

# BPEL for Workflow Developers

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# Agenda

- Introduction
- Major Differences
- What is BPEL
- BPEL Process Manager Components
- Process Comparison Example

# Introduction

- BPEL
  - Key to SOA development
  - Business Processing Standard
  - Important part of Fusion
  - Part of E-Business Suite future
  - Ideal for bolting together Oracle's application purchases
  - Usage growing
- Standalone Workflow no longer supported after September
  - Still a part of E-Business Suite and Warehouse Builder



# Major Differences

- Original Design Goals
- Language
- Standards
- License Fees

# Original Design Goals

- Workflow
  - Manage flow within a single database and communicate with people
  - Event system added around 2001 to address communication outside database
- BPEL
  - Perform complex integration between disparate systems via web-services
  - Human Workflow added within the last year to address communication with people

# Language

- Workflow
  - Primarily PL/SQL packages
  - Portions in the database kernel
- BPEL
  - XML and java
  - Resides primarily in the middle tier

# Standards

- Workflow
  - Proprietary
- BPEL
  - Industry-wide standards

# License Fee

- Workflow
  - Free with database
- BPEL
  - Separate license fee – your guess?



# What is BPEL?

- XML
  - Used to define processes
    - Order of operation
    - Looping
    - Fault processing
    - Reversing operations
  - Interpreted by BPEL Engine
- WSDL
  - Web Services Description Language
  - Define communication between processes

# What is BPEL?

- SOAP
  - Simple Object Access Protocol
  - Used to transmit messages across the web
- UDDI
  - Universal Description, Discovery and Integration
  - Directory of available web services for lookup



# BPEL Process Manager Components

- Designer
- Engine
- Integration Services
- WSDL
- Console

# Designer

- JDeveloper or Eclipse
- Graphical interface
- Portable native BPEL format
- Source code modifiable

# Engine

- Executes standard BPEL processes
- Provides a “dehydration” capability
  - Stores status and activities in database
  - Supports long-running flows
- Underlying J2EE application server
  - Bundled version available

# Integration Services

- XSLT and XQuery transformations
- Bindings to legacy systems through JCA adaptors and native protocols
- Human Workflow for people and manual tasks

# WSDL

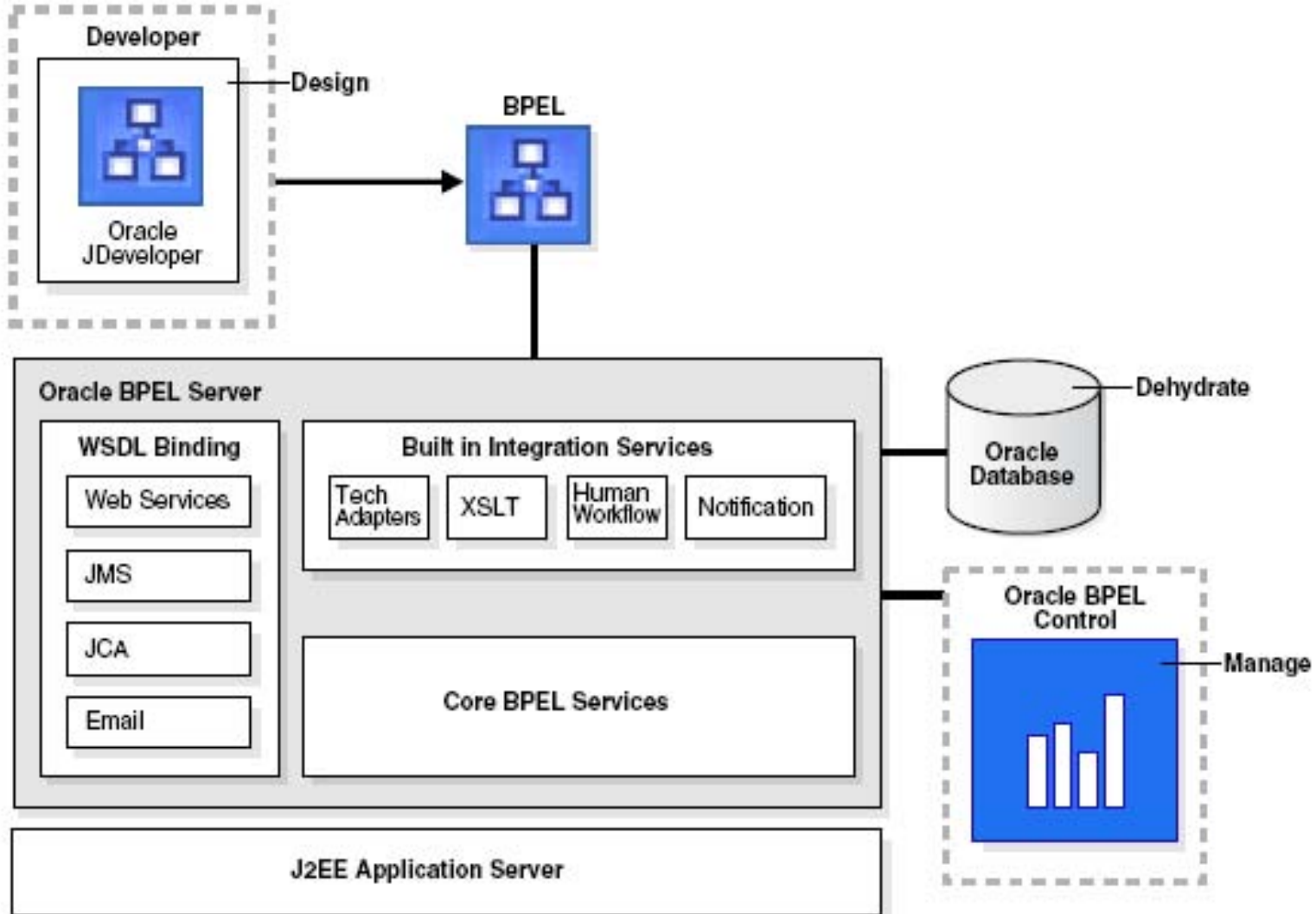
- Connectivity to protocols and message formats other than SOAP
- WSIF binding to backends or programming constructs
- Supports loosely-coupled Web services architecture

# Console

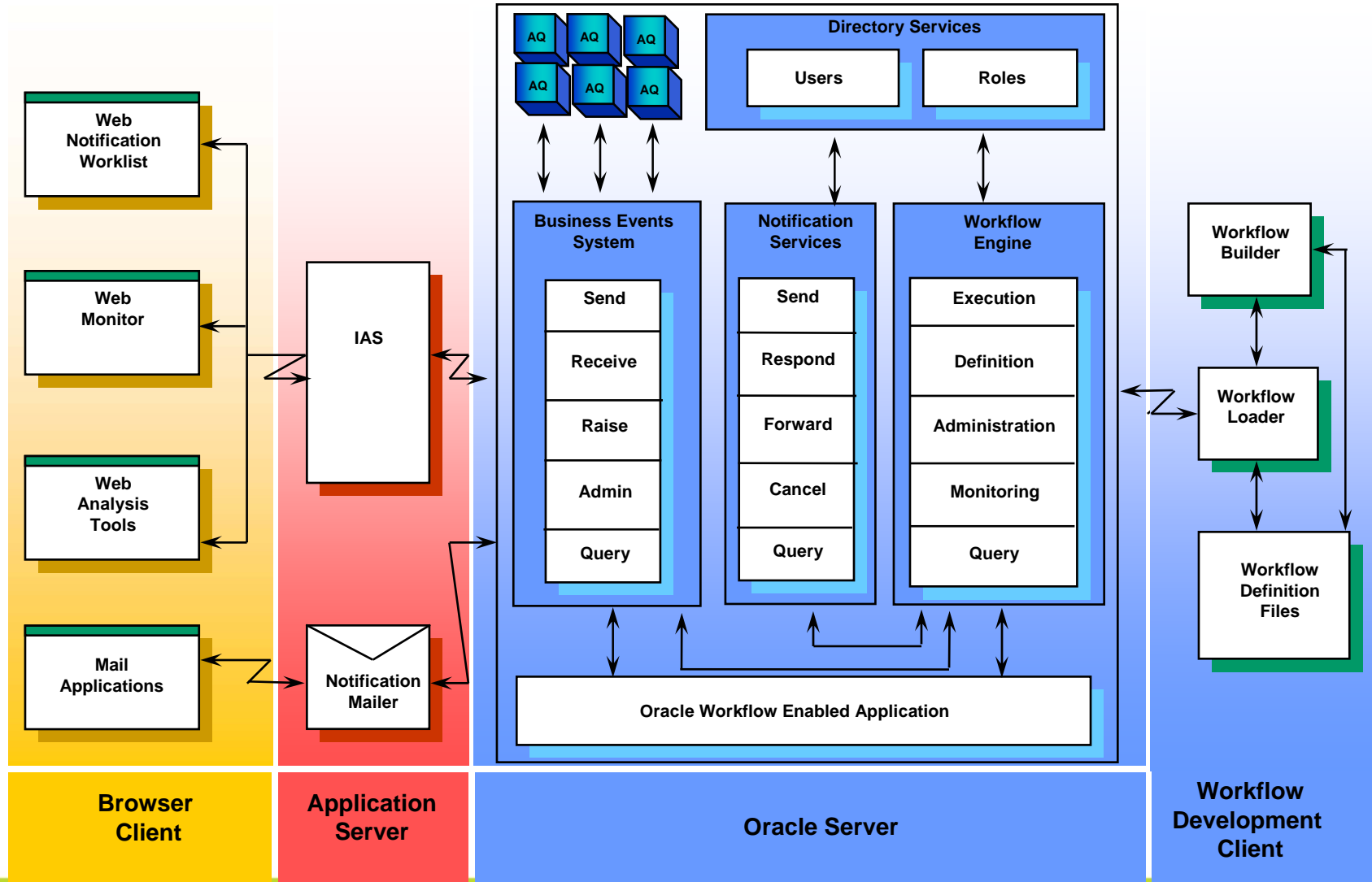
- Web-based interface for deployed processes
  - Management
  - Administration
  - Debugging
- Audit trails and process history reports



