

6 Monitoring with Oracle BAM

In this lab, you continue the Process Analytics lab and use Oracle BAM to monitor the process analytic data in real time. Oracle BAM provides a real-time event based monitoring option. It can aggregate and correlate events from multiple sources and raise alerts on abnormal business condition, thereby, enabling end-to-end business process visibility.

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6.1 Setting Up for Monitoring with Oracle BAM

In this section, you do the one-time setup needed for enabling Oracle BAM monitoring of BPM processes. These steps are typically done by the person managing the installation.

6.1.1 Configuring BAM Adapter

The BPM Server uses BAM Adapter to push events to BAM. This adapter needs to be configured so that it knows how to connect to the BAM Server. Note that the BPM Server and BAM Server can be running in different environments.

This configuration is done using the EM Console application for the BPM Server.

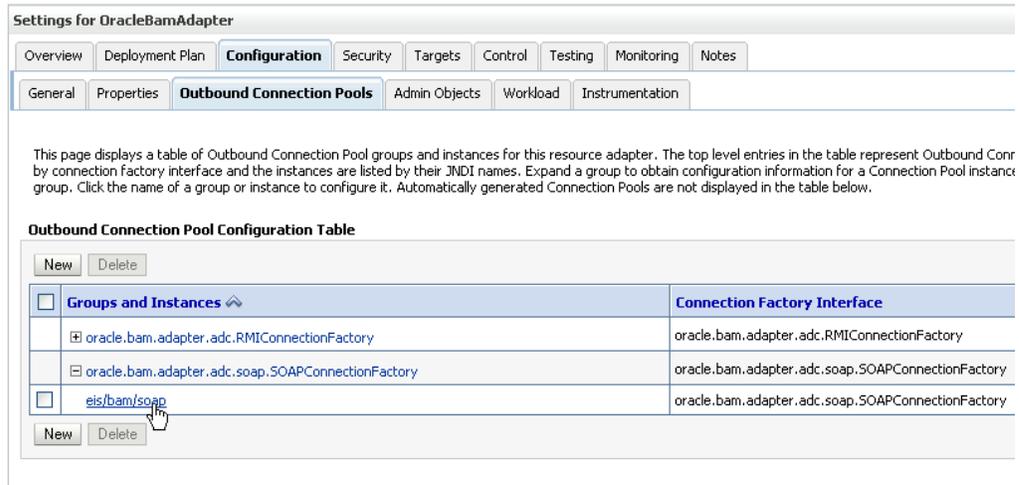
If you are using a pre-configured system for this training, you do not need to do this step.

1. Log into the WLS Console application for BPM Server, typically <http://bpmhost:7001/console> (where you would replace bpmhost with details specific to your environment)
2. Find the **Domain Structure** panel on the left hand bar, and click on **Deployments**
3. In the **Deployments** table in the main panel, find **OracleBamAdapter** of type **Resource Adapter**

<input type="checkbox"/>	oracle.wsm.seedpolicies(11.1.1,11.1.1)	Active		Library	100
<input type="checkbox"/>	OracleAppsAdapter	Active	✓ OK	Resource Adapter	328
<input type="checkbox"/>	OracleBamAdapter	Active	✓ OK	Resource Adapter	329
<input type="checkbox"/>	OracleBPMComposerRolesApp	Active	✓ OK	Enterprise Application	382
<input type="checkbox"/>	OracleBPMProcessRolesApp	Active	✓ OK	Enterprise Application	381

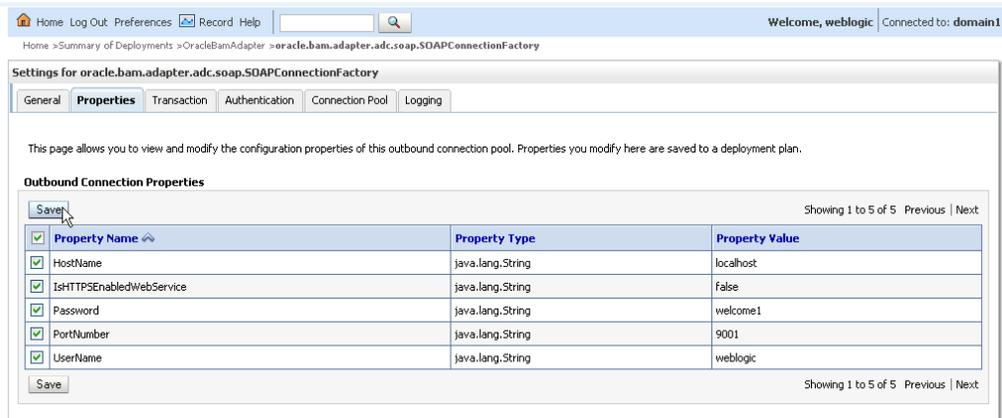
Tip: You may use the **Customize This Table** and choose to filter out Libraries as well as increase the number of rows displayed to 100 to make it easier to find OracleBamAdapter

4. Drill into **OracleBamAdapter** by clicking the name (not the checkbox)
5. Select the **Configuration** tab and within it the **Outbound Connection Pools** tab
6. Expand the **oracle.bam.adapter.adc.soap.SOAPConnectionFactory** and drill down into the **eis/bam/soap** link



7. In the **Properties** tab, specify the connection information for BAM Server

Property Name	Property Value
HostName	localhost
IsHTTPEnabledWebService	false
Password	welcome1
PortNumber	9001 (or 7001 if you have BAM on the AdminServer)
UserName	weblogic



Important Tip: You need to press **enter** after entering a property value – moving out of the field without pressing enter, will cause changes to the field to be lost.

8. Click **Save**

If this is the first time you are changing properties for the BAM adapter you will be asked to specify the deployment plan.

9. Create a directory, **BAMPlan**, in your **SOA_HOME/soa** directory

10. In the dialog, select **BAMPlan** in the locations list

Save Deployment Plan Assistant

OK Cancel

Save Deployment Plan

You have made configuration changes that need to be stored in a new deployment plan.

Select or enter the path of a deployment plan file. The path must end with '.xml'. It is highly recommended that this file be named 'Plan.xml'.

Each plan should be located in its own directory, otherwise applications can inadvertently share deployment plan files. The plan file will be overwritten if it already exists. Other files in the plan directory may be overwritten as well.

Path: /scratch/hbuelow/Oracle/Middleware/home_ps2/Oracle_SOA1/soa/Plan.xml

Recently Used Paths: (none)

Current Location: adc2110578 / scratch / hbuelow / Oracle / Middleware / home_ps2 / Oracle_SOA1 / soa

- BAMPlan
- applications
- connectors
- modules
- thirdparty

OK Cancel

The **Path** field should be set as shown below.

Path: /scratch/hbuelow/Oracle/Middleware/home_ps2/Oracle_SOA1/soa/BAMPlan/Plan.xml

Recently Used Paths: (none)

Current Location: adc2110578 / scratch / hbuelow / Oracle / Middleware / home_ps2 / Oracle_SOA1 / soa / BAMPlan

11. Click **Save**

12. Now you need to update the BAM adapter with the new plan. Find **OracleBAMAdapter** in the **Deployments** table as in step 3 above

13. Select the checkbox for the adapter and click **Update**

14. In the **Update Application Assistant**, choose **Update this application in place**

Update Application Assistant

Back Next Finish Cancel

Locate new deployment files

You have elected to update the OracleBamAdapter application.

