

Build a Custom Portal with Oracle WebCenter

Istvan Kiss

Principal Curriculum Developer, Oracle WebCenter

Christina Kolotouros

Director, Oracle WebCenter Curriculum Development & Product
Management

Ellen Gravina

Senior Principal Curriculum Developer, Oracle WebCenter

Introduction

Oracle WebCenter Suite, an offering in Oracle's Fusion Middleware product line, is designed to help you build more effective applications that take advantage of Service-Oriented Architecture (SOA) to bring complete context to the information worker's daily tasks. WebCenter Suite weaves process, business intelligence, structured and unstructured content, communication, and Web 2.0-style services into the very fabric of the application to create next generation online work environments.

Today we will focus on key new features of the PS3 release, including site navigation, site resource management (such as page templates), and deep content integration with Oracle UCM. This enables you to create and update polished Websites without programming.

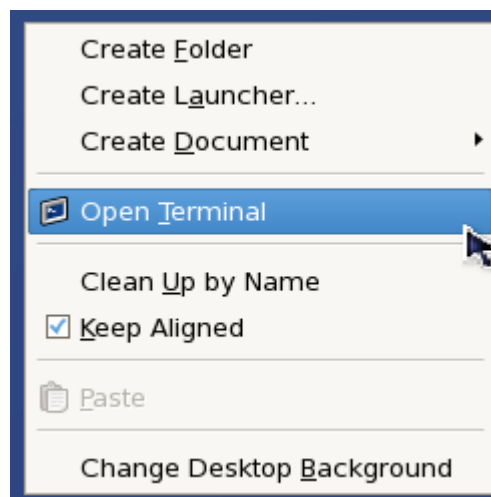
You will work on the website for El Piju, a fictitious construction company specializing in natural building. Natural building is all about achieving sustainability through the use of minimally-processed, plentiful, and renewable resources as well as recycled or salvaged materials that produce healthy living environments.

Initially you will use JDeveloper to create a custom WebCenter portal application. El Piju's Web designers have given you a custom page template for the Website. You will use this new template to create pages and page hierarchy, which will provide navigation for your application. You will also populate some of the pages using content from an Oracle Content Server

Later you will switch to the running application and further refine the portal application at run time. You will learn that at run time you can create new pages, edit existing pages, upload or create new content and edit existing content stored in the Content Server. You will also see, how security roles and access privileges can be defined, or modified at run time.

Create a WebCenter Portal Application

1. Start the Content Server and related components.
 - a. In the Linux desktop, right-click an empty area and select Open Terminal from the pop-up menu.



- A new terminal window opens.
- b. In the terminal window type `vmactl`, then in the Oracle WebCenter

Administration menu choose option 1 (one) to start all the required components:

- Oracle Database and TNS Listener
- WebLogic Administration Server
- Managed WebLogic server instance UCM_server1, that hosts Oracle Content Server.

```
oracle@localhost:~
File Edit View Terminal Tabs Help
[localhost oracle ~]$ vmctl

** Oracle WebCenter Administration Menu **

                Thursday 07-Apr-2011-05:40:05 AM

0.  STOP  ALL - [Stops: DB, Listener, AdminServer, UCM_Server1
                WC_Portlet, WC_CustomPortal]

1.  START Content Server - [Starts: Database, Listener, AdminServer
                UCM_Server1]
2.  START AviTrust - [Starts: Database, Listener, AdminServer
                UCM_Server1, WC_CustomPortal]

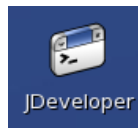
3.  START Oracle Database and Listener
4.  START Oracle Weblogic Server [AdminServer]
5.  START Oracle ECM [UCM_server1]
6.  START Oracle WC_CustomPortal [WC_CustomPortal]
7.  START Oracle WC_Portlet [WC_Portlet]

8.  STOP  Oracle ECM [UCM_server1]
9.  STOP  Oracle WC_CustomPortal [WC_CustomPortal]
10. STOP  Oracle WC_Portlet [WC_Portlet]
11. STOP  Oracle Weblogic Server [AdminServer]
12. STOP  Oracle Database and Listener

X.  EXIT from this Menu
*****
Enter the Administration Option (X to exit menu):
1
```

c. Starting the Content Server will take several minutes. However you don't have to wait till it fully starts, you can continue with the following steps.

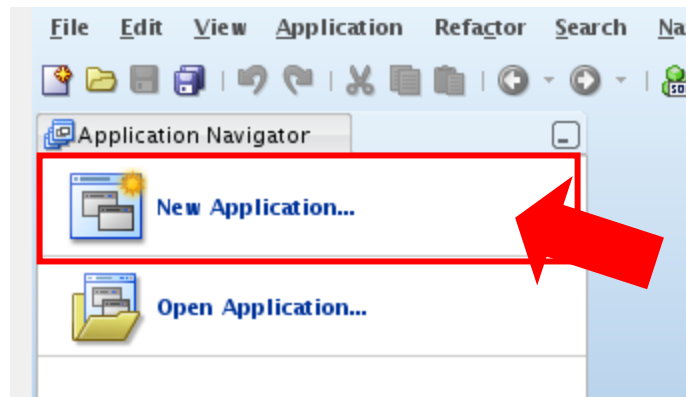
2. Start JDeveloper.



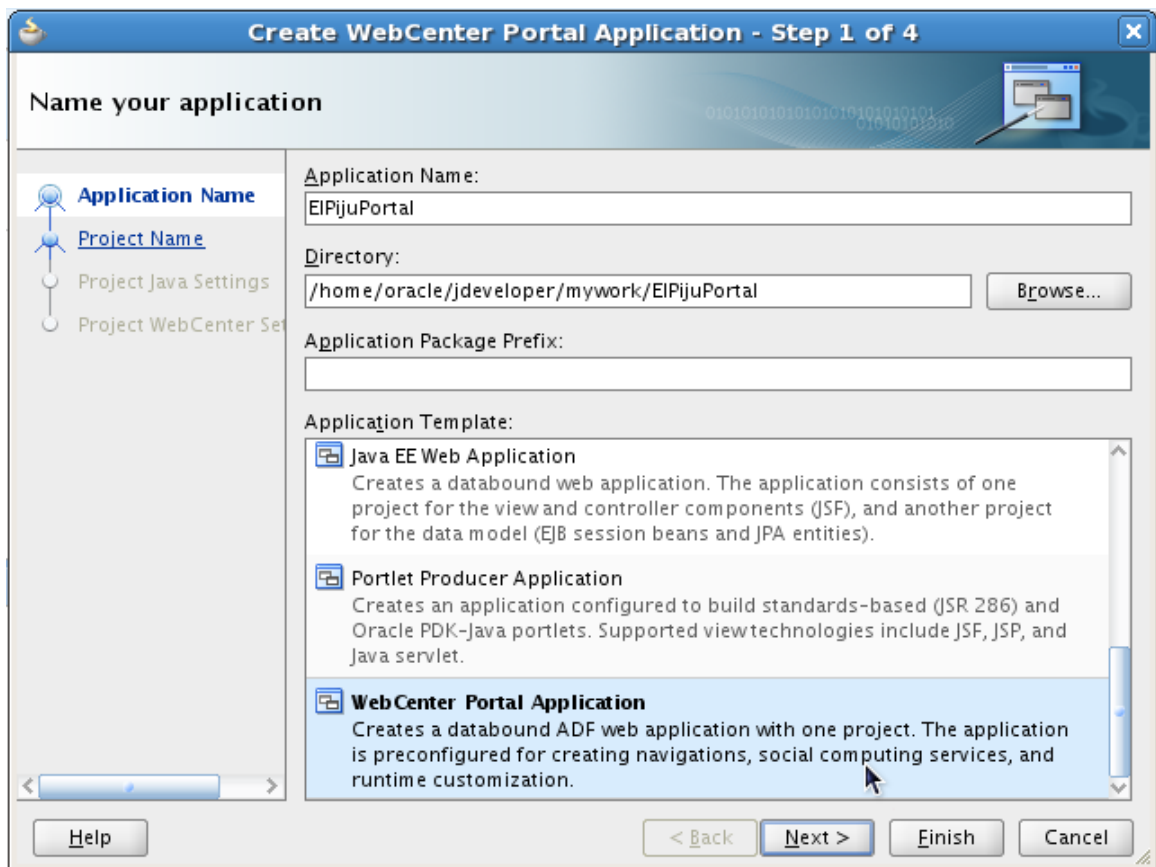
Double click the JDeveloper icon on the desktop.

3. Create a new WebCenter Portal application.

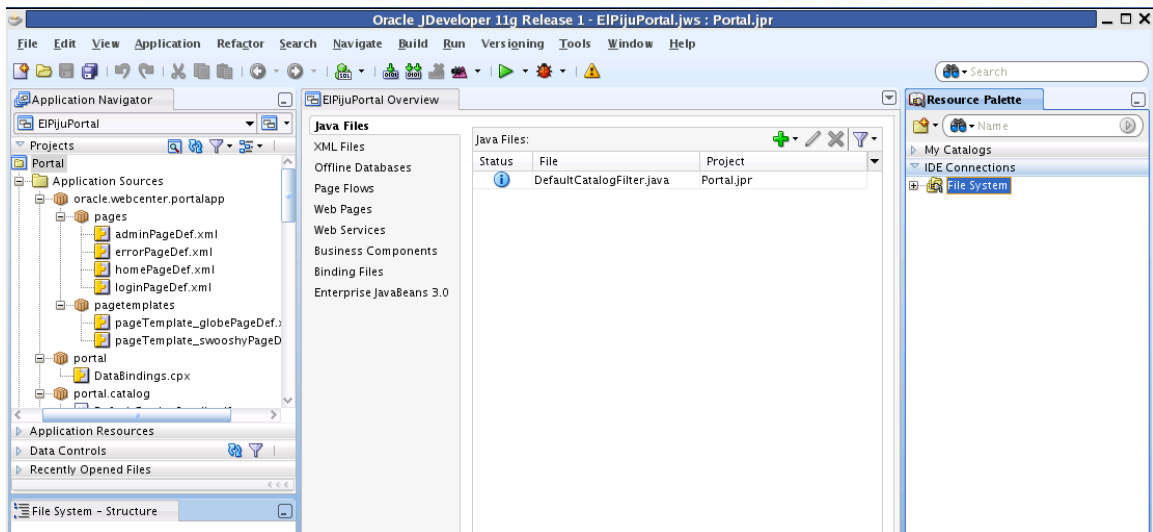
a. Bring up the new application wizard by selecting **New Application** under the **Application Navigator**.



- b. In the Application **Name** field, enter `ElPijuPortal`. Note this also updates the Directory. For completing the practices it is important that you give the above – case sensitive name for your application. Navigate to the bottom and select **WebCenter Portal Application**.



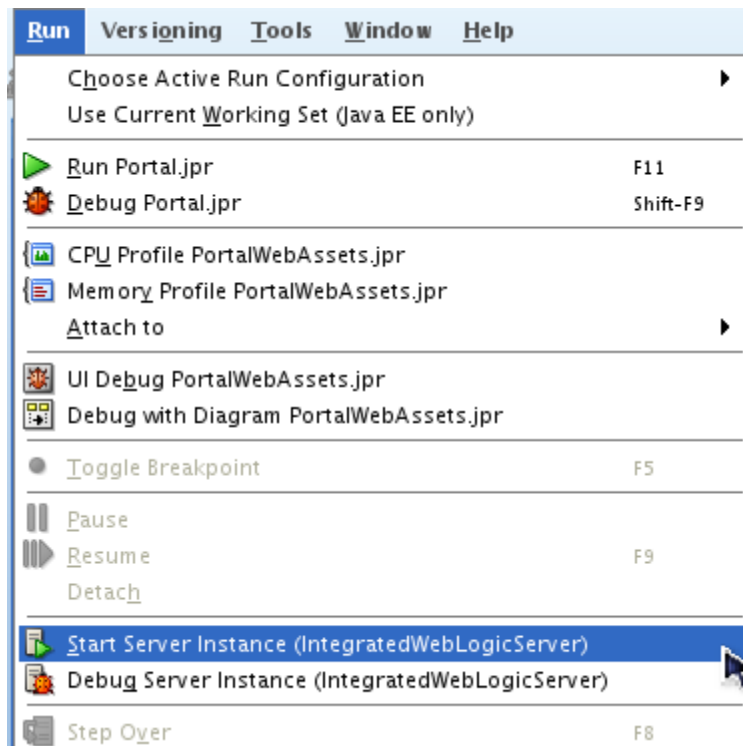
- c. Click **Finish**, since we do not want to change the application's default settings.
4. In this screen you see the resulting application, with two projects. We will use the `Portal` project to create the application, while the `PortalWebAssets` project can be used for the static resources, like images, HTML, or JavaScript files, etc.



You can close the EIPjpuPortal Overview pane.

5. Start JDeveloper's integrated WebLogic Server.

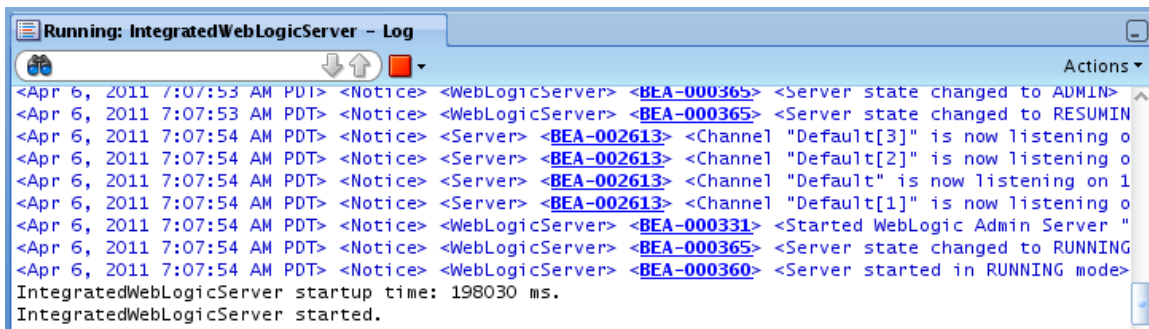
Select **Start Server Instance (IntegratedWebLogicServer)** from Run menu.



