

Introduction to BPEL

Objectives

After completing this lesson, you should be able to:

- Describe the role of the XSD, WSDL, and BPEL files in a business process module
- Describe the relationship between WSDL partner link types and BPEL partner link elements
- Describe the role of a business process in a composite application
- Create a business process in a BPEL module
- Use the BPEL editor in JDeveloper
- Use basic BPEL activities to interact with partners
- Use the Assign activity to manipulate data in BPEL variables

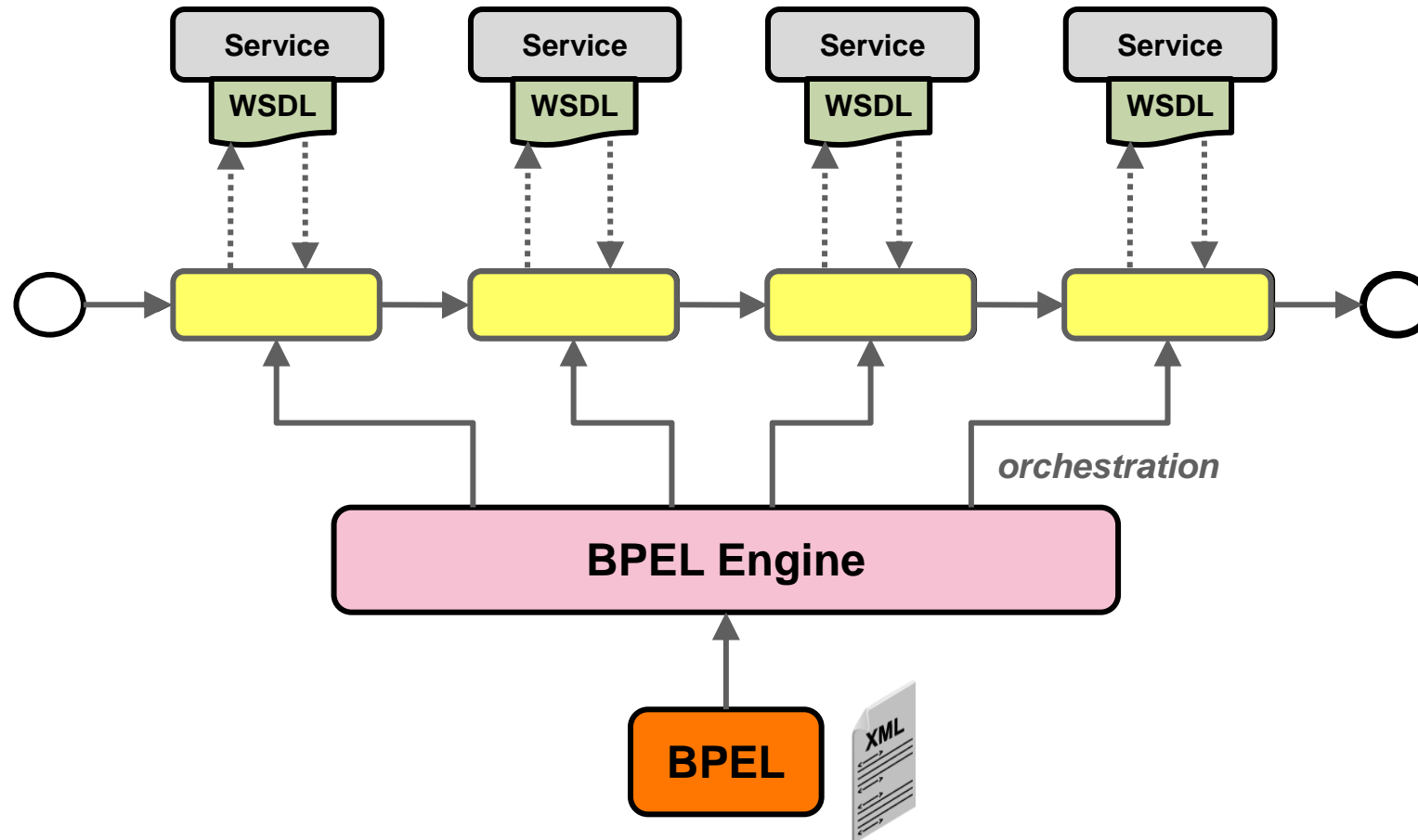


Agenda

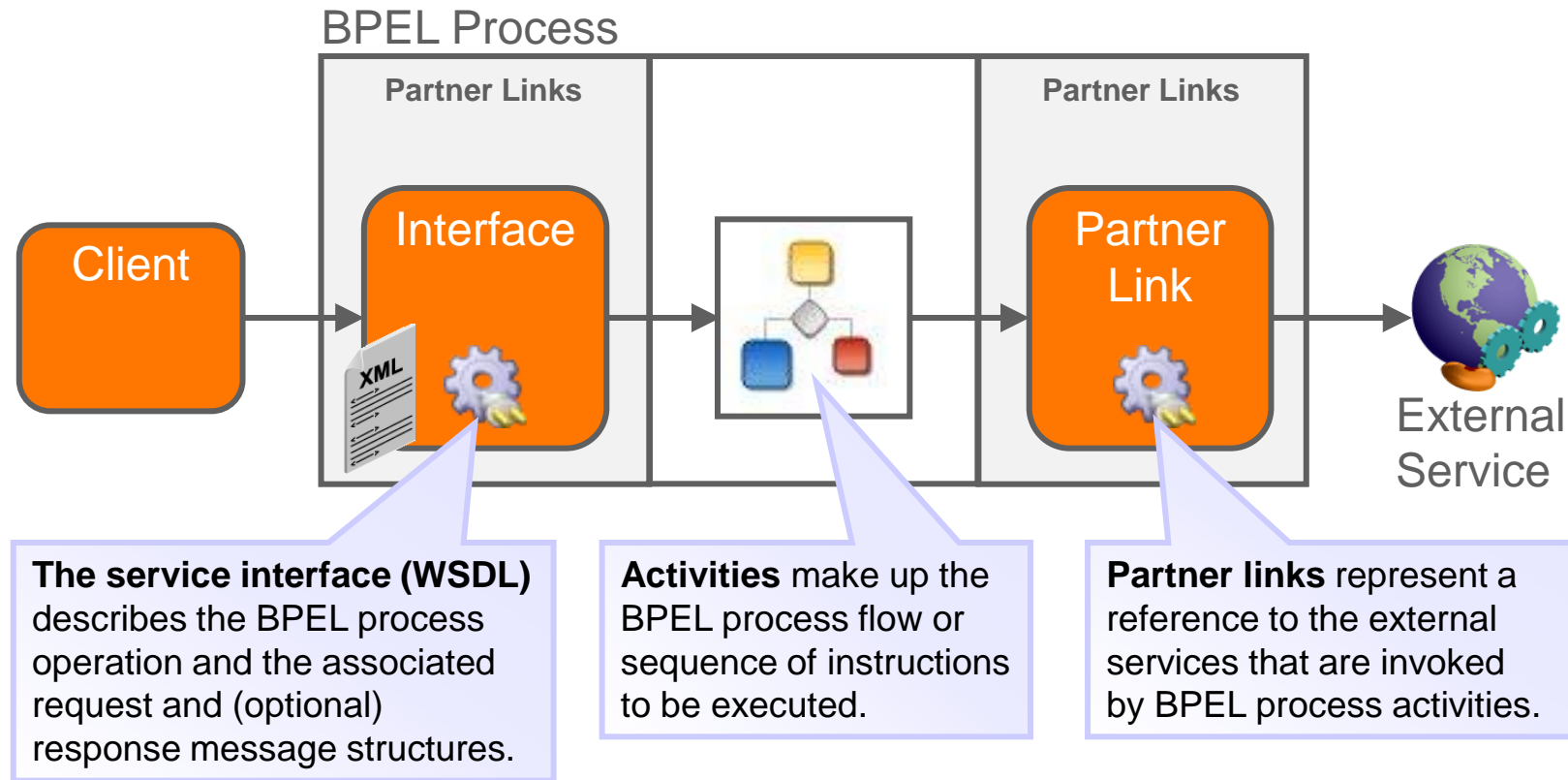
- Introduction to Business Processes and BPEL
- BPEL Process in Oracle SOA Suite 12c