Update this application in place with new deployment plan changes. (A deployment plan must be specified for this option)

Deployment plan path: /scratch/hbuelow/Oracle/Middleware/home_ps2/Oracle_SOA1/soa/BAMPlan/Plan.xml [Change Path](#)

Redeploy this application using the following deployment files:

Source path: /scratch/hbuelow/Oracle/Middleware/home_ps2/Oracle_SOA1/soa/connectors/OracleBamAdapter.rar [Change Path](#)

Deployment plan path: /scratch/hbuelow/Oracle/Middleware/home_ps2/Oracle_SOA1/soa/BAMPlan/Plan.xml [Change Path](#)

Back Next Finish Cancel

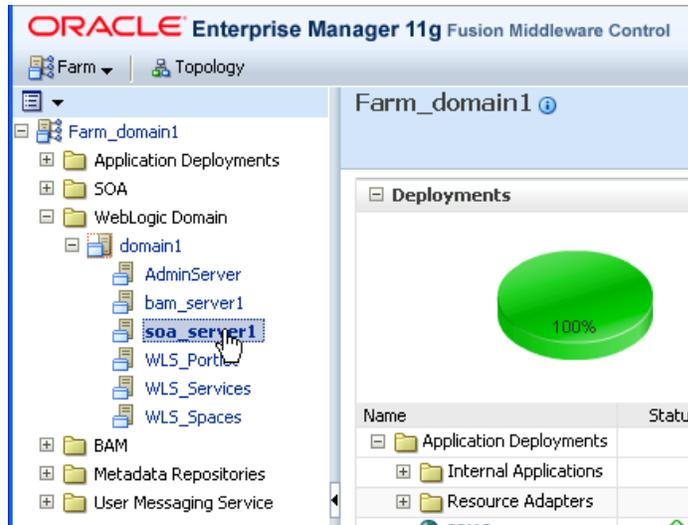
15. Click **Finish**

6.1.2 Configuring BPMN Engine for BAM Integration

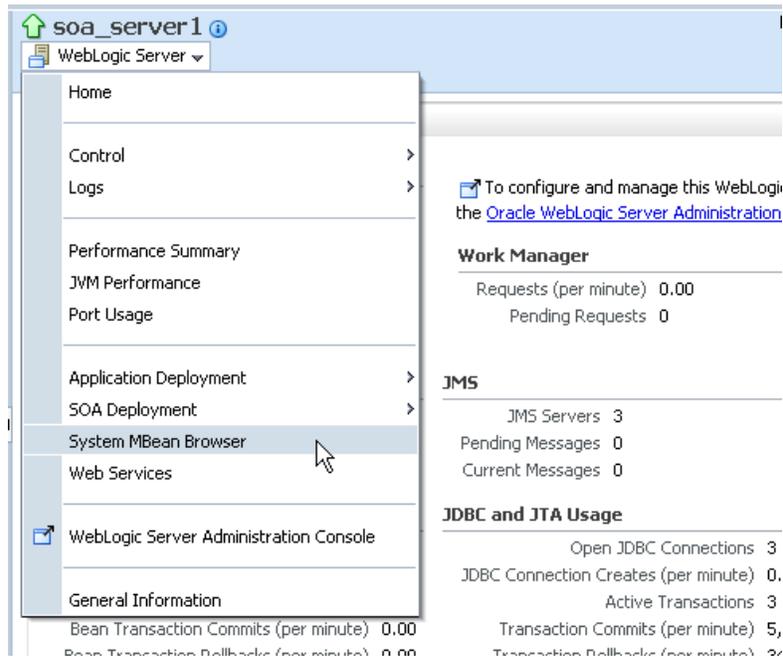
The BPMN engine has a configuration option to send events to BAM; this option needs to be turned on from **Fusion Middleware Control**.

If you are using a pre-configured system for this training, you do not need to do this step.

1. Log into Oracle EM Fusion Middleware Control, typically <http://bpmhost:7001/em> (where you would replace bpmhost with details specific to your environment)
2. Expand **Weblogic Domain** within **Farm_domain**, select your domain, e.g. **domain1**, and then select the BPM Server (typically, **soa_server1** if running managed servers; otherwise, AdminServer).



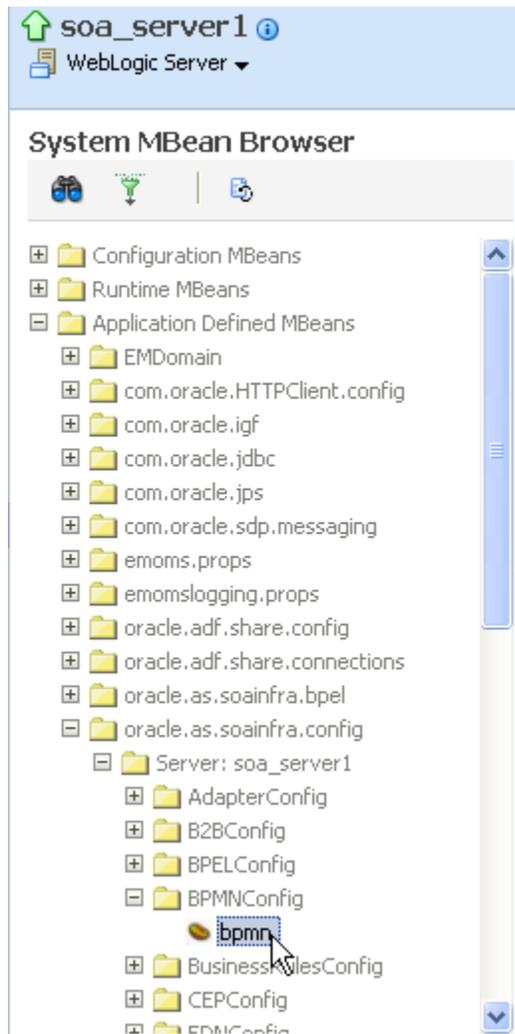
3. Click on the **WebLogic Server** drop-down menu, and select **System MBean Browser**



4. In the **System MBean Browser**
 - a. Expand **Application Defined MBeans**

Tip: Collapsing other top-level nodes will make finding this easier

- b. Expand **oracle.as.soainfra.config**
- c. Expand **Server: soa_server1** (Server: AdminServer, if not running managed server)
- d. Expand **BPMNConfig**
- e. Click on the **bpmn** entry



5. Set Value of DisableActions to empty
 - a. Find attribute **DisableActions**
 - b. Clear its current **Value**
 - c. Click on **Apply**

Application Defined MBeans: BPMNConfig:bpmn Apply Revert

Show MBean Information

Attributes Notifications

Name	Description	Access	Value
8 CubeUpdateFrequency	Frequency in seconds at which cube action calculates the workload	RW	300
9 DisableActions	Comma delimited list of disabled measurement actions (e.g. "CubeCommand, BAMCommand")	RW	
10 DisableSensors	If set to "true" the engine will disable all calls to sensors. The default value "false".	RW	false
11 DispatcherEngineThreads	The total number of threads that will be allocated to process engine dispatcher messages	RW	30
12 DispatcherInvokeThreads	The total number of threads that will be allocated to process invocation dispatcher messages	RW	20

6.1.3 Importing BAM Monitor Express

Oracle BAM ships with standard data objects and dashboards defined for BPMN and BPEL processes. However, these need to be imported into BAM after installation.

