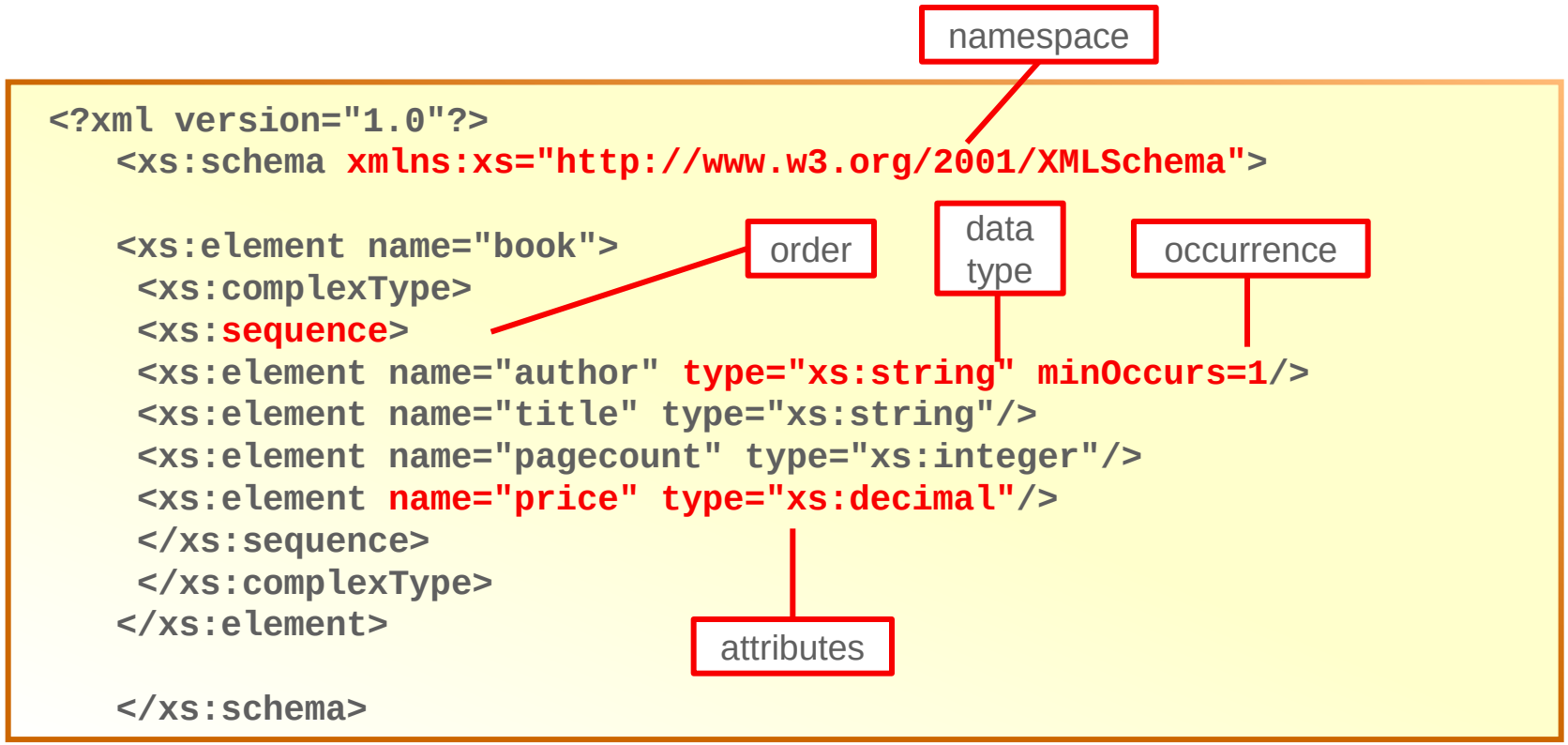
Asynchronous request/callback
- Client freed after request submission
- Separate service invocation for response



Asynchronous request only
- Also known as “fire and forget”
- Client freed after request submission
- No response message (ACK only)



Describing a Message with XSD

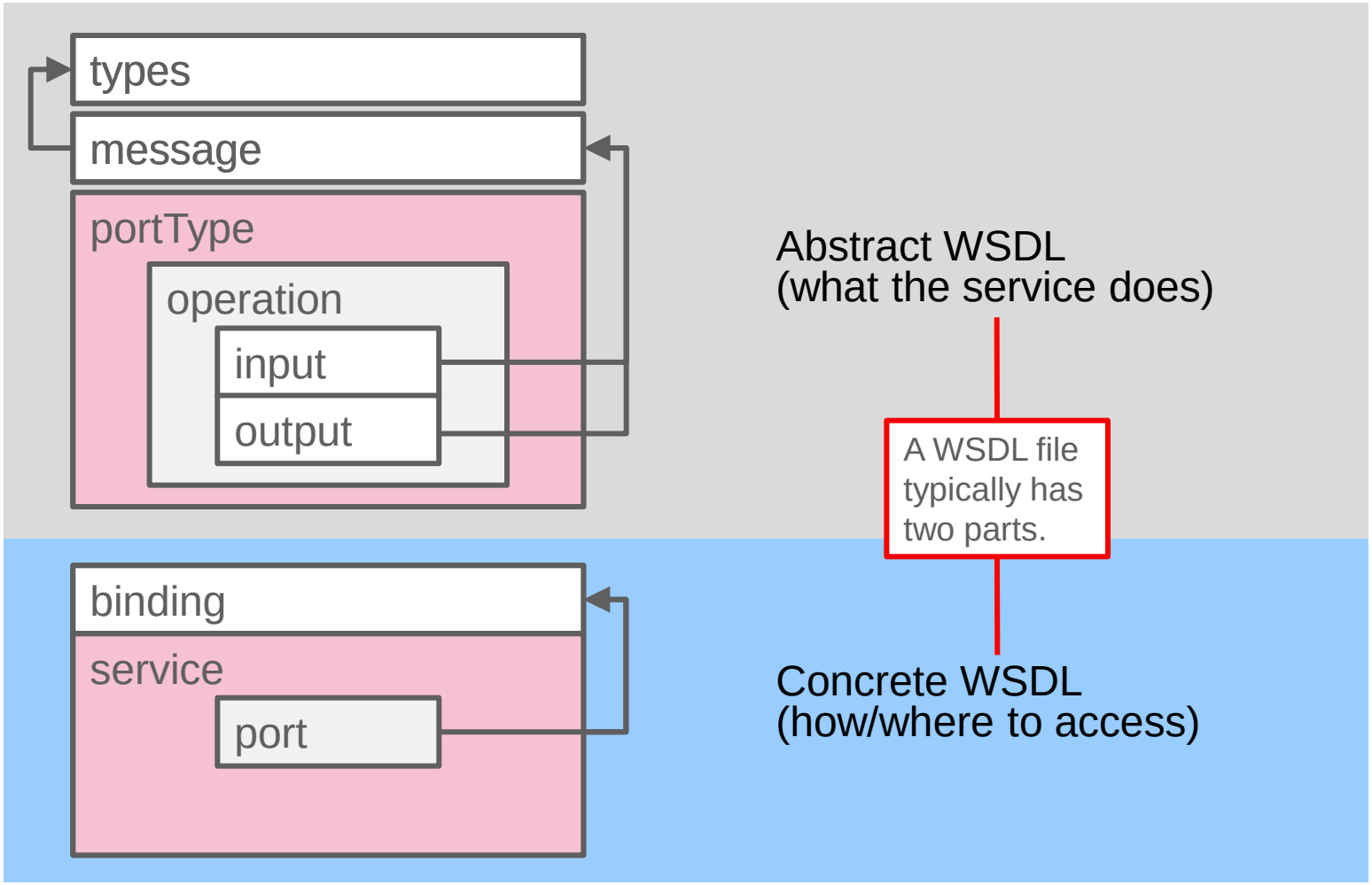



```
<?xml version="1.0"?>
   <xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">

   <xs:element name="book">
    <xs:complexType>
    <xs:sequence>
    <xs:element name="author" type="xs:string" minOccurs=1/>
    <xs:element name="title" type="xs:string"/>
    <xs:element name="pagecount" type="xs:integer"/>
    <xs:element name="price" type="xs:decimal"/>
    </xs:sequence>
    </xs:complexType>
   </xs:element>

   </xs:schema>
```

Web Services Description Language



Abstract WSDL

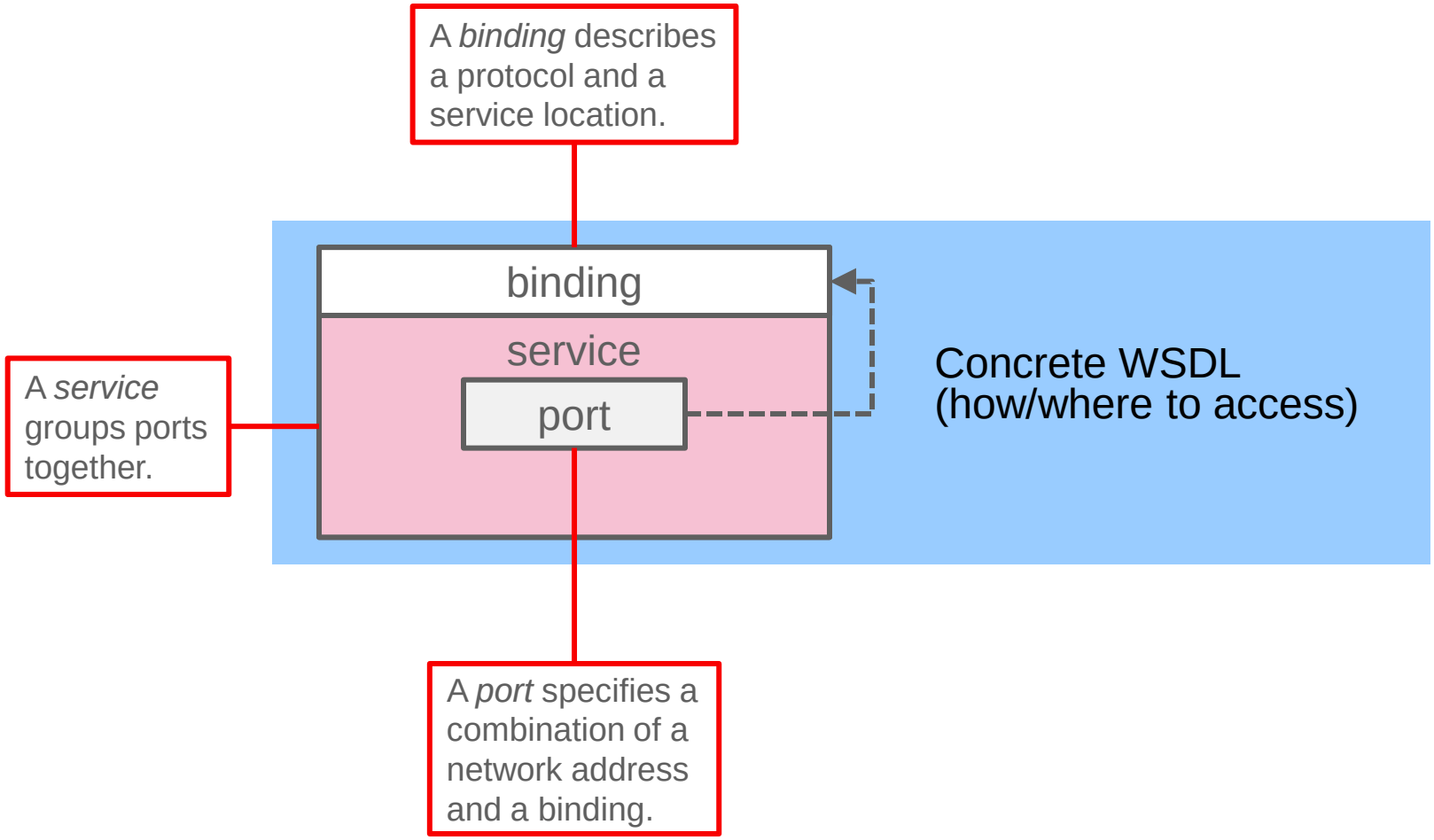
```
<?xml version= '1.0' encoding= 'UTF-8' ?>
<wsdl:definitions
 name="ReceiveData"
    targetNamespace="http://oracle.com/sca/soapservice/Basics/HelloWorld/ReceiveData"
 xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
 xmlns:inp1="http://www.example.org/ns/porder"
 xmlns:tns="http://oracle.com/sca/soapservice/Basics/HelloWorld/ReceiveData"
 >
  <wsdl:types>
  <schema xmlns="http://www.w3.org/2001/XMLSchema" >
    <import namespace="http://www.example.org/ns/porder" schemaLocation="xsd/po.xsd"
     />
  </schema>
  </wsdl:types>
  <wsdl:message name="requestMessage">
    <wsdl:part name="part1" element="inp1:PurchaseOrder"/>
  </wsdl:message>
  <wsdl:portType name="execute_ptt">
    <wsdl:operation name="execute">
      <wsdl:input message="tns:requestMessage"/>
    </wsdl:operation>
  </wsdl:portType>
</wsdl:definitions>
```

