

Developing BPEL processes

First part: Introducing the Oracle BPEL Process Manager



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Questions about BPEL processes

- What's a BPEL process?
- Why BPEL processes?
- When to use them?
- Who should use them?

See professor Casati's lessons!

- How to (design && develop && test && deploy && manage) a BPEL process?

My lessons' core topic

Brief recap

- Anyway, let's do a brief recap of the BPEL theory
 - BPEL, or WS-BPEL, is a language for specifying business process behavior based on Web Services
 - BPEL is based on XML
 - BPEL relies on WSDL for publishing/invoking services
 - BPEL relies also on other WS-related and XML standards (XSD, XPath, ...)

Brief recap (2)

- BPEL defines **executable processes**, which can be executed just like a computer program
 - ...in order to model various “business actors” behavior
- BPEL defines **abstract processes**, that only have a descriptive role
 - ...in order to model business process “use cases”
- they allow partner interaction
- they are **non-deterministic**

How to execute a BPEL process

- BPEL process are executable
- But how?
 - Like dynamic web application
 - Run inside a container application
 - JSPs run inside Tomcat or Jetty or Resin or ...
 - ASPs run inside Microsoft IIS
 - And so on for PHP, RoR, Python, ...
- It's called a deployment engine
- There are many

A brief list of BPEL deployment engines

- (Non exhaustive):
 - Apache ODE
 - Apache ServiceMix (with ODE as BPEL component)
 - ActiveEndpoints ActiveBPEL Engine
 - Oracle BPEL Process Manager
 - Microsoft BizTalk Server
 - IBM WebSphere Process Server
 - ...

What does a deployment engine do?

- A BPEL engine takes care of
 - execute business process logic
 - expose processes' access points, that is, publish their web services
 - manage instances life cycles
 - publish a web interface for administration
 - provide commodity services for all deployed processes

Oracle BPEL Process Manager

- What's it?
 - A suite of tools for modeling, developing, deploying and monitoring business processes
 - A part of Oracle Fusion Middleware
- What does it do for us?
 - Automated deploy
 - Running instances monitoring
 - Testing
 - Debugging
- Why did we prefer it over other BPEL engines?
 - Complete
 - Integrated
 - Free (for personal use according to OTN license)
 - Comes with an exhaustive set of examples, demos and tutorials

Oracle BPEL PM: getting started

- Where and how to retrieve it
 - Browse to www.oracle.com
 - Search for BPEL Process Manager
 - Download the latest edition (see references at the end of the slide show)
- Licensing issues
 - In order to download and use Oracle BPEL PM, you **MUST** accept OTN license
 - You have to subscribe OTN
 - It's free for personal use, otherwise you have to pay



Oracle BPEL PM: getting started (2)

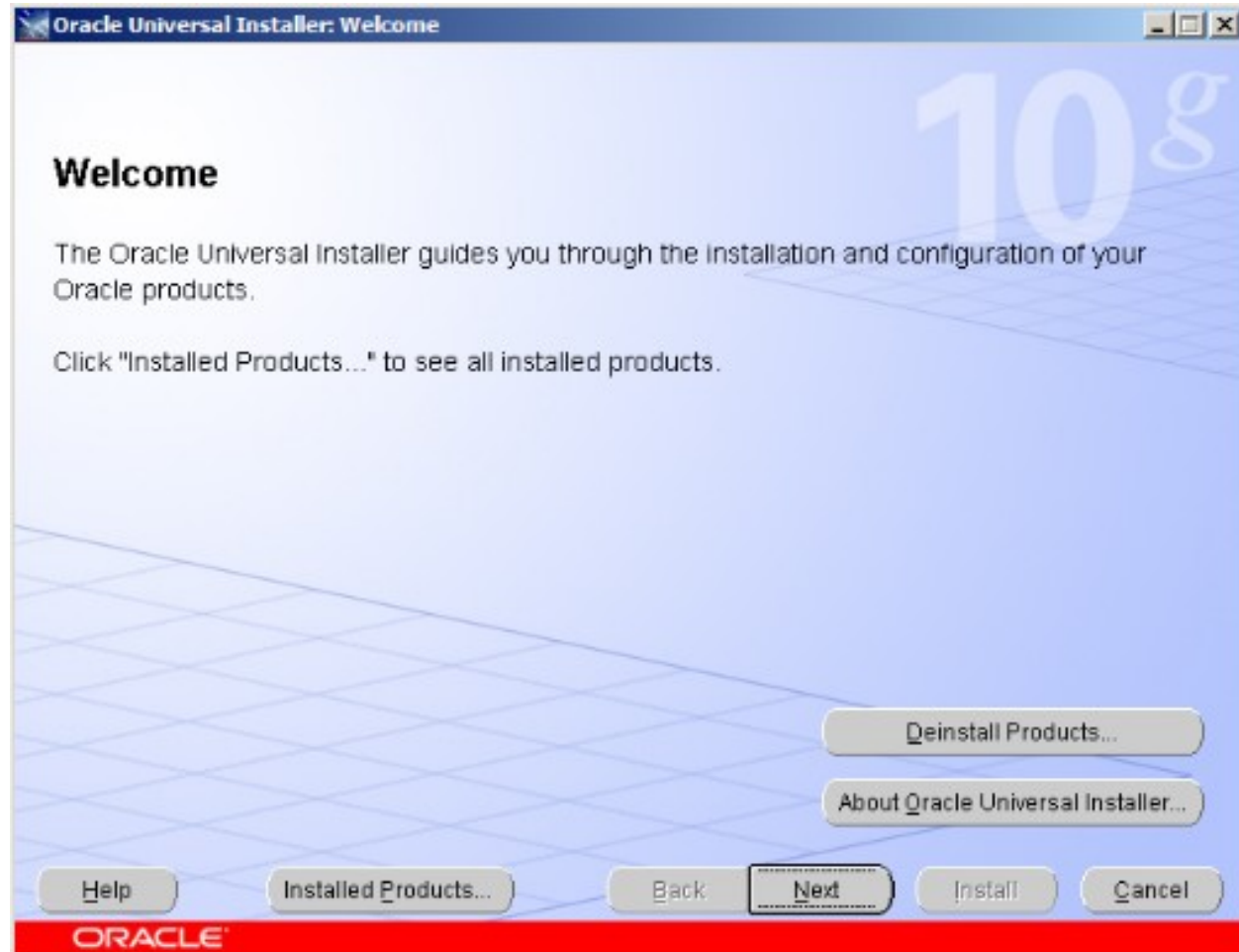
- Installation
 - I would suggest using the Windows version
 - Easier to install
 - Just one file, contains all you need for start
 - Launch the executable and follow the instructions
 - There's also a Linux version
 - You will need other Oracle tools
 - An Oracle DB (like Oracle XE)
 - Oracle AS J2EE Container
 - Configure Oracle DB