If you are using a pre-configured system for this training, you do not need to do this step.

In these instructions **\$SOA_HOME** refers to where you chose to install SOA, usually **\$MW_HOME/Oracle_SOA1**

In order to eliminate manually entering the username and password multiple times, update the **BAMICommandConfig.xml** with the following:

1. Edit `$SOA_HOME/bam/config/BAMICommandConfig.xml` file as follows.

Add the following two lines above the `</BAMICommand>` tag at the bottom. Replace the `user_name` and `password` value with your admin username and password.

```
<ICommand_Default_User_Name>user_name</ICommand_Default_User_Name>
```

```
<ICommand_Default_Password>password</ICommand_Default_Password>
```

2. Set `JAVA_HOME` environment variable

Linux:

```
setenv JAVA_HOME /scratch/hbuelow/Oracle/Middleware/home_ps2/jdk160_18
```

Windows:

```
set JAVA_HOME=c:\Oracle\Middleware\home_ps2\jdk160_18
```

3. Find the Monitoring Express sample shipped with BAM and run the included setup script

```
cd $SOA_HOME/bam/samples/bam/monitoringexpress/bin
```

```
./setup.sh
```

If you did not edit the config file in step 1, there will be multiple prompts for username/password; use user weblogic

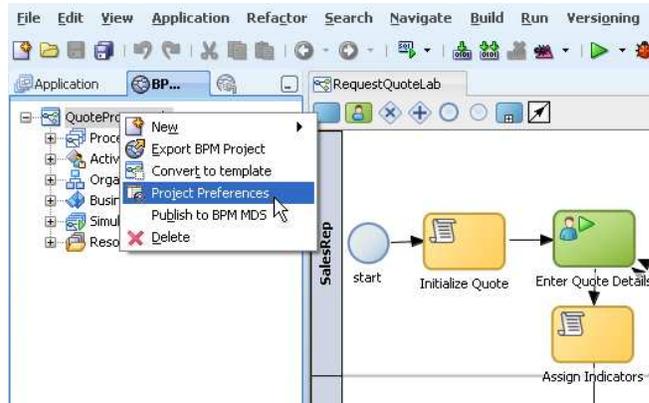
Later in this lab, you review the dashboard you just imported.

6.2 Configuring BPM Project for BAM Monitoring

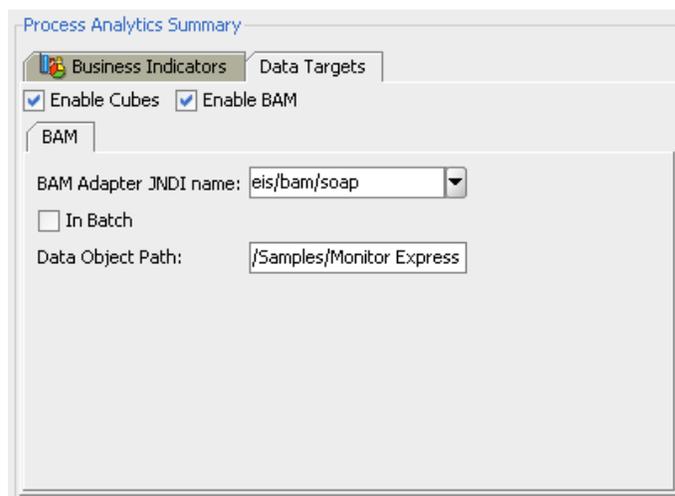
In this section, you set up your BPM Project for BAM Monitoring. This setup is very simple and would usually be done earlier in process definition. For flow of tutorial purposes, you are doing it here as it is specific to this lab.

1. Open **Project Preferences** for QuoteProcessLab

- a. Open the BPM Project in JDeveloper (if not already open)
- b. Navigate to the **BPM Navigator** panel (use **View** menu if needed)
- c. Right click on the project, **QuoteProcessLab**, and select **Project Preferences**



2. In the **Data Targets** tab, select **Enable BAM** as a data target for process analytics



3. Select **eis/bam/soap** as the BAM Adapter JNDI name

Recall this is the outbound connection we configured in section 16.1.1, step 6.

4. Specify Data Object Path as */Samples/Monitor Express*

This corresponds to where the Monitor Express setup script imported the data objects.

5. Deploy the project

6.3 Creating Process Specific BAM Data Object

For capturing process specific process analytic events, you need to create BAM Data Objects for each process. The bulk of the data object is the same for every process so you import the common data object and create the process specific data object by adding process business indicators to it.

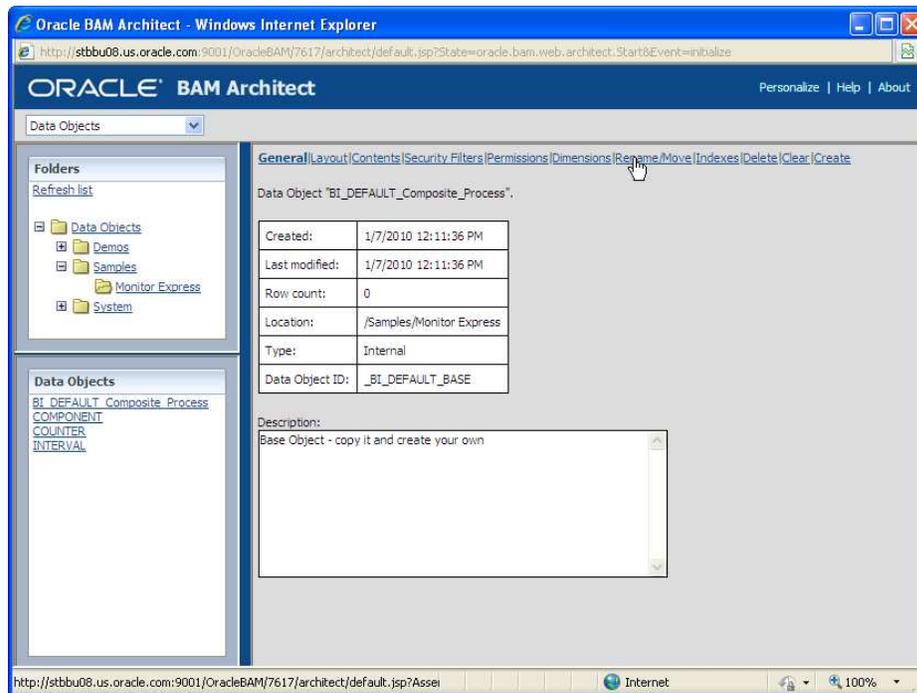
Following are the rules for creating a BAM Data Object for the BPM process:

- Name of the Data Object must be exactly `BI_DEFAULT_<Composite Name>_<Process Name>` (Composite Name is same as Project Name)

