Creating Pentaho Dashboards

This document is copyright © 2011 Pentaho Corporation. No part may be reprinted without written permission from Pentaho Corporation. All trademarks are the property of their respective owners.

Help and Support Resources

If you have questions that are not covered in this guide, or if you would like to report errors in the documentation, please contact your Pentaho technical support representative.

Support-related questions should be submitted through the Pentaho Customer Support Portal at http://support.pentaho.com.

For information about how to purchase support or enable an additional named support contact, please contact your sales representative, or send an email to sales@pentaho.com.

For information about instructor-led training on the topics covered in this guide, visit http://www.pentaho.com/training.

Limits of Liability and Disclaimer of Warranty

The author(s) of this document have used their best efforts in preparing the content and the programs contained in it. These efforts include the development, research, and testing of the theories and programs to determine their effectiveness. The author and publisher make no warranty of any kind, express or implied, with regard to these programs or the documentation contained in this book.

The author(s) and Pentaho shall not be liable in the event of incidental or consequential damages in connection with, or arising out of, the furnishing, performance, or use of the programs, associated instructions, and/or claims.

Trademarks

Pentaho (TM) and the Pentaho logo are registered trademarks of Pentaho Corporation. All other trademarks are the property of their respective owners. Trademarked names may appear throughout this document. Rather than list the names and entities that own the trademarks or insert a trademark symbol with each mention of the trademarked name, Pentaho states that it is using the names for editorial purposes only and to the benefit of the trademark owner, with no intention of infringing upon that trademark.

Company Information

Pentaho Corporation
Citadel International, Suite 340
5950 Hazeltine National Drive
Orlando, FL 32822
Phone: +1 407 812-OPEN (6736)
Fax: +1 407 517-4575
http://www.pentaho.com

E-mail: communityconnection@pentaho.com

Sales Inquiries: sales@pentaho.com

Documentation Suggestions: documentation@pentaho.com

Sign-up for our newsletter: http://community.pentaho.com/newsletter/

Contents

Introduction....4
Dashboard Theory....5
Dashboard Designer....6
Using Pentaho Dashboard Designer....6
Creating a New Dashboard....6
Implementing Filters....18
Dashboard Parameters....29
Adjusting Whitespace in Dashboard Panels....43
Setting the Refresh Interval....43
Creating a Dashboard Designer Template....44
Community Dashboard Framework (CDF)....45
Creating a Community Dashboard Framework (CDF) Template....45
Exploring the CDF Sample Content....45
Custom JSP Dashboards....47
Enterprise Dashboard Support....48

Introduction

This document explains dashboard theory and content and template creation with Pentaho software. There are three ways to fashion a dashboard from Pentaho content:

Method	Purpose
Pentaho Dashboard Designer	Quick and easy dashboards based on existing Pentaho content produced by Report Designer, ad hoc reporting, Interactive Reporting, JPivot, or Analyzer; or charts and data tables created through Dashboard Designer or the Data Access Wizard. Basically, Dashboard Designer enables you to display content in a predefined layout; there is a low degree of customization, but greater ease of use than other dashboard methodologies.
Community Dashboard Framework (CDF)	CDF is an open, community-supported framework for creating dashboards from XML configuration files and HTML templates. CDF dashboards must be created by hand from a text editor and are thus not nearly as quick and easy to create as Dashboard Designer dashboards, but there is much more flexibility with how content is displayed and refreshed.
Custom JSPs	If you are a Java Web developer (or have one on staff), you can create your own JSPs that display Pentaho content in whatever ways are possible through the BI Platform's content and service APIs. Of course this is the most difficult way to create a dashboard, but it allows you complete freedom in terms of the type of content that can be displayed, and how that content is laid out. Depending on the complexity of the design and the technical details of the implementation, a JSP dashboard could perform better than CDF or Dashboard Designer.

Dashboard Theory

Pentaho dashboards provide immediate insight into individual, departmental, or enterprise-wide performance by incorporating key metrics, reports, Analyzer reports, and/or custom content in a cohesive, visually rich interface. Dashboards are useful for providing quick, at-a-glance key performance indicators. Stoplight indicators are a staple of traditional dashboards; they indicate the status of a major KPI in terms of colors, or a dial on an analog gauge. Simple and colorful charts are just as useful for quick KPI analysis in dashboards. Typically you wouldn't provide a high level of detail in a dashboard -- that's what reports are for -- and even if some of your dashboard content is drillable, you probably wouldn't replace a good, detailed, drillable Analyzer report with a dashboard.

Dashboard Designer

This section contains information on Pentaho Dashboard Designer. If you don't know where to start with dashboards, read this section first.

Using Pentaho Dashboard Designer

Restriction: Dashboard Designer is exclusive to the BI Suite Enterprise Edition, and requires a Dashboards Enterprise Edition license.

Creating a dashboard in Dashboard Designer is as simple as selecting a layout template, theme, and the content you want to display. In addition to displaying content generated from action sequences, Interactive Reporting, and Analyzer, Dashboard Designer can also include:

- **Charts**: simple bar, line, area, pie, and dial charts created with Chart Designer.
- **Data Tables**: tabular data.
- **URLs**: Web sites that you want to display in a dashboard panel.

Dashboard Designer also has dynamic filter controls, which enables end-users to change a dashboard's details by selecting different values from a drop-down list, and to control the content in one dashboard panel by changing the options in another (content linking).

Creating a New Dashboard

You must be logged into the Pentaho User Console. Follow the instructions below to create a new dashboard:

1. In the Pentaho User Console quick launch bar, click **New Dashboard**. Alternatively, you can click **File** > **New** > **Dashboard** or click (New Dashboard) in the tool bar. The New Dashboard page appears.
2. In the edit pane (lower portion of the page), click **Properties**, and enter a title for your dashboard page in the **Page Title** text box.
   The name you entered appears on the top left corner of the dashboard. This name helps you identify the page if you want to edit, copy, or delete it later.
3. Click **Templates** to select a dashboard layout.
   A blank dashboard with the layout you selected appears.
4. Click **Theme** to select a theme for your dashboard.
   The theme you selected is applied to your dashboard.

You now have the basic framework for a Pentaho dashboard.

Working with the Chart Designer

The Chart Designer allows you to create bar, pie, line, dial, and area charts that can be added to a dashboard. Below are the general steps associated with creating a chart:

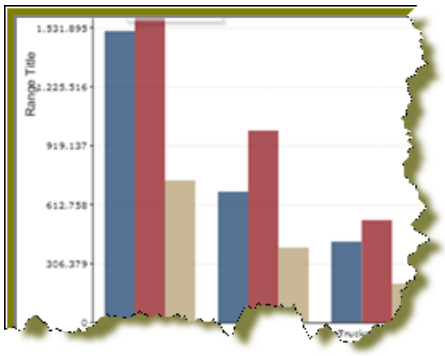
1. Select a data source.
2. Build a query.
3. Set the data definitions: values, series, category.
4. Select a chart type and theme.
5. Enter labels for the chart title, and x,y axes.
6. If applicable, adjust scaling and label rotation.
7. Place your chart in the dashboard.
8. Save your dashboard.

If you are new to charting, here are some minimal guidelines that may help you determine what type of chart is best suited for the data you want to present in your dashboard:

Bar Charts

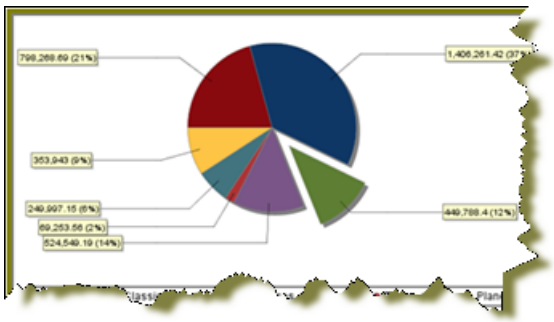
If you want to compare items during a specific time period, consider using a bar chart. Key words to think about when creating a bar chart are *compare* or *rank*. For example if you want to compare items sold to

show which one made the most profit, you might create a bar chart that ranks the products from the lowest to highest profit. The bar's length determines its ranking; the label identifies the item. Bar chart data can be presented horizontally or vertically depending on your requirements.



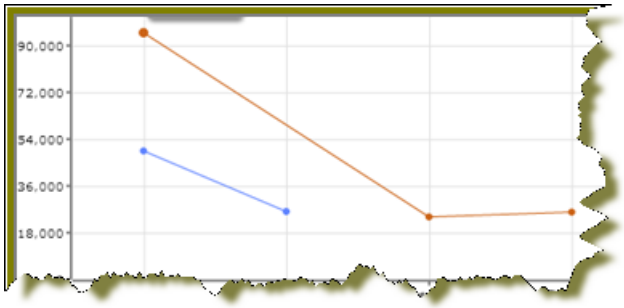
Pie Charts

If you are comparing parts of a whole, consider using a pie chart. Key words associated with charts include, *portion*, *share*, and *percentage*. If for example, you want to demonstrate the proportion of the company's budget spent on health insurance, use a pie chart. To make the chart easier to read limit the number of slices to five. Pie charts can also be *exploded*, which means certain slices are pulled away from the remainder of the chart for emphasis.



Line Charts

Line charts are useful for showing changes over time. Key words associated with data that is best suited for a line chart are *trend*, *growth*, and *decline*. If, for example, you want to show how product sales have changed over five years, use a line chart. The slope of the line helps users quickly identify the direction of the trend.

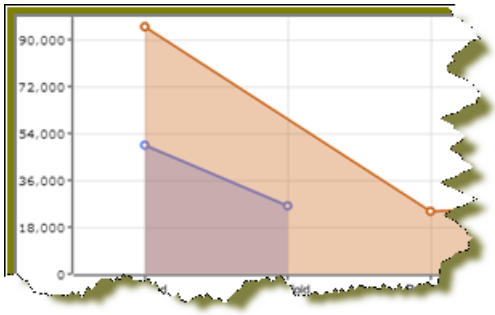


Dial Charts

Dial charts are often associated with Key Performance Indicators (KPIs). Dial charts are circular and contain a scale, a needle, and one or more a dial sectors. The dial sector is used to identify a specified area on a dial chart using a particular color. For example, you could have a dial plotting inventory with a minimum dial value of 10000 and a maximum dial value of 50000. There could be a red dial sector for the region between 2000 and 4000 indicating that if the needle is in this area, there is a danger of a supply inventory shortage.

Area Charts

Area charts can be used to show a comparison of the same thing during different points in time. Area charts are not designed to provide exact data but they do give users visual clues of the relative sizes of the items they are representing.



Rotating Chart Axis Labels

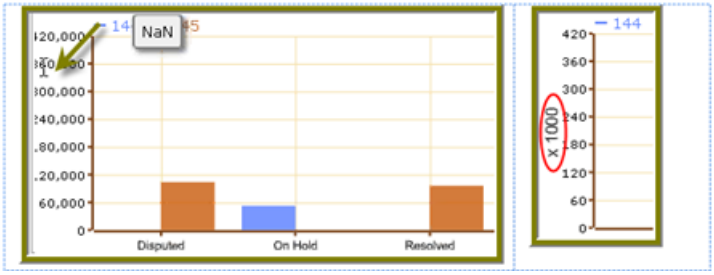
If your chart axis labels become unreadable because they are too long, **Label Rotation** may correct the problem.