# BPEL Process Manager Components



# Workflow Components



# Workflow Components

- Similar functionality
- Resides primarily in database server
- Client based designer
- Monitoring is web-based

# BPEL Server Control

- Dashboard
- Processes
- Instances
- Activities

# Dashboard

- Currently deployed processes
- Currently running and recently completed instance
- Click process to create a test instance
- Click an instance to view details

Dashboard				BPEL Processes	Instances	Activities
Deployed BPEL Processes		In-Flight BPEL Process Instances 1 - 3				
Name	Instance	BPEL Process	Last Modified ↑			
BatchOrderProcessing	<b>34 : Instance #34 of OrderBooking</b>	OrderBooking (v. 1.5)	7/23/06 11:30:56 AM			
CreditRatingService	<b>30 : Instance #30 of OrderBooking</b>	OrderBooking (v. 1.4)	7/23/06 11:06:07 AM			
FulfillOrder	<b>32 : Instance #32 of SelectManufacturing</b>	SelectManufacturing (v. 1.0)	7/23/06 11:05:29 AM			
POAcknowledge						
RapidDistributors						
ReportsDemo ( v. 1.0 )						
ReportsDemo ( v. 2.0 )						
ReportsDemo ( v. 3.0 ) ★						
SelectManufacturing						
TaskActionHandler						
TaskManager						
		Recently Completed BPEL Process Instances ( <a href="#">More...</a> )				
	✓ 149 : Instance #149 of ReportsDemo	ReportsDemo (v. 3.0)	7/24/06 7:11:14 PM			
	✓ 148 : Instance #148 of ReportsDemo	ReportsDemo (v. 3.0)	7/24/06 7:05:50 PM			
	✓ 147 : Instance #147 of ReportsDemo	ReportsDemo (v. 3.0)	7/24/06 7:05:44 PM			

# Processes

- More summary information on deployed process lifecycles
- Additional management capabilities

Dashboard
**BPEL Processes**
Instances
Activities

**Search Processes**

Process Name

State  
Any ▾

Lifecycle  
Any ▾

---

**Related Tasks**

- [➤ Clear WSDL Cache](#)
- [➤ Deploy New Process](#)
- [➤ Perform Manual Recovery](#)
- [➤ Refresh Alarm Table](#)
- [➤ View Process Log](#)

**Deployed Processes**

	BPEL Process ↓	Lifecycle	State	Open Instances	Closed Instances
<input type="checkbox"/>	BatchOrderProcessing (v. 1.0)	Active	On	0	2
<input type="checkbox"/>	CreditRatingService (v. 1.0)	Active	On	0	9
<input type="checkbox"/>	FulfillOrder (v. 1.0)	Active	On	0	0
<input type="checkbox"/>	OrderApproval (v. 1.0)	Active	On	0	1
<input type="checkbox"/>	OrderApproval (v. v2006_07_25__37316) ★	Active	On	0	0
<input type="checkbox"/>	OrderBooking (v. 1.0)	Active	On	0	1
<input type="checkbox"/>	OrderBooking (v. 1.1)	Active	On	0	2
<input type="checkbox"/>	OrderBooking (v. 1.2)	Active	On	0	1
<input type="checkbox"/>	OrderBooking (v. 1.3)	Active	On	0	1
<input type="checkbox"/>	OrderBooking (v. 1.4)	Active	On	1	2
<input type="checkbox"/>	OrderBooking (v. 1.5) ★	Active	On	1	0
<input type="checkbox"/>	POAcknowledge (v. 1.0)	Active	On	0	4
<input type="checkbox"/>	RapidDistributors (v. 1.0)	Active	On	0	8
<input type="checkbox"/>	ReportsDemo (v. 1.0)	Active	On	0	3

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# Instances

- Search and list of process instances
- Clicking on an instance displays a page providing access to more detail

Dashboard
BPEL Processes
Instances
Activities

Locate Instances	List of BPEL Process Instances 1 - 20			
	Instance	BPEL Process	Last Modified ↑	
Instance Id# <input type="text"/> Title <input type="text"/> Priority <input type="text"/> BPEL Process All Processes ▾ Creation Date All Times ▾ State All States ▾ Test Filter Show All ▾ <div style="text-align: right; margin-top: 10px;"><input type="button" value="Go"/></div>	           	30 : Instance #30 of OrderBooking 32 : Instance #32 of SelectManufacturing 104 : Instance #104 of ReportsDemo 38 : Instance #38 of POAcknowledge 34 : Instance #34 of OrderBooking 36 : Instance #36 of SelectManufacturing 37 : Instance #37 of RapidDistributors 35 : Instance #35 of CreditRatingService 33 : Instance #33 of RapidDistributors 31 : Instance #31 of CreditRatingService 29 : Instance #29 of BatchOrderProcessing 28 : Instance #28 of POAcknowledge	OrderBooking (v. 1.4) SelectManufacturing (v. 1.0) ReportsDemo (v. 2.0) POAcknowledge (v. 1.0) OrderBooking (v. 1.5) SelectManufacturing (v. 1.0) RapidDistributors (v. 1.0) CreditRatingService (v. 1.0) RapidDistributors (v. 1.0) CreditRatingService (v. 1.0) BatchOrderProcessing (v. 1.0) POAcknowledge (v. 1.0)	7/26/06 6:47:29 AM 7/26/06 6:47:28 AM 7/24/06 6:44:38 PM 7/23/06 11:30:56 AM 7/23/06 11:30:56 AM 7/23/06 11:30:55 AM 7/23/06 11:30:54 AM 7/23/06 11:30:15 AM 7/23/06 11:06:06 AM 7/23/06 11:05:27 AM 7/23/06 11:05:27 AM 7/23/06 10:51:57 AM

# Instance Detail

- Flow – visual display of actual process path
- Audit – list of activities performed
- Debug – link to current place in source code
- Interactions – display activity page below
- Sensor Values – show sensor results
- Test – save current instance as test case for import into JDeveloper





# Activities

- Shows the status of individual activities within an instance

Navigation: **Dashboard** | **BPEL Processes** | **Instances** | **Activities**

Locate Activities

Activity Label

Activity State  
All States ▼

Activities 1 - 20

	Activity Label	Instance	Process	Created	Due
✓	assign (78)	2	<a href="#">CreditRatingService (v. 1.0)</a>	7/22/06 7:18:48 PM	no date
✓	receiveInput	2	<a href="#">CreditRatingService (v. 1.0)</a>	7/22/06 7:18:48 PM	no date
✓	replyOutput	2	<a href="#">CreditRatingService (v. 1.0)</a>	7/22/06 7:18:48 PM	no date
✓	assignCR	1	<a href="#">OrderBooking (v. 1.0)</a>	7/22/06 7:18:48 PM	no date
✓	assignRating	1	<a href="#">OrderBooking (v. 1.0)</a>	7/22/06 7:18:48 PM	no date
✓	assignOutput	1	<a href="#">OrderBooking (v. 1.0)</a>	7/22/06 7:18:48 PM	no date

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# BPEL Designer

- Building Blocks
  - Activities
  - Partner Links
- Sections/Windows – all kept in sync as changes are made anywhere
  - Application Navigator
  - Diagram Window
  - Structure Window
  - Component Palette
  - Property Inspector
  - Log Window

# Building Blocks

- Activities
  - Drag and drop onto diagram
  - Edit property pages
  - Many wizards to simplify complex constructs
- Partner Links
  - Integration to external services
  - Drag and drop onto diagram
  - Edit property pages



File Edit View Search Navigate Run Debug Refactor Versioning Tools Window Help

Applications Connecti... FlowPlus.bpel OrderBooking.bpel OrderBooking.bpel bpel.xml

Component Palette

Process Activities

- Pointer
- Assign
- Compensate
- Decide
- Email
- Empty
- Fax
- Flow
- FlowN
- Human Task
- Invoke

OrderBooking - Property Inspe...

- abstractProcess
- enableInstance...
- expressionLang...