1

2

3

Concrete WSDL



Quiz

Abstract and concrete WSDLs are two separate but related files that describe the conversation between a service and the calling application.

a. True
b. False

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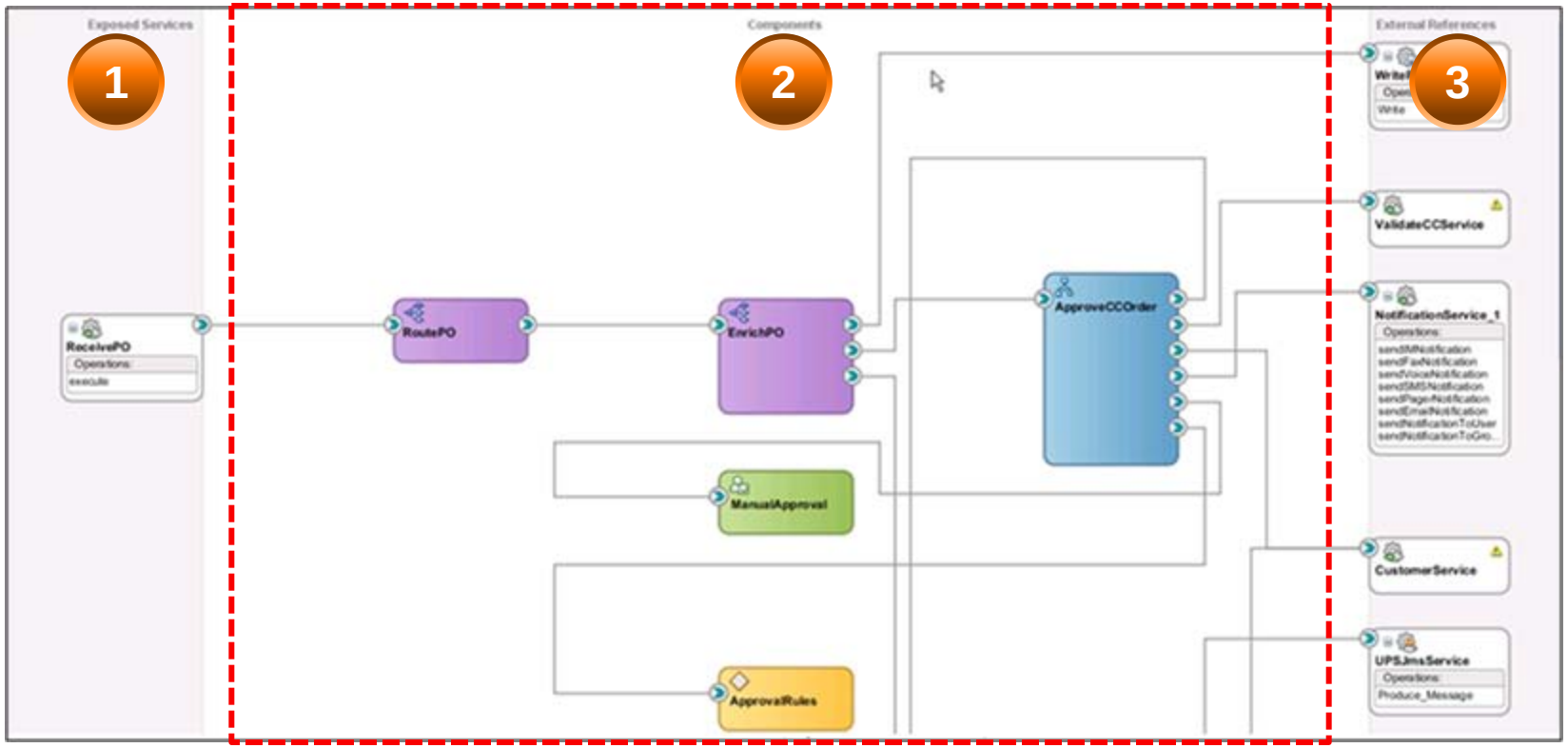
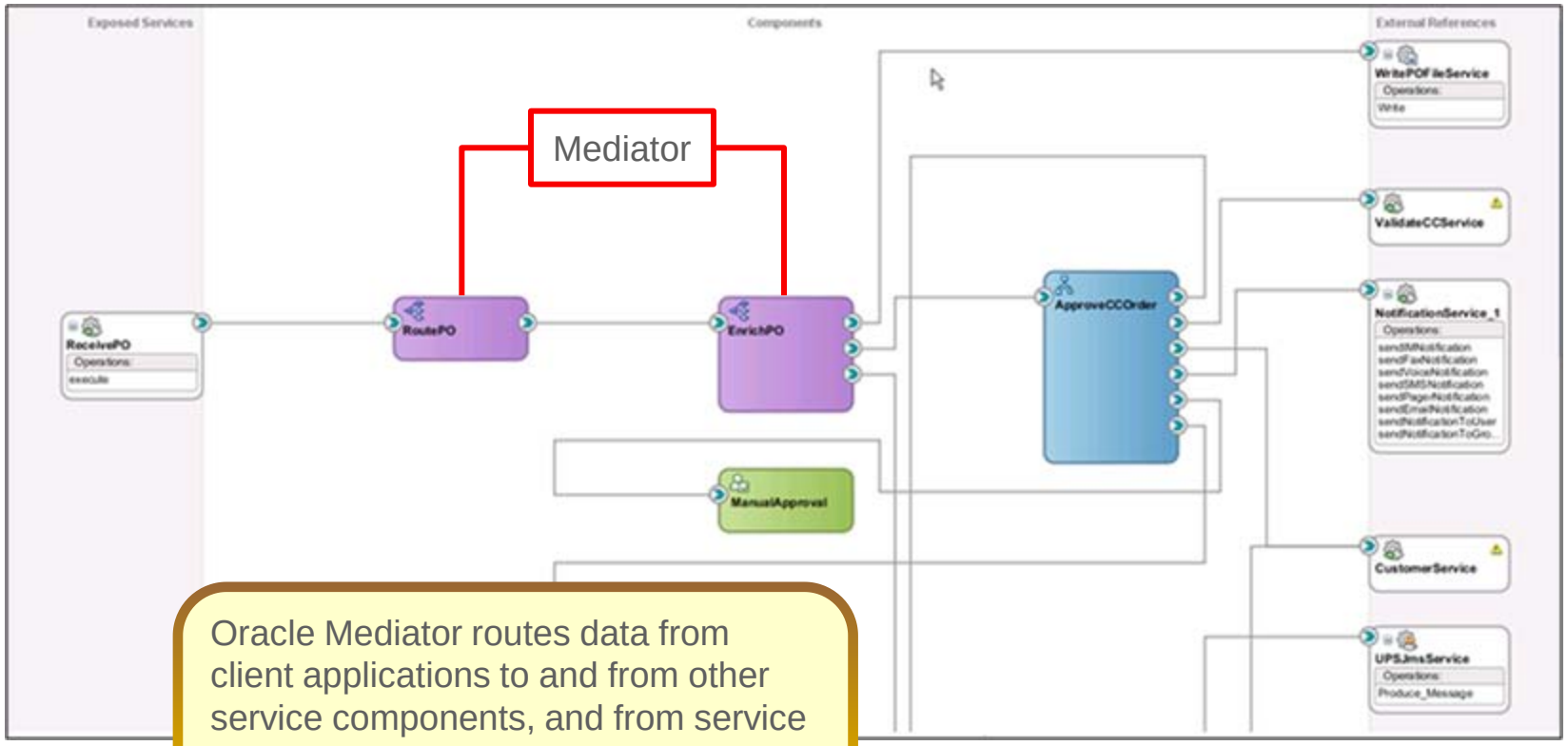
Elements of a SOA Composite Application

