IBM WEBSPHERE BUSINESS MONITOR 7.0 – LAB EXERCISE

# WebSphere Business Monitor V7.0

# KPI history and prediction lab

## What this exercise is about

The objective of this lab is to show you how to use the KPI history and prediction widget. Since the KPI history service runs once per hour, it could take some time to build up enough history records for testing the widget. In this lab, you will preload the database with history records, then use the widget to view those records. You will create a KPI prediction model using the KPI Manager widget, then view the prediction data. Also, you will configure a business user alert using the Alert Manager widget, and the alert will be based on data that exceeds a threshold which is defined on the prediction model.

## Lab requirements

List of system and software required for the student to complete the lab:

- Rational Application Developer V7.5 or WebSphere Integration Developer V7.0.

- WebSphere Business Monitor V7.0 – Toolkit Installation including the Monitor Model editor and Monitor Server

## What you should be able to do

At the end of this lab you should be able to:

- Use the KPI history and prediction widget to view KPI historical information and KPI prediction information.

# Introduction

In this lab you will load the KPI history table with approximately 52,000 records, approximately 3 years of data for each of two KPIs. You will load the records into the Derby database for use with the Monitor toolkit.

After loading the database with the history records, you will deploy the monitor model. Then you will create a dashboard and use the KPI history and prediction widget.

You will also create a prediction model and view the prediction values in the dashboard.

Finally, you will create a business user alert when the KPI prediction values exceed a predefined threshold.

### URL Cheat sheet

The following URLs may be helpful to you as you exercise this lab. Note that the port numbers in the URL of your installation may be different depending on your configuration.

- Server administrative console

https://localhost:9043/ibm/console

- Business space dashboard

https://localhost:9443/BusinessSpace

# Part 1: Load the KPI history table with data

To load the history data into Derby, use the following procedure.

____ 1. Open the Monitor toolkit, pointing to a new workspace, for example c:\workspaces\KPIHistory

____ 2. Stop the Monitor server in the servers view

____ 3. Open the Data perspective using the icon in the upper right corner of the window
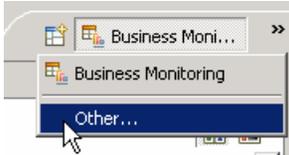


____ 4. Create a new connection to the MONITOR database

___ a. In the Data Source Explorer view, right click **Databases**, then click **New**

___ b. Select **Derby** as the database manager

___ c. For JDBC driver, select '**Derby 10.2 - Embedded JDBC Driver Default**'

___ d. For database location, browse to
   **<WID_WTE_PATH>\runtimes\bi_v7\profiles\qmwps\databases\MONITOR**

___ e. For user name, enter '**user**'

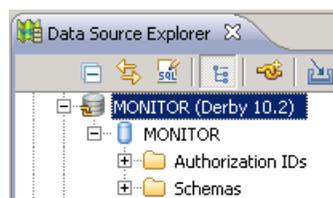___ f. Leave the password field empty

___ g. De-select 'Create database'
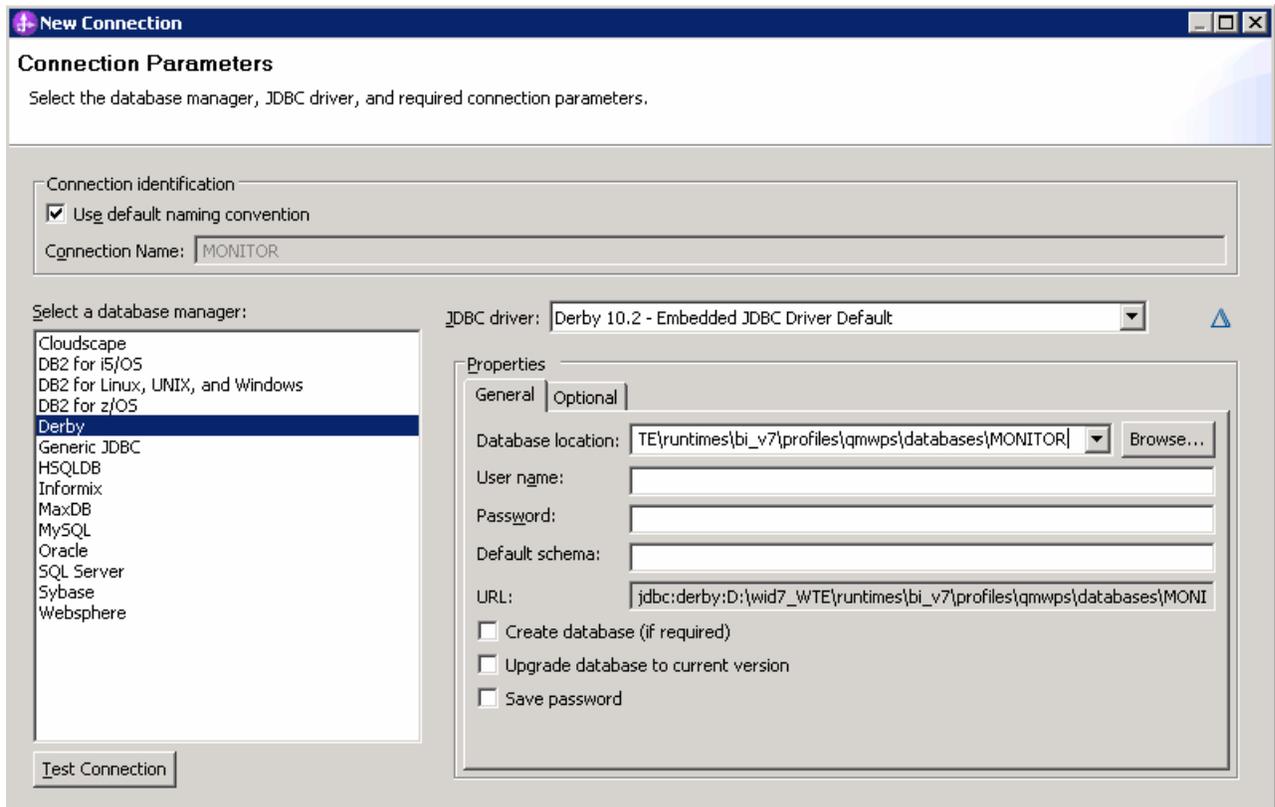
__ h. Click 'Test Connection' button to verify the connection