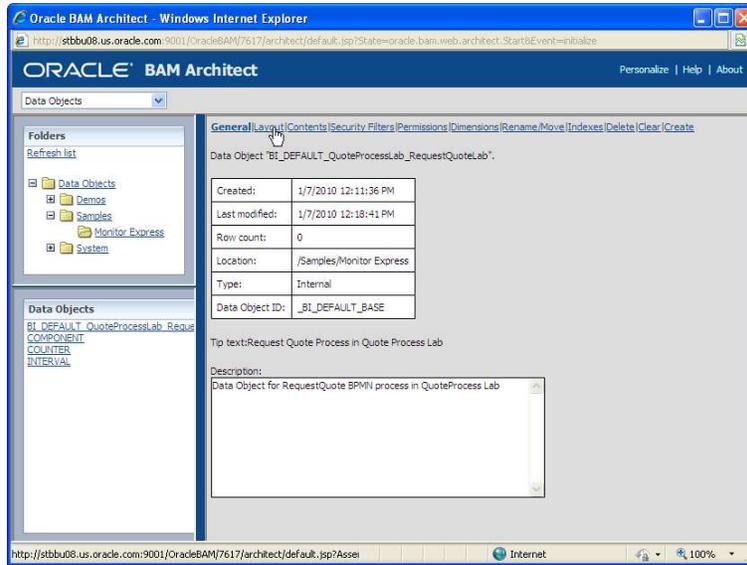
- For every business indicator, a column needs to be created in the data object
 - Column name must be exactly METRIC_<business indicator name>
 - Types should match
 - For business indicator with ranges, i.e. dimension business indicators of numerical types, and additional column needs to be created to capture the range
 - Column name must be exactly METRIC_RANGE_<business indicator name>
 - Type is String
1. Launch BAM Architect
 - a. Log in to Oracle BAM, <http://bamhost:9001/OracleBAM>, as weblogic. Use port 7001 if you have a single AdminServer configuration.

Important: BAM web tools require Internet Explorer

- b. Click on **Architect**
2. Follow the steps to find the imported base data object and rename it to **BI_DEFAULT_QuoteProcessLab_RequestQuoteLab**
 - a. Drill down into folder **Data Objects, Samples, Monitor Express**
 - b. Select Data Object **BI_DEFAULT_Composite_Process**

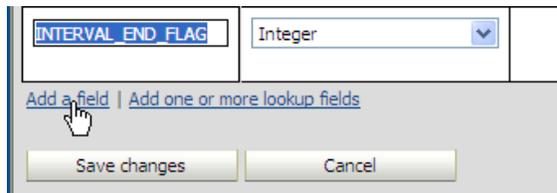


- c. Click on **Rename/Move**
- Specify **Name** as *BI_DEFAULT_QuoteProcessLab_RequestQuoteLab*
- d. **Save Changes** and **Continue**
3. Add **Business Indicators** to **BI_DEFAULT_QuoteProcessLab_RequestQuoteLab** data object as follows
 - a. Click on **Layout**



b. Click on **Edit Layout**

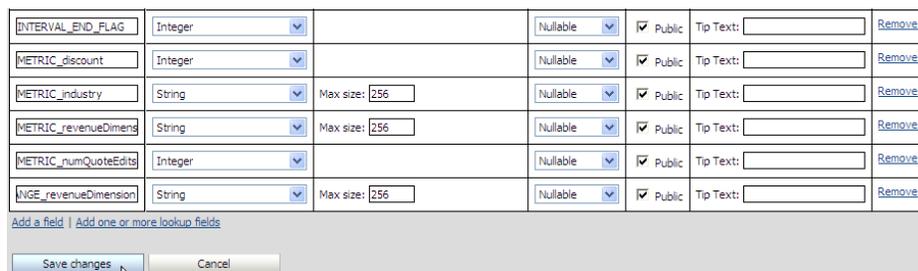
c. Add following fields, clicking on **Add a field** (at the bottom of the panel)



See rules for creating Data Object columns for process business indicators at the beginning of this section.

Field Name	Field Type
METRIC_revenueDimension	Integer
METRIC_RANGE_revenueDimension	String
METRIC_discount	Integer
METRIC_industry	String
METRIC_numQuoteEdits	Integer

d. **Save changes and Continue**



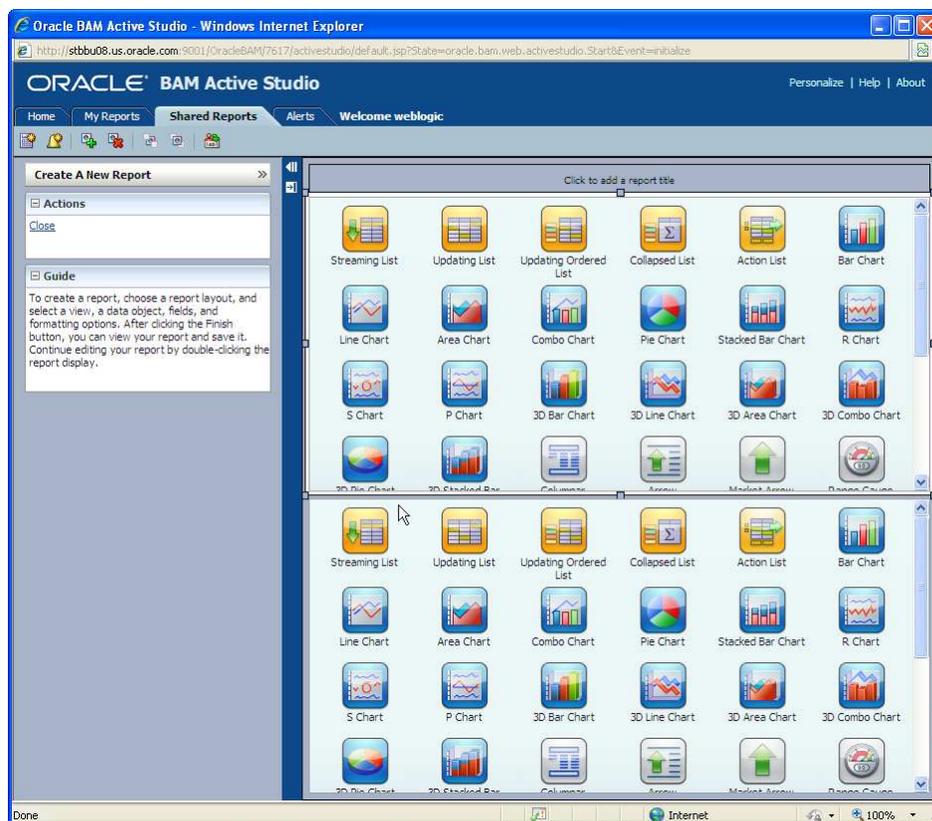
6.4 Creating BAM Dashboards

Once you have your BAM data object and set the properties in your BPM project for BAM process analytics, it's time to create the BAM dashboard. While creating the dashboard, you can preview how it will look if you have data in your data object.