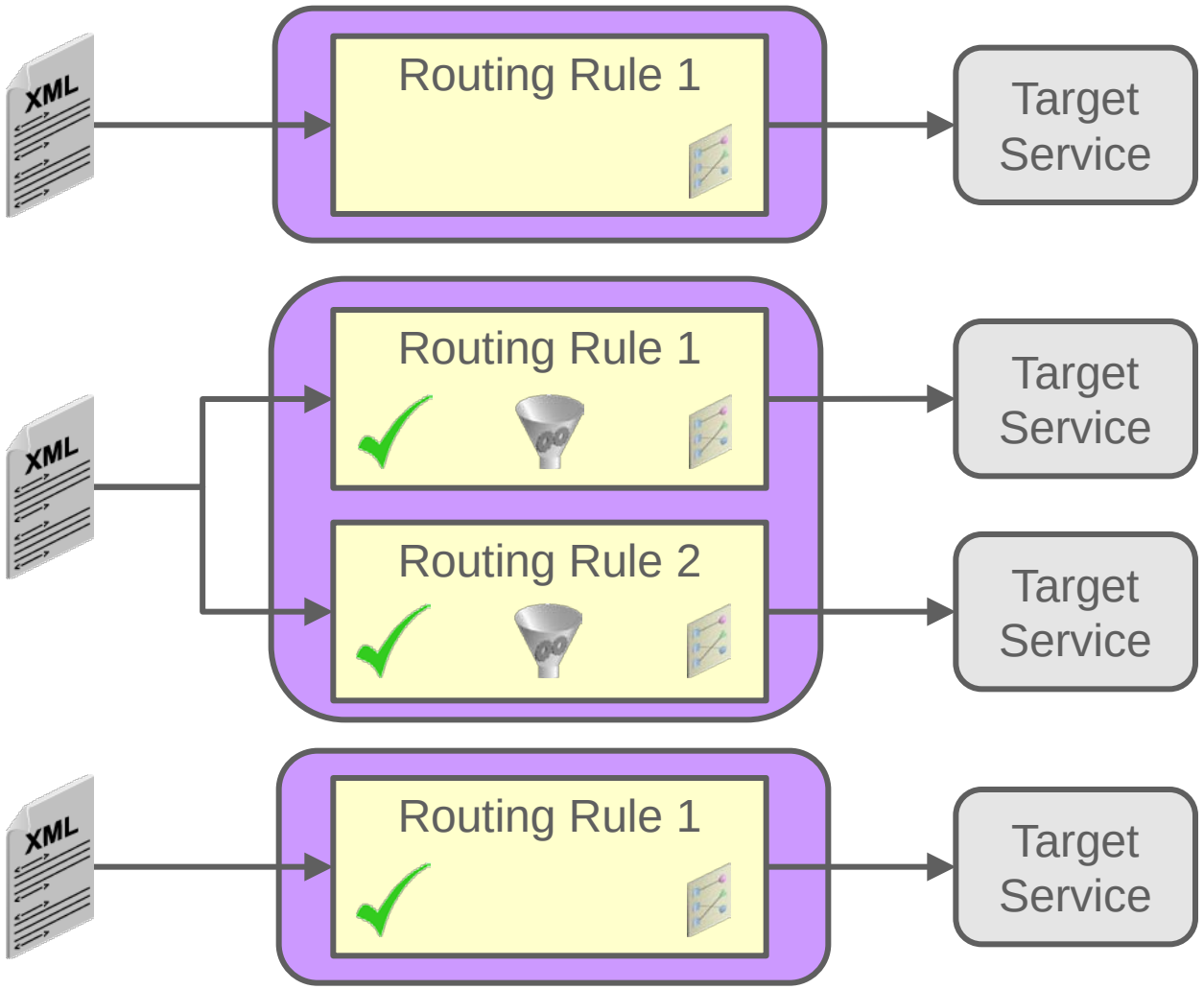


SOA Components: Oracle Mediator

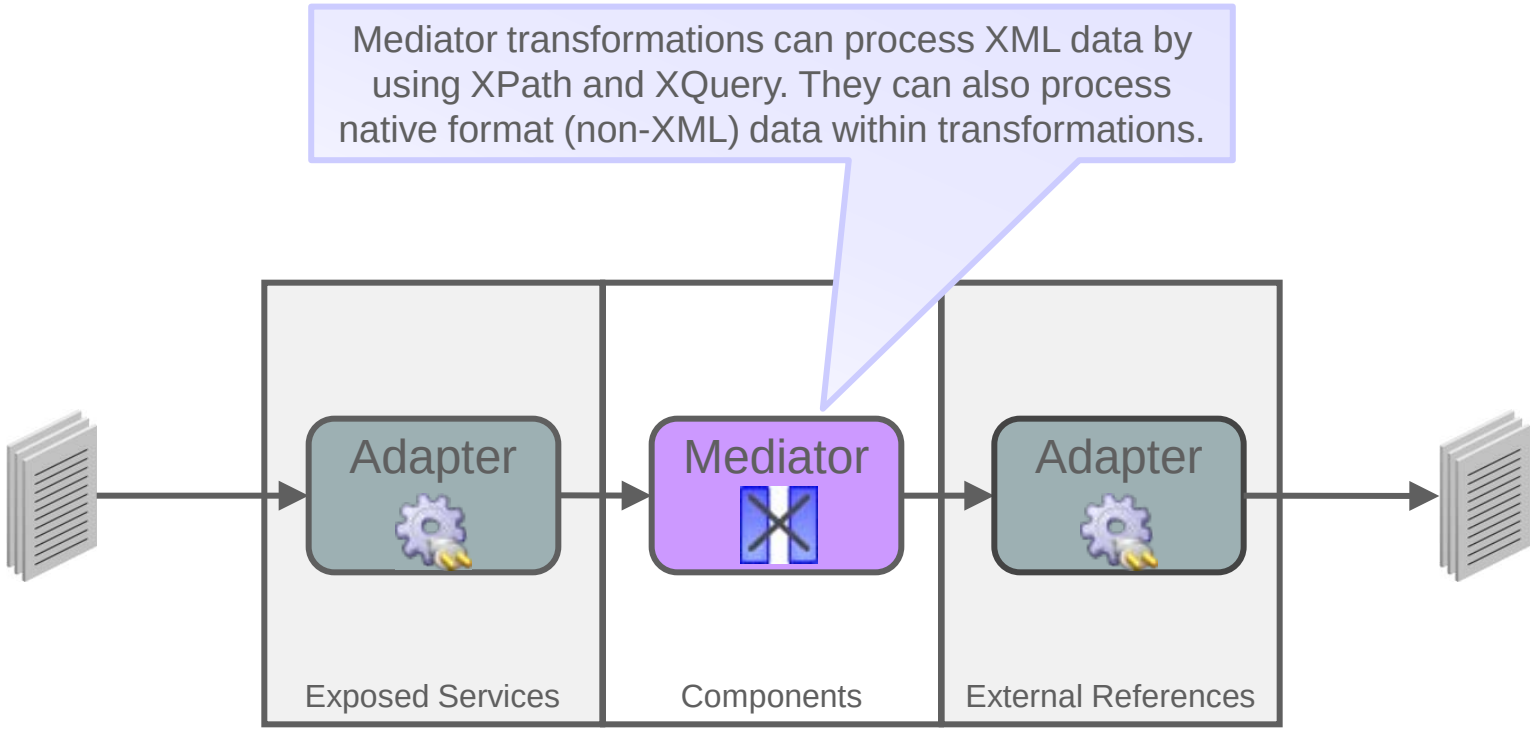


Oracle Mediator routes data from client applications to and from other service components, and from service components to external partners.
It provides validation, filtering, routing, and transformation capabilities.

Routing Data



Transforming Data



Additional Features of Mediators

Mediators provide the following additional features:

- Error routing and management
  - Mediator components support fault policy–based error handling. A fault policy consists of conditions and actions. Conditions specify the action to be carried out for a particular error condition.
- Event Handling
  - Mediator components provide support for subscribing to or publishing business events delivered through the Oracle SOA Suite 12*c* Event Delivery Network (EDN).

Quiz

Which Mediator Component feature enables target services to receive data in their desired format?

a. Filter expression
b. XSL Transformation
c. Validation
d. Routing rule

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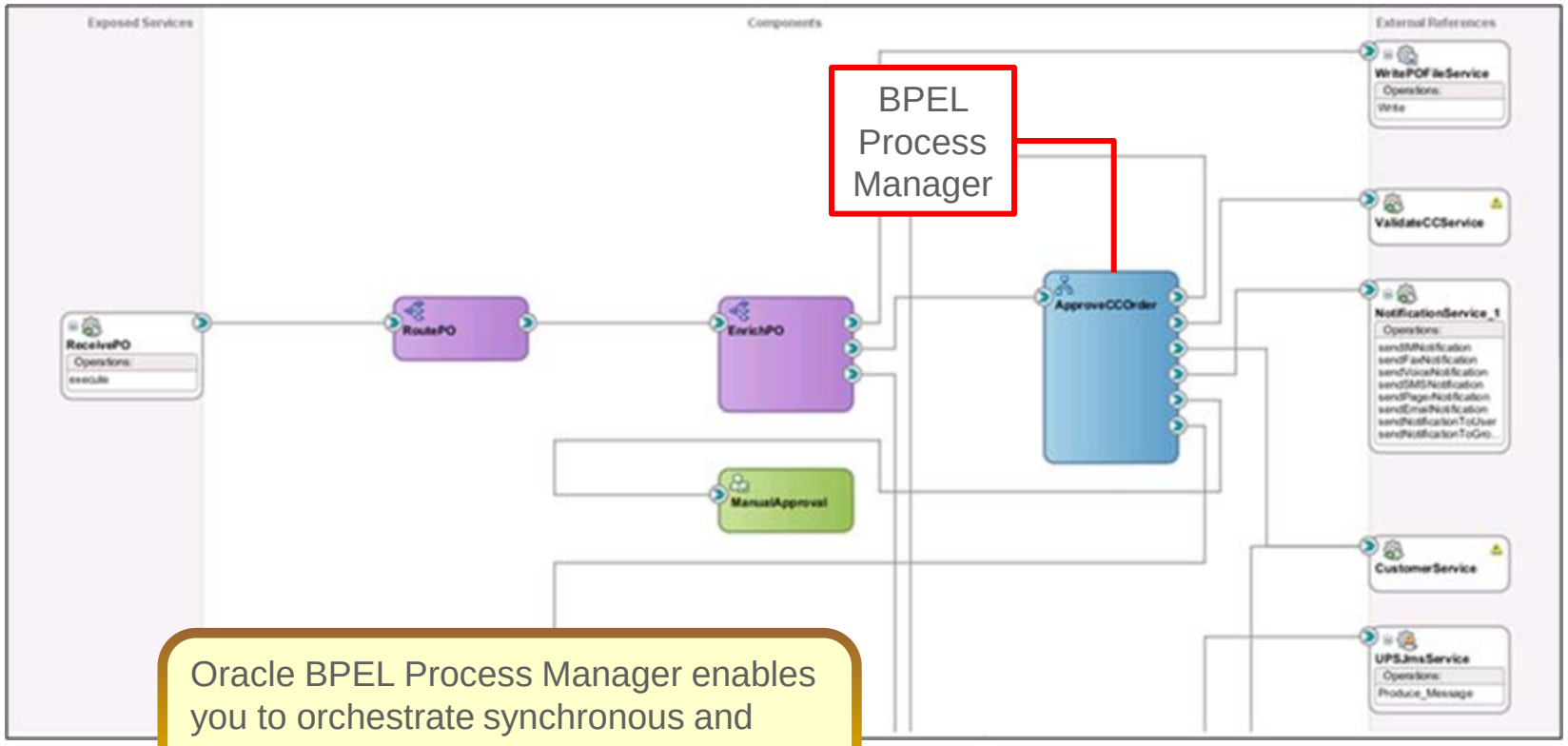
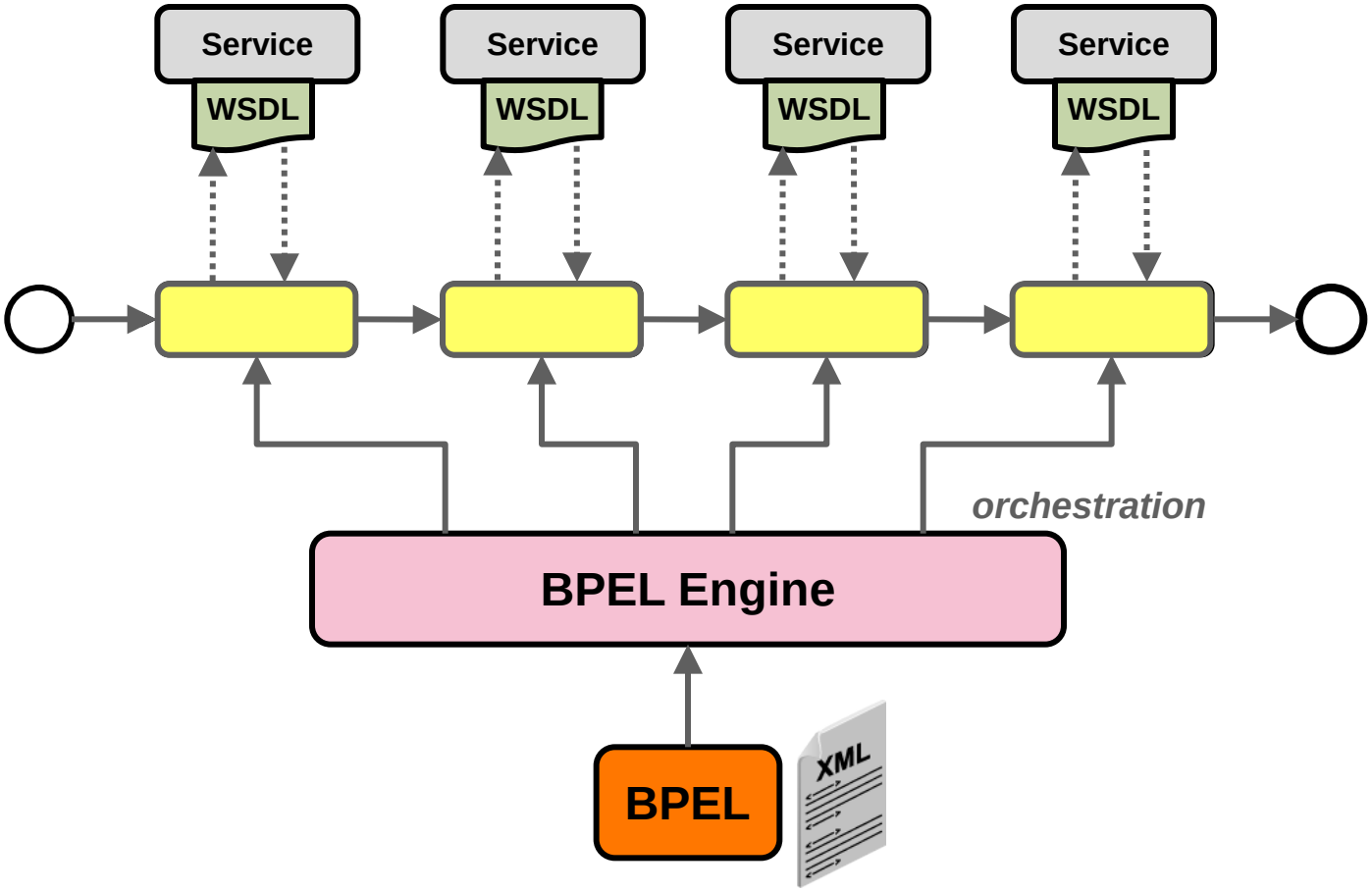
SOA Components: Oracle BPEL Process Manager