__ i. Click OK

__ j. Click Finish

__ k. You should see the Monitor database in the data source explorer



____ 5.    Load the supplied data into the Monitor KPI History table

__ a. In the data source explorer, navigate to **Databases > MONITOR > MONITOR > Schemas > MONITOR > Tables > KPI_HISTORY_T**

__ b. Right click **KPI_HISTORY_T** and select **Data > Load...**

__ c. For import file, browse to the supplied file load-KPI-history.data

    1) For example, browse to c:\Labfiles70\KPIHistory\load-KPI-history.data

__ d. Use column delimiter Comma and character string delimiter ". De-select 'Replace existing data', which will preserve history data for any other models, such as the showcase model.
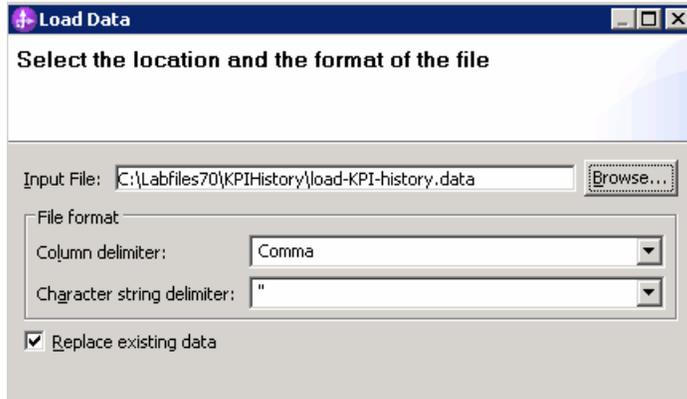


__ e. Click **Finish**

__ f. After a few minutes, in the SQL Results view you should see that the rows were loaded
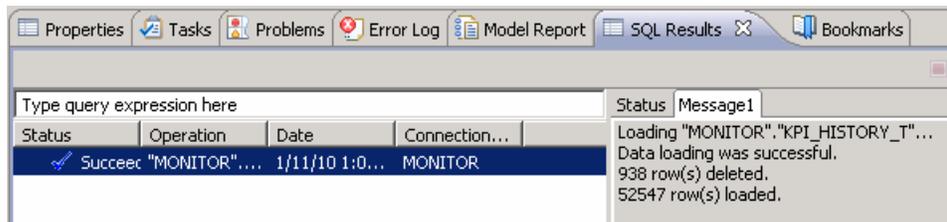


____ 6. Disconnect the connection to the MONITOR database

__ a. In the data source explorer view, right click the MONITOR connection and select Disconnect

# Part 2: Import the monitor model

Import the supplied monitor model to the monitor toolkit.

____ 1.    Open the Business Monitoring perspective using the icon in the upper right corner of the window.

____ 2.    If it is not started, start the monitor server in the servers view.

____ 3.    Import the supplied project interchange file

__ a.  In the Project Explorer view, right click then select **Import**…

__ b. Navigate to **Other > Project Interchange** then click **Next**.

__ c. For the .zip file, browse to the supplied file, for example, c:\Labfiles70\KPIHistory\OrderItem-PI.zip

__ d. You should see two projects listed, so click **Select All**.

__ e. Click **Finish**.

__ f. You should see two projects listed in the project explorer.

     OrderItem
     OrderItemUDF
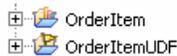
__ g. Check for any errors in the Problems view. You should resolve any errors before continuing. Warnings and informational messages may be present but these will not be a problem.

____ 4.    Review the two KPIs in the model.

__ a. In the Project Explorer, navigate to OrderItem > Monitor Models. Double click OrderItem.mm to open the monitor model editor.

__ b. Click the KPI Model tab.

__ c. In the editor, navigate to Order Item > FunctionKPIs, then click Avg Order Price.

__ d. You see that the check box is selected for keeping track of KPI history.

     ☑ Keep track of historical values for this KPI

__ e. It has a target and ranges, and colors have been selected for the ranges. These colors will show up on the KPI history widget in the dashboard.

Target: 20000

Ranges: Actual value

| Range name | Start value | End value | Color | |
|---|---|---|---|---|
| Low | 0 | < 10000 | 🟥 | CC0000 |
| Medium | 10000 | < 20000 | 🟨 | FFFF00 |
| High | 20000 | < 40000 | 🟩 | 339900 |

__ f. Notice also that the metric is Item Price and the function is Average, and no time period is selected.

__ g. In the editor, navigate to Order Item > TimePeriodKPIs, then click Sum Price Today.

__ h. You see that the check box is selected for keeping track of KPI history. It has a target and ranges, and colors have been selected for the ranges. These colors will show up on the KPI history widget in the dashboard. Notice also that the metric is Item Price and the function is Sum. The time period metric is set to Date Ordered, and the time period is set to a repeating daily period.