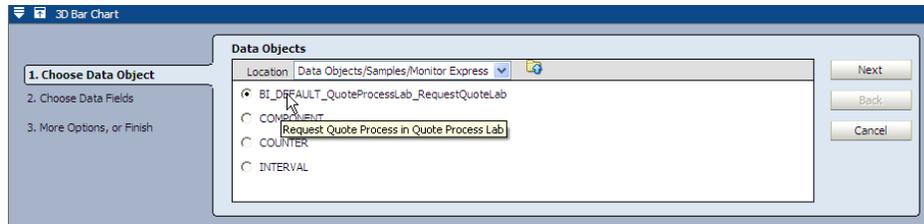
1. In **BPM Workspace** as **jcooper**, submit a few instances of the process to put data in the data object. Be sure to enter **industry**, **total revenue**, and **discount** values. You only need to submit the first form, **Enter Quote Details**. Be sure your discount percentage value is in decimal form, like .25 and not like 25%.
2. Log in to **Oracle BAM**, <http://bamhost:9001/OracleBAM>, as **weblogic**. Use port 7001 if you have a single AdminServer configuration.

Important: BAM web tools require Internet Explorer

3. Click on **Active Studio**
4. Create a new report as follows
 - a. Click **Shared Reports** tab
 - b. Click on **Create a New Report** button
 - c. Select the template with 2 horizontal sections



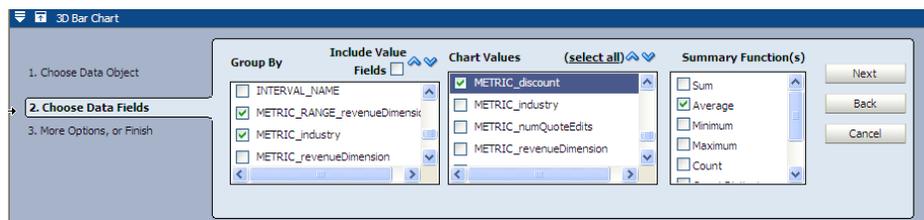
5. Click on **Click to add a report title** and enter *Request Quote Dashboard*
6. Add a chart to display **discount** grouped by **revenue** and **industry** as follows
 - a. Click on **3D Bar Chart**
 - b. In **Choose Data Object** tab, drill down in to **Data Objects, Samples, Monitor Express** and select **BI_DEFAULT_QuoteProcessLab_RequestQuoteLab**



c. Click Next

d. In Choose Data Fields:

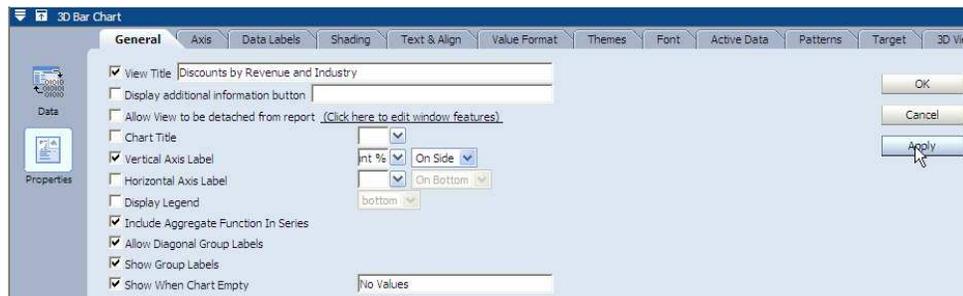
- **Group By:** METRIC_RANGE_revenueDimension and METRIC_industry
- **Chart Values:** METRIC_discount
- **Summary Function(s):** Average



e. Click Next

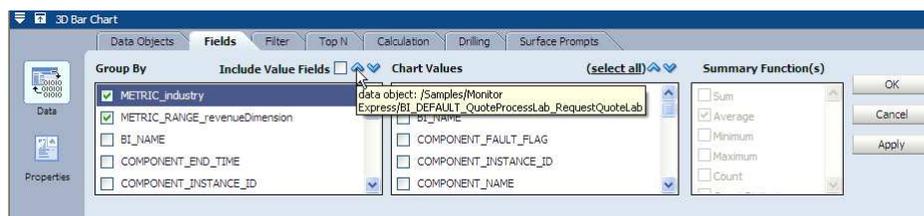
f. Select Change View Properties and enter

- **View Title:** Discounts by Revenue and Industry
- **Vertical Axis Label:** Discount%
- Click Apply to review

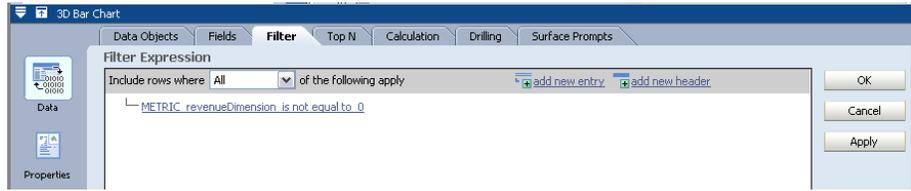


g. If you don't like the order of grouping in X-axis

- Click on **Data** and go to the **Fields** tab
- Use the blue arrows in the **Group By** column to re-arrange
- Apply and review



- h. Specify a filter so that any orders with revenue = 0 are not shown in the dashboard (these are the orders at activation, before any data is entered).



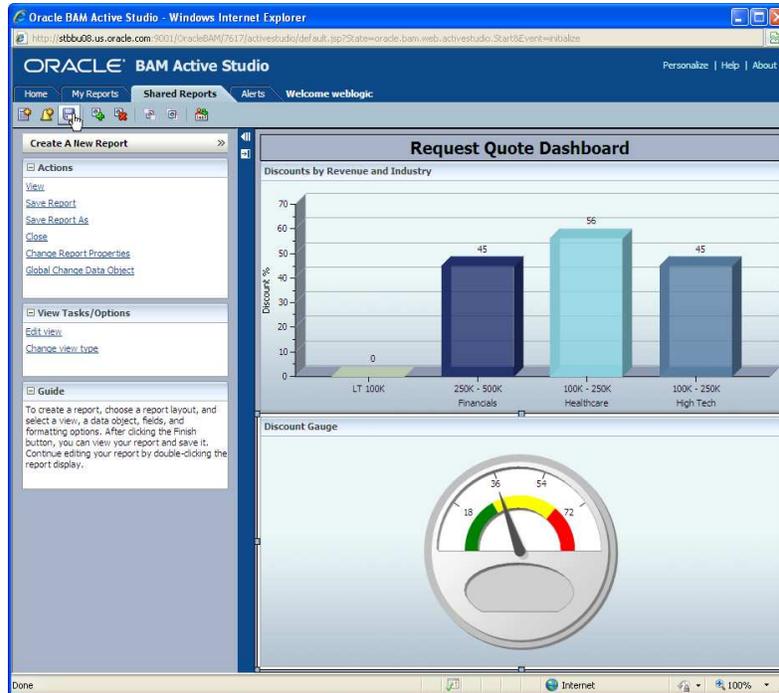
- a. Click **OK**
7. Add a gauge to display discount as follows
- a. For the bottom of your report, click on **Range Gauge** and choose **Data Objects** exactly as in previous step
 - b. In **Choose Data Fields**:
 - Select **METRIC_discount** in the center picklist
 - Select **Average** in the picklist below it