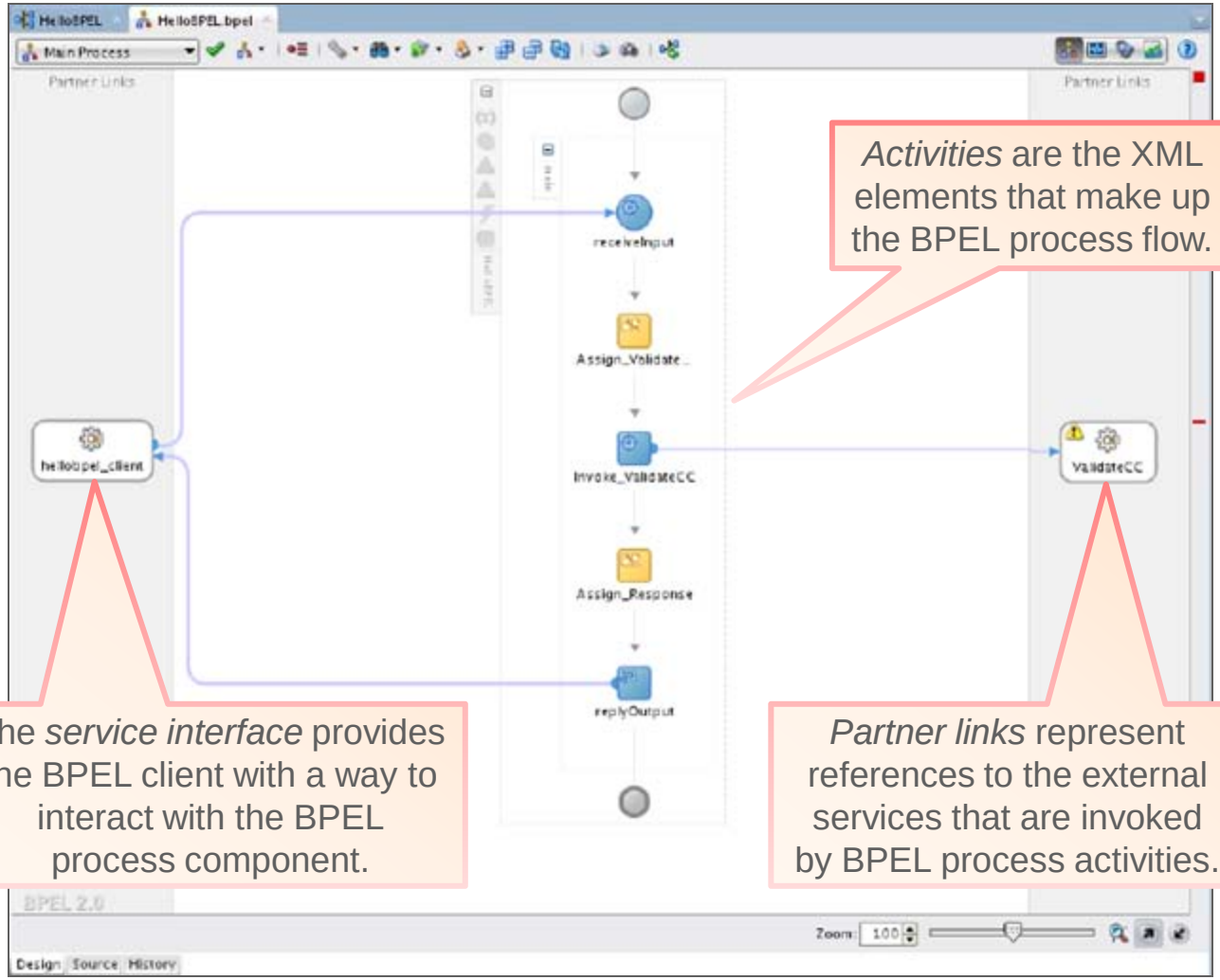


Oracle BPEL Process Manager enables you to orchestrate synchronous and asynchronous services into end-to-end BPEL process flows.

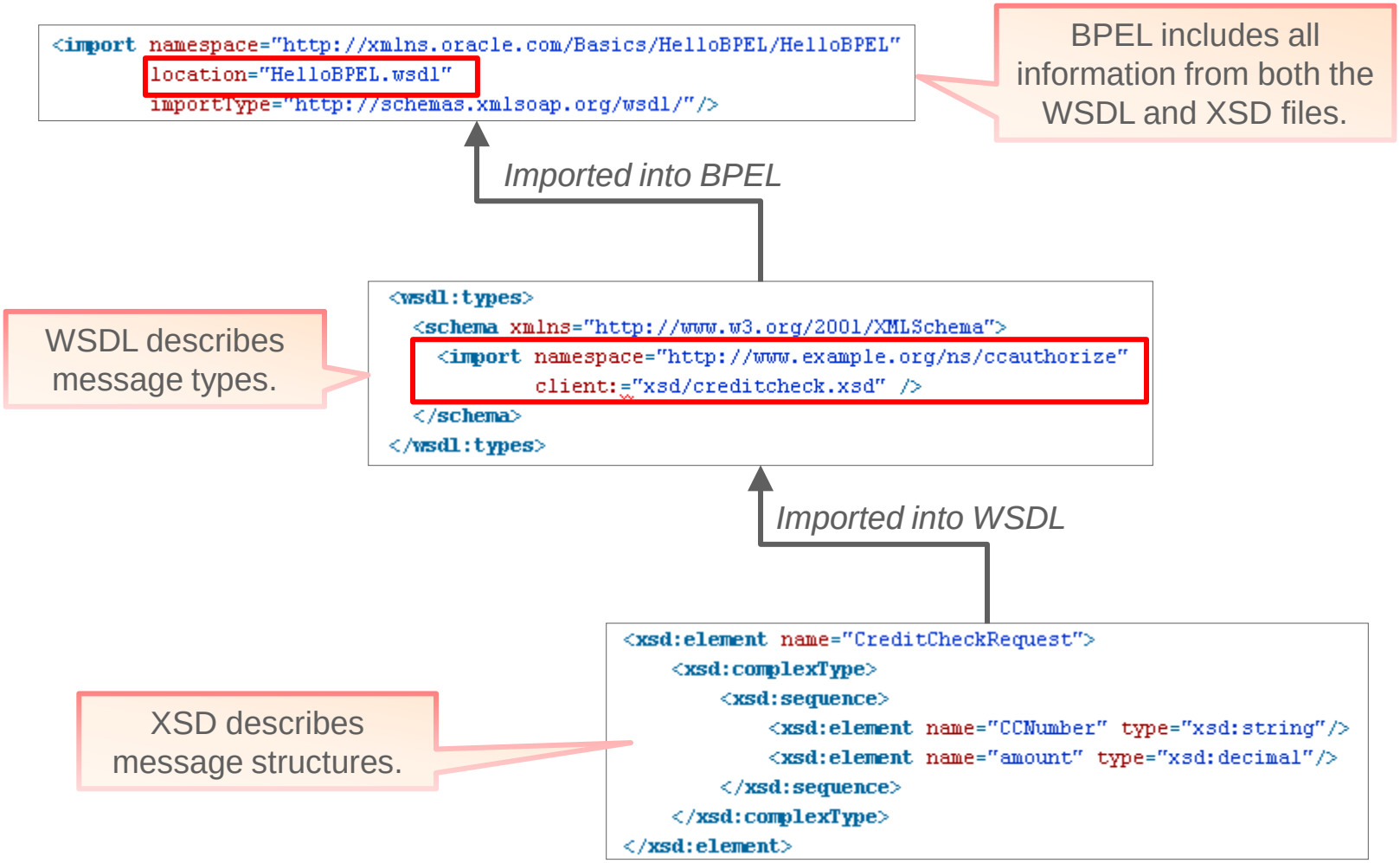
Business Processes and BPEL



Parts of a BPEL Process



BPEL, WSDL, and XSD



Partners, PartnerLinks, and Roles

BPEL **partnerLink**

```
<partnerLinks>
  <!--
    The 'client' role represents the requester of this service. It is
    used for callback. The location and correlation information associated
    with the client role are automatically set using WS-Addressing.
  -->
  <partnerLink name="hellobpel_client" partnerLinkType="client:HelloBPEL" myRole="HelloBPELProvider"/>
  <partnerLink name="ValidateCC" partnerLinkType="nsl:validateCC_ptt_PL"
               partnerRole="validateCC_ptt_Role"/>
</partnerLinks>
```

WSDL **partnerLinkType**

```
<!-- ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
PARTNER LINK TYPE DEFINITION
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ -->
<plnk:partnerLinkType name="HelloBPEL">
  <plnk:role name="HelloBPELProvider" portType="client:HelloBPEL"/>
</plnk:partnerLinkType>
```

```
<plnk:partnerLinkType name="validateCC_ptt_PL">
    <plnk:role name="validateCC_ptt_Role" portType="tns:validateCC_ptt"/>
</plnk:partnerLinkType>
```

Quiz

In a BPEL process, a partner link describes:

a. The roles played during the interaction between the BPEL process and the service that it invokes
b. The BPEL process operation and the associated request and response message structures
c. The contract between a business process and the partner services
d. The standard for assembling a set of discrete services into an end-to-end process flow

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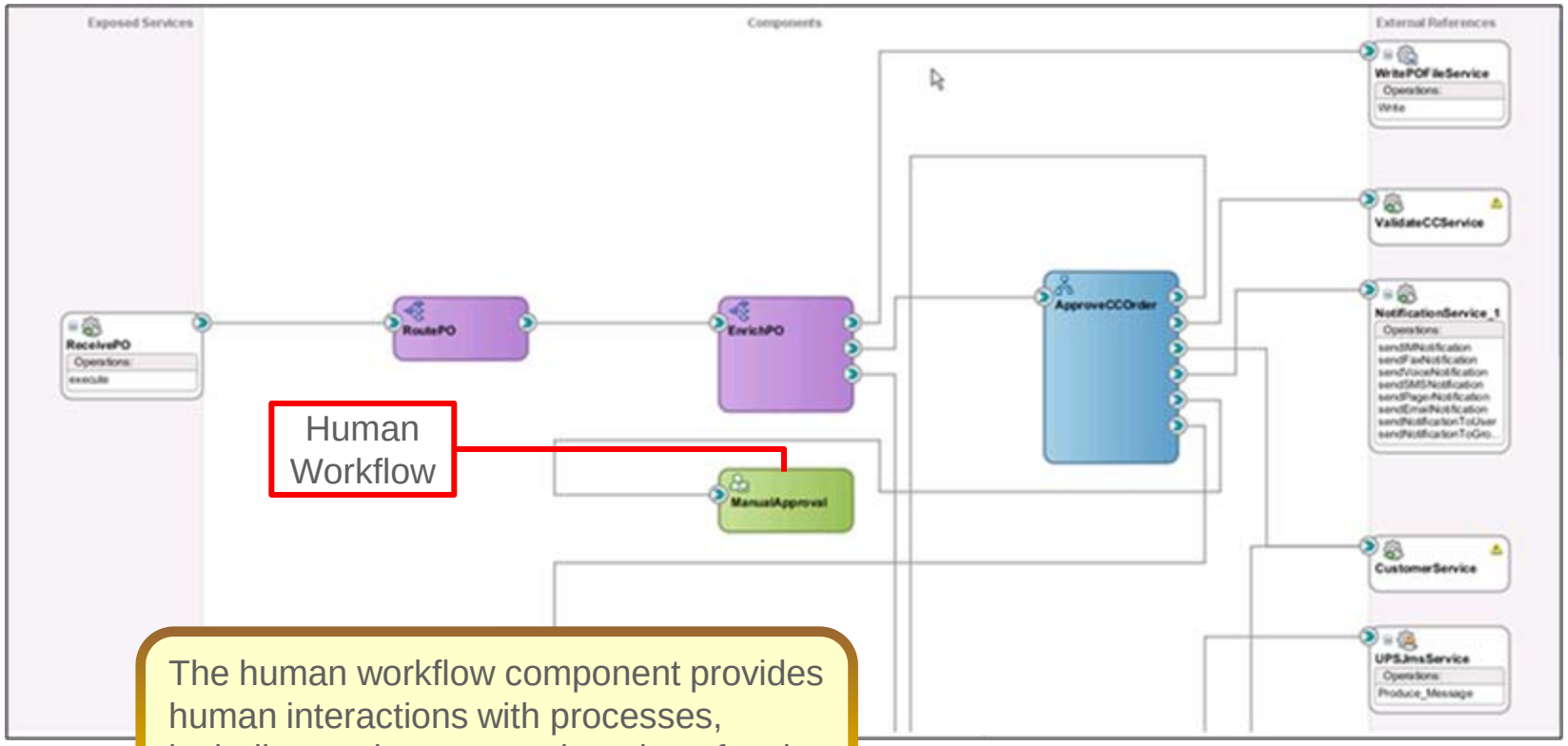
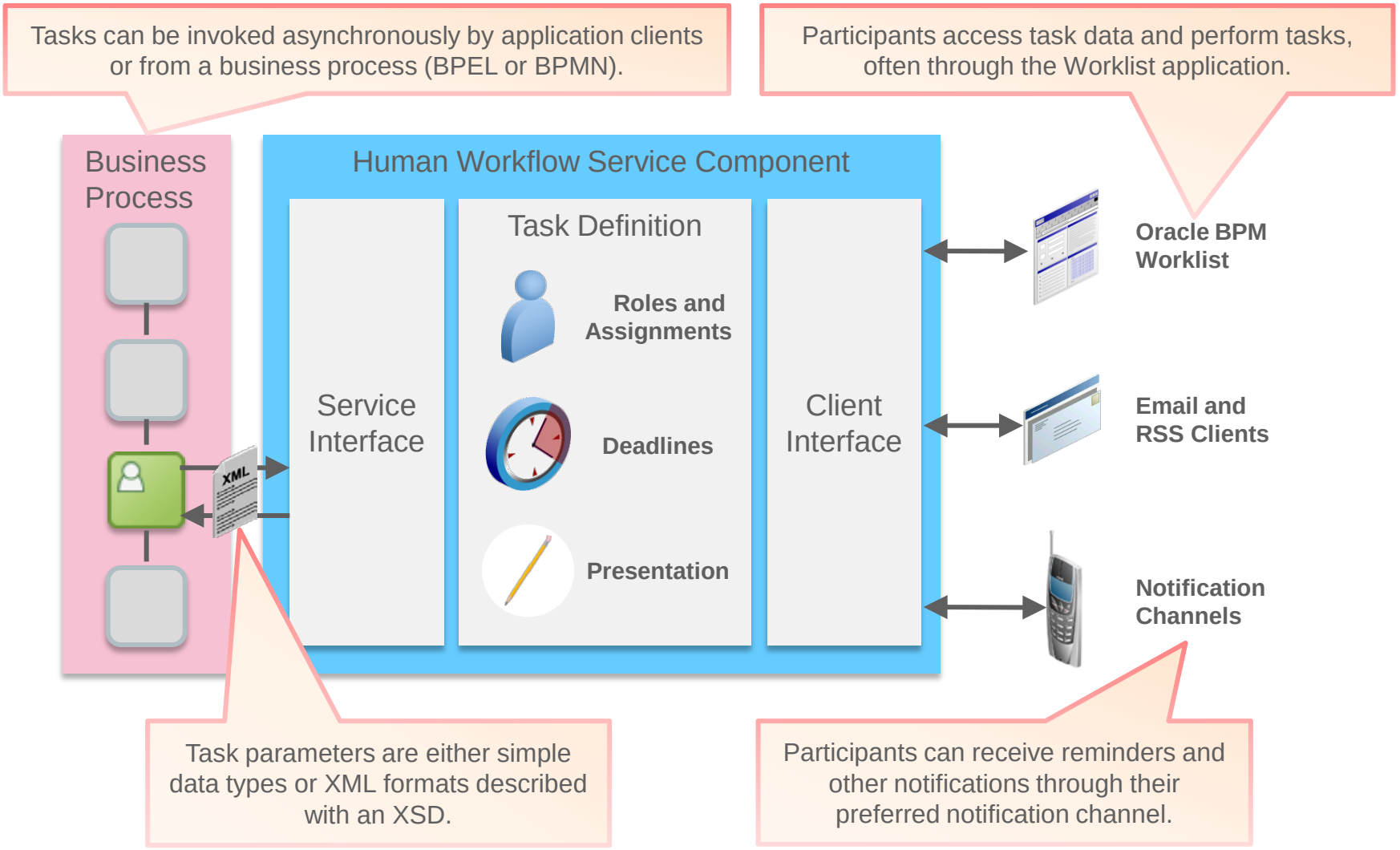
SOA Components: Oracle Human Workflow