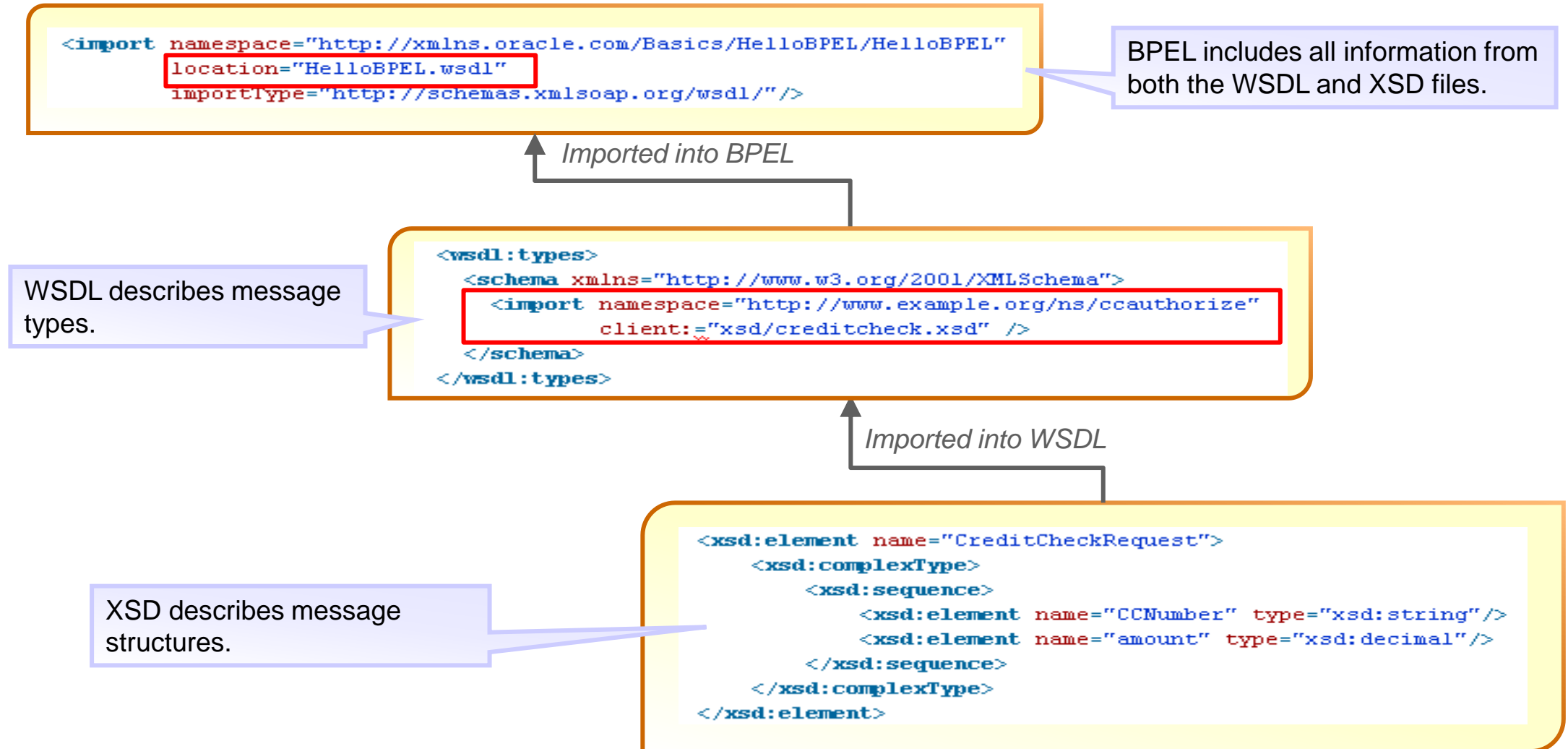
Business Processes and BPEL



Parts of a BPEL Process



BPEL, WSDL, and XSD



Partners, Partner Links, and Roles

BPEL partnerLink

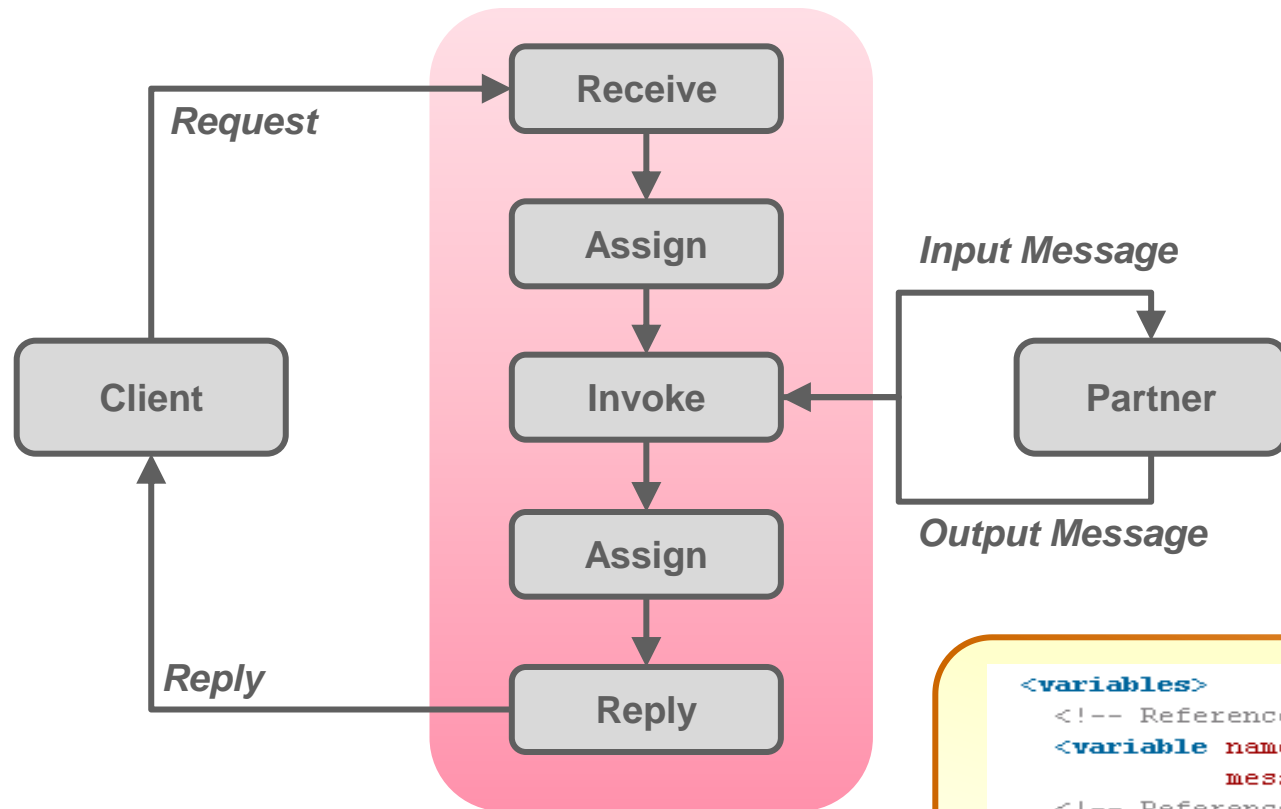
```
<partnerLinks>
  <!--
    The 'client' role represents the requester of this service. It is
    used for callback. The location and correlation information associated
    with the client role are automatically set using WS-Addressing.
  -->
  <partnerLink name="hellobpel_client" partnerLinkType="client:HelloBPEL"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

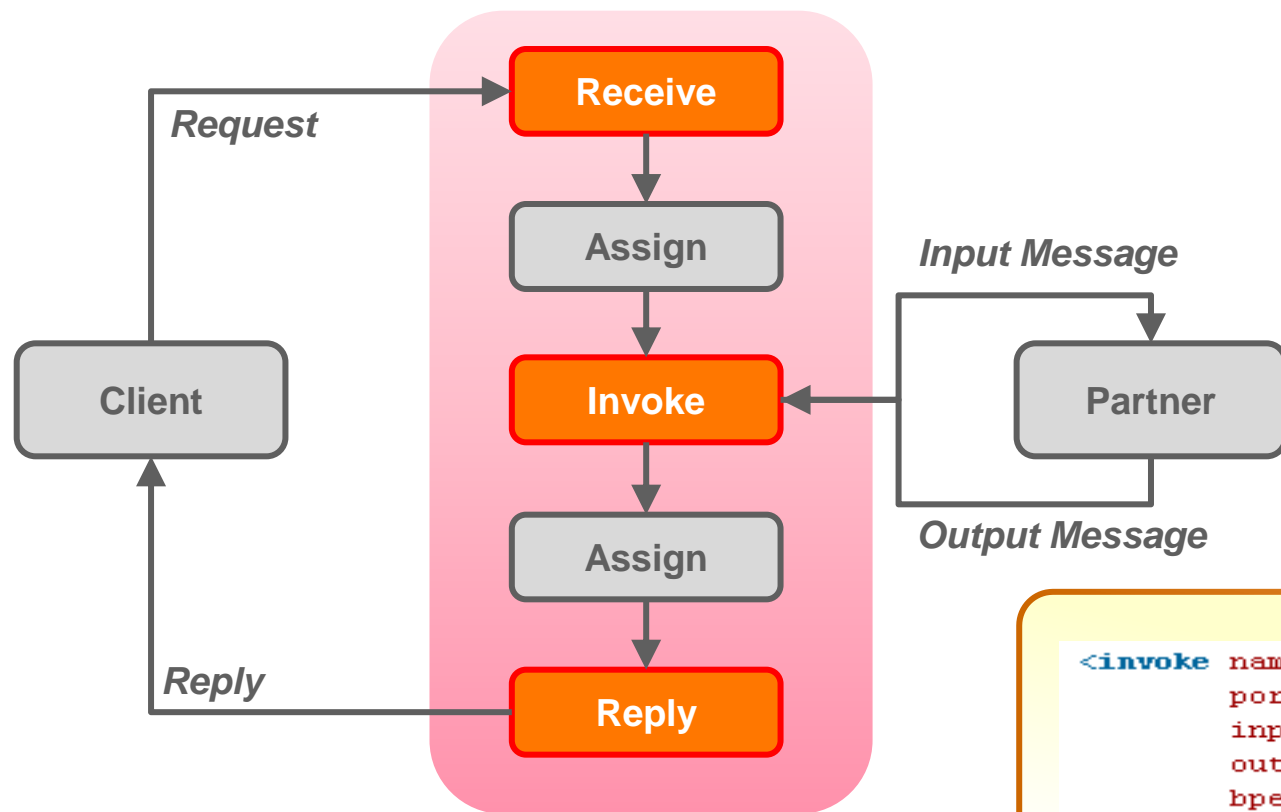
<plnk:partnerLinkType name="validateCC_ptt_PL">
  <plnk:role name="validateCC_ptt_Role" portType="tns:validateCC_ptt"/>
</plnk:partnerLinkType>
```