OrderBooking.bpel - Structure

BPEL Structure

- Variables
- Message Types
- Correlation Sets
- Schemas
- Partner Links
- Activity Structure
- Properties
- Property Aliases
- Sensor Actions
- Sensors
- Test Suites

Diagram Source History

BPEL Messages - Log

OrderBooking.bpel

	XPath	Type	# of Errors
	/process/partnerLinks/partnerLink[3]	Partner Link	1
	/process/partnerLinks/partnerLink[4]	Partner Link	1
	/process/partnerLinks/partnerLink[5]	Partner Link	1

Errors: 5 Warnings: 0 Last Validated On: 23 Aug 2006 21:52:06 GMT

Validation Errors Log Messages Search Results

Messages BPEL Messages Compiler

Source BPEL

# Sections/Windows

- Application Navigator
  - Tree of application objects
    - Applications
    - Projects
    - Project files
  - Double-click objects to display
  - Right-click object for context sensitive menu of relevant commands



# Sections/Windows

- Diagram Window
  - Visual representation of an object
  - Toggle source and diagram – always in sync
  - History tab for side-by-side comparison of source versions



# Sections/Windows

- Structure Window
  - Tree structured representation of diagrammed object
  - Or source if Diagram source tab is used
  - Clicking an object will highlight it in diagram



# Sections/Windows

- Component Palette
  - Context sensitive list of objects that can be dragged onto diagram
  - Process Activities and Services provide building blocks for processes



# Sections/Windows

- Property Inspector
  - Details of an object
  - Single click on object from diagram or structure window to display

# Sections/Windows

- Log Window
  - Displays progress and errors of designer tasks
  - Double-clicking an error navigates to the offending spot in source

# Example Process

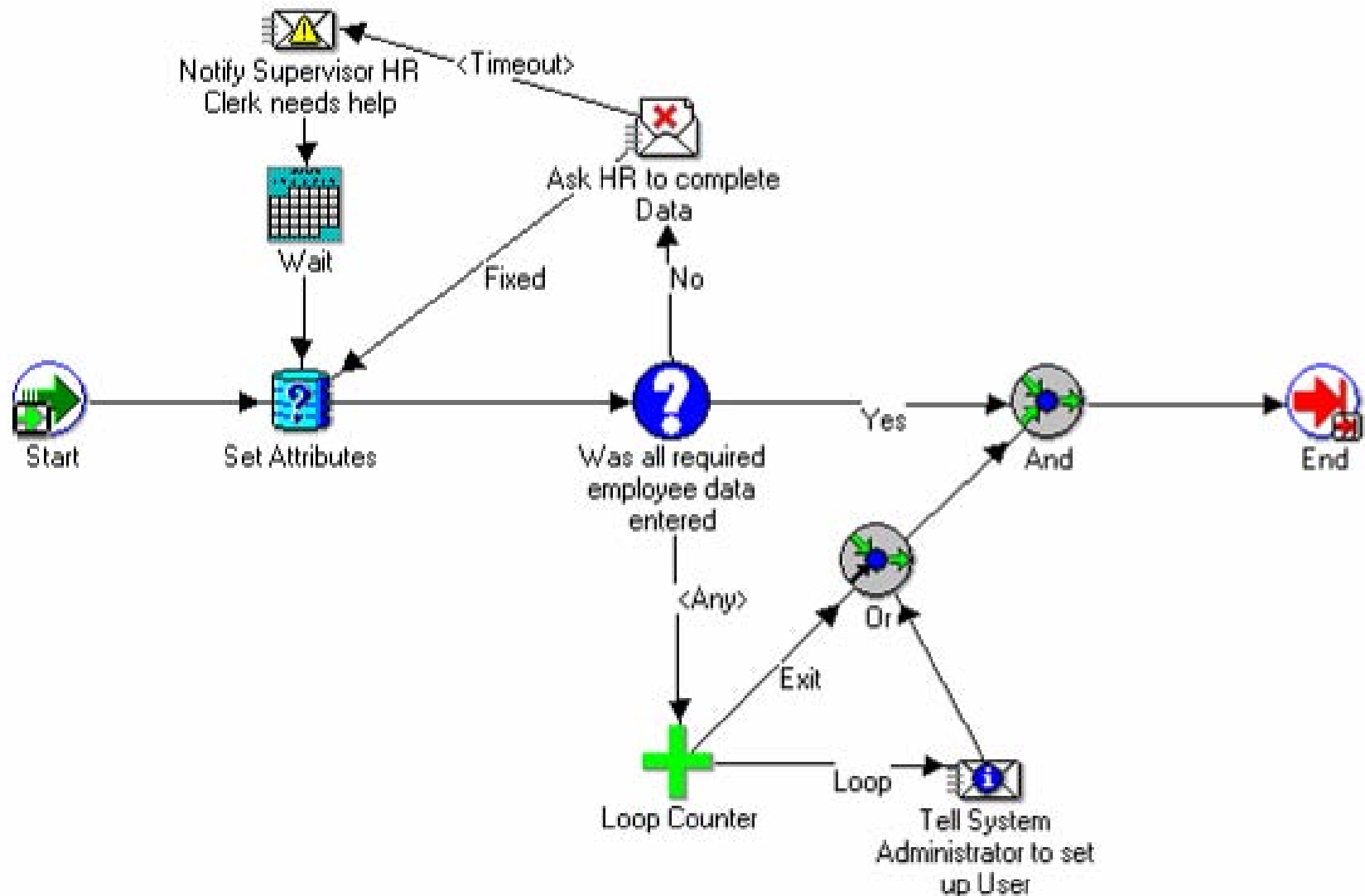
- Overview
- Detailed Steps
  - Create the process
  - Check employee for valid setup
  - HR Notification
- Running the process



# Process Overview

- From E-Business Suite example
- New employee entered into HR
  - Validate that everything is set up correctly
  - Notify someone if it is not
  - Loop until everything is OK

# Workflow Version



# Workflow Version

- More readable and concise
  - Display names
  - Labeled flows
- Look up attributes from database
- Check to see everything is OK
  - End if **YES**, just waiting for system admin notification
  - If **NO**, notify HR and wait for response
  - If no timely response notify manager and manually wait

# BPEL Version

- Have to view in pieces
- Swim lanes for services
  - TaskService for Human Workflow
  - NotificationService for email (no response)
  - InitializeEmp for lookup of database information
  - CheckEmp for validating all information correct