# Part 3: Publish the model to the server

In this section you will use the toolkit to publish the monitor model to the monitor server.

____ 1.  In Project Explorer, expand **OrderItem → Monitor models → OrderItem.mm**. Right click over **OrderItem.mm** and then select **Generate Monitor JEE Projects** from the pop-up menu

____ 2.  Select **Finish**.

____ 3.  A progress dialog shows the status of the operation and it closes when the operation is complete. Check for errors in the Problems view. There may be warnings, but there should not be any errors. If you see errors, then try to perform a clean to see if the errors can be removed:  Project > Clean… > select 'Clean all projects', then click OK.

____ 4.  If your server is not started, in the Servers tab, right click and select the **Start** option to start the server. This may take a few minutes to complete.
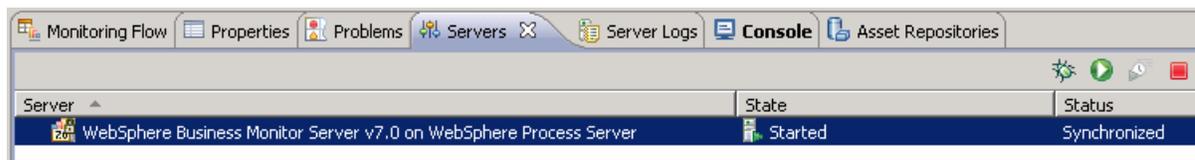


____ 5.  Right click in the servers view, then select **Add and Remove Projects….**

____ 6.  Click **Add** to move the OrderItemApplication from the list of available projects to the list of configured projects.

____ 7.  Click **Finish**.

____ 8.  A progress message is displayed in the lower right corner of the window.

____ 9.  Check the messages in the console view. You should see the following message when the application has been started:

    Application started: OrderItemApplication

____ 10.  In the servers view, right click, then select **Administration > Run administrative console**. You should see it open in a separate tab.

____ 11.  It will prompt you for user ID and password. Enter 'admin' without the quotation marks for user ID, then enter 'admin' without the quotation marks for password. Click **Log in**

____ 12.  Click **Applications > Monitor Models**. The application should show green status if it started successfully.

____ 13.  If the model shows red (stopped), then wait a moment, then refresh by clicking on the icon to the right of Status in the last column of the table. You should see green (started) for the model. If it does not show green, be patient and keep refreshing until it does show green.

____ 14.  Check the server log to ensure there are no problems. You can check this in the console view.

____ 15.  If you are using the integrated server within WebSphere Integration Developer or Rational Application Developer, then you do not need to setup Monitor data security, since the administrative user is automatically authorized to all models. If you are using a different server, then you should

open the administrative console, navigate to **Security > Monitor Data Security,** then add the model, role and user information to a resource group.

# Part 4: Create a dashboard in business space

In this section you will build a dashboard in business space. You will add views to the dashboard and configure them.

____ 1. Create the dashboard.

    __ a. The default browser is 'Internal Web Browser', but you should not use this one since some standard functions are not provided that you may need. Select Window > Preferences > General > Web browser > select 'Use external Web browser'. Select an external browser. Click OK.

    __ b. In WebSphere Integration Developer, in the servers view, right click and select **Launch > Business Space**

    __ c. When prompted, enter **admin** for the user ID and enter **admin** for the password. You must log in with 'admin' so that you can view the alerts which were setup in action manager to be sent to this particular user ID. Also, in the toolkit environment, this is the user ID that is automatically defined on the secured server.

    __ d. Click in the Actions menu to create a new space



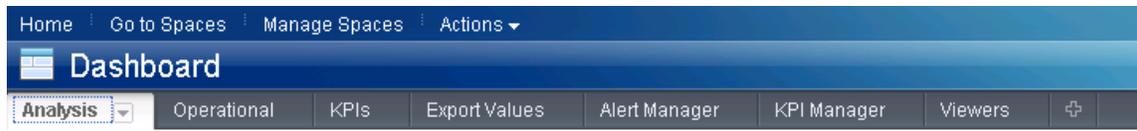    __ e. Enter a name such as Dashboard, and select the Business Monitoring template.



    __ f. Click Save.

*KPI history and prediction*

# Part 5: View KPI history information

In this section you will use the KPI history widget to view KPI historical information.

\_\_\_\_ 1.    Configure the KPI history and prediction widget.

   \_\_ a. On the new space, click the Analysis tab.

   \_\_ b. Click the 'Edit Page' link to enter edit mode.

   \_\_ c. To configure the KPI history and prediction widget, hover the mouse over the right corner of the widget                     and then click the down arrow. Select 'Edit Settings…'.

   \_\_ d. On the KPI tab, select 'Latest version', 'KPI ranges', 'KPI target'

   \_\_ e. For the monitor model, navigate to OrderItem <timestamp> > Avg Order Price, then select it.

   \_\_ f. Click **OK**.

   \_\_ g. You can adjust the granularity and the date window on the widget. The default display is two months with daily data points. Initially the data display may be empty because historical data has been loaded for this KPI only from years 2008 through 2010. You should adjust the dates to display historical data within this date window. To change the date period, you can use the pre-set date windows such as 1D or YTD, or you can click the blue From and To dates to open a calendar picker to select specific dates.