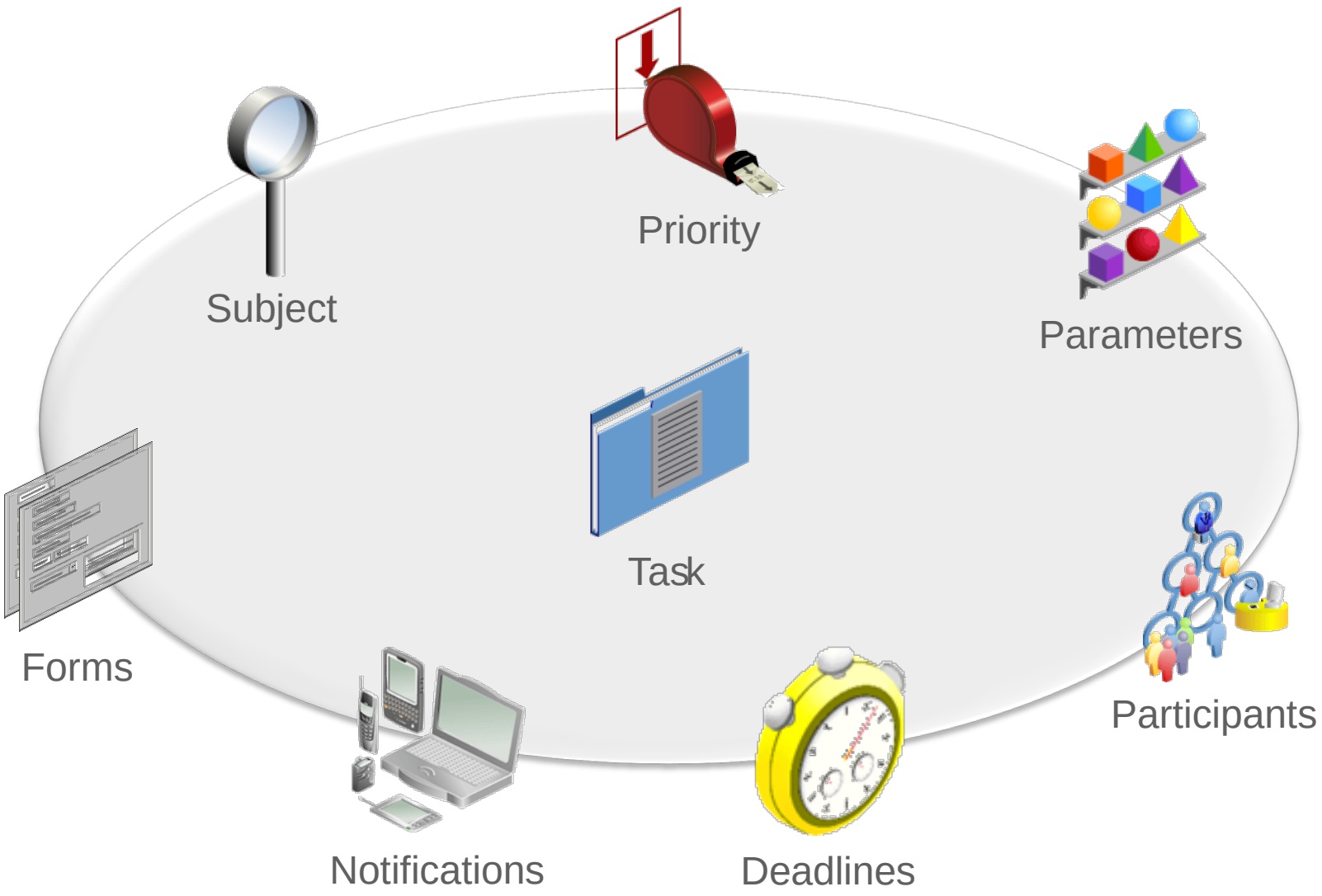


The human workflow component provides human interactions with processes, including assignment and routing of tasks to the correct users or groups.

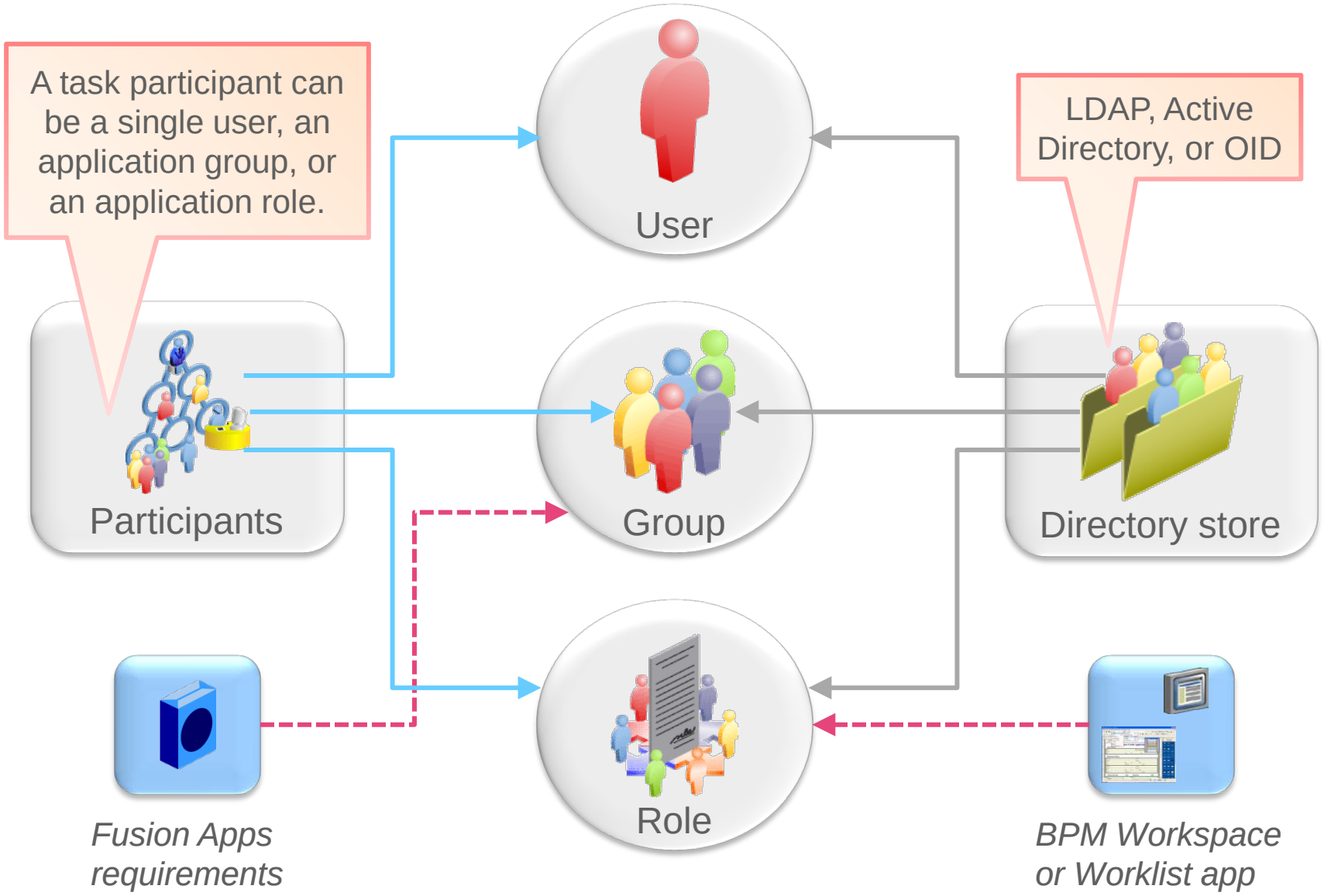
Human Workflow Service Component



Facets of a Task



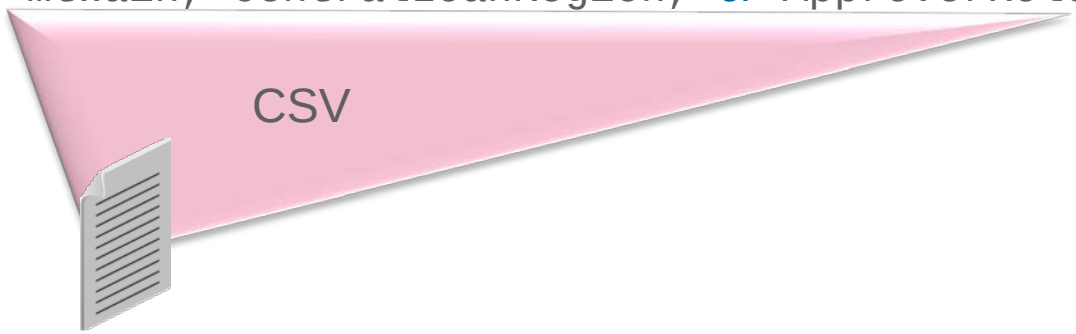
Task Participants



Task Routing

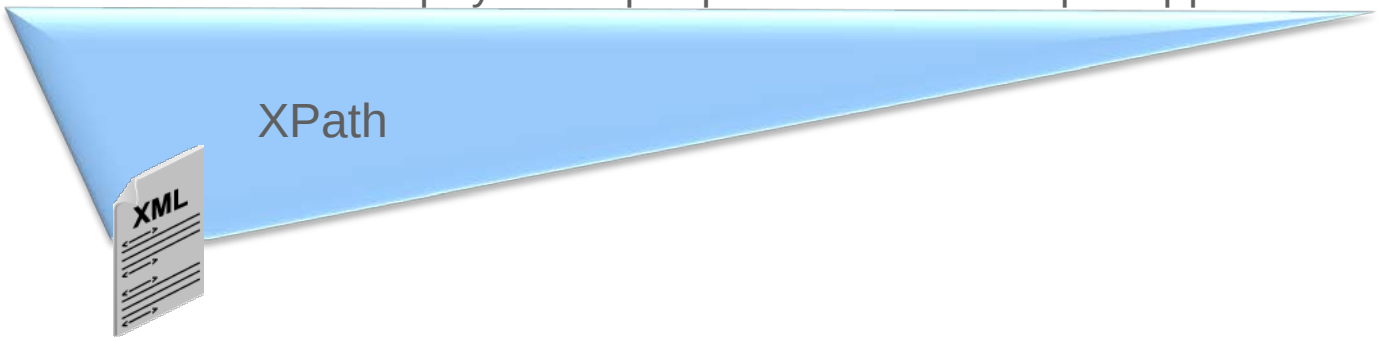
Static

```
mtwain, CentralLoanRegion, or ApproverRole
```

