



Labkit  
for  
WSO2 Business Process Server 3.6.0  
Developer Fundamentals

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## Prerequisites

Install WSO2 Business Process Server

<https://docs.wso2.com/display/BPS360/Installation+Guide>

Install Eclipse IDE and the WSO2 BPS Tooling plugin

<https://docs.wso2.com/display/BPS360/Installing+the+BPS+Tooling+Plug-In>

# Setting Up

Make sure that both BPS and developer studio is configured. Start developer studio and install Activiti plugin

# Lab 6 : BPMN Process Creation (mixed use case)

BPMN is the most popular process modeling standard in the industry due to its modeling and execution capabilities and vendor support. With BPMN you can model process orchestrations with user interactions very easily.

## Training Objective

Learn how to create BPMN processes.

## Business Scenario

The leave application process is a process that involves human interaction as well as branching based on decision points. It would start with an employee requesting for leave with a leave form submission, which will be checked by the relevant manager who can either approve or reject it. Finally, the employee will be notified of leave approval or rejection. Follow the steps below to model this process as a BPMN process.

## High Level Steps

- Creating an Activiti Project
- Creating the BPMN Process
- Deploying the BPMN Process

## Detailed Instructions

### Setting up the project

1. Start Eclipse and navigate to **File > New > Other**. From the window that appears select **Activiti > Activiti Project** and click **Next**.
2. Provide a suitable Project Name and click **Finish**. (For this tutorial, the project was named "Activiti Project")
3. Right-click on your project and navigate to **New > Other**. From the window that appears, select **Activiti > Activiti Diagram**.
4. Select the project in the viewer, enter a filename and click **Finish**. (For this tutorial, the diagram was named "LeaveApprovalProcess")
5. The palette found on the right side of the BPMN process lists down all the necessary

BPMN notations. Every BPMN process should start with a 'start event' and end with an 'end event'. Drag a **StartEvent** node to the design space as seen below. You can also update the properties **Name** field accordingly.



6. The first step of the BPMN process is where a user submits a leave application form. Add the application form to the start event. To do this, click on the StartEvent node and go to the **Form** tab of the **Properties** panel.

7. Click **New** and add a new field for each of the following fields.

Id	numberOfDays																		
Name	Number of days																		
Type	long																		
Expression																			
Variable																			
Default																			
Date pattern																			
Readable	True <input checked="" type="checkbox"/>																		
Writeable	True <input checked="" type="checkbox"/>																		
Required	True <input checked="" type="checkbox"/>																		
Form values	<table border="1"> <thead> <tr> <th>Id</th> <th>Name</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <div> New  Edit  Remove  Up  Down </div>	Id	Name																
Id	Name																		

Number of days	
Id	numberOfDays

Name	Number of days
Type	long
Readable	true
Writeable	true
Required	true

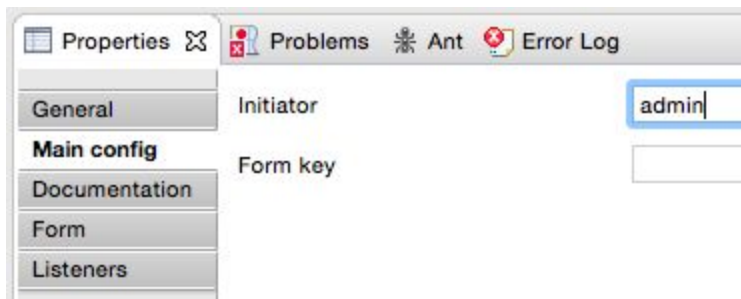
Start Date	
Id	startDate
Name	First day of holiday (dd-MM-yyyy)
Type	string
Date Pattern	dd-MM-yyyy hh:mm
Readable	true
Writeable	true
Required	true

Vacation Reason	
Id	vacationReason
Name	Reason
Type	string
Readable	true
Writeable	true
Required	true