*KPI history and prediction*

__ h. The graph shows a line for the KPI value in blue. The black line is the target value. The three bands of color represent the three ranges defined in the KPI.
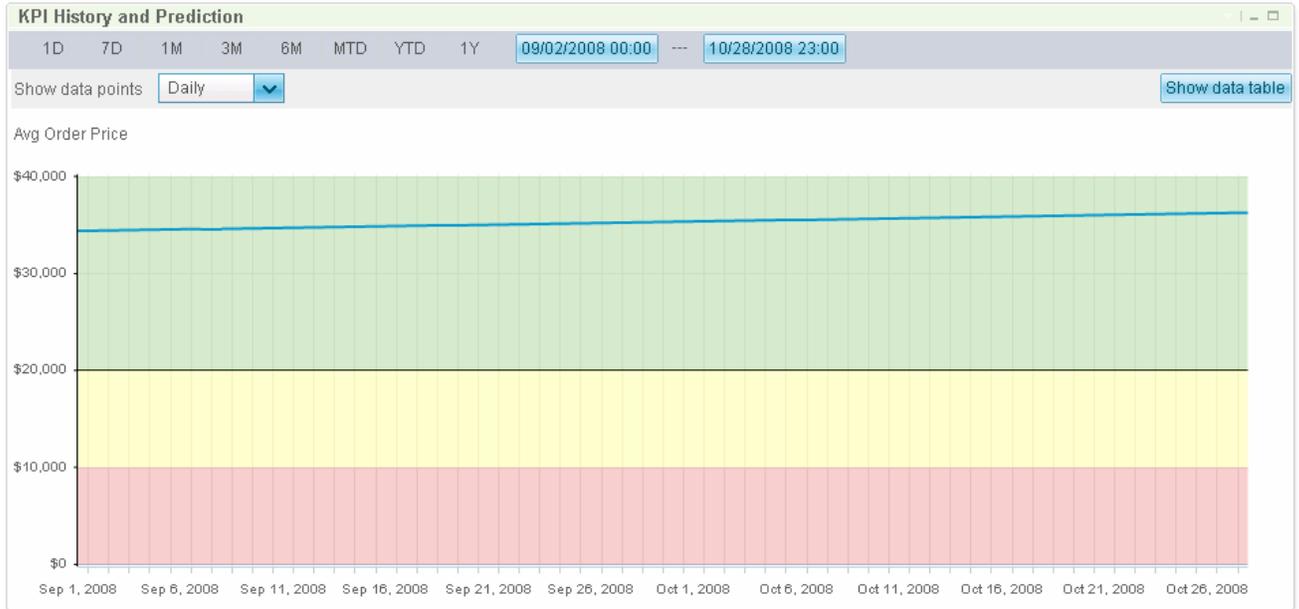


__ i. To see the values in tabular format, click 'Show data table'.
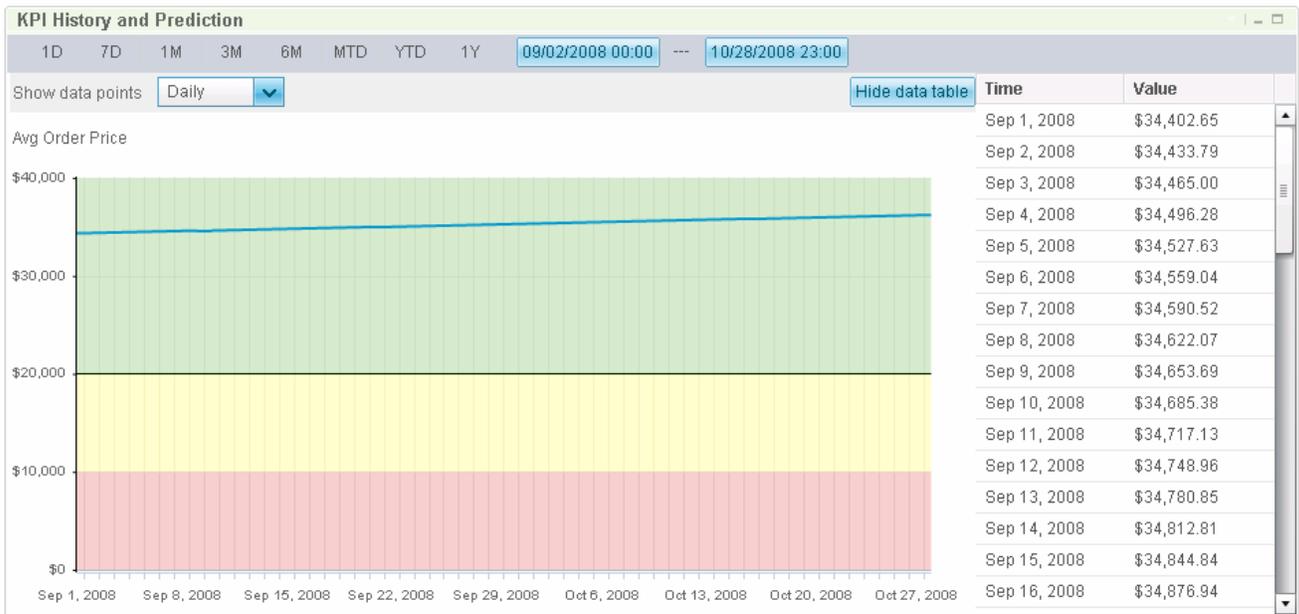


__ j. To see specific values in the graph, hover your mouse pointer over the blue KPI value line.

KPI history and prediction
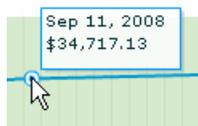
\_\_ k. To see specific targets in the graph, hover your mouse pointer over the black target line. Since the target coincides with the top of a range, you also see the range values.

```
Medium                    Target
$10,000.00 - $20,000.00   $20,000.00
```