Variables in BPEL



```
<variables>
  <!-- Reference to the message passed as input during initiation -->
  <variable name="inputVariable"
    messageType="client:HelloBPELRequestMessage"/>
  <!-- Reference to the message that will be returned to the requester-->
  <variable name="outputVariable"
    messageType="client:HelloBPELResponseMessage"/>
  <variable name="Invokel_validateCC_InputVariable"
    messageType="nsl:requestMessage"/>
  <variable name="Invokel_validateCC_OutputVariable"
    messageType="nsl:replyMessage"/>
</variables>
```


Interacting with Partners



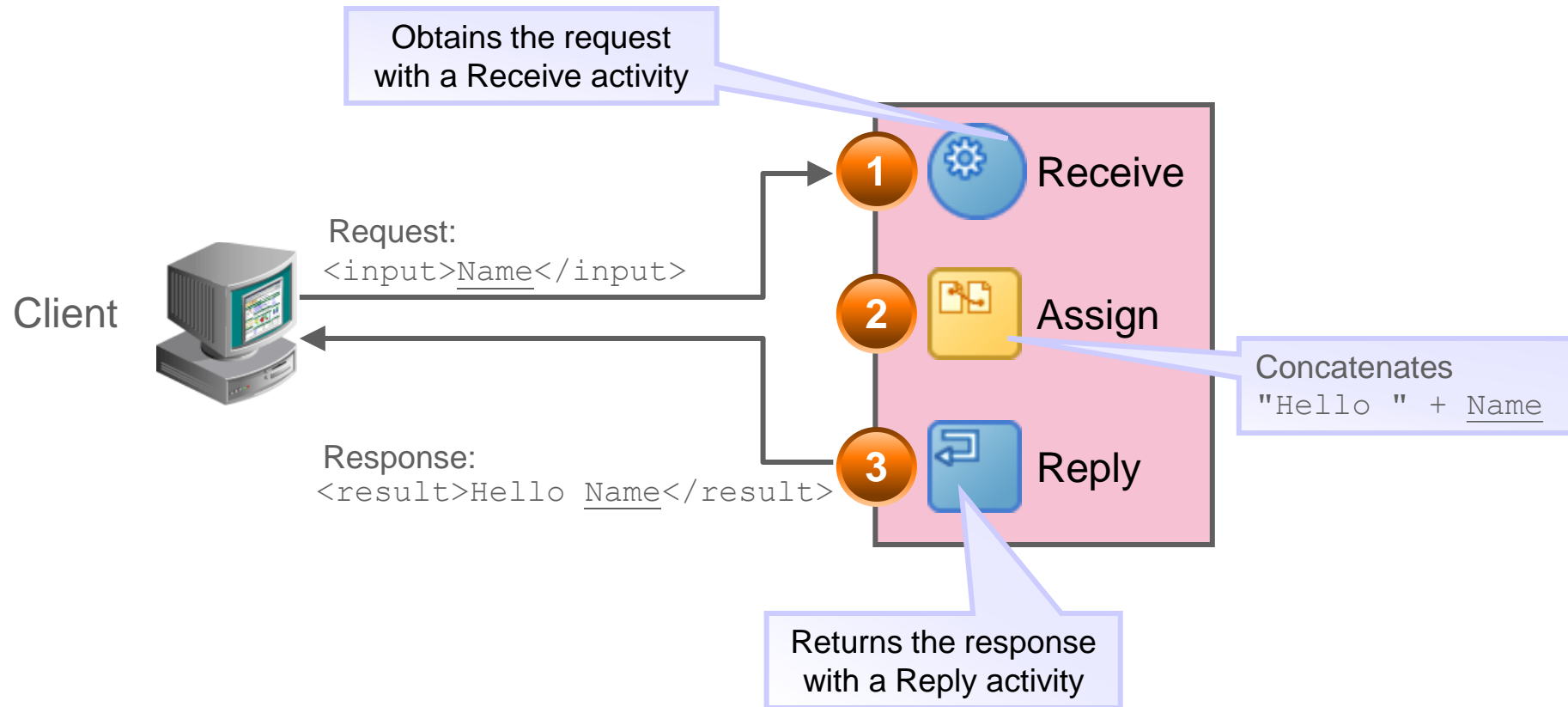
```
<receive name="receiveInput"
  partnerLink="hellobpel_client"
  portType="client:HelloBPEL"
  operation="process"
  variable="inputVariable"
  createInstance="yes" />
```

Information from the partner's WSDL is referenced here.

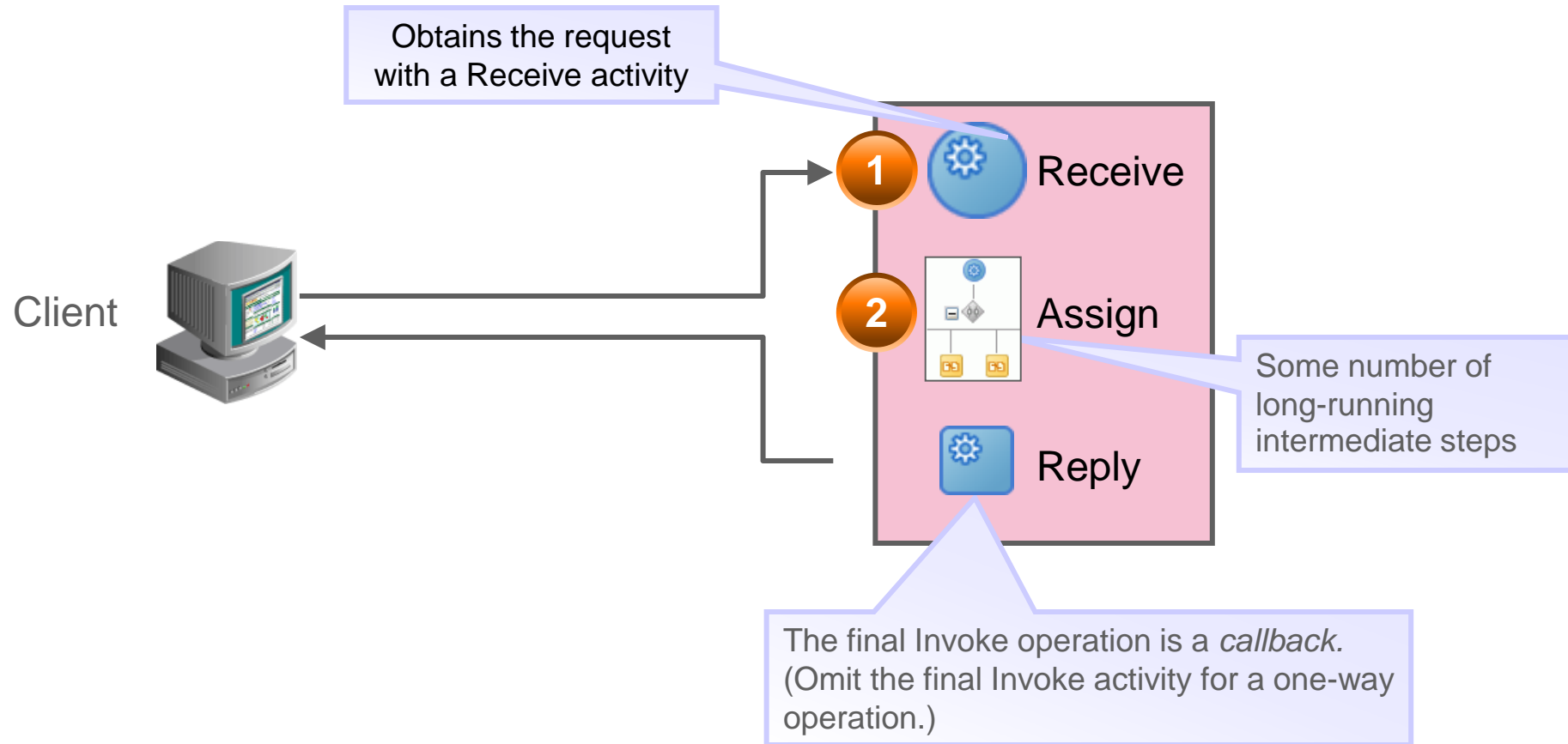
```
<invoke name="Invoke1" partnerLink="ValidateCC"
  portType="nsl:validateCC_ptt" operation="validateCC"
  inputVariable="Invoke1_validateCC_InputVariable"
  outputVariable="Invoke1_validateCC_OutputVariable"
  bpelx:invokeAsDetail="no" />
```

```
<reply name="replyOutput"
  partnerLink="hellobpel_client"
  portType="client:HelloBPEL"
  operation="process"
  variable="outputVariable" />
```