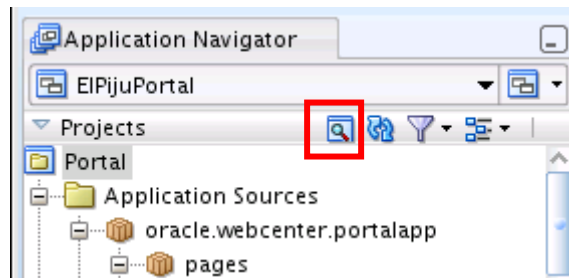
As the server starts, it will display status messages to the Log pane at the bottom of the JDeveloper's window. The server fully started, when you see the message:

IntegratedWebLogicServer Started

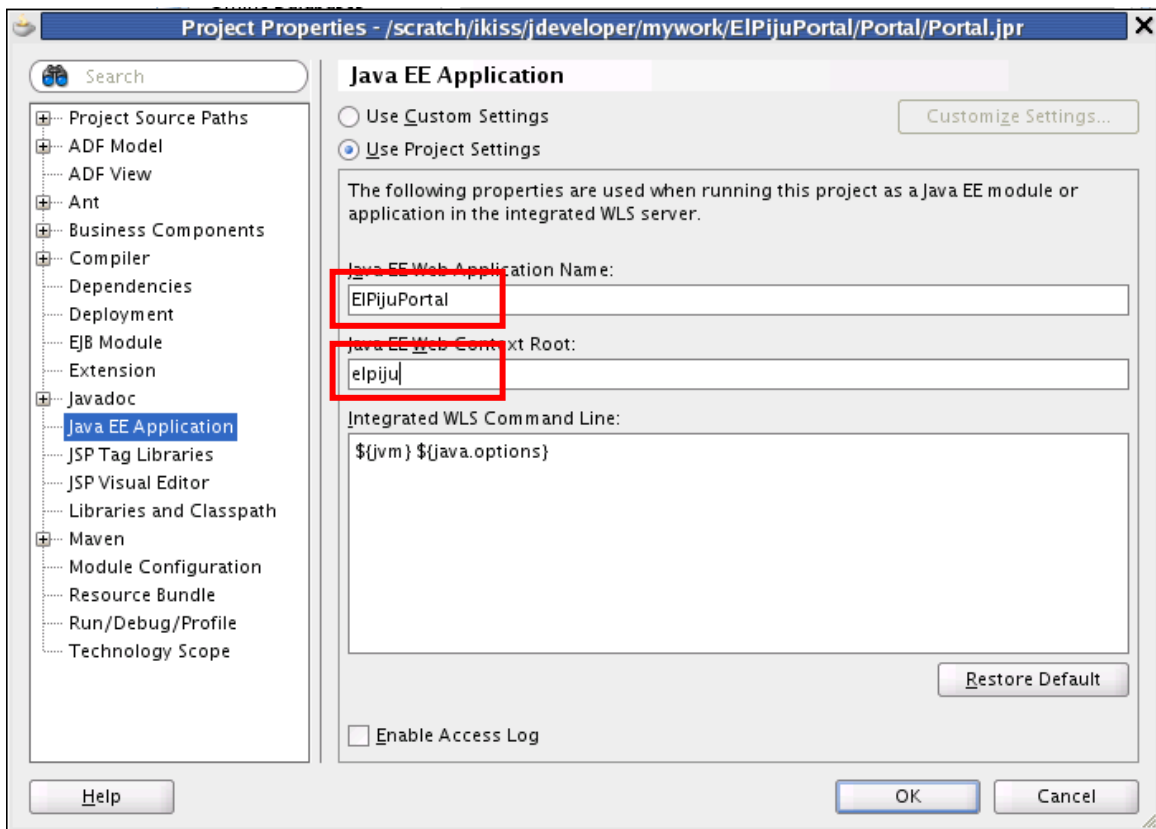
However you don't have to wait for the server, keep on doing the following steps.



6. Change the Portal project's properties.
 - a. Make sure that the Portal project is selected. In the Application Navigator, click the Project Properties icon.



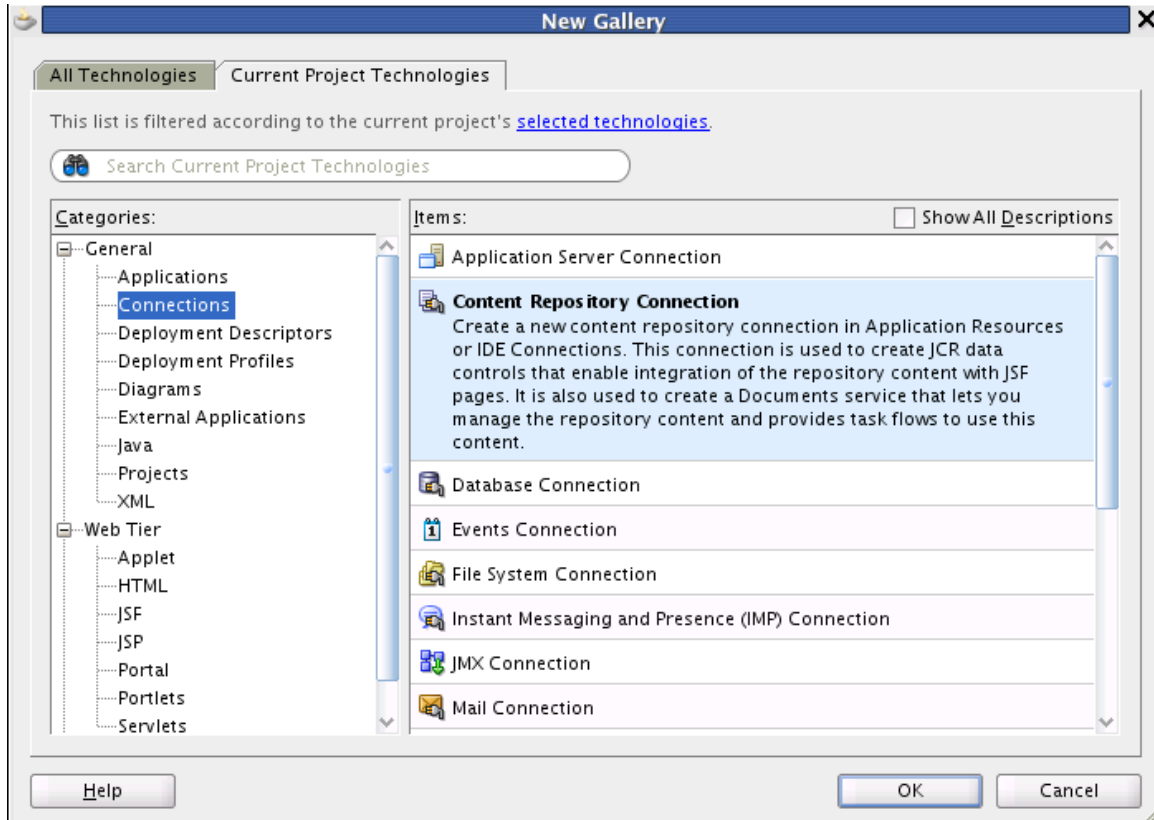
- b. Select **Java EE Application** properties and change the Java EE Application Name to **ELPijuPortal** and the Web context root to **elpiju**.



- c. Click **OK** to close.
7. Create a Content Repository Connection.

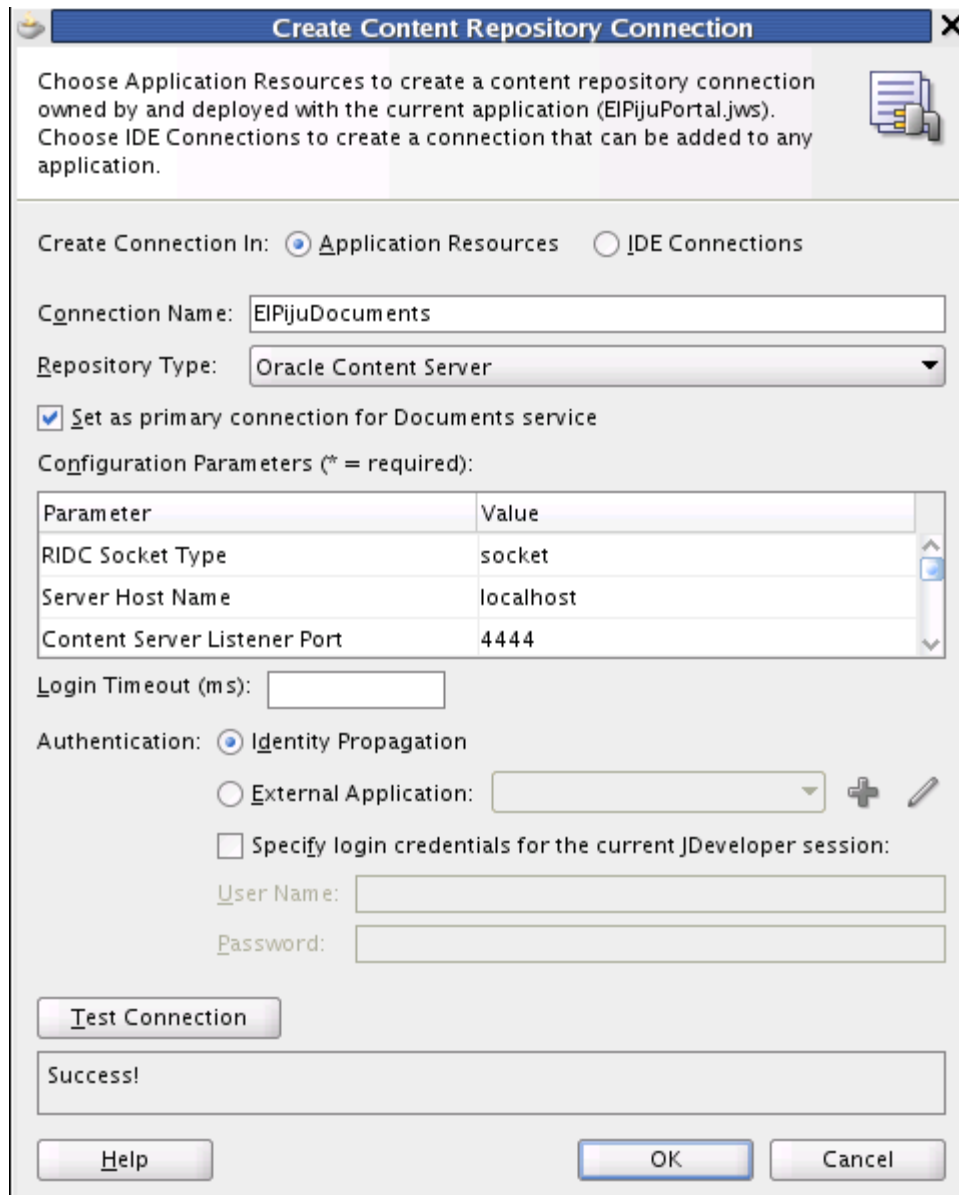
Corporate documents are stored in an Oracle Content Server. Since we would like to display and manage these documents in our portal, we need to create a connection that describes how the Content Server can be accessed.

- a. Select **New** from File menu and choose **Content Repository** from Connections. Click **OK**.



- b. Create a Content Repository connection with the following attributes:

Create connection in	Application Resources
Connection Name	ElPijuDocuments
Repository Type	Oracle Content Server
Set as primary connection ...	Selected
RDIC Socket Type	socket
Server Host Name	localhost
Content Server Listener Port	4444
Authentication	Identity Propagation

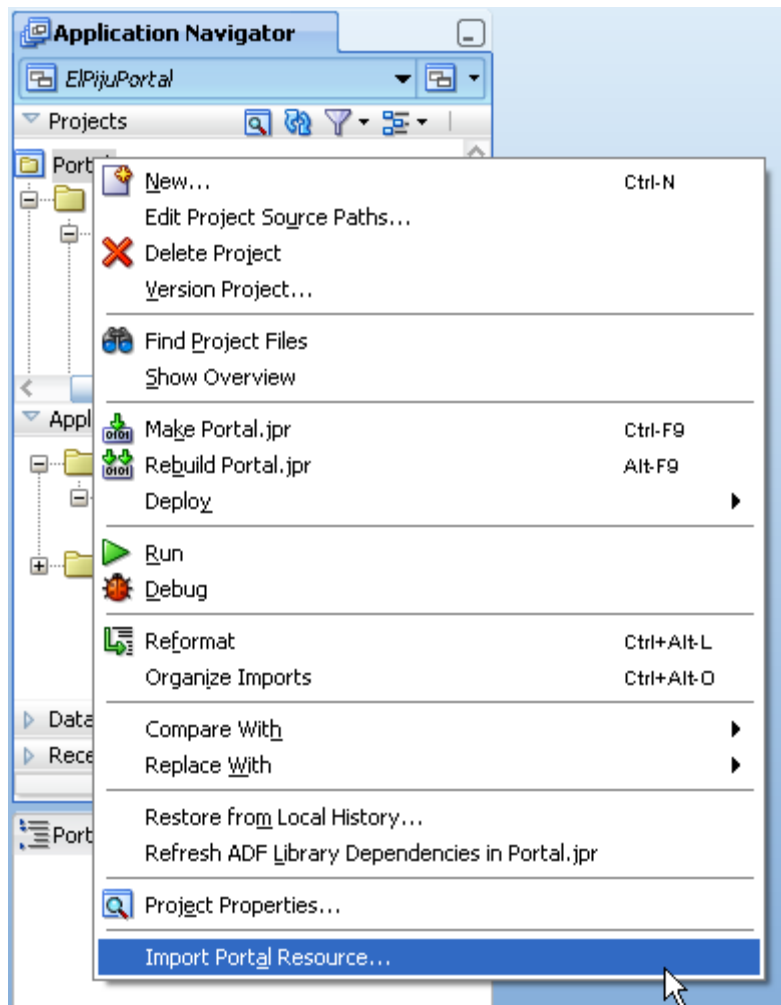


Note: You should use connection name as indicated above. Test the connection; make sure it works ('Success!') before clicking **OK**.

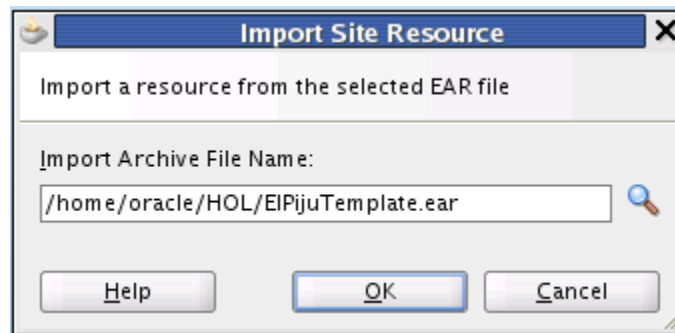
Import a New Page Template

In the corporation, Web designers created a new page template to provide a corporate-specific, uniform layout for the portal application. This template was developed using JDeveloper, then exported and packaged into a site resource archive.

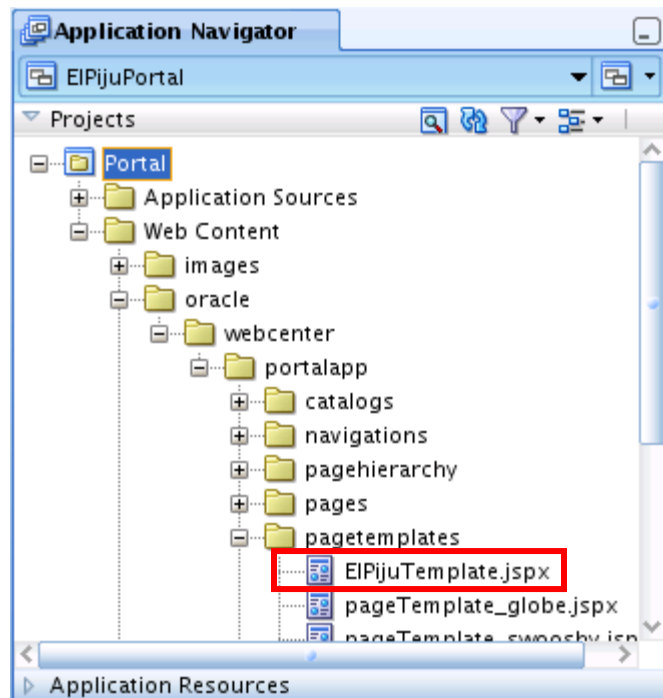
8. Import the template.
 - a. In JDeveloper's Application Navigator right-click on Portal project and select **Import Portal Resource** from the pop-up menu.