1. In the Chart Designer, display your chart.
2. Under **Label Rotation**, select **Diagonal** or **Vertical** and click **Apply**.
   The labels display with the rotation you set.
3. Click **OK** to display the chart in the dashboard panel.

Correcting Scaling Issues

Use the scaling feature in instances where numeric values in a chart are so long that they affect the display.

1. Preview your chart in the Chart Designer.
2. Under **Scale**, click to display the drop-down list of scaling options. In the example below, the scaling option used is "1000." Notice the change in the display of numeric values when scaling is applied. Users of the chart can see actual values when they hover over the bars in the chart.



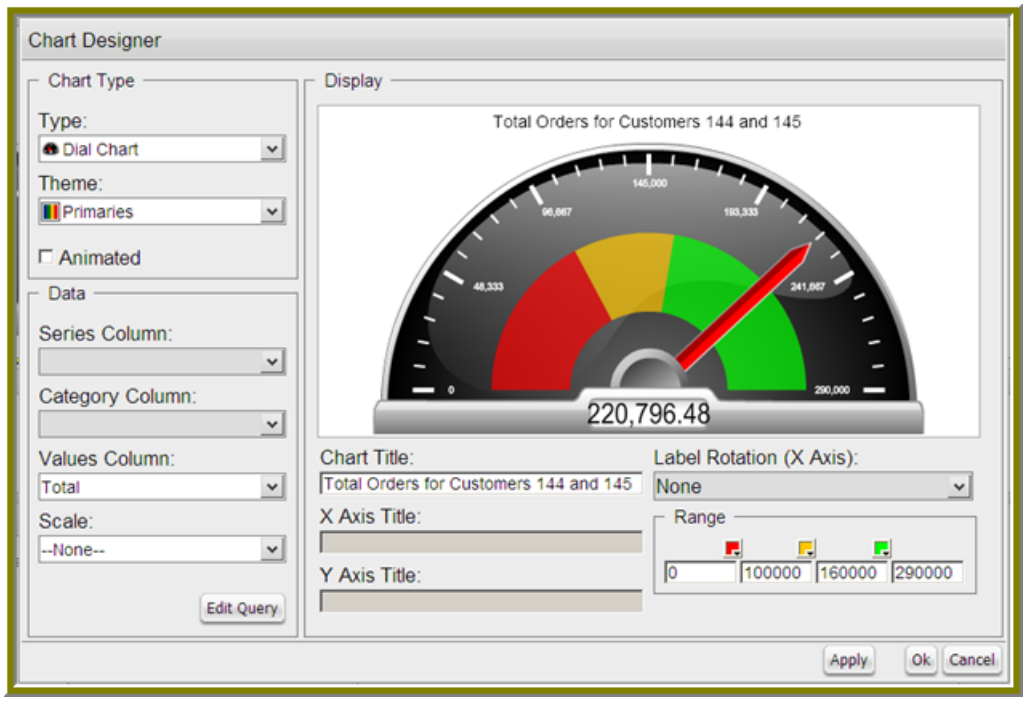
3. Click **OK** to display the chart in the dashboard.

Note: The scaling feature is available for all chart types except pie.

Working with Dial Charts

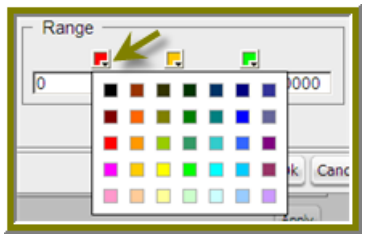
For dial charts to display correctly, you must enter values for your range and the chart title. In the example below, the dial chart preview is displaying ranges associated with sales. Notice that each dial sector is

represented by a color, red, yellow, or green. The needle is positioned in the 220796.48 range, indicating that total orders, while not stellar, are not near the danger zone indicated by the red sector in the dial.



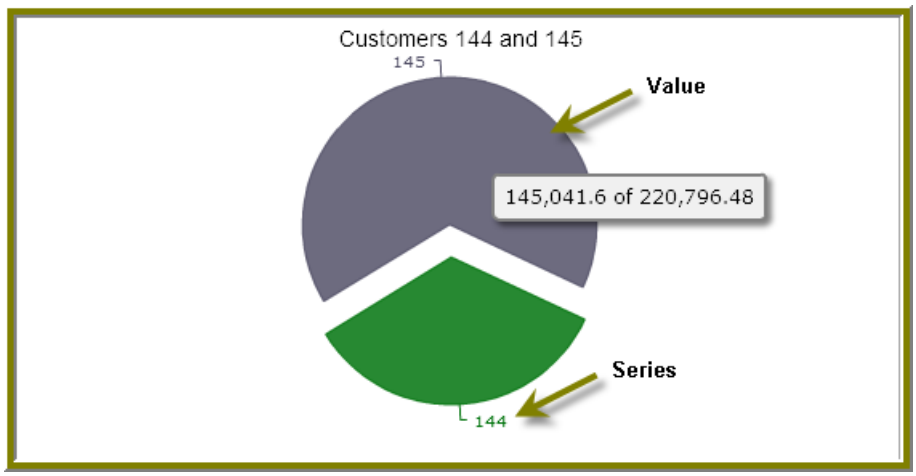
Changing Dial Sector Colors

You can change the color of a dial sector by clicking the small down arrow in the color boxes associated with Range. Select a color from the palette so that you can preview it on your dial chart. Click **Apply** to preview your dial chart. Click **OK** to place your dial chart into the dashboard.

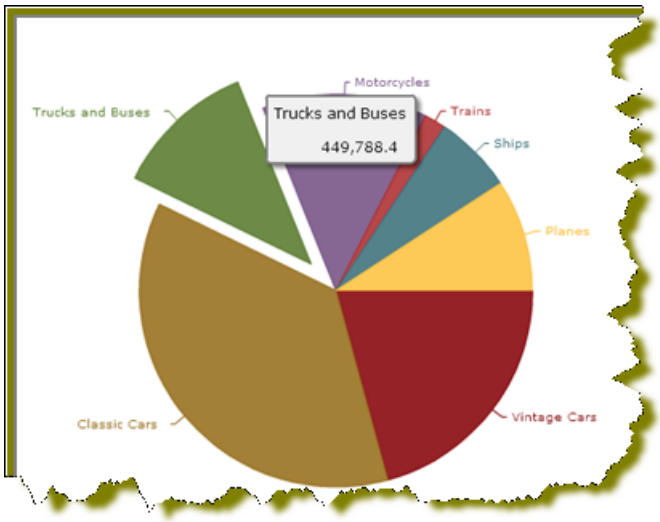


Working with Pie Charts

A pie chart gives dashboard consumers an immediate visual clue of the relative sizes of the shares of a whole. Categories are represented by individual slices. The size of the slice in a pie chart is determined by the value.



You can animate a pie chart if you want its pieces to be *exploded*, which means that the individual slices of the pie can be pulled away from the rest of the pie.



To animate a pie, enable **Animated** check box in the Chart Designer.

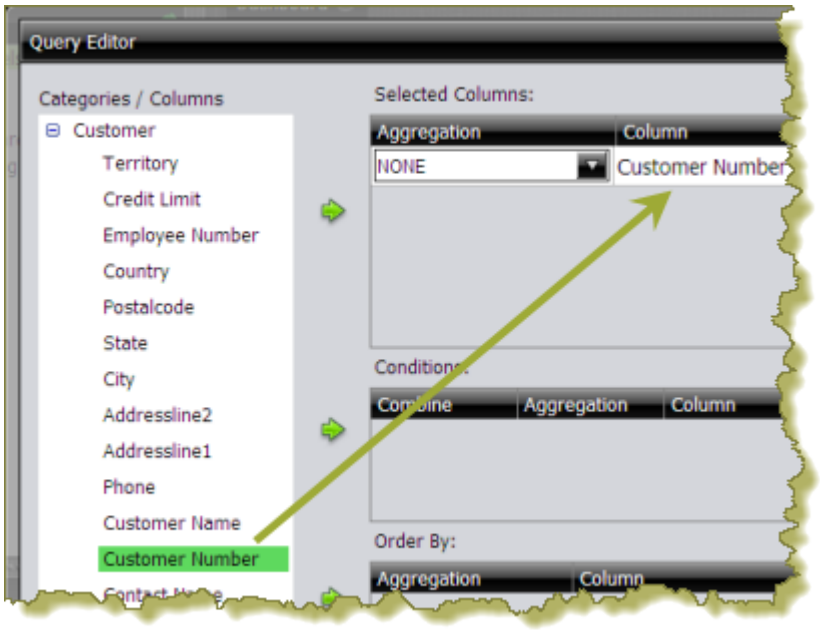
Adding Data to a Chart

Before you can start creating a chart you must select a data source that contains the data you want to use. You must then define the data that will be displayed in the chart.

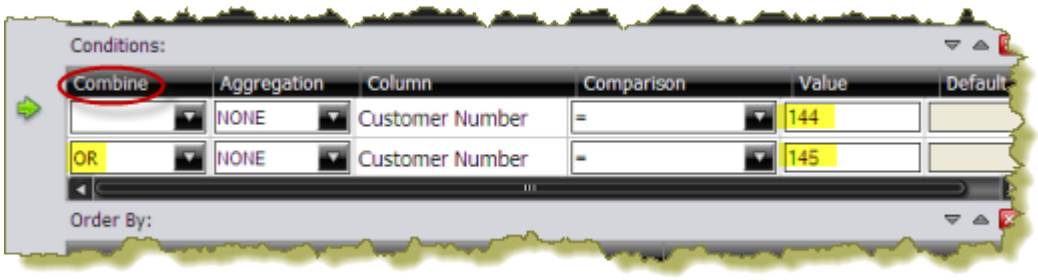
Note: If you are unsure what chart type is best for displaying your data, see *Working with the Chart Designer* on page 6 for more information.

Follow the instructions below to add data to your chart:

1. In the Dashboard, choose a dashboard panel and click (Insert) and select **Chart**.
   The **Select a Data Source** dialog box appears.
2. Select the data source from the list of available choices. The data source contains the content you want to display in your chart.
   The **Query Editor** appears.
3. The Query Editor allows you to retrieve dynamic data from a database for display in a chart. Defining your query is the first step in ensuring that the correct data is selected. In the Query Editor, click (+) next to a category name to display its associated table columns.
4. Click the small green arrow to place the column name under **Selected Columns**. In the example below, the **Customernumber** column has been selected and moved under Selected Columns. Notice that the column names appear under Selected Columns. Continue adding columns as needed.



5. Now add the **Conditions**; these are your constraints that filter what you are selecting. You can add multiple conditions. In the example below, the search is limited to customer numbers.