Services

TaskService

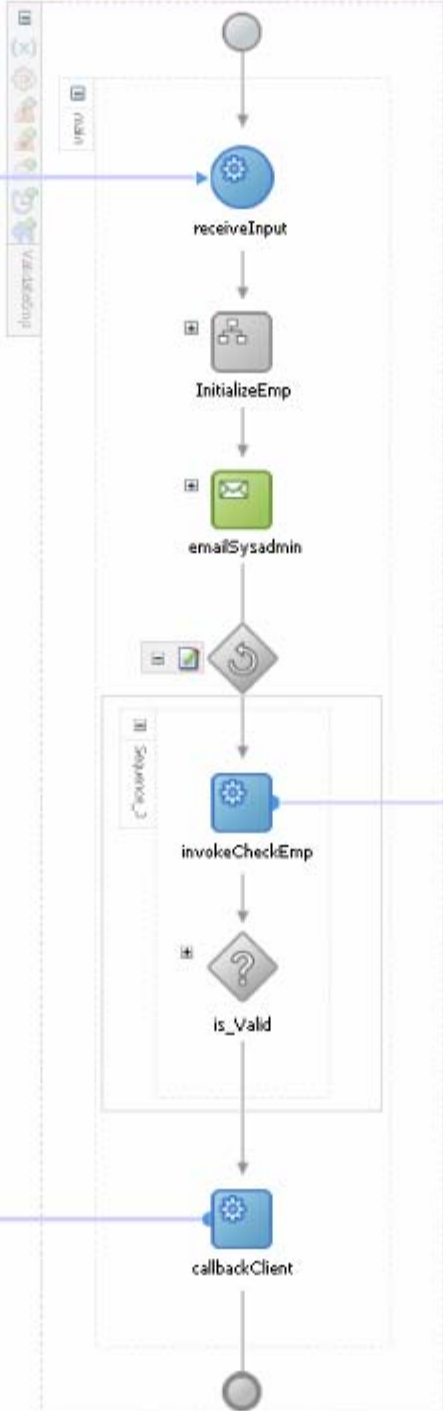
NotificationService

client

Services

InitializeEmp

CheckEmp



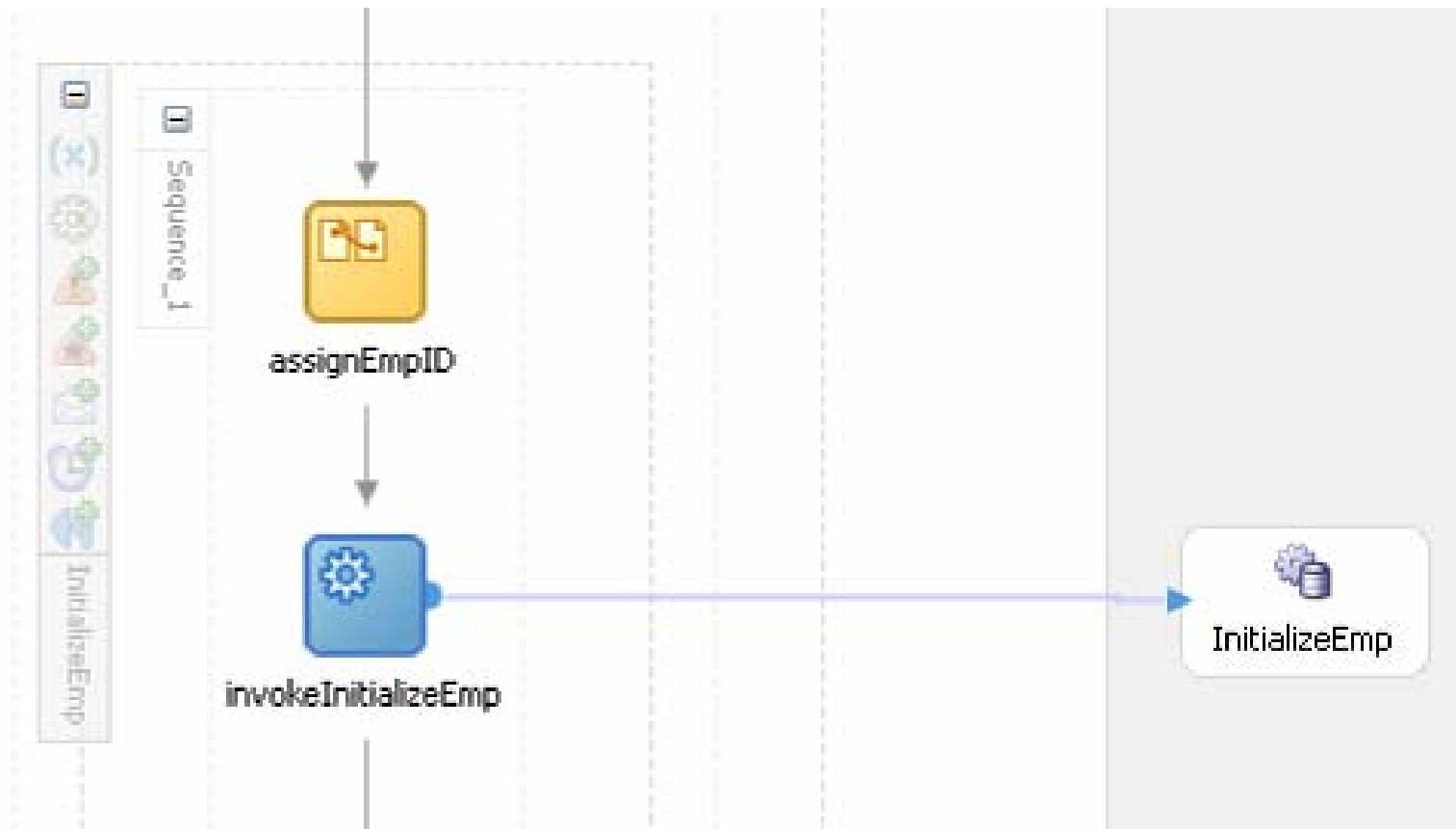


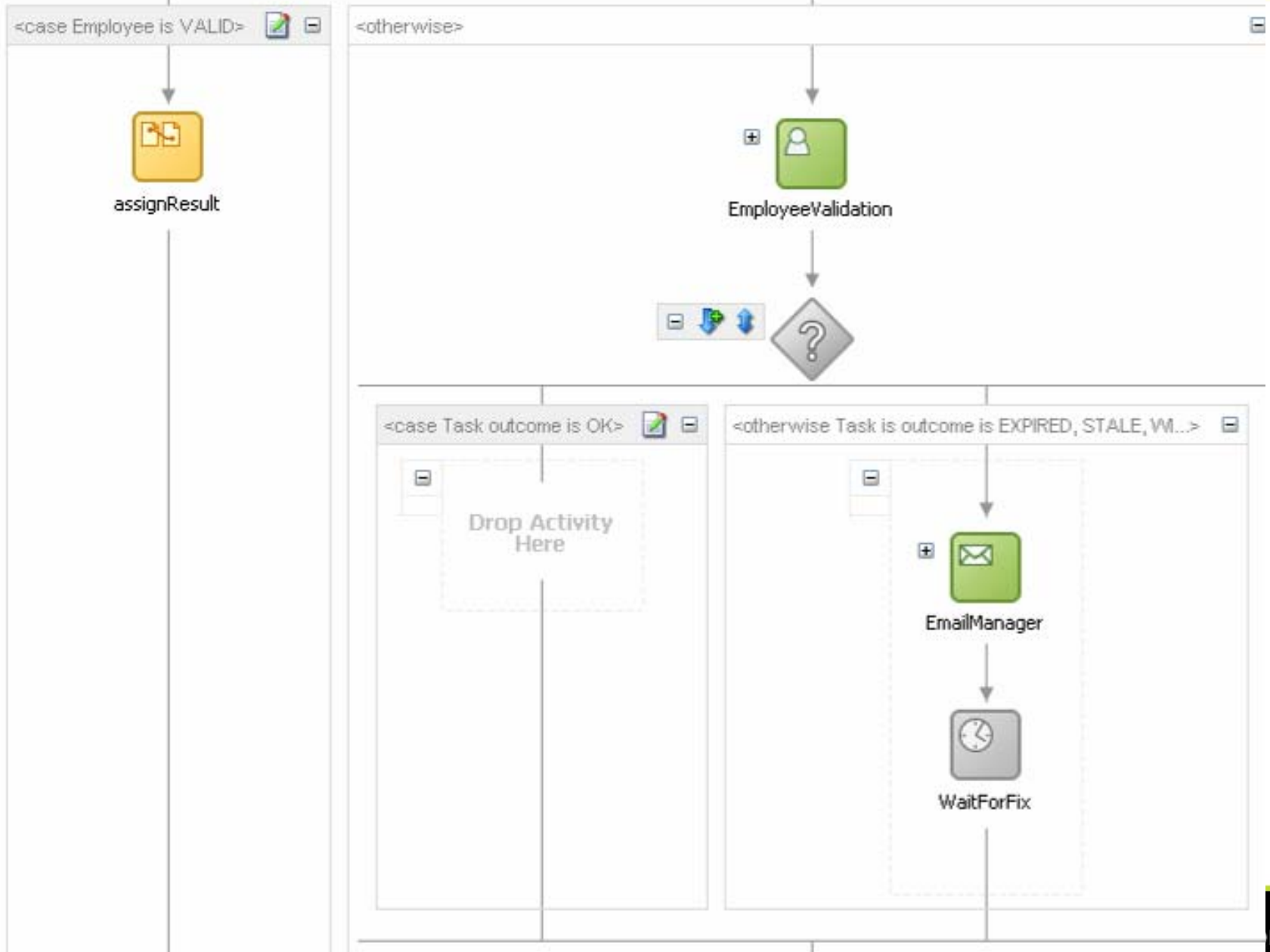
# BPEL Version

- Initialization scope to call database
- Notification to system admin
- While Loop to validate the employee and branch on result

# Initialization Scope

- Assign values to internal variables
- Invoke the database lookup service





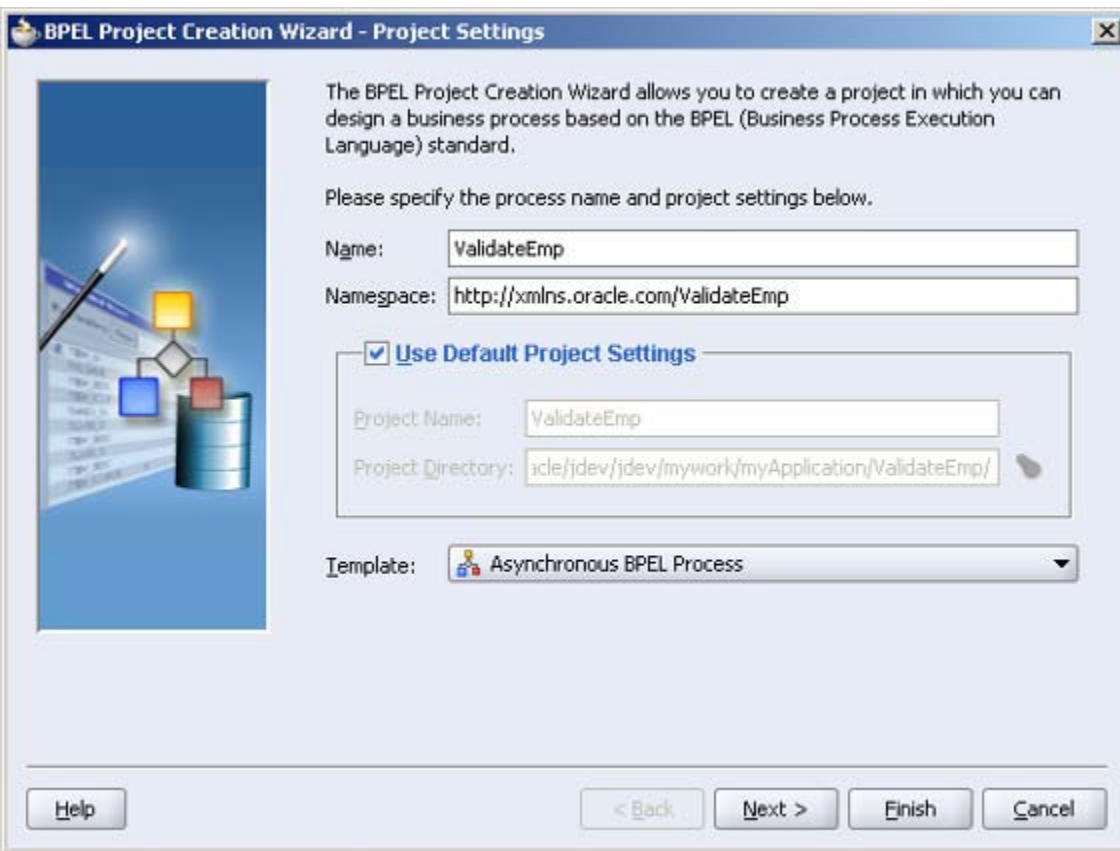
# Switch Activity

- Just set return values if OK
- Send notification to HR and wait for response
- If response is OK drop through and loop
- Time out or error notify manager and manually wait