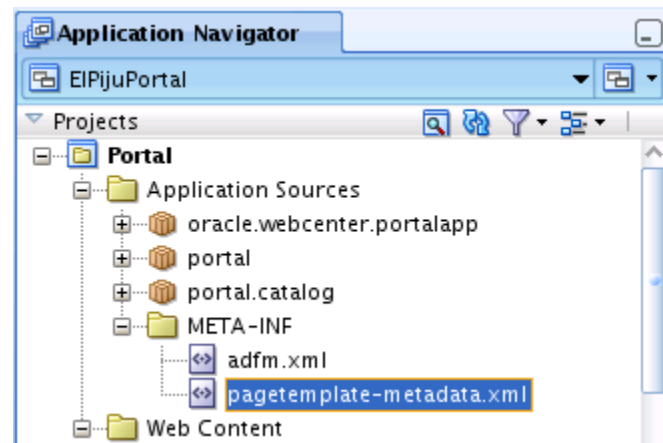
- b. Select `/home/oracle/HOL/ELPijuTemplate.ear` and click **OK**.



- c. When the import is finished, you can find the template file in the Application Navigator, under the **Portal > Web Content > oracle > webcenter > portalapp > pagetemplates** node.



- d. You have to register the imported template with the application. You do this by editing the `pagetemplate-metadata.xml` file. Using Application Navigator to select the file.

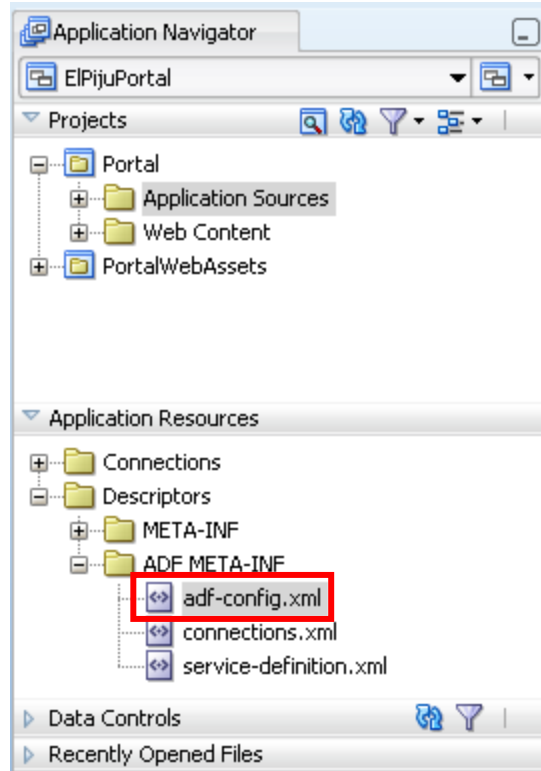


Double-click the file name or select open after right-clicking the name. In this file there are already two templates registered. Add a third element to the `pageTemplateDefs` element:

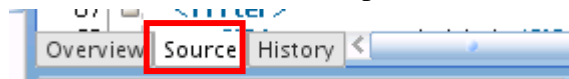
```
<pagetemplate-jsp-ui-def>
  /oracle/webcenter/portalapp/pagetemplates/EIPijuTemplate.jspx
</pagetemplate-jsp-ui-def>
```

```
<?xml version="1.0" encoding="US-ASCII" ?>
<pageTemplateDefs xmlns="http://xmlns.oracle.com/adf/faces/rich/pagetemplate">
  <pageTemplate-jsp-ui-def>/oracle/webcenter/portalapp/pagetemplates/pageTemplate_globe.jspx</pageTemplate-jsp-ui-def>
  <pageTemplate-jsp-ui-def>/oracle/webcenter/portalapp/pagetemplates/pageTemplate_swooshy.jspx</pageTemplate-jsp-ui-def>
  <pageTemplate-jsp-ui-def>/oracle/webcenter/portalapp/pagetemplates/EIPijuTemplate.jspx</pageTemplate-jsp-ui-def>
</pageTemplateDefs>
```

9. Set the newly uploaded template as the default template for the already existing pages.
 - a. In the Application Navigator pane, locate **Application Resources > Descriptors > ADF META-INF > adf-config.xml** and open it by double-clicking on the name.



- b. If the file is opened in Overview mode, switch to the source mode by clicking on the **Source** tab at the bottom of the viewer pane.



- c. In the search bar at the top of the viewer pane, under **adf-config.xml**, type **_globe** to find the current default page template setting in this file. You should see the following preference setting:

```
<portal:preference
  id="oracle.webcenter.portalapp.pagetemplate.pageTemplate"
  desc="Default Page Template"
  value="/oracle/webcenter/portalapp/pagetemplates/pageTemplate_globe.jspx"
  resourceType="Template" display="true"/>
```

Change the highlighted value to: **ElPijuTemplate.jspx**

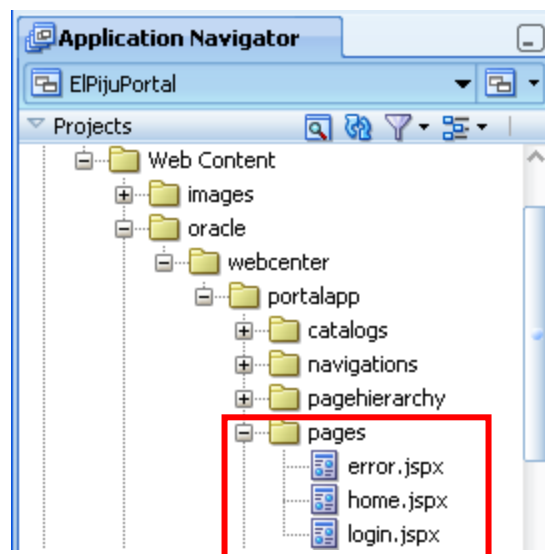
- d. You should now see the following:

```
adf-config.xml
_globe
245 resourceType="ResourceCatalog" display="true"/>
246 <portal:preference id="oracle.webcenter.portalapp.pagetemplate.pageTemplate"
247 desc="Default Page Template"
248 value="/oracle/webcenter/portalapp/pagetemplates/ElPijuTemplate.jspx"
249 resourceType="Template" display="true"/>
250 <portal:preference id="oracle.webcenter.portalapp.navigation.renderer"
```

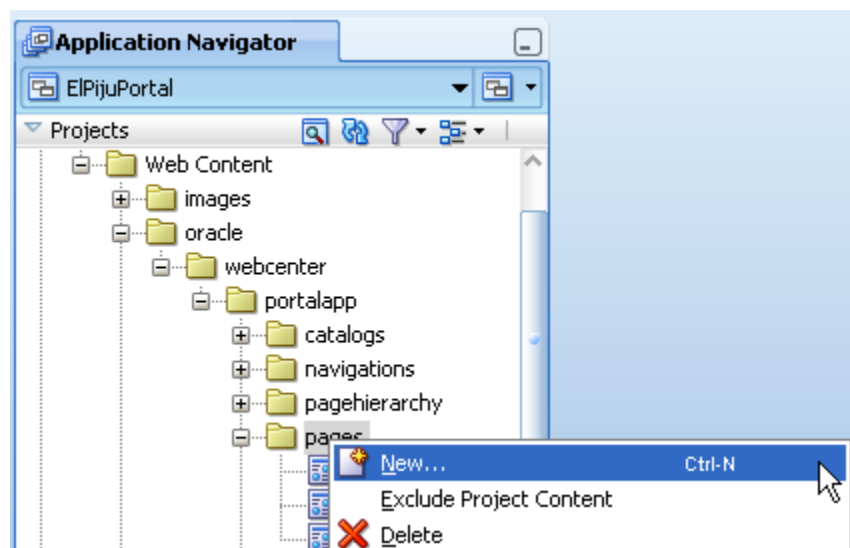
Create and Populate Pages

10. Create new portal pages.

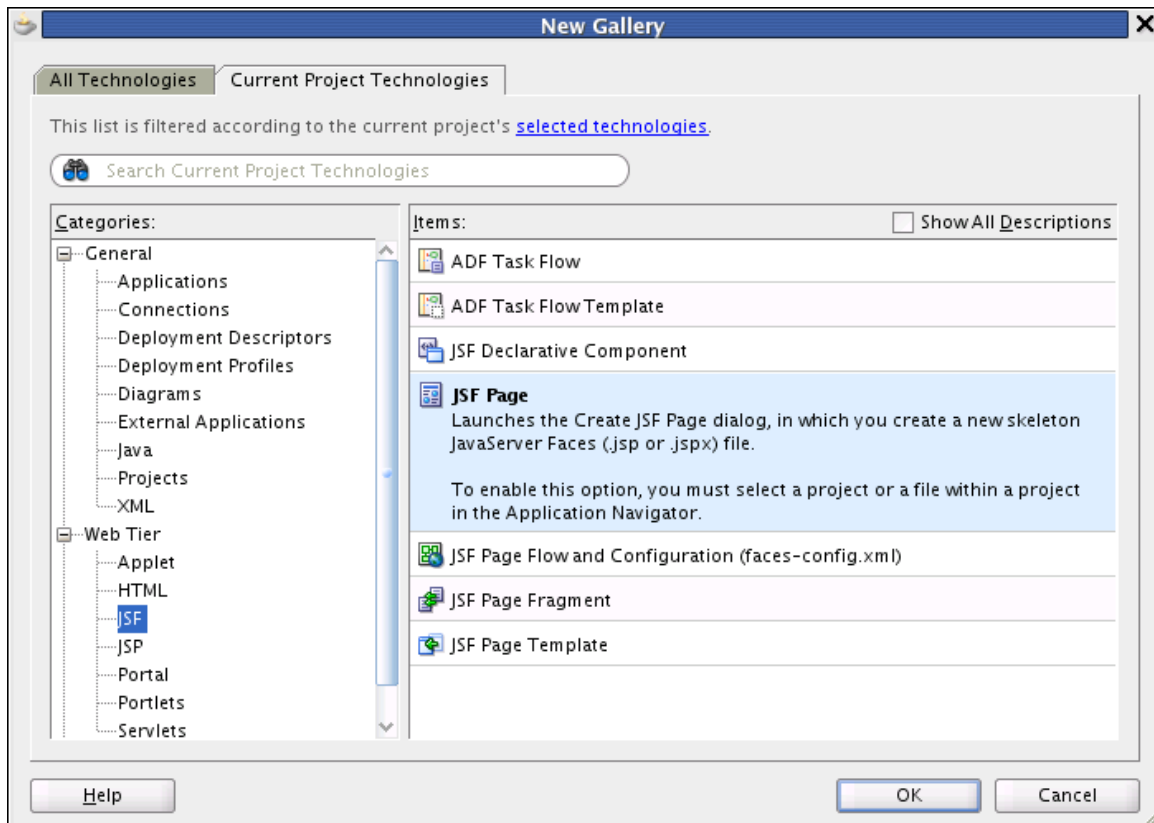
- a. In the Application Navigator expand the node **Portal > Web Content > oracle > webcenter > portalapp > pages** node. Here you can find the portal application's initial pages: error.jspx, home.jspx, and login.jspx.



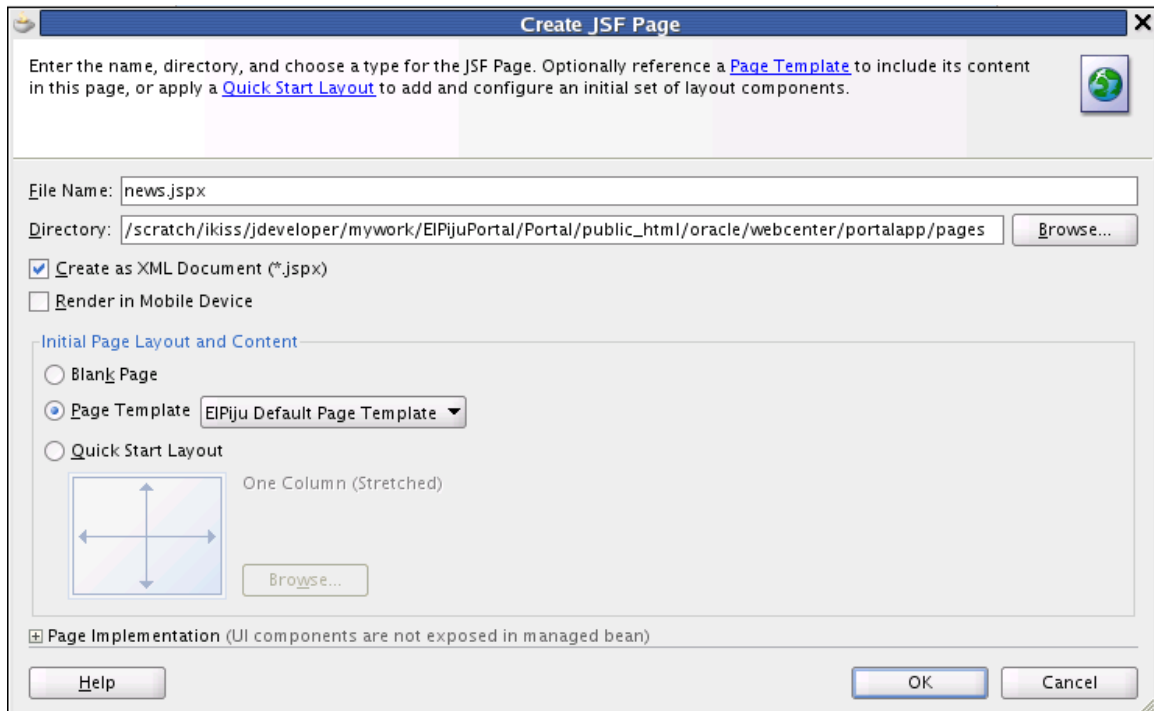
- b. Right click on **pages** and select **New** from the pop-up menu.