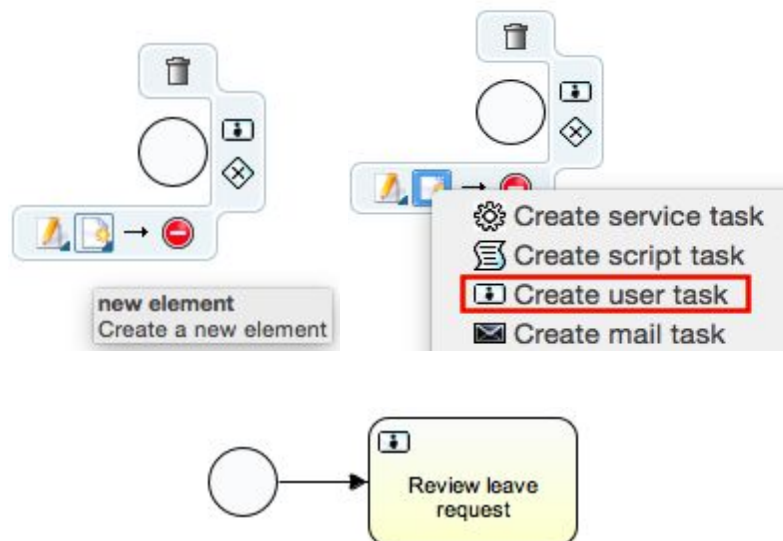
Employee Name	
Id	employeeName

Name	Name of employee
Type	string
Readable	true
Writable	true
Required	true

8. Now you need to add an initiator to the start event. Go to the **Main config** tab of the **Properties** panel and add the initiator field.



9. The next step of the process is where the respective manager checks the leave application form and approves/rejects it. For this part of the process, add a **UserTask** as it will be a task performed by a user. To add a user task, hover over the **StartEvent** on the design canvas, click on **new element** and select **Create user task**. Name it "Review leave request".



10. Click on the user task and go to the **Form** tab of the **Properties** panel. Click on **New** and add the following field:
- For fields of type "enum" you can add form values that act as different options.



You can provide two options “Approve” and “Reject” for this field.

Vacation Approval	
Id	vacationApproved
Name	Do you approve this vacation request?
Type	enum
Readable	true
Writeable	true
Required	true
Form Values	
Id	true
Name	Approve
Id	false
Name	Reject

Form property configuration

Id

vacationApproved

Name

Do you approve this vacation request?

Type

enum

Expression

Variable

Default

Date pattern

Readable

True

Writeable

True

Required

True

Form values

Id	Name
true	Approve
false	Reject

New

Edit

- Now you need to add an assignee to the user task. Assuming that a single person (e.g., HR manager) is responsible for approving or rejecting leave, you can go to the **Main Config** tab and enter the relevant user in the **Assignee** field.

- If you want to allow a group of people (e.g, anyone in the HR department) to approve/reject leave, you can enter the group role name (“hrDepartment”) in the **Candidate group** field.

General	Assignee	manager
Main config	Candidate user...mma separated)	
Documentation	Candidate grou...mma separated)	
Form	Form key	
Listeners	Due date (variable)	
Multi instance	Priority	
	Category	
	Skip expression	

- The next part of the process depends on two possible outputs; approval of the request and rejection of the request. If the request was approved, you can send an email to the employee. If it was rejected, you can let the employee decide whether to re-submit a leave request or end the process.

To indicate these two actions, add a decision making notation. Hover over the UserTask and click **new exclusive gateway**.



- Click on the gateway and go to the **General** tab of the **Properties** panel. Fill in the following fields:

- Id: requestApprovedDecision
- Name: Request approved?

General	Id	requestApprovedDecision
Documentation	Name	Request approved?
Listeners	<input type="checkbox"/> Asynchronous	
	<input checked="" type="checkbox"/> Exclusive	

- Add two tasks for the two actions; a mail task to send a confirmation email if the request is approved and a user task to adjust the vacation request if it is rejected.

15. Click on the mail task and go to the **General** tab of the **Properties** panel. Enter **Send confirmation e-mail** as the value for the **Name** field. Similarly, name the user task **Adjust vacation request**.

Properties Problems Ant Error Log

**General**

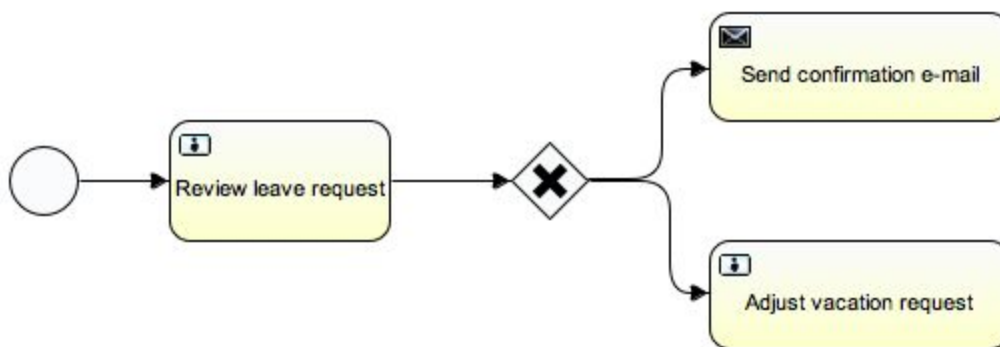
Id: mailtask1

Name: Send confirmation e-mail

☐ Asynchronous

☒ Exclusive

☐ Is for compensation?