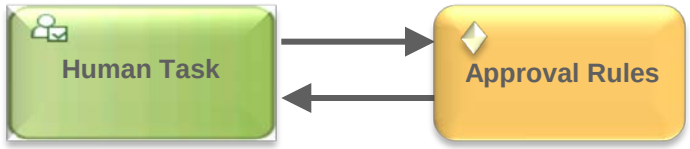


Dynamic

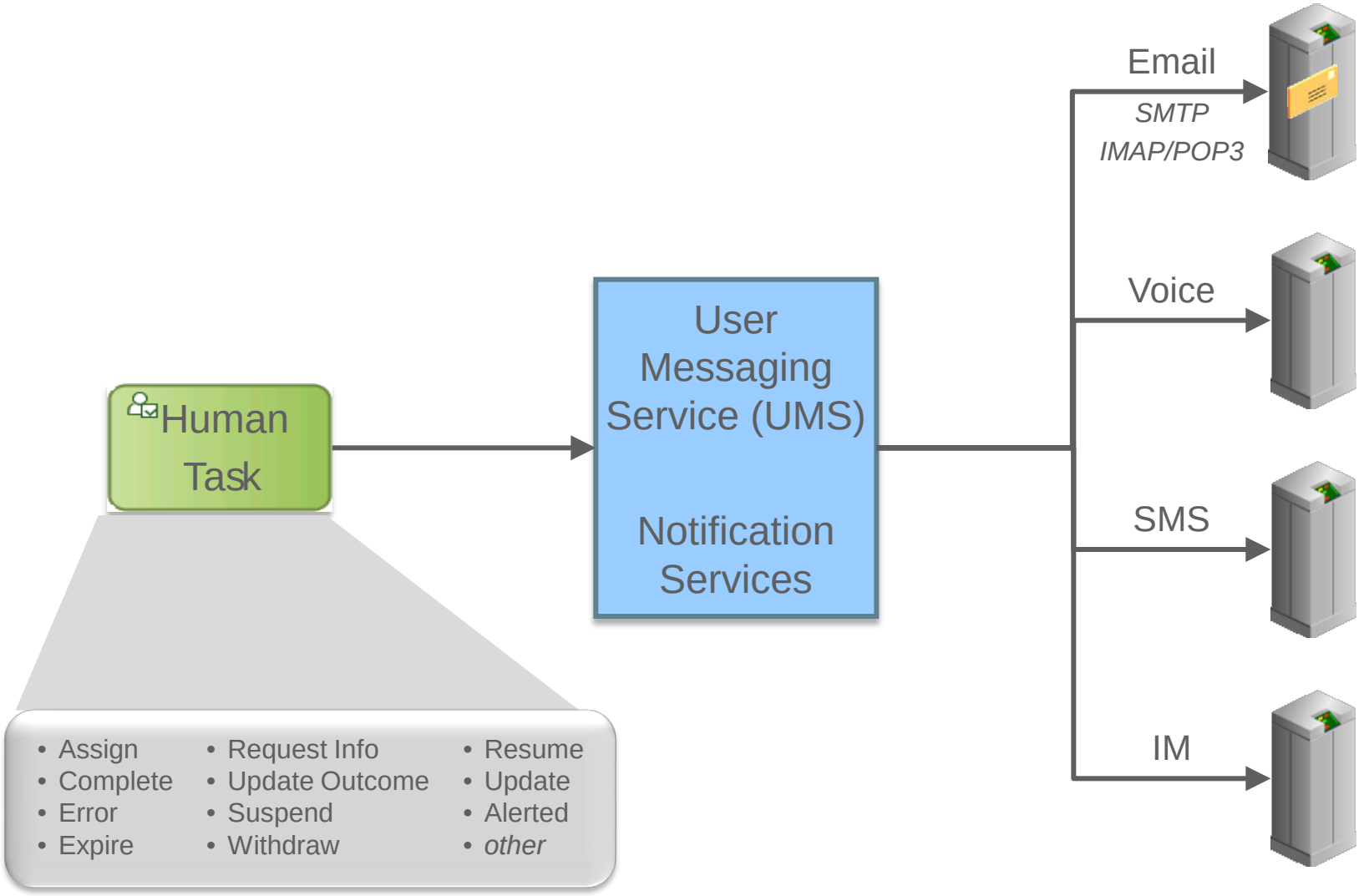
```
/task:task/task:payload/po:purchaseOrder/po:approvers
```