- c. Click **Next**
- d. Click **Change View Properties**
 - Specify **View Title** as *Discount Gauge*
 - Specify **Value display ranges** as *0, 30, 65, 90*
- e. Click **Apply** to review
- f. Specify a filter as you did with the 3D chart so that any orders with revenue = 0 are not considered in the discount average
- g. Click **OK**



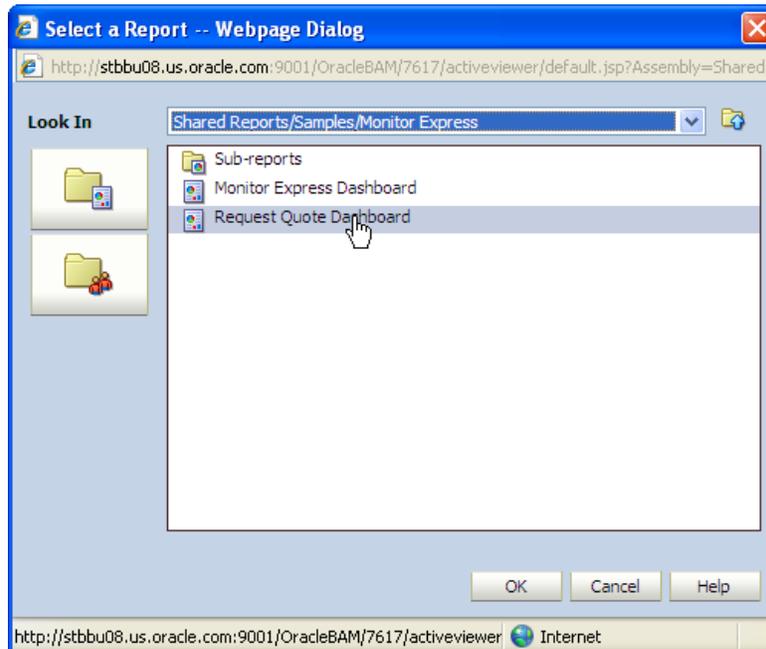
- 8. Save the report under **Shared Reports/Samples/Monitor Express**



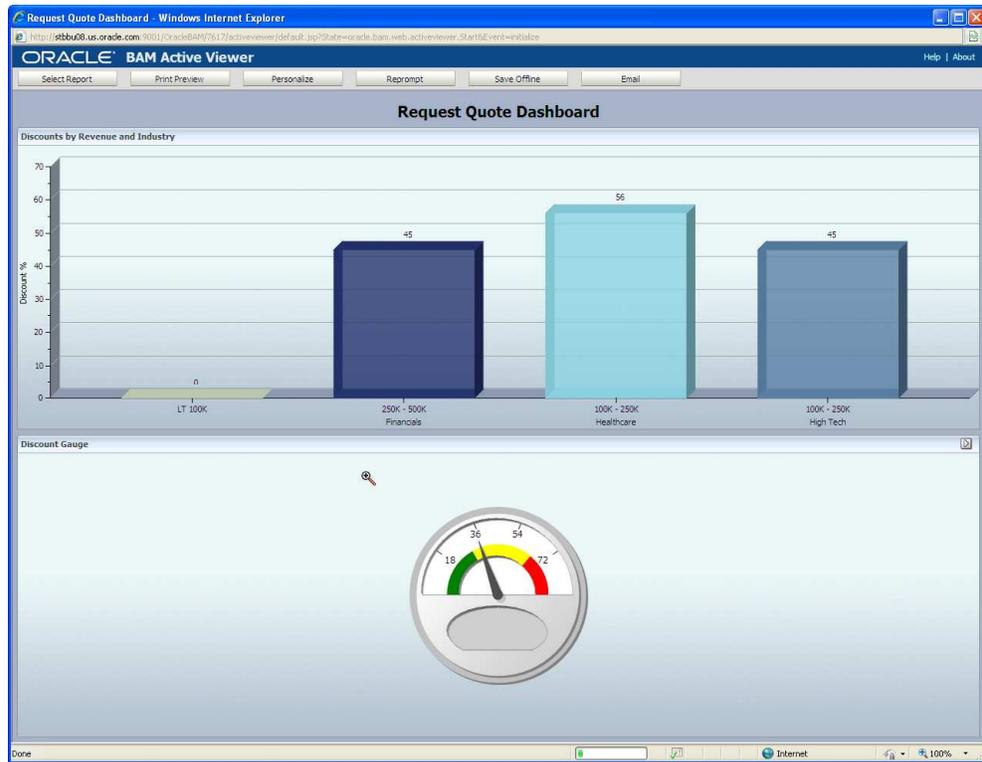
6.5 Viewing BAM Dashboards

In this section, you use **BAM Active Viewer** to view both the standard dashboard as well as the one you created in the previous section.

1. Log in to **Oracle BAM**, <http://bamhost:9001/OracleBAM>, as weblogic. Use port 7001 if you have a single AdminServer configuration and click on **Active Viewer**
2. Click on **Select Report** and open the **Request Quote Dashboard**

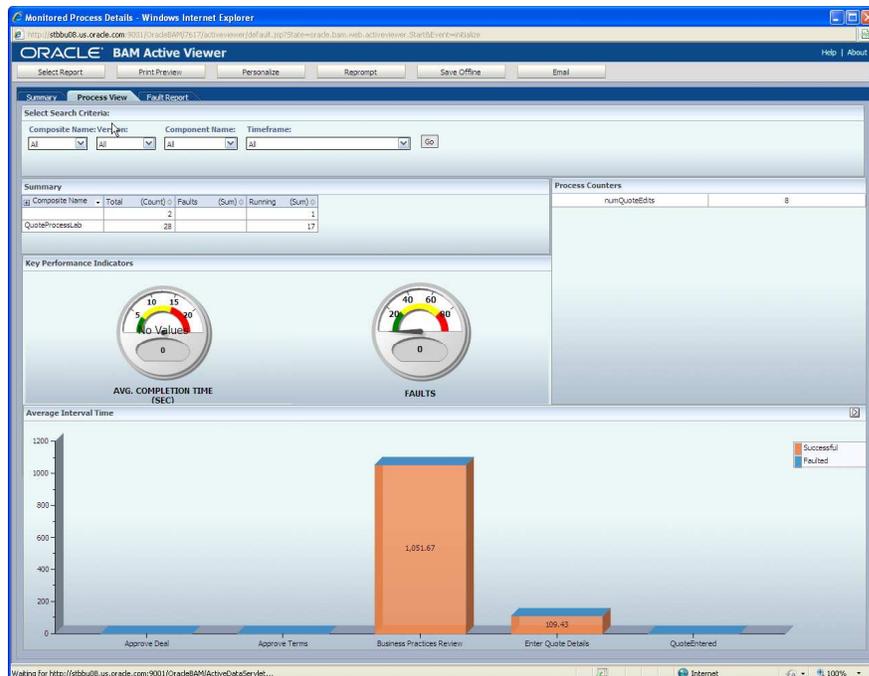


3. View the **Request Quote Dashboard**



4. View the **Standard Dashboards** (Monitor Express Sample) as follows

- a. Click on **Select Report**
- b. Drill down into **Shared Reports/Samples/Monitor Express**
- c. Select **Monitor Express Dashboard** and click **OK**
- d. Select **Process View** tab