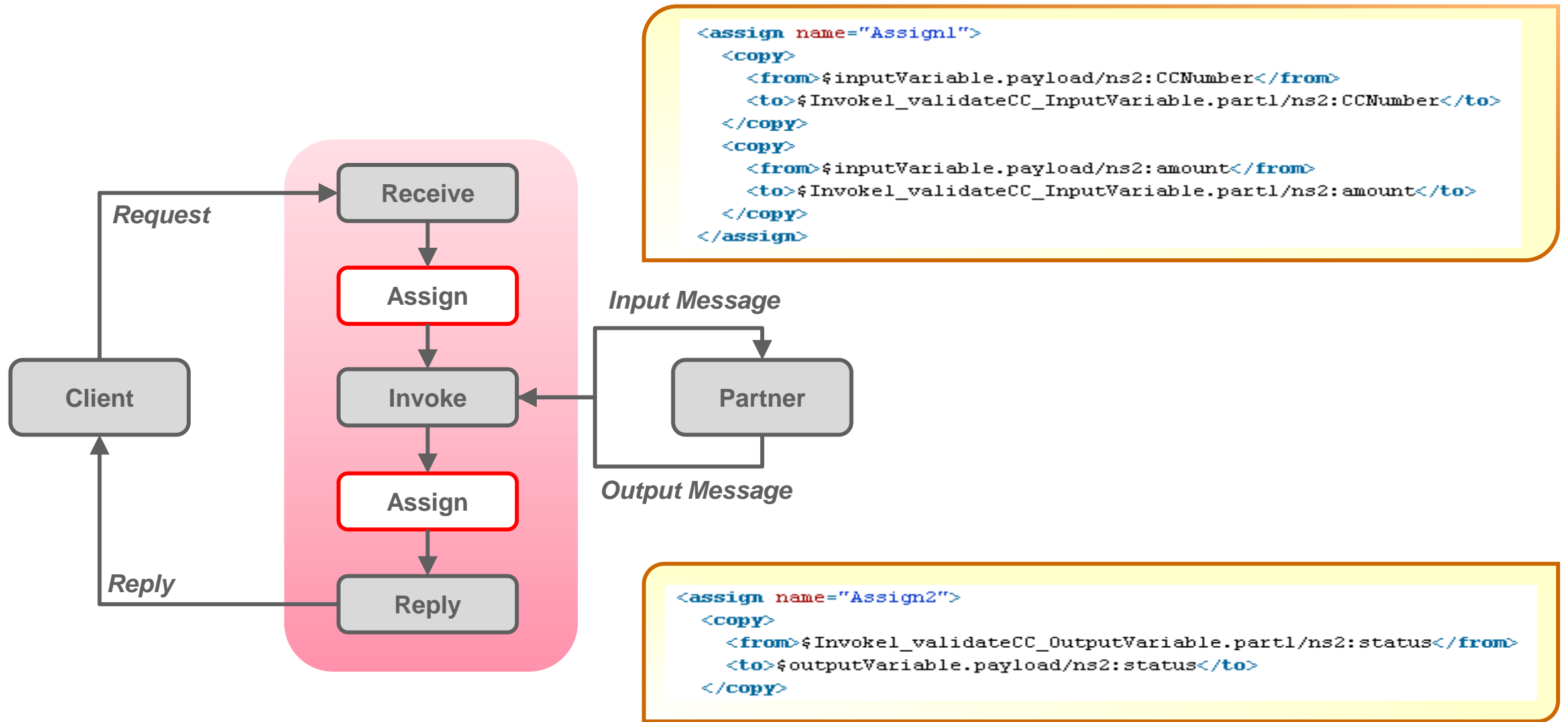

Synchronous Process Concepts



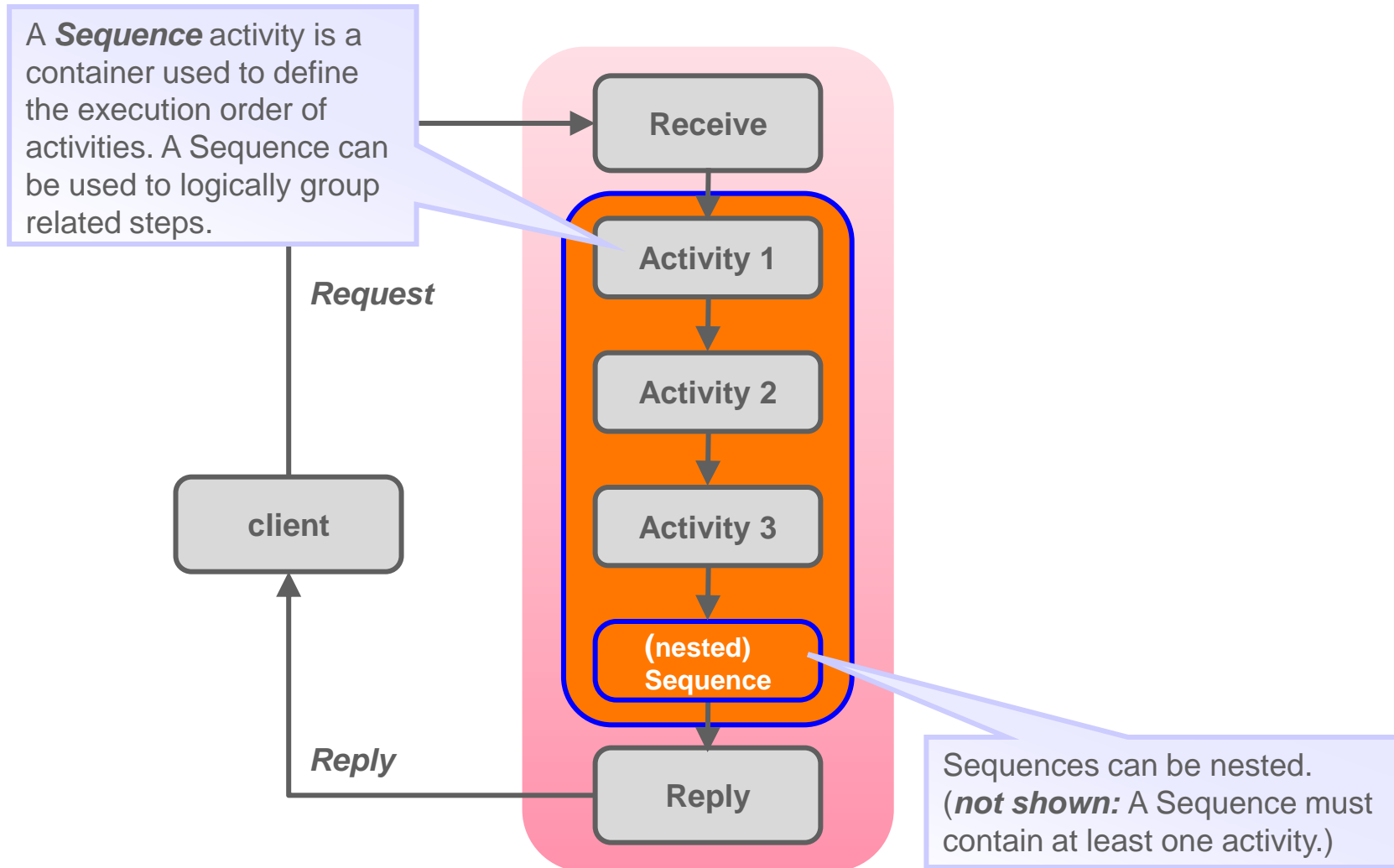
Asynchronous Process Concepts



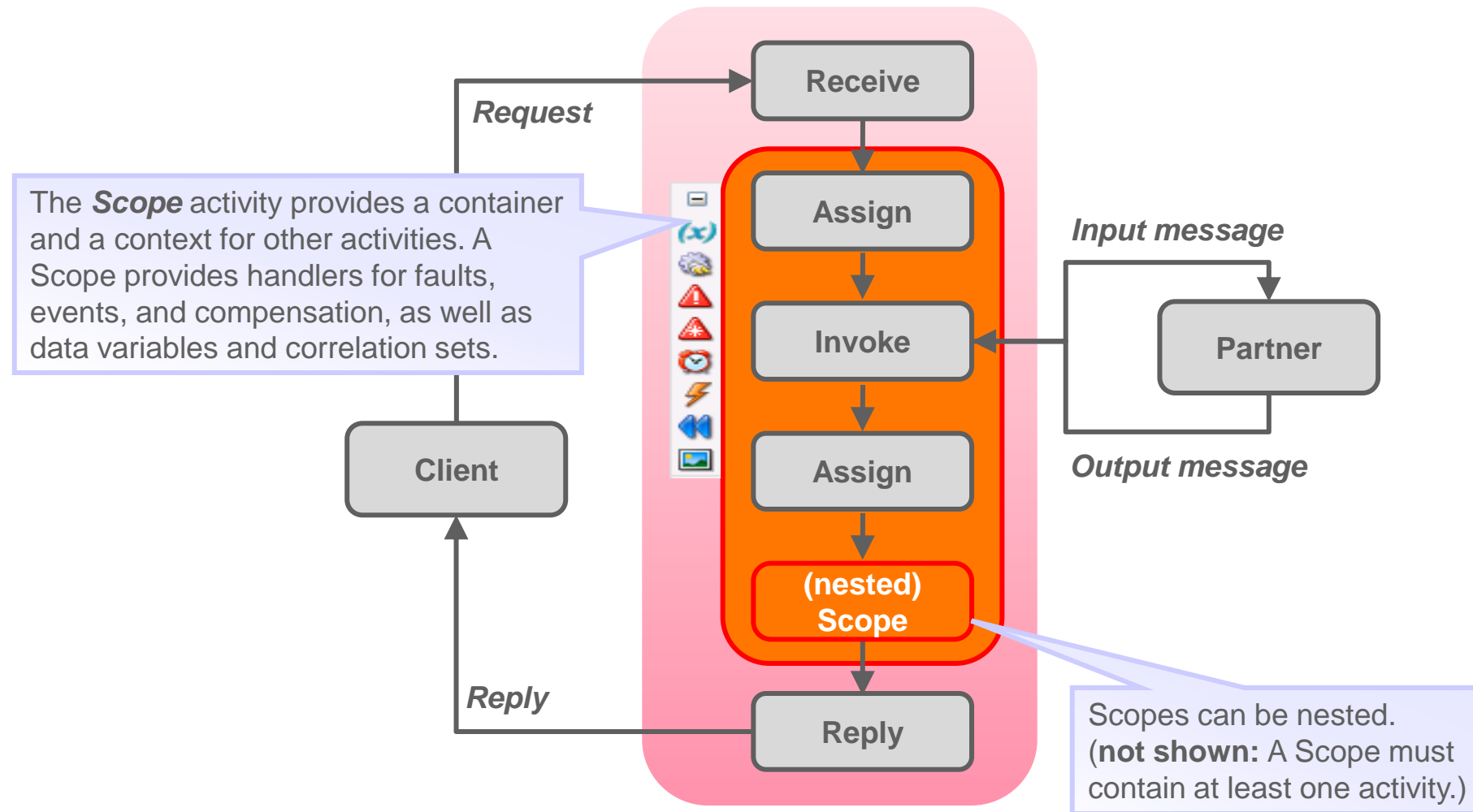