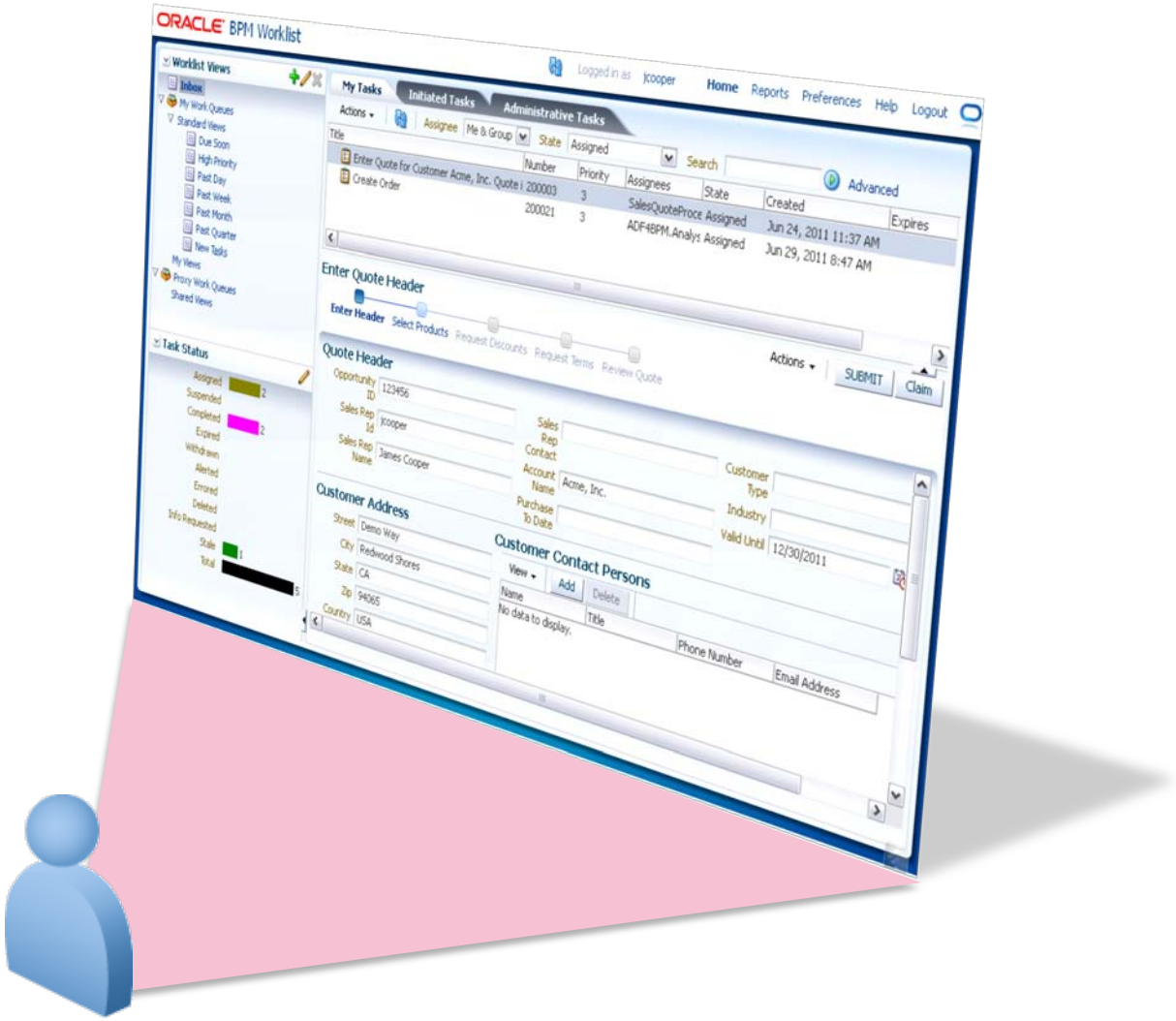
Rule-based



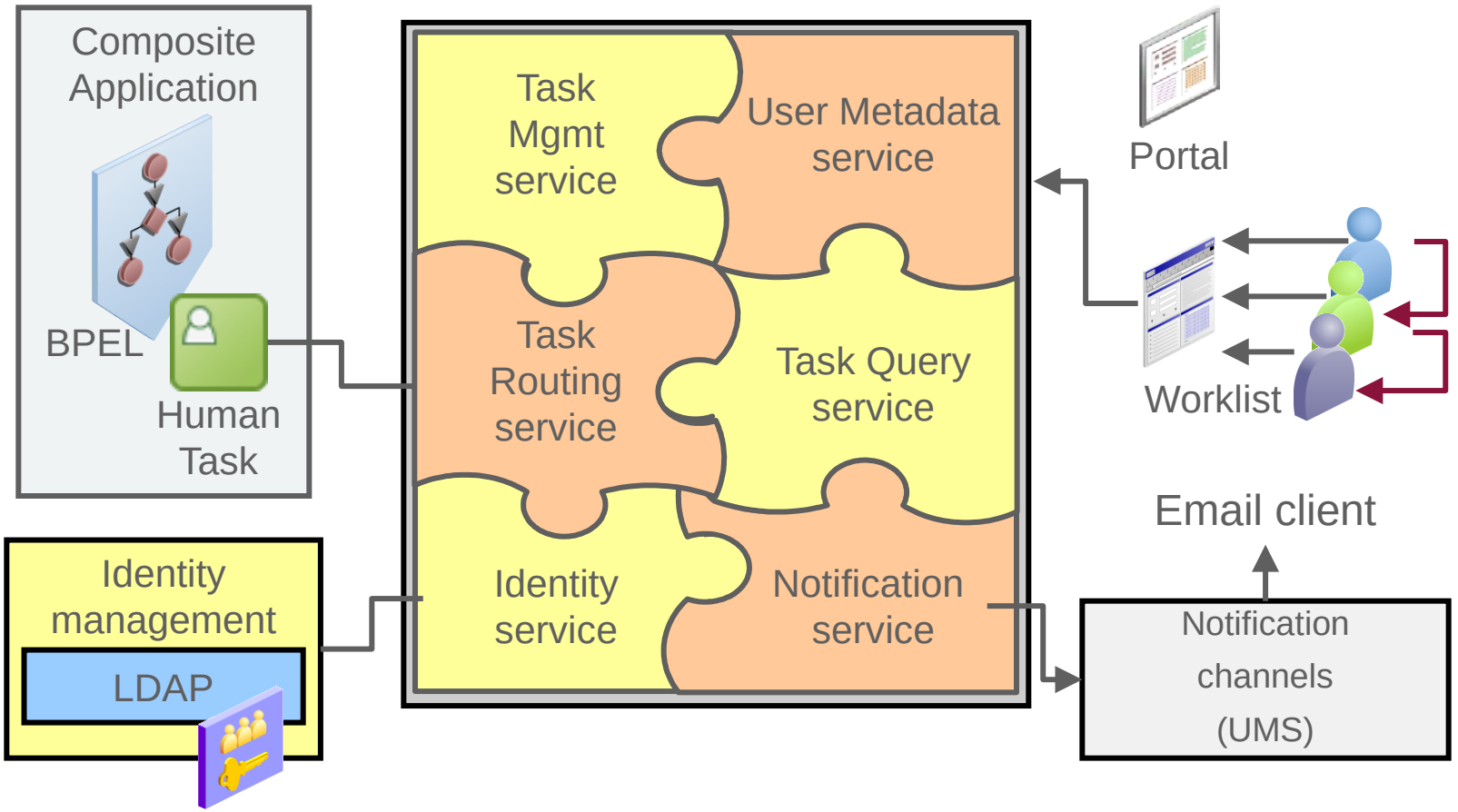
Notifications



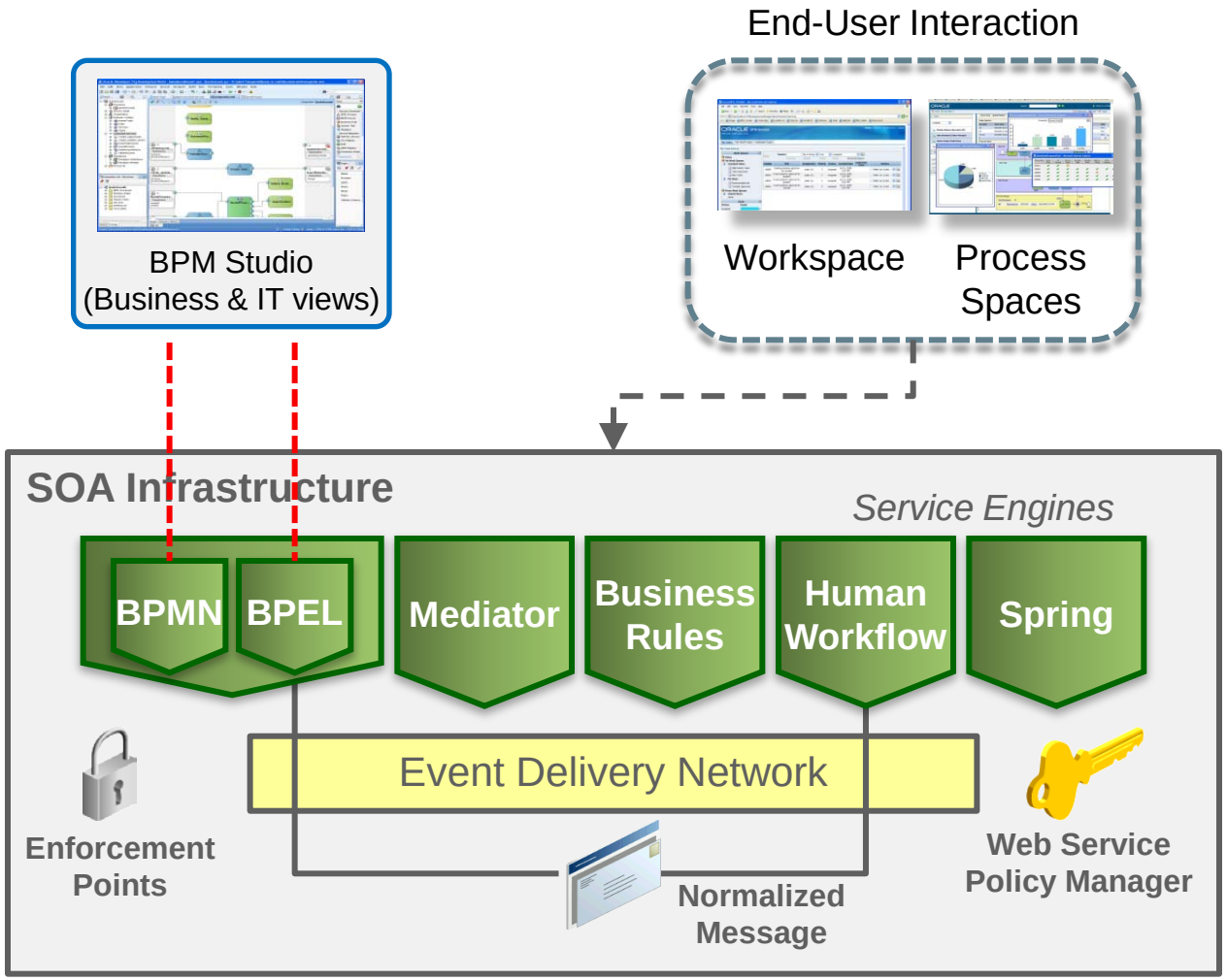
Task Forms



Components of Human Workflow



Oracle BPM Runtime Architecture



Quiz

Notifications enable interested users to receive alerts about changes in the state of a task during the task life cycle.

a. True

b. False

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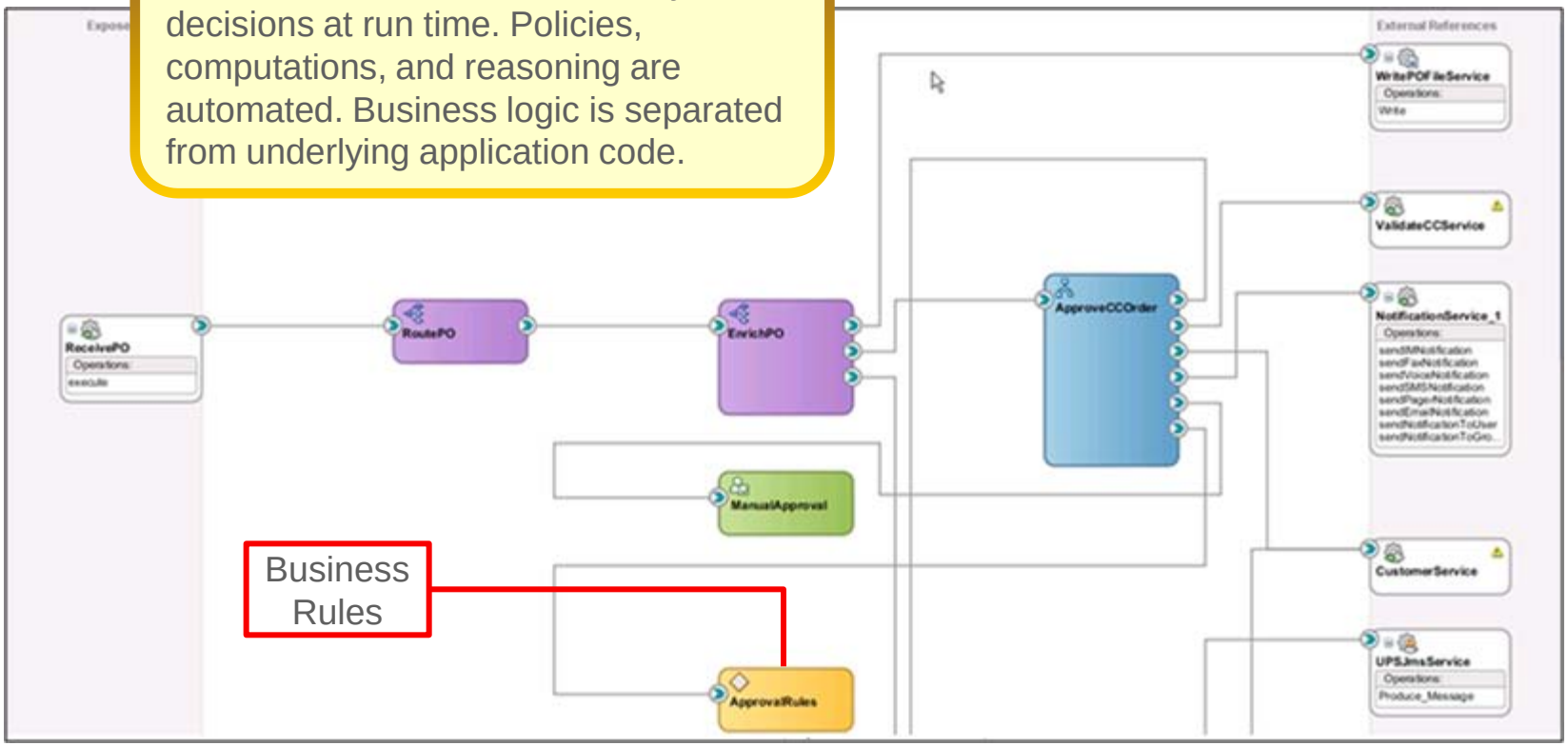
SOA Components: Oracle Business Rules

Oracle Business Rules enable dynamic decisions at run time. Policies, computations, and reasoning are automated. Business logic is separated from underlying application code.



Introducing Business Rules

Business rules are:

- Declarative statements that describe business policies or key business decisions, such as the following:
  - Business policies, such as spending policies and approval matrixes
  - Constraints, such as valid configurations or regulatory requirements
  - Computations, such as discounts or premiums
  - Reasoning capabilities, such as offers based on customer value
- Separated from code to enable their definition and modification by non-technical users

Declarative Rule Concepts

Rule statements are easier to maintain than procedural code because they:

- Declare intent instead of coding logic
- Exclude flow control that is determined by the rules engine
- Relate well to business user drivers

Examples:

```
If a customer is a Premium customer, offer them 10%
   discount.

If a customer is a Gold customer, offer them 5% discount.
```