Oracle BPEL PM: getting started (3)

- Oracle BPEL process manager prefer to run on machine with fixed network (IP) address
- Most developer have DHCP-leased addresses, which changes upon each reconnection
- How to solve this?
- Install a loopback adapter!
- See instructions here:
http://download.oracle.com/docs/cd/B19306_01/install.102/b14316/reqs.htm#BABBDGBI

Oracle BPEL PM: getting started (4)

In both
Linux and
Windows,
installation
GUI's
interfaces
look almost
identical



BPEL Console

- A web application that allows you to manage BPEL instances running on Oracle BPEL PM
 - Deploy / Undeploy
 - Inspect
 - Debug
 - Audit
 - Test
- To access it:
 - Start Oracle BPEL PM
 - Browse to “<http://localhost:9700/BPELConsole>”
 - Default username: 'oc4jadmin'
 - Default password: 'welcome1'



Designing and Developing BPEL processes: Oracle JDeveloper

- In theory:
 - To develop a BPEL process, you need just:
 - A text editor
 - A BPEL server
 - An ant script for the deploy
- In practice
 - Things are much more easy when using a dedicated IDE
- Jdeveloper is such an IDE
 - Supports modeling, developing, automated deploying
 - Has a rich, easy-to-use GUI
 - Excellent integration with Oracle BPEL PM