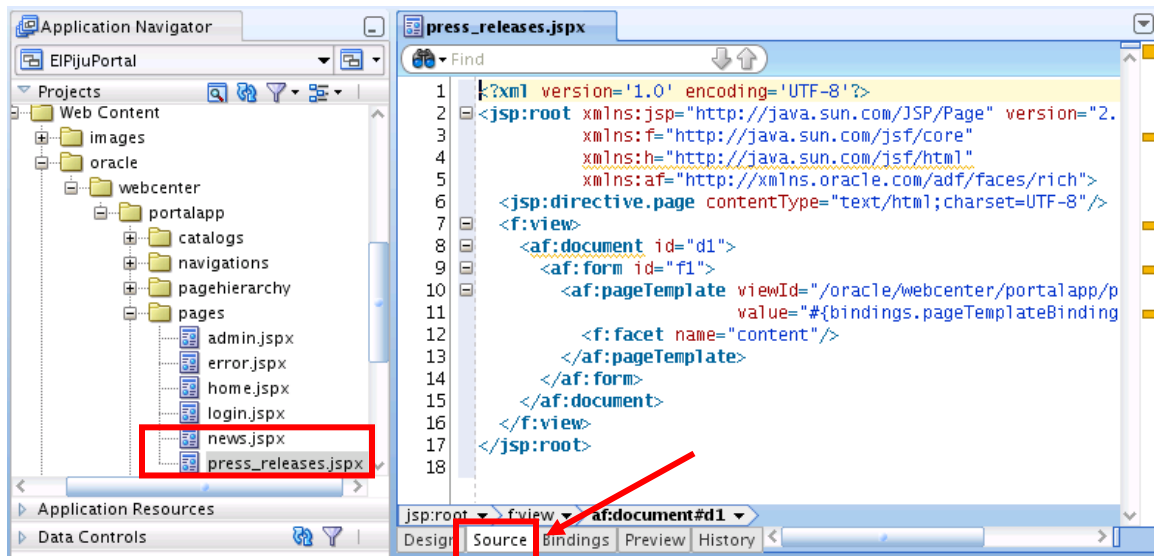
- c. In the New Gallery, select **Web Tier > JSF** and choose **JSF Page**.



- d. In the Create JSF Page dialog, make sure that the **Create as XML Document** checkbox is selected. Set the file name to **news .jspx**, select the **Page Template** radio button, and make sure that **EIPiju Default Page Template** is selected in the drop-down list. Click **OK**.



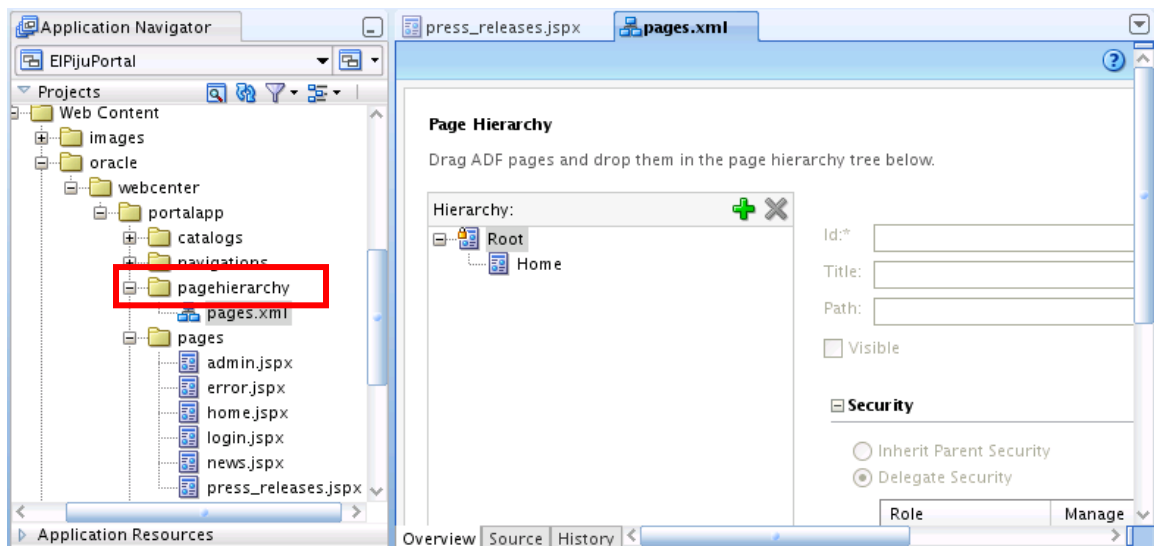
- e. After the page is created, it opens in the editor pane. You can close this pane, we will not edit the news page.
- f. Similarly, create another page called **press_releases.jspx**. Keep the editor pane open, and switch to the **Source** view mode, if necessary.



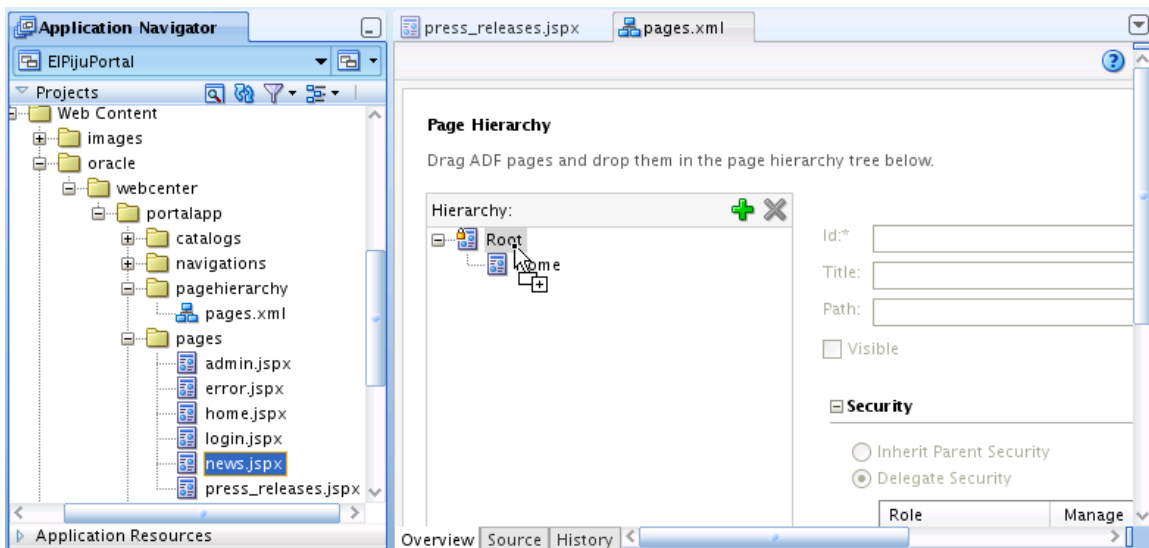
11. Define the page hierarchy.

All the pages of the portal application are stored in the same folder: **/oracle/webcenter/portalapp/pages**. However, you can define a hierarchy of these pages. In our portal, the page hierarchy will drive the navigation, i.e., define how users can access the pages.

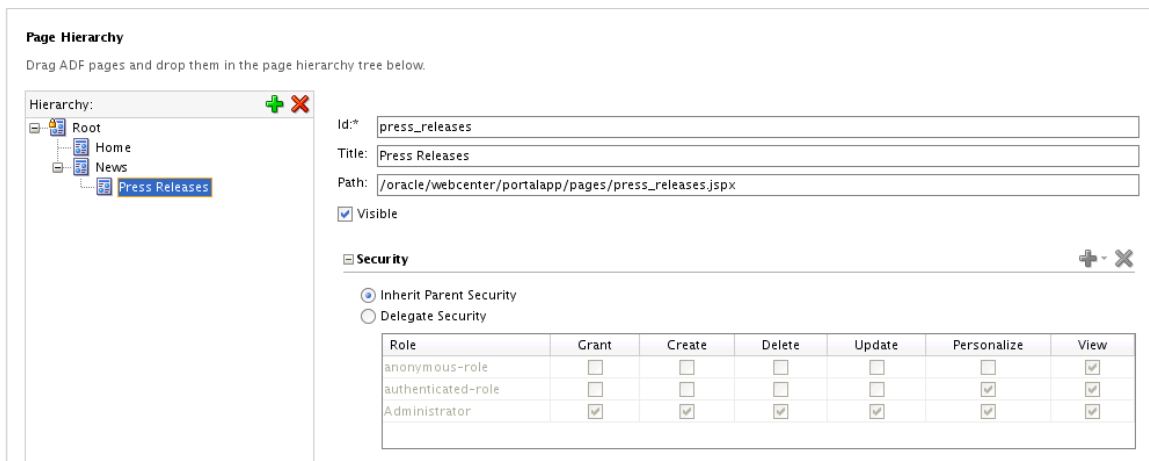
- a. Open **pages.xml** under the **pagehierarchy** node in Overview mode. In the initial page hierarchy, only the Home page is defined.



- b. Select **news.jspx** in the Application Navigator. Drag the file and drop it on top of the Root node in the hierarchy.



- c. Similarly, drop **press_releases.jspx** on top of news page, making it a sub page of the news page. Then select each page in the hierarchy and change the titles of the pages to **News** and **Press Releases**, respectively. This is the resulting page hierarchy:



12. Add Content to the Press Releases page.

This is how the Press Releases page will look in the finished portal. You can see the corporate page template, with header and footer area and left-side navigation. This will be identical in all of the pages. The page-specific content is in the red box, as indicated in the screenshot. You will add the content to the page: on the left side you will add an accordion, displaying documents from the Content Server, on the right, you will add some static images, also stored in the Content Server. In order to this, you need to add content to the page.

News

News

[Articles](#)
[Press Releases](#)
[News Manager](#)

20100811 El Piju Breaks Ground.html

El Piju Breaks Ground on Hutton Community Center

Camarillo, CA—August 11, 2010—In an official groundbreaking ceremony today, El Piju kicked off construction on the 60,000 square foot Hutton Community Center. With completion expected next summer, the center will offer many types of recreational and cultural activities.

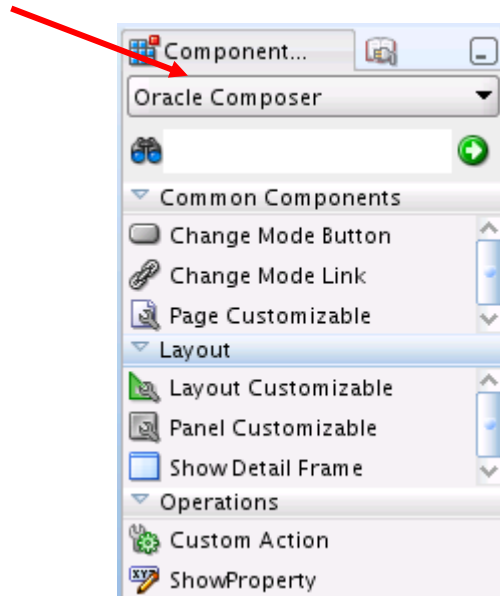
The Hutton facility is expected to serve up to 10,000 community members of Camarillo, CA with an aquatics center, wellness centers, exercise and multipurpose rooms, youth drop-in center, gym, community meeting rooms, and nursery. El Piju used a 3D virtual construction technology called Building Information Modeling (BIM) on this project to maximize the design and enhance construction efficiency.

[20100823 Zoo Concessions.html](#)

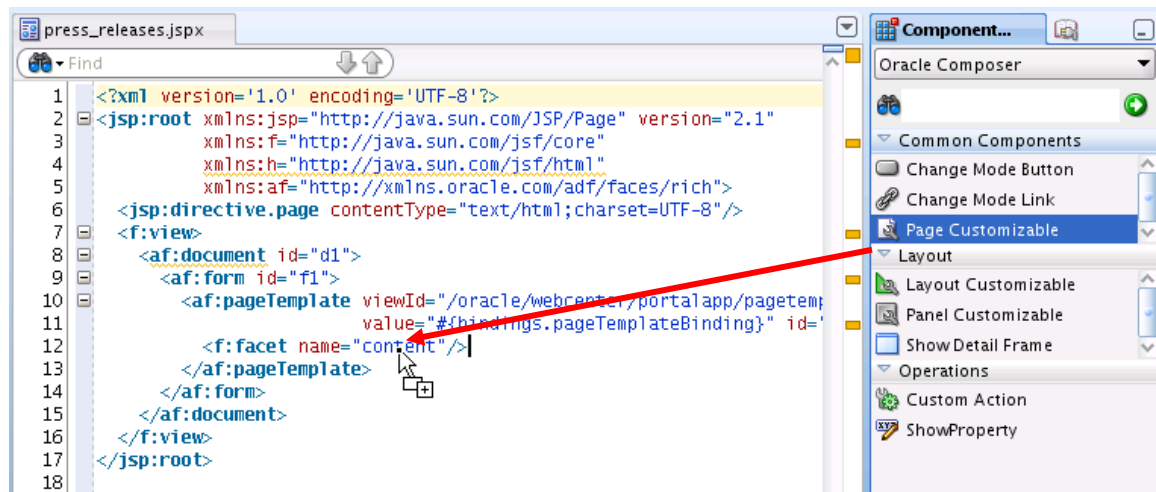
[20100907 Emergency Shelters.html](#)



- Make sure that `press_releases.jspx` is opened in the Editor pane. We recommend that you work in Source view mode.
- In the Component Palette, scroll to select the **Oracle Composer** group.



- Drag the **Page Customizable** component and drop it on the `<f:facet name="content"/>` tag.



This is the resulting code fragment.

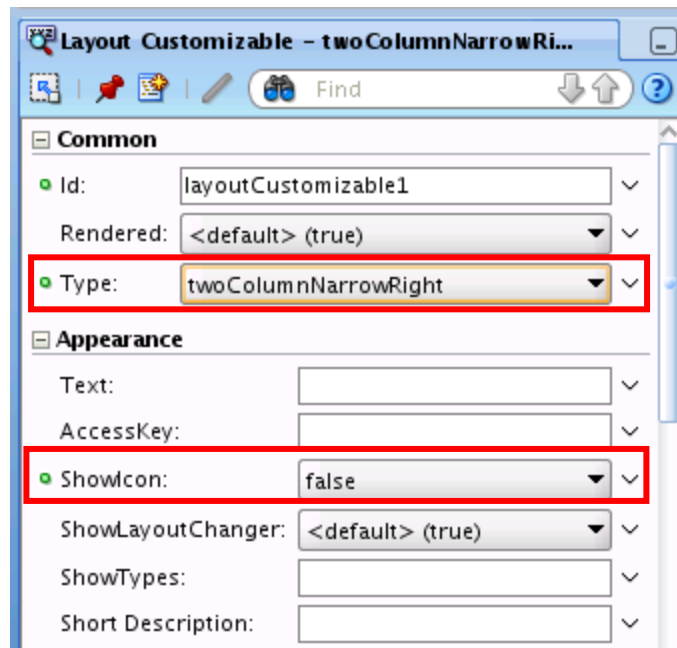
```

<f:facet name="content">
  <pe:pageCustomizable id="pageCustomizable1">
    <cust:panelCustomizable id="panelCustomizable1"
                          layout="scroll" />
  </pe:pageCustomizable>
</f:facet>

```

Delete the highlighted `panelCustomizable` element; we will not use it.