Assigning Values to Variables



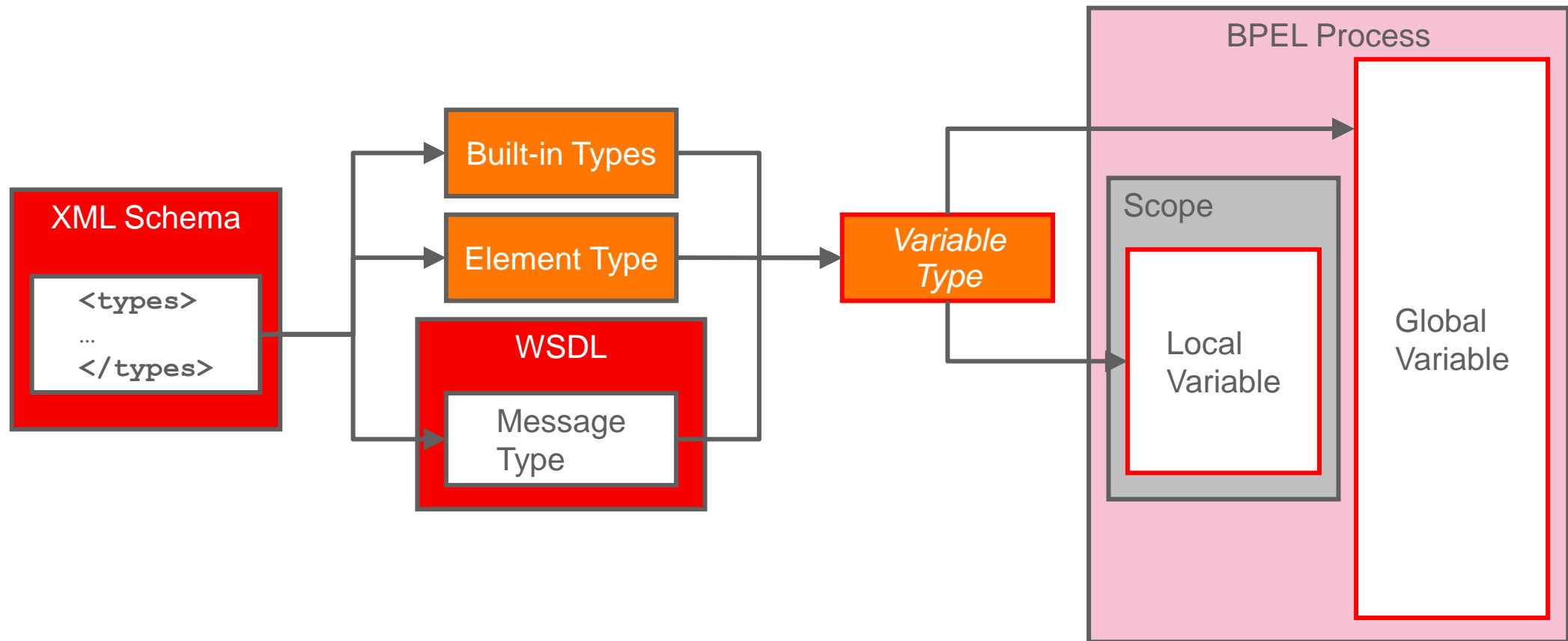
Ordering Execution with a Sequence Activity



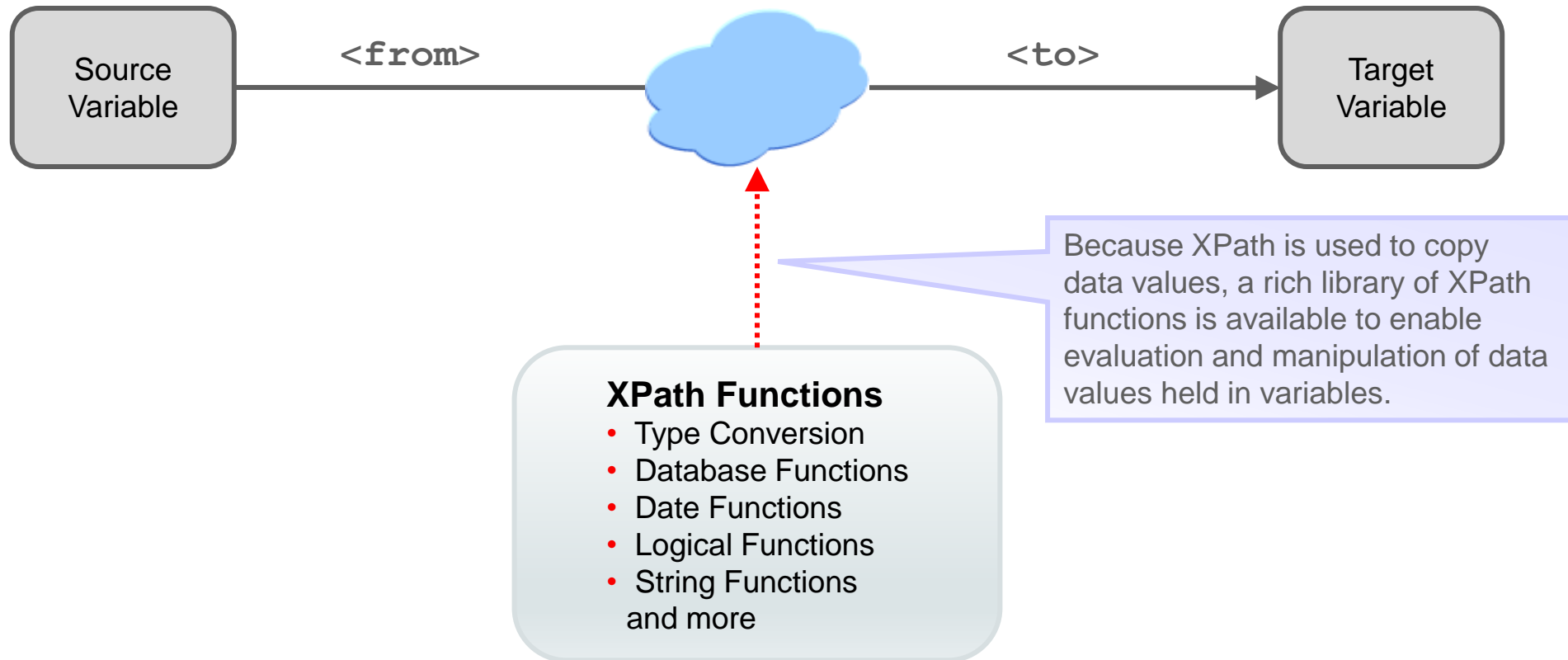
Structuring a Process with a Scope Activity