Installing Oracle JDeveloper

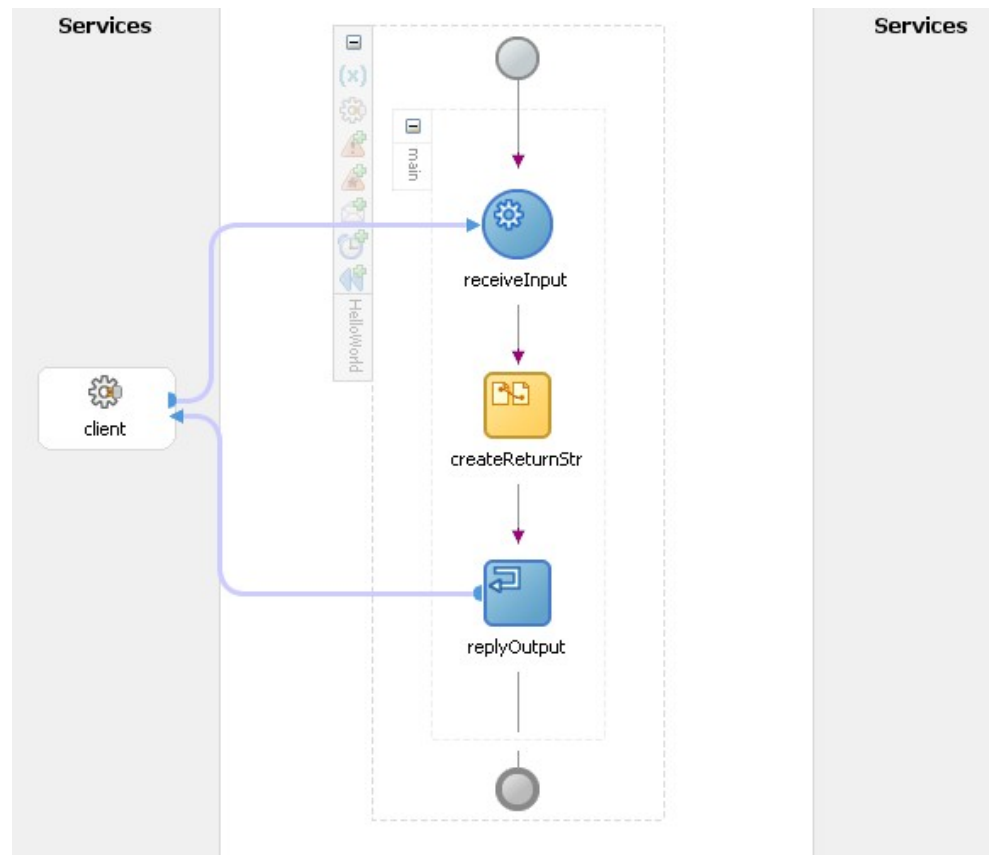
- Download it from OTN
- Remember: JDeveloper version **MUST** match BPEL process manager version
 - At the time of writing it is 10.1.3.4 for both
 - Hint: from the same page as Oracle BPEL process manager, look for “Related Downloads” box
- Simply unzip container archive and run “jdeveloper”
- Then configure IDE connection with BPEL PM
 - Top right, “Connections” tab
 - Open “Integration server”
 - Right click and create “new integration server connection”
 - Leave default values
 - When asked for username and password, use “oc4jadmin” and “welcome1”

JDeveloper BPEL designer: a warning

- JDeveloper designer is great but sometimes it just fails
 - Diagrams is out of synch
 - Warning and errors just wont go away
 - Sluggishness
 - GUI's flickers, doesn't display stuff in the right place/order, etc.
- “Use the Source, Luke!”
- Remember: the XML source is authoritative, the diagram is just a (convenient) representation of it
 - Switch to the source if you are unsure

First example: BPEL “Hello, world!”

- The most basic BPEL process



HelloWorld.bpel source excerpt

```
<?xml version = "1.0" encoding = "UTF-8" ?>
<process ...>
  ...
  <partnerLinks>
    <partnerLink name="client" partnerLinkType="client:HelloWorld"
      myRole="HelloWorldProvider"/>
  </partnerLinks>
  <variables>
    <variable name="inputVariable"
      messageType="client:HelloWorldRequestMessage"/>
    <variable name="outputVariable"
      messageType="client:HelloWorldResponseMessage"/>
  </variables>
  <sequence name="main">
    <receive name="receiveInput" partnerLink="client"
      portType="client:HelloWorld" operation="process"
      variable="inputVariable" createInstance="yes"/>
    <assign name="createReturnStr">
      <copy>
        <from expression="'Hello, world!'" />
        <to variable="outputVariable" part="payload"
          query="/client:HelloWorldProcessResponse/client:result"/>
      </copy>
    </assign>
    <reply name="replyOutput" partnerLink="client" portType="client:HelloWorld"
      operation="process" variable="outputVariable"/>
  </sequence>
  ...
</process>
```



Examples installation walk through

- How to install the Helloworld example?
 - Open JDeveloper
 - Create a new Application (suggestion: 'WebLanguages')
 - Create a new BPEL process
 - Click on 'Source' Tab
 - Copy&Paste example's source code
 - Right-click on process name and choose 'Deploy'
 - Use BPELConsole to invoke it and test if it works
- For next examples / solved exercises, complete 'bpel' directory of related JDeveloper process is provided
 - This one contains also WSDLs and XSDs for the process

References

- A three-parts article about using Oracle BPM to design, develop and deploy BPEL processes (in Italian only):
http://www2.mokabyte.it/cms/article.run?articleId=FS2-7RK-STN-QPO_7f000001_1936751_5fdce1
- Apache ODE home page: <http://ode.apache.org>
- BPEL 2.0 definition: <http://docs.oasis-open.org/wsbpel/2.0/wsbpel-v2.0.html>
- ActiveBPEL Designer home page: <http://www.activevos.com/index.php>
- NetBeans SOA plugin: <http://www.netbeans.org/features/soa/index.html>
- Eclipse BPEL plugin: <http://www.eclipse.org/bpel/>
- InfoQ article about Oracle BPM: <http://www.infoq.com/news/2008/10/OracleBPM>
- Oracle web page about BPM: <http://www.oracle.com/technology/products/ias/bpel/index.html>