

# LAB 2– NetBeans BPEL Engine

Service Oriented Architectures Security

Module 5 - Lab

Unit 2 – BPEL

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# Outline

- Introduction to BPEL
- Building Web Service
- Creation of the BPEL diagram
- Testing

# BPEL Overview

## Three activities categories:

- Web Service
- Basic Activities
- Structured Activities

## Fault Handlers Management

# Web Service

## Represents agreements between the process and its partner services



- **Invoke:** Enable the process to send a message to partner web service



- **Receive:** Causes the process to wait for a message to arrive from a partner web service



- **Reply:** Causes the process to send a message in reply to a partner web service that come from a receive activity

# Basic Activities



- **Assign:** Assigns the values to a variable or web services parameters



- **Wait:** instructs the process to wait for a specified time or until a certain time has passed

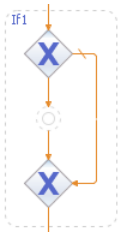


- **Throw:** Generates a fault or throws an exception within a process

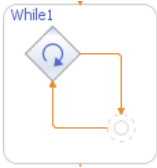


- **Exit:** Terminates the execution

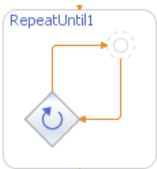
# Structured Activities



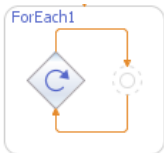
- **If:** Specifies a conditional behavior when one branch of activity is executed from a set of activities



- **While:** Repeat an activity as long as the condition is true



- **Repeat Until:** Repeats an activity as long as the condition, evaluated after the execution of the activity, is true



- **For Each:** Executes the contained activities N+1 times



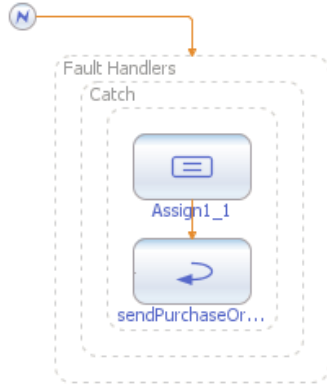
- **Pick:** waits for the occurrence of an event



- **Flow:** Specifies one or more activities to be executed concurrently 6

# Fault Handlers

## BPEL allows to catch and manage exceptions using fault handlers



- The **catch** activity intercepts and handles specific types of fault
- Each fault handler contains an activity that runs in case of an exception
- Several catch activities could be attached to the process to manage different types of faults

# Example Description

**A simple travel agency proposes to customers a choose between two airline companies (West and East Airlines) and two hotels groups (BestWestern and HolidayInn).**

**The business process takes in input:**

- name of the customer
- source and destination
- number of days and passengers

**The process of reservation asks first if West has availability of a flight and, if it doesn't, asks to East. Then, it calls in parallel the hotel booking services and reserves the room in the cheaper hotel.**

- BestWestern fees:  $5 * \text{places} * \text{days}$
- HolidayInn fees:  $4 * \text{places} * \text{days}$



# **1<sup>st</sup> step: Web Application**

## **Creation of the web application**

## **Configuration of web services**

- Definition of operations parameters
- Operations implementation

## **Testing**

# **2<sup>nd</sup> step: Orchestration Parameters**

**Definition of XSD schema describing process input, output, and fault messages**

**Creation of process WSDL**

# 3<sup>rd</sup> step: BPEL Diagram

## Creation of BPEL diagram

- Partner links
- Activities
- Control Structures
- Variables

# **4<sup>th</sup> step: Composite Application**

**Creation of a Composite Application**

**Importing of business process**

**Testing of the business process**

## **Create 4 new Web Services for car rentals:**

- FirstRental-Roma and FirstRental-NewYork
- Cars-Roma and Cars-NewYork

**Call in parallel the two rental companies, differentiating for destination**

**Rent the cheaper car**

# Suggested books

- David Salter, and Frank Jennings. **Building SOA-Based Composite Applications Using NetBeans IDE 6.** *Packt Publishing.*
- Judith Hurwitz, Robin Bloor, Carol Baroudi, and Marcia Kaufman. **Service Oriented Architecture for Dummies.** *Wiley Publishing, inc.*
- Thomas Erl. **SOA: Principles of Service Design.** *Prentice Hall.*
- **SOA Tutorials:** <http://www.netbeans.org/kb/trails/soa.html>

# 5<sup>th</sup> step: Process Enrichment

## Travel Agency Homepage Creation

### Simplified fault handling

**Bug? Substitute the HTTPDefaultPort parameter in WSDL file – *SOAP:Address tag***

- Retrieve it in Glassfish Startup log (default 9080)

# Summarizing

- NetBeans offer a clean and esay interface for BPEL diagram management and execution
- Any other IDE can be used for BPEL programming. Eclipse offers a SOA plugin.