Global and Local Variables

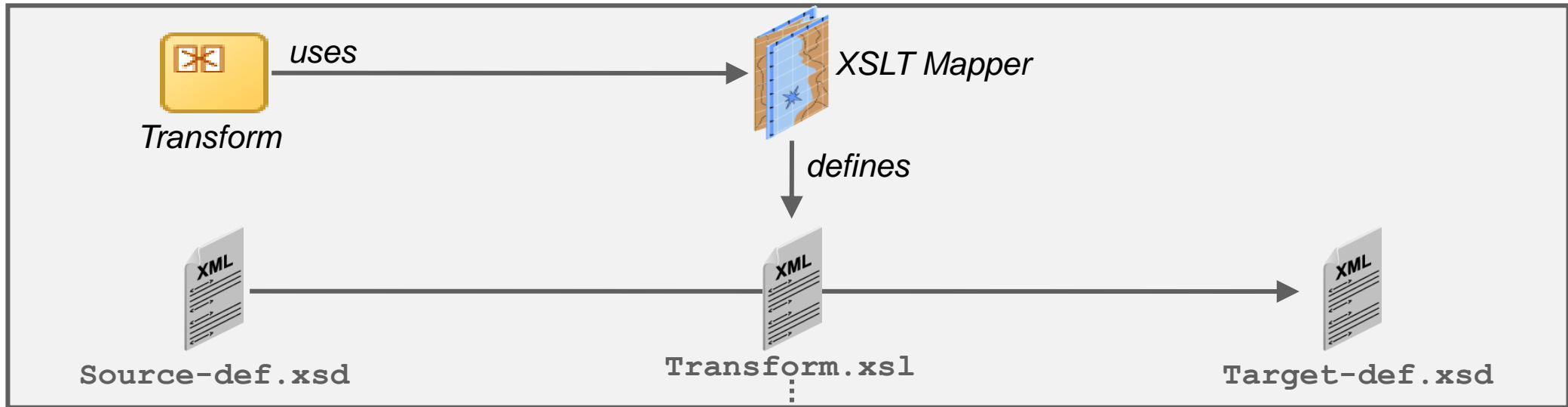


Manipulating Data in Variables

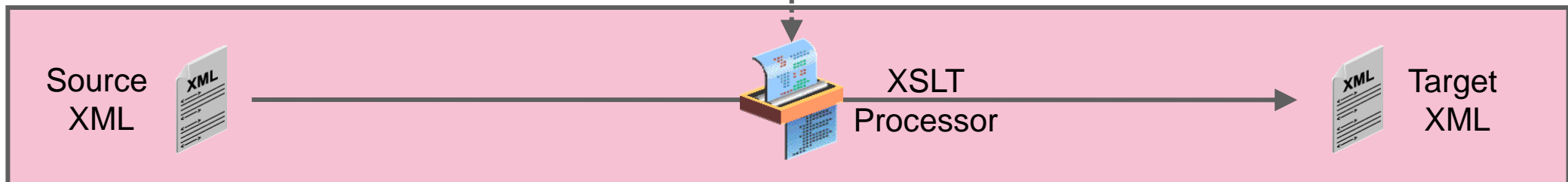


Transformation

BPEL Design Time



BPEL Run Time



Quiz



The BPEL engine instantiates a business process when a message is received by an activity (often a Receive activity) with the createInstance attribute set to “yes.”