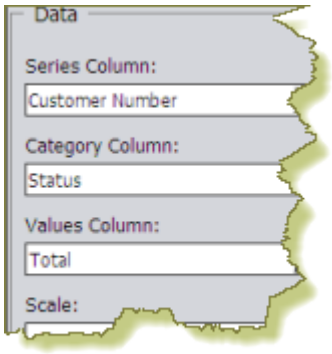


Under **Combine**, you can select your constraint (and, or, and not, or not) from the drop-down list. Under **Comparisons** you can click the drop-down list to display options for comparisons, =, <, >, and so on; (for example, where the customer number is *equal* to 144 *or* 145). You can also select an aggregation type from the drop-down list for table columns that contain numeric data. The table below contains a definition for each aggregate type:

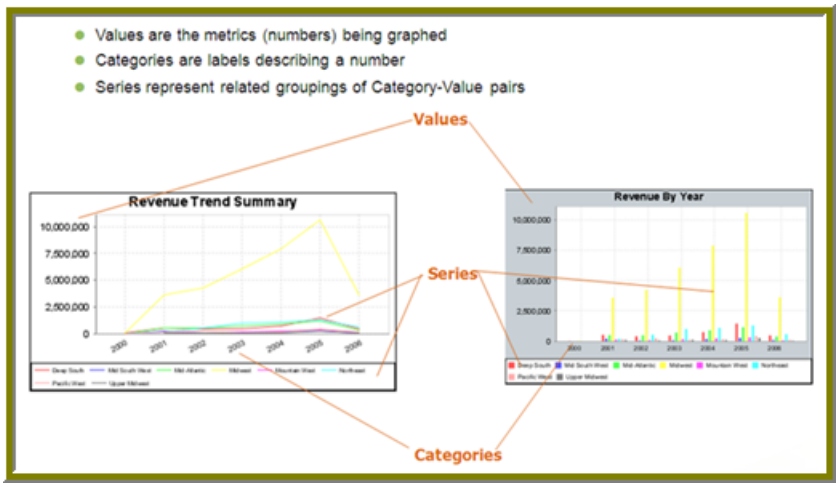
Aggregate Type	Description
SUM	Sums a column's values
COUNT	Counts a column's values
AVG	Averages a column's values
MIN	Selects the minimum column value
MAX	Selects the maximum column value

Note: Click **Preview** at any time to view the data associated with your query.

6. Add the columns that you want to **Order By**. The ordering of the selected data is accomplished by one or more columns in a table. For example, you can sort the data by customer name and address.
7. Click **OK** in the Query Editor when you are done.
   The Chart Designer appears.
8. Under **Data**, click the drop-down arrow to display and select the table columns.



Data Definition	Description
Series Column	Series show up as the individual columns on a bar chart and as individual lines in a line chart. Area charts display each series as a point.
Category Column	Categories are displayed as bars or groups of bars on the x-axis (horizontal axis). In line charts, categories are usually associated with time periods. In area charts, the x-axis displays the category labels. **Note:** If you don't want to display categories, select **None**.
Values Column	The value is always numeric. The value determines the height of columns in a bar chart and the height of lines in a line chart. In area charts, the y-axis values determine the heights of the points.



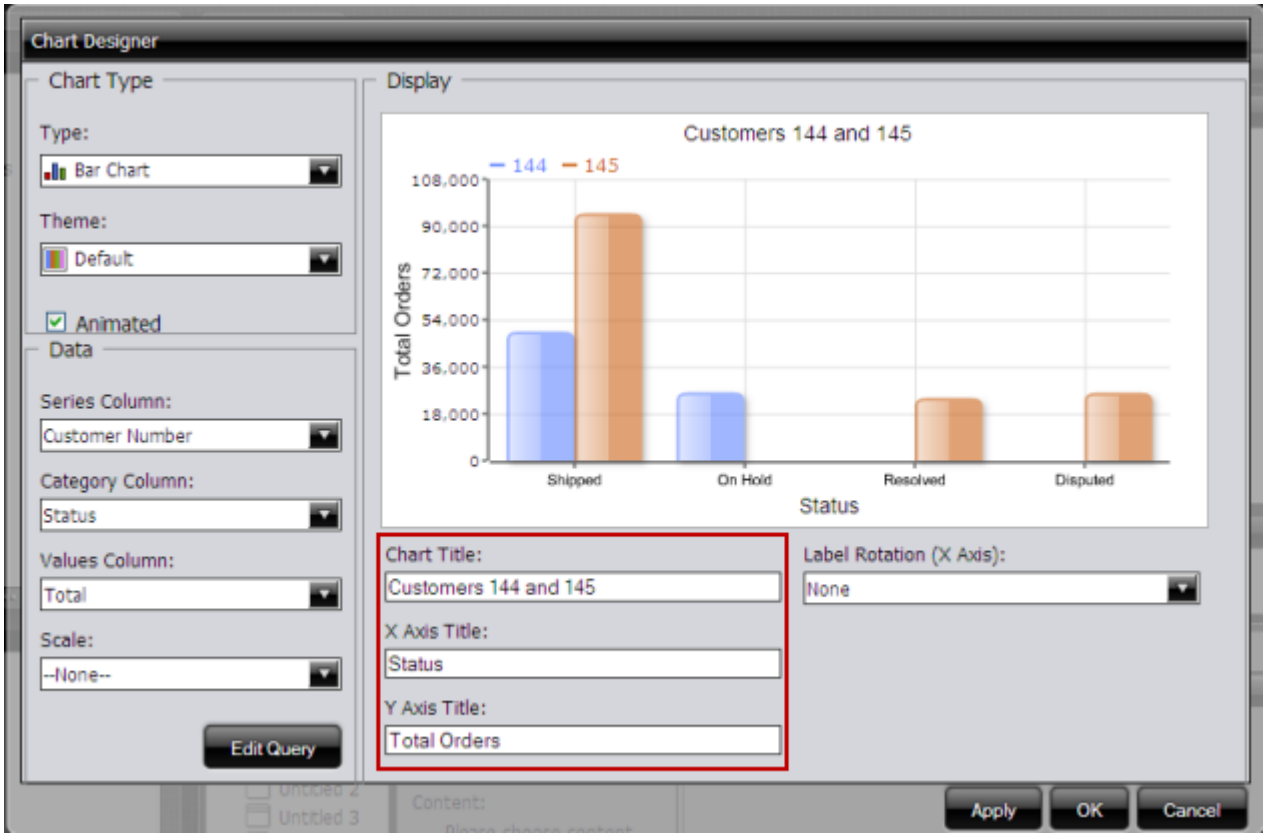
A preview of the chart appears in a box in the upper-right corner of the Chart Designer as you select your options.

9. Under **Chart Type**, click on a chart type to select it.

Note: By default, pie and dial charts display in "animated" Flash mode. You can turn animation off by disabling the **Animated** check box in the Chart Designer. Animated charts bring focus to important aspects of your data. For example, animation allows you to bring out a data point if it reaches a critical value, such as high or low sales numbers.

If you selected a pie or dial chart, see *Working with Pie Charts* on page 9 or *Working with Dial Charts* on page 8, respectively.

10. Under **Theme**, select a theme from the list.
    The theme is applied to your chart.
11. Enter the labels for the **Chart Title**, **X Axis Title** (horizontal axis), and **Y Axis Title** (vertical axis).
    Entries are displayed in the chart preview.



12. Click **Apply** to see the chart preview.
13. Click **OK** display your chart in the dashboard panel.

Adding a Data Table to a Dashboard

The Data Table feature allows you to display a tabular representation of a database query in a dashboard. It also allows you and consumers of the dashboard to manipulate the display of the data in the data table, while in the dashboard. For example, users can resize, sort, and change the order of columns. Follow the instructions below to add a data table to your dashboard.

1. Select a panel in the Dashboard Designer.
2. Click (Insert) and select **Data Table**.
   The **Select a Data Source** dialog box appears.
3. Select a data source from the list of available data sources and click **OK**.
   The Query Editor opens.
4. Begin building your query. Click (+) next to the category name to display its associated table columns. When the column names appear, click to select the column that contains the data you want displayed in your data table.
5. Click the small yellow arrow to place the column name under **Selected Columns**.

6. Now add the **Conditions**; these are your constraints that filter what you are selecting. You can add multiple conditions.
   Under **Combine**, you can select your constraint (and, or, and not, or not) from the drop-down list. Under **Comparisons** you can click the drop-down list to display options for comparisons, =, <, >, and so on; (for example, where the customer number is *equal* to 144 *or* 145). You can also select an aggregation type from the drop-down list for table columns that contain numeric data. The table below contains a definition for each aggregate type:

Aggregate Type	Description
SUM	Sums a column's values
COUNT	Counts a column's values
AVG	Averages a column's values
MIN	Selects the minimum column value
MAX	Selects the maximum column value

Note: Click **Preview** at any time to view the data associated with your query.

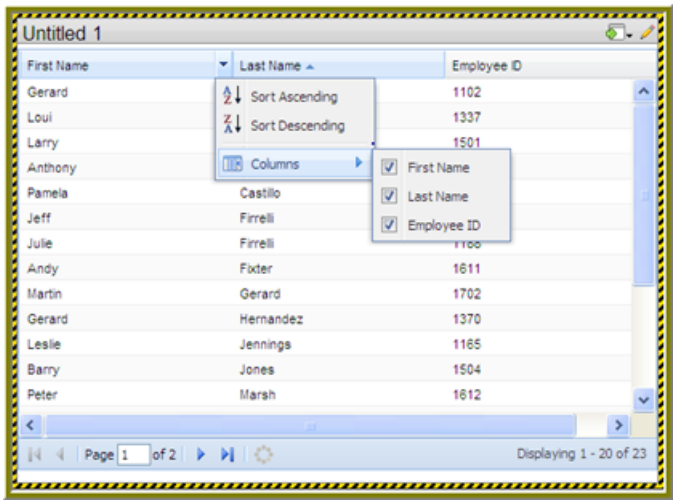
7. Add the columns that you want to **Order By**. The ordering of the selected data is accomplished by one or more columns in a table. For example, you can sort the data by customer name and address.
8. Click **OK** in the Query Editor when you are done.
   The Data Table appears in the dashboard panel.

Updating the Data Table Display

You can edit the data table display directly in the dashboard panel.

Sorting Column Data

To change the sort order data under a column, click the drop-down arrow in the header and choose **Sort Ascending** or **Sort Descending**. You can also hide one or more columns by disabling the appropriate check boxes next to the column names.