- d. Drop the **Layout Customizable** component on top of the `<pe:pageCustomizable>` tag.
- e. To select the `<pe:layoutCustomizable ...>` tag, click somewhere in the tag name. The Property Inspector pane will display the attributes of the Layout Customizable tag. Change two properties: set **Type** to **twoColumnNarrowRight** and **ShowIcon** to **false**.



This is the resulting page fragment:

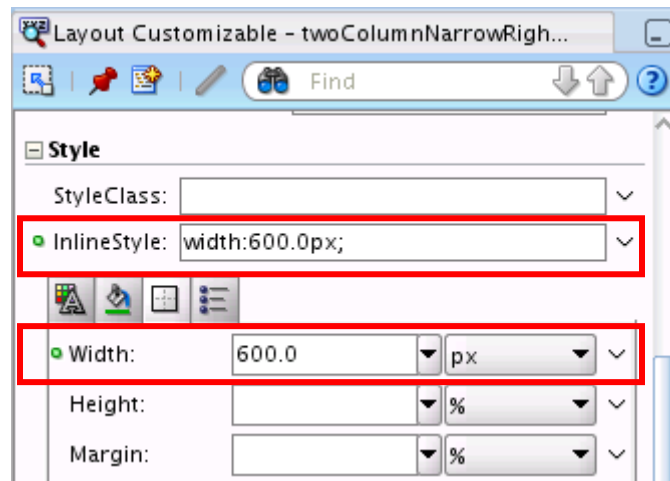
```

<f:facet name="content">
  <pe:pageCustomizable id="pageCustomizable1">
    <pe:layoutCustomizable id="layoutCustomizable1"
      type="twoColumnNarrowRight"
      showIcon="false">
      <cust:panelCustomizable id="panelCustomizable1"/>
      <f:facet name="contentA">
        <cust:panelCustomizable id="panelCustomizable2"/>
      </f:facet>
      <f:facet name="contentB">
        <cust:panelCustomizable id="panelCustomizable3"/>
      </f:facet>
    </pe:layoutCustomizable>
  </pe:pageCustomizable>
</f:facet>

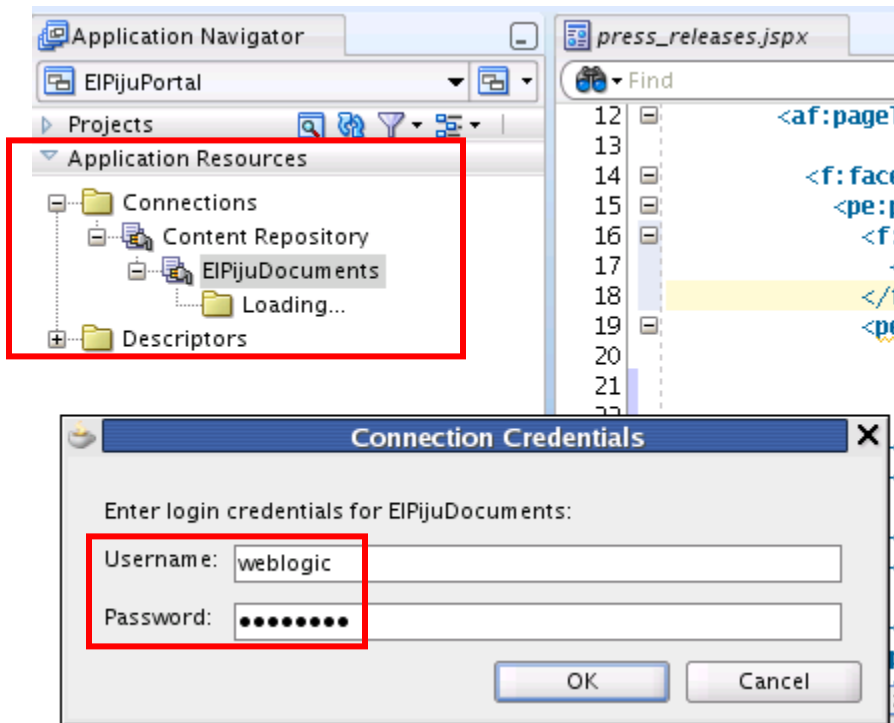
```

Note that by adding a Layout Customizable element, you also got three `<cust:panelCustomizable ...>` elements, which would hold the actual content. Since we've decided to use a two-column layout, you will use only the first two Panel Customizable elements.

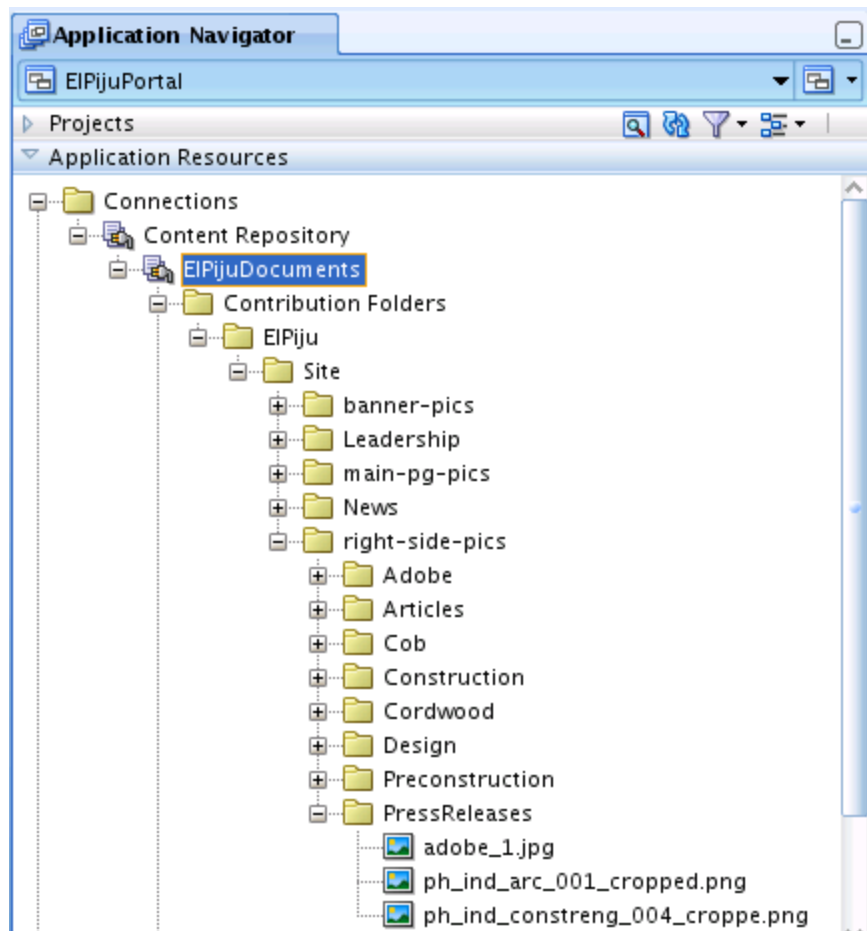
- f. Select the first Panel Customizable element and use the Properties Inspector pane to set the width property to 600 px. You can either type the width setting to the **InLineStyle** attribute as `width: 600.0px`; or use the Box's **Width** attribute.



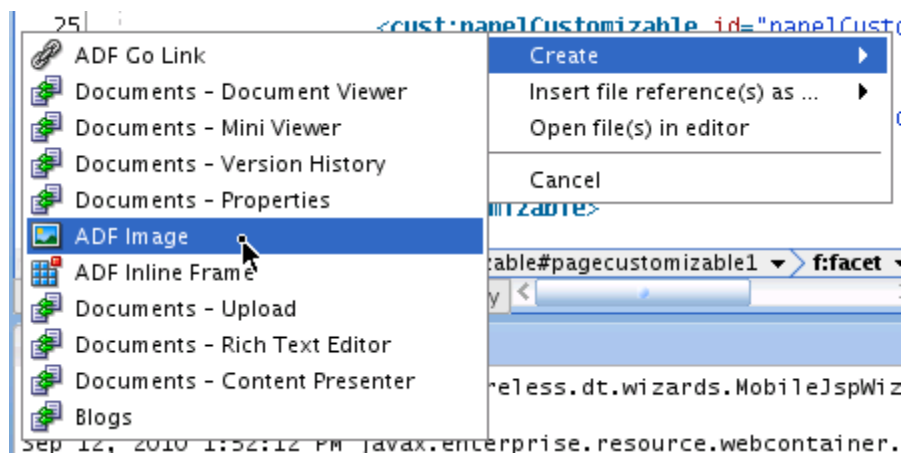
- g. Similarly, select the second Panel Customizable element – the one in the facet called **contentA**. Change its width to **194** pixels.
- h. In JDeveloper's Application Navigator pane, expand the **Application Resources** > **Connections** > **Content Repository** > **EIPijuDocuments** node. When prompted for Connections Credentials, use **weblogic** for the username and **welcome1** for the password.



Further expand the node **Contribution Folders > El Piju > Site > right-side-pics > PressReleases**.



Drag the first image from this folder and drop it on the second Panel Customizable element. When you release the mouse, JDeveloper will ask you how to insert the image to the page. **Choose Create > ADF Image.**



This is the resulting code fragment.

```
<f:facet name="contentA">
  <cust:panelCustomizable id="panelCustomizable3"
    inlineStyle="width:194.0px;">
    <af:image
```

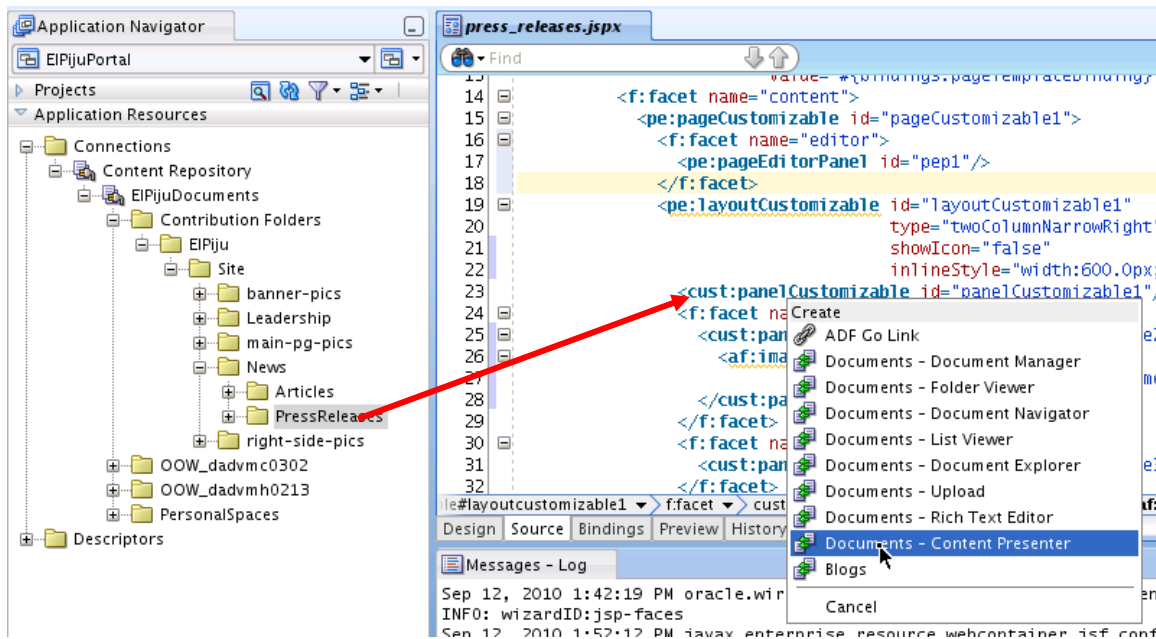
```

id="image1"
source="/content/conn/ElPijuDocuments/path/
Contribution%20Folders/ElPiju/Site/
right-side-pics/PressReleases/adobe_1.jpg"/>
</cust:panelCustomizable>
</f:facet>

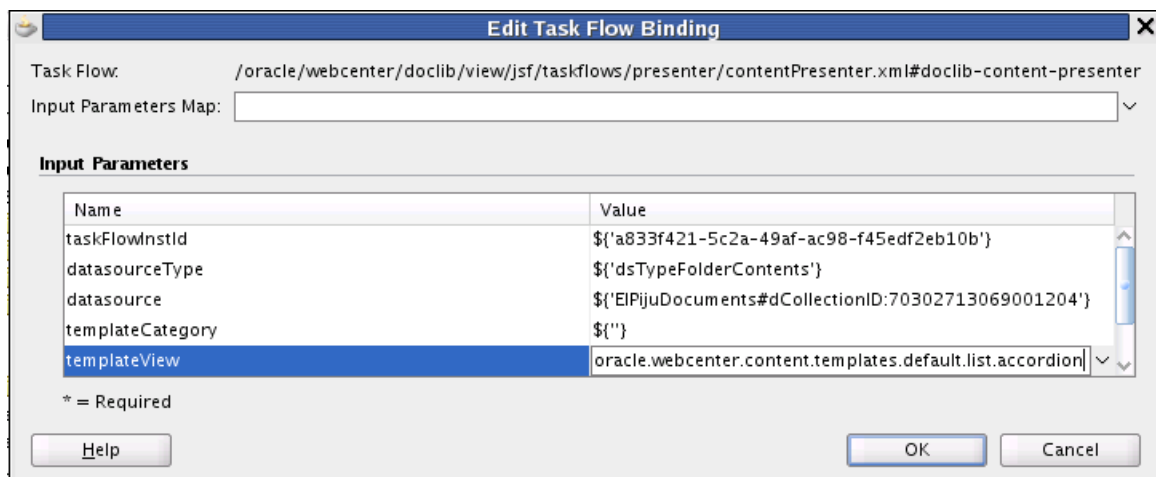
```

Add the other two images from the folder to the same Panel Customizable component.

- i. Expand the node **Contribution Folders > El Piju > Site > News**. Drag the **PressReleases** folder and drop it on the first Panel Customizable. Choose **Documents – Content Presenter** from the pop-up menu.




In the Edit task Flow Binding dialog, enter in the templateView field `oracle.webcenter.content.templates.default.list.accordion`



This is the resulting code fragment. Note that the task flow's parameters are not

visible in the source; they are stored separately, in the page definition file.

```
<cust:panelCustomizable id="panelCustomizable2"
                        inlineStyle="width:600.0px;">
    <af:region
        value="#{bindings.doclibcontentpresenter1.regionModel}"
        id="r1"/>
</cust:panelCustomizable>
```

j. Save all pending changes. Click the Save All  icon in the tool bar.

13. Add pre-created pages.

When developing a custom portal application, you will be creating many more pages and you have to populate them. This can be done at design time using JDeveloper, as you have seen it in the previous steps, or at run time, as you will do later in this practice.

In order to save time during the practice, we have created several pages and packaged them in a ZIP archive. Next you will unzip the archive over the folder where JDeveloper keeps the application's source.