- a. True
- b. False

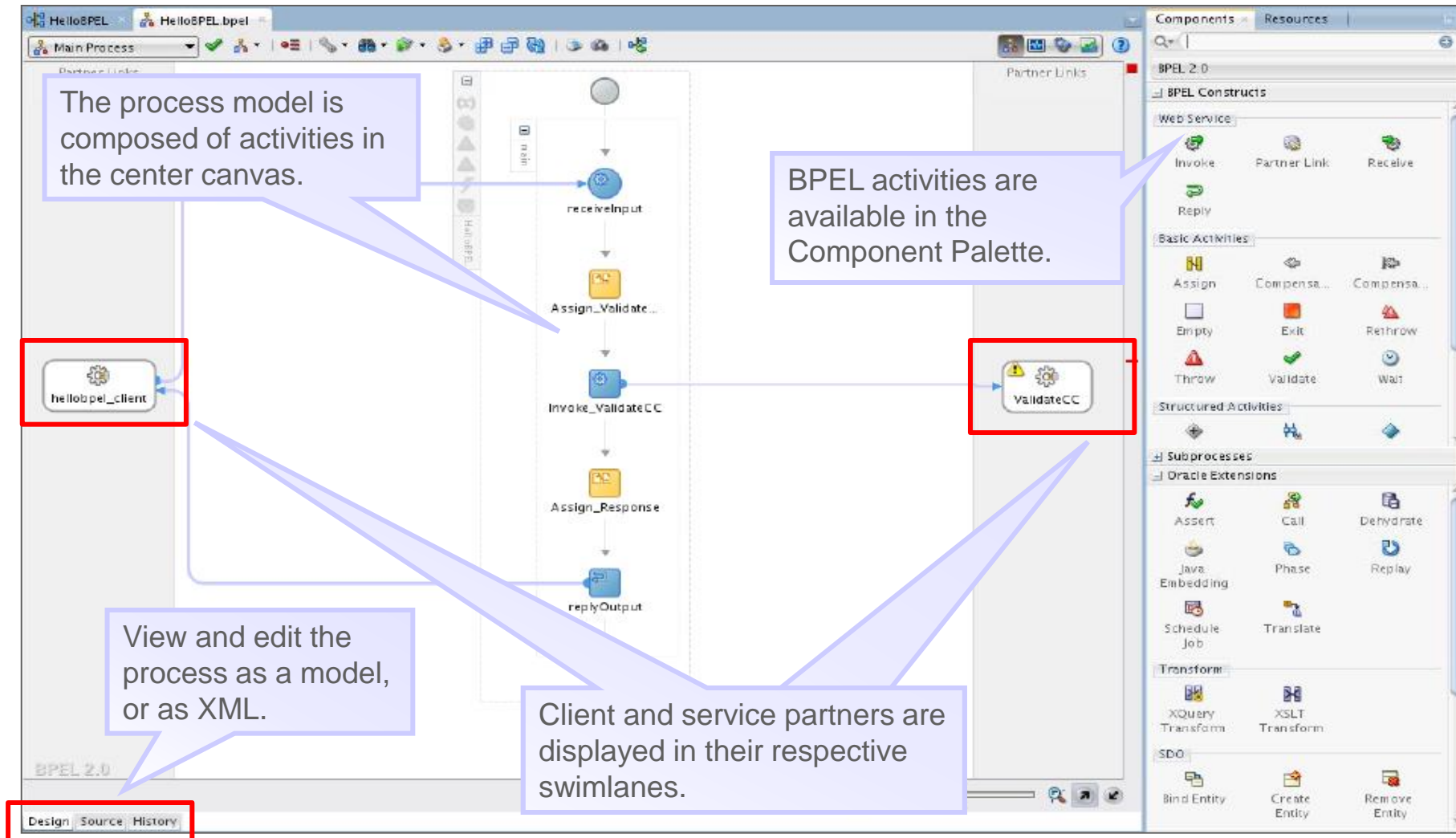


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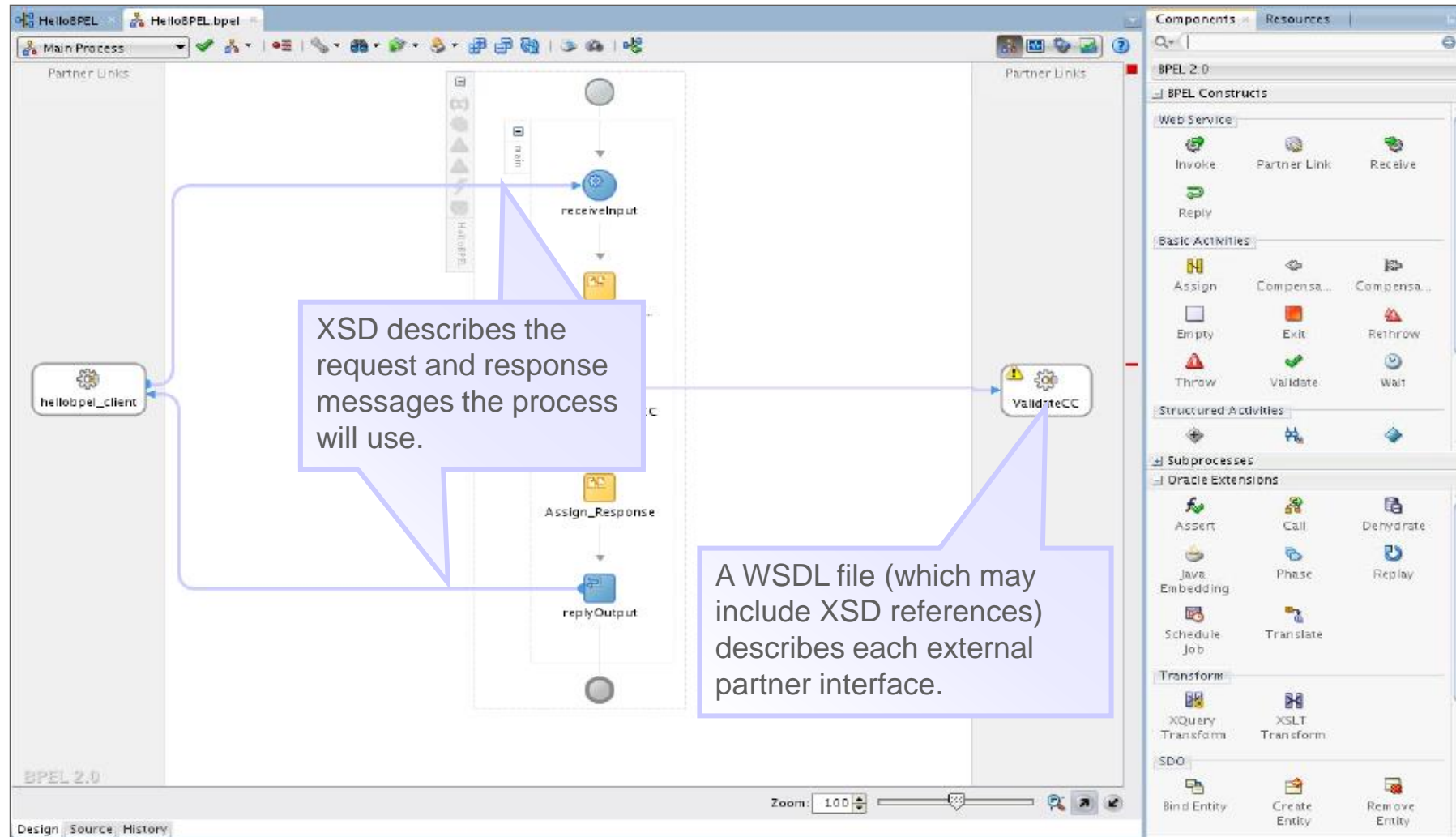
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BPEL Design Editor