\_\_ l. To see ranges in the graph, hover your mouse pointer over the top of the range.

```
Low
$0.00 - $10,000.00
```
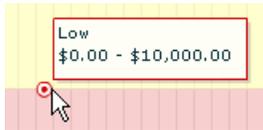
\_\_ m. There are hourly records loaded in KPI history and so you can experiment with various granularities and date windows. To change the date window, you can use the pre-set date windows such as 1D or YTD, or you can click the blue From and To dates to open a calendar picker to select specific dates.

```
1D   7D   1M   3M   6M   MTD   YTD   1Y   09/02/2008 00:00  ---  10/28/2008 23:00
```

Finish Editing ⌃
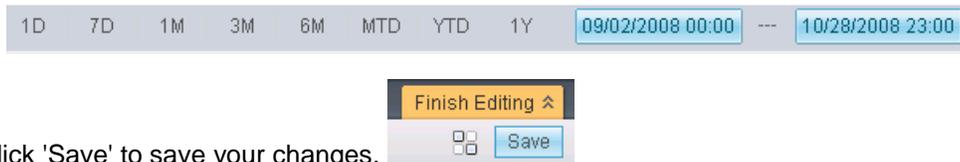
\_\_ n. Click 'Save' to save your changes.   Save

# Part 6: Create a prediction model and view KPI prediction data

In this section you will create a prediction model, then view the prediction data in the KPI history and prediction widget.

_____ 1.   Configure and view KPI prediction for KPI Avg Order Price.

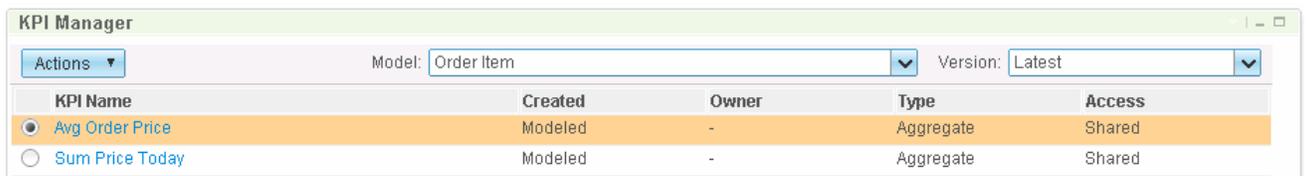__ a. On the KPI history and prediction widget, click the Edit Settings… menu option.

__ b. Previously you configured the widget for the KPI Avg Order Price, so now click the tab History and Prediction.

__ c. Notice that it says that prediction is not enabled for this KPI, but that you can use the KPI Manager to enable it.

Avg Order Price

KPI Prediction
Prediction is not enabled for this KPI. Use KPI Manager to enable this feature.
☐ Show predictions based on the following prediction model
None ▾
☐ Show prediction data on graph by default

__ d. Click the Cancel button to exit the configuration.

__ e. Click the KPI Manager tab on the dashboard.

**KPI Manager**

Actions ▾   Model: Select a model....   Version: Latest

__ f. For model, select Order Item.

__ g. Select Avg Order Price.

**KPI Manager**

Actions ▾   Model: Order Item   Version: Latest

| KPI Name | Created | Owner | Type | Access |
|---|---|---|---|---|
| ⦿ Avg Order Price | Modeled | - | Aggregate | Shared |
| ○ Sum Price Today | Modeled | - | Aggregate | Shared |

__ h. Click Actions, and select History and Prediction.

__ i. Click New Model to create a new prediction model.

KPI Prediction
☐ Enable KPI Prediction based on the historical data for this KPI

New Model

| Model Name | Interval | Period | Cyclical Pattern | |
|---|---|---|---|---|
| - | - | - | - | |

__ j. Enter a prediction model name such as Daily. Select 'Once a day' for prediction data points. Enter '30' for the prediction period.
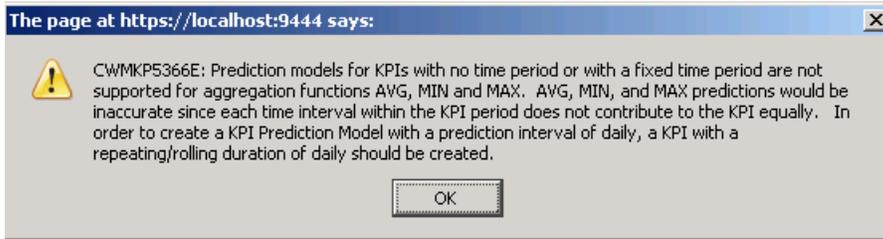
**Prediction Model Definition**

Model name

Daily

Prediction data points

Once a day ▼

Prediction
period

◉ 30    Days

○ To the end of the KPI time period

☐ Include a repeating business pattern

☐ Days

__ k. Click OK.

__ l. You will receive a message indicating that you need a time period to be set on this KPI.

**The page at https://localhost:9444 says:**                    ⊠

⚠ CWMKP5366E: Prediction models for KPIs with no time period or with a fixed time period are not
supported for aggregation functions AVG, MIN and MAX. AVG, MIN, and MAX predictions would be
inaccurate since each time interval within the KPI period does not contribute to the KPI equally. In
order to create a KPI Prediction Model with a prediction interval of daily, a KPI with a
repeating/rolling duration of daily should be created.