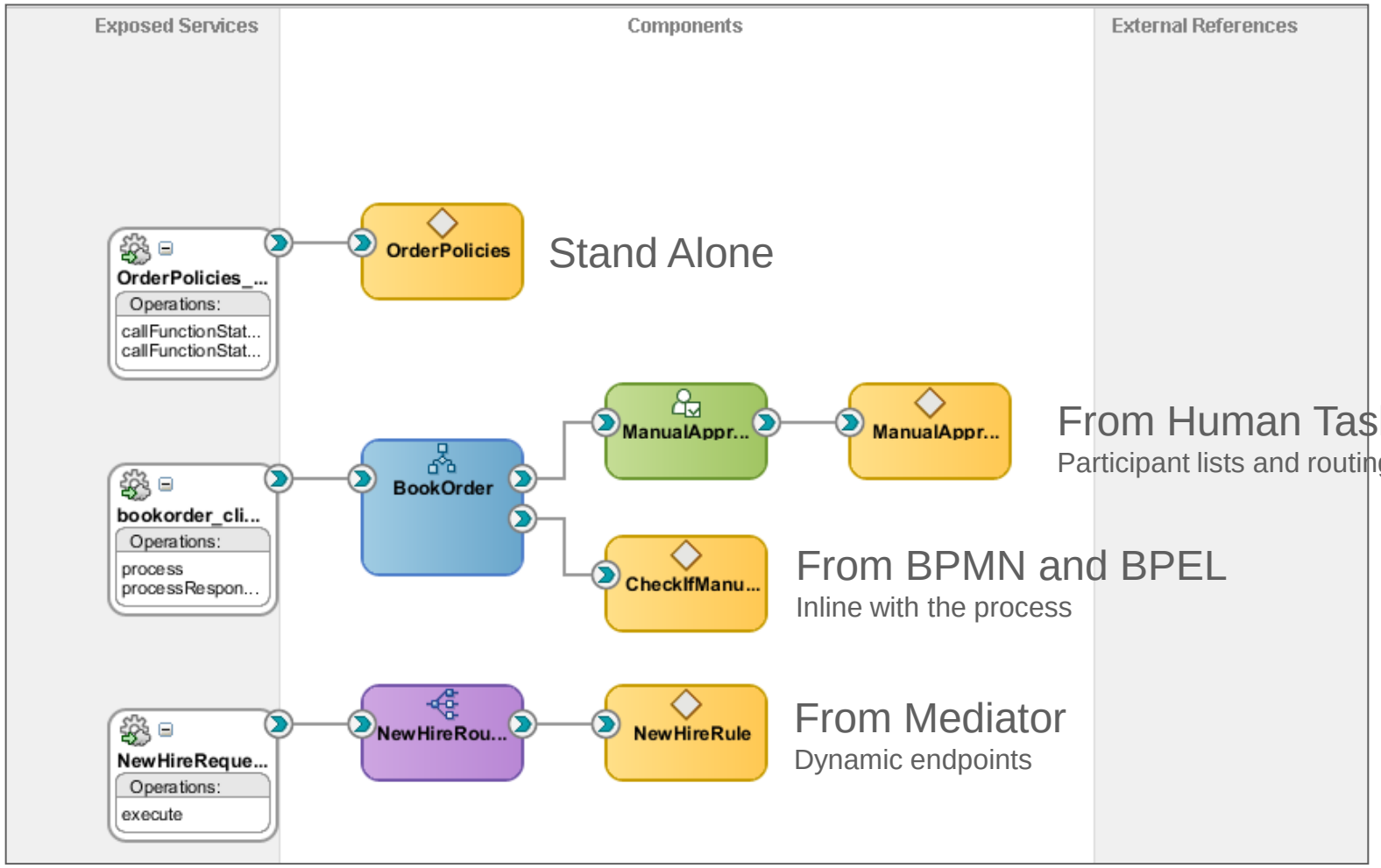
Decision Tables

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

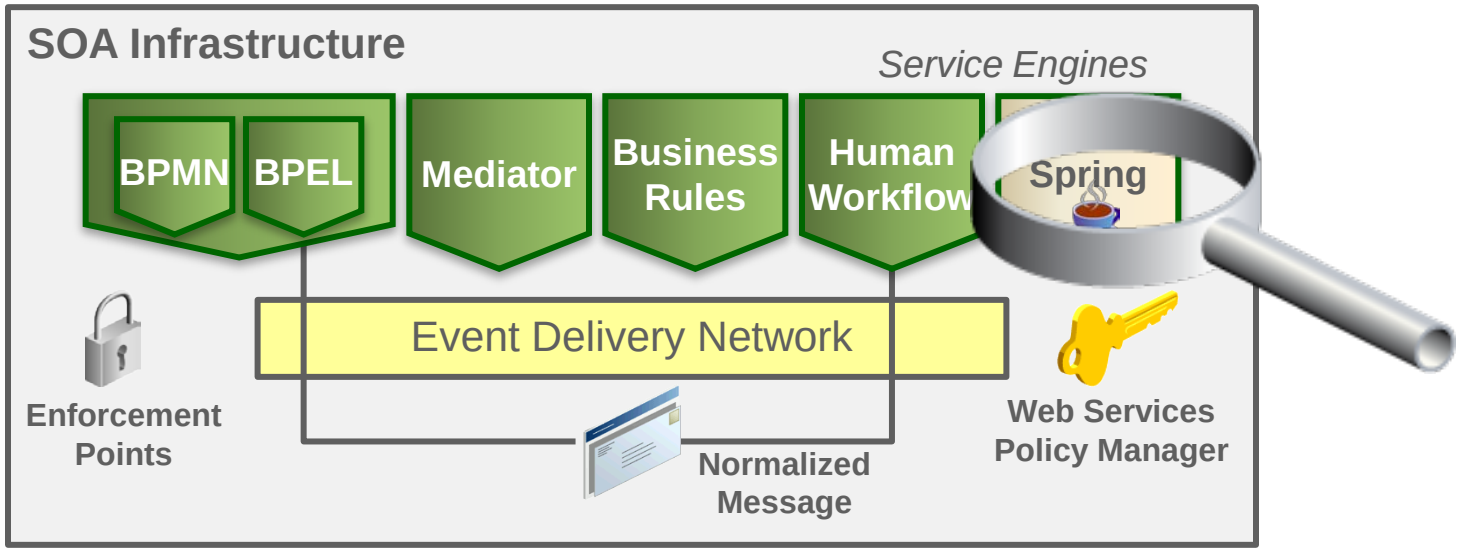
Decision Table	R1	R2	R3
CONDITION `If shipChoice`	`two_day`	`five_day`	`next_day` or `international`
ACTION `Assert carrier`	`RedShipper`	`GreenShipper`	`BlueShipper`

- If shipping choice = two day, THEN use Red shipper.
- If shipping choice = five day, THEN use Green shipper.
- If shipping choice = next day or international, THEN use Blue shipper.

Using Business Rules in a Composite Application



The Spring Component



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

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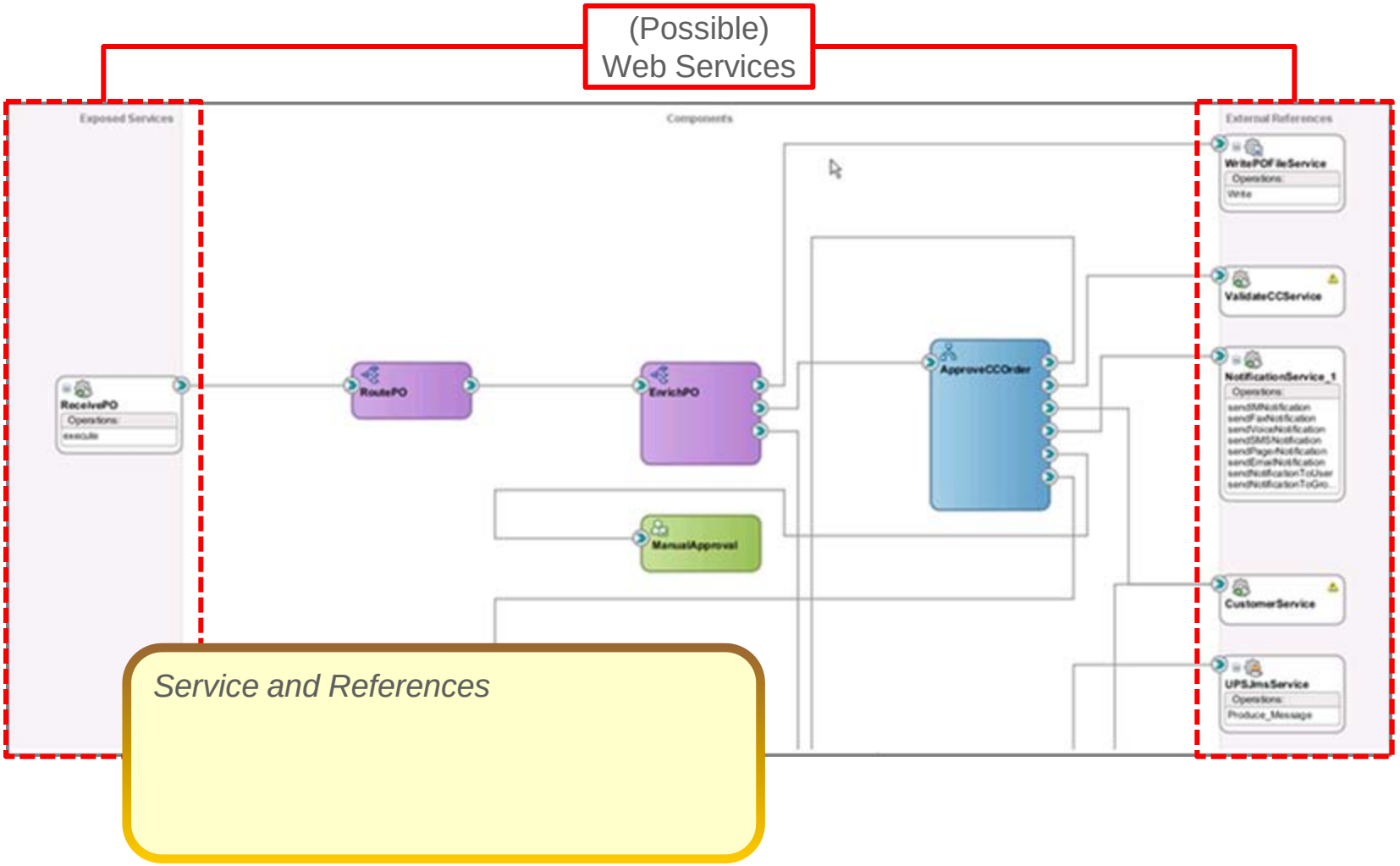
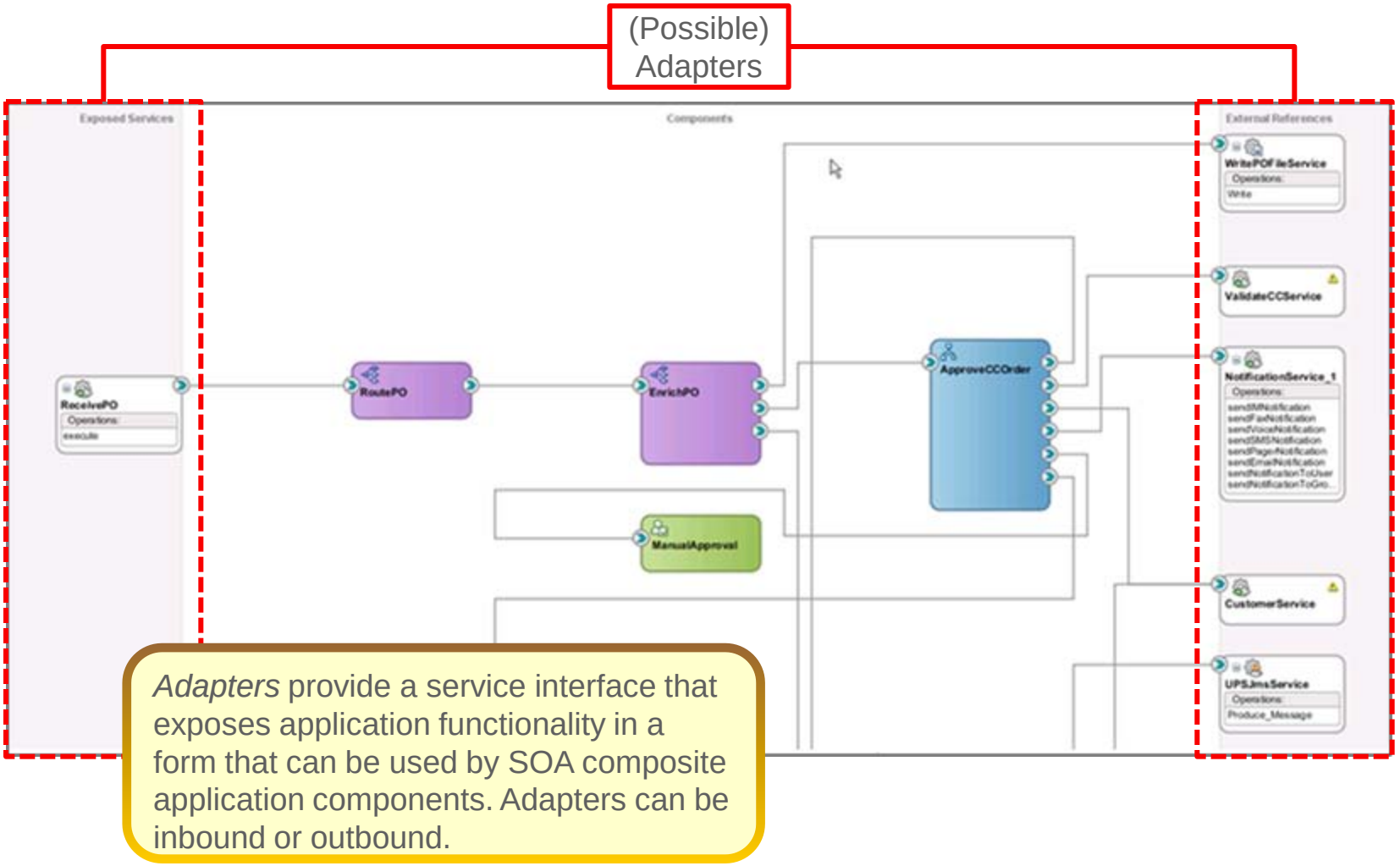
Services and References: Web Services



Services and References: Adapters



Adapters provide a service interface that exposes application functionality in a form that can be used by SOA composite application components. Adapters can be inbound or outbound.

Quiz

An adapter exposes an API through which a service component can access an external application as if it were a web service.

a. True
b. False

Summary

In this lesson, you should have learned how to:

- Describe Service-Oriented Architecture (SOA)
- Explain how services communicate
- Describe the functionality of each type of Oracle SOA Suite 12*c* service component

Practice 7: Overview

There is no practice for this lesson, but the vocabulary and concepts in this lesson are leveraged heavily in subsequent lectures and practices.