# Create BPEL Application

- Right-click **Application**
- Choose **New Application**
- Type **myApplication** for Name
- Click **OK** and **Cancel** to **Project Pop-up**

# Create BPEL Project



- Right-click **myApplication**
- Double-click **BPEL Process Project**
- Type **validateEmp** as Name and click **Finish**

Oracle JDeveloper - myApplication.jws : myBPELProcess.jpr : F:\oracle\jdev\jdev\mywork\myApplication\myBPELProcess\bpel\myBPELProcess.bpel

File Edit View Search Navigate Run Debug Refactor Versigning Tools Window Help

Applications Navigator myBPELProcess.bpel Start Page myBPELProcess.bpel Help

Component Palette

Services

- Pointer
- AQ Adapter
- Database Adapter
- Decision Service
- EJB Web Service
- File Adapter
- FTP Adapter
- Java Web Service
- JMS Adapter
- MQ Adapter
- Oracle Applications
- PartnerLink

Property Inspector

myBPELProcess.bpel - Structure

BPEL Structure

- Variables
- Message Types
- Correlation Sets
- Schemas
- Partner Links
- Activity Structure
- Properties
- Property Aliases
- Sensor Actions
- Sensors
- Test Suites

Diagram Source History

BPEL Messages - Log

myBPELProcess.bpel

XPath	Type	# of Errors
/process/sequence/invoke	Invoke	0

Errors: 0 Warnings: 1

Last Validated On: 4 May 2007 19:02:57 GMT

Validation Errors Log Messages Search Results

Messages BPEL Messages

Zoom: 100

```

    graph TD
      Start(( )) --> Receive((receiveInput))
      Receive --> Callback((callbackClient))
      Callback --> End(( ))
      Client[client] --> Receive
      Client --> Callback
  
```

# Create Workflow Item Type and Process

- Choose **Quick Start Wizard** from **File Menu**
- Enter Following information
  - Internal Name – **XXEMP**
  - Display Name – **Validate New Employee**
  - New Process Internal Name – **XXVALEMP**
  - Display Name – **Validate New Employee Data**
- Click **OK**





# Create Workflow Item Type and Process

**Workflow Quick Start Wizard**

Please provide the following information for an automatic definition generation.

**New Item Type**

Internal Name:

Display Name:

Persistence Type:

Number of Days:

**New Process**

Internal Name:

Display Name:

OK Cancel



- Validate\_employee
- Untitled -
- Direct
- Stand
- Valid
- A
- F
- M
- F
- E
- M
- L



# BPEL Check for Valid Setup

- Add Database Connection
- Add Database Adaptor Service to diagram
- Add Invoke activity to diagram

# Add Database Connection

- Click **Connections** tab
- Right-Click on **Database**, choose **New Database Connection** and Click **Next**
- Enter **DBConnection1** and click **Next**
- Enter **Username** and **Password**, check **Deploy Password** and click **Next**
- Enter the appropriate **Host Name**, **JDBC Port** and **SID** for the database and click **Next**
- **Test Connection** and **Finish**

**Create Database Connection - Step 1 of 4: Type**

Specify a unique name and type for the connection. The name must be a valid Java identifier.

Connection Name:

**Create Database Connection - Step 2 of 4: Authentication**

Specify a username and password to authenticate the connection. To bypass authentication at runtime, select Deploy Password.

Username:

Password:

Role:

Deploy Password

**Create Database Connection - Step 3 of 4: Connection**

Specify connection details for the database machine. The database administrator should be able to provide you with this information.

Driver:

Host Name:

JDBC Port:

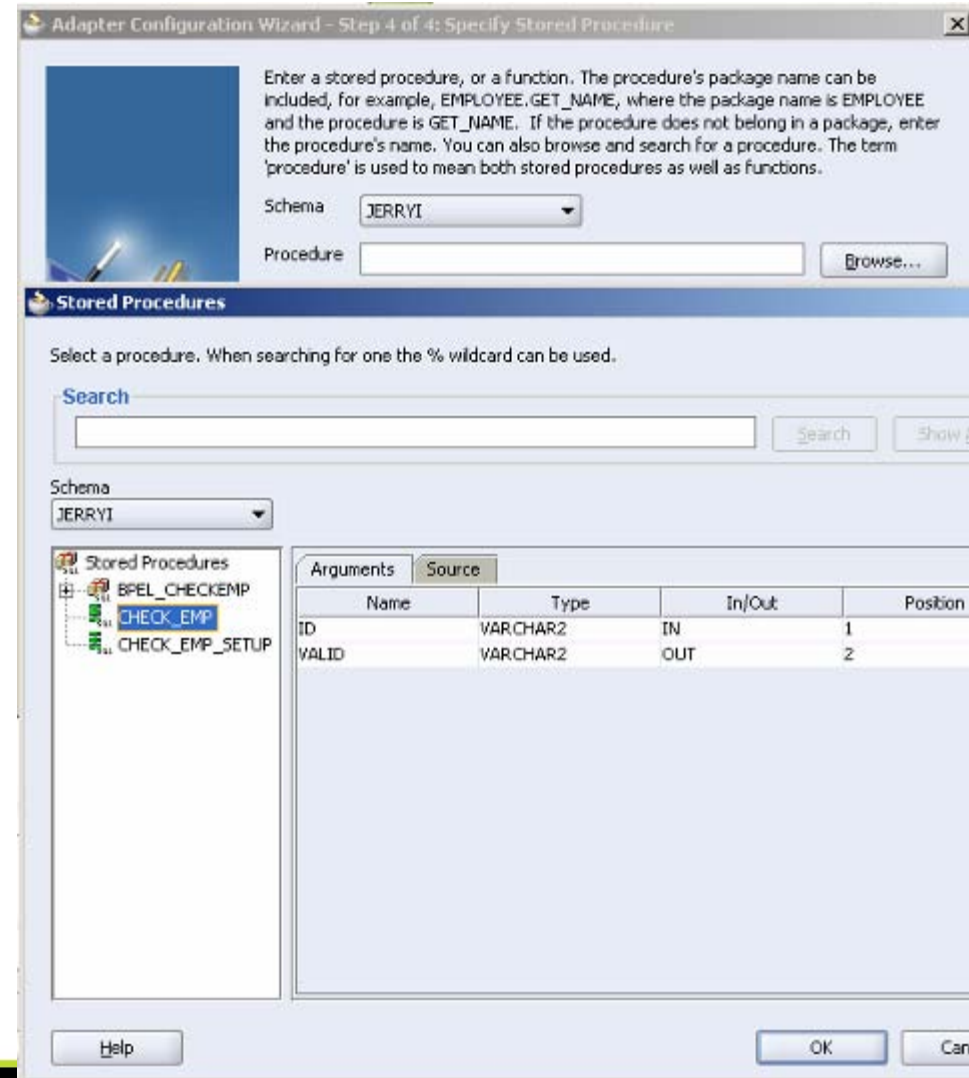
SID:

Service Name:

Enter Custom JDBC URL:

# Add Database Adaptor Service

- Select **Services in Component Palette**
- Drag and drop the **Database Adaptor** into the right swim lane
- Click **Next**, Enter **CheckEmp** and click **Next**
- Select **Database Connection** from above
- Select **Stored Procedure or Function** and click **Next**
- Select **Schema JERRYI** from dropdown and click **Browse**
- Choose **CHECK\_EMP** and Click **OK**
- Click **Next** and then **Finish**.