[ OK ]

__ m. You could update the model with a daily time period, but this would also delete the KPI history
when you re-deployed the changed model. To show you the prediction capability for a KPI with a
daily time period, another KPI 'Sum Price Today' is available which is already setup in the model.
Proceed to the next section to see how to setup prediction for this KPI.

__ n. Click OK. Click Cancel. Click Cancel.

____ 2.    Configure and view KPI history for KPI Sum Price Today.

**Edit Page ⯆**

__ a. On the Analysis tab, click the 'Edit Page' link to enter edit mode.

__ b. On the KPI history and prediction widget, click **Edit Settings…** on the widget menu.

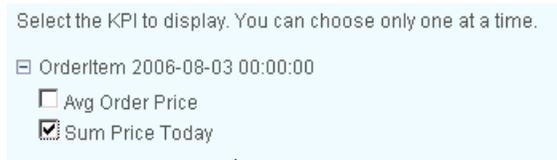__ c. On the KPI tab, select 'Latest version', 'KPI ranges', 'KPI target'

**KPI History and Prediction Edit**

KPI | History and Prediction

Select the models for which you want to retrieve the KPIs.

◉ Latest version  ○ All versions
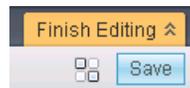
Display options

☑ KPI ranges  ☑ KPI target

__ d. For the monitor model, navigate to OrderItem <timestamp> > Sum Price Today, then select it.

Select the KPI to display. You can choose only one at a time.

☐ OrderItem 2006-08-03 00:00:00
   ☐ Avg Order Price
   ☑ Sum Price Today

__ e. Click **OK**.

__ f. You can adjust the granularity and the date window on the widget. The default display is two months with daily data points. Initially the data display may be empty because historical data has been loaded for this KPI only from years 2008 through 2010. You should adjust the dates to display historical data within this date window. To change the date window, you can use the pre-set date windows such as 1D or YTD, or you can click the blue From and To dates to open a calendar picker to select specific dates.

__ g. Notice that there is a repeating business pattern or business cycle such that there is a significant drop in values on the weekends, so there is a seven day business cycle. You will use this information when you create the prediction model.

**KPI History and Prediction**

1D  7D  1M  3M  6M  MTD  YTD  1Y   11/01/2008 00:00  ---  12/02/2008 00:00

Show data points  Daily ▼        Show data table

Sum Price Today

__ h. Click 'Save' to save your changes.

Finish Editing ≫
    Save

____ 3.   Create a prediction model for KPI Sum Price Today.

__ a. Click the KPI Manager tab on the dashboard.

__ b. For model, select Order Item.

__ c. Select Sum Price Today.

__ d. Click Actions, and select History and Prediction.

__ e. Select 'Enable KPI Prediction based on the historical data for this KPI'.



__ f. Click **Apply**. If you forget this step, then the predictions will not be displayed and you may have to wait up to an hour for the KPI prediction service to run.

__ g. Click **New Model** to create a new prediction model.

__ h. Enter a prediction model name such as Daily. Select 'Once a day' for prediction data points. Enter '30' for the prediction period. As you saw in the KPI history graph, there is a seven day business cycle. To provide a more accurate prediction, select 'Include a repeating business pattern', and enter 7 Days for the pattern. If you did not know there was a repeating 7 day pattern or if you forgot to enter it here, the prediction will still be created, however it will not be as accurate.
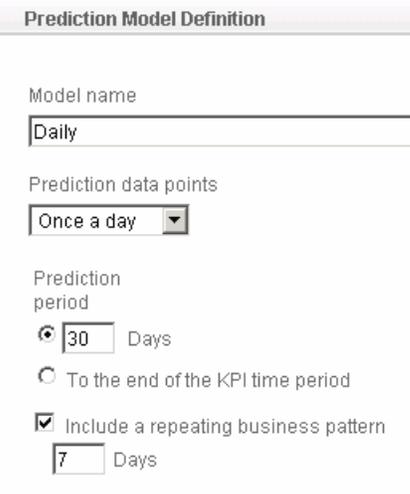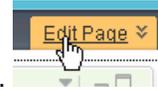


__ i. Click OK. The KPI prediction service runs immediately, so this dialog may take a few moments to close while the service is invoked. Do not click the OK button twice, since this will create a duplicate model. You should see the prediction model listed as follows:
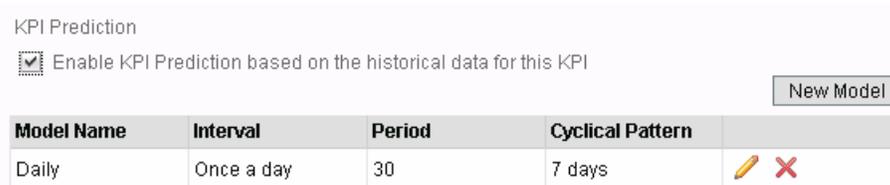
__ j. Click OK.