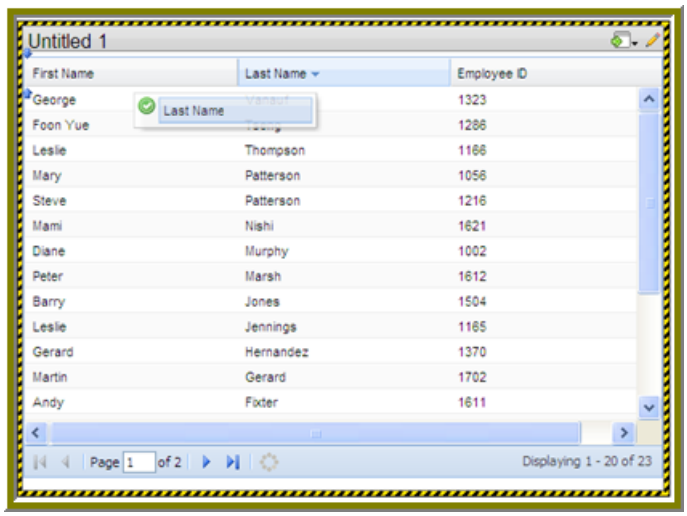


Adjusting Column Width

You can adjust the width of a column by clicking the right border of the column header and dragging it to the right or left. Release the mouse button when you are done.

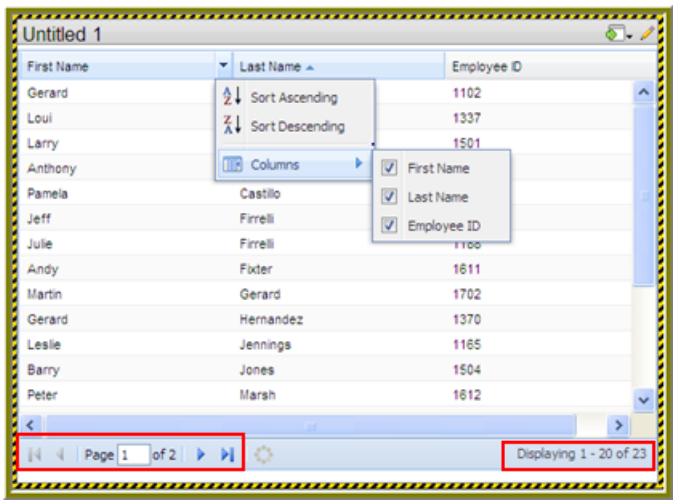
Moving Columns

To move the placement of a column, click and drag the column it to the appropriate location in the Data Table as shown in the example below:



Paginating

The pagination feature allows you to page through a large number of records.

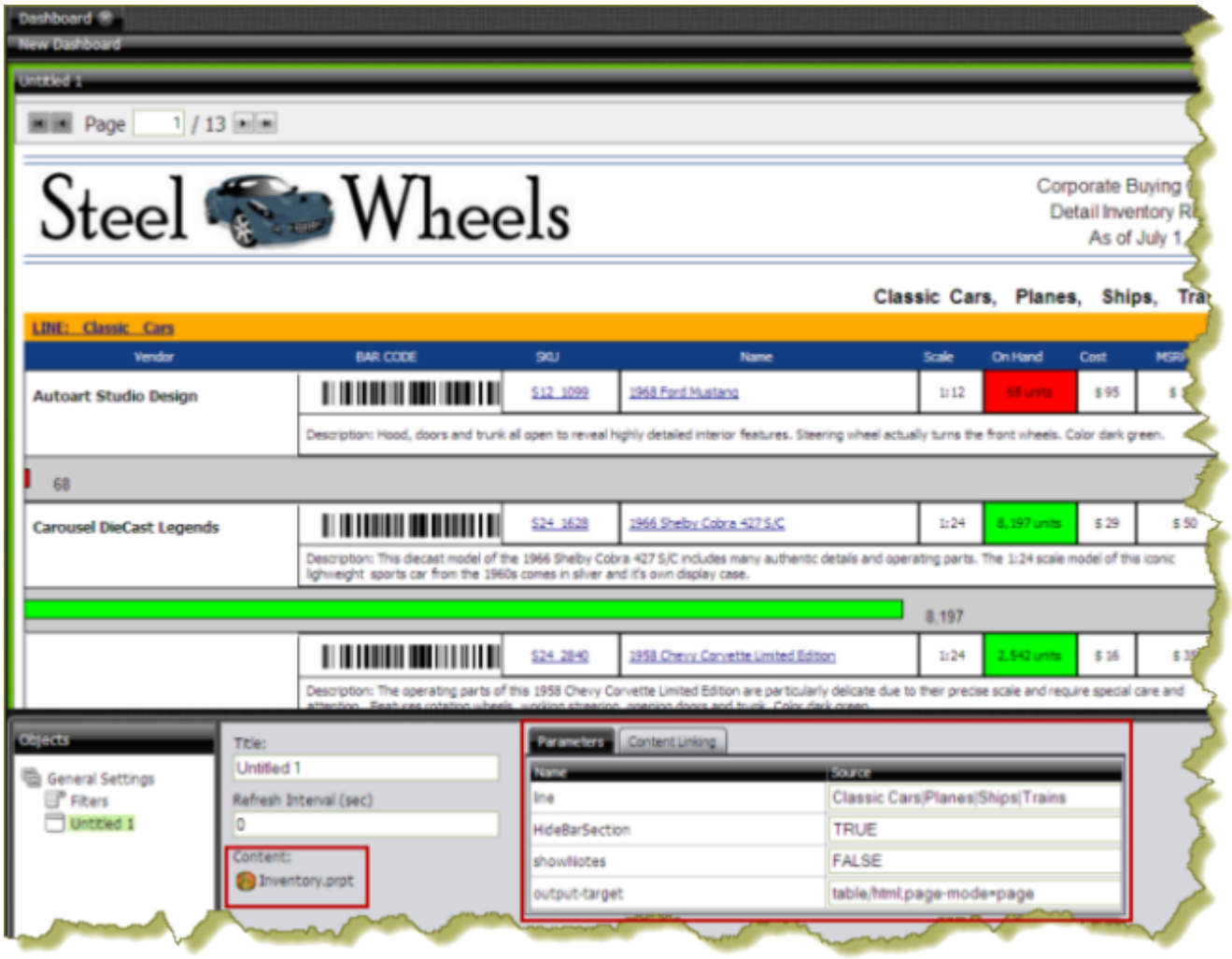


Adding a Report Designer Report to a Dashboard

Follow the instructions below to add a report created with Report Designer.

1. Select a panel in the Dashboard Designer.
2. Click (Insert) and select **File**.
   A browser window opens.
3. Locate the appropriate report file.
4. Click **Select** to place the report inside the dashboard panel.

   Pagination control arrows at the top of a report allows you to scroll through long reports. Notice that the report file name, *Inventory.prpt*, appears under **Content:** in the dashboard edit pane in the sample below. This sample report contains parameters. You can enter values manually and link them to a dashboard filter in the text boxes under **Source**. When the report renders again, the parameter value(s) you entered are included in the report.



Important: If you select a Report Designer file to place in a dashboard, but do not supply values for required parameters, the report will show up blank.

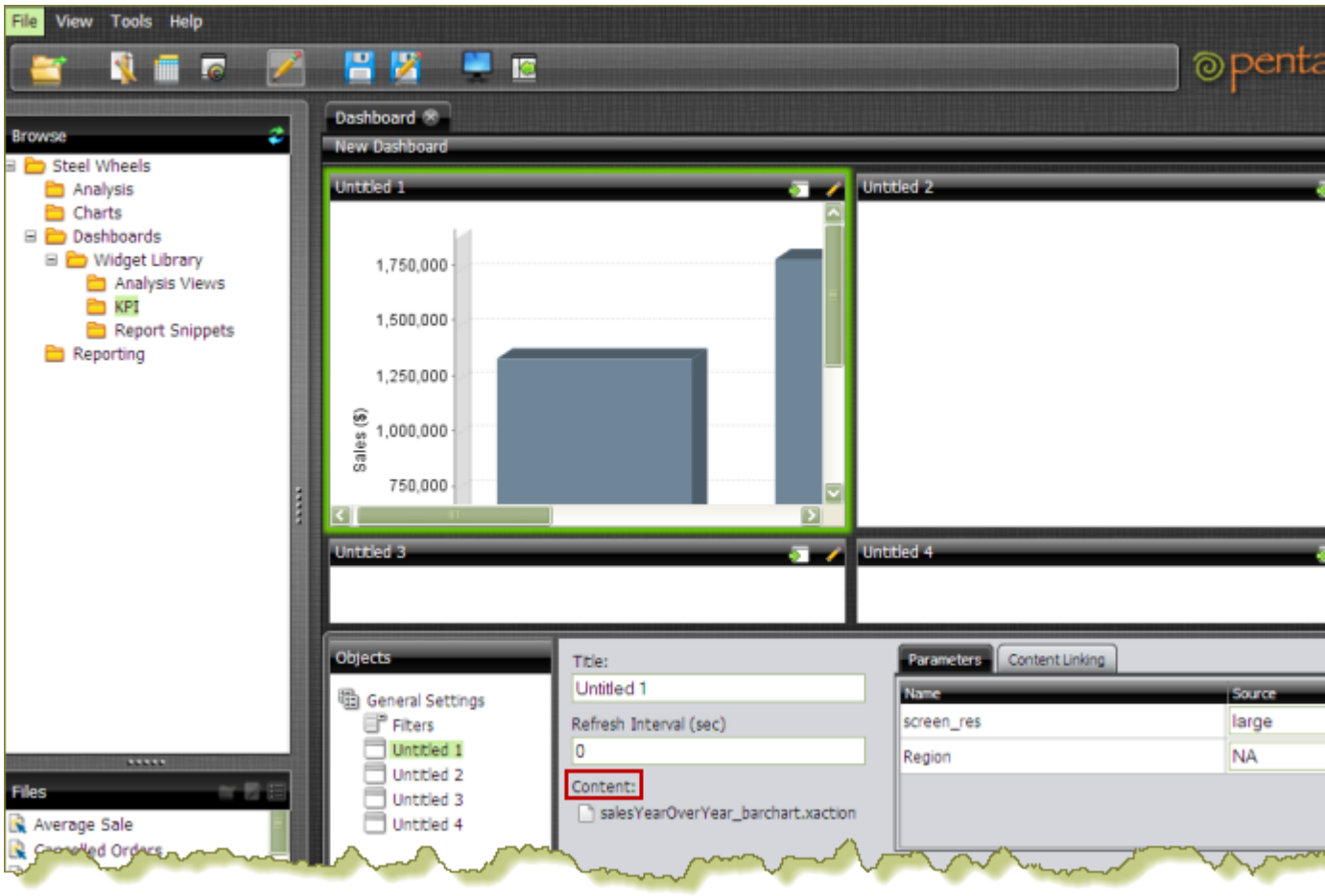
Adding an Action Sequence to a Dashboard

Follow the instructions below to display the contents of an .xaction file in a dashboard.

Note: Generally, .xaction files are provided to you by an administrator. An .xaction file may contain a report, a chart, or other type of content.

1. Select a panel in the Dashboard Designer.
2. Click (Insert) and select **File**.
   A browser window opens.
3. Locate the appropriate .xaction file.
4. Click **Select** to place the contents of the file inside the dashboard panel.

   Notice that the file name appears under **Content:** in the dashboard edit pane of the sample below. This sample chart contains parameters, (*screen_res*, *Region*), and default values (*large*, *NA*).