# Add Invoke Activity

- Select **Process Activities in Component Palette**
- Drag and drop the **Invoke** activity
- Double-click the new activity.
- Enter **invokeCheckEmp** and click the **flashlight** icon at the end of **Partner Link**.
- Choose **CheckEmp** - expanded to show the details
- Click on the **Create Variable** icon to the right of **Input** and **Output Variable** and accept the default variables
- Click **OK**

The screenshot displays the 'Invoke' activity configuration window in Oracle BPM Studio. The 'General' tab is active, showing the following configuration:

- Name:** invokeCheckEmp
- Partner Link:** CheckEmp
- Operation:** CheckEmp
- Input Variable:** invokeCheckEmp\_CheckEmp\_InputVariable\_1
- Output Variable:** invokeCheckEmp\_CheckEmp\_OutputVariable\_1

Below the configuration fields is the 'Partner Link Chooser' tree view, which is expanded to show the details of the 'CheckEmp' partner link:

- Partner Links
  - Process
    - Partner Links
      - client
        - InitializeEmp
          - NotificationService
            - CheckEmp
              - Role - CheckEmp\_role
                - PortType - CheckEmp\_ptt
                  - Operation - CheckEmp
                    - args\_in\_msg
                      - InputParameters
                        - db:InputParameters
                          - ID
                      - args\_out\_msg
                        - OutputParameters
                          - db:OutputParameters
                            - VALID

The 'Show Detailed Node Information' checkbox is located at the bottom of the tree view.

# Workflow Check for Valid Setup

- Click the **Function** Icon at top of Diagram
- Click the diagram where you want the function to be
- Enter the following data in the pop-up:
  - Internal Name – **XXVALEMP**
  - Display Name - **Was all required employee data entered**
  - Function Name – **wf\_valemp.check\_emp**
  - Result Type – **Yes/No**

The screenshot shows the 'Navigator Control Properties' dialog box with the 'Function' tab selected. The fields are filled with the following values:

- Item Type: Validate New Employee
- Internal Name: XXVALEMP
- Display Name: Was all required employee data entered
- Description: (empty)
- Icon: FUNCTION.ICO (with a gear icon next to it)
- Function Name: wf\_valemp.check\_emp
- Function Type: PL/SQL
- Result Type: Yes/No
- Cost: 0.00

Buttons for 'Edit', 'Browse', 'OK', 'Cancel', 'Apply', and 'Help' are visible.

## Workflow

- Simpler
- Return values to flow not as clear
  - APIs set flow attributes

## BPEL

- More options
  - Functions
  - Custom SQL
  - Polling for changes
- Return values to flow explicit in definition



# BPEL Validation Notification

- Define Human Task
- Add to Diagram
- Create Task Form

# Define Human Task

- Define Human Task first
  - Different outcome from the default APPROVE, REJECT
  - Otherwise designer does not default all pieces with correct values



### Human Task

Title:  Priority: 3 ( Normal )

Outcomes:  Owner:

#### Parameters

| Name          |
|---------------|
| EmpCollection |

#### Assignment and

Click the + icon to add parameters

Dev Team Approval Required majority:

Allow all participants to complete

Enable abrupt completion

#### Expiration and Escalation

#### Notification Settings

#### Advanced Settings

#### Edit Task Parameter

Define this parameter's type:

Type:

Includes standard simple XML types and types found in project schemas

Element:

Define type by reference to

Modifiable via worklist

#### Type Chooser

Type Explorer

- Project Schema Files
  - InitializeEmp\_table.xsd
    - EmpCollection**
    - InitializeEmpSelect\_inputIDInputParameters
  - JERRYI\_CHECK\_EMP.xsd
  - NotificationService.xsd
  - RoutingSlip.xsd
  - TaskService.xsd
  - ValidateEmp.xsd
  - WorkflowCommon.xsd
  - WorkflowTask.xsd
  - EmployeeValidation\_payload.xsd
  - WorkflowTask.xsd

Type:

Show Detailed Node Information

# Define Human Task

- Right click on the project **ValidateEmp**
- Choose **Create Human Task Definition**
- Enter **EmployeeValidation** and click **OK**
- In the **Human Task Editor** enter **Employee Validation** for **Title**
- Click the **flashlight** icon next to the **Outcomes** field
- Uncheck **APROVE** and **REJECT** and check **OK**



# Define Human Task

- For **Parameters** click the **+** icon on the right side.
- In the **Add Task Parameter** window click **Element** and then the **flashlight** icon
- In the **Type Chooser** window expand and select **Project Schema Files > InitializeEmp\_table.xsd > EmpCollection**, and click **OK**. This is the schema that was defined as part of the **InitializeEmp** database adaptor

### Human Task

Title:  Priority: 3 (Normal) ▾

Outcomes:  Owner:

---

### Parameters

| Name          | Element or Type   | View Only |
|---------------|---|-----------|
| EmpCollection | <> {http://xmlns.oracle.com/pcbpel/adapter/db/top/InitializeEmp}EmpCol... |           |

---

### Assignment and Routing Policy

### Edit Participant Type

**General**

Type:  ▾

Label:   
e.g., Approval Manager

Requires action from **one** of the participants below:

By name  By expression

User Id(s)  
  
Enter comma separated

Group Id(s)  
  
Enter comma separated

Specify skip rule

**Advanced**

### Identity lookup dialog

Integration Server Connection:

Realm:  ▾

Search Pattern:

**Search user**

- cdickens
  - wfaulk
    - jstein
      - jcooper**

**Selected user**

jcooper

# Define Human Task

- In the **Assignment and Routing Policy** section, click the **+** icon on the right side of the window
- In the **Add Participant Type** window, for **Type**, select **Single Approver**
- For **Label**, enter **Employee Validators**
- Click **By name** and then the **flashlight** icon to the right of **User Id(s)** to display the **Identity lookup dialog** window



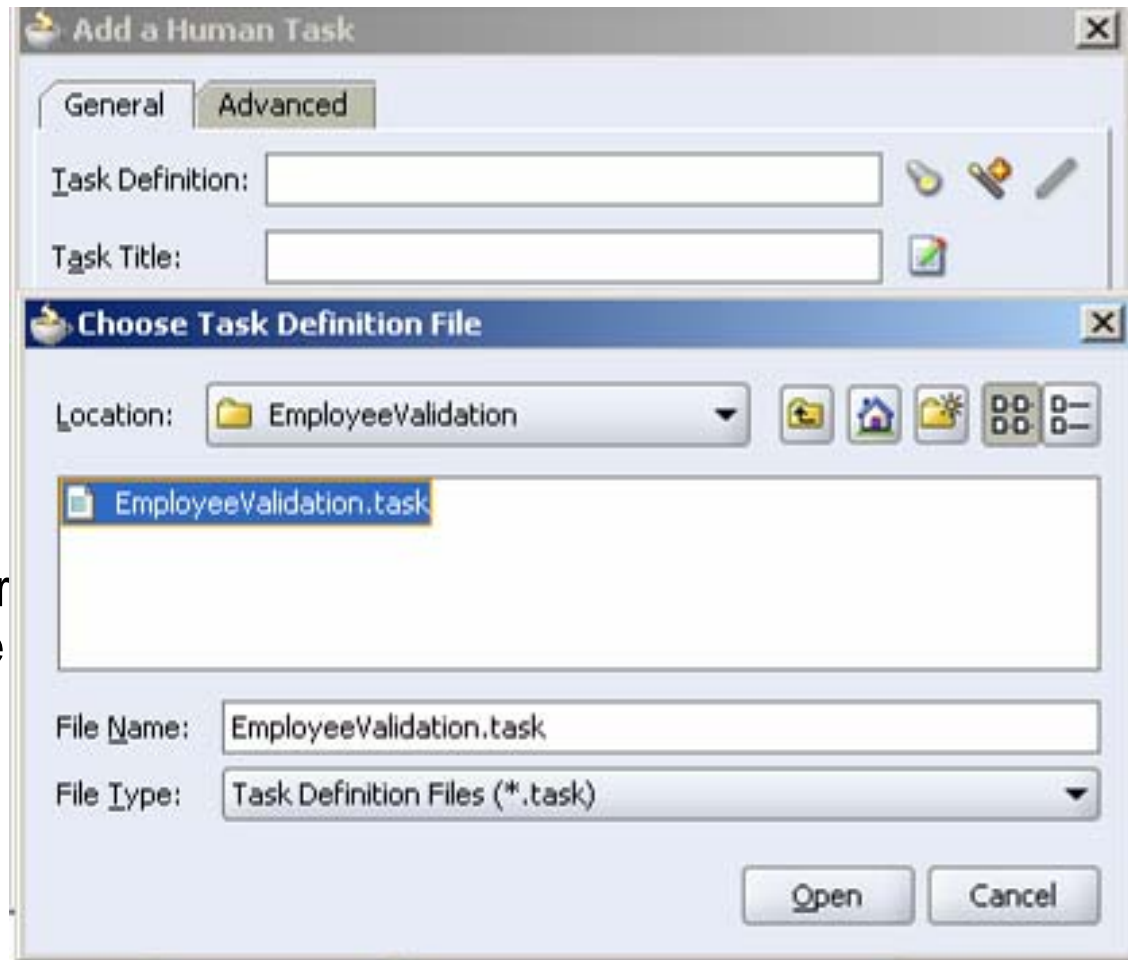
# Define Human Task

- Ensure that your integration server connection is selected and Oracle BPEL Server is running
- Click **Lookup** to see a list of users currently in the system
- Select **jcooper** and click the hierarchy just to see what that looks like
- Click **jcooper** again to highlight it and click **Select**, and click **OK**
- Click the **+** icon next to **Expiration and Escalation Policy**
- Select **Expire after** from the drop down
- Enter a **1** in **Day** to have the notification expire after a day



# Add to Diagram

- Drag and drop **Human Task** from **Process Activities** in **Component Palette**
- Click the **flashlight** icon to right of **Task Definition** field.
- Double-click **bpel** folder
- Double-click **EmployeeValidation** folder that was just created above
- Click on the **EmployeeValidation.task** entry.
- Click **Open**.