____ 4.    Configure and view prediction data for KPI Sum Price Today.

__ a. On the Analysis tab, click the 'Edit Page' link to enter edit mode.

__ b. On the KPI history and prediction widget, click **Edit Settings…** on the widget menu.

__ c. On the KPI tab, insure that you have selected KPI 'Sum Price Today'.

__ d. On the History and Prediction tab, select 'Show predictions based on the following prediction model. Select Daily. Select 'Show prediction data on graph by default'. Take the defaults for the remaining fields.
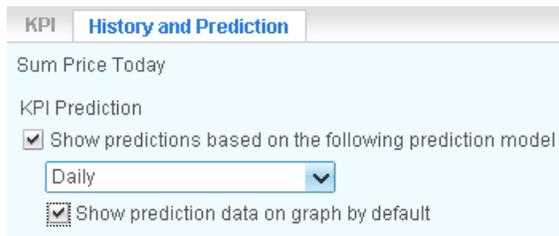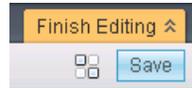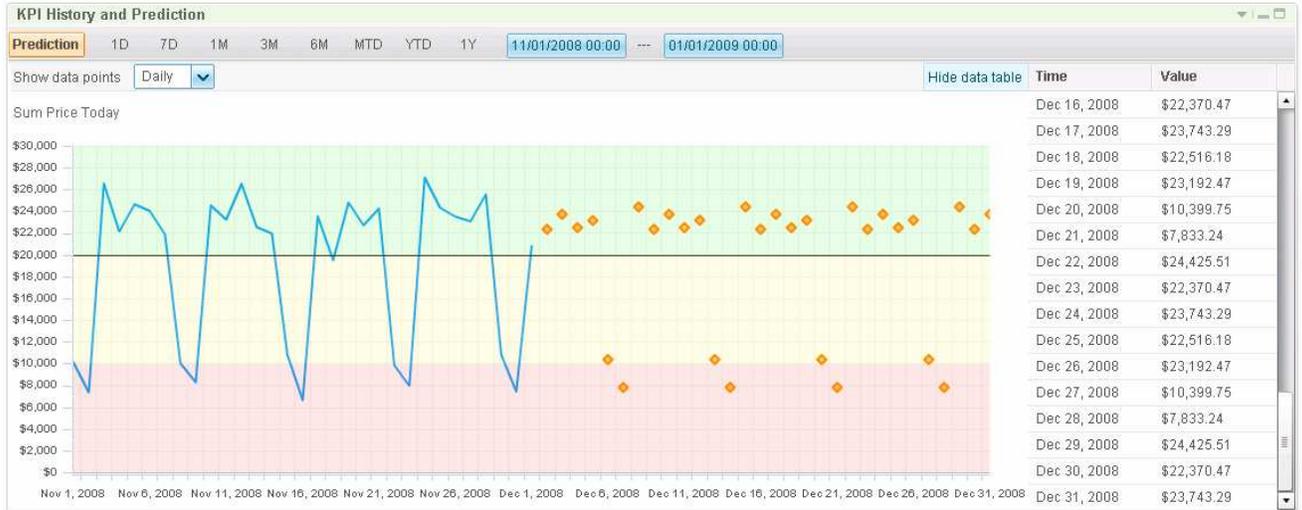
__ e. Click OK.

__ f. Notice the orange diamonds that represent the prediction points in the graph. If you do not see the orange diamonds, then the KPI prediction service has not completed, so wait a few moments then refresh the widget display by clicking the down arrow in the upper right corner of the widget, and selecting the refresh option.
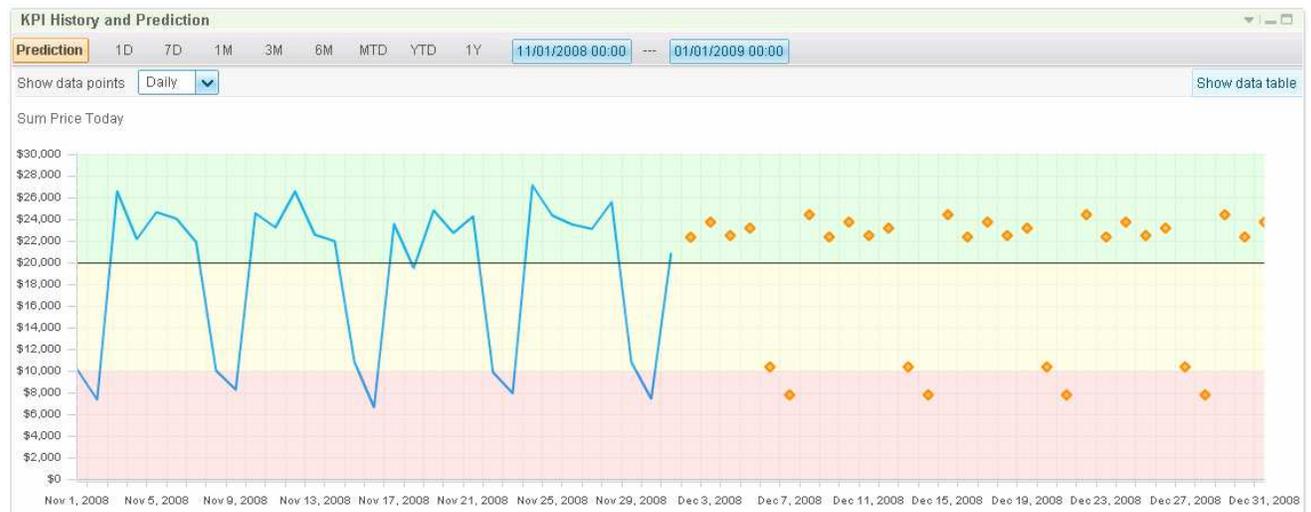
__ g. Click 'Show data table', and you can see the specific prediction values at the end of the table.