5. Save your dashboard.

Adding an Analyzer Report to a Dashboard

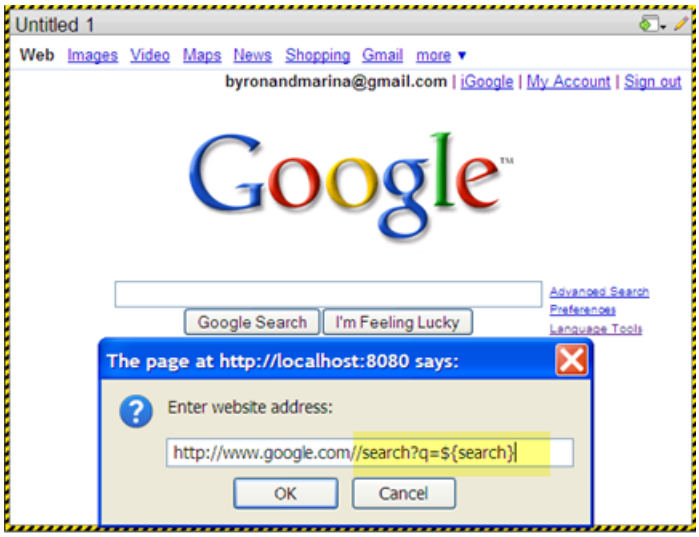
Follow the instructions below to display an Analyzer report in a dashboard.

1. Select a panel in the Dashboard Designer.
2. Click (Insert) and select **File**.
   A browser window opens.
3. Locate the appropriate Analyzer report and click **Select**.
   The Analyzer Report appears inside the dashboard panel.

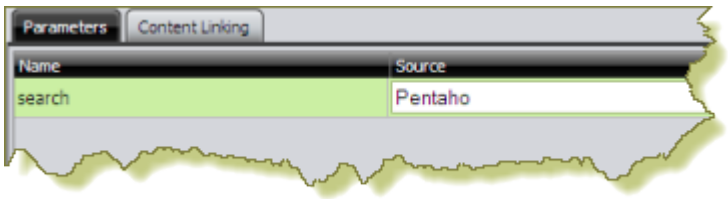
Adding a Web Site to a Dashboard

Follow the instructions below to display contents of a Web site in a dashboard panel. You may need administrator privileges to display a Web site content in a dashboard.

1. Select a panel in the Dashboard Designer.
2. Click (Insert) and select **URL**.
   The **Enter Web site** dialog box appears.
3. Enter the Web site URL in the text box and click **OK**.
   In the example below, a search parameter has been added to the URL.



When the parameter displays in the edit pane of the dashboard, you can enter a value for the parameter in the text box next to the parameter name.



4. If applicable, click (Edit) to make changes.
5. Save your dashboard when you are done.

Implementing Filters

Filters display a subset of data based on the dashboard user's point of view. For example, a European user may only want to see EMEA region sales data, whereas the dashboard's default region is the NA region.

Note: To ensure that a filter links to the correct content in a dashboard, the content to which you are linking (data table or chart) must contain at least one parameter.

Below are general instructions below for adding filters to your dashboard:

1. In the dashboard page, under **General Settings**, select **Filters**.
   The Filter Editor appears on the right. No filters are listed if this is the first time you are assigning filters.
2. To display a filter toolbar to users of the dashboard, enable **Show Filter Toolbar**.
   A placeholder for the filter toolbar appears at the top of the dashboard.
3. Click (Add) to start adding filters.
   The **Filter Properties** dialog box appears.
4. In the **Filter Properties** dialog box, type a display name for the control label. For example, "Region."
5. Enable **Display Name as Control Label** if you want users to see the display name in the filter toolbar.
6. Select your control type. Control types define how your filter values are selected; for example, in a drop down list, radio button, checkbox, and so on.

   The table below contains a description of each control type.

Control Type	Description
Drop Down	Users select a filter value from a drop-down list.
List	Users select a filter value from a scrolling list. This filter control supports multiple selections.
Radio button	Users click a radio button to select a filter value.
Checkbox	Users enable a checkbox to select a filter value. This filter control supports multiple selections.
Button	User click a button to select a filter value. This filter control supports multiple selections.
Text Field	Users enter a text string or number into a text field manually.
Date Picker	Users examine filter values based on calendar date.

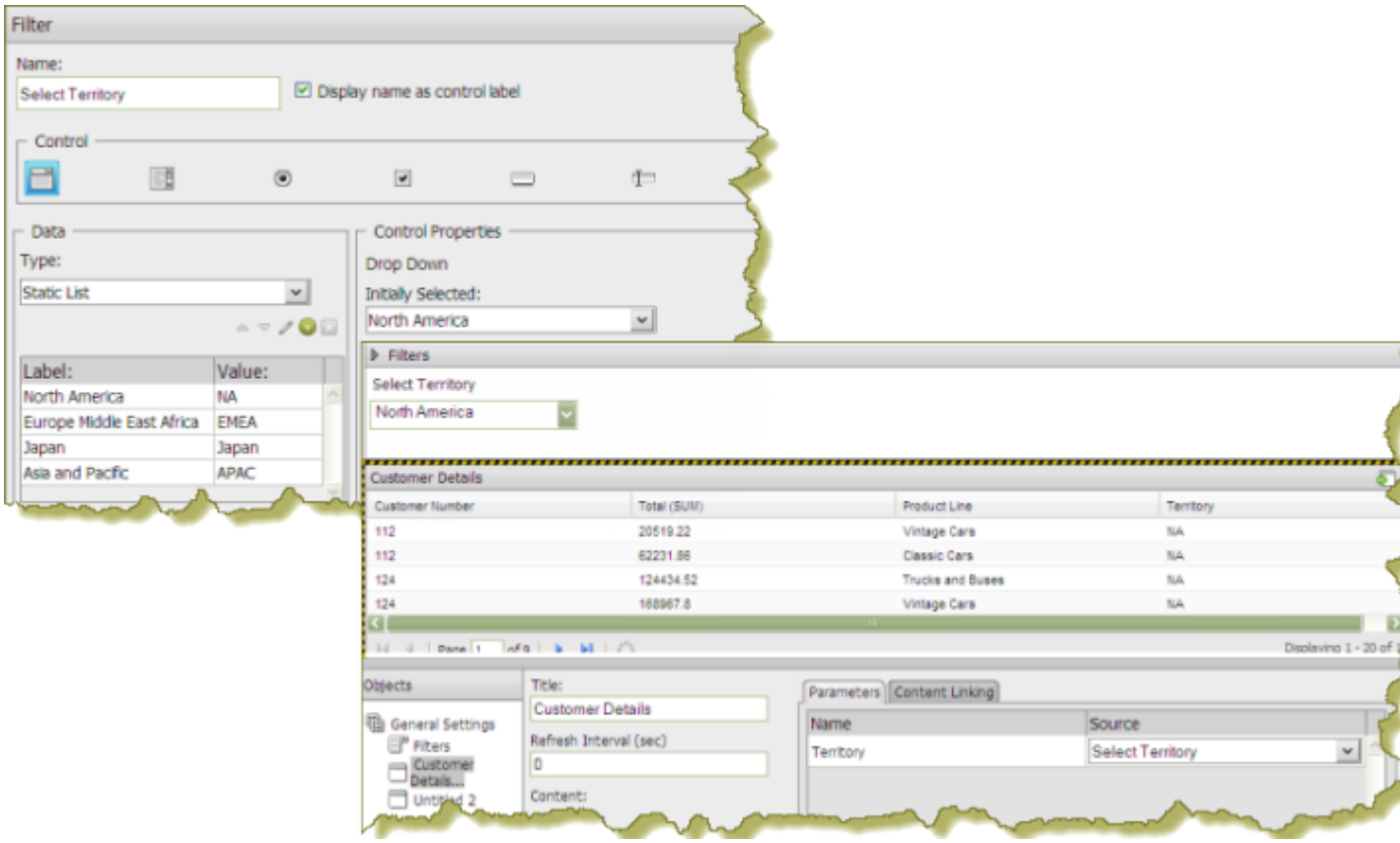
Your dashboard now has a filter.

If you plan to provide hard-coded names and values for your dashboard users, or produce a dynamic filter list, continue on to the next few sections.

Creating a Static List of Options

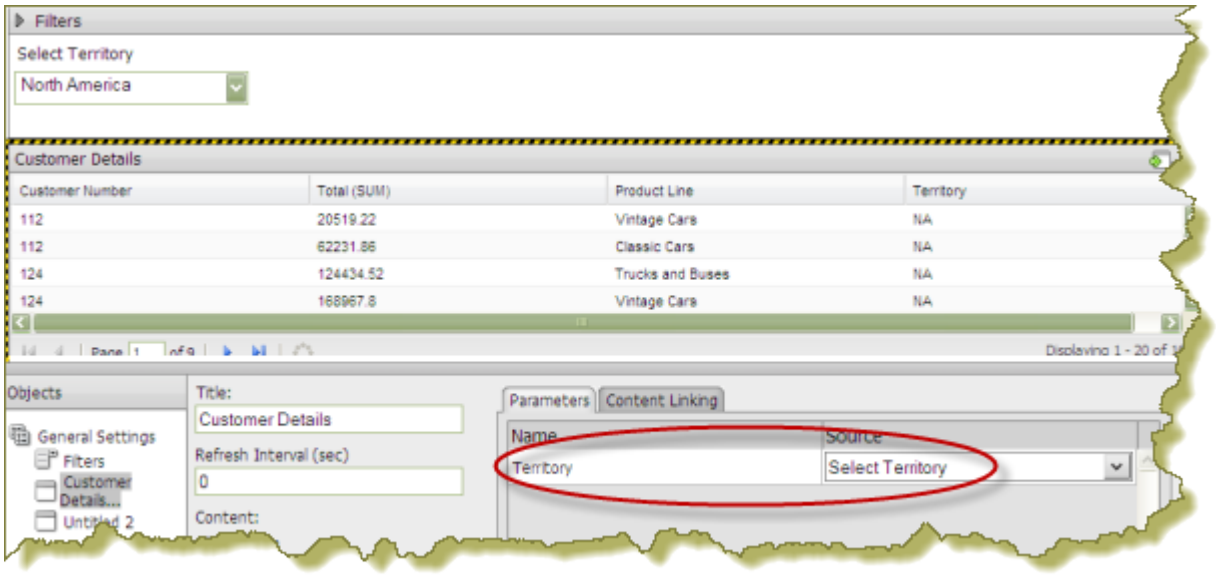
You must have a data table or chart that contains at least one parameter for your filter control to function correctly.