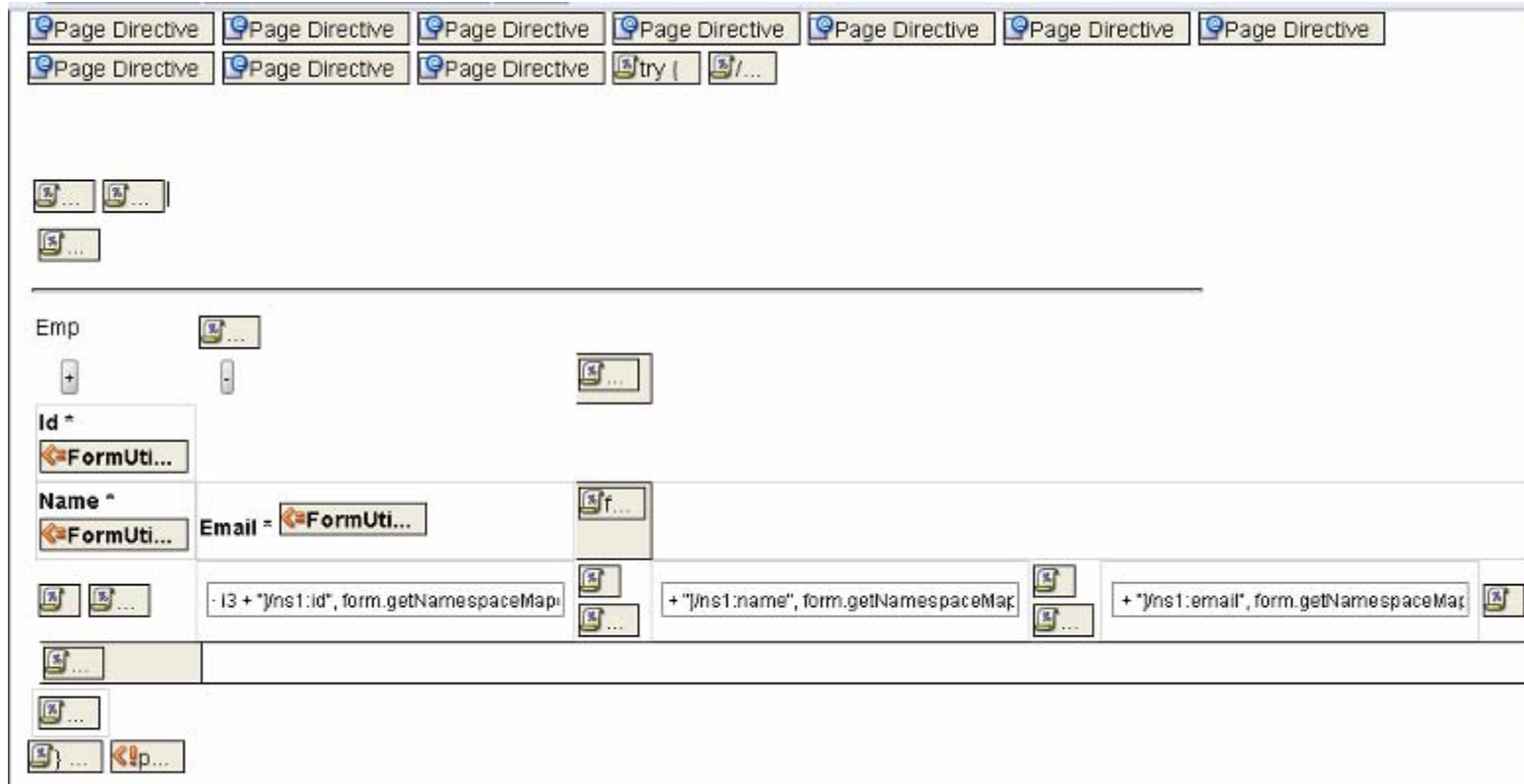


# Add to Diagram

- Add the word **for** to the end of **Employee Validation** in **Task Title**
- Click the **XPath Expression Builder** icon to the right
- In the **BPEL Variables** section, expand and select **invokeInitialize\_InitializeEmpSelect\_inputID\_OutputVariable > EmpCollection > ns2.EmpCollection > ns2.Emp > ns2:EmpName** and click **Insert Into Expression**
- Click **OK**
- Click the **flashlight** icon in the **BPEL Variable** column
- In the **Task Parameters** window, expand and select **Variables > invokeInitialize\_InitializeEmpSelect\_inputID\_OutputVariable > EmpCollection > ns2.EmpCollection** and click **OK**
- Click **OK** in the **Human Task** window



# Create Task Form



- In **Application Navigator**, right-click **EmployeeValidation** folder and select **Auto Generate Simple Task Form**
- Close default form **payload-body.jsp** by clicking the **X** on the tab.

# Workflow Validation Notification

- Create Lookup Type
- Create Message
- Create Notification on Diagram

# Create Lookup Type

- Right-click **Lookup Type** entry in tree and select **New Lookup Type**.
- Enter an **Internal Name** of **FIXED** and a **Display Name** of **Fixed**.
- Click **OK**.
- Right-click resulting **Fixed Lookup Type** and select **New Lookup Code**.
- Enter an **Internal Name** of **FIXED** and a **Display Name** of **Fixed**.
- Click **OK**.

**Navigator Control Properties**

Message | Body | Roles | Access | Result

Internal Name: ASK\_HR\_TO\_COMPLETE\_DATA

Display Name: Ask HR to Complete Data

Description: Ask HR to Complete Data

Priority: High

**Navigator Control Properties**

Message | Body | Roles | Access | Result

Subject: Employee data for employee &EMPLOYEE\_NAME is not complete

Text Body | HTML Body

Please check information for &EMPLOYEE\_NAME

OK Cancel

**Navigator Control Properties**

Message | Body | Roles | Access | Result

Display Name: Result

Description:

Lookup Type: Fixed Edit

Default

Type: Constant

Value: <None> Edit

Clear

OK Cancel Apply Help

# Create Message

- Right-click **Message** entry in tree and select **New Message**.
- Enter **HRALERT** for **Internal Name** and **Ask HR to Complete Data** as the **Display Name**.
- Click the **Body** tab
- Enter **Employee Data for employee &EMPLOYEE\_NAME is not complete** in the **Subject** line. The &attribute\_name substitutes the value of the attribute.
- Enter **Please check information for &EMPLOYEE\_NAME** in the **Text Body**.
- Click the **Result** tab.
- Enter **Result** in the **Display Name**.
- Choose **Fixed** from the drop-down list in the **Lookup Type** field.
- Click **OK**.

# Create Notification on Diagram

**Navigator Control Properties**

Notification | Details | Roles | Access | Node | Node Attributes

Item Type: Validate New Employee Data [Edit]

Internal Name: ASK\_HR\_TO\_COMPLETE\_DATA [New]

Display Name: Ask HR to complete Data

Description: Send notification to HR

Icon: NTF\_BAD.ICO [Browse]

Function Name: [ ]

Function Type: PL/SQL

Result Type: Fixed

Message: Ask HR to Complete Data

Expand Roles

[OK] [Cancel]

**Navigator Control Properties**

Notification | Details | Roles | Access | Node | Node Attributes

Label: ASK\_HR\_TO\_COMPLETE\_DATA

Start/End: Normal

Comment: [ ]

Timeout

Type: Relative Time

Value: 1 days 0 hours 0 Minutes

Priority

Type: Default

Performer

Type: Constant

Value: HR003.HR GENERALIST [Edit]

[OK] [Cancel] [Apply] [Help]



# Create Notification on Diagram

- Click **New Notification** icon at top of the diagram.
- Click on diagram where you want it placed.
- Enter the following data into the form:
  - Internal Name - **ASK\_HR\_TO\_COMPLETE\_DATA**
  - Display Name - **Ask HR to complete Data**
  - Description - **Send notification to HR**
  - Result Type – **Fixed**
  - Message – **Ask HR to Complete Data**
- Click **OK**.
- Click on **Node** tab.
- For **Performer value** enter **HR003.HR GENERALIST**
- Choose **Relative Time** from **Timeout Type** drop-down list.
- Enter **1** in **days** field.

# Workflow vs. BPEL

- Workflow
  - Simpler
- BPEL
  - Complex - Just expand EmployeeValidation
  - Many more built-in options
    - Automatic escalation
    - Automatic reminders
    - Many more
  - Notification without response simpler



# BPEL Deploy and Run

- Deploy
- Run
- Monitor
- Interact

# Deploy

- Right-click the **ValidateEmployee** process in the **Application Navigator**
- Select **Deploy > BPEL Process Deployer** and click **OK**.
- Check for and repair errors.