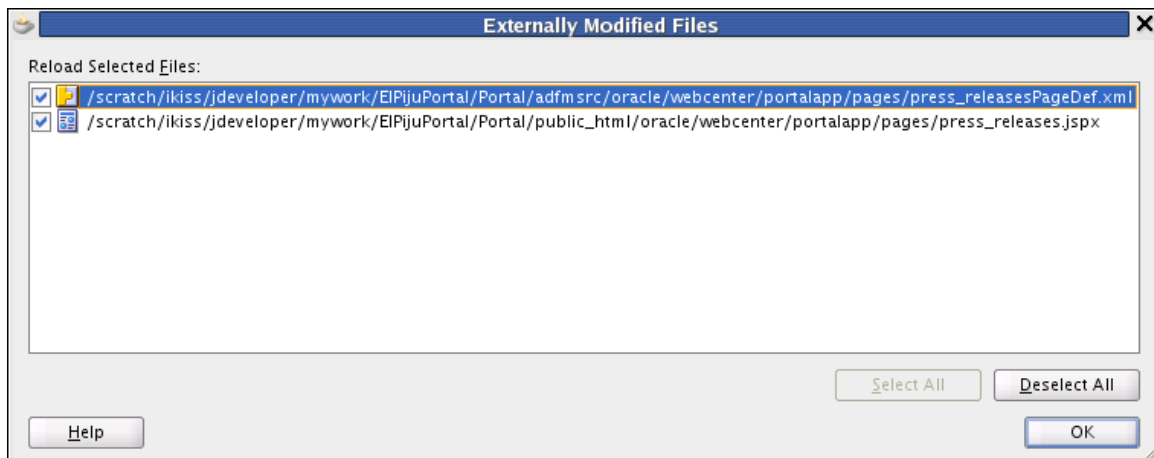
- a. Minimize JDeveloper window if needed, but do not close it.
- b. Select the previously used terminal window, or open a new one as it is described in step #1/a.


c. Type the following command in the terminal:

```
unzip -d $JDEV_USER_DIR/mywork /home/oracle/HOL/Pages.zip
```

The program will warn you that it is going to replace existing files. Answer **All** to replace all files without further warnings.

- d. Return to the JDeveloper window. If there is a warning that files were externally modified, click **OK** to accept it.

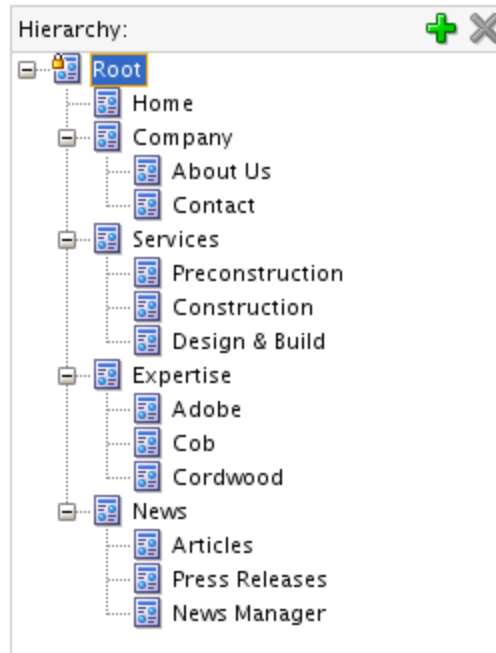


- e. In the Application Navigator pane, select the Portal project. Use the Refresh  icon or choose **Refresh** from the **View** menu. Similarly refresh the PortalWebAssets project.
- f. Open the page hierarchy description file: **Portal > Web Content > oracle > webcenter > portalapp > pagehierarchy > pages.xml**. As you expand the nodes

observe that several new pages have been added to the project and placed into the page hierarchy.

Page Hierarchy

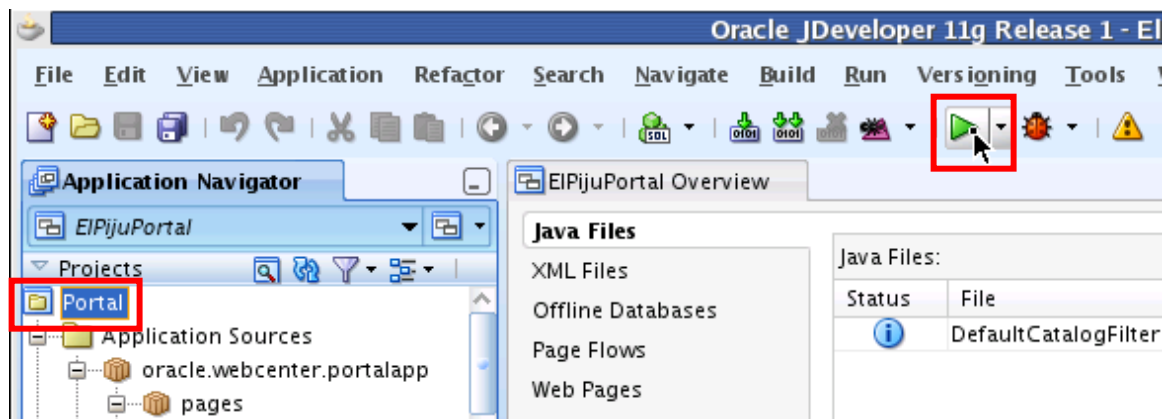
Drag ADF pages and drop them in the page hierarchy



Run the Portal Application and Explore the Pages

14. Run the portal application.

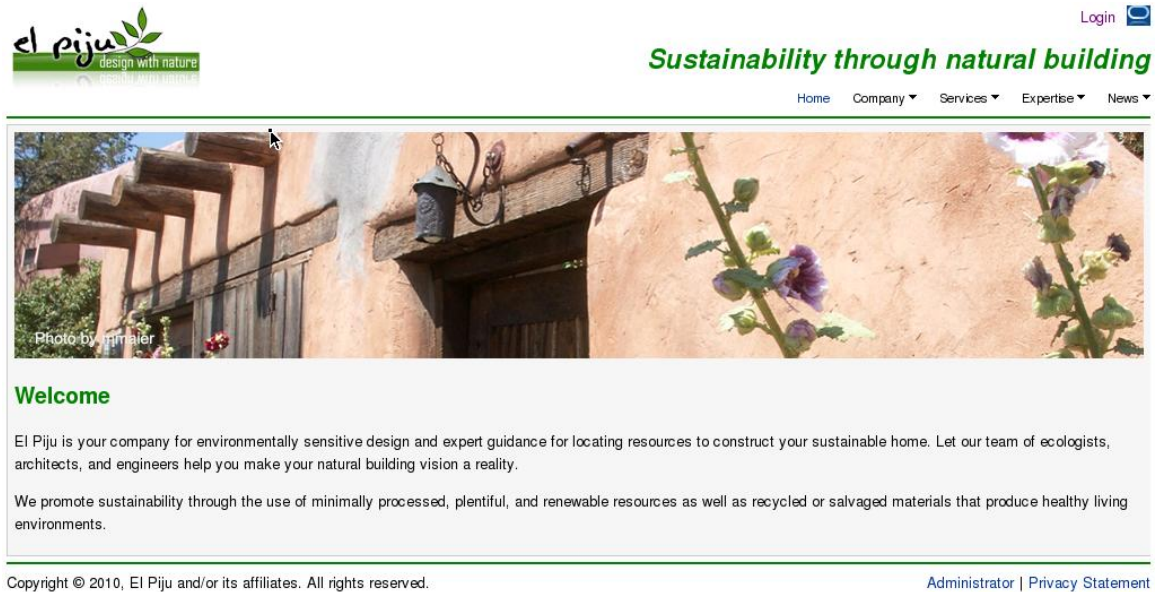
- a. Select **Portal** under Projects and click the **Run** icon.



- b. JDeveloper will first compile the project. If it is successful, it will start its integrated WebLogic Server, which is used to test Web applications. After the server is started, JDeveloper will deploy the current project as a Web application.
- c. As a last step, JDeveloper will start a browser and point it to the URL of the currently deployed application, in our case:

`http://127.0.0.1:7101/elpiju`

d. The browser will be redirected to the portal's home page.



15. Explore the page navigation.

- a. Note that the header of the page contains a navigation component, which displays the root-level pages from the page hierarchy. Home does not have any subpages; it can be accessed directly. When a page has subpages, its name is displayed with a down-arrow icon. Clicking the name will show all the subpages.



- b. Open the Services > Construction page.

Services

Services

- [Preconstruction](#)
- [Construction](#)**
- [Design & Build](#)

Construction

Regardless of its size or type, your project will be managed throughout the construction process by a knowledgeable, highly qualified team of El Piju professionals who will act as stewards of your money and facility. We combine contemporary project management technologies, sophisticated subcontractor risk management techniques and sound safety, quality assurance, and scheduling procedures to construct high high quality buildings that maximize the return of your investment.



Each of the subpages is similar to the Home page. The page header, including the main navigation bar, and the page footer is the same. But in addition to these components, each subpage has a banner image in which the name of the root page is displayed. There is also a navigation component on the left side of the page, which displays the root page name, and all of its subpages, as links. Therefore, from a subpage, all of the sibling pages can be accessed with a single click.

- Return to the Home page. You can click either the **Home** link in the top navigation bar or the corporate logo in the top left corner of the header.

Edit a Page

- Click **Login** and log in as user **weblogic** with password **weblogic1**.

Username:	<input type="text" value="weblogic"/>
Password:	<input type="password" value="*****"/>

Note that weblogic is a special user, created out of the box for your portal application. As you will see, weblogic has administrator privileges throughout the application. This is how the Home page is displayed for weblogic.

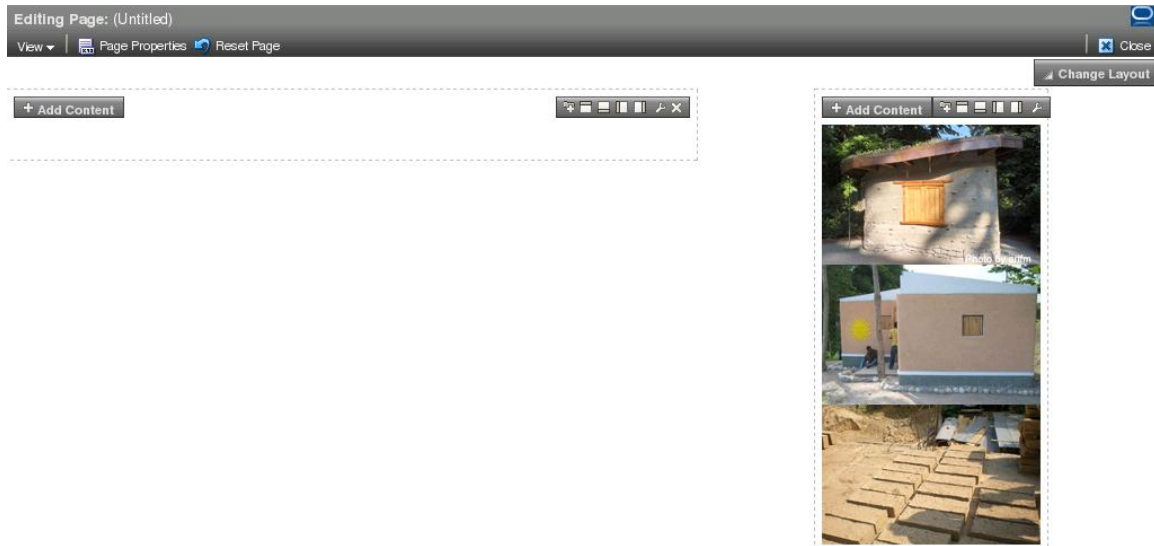
Sustainability through natural building

Note:

- the greeting message in the header, displaying the current user's name: weblogic.
- the Administration link, which will take you to a special administration page, as you will see later in the practice.
- the Edit link at the beginning of the navigation bar. This is displayed if the current user has edit privilege for the current page.

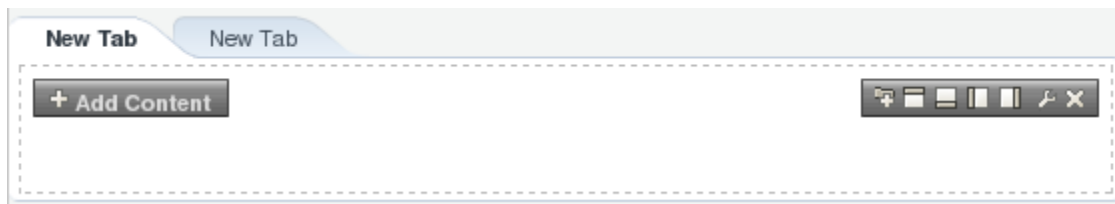
18. Add tabs to Articles page.

- a. Open the **News > Articles** page and click **Edit**. It will open the page in Edit mode.

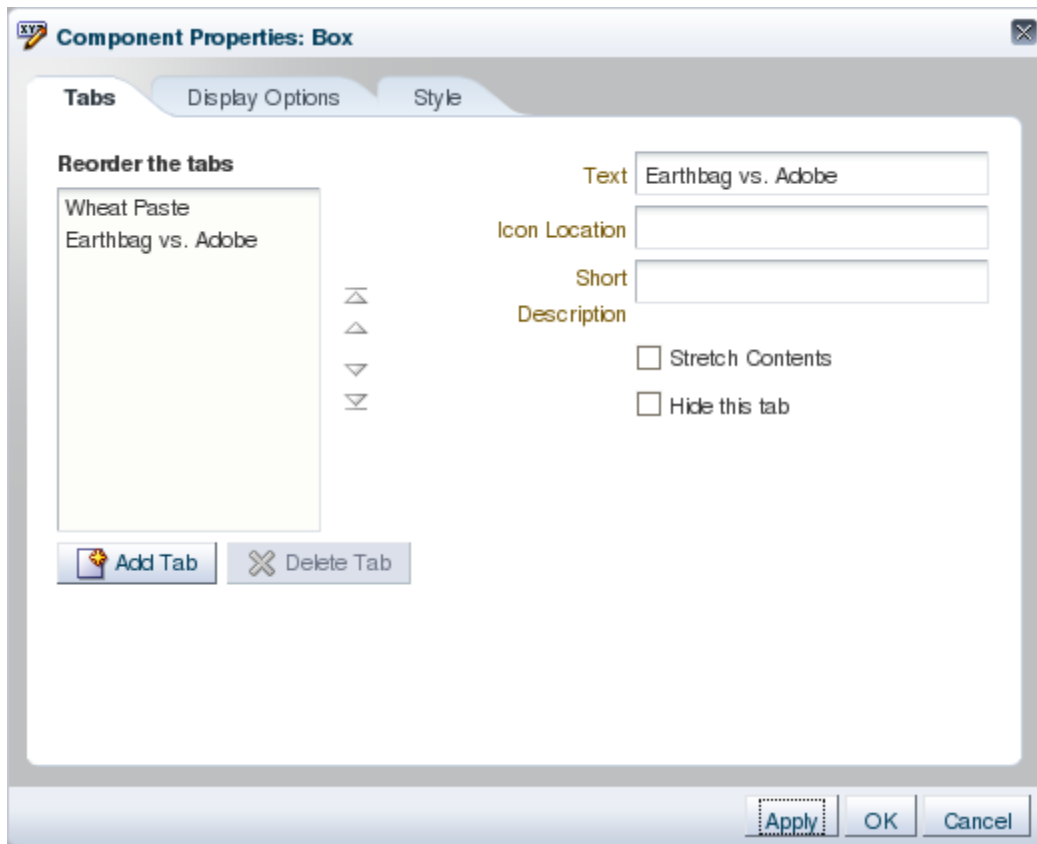


You can see the images already added to the right column, and the empty left column, where you will add a tabbed view of documents.