When you create a static list, you define a static list of options to present to the dashboard user. Each option consists of a display name that appears in a drop-down list and a value that is used to restrict the data query in the filter toolbar as shown in the example below:



Follow the instructions below to create a static list:

1. In the dashboard page, under **General Settings**, select **Filters**.
   The Filter Editor appears on the right. No filters are listed if this is the first time you are assigning filters.
2. To display a filter toolbar to users of the dashboard, enable **Show Filter Toolbar**.
   A placeholder for the filter toolbar appears at the top of the dashboard.
3. Click (Add) to add a filter.
   The **Filter Properties** dialog box appears.
4. Click on an icon to select your **Filter Control** type. In the example above, the (Drop Down) control was used.
5. Ensure that **Static List** is selected under **Type**. Static List is the default selection.
6. Click (Add).
   The **List Value** dialog box appears.
7. In the **List Value** dialog box, enter the label and a value for the first option in the list. The label is the option that is visible to dashboard users; the value is passed as the parameter's source value.
8. When you are done adding labels and values, click **Close** to exit the List Value dialog box.
9. In the Filter Control dialog box, change the label (filter option) that will appear first in the filter control selecting another label from the list under **Initially Selected**.
10. In the dashboard, select your chart or data table. Click the **Parameters** tab and choose another **Source** for the parameter from the list. That source should be the name of your filter control; in this example, **Select Territory**.



The original default value (Source) for the **{Territory}** parameter was **NA** but for the filter to display correctly, the **Source** was changed to **Select Territory** in the dashboard so that the filter control could drive the content in the data table.

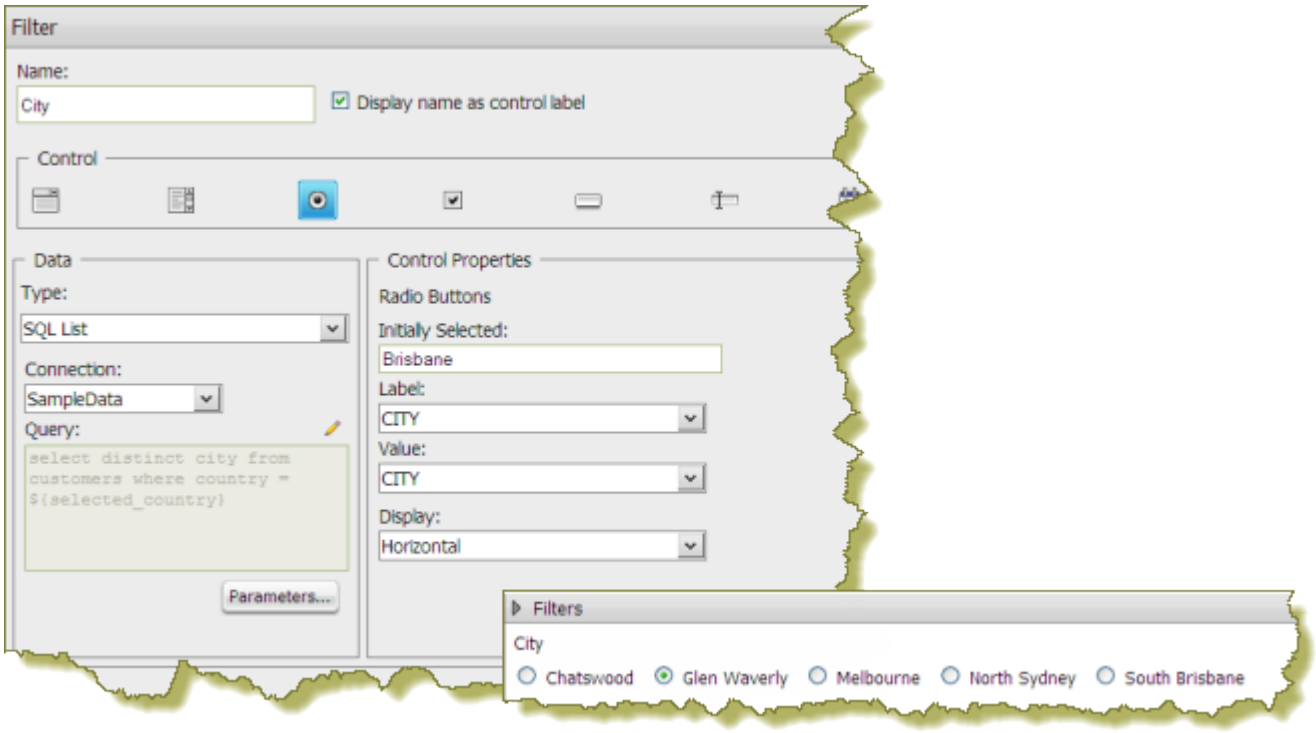
11. Click **OK** to exit the **Filter Control** dialog box.
The filter options are displayed to the dashboard user when viewing the data table.

12. Click **OK** to exit the Filter Properties dialog box and save your dashboard.

Creating a SQL List

You must have a data table or chart that contains at least one parameter for your filter control to function correctly.

When you create an SQL List, you are using a SQL query to dynamically retrieve a list of display names and corresponding values directly from a relational database as shown in the example below:



a

Note: You must have administrative permission to create SQL-based filters.

Follow the instructions below to create a SQL List:

1. In the dashboard page, under **General Settings**, select **Filters**.
   The Filter Editor appears on the right. No filters are listed if this is the first time you are assigning filters.
2. To display a filter toolbar to users of the dashboard, enable **Show Filter Toolbar**.
   A placeholder for the filter toolbar appears at the top of the dashboard.
3. Click (Add) to add a filter.
   The **Filter Properties** dialog box appears.
4. In the **Filter Properties** dialog box, enter a **Name** for your filter.
5. Enable the **Display Name as Control Label**, if appropriate.
6. Click the appropriate icon to select your filter control. In the example above, the Radio Button control was selected.
7. Under **Type**, select **SQL List**.
8. Select the data source (**Connection**) that contains the content you need to set options from the drop-down list.
9. Click (Edit) to display the **Query** input text box.
10. Type the SQL query in the area provided for you. If you enter a parameter query, use the following format **${*parametername*}** and provide a default value for the parameter.
11. Click **Test** to ensure that your SQL query is displaying the correct values.

    Note: Use a SQL query that returns two columns — one for the display name and one for the value.

12. Adjust your SQL query as needed and click **OK**.
13. Under **Control Properties**, enter a **Default Label/Value** for the *initially selected* option in your filter control.
14. Select a **Label** to display in the filter control; this is the user-friendly name that users will see in the dashboard.
15. Select the **Value**; this is the field that is passed as the parameter's source value.
16. If applicable, select your **Display** type from the list.

    Note: Some filter controls allow you to choose the position of your filter options. If you have a long list of options, for example, a list of cities, you can change the Display type to horizontal.

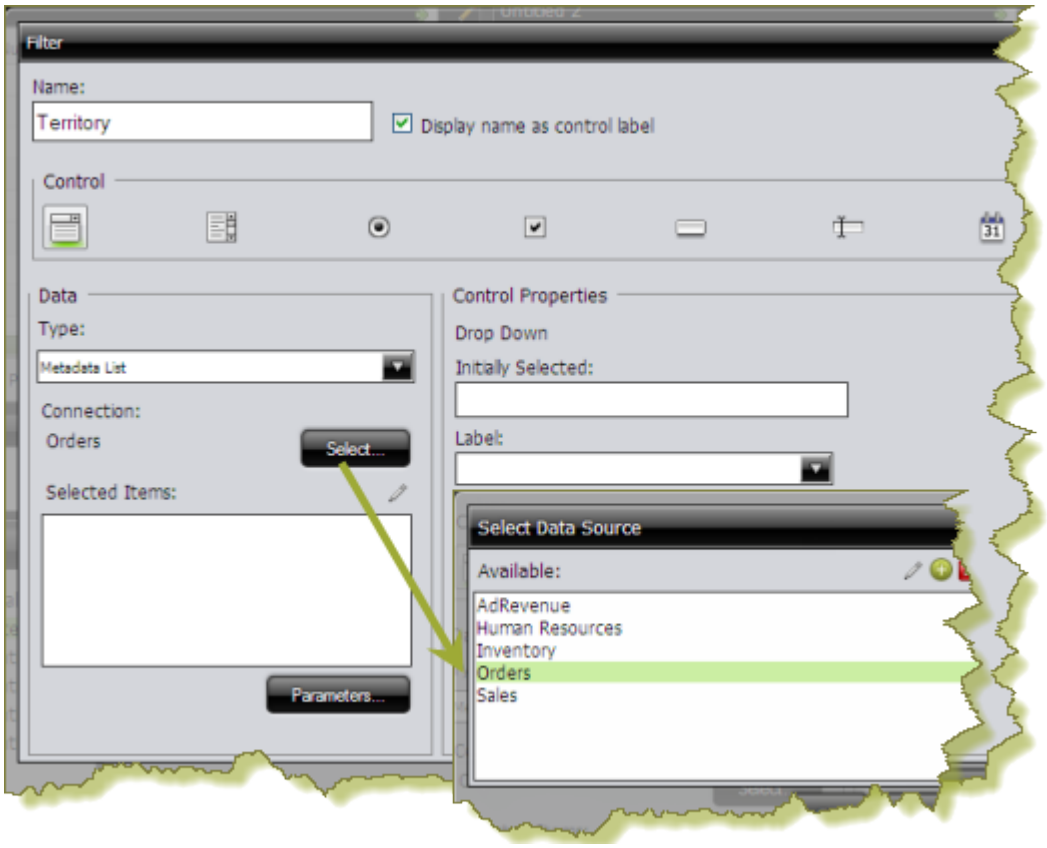
17. Click **OK**.

The list of values appear in the filter toolbar in the dashboard.

Creating a Metadata List

You must have a data table or chart that contains at least one parameter for your filter control to function correctly.

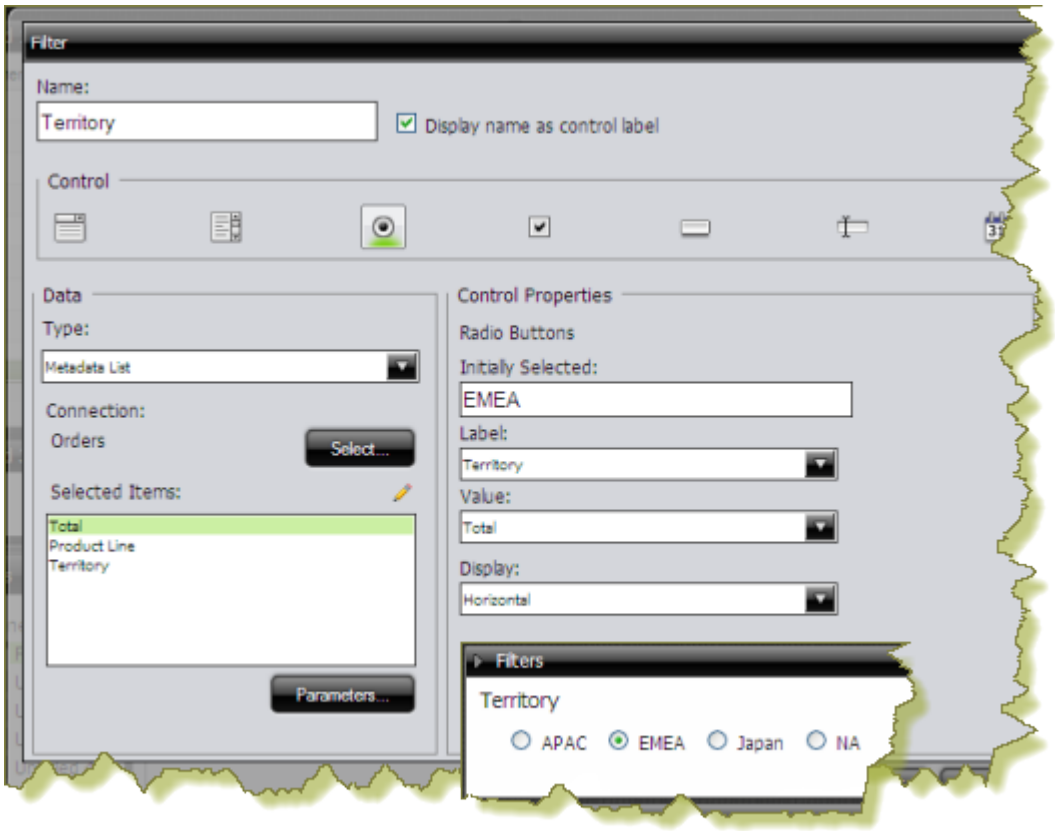
When you create a Metadata List, you are defining a query to retrieve a list of display names and corresponding values from a metadata data source provided by your administrator.