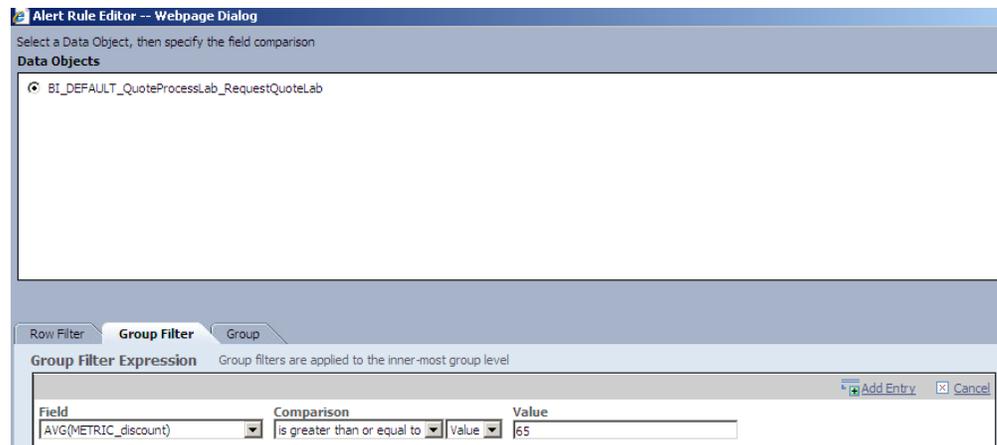
6.6 Create an Alert for a High Discount Sales Quote

In this section, you use **BAM Active Studio** to create an alert when the KPI for the average discount is in the red zone

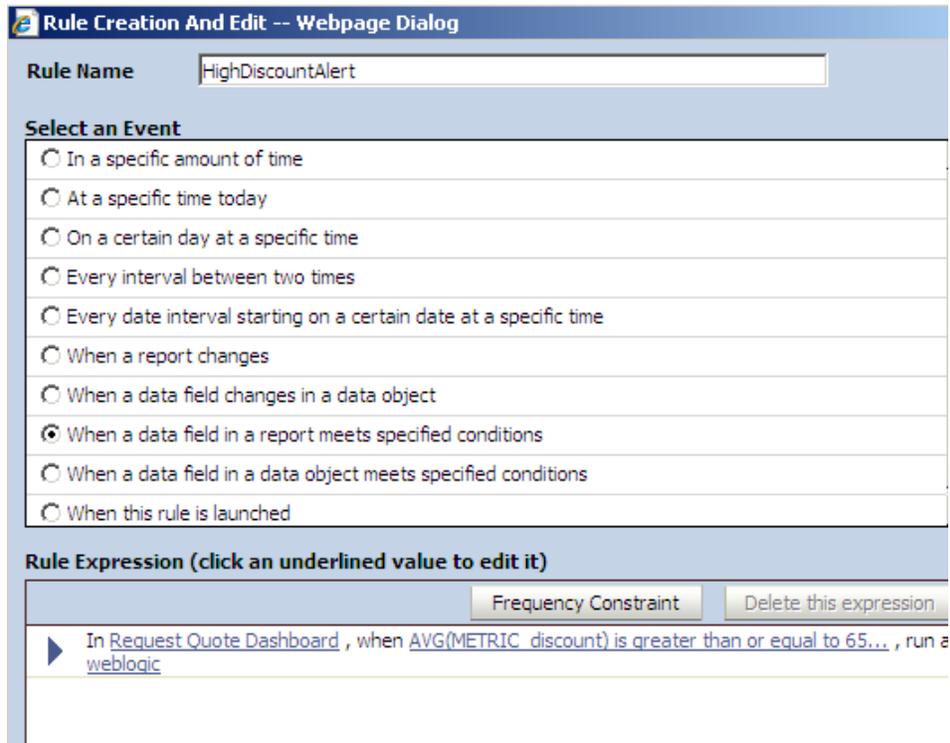
1. Launch **BAM Active Studio**
2. Click on **Alerts** tab
3. Click **Create a New Alert**



4. Select **Create a Rule**
5. Name the alert *High Discount Alert*
6. Select **Event** as **When a data field in a Report meets a specified condition**
7. In **Rule Expression**
 - Click on **Select Report**
 - Select **Request Quote Dashboard**
 - Click on **When this data field has a condition x**
 - Select **DataObject BI_Default_QuoteProcesslab_RequestQuoteLab**
 - Click on **Group Filter** tab
 - Click on **Add New Entry**
 - Set the filter for **AVG(METRIC_Discount) is greater than or equal to 65**



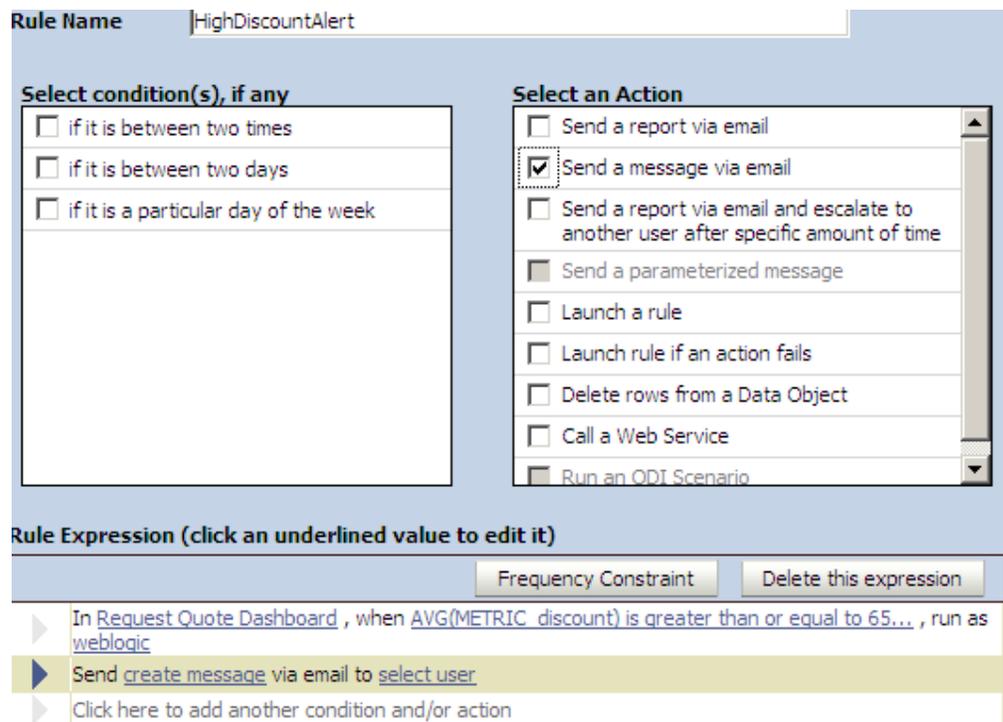
8. Click **Add Entry** to save the group filter condition
9. Click **OK**