- b. Click the **Add a Tab** icon  to add a tab, then do it again to add a second tab.



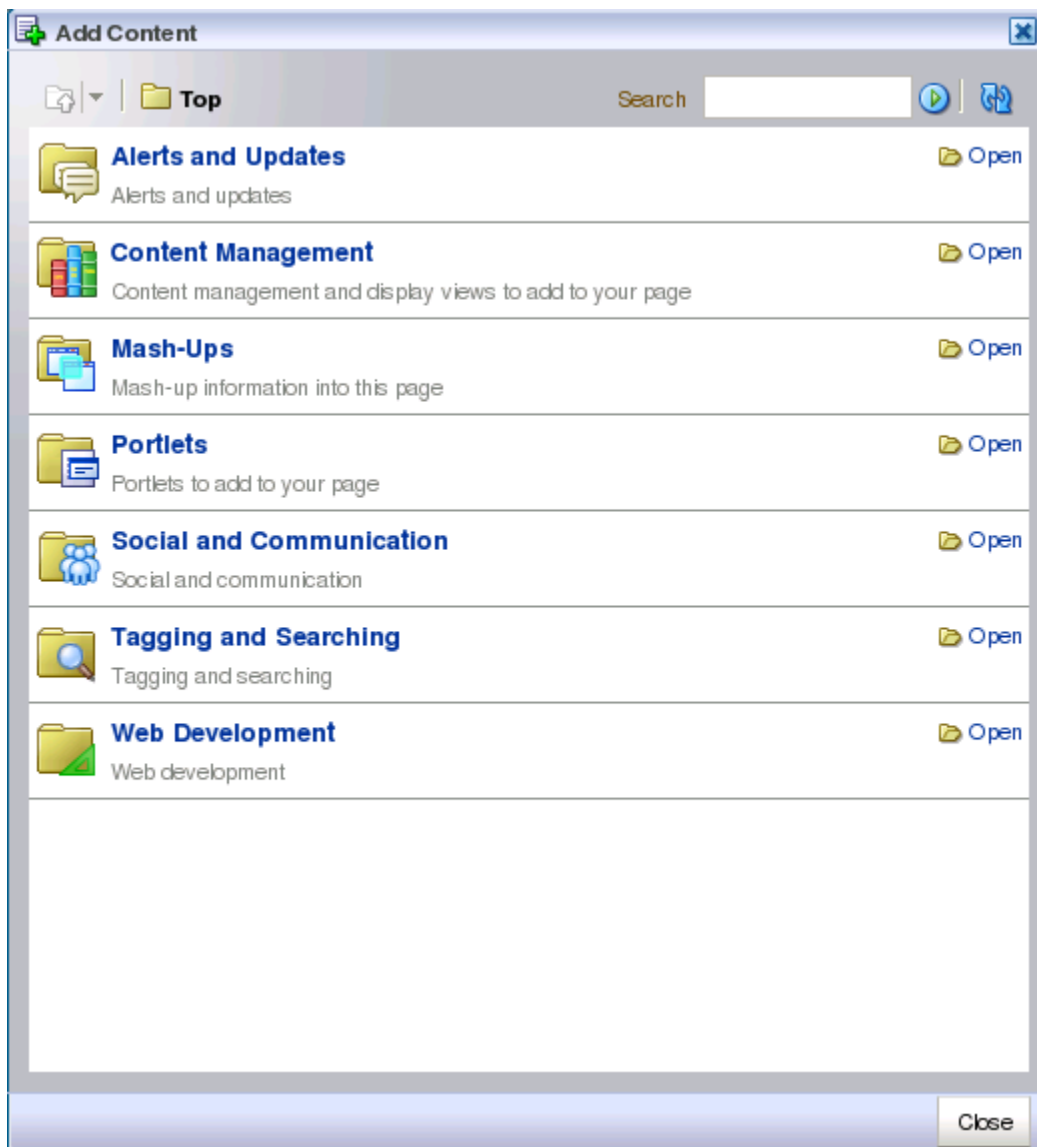
- c. Click the **Edit Properties** icon . This will display the Box component's properties. Change the text for the two tabs to **Wheat Paste** and **Earthbag vs. Adobe**, respectively. Click **Apply** and observe the changes before clicking **OK**.



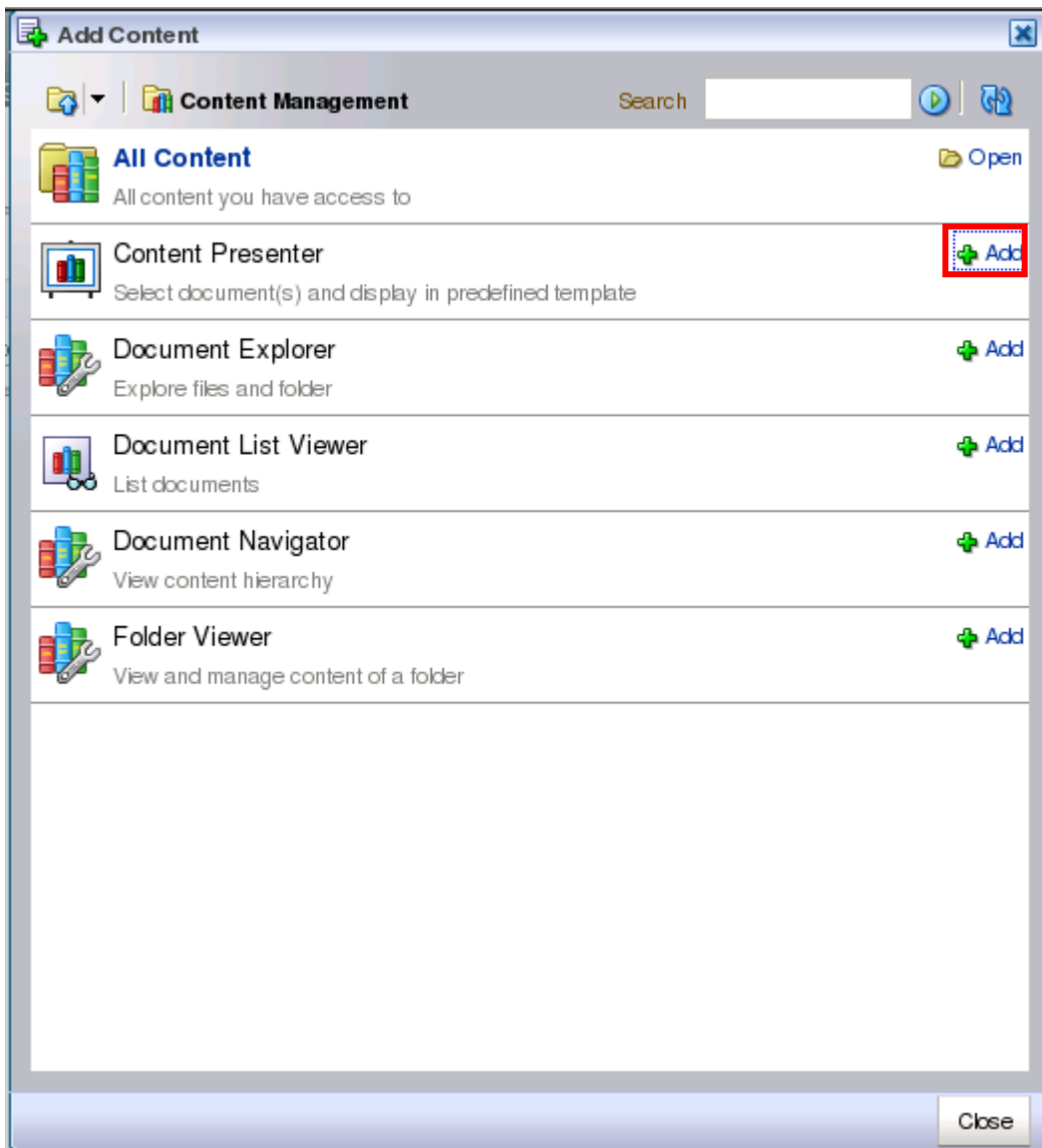
19. Add Content Presenter to a tab.



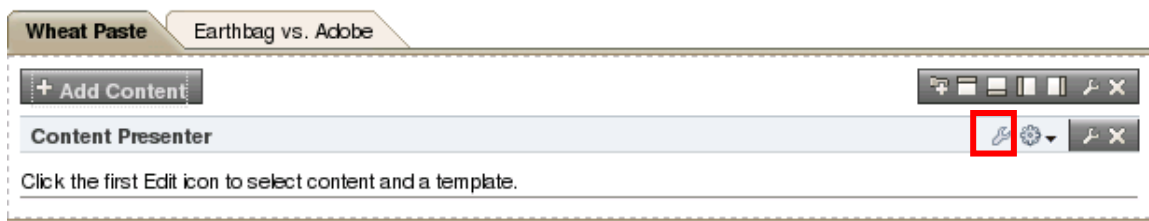
- a. Make sure that the tab with the title **Wheat Paste** is selected. Click **Add Content**. This will open the Business Dictionary, where you can find all the components that can be added to your page. The available components are arranged in folders.



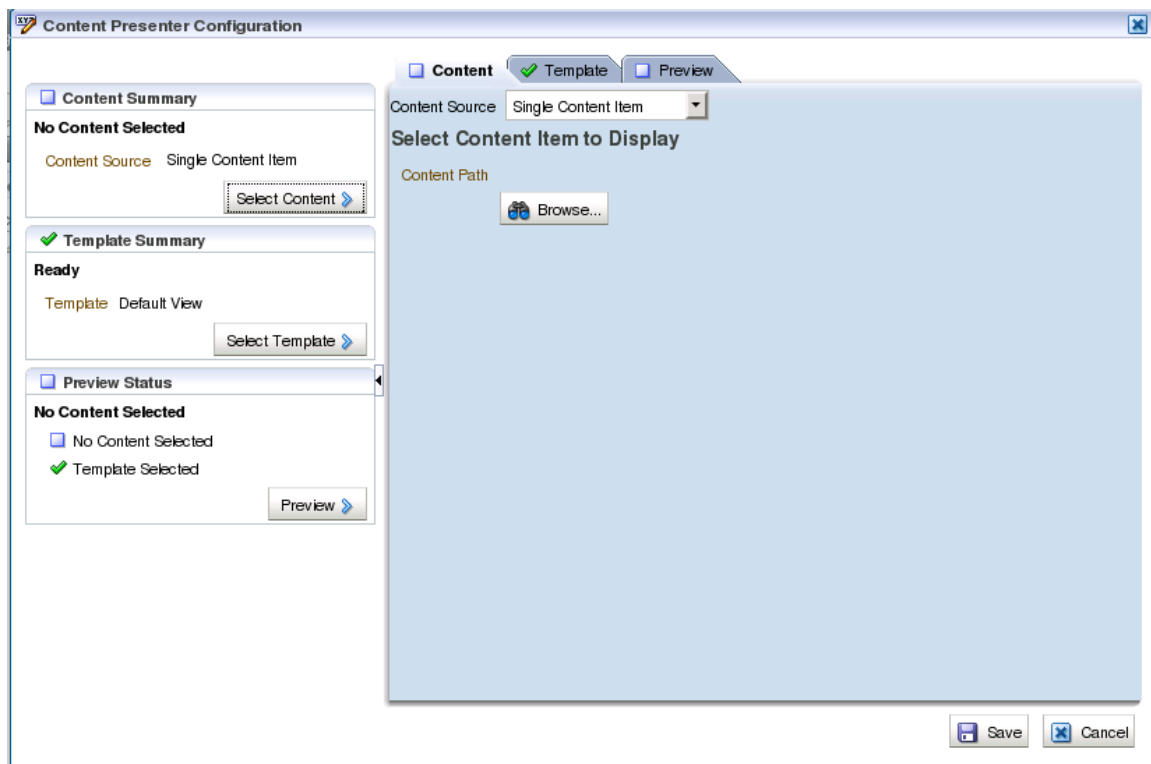
- b. Open the **Content Management** folder and click **Add** in the row of the Content Presenter task flow. **Close** the Business Dictionary.



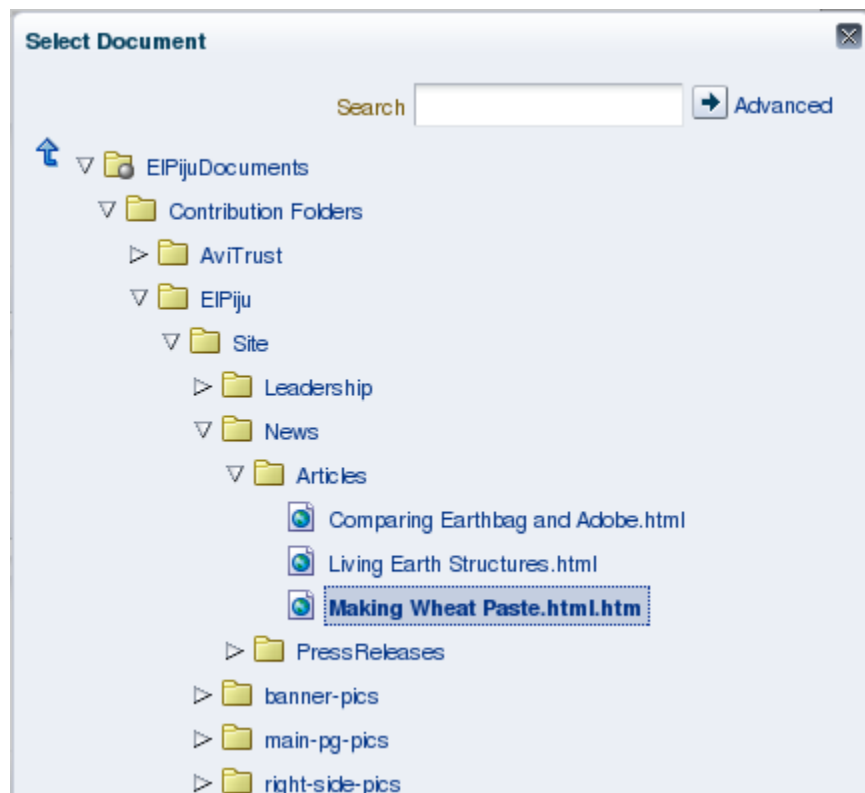
This is the resulting page:



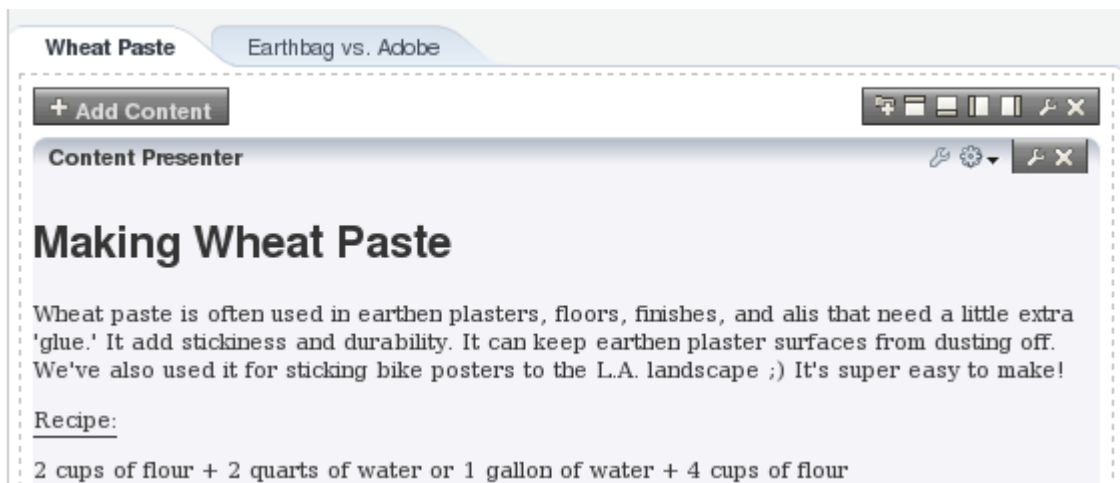
20. Select the content and a template.
 - a. Click the first **Edit** icon. In the Content Presenter Configuration Window, select the **Content** tab and click the **Browse** button.