1. In the dashboard page, under **General Settings**, select **Filters**.
   The Filter Editor appears on the right. No filters are listed if this is the first time you are assigning filters.
2. To display a filter toolbar to users of the dashboard, enable **Show Filter Toolbar**.
   A placeholder for the filter toolbar appears at the top of the dashboard.
3. Click (Add) to add a filter.
   The **Filter Properties** dialog box appears.
4. In the **Filter Properties** dialog box, enter a **Name** for your filter.
5. Under **Data Type**, select **Metadata List**.
6. Click **Select** to choose the data source that contains the content you need to set options from the drop-down list and click **OK**.
   The **Query Editor** opens.
7. In the **Query Editor**, build a query to select either a single column (that represents both a name and a value), or two columns representing the display names and corresponding values.

   Note: If a single column query is defined the values of that column will be used for both the display names and the values.

8. Click **OK** to exit the Query Editor.
   Your options appear under **Selected Items** in the Filter Properties dialog box.
9. Under **Control Properties**, enter a **Default Label/Value** for the *initially selected* option in your filter control.



10. Select a **Label** to display in the filter control; this is the user-friendly name that users will see in the dashboard.
11. Select the **Value**; this is the value in the database that is associated with the Label you selected in the previous step.
12. If applicable, select your **Display** type from the list.

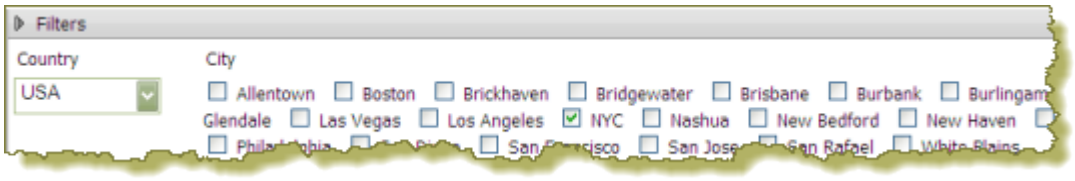
Note: Some filter controls allow you to choose the position of your filter options. If you have a long list of options, for example, a list of cities, options may not appear correctly in the user console unless you change the Display type to **Horizontal**.

13. Click **OK**.

The list of values appear in the filter toolbar in the dashboard.

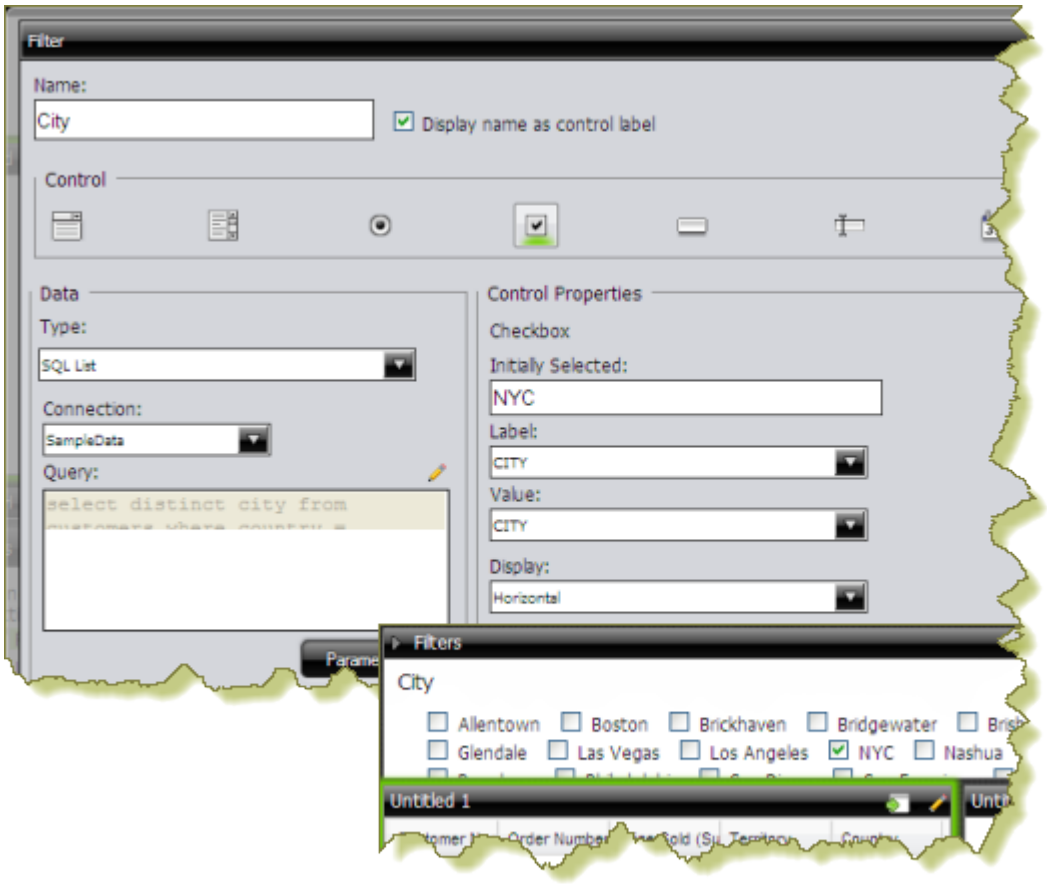
Creating a Cascading Filter

A cascading filter changes based on a value a user selects. When the value in the drop down list, (Country), changes, the filter is automatically applied to the second filter, (City) thus changing its values.

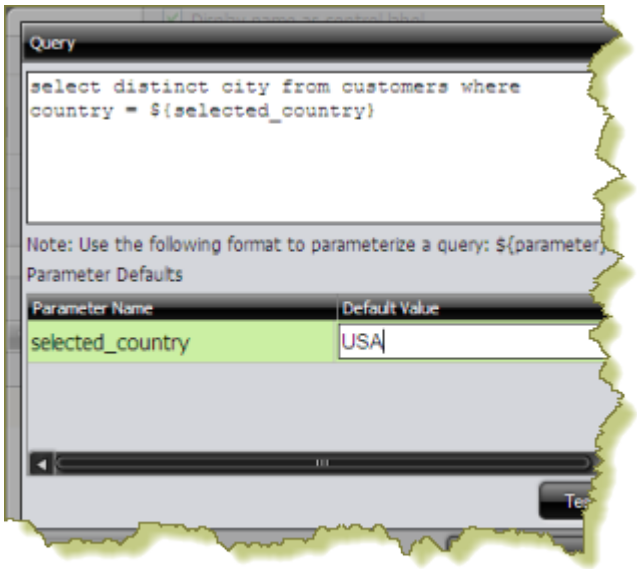


The example above was created using a Metadata List for the drop down filter (Country).

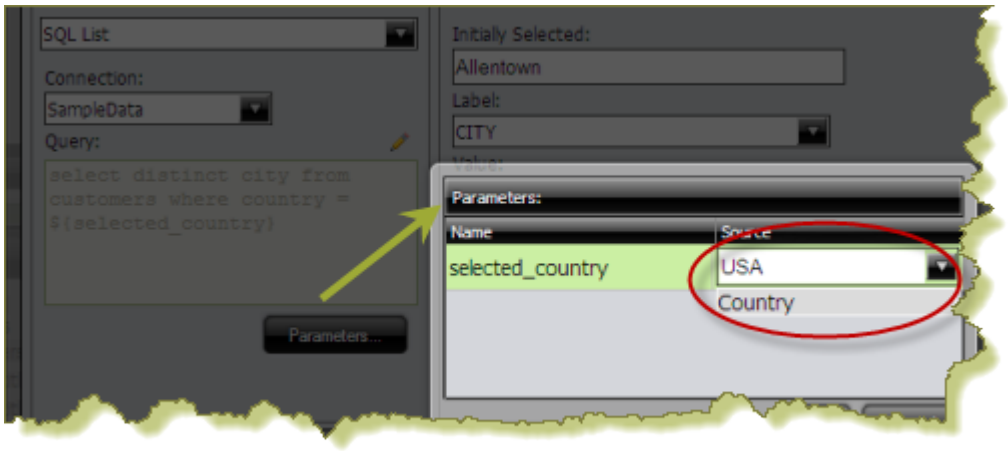
A SQL List that included a parameter, **${selected_country}**, in its associated query was used for the checkbox filter (**City**).



The **Default Value** for the **selected_country** parameter was set to **USA** with New York City (**NYC**) as the initially selected value for the checkbox filter.



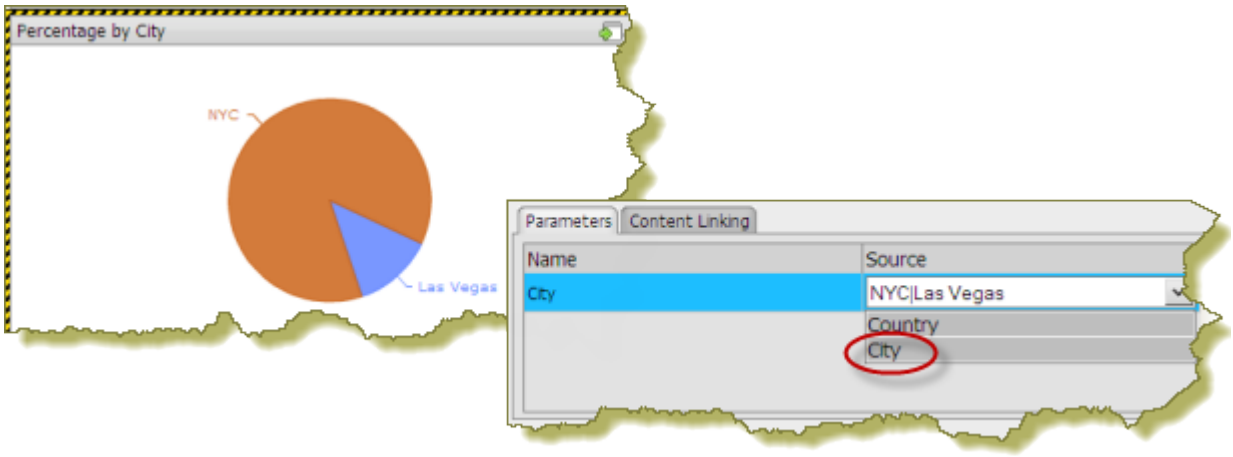
To link the City filter to the Country filter, another **Source** for the **selected_country** parameter was chosen. The alternate source is the **Country** filter.