10. Click **Next** to set up an action on the alert

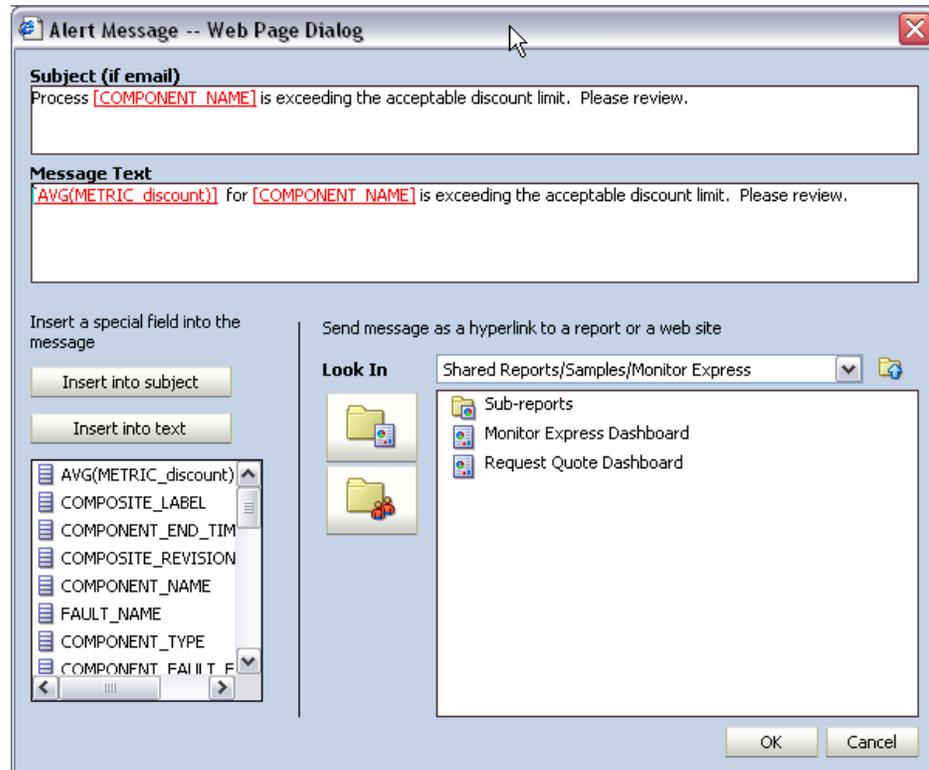
11. Under **Select an Action**, check **send a message via e-mail**

You can also invoke a web service or start an ODI scenario among other options as part of the action. One alert can kick off multiple actions.



12. Under **Rule Expression**, click on **create message**

13. Select the **parameters** to populate for the message as shown below



14. Click **OK**
15. Click on **Select User** , select **Weblogic**
16. Click **OK**
17. Click **OK** on the main Alert dialog

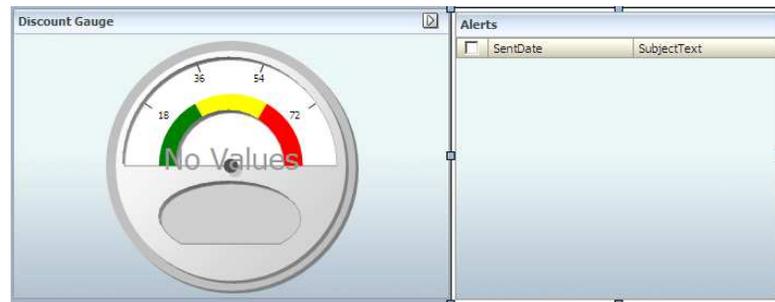
Alert Rules		
Activate	Alert Name	Last Launched
<input checked="" type="checkbox"/>	HighDiscountAlert	

Since you do not have an e-mail address configured, the following steps will show how alerts can be viewed on the Dashboard. In production scenarios, the users will normally send the alert e-mail and keep the dashboard design to allow analysis of the situation for the alert recipient.

18. Go to **Active Studio** and open Request Quote Dashboard
19. Click **Edit**
20. Resize the KPI Dial Gauge view by selecting it and dragging the window from the right corner to have it take up the left half of the lower part of the dashboard.
21. Click Insert View on the top menu bar
 
22. Select **Action List** view
23. Select the following **System/Alerts/History** Data object
24. Click **Next**
25. Select **Subject Text** and **Sent Date** (re-order the fields with the arrows)
26. Click **Next**

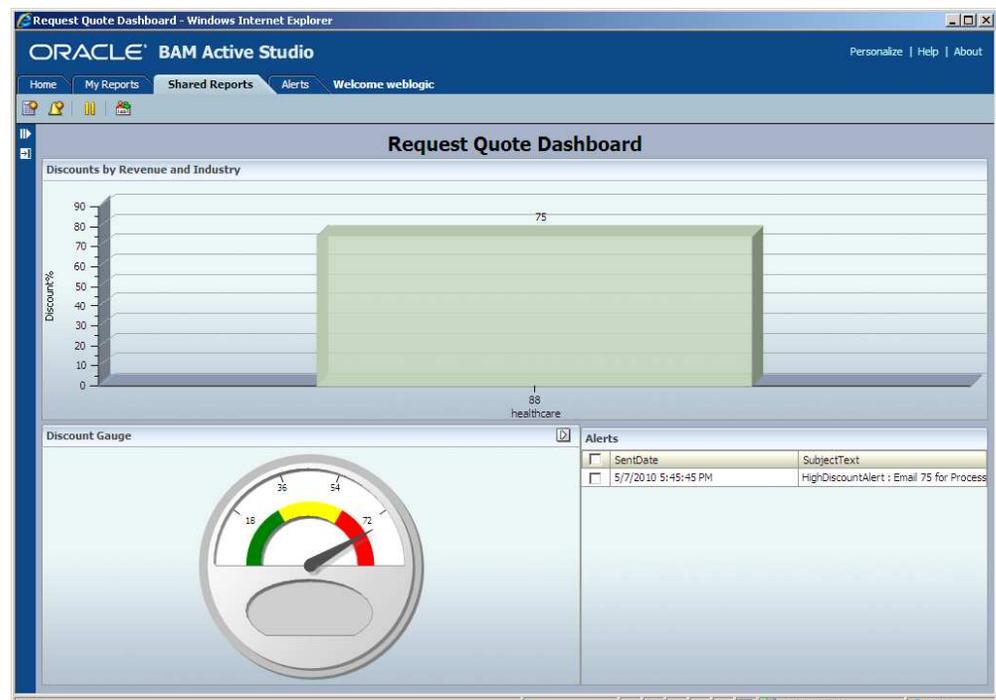
27. Click on **Change View properties**
28. Change **View Title** to **Alerts**
29. Click **Apply**
30. Click **OK**
31. **Select the Alert Action List view** , the cursor will show up as a cross when placed on the edge of the view, **Click and drag the view** to the lower right corner

The alert view will show next to the KPI



If you want to test the alert, enter a Discount metric such that the average is 65 or above.

You should see the following on the dashboard



Use **Architect** to edit the content of the data object so that you can test your dashboard with different data.

Challenge Exercise – Create an alert that can invoke a web service in your BPM process to allow dynamic process handling based on real-time monitoring..