16. Next, you need to add the decision logic that specifies that the process should proceed to the mail task if approved and to the user task if rejected.

Click on the arrow leading to the mail task and enter the following condition in the **Main config** tab of the **Properties** panel.

- `${vacationApproved == 'true'}`
- “vacationApproved” is the id of the enum field we added to the **Review leave request** user task.

Properties Problems Ant Error Log

**Main config**

Label width (50-500): 100

Skip expression:

Condition: `${vacationApproved == 'true'}`

17. Click on the arrow leading to the user task from the exclusive gateway and enter the following condition in the **Main config** tab.

- `${vacationApproved == 'false'}`

18. Next, click on the mail task and go to the **Main Config** tab of the **Properties** panel. Fill in the following fields:

- **To:** admin@gmail.com
- **From:** manager@gmail.com
- **Subject:** Leave approved!
- **Non html:** Hi {\$employeeName}, your leave request is approved.

*Note that the sender email address specified here needs to be defined in the `activiti.xml` file as well. You will see the instruction for that step later in this labkit.*

*If you are using Gmail to try out this scenario, enable IMAP access for Gmail. See [Enable IMAP settings in Gmail](#) for more information.*

*If you receive an authentication error, you may have to adjust your account access settings in Gmail as well. See [Allowing less secure apps to access your account](#) for more information.*

General	To	admin@gmail.com
<b>Main config</b>	From	manager@gmail.com
Documentation	Subject	Leave approved!
Listeners	Cc	
Multi instance	Bcc	
	Charset	
	Html	
	Non html	Hi {\$employeeName}, your leave request is approved.

19. Click on the user task **Adjust vacation request** and go to the **Main Config** tab. Set the assignee as admin who was the initiator you set for the start event as well.

General	Assignee	admin
Main config	Candidate user...mma separated)	
Documentation	Candidate grou...mma separated)	
Form	Form key	
Listeners		
Multi instance		

20. Go to the **Form** tab and add all the form fields you added for the form on the start event. Add the following additional field as well.

Resend request	
Id	resendRequest
Name	Resend vacation request to manager?
Type	enum
Readable	true
Writeable	true
Required	true
Form Values	
Id	true
Name	Yes
Id	false
Name	No

Id	resendRequest								
Name	Resend vacation request to manager?								
Type	enum								
Expression									
Variable									
Default									
Date pattern									
Readable	True								
Writeable	True								
Required	True								
Form values	<table> <tr> <th>Id</th> <th>Name</th> </tr> <tr> <td>true</td> <td>Yes</td> </tr> <tr> <td>false</td> <td>No</td> </tr> </table>			Id	Name	true	Yes	false	No
Id	Name								
true	Yes								
false	No								

New
Edit

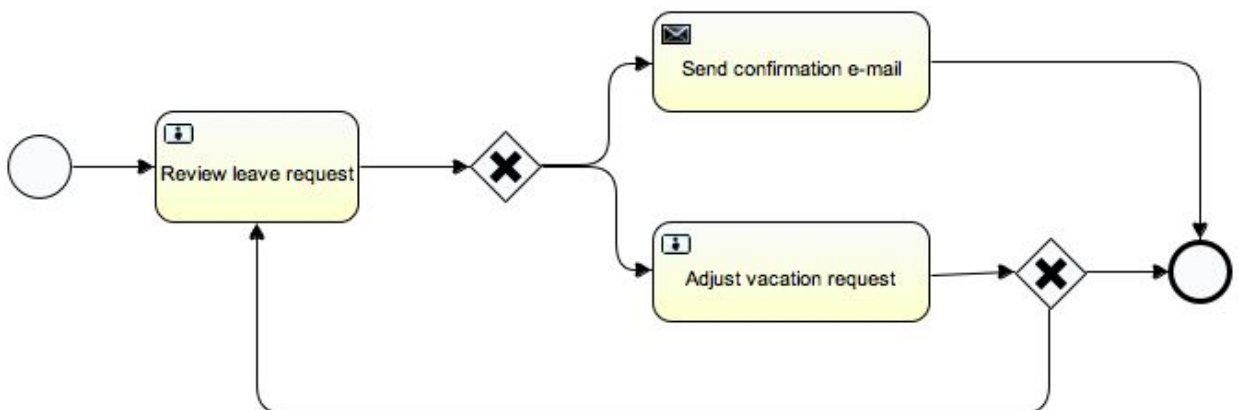
21. The form properties should look like the following:

Form properties:

Id	Name	Type	Pattern	Required	Readable	Writeable	Form values
numberOfDays	Number of Days	long		true	true	true	
startDate	First day of holiday (d...	string	dd-MM-...	true	true	true	
vacationReason	Reason	string		true	true	true	
employeeName	Name of Employee	string		true	true	true	
resendRequest	Resend vacation requ...	enum		true	true	true	true:Yes,false:No

New
Edit
Remove

22. Click on the user task and add another exclusive gateway. One of the outgoing arrows should lead to an **endEvent** and the other should lead to the **Review leave request** user task.



23. Click on the arrow leading to **Review leave request** and add the following condition on

the **Main config** tab.

- `${resendRequest == 'true'}`

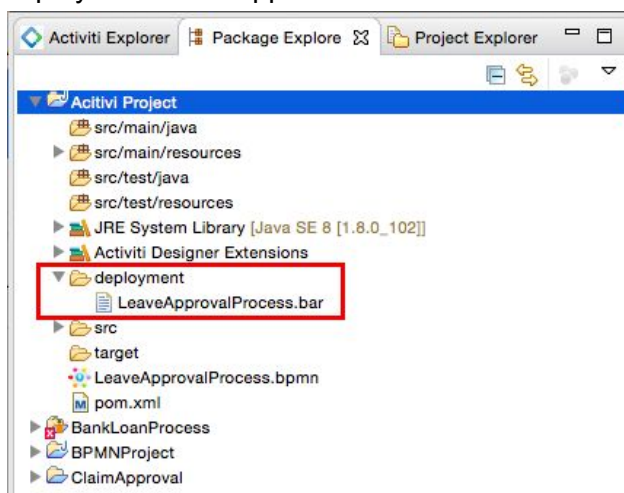
General	Label width (50-500)	100
<b>Main config</b>	Skip expression	
Documentation	Condition	<code>\${resendRequest == 'true'}</code>
Listeners		

24. Click on the arrow leading to the endEvent and add the following condition on the **Main config** tab.

- `${resendRequest == 'false'}`

General	Label width (50-500)	100
<b>Main config</b>	Skip expression	
Documentation	Condition	<code>\${resendRequest == 'false'}</code>
Listeners		

25. Go to the **Package Explorer** view of Eclipse found on the right side panel and right click on the Activiti project. Select **Create deployment artifacts**. This will create the deployable LeaveApprovalProcess.bar file.



## Deploying the BPMN Process

1. Configure the following properties under the processEngineConfiguration bean found in the <BPS\_HOME>/repository/conf/activiti.xml file with the following values as seen below:
  - <property name="mailServerHost" value="smtp.gmail.com"/>
  - <property name="mailServerPort" value="456"/>
2. Add the following properties to the activiti.xml file under the processEngineConfiguration bean:
  - <property name="mailServerDefaultFrom" value="admin@gmail.com"/>
  - <property name="mailServerUseSSL" value="true"/>
  - <property name="mailServerUsername" value="admin@gmail.com"/>
  - <property name="mailServerPassword" value="mailtask123"/>
3. Copy the following jar files into the <BPS\_HOME>/repository/components/lib directory and restart the server.
  - [org.apache.commons:commons-email:jar:1.3](#)
  - [javax.mail:mail:jar:1.4.7](#)
  - [javax.activation:activation:jar:1.1](#)
4. Login to the management console and go to **Configure>Users and Roles>Add>Add New User**. Create a user called manager and click **Next**.

[Home](#) > [Configure](#) > [Users and Roles](#) > [Add](#) > [Add User](#)

### Add New User

#### Step 1 : Enter user name

Enter user name	
Domain	PRIMARY
User Name*	manager
Password*	*****
Password Repeat*	*****
<input type="button" value="Next &gt;"/> <input type="button" value="Finish"/> <input type="button" value="Cancel"/>	



5. Assign the user to the **admin** role and click **Finish**.

Home > Configure > Users and Roles > Add > Add User > Users of Role

## Add User

### Step 2 : Select roles of the user

Enter role name pattern (\* for all)

Search Users

#### Users of Role

Select all on this page | Unselect all on this page

☒

admin

☒

Internal/everyone

Finish

Cancel

6. Go to the **Main** tab and click on **Add>BPMN** under the **Processes** section. Upload the LeaveApprovalProcess.bar file.