| KPI History and Prediction | | | | | | | | | | | | ▼ _ □ |

| Prediction | 1D | 7D | 1M | 3M | 6M | MTD | YTD | 1Y | 11/01/2008 00:00 | --- | 01/01/2009 00:00 |

Show data points | Daily ▼ |

Hide data table

| Time | Value |
|---|---|
| Dec 16, 2008 | $22,370.47 |
| Dec 17, 2008 | $23,743.29 |
| Dec 18, 2008 | $22,516.18 |
| Dec 19, 2008 | $23,192.47 |
| Dec 20, 2008 | $10,399.75 |
| Dec 21, 2008 | $7,833.24 |
| Dec 22, 2008 | $24,425.51 |
| Dec 23, 2008 | $22,370.47 |
| Dec 24, 2008 | $23,743.29 |
| Dec 25, 2008 | $22,516.18 |
| Dec 26, 2008 | $23,192.47 |
| Dec 27, 2008 | $10,399.75 |
| Dec 28, 2008 | $7,833.24 |
| Dec 29, 2008 | $24,425.51 |
| Dec 30, 2008 | $22,370.47 |
| Dec 31, 2008 | $23,743.29 |

__ h. Click 'Save' to save your changes.

Finish Editing ⌃
Save

# Part 7: Create a business user alert based on the KPI prediction model

In this section you will configure a business user alert that will fire when the KPI prediction data exceeds a predefined threshold.

____ 1.   Create a business user alert when the KPI prediction values exceed a predefined threshold.

___ a. Click the Alert Manager tab in the dashboard.

___ b. Click the New Alert button.

___ c. Enter an alert name and optionally a description. Also, for the model, select 'Order Item 2006-08-03 00:00:00' from the drop down.

| Alert | | |
|---|---|---|
| **Conditions** | Alert Content | Notification |
| Alert name | Prediction low | |
| Description | | |
| Model | Order Item 2006-08-03 00:00:00 | |
| Owner | admin | |

___ d. In the Conditions section, click Add, which will add a row to the conditions table.

**Conditions**

| Notify when all of the following conditions apply | | | | Add |
|---|---|---|---|---|
| **KPI Name** | **Prediction Model** | **Condition** | **Value** | |
| Click to choose KPI | None (Use actual data) | Click to choose condition | Click to choose value | ✕ |

___ e. For KPI Name, click to choose Sum Price Today.

___ f. For Prediction Model, click to choose Daily (Anytime). You could also choose Daily (End) which would only compare to end of day values.

___ g. For Condition, click to choose 'Below range'.

___ h. For Value, click to choose range Medium.

| KPI Name | Prediction Model | Condition | Value |
|---|---|---|---|
| Sum Price Today | Daily(Anytime) | Below range | Medium |

___ i. In the timing section, set the timing to 5 minutes, and set the notification frequency to 'Only once during the KPI time period when the condition applies'. So this means that the condition will be checked every 5 minutes, but the alert will be created at most once per day since the KPI period is daily.

Timing

| How often to check conditions | Minutes | 5 |
| When to start notifications | December 10, 2008 00:00:00 | GMT-05:00 | America/New_York |
| Notification frequency | Only once during the KPI time period when the condition applies | Sum Price Today |

__ j. Click the Alert Content tab, and view the default message that is created. You could customize the alert message if the generated content did not meet your needs.

Conditions **Alert Content** Notification

◉ Generated content ○ Define your own content

Subject

Prediction low

Body

%/SumPriceToday/name% %/SumPriceToday/prediction/Daily/name% Below range %/SumPriceToday/range/My_Range/name%

__ k. Click the Notification tab, and you see that the administrative user is notified using a dashboard alert.

Conditions Alert Content **Notification**

| Recipients | ☑ Dashboard Alert | ☐ Cell Phone | ☐ E-mail | ☐ Pager |
|---|---|---|---|---|
| admin | ☑ | ☐ | ☐ | ☐ |

__ l. Click OK.

__ m. Click OK. You should see the new alert in the list.

**Alert Manager**

Alerts to Display | All alerts

| Alert Name | Description | Owner | ☐ Dashboard Alert | ☐ Cell Phone | ☐ E-mail | ☐ Pager |
|---|---|---|---|---|---|---|
| Prediction low | | admin | ☑ | ☐ | ☐ | ☐ |
| Print 72 hours exceeded Alert | | | ☑ | ☐ | ☐ | ☐ |
| NTB Failure Alert | | | ☐ | ☐ | ☐ | ☐ |
| Invalid Loan Application Alert | | | ☐ | ☐ | ☐ | ☐ |
| Fee Compliance Alert | | | ☑ | ☐ | ☐ | ☐ |

____ 2. In Business Space, click the Operational tab. You should see the new alert listed in the Alerts widget. If you remember, the prediction values that you saw earlier included values that were in the low range, so the alert should have been created since the condition on the alert was based on the predicted value being below the medium range. If you do not see the alert, then wait a few moments then refresh the widget display by clicking the down arrow in the upper right corner of the widget, and selecting the refresh option.

__ a. To see the details of the alert, click the alert.

# What you did in this exercise

In the lab, you loaded the KPI history table with data, deployed a monitor model, and used the KPI history and prediction widget to view the KPI historical information. You created a prediction model and viewed KPI prediction information. You defined a business user alert based on the prediction model exceeding a certain threshold.