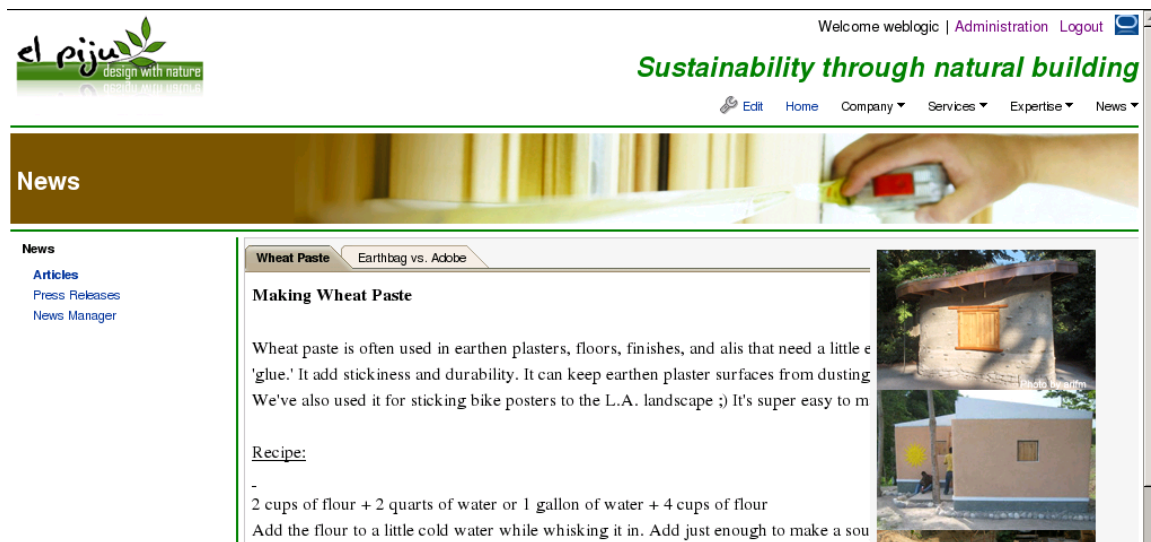
- b. In the folder hierarchy, drill down to the Articles folder, select the document about wheat paste, and click **Select**.



- c. There is no need to change the Content Presenter template; we will use the default viewer. **Save** the changes in the configuration dialog.



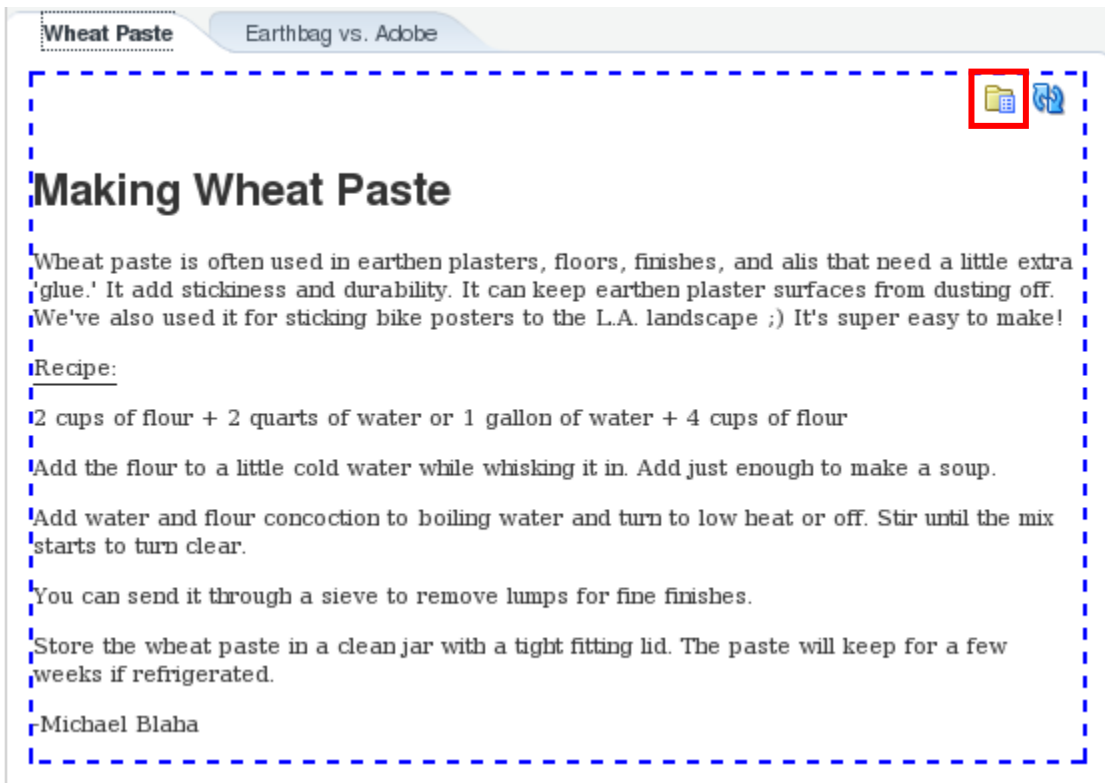
21. If you have less than 10 minutes left, move on to the next step. Otherwise repeat steps 19 and 20 for the other tab, adding the document that compares earth bag and adobe construction methods.
22. Click **Close** at the top right corner of the page. This is how the resulting page looks.



Edit Content

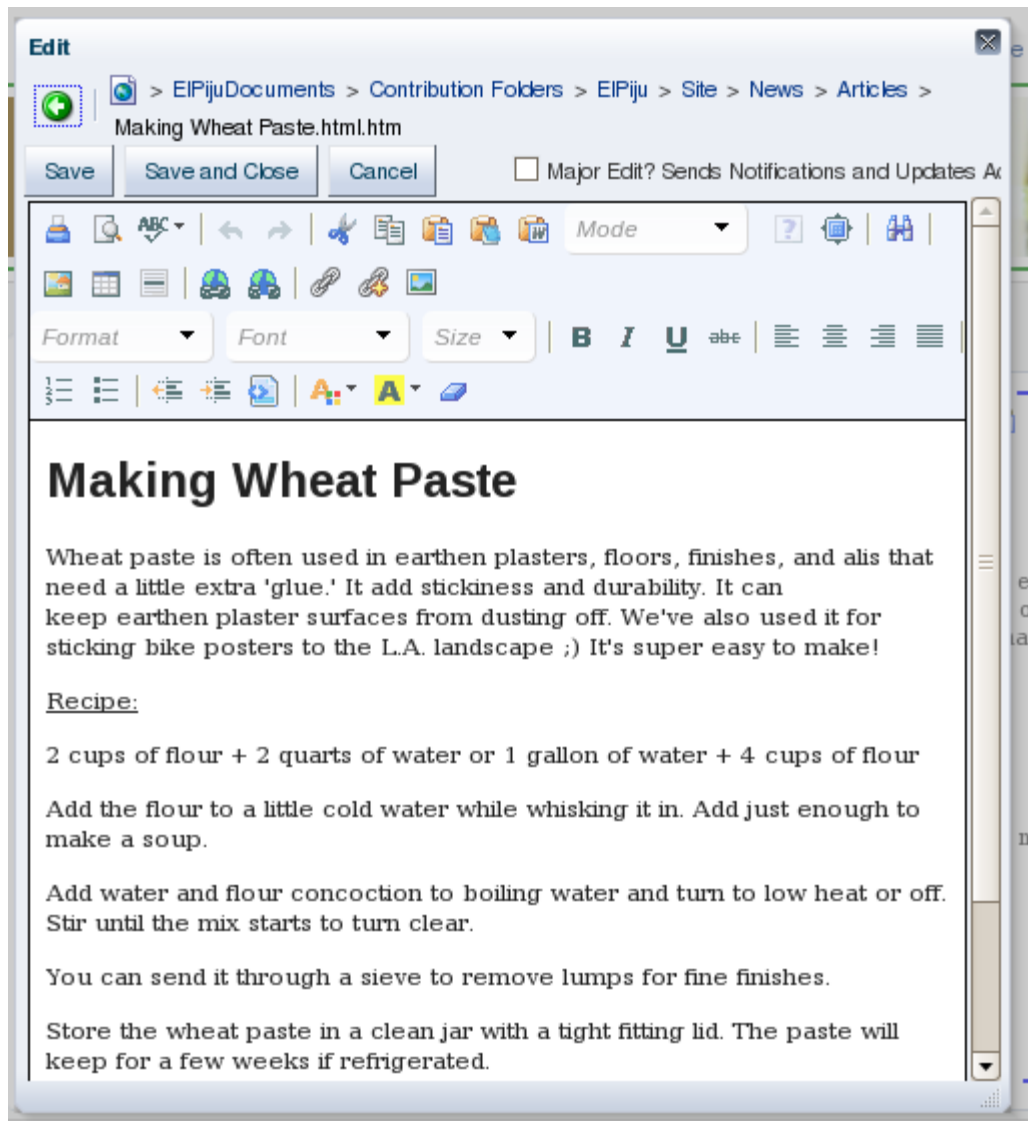
In this part of the practice, you will learn two ways of editing content stored in Oracle Content Server: direct, in-context editing and uploading documents using Document Manager.

23. Edit the document comparing earthbag and adobe construction methods.
 - a. Make sure you are viewing the **Articles** page and select the **Wheat Paste** tab.
 - b. Activate the in-context editing mode by using **CTRL-SHIFT-C**. You will see a dashed line around the document with Edit and Refresh icons in the top right corner.



- c. Click the **View and manage this document** (a folder and a document) icon. The document displays in a pop-up Document Manager window. Click **Edit**.





- You can edit the HTML document using the rich text editor. When you are finished editing click **Save and Close**.
- d. Finally, close the Document Manager window and use **CTRL-SHIFT-C** again to return to normal mode. Observe the changes you have made.
24. Upload a new press release document.
- a. Open the **News > Press Releases** page. You should see 3 documents in the accordion display.



News

- Articles
- Press Releases**
- News Manager

20100811 El Piju Breaks Ground.html

El Piju Breaks Ground on Hutton Community Center

Camarillo, CA—August 11, 2010—In an official groundbreaking ceremony today, El Piju kicked off construction on the 60,000 square foot Hutton Community Center. With completion expected next summer, the center will offer many types of recreational and cultural activities.

The Hutton facility is expected to serve up to 10,000 community members of Camarillo, CA with an aquatics center, wellness centers, exercise and multipurpose rooms, youth drop-in center, gym, community meeting rooms, and nursery. El Piju used a 3D virtual construction technology called Building Information Modeling (BIM) on this project to maximize the design and enhance construction efficiency.

- 20100823 Zoo Concessions.html
- 20100907 Emergency Shelters.html



- b. Open the **News > News Manager** page. This contains a Document Manager task flow, which points to the News folder in the Content Server.



News

- Articles
- Press Releases
- News Manager**

Organize View Filter [Advanced](#)

Name	Modified By	Last Modified	Description
Articles	weblogic	8/23/10 8:06 AM	
PressReleases	weblogic	8/23/10 8:06 AM	

- c. Drill down to the **PressReleases** folder. Click **Upload** and upload the Cob Workshop file (201100919 Cob Workshop.html) from /home/oracle/HOL folder. The folder on the Content Server should now contain four documents.

Name	Modified By	Last Modified	Description
20100811 El Piju Breaks Ground	weblogic	8/25/10 1:30 PM	
20100823 Zoo Concessions.htm	weblogic	8/25/10 1:30 PM	
20100907 Emergency Shelters.h	weblogic	8/25/10 1:30 PM	
20100919 Cob Workshop.html	weblogic	9/13/10 6:06 AM	

- d. Return to the **News > Press Releases** page. View the newly uploaded document in the accordion display.

The screenshot shows the El Piju website header with the logo and navigation menu. The main content area is titled 'News' and features an accordion display of press releases. The selected item is '20100919 Cob Workshop.html', which is expanded to show the following content:

20100919 Cob Workshop.html
 For Immediate Release - El Piju
09-18-2010 Cob Workshop
Portland, OR - September 19, 2010 Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nulla commodo metus sed velit pretium quis consectetur metus mattis. Maecenas id nibh tellus, a interdum urna. Nunc est urna, elementum ut laoreet at, placerat a augue. Pellentesque id nisi in purus tristique ullamcorper. Nulla commodo hendrerit nisi, ut mattis diam suscipit et. Aenean in eros libero. Cras sed justo sed massa porttitor molestie. Phasellus est sem, pulvinar vel lobortis id, vulputate quis magna. Aliquam ante metus, mattis et hendrerit id, elementum et nisi. Maecenas vitae mauris vel sapien aliquam vehicula ut quis ante. Mauris et est vel nisi volutpat malesuada. Vivamus in vestibulum ante. Nulla sit amet nulla ac orci rhoncus, posuere. Maecenas in velit id felis tempus cursus. Pellentesque

25. Congratulations, you have finished! It is a good idea to shutdown your services before exiting your VM. Follow steps 1a and 1b from the beginning of this document, but chose option 0 (zero) this time.
26. If you would like to use this VM to do this exercise again, you should delete the ElPijuPortal application that you created. In your terminal session do the following:
- > cd \$JDEV_UDEP_DIR/mywork
 - > rm -rf ElPijuPortal