Home > Manage > Processes > Add > BPMN

## New BPMN Package

### Upload BPMN Package(s)

BPMN Package(.bar)\*

Choose File

LeaveApprovalProcess.bar



Upload

Cancel

7. Now login to the [BPMN explorer](#) using admin/admin credentials and go to the **PROCESSES** tab.

Processes				
Package Name	Process Name	Process Definition ID	Version	Action
LeaveApplicationProcess-1	Vacation request	vacationRequest:1:4	1	<a href="#">Start</a>

8. Click on the **Start** button to initiate this process. You will be presented with the following form. Fill in the fields and click **Start**.
- Initiate the process twice (repeat step 8) so that you can view the response of both leave approval and leave rejection.

## Start Process

Number of days:

First day of holiday (dd-MM-yyyy):

Reason:

Name of employee:

Start

9. Now logout and login again using manager/manager credentials. Go to the **TASKS>MY TASKS** tab. The following task will be listed twice.

WSO<sub>2</sub>

BPMN EXPLORER

manager | Logout

DASHBOARD

TASKS

PROCESSES

MONITORING

REPORTS

SEARCH

My Tasks

Task ID	Task Name	Due Date
45	Review leave request	Not available
55	Review leave request	Not available

1

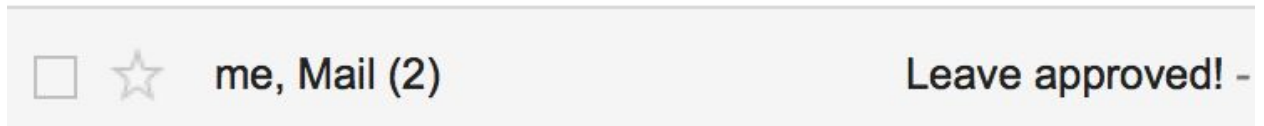
10. Click on the task, **approve** it and click **Complete Task**.

Process Definition ID	vacationRequest:1:4		
Process instance ID	5		
Process Status	ACTIVE		
People	Owner: Not available	<div style="background-color: #333; color: white; padding: 2px 5px;">Transfer</div>	
	Assignee: manager	<div style="background-color: #333; color: white; padding: 2px 5px;">Reassign</div>	
Subtasks:	No subtasks		
Fill in the form	<div>Do you approve this vacation:</div> <div style="border: 1px solid #ccc; padding: 2px; display: inline-block;">Approve</div>		
	Reason:	<div style="border: 1px solid #ccc; padding: 2px; display: inline-block;">ok</div>	

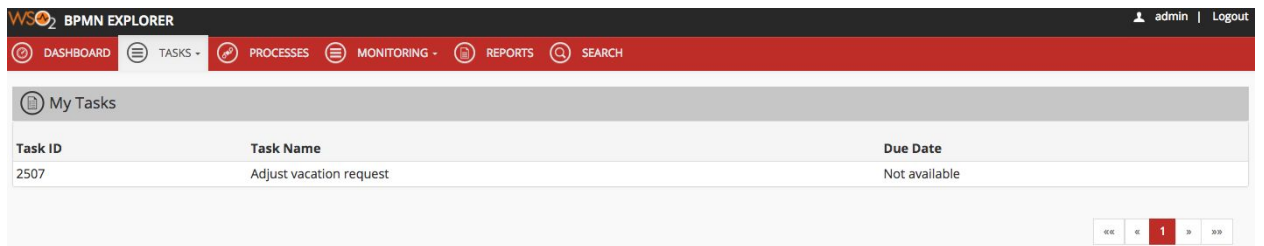
Complete Task

11. Click on the other task, **reject** it and click **Complete Task**.
12. Since you have approved one request now, login to your email account. You should have received a mail with the subject line “Leave approved!”. This is the response of the

leave request you approved.



13. Logout and login with admin/admin credentials. You will see an **Adjust vacation request** task in the **MY TASKS** tab of the BPMN explorer to resend the leave application. This is the response of the leave request you rejected as a manager.



14. If you fill in the **Adjust vacation request** form and click **Complete Task**, the manager will receive another new task to check the vacation request that was re-sent. Else, the process will end.

Fill in the form

Number of days:

5

First day of holiday (dd-MM-yyyy):

07/09/2016

Reason:

holiday

Resend vacation request to manager?:

Yes

Complete Task