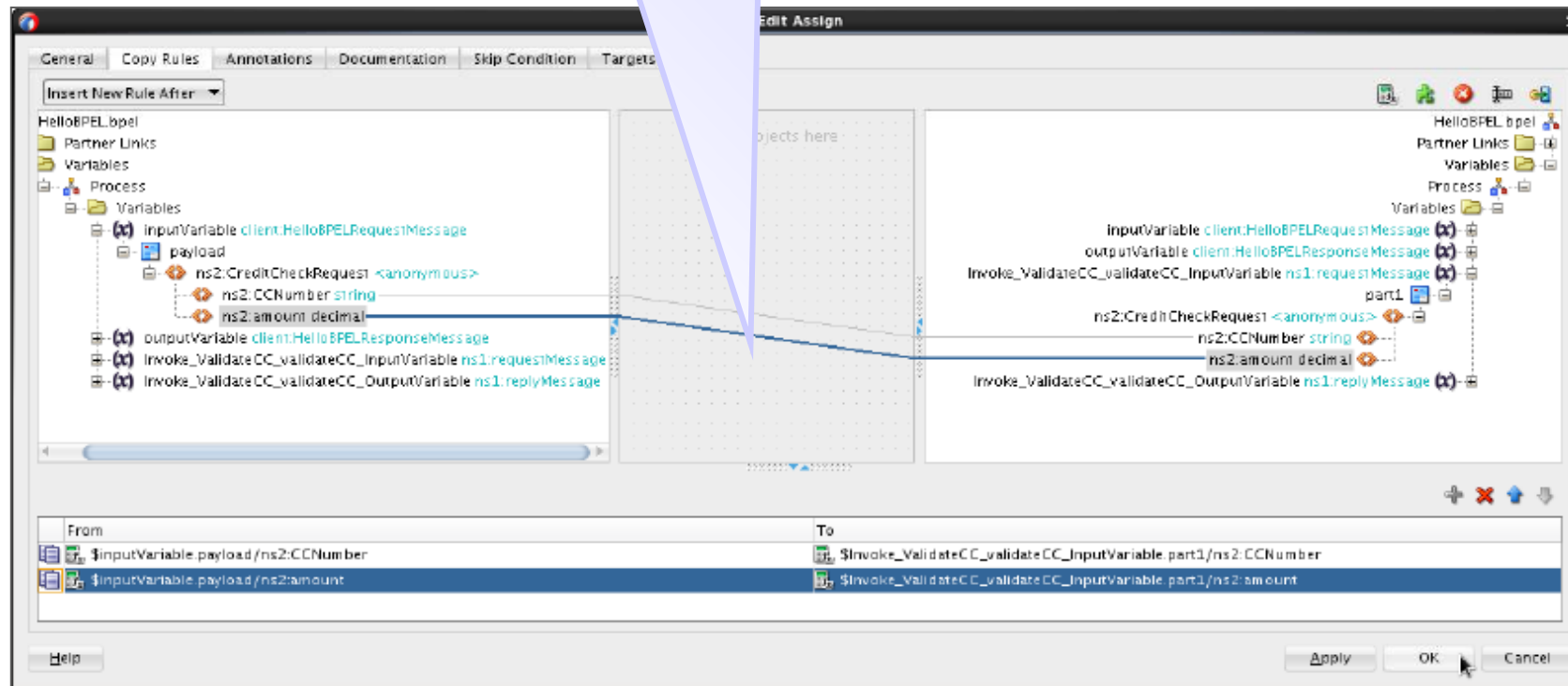


Creating a BPEL Process

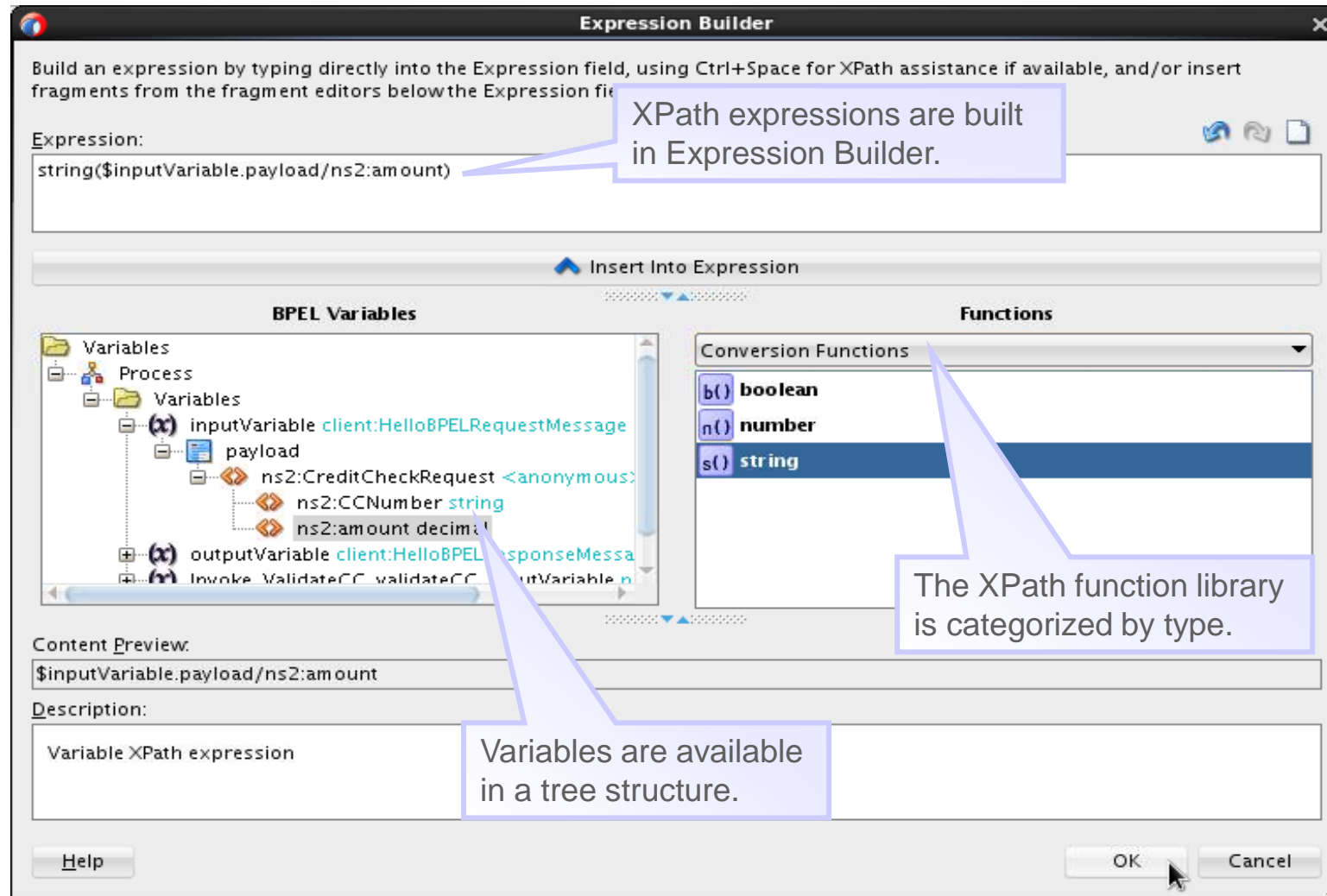


Mapping Values to Variables

Simple copy operations in an <assign> are generated with drag-and-drop.



Using Expression Builder



Testing a BPEL Process

Input Arguments

Tree View ☒ Enable Validation ☒ Load Payload Browse...

SOAP Body

View

Name	Type	Value
* payload	payload	
* CCNumber	string	1234-1234-1234-1234
* amount	decimal	1000

Supply input values and run the test.

Request **Response**

Test Status Request successfully received.

Response Time (ms) 943

Tree View

A new flow instance was generated.

Name	Type	Value
payload	payload	
status	string	VALID

The response is displayed. The Flow Trace is accessed from here.

The Flow Trace lists each step of the test and its state.

Click the BPEL process to access the audit trail.

Trace

Actions Show Instance IDs ☐

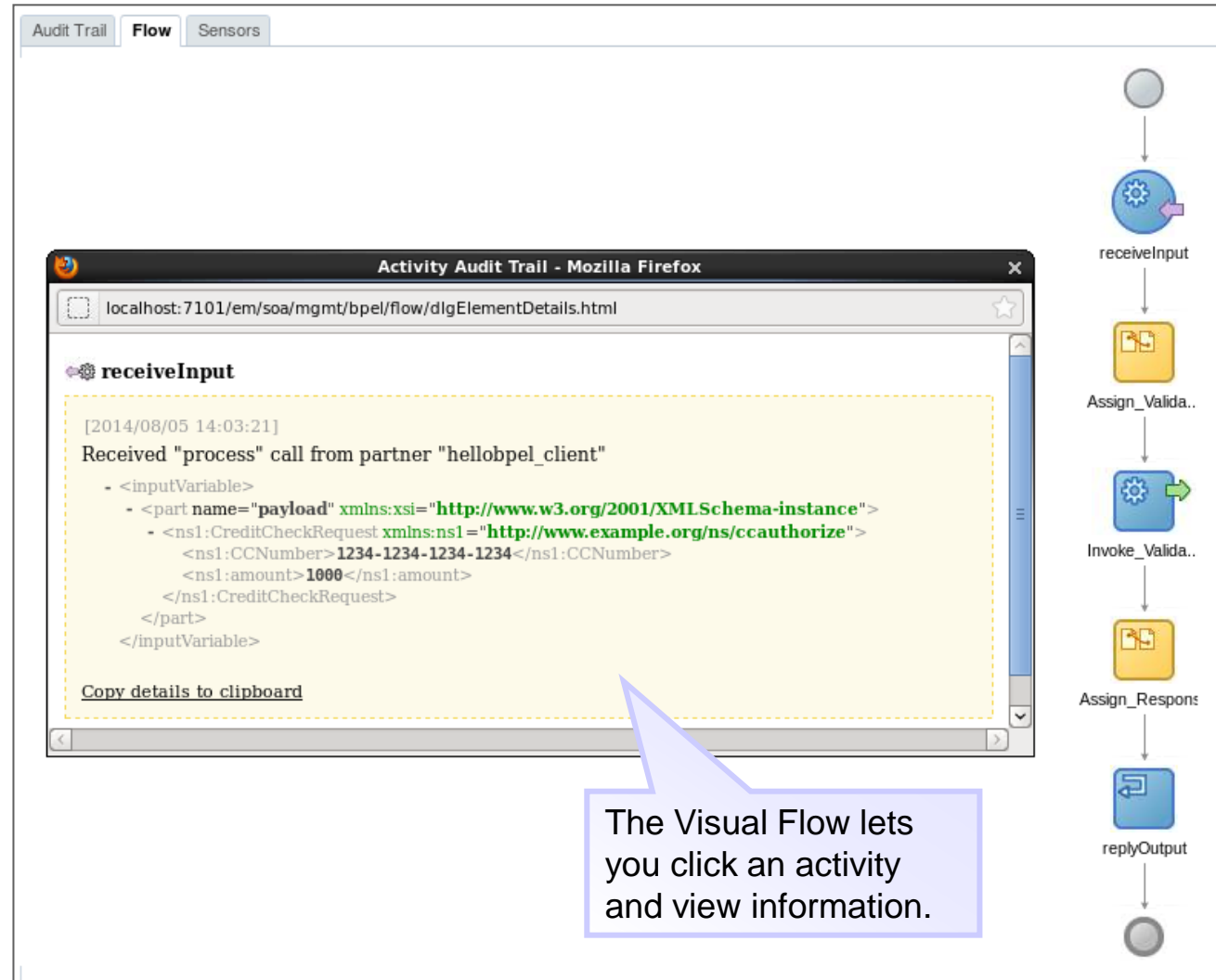
Instance	Type	Usage	State
hellobpel_client_ep	Service	Service	✓ Completed
HelloBPEL	BPEL	BPEL	✓ Completed
ValidateCC	Reference	Reference	✓ Completed
HelloBPEL	Service	Service	✓ Completed
ValidateCreditCard	Mediator	Mediator	✓ Completed
CreditCardDBService	Reference	Reference	✓ Completed

Examining the BPEL Process Audit Trail

The screenshot displays the 'Audit Trail' tab of a BPEL process monitoring tool. The interface includes a tree view on the left showing the process structure: `<process>` containing `<main (63)>`, which includes `receiveInput`, `Assign_ValidateCC`, `Assign_Response`, and `replyOutput`. The main panel shows a list of audit events with columns for timestamp, activity name, and description. Callouts provide additional context: one points to the 'Flow' tab, stating 'The Flow tab provides access to the Visual Flow information for the process.', and another points to the 'View Payload' link, stating 'The audit trail allows you to examine values at each activity.'

Timestamp	Activity	Description
Aug 5, 2014 2:03:21 PM	receiveInput	Received "process" call from partner "hellobpel_client"
Aug 5, 2014 2:03:21 PM	Assign_ValidateCC	Updated variable "Invoke_ValidateCC_validateCC_InputVariable"
Aug 5, 2014 2:03:21 PM	Assign_ValidateCC	Updated variable "Invoke_ValidateCC_validateCC_InputVariable"
Aug 5, 2014 2:03:21 PM	Assign_ValidateCC	Completed assign
Aug 5, 2014 2:03:21 PM	Assign_ValidateCC	Started invocation of operation "validateCC" on partner "ValidateCC".
Aug 5, 2014 2:03:21 PM	Assign_ValidateCC	Invoked 2-way operation "validateCC" on partner "ValidateCC".
Aug 5, 2014 2:03:21 PM	Assign_Response	Updated variable "outputVariable"
Aug 5, 2014 2:03:21 PM	Assign_Response	Completed assign
Aug 5, 2014 2:03:21 PM	replyOutput	Reply to partner "hellobpel_client".
Aug 5, 2014 2:03:21 PM		BPEL process instance "20005" completed

Examining the BPEL Process Visual Flow



Quiz



A business process can be deployed as a stand-alone application separately from a composite application, and can then interact with the composite at run time.

- a. True
- b. False



Summary

In this lesson, you should have learned how to:

- Describe the role of the XSD, WSDL, and BPEL files in a business process module
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Practice 6 Overview