# Run

- Log into the **Oracle BPEL Control** by selecting it from the Start menu.
- When the **Dashboard** tab appears, click on the **ValidateEmployee** from the **Deployed BPEL Process** list.
- Enter an **ID** for an Employee and click **Post XML Message**.



Dashboard

BPEL Processes

Instances

Activities

BPEL Process: ValidateEmp Version: 11 Lifecycle: Active

Statistics: [0 Open Instances](#) | [6 Closed Instances](#)

[Manage](#)

**Initiate**

[Descriptor](#)

[WSDL](#)

[Sensors](#)

[Source](#)

[Test Suites](#)

[Reports](#)

Testing this BPEL Process

[Through SOAP](#) | [Through Java Delivery API](#)

### Initiating a test instance

To create a new 'test' instance of this BPEL Process, fill this form and click on the 'Post XML Message' button.

Operation   HTML Form  XML Source

WS-Security  Include In Header

WS-Addressing  Include In Header

payload

input  xsd:string

Note: XML source view contents will not be reflected in the HTML form view

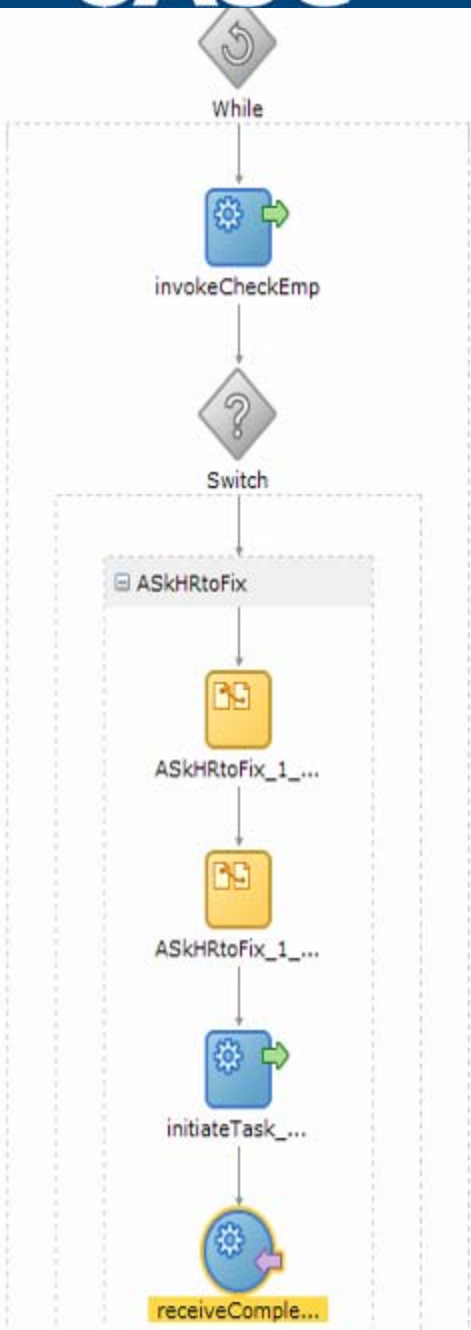
Save Test

Perform stress test

Post XML Message

# Monitor

- When the **Instance Initiated** page is displayed click on the **Flow** icon to see where the process is.
- Expand the **EmployeeValidation** activity to see the detail.
- Click on Audit tab to see list of activities
- Waiting for a response from the validators



```

<sequence>
  receiveInput
    [2007/05/24 16:46:56] Received "inputVariable" call from partner "client" More...
    <scope name="InitializeEmp">
    <scope name="emailSysAdmin">
    <while>
      <sequence>
        invokeCheckEmp
          [2007/05/24 16:46:58] Invoked 2-way operation "CheckEmp" on partner "CheckEmp". More...
          <switch>
            <sequence>
              <scope name="ASkHRtoFix">
                <sequence>
                  ASkHRtoFix_1_AssignTaskAttributes
                    [2007/05/24 16:46:58] Updated variable "initiateTaskInput" More...
                    [2007/05/24 16:46:58] Updated variable "initiateTaskInput" More...
                    [2007/05/24 16:46:58] Updated variable "initiateTaskInput" More...
                    [2007/05/24 16:46:58] Updated variable "initiateTaskInput" More...
                  ASkHRtoFix_1_AssignSystemTaskAttributes
                    [2007/05/24 16:46:58] Updated variable "initiateTaskInput" More...
                    [2007/05/24 16:46:58] Updated variable "initiateTaskInput" More...
                    [2007/05/24 16:46:58] Updated variable "initiateTaskInput" More...
                    [2007/05/24 16:46:58] Updated variable "initiateTaskInput" More...
                    [2007/05/24 16:46:58] Updated variable "initiateTaskInput" More...
                  initiateTask_ASkHRtoFix
                    [2007/05/24 16:47:21] Invoked 2-way operation "initiateTask" on partner "TaskService". More...
                receiveCompletedTask_ASkHRtoFix - pending
                  [2007/05/24 16:47:21] Waiting for "onTaskCompleted" from "TaskService". Asynchronous callback.
                
```



# Interact

- Start the **Oracle BPEL Worklist** and log in as cdoyle/welcome1
- Respond to Task Action from list or click on Task Number to see details
- The details of the item are displayed along with a short history of what has happened to the item.
- Select the response **OK** in the **Task Action Field** and click **Go**.
- Go back to the BPEL Control page and re-query the process instance. It has now progressed.

My Tasks (Inbox)

- Work Queues**
- Inbox**
- My Work Queues**
- Standard Views**
- High Priority Tasks
- Tasks Due Soon
- New Tasks
- My Views**
- None*
- Proxy Work Queues**
- Delegated Views**
- None*

Search:  My & Group  Any  Assigned

Keyword Category Priority Status Advanced Search

| Task Number | Title             | Priority | Assigned Users | Assigned Groups | State    | Created Date         | Expiration Date      | Actions   |
|-------------|-------------------|----------|----------------|-----------------|----------|----------------------|----------------------|---|
| 10026       | Validate Employee | 3        | cdoyle         |                 | Assigned | May 24, 2007 2:17 PM | May 24, 2007 2:20 PM | <input type="button" value="-- Select an Action --"/> <input type="button" value="Go"/><br><input type="button" value="-- Select an Action --"/> OK |

My Tasks > Task Details (Validate Employee)

Task Action:

OK

|   |   |                             |
|---|---|-----------------------------|
| <b>Task Number:</b> 10026                         | <b>Title:</b> Validate Employee           | <b>Task Key:</b>            |
| <b>State:</b> Expired                             | <b>Created Date:</b> 05/24/07             | <b>Creator:</b>             |
| <b>Outcome:</b>                                   | <b>Updated Date:</b> 05/24/07 05:20 PM    | <b>Acquired By:</b>         |
| <b>Priority:</b> <input type="button" value="3"/> | <b>Expiration Date:</b> 05/24/07 05:20 PM | <b>Assignees:</b> cdoyle(U) |

**Emp**

|   |   |  |
|---|---|--|
| <b>Id:</b> <input type="text" value="123"/> | <b>Name:</b> <input type="text" value="Harry Smith"/> | <b>Email:</b> <input type="text" value="hsmith@test.com"/> |
|---|---|--|

|  |                                       |
|--|---------------------------------------|
| <b>Comments:</b><br><input type="text"/> | <b>Attachments:</b><br>No Attachments |
|--|---------------------------------------|

Short History:

| Action       | State    | Outcome | Updated By | Updated Date         |
|--------------|----------|---------|------------|----------------------|
| Task Created | Assigned |         | bpeladmin  | May 24, 2007 2:17 PM |

# Workflow Deploy and Run

- Load to Database
  - Select **Save as** from **file menu**
  - Click **Database**
  - Enter **APPS** user, password, SID
  - Click **OK**
- Run
  - Workflow API
- Interact
  - Interface similar in functionality to Worklist
  - Regular email

# Additional Observations

- Common Features
  - Detailed Logging of Activities
  - Extensive Error Handling
  - Undo
  - Confusion
- Differences
  - UI
  - Programming language
  - Testing

# Detailed Logging Of Activities

- Log to database
  - BPEL can be a separate database
- Valuable historical data
- Vigilant purging required

# Extensive error handling capability

- BPEL – throw and catch logic
- Workflow – specified error workflows

# Undo

- Workflow has a CANCEL mode
- BPEL has compensation flows
- Both can be very complex to implement

# UI

- BPEL
  - Modern
  - Many wizards
  - Large footprint
  - Need large screen
- Workflow
  - Old client interface
  - More compact



# Language

- BPEL has underlying language
  - View source
  - Edit source directly
- Workflow has no underlying language
  - PL/SQL or Java in database
  - Not accessible via designer

# Testing

- BPEL
  - UI has built-in testing facilities
  - Can easily capture testing scenarios from console

# Conclusions

- Both have strengths and weaknesses
- Transition is going to be interesting to watch and probably painful

# Q&A

## BPEL for Workflow Developers

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