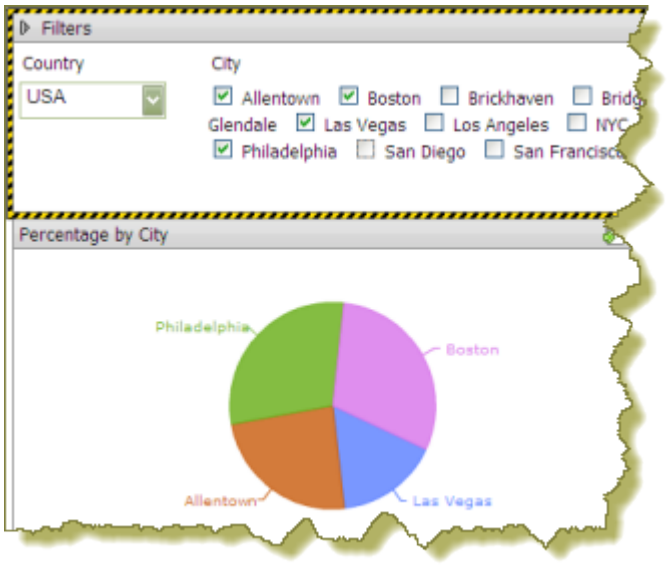
Once the filters are linked, users can select a country and then select a city (or cities) in the country of their choice.

Using this example, the report designer can now add a data table, chart, or other content in the dashboard that can be driven by the filter he or she just created. Suppose the designer decides to add a pie chart to the dashboard. The pie chart will display the percentage of sales per city.

In the Query Editor, the report designer creates a parameter, {**City**}, with an extended default value: **NYC|Las Vegas**. The resulting pie chart displays values for New York City and Las Vegas. Under the Parameters tab associated with the pie chart, the **Source** value for the City parameter is changed to the **City** filter.



When the report is saved, users of the dashboard can see results for a country and multiple cities within that country.



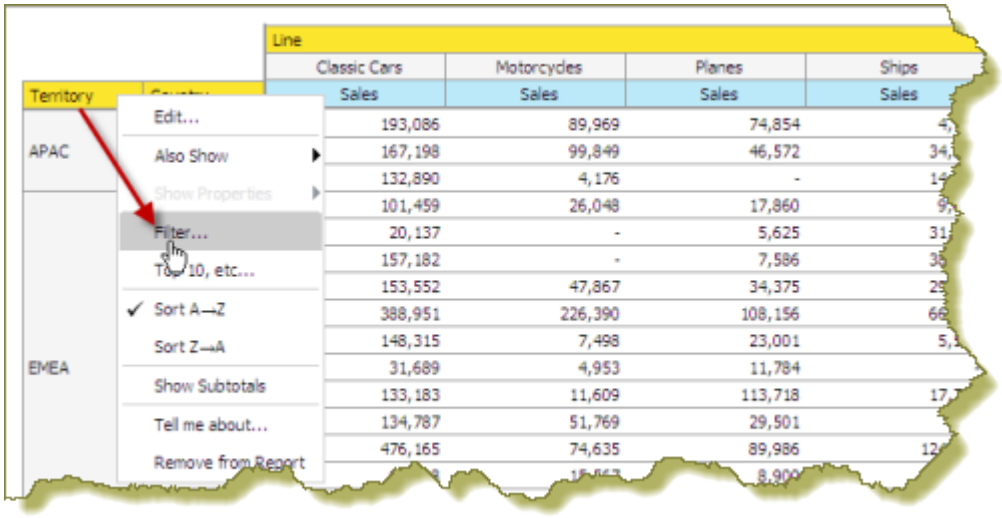
Linking Dashboard Filters to Analyzer Parameters

This process only applies to dashboards that include parameterized Analyzer reports. You must have an Analyzer report with a query parameter in it in order to proceed.

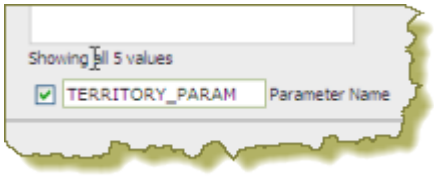
The instructions below explain how to parameterize an Analyzer report.

1. In Analyzer, select a field in your report to which you want to link; then, right-click and choose **Filter**.

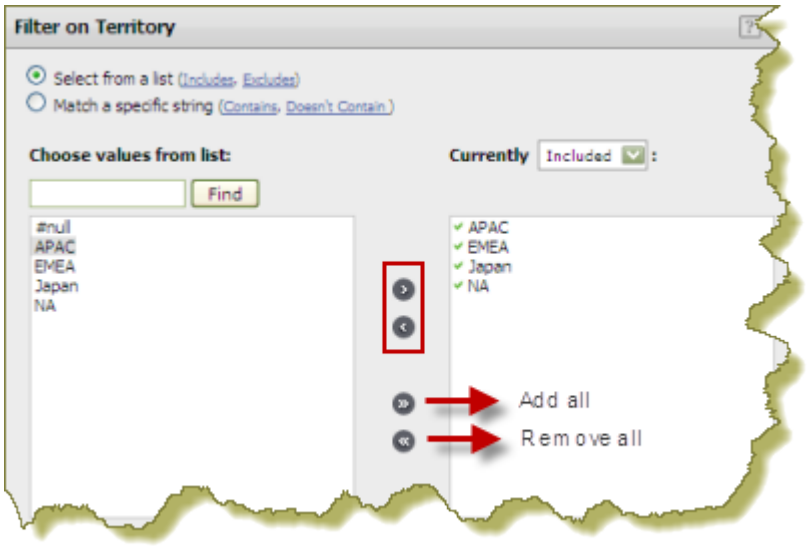
   In the example below, data will be filtered by **Territory**.



2. In the **Filter** dialog box, enter a name for the parameter in the **Parameter Name** text box and click the check box to enable it.

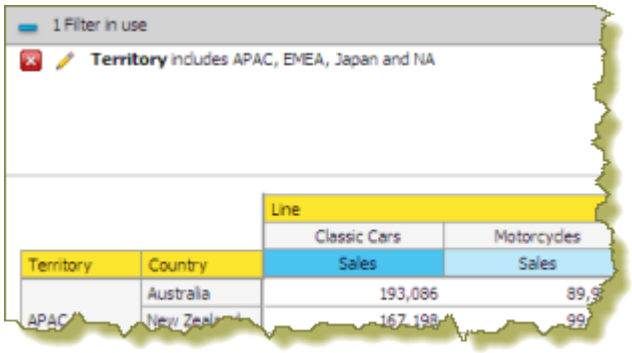


3. Select the values you want associated with the parameter. Use the arrows to add values to the box on the right.



4. Click **OK** to exit the Filter dialog box.
5. Save your Analyzer report.

   In the upper left corner of the report, you can see that a filter is in use. Click (Edit) to edit your filter; click to delete the filter.



6. Create a dashboard and drag the Analyzer report into a panel.

   The name of the parameter appears in the lower portion of the dashboard under **Parameters**.
7. Add a filter to the dashboard based on the parameter you created in your Analyzer report.
   The filter appears in the dashboard.

Dashboard Parameters

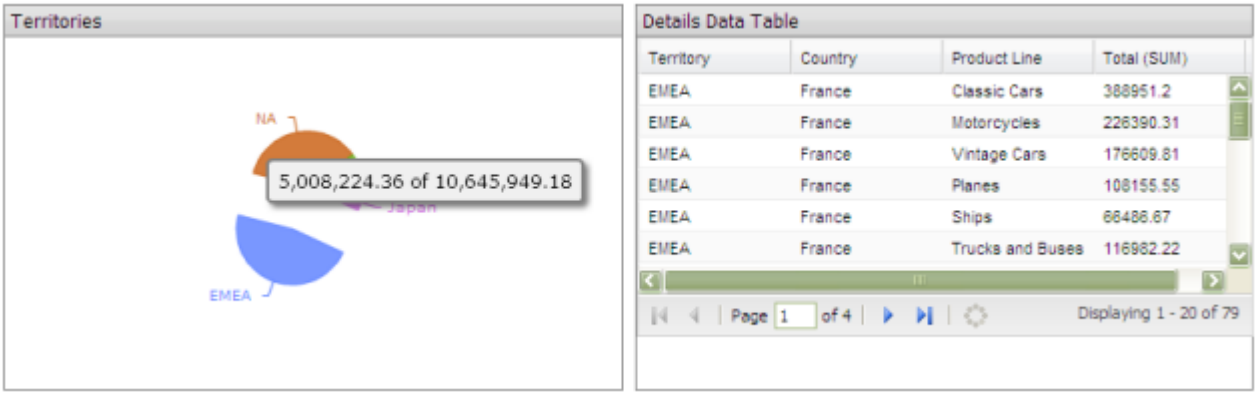
If you are placing a file, such as an .xaction or .prpt, inside a dashboard panel, it is possible that the author of the file, defined meaningful parameters for the content. If previously defined, the parameters and their associated default values, appear under **Parameters** in the edit pane of the dashboard. In the example below, when the chart initially rendered, it displayed a parameter called, "chart_type" with a default value called, "bar." A user can change the value of the parameter to see the content rendered as a pie, line, or area chart.

Parameter names are "hard-coded," in the file; that means they cannot be changed. Neither can you change the number of parameters associated with a file. When you create a chart using the Chart Designer, embed a URL into a dashboard, or create a data table, you can change both the name and value of a parameter.

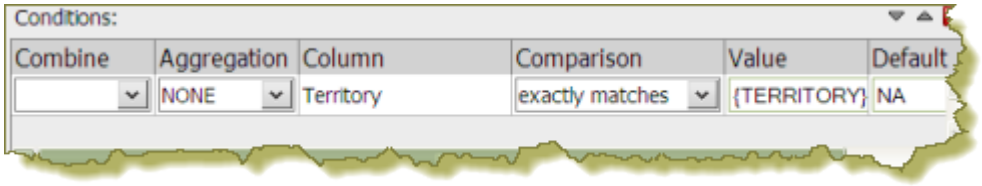
Creating Chart or Data Table Parameters With the Query Editor

When you place a chart in a dashboard panel, you use the Query Editor to retrieve data from a database for display on your chart or data table. If applicable, you can add Conditions or constraints that filter the data so that the chart or data table displays the information you want dashboard consumers to see.

Using parameters is critical if you plan on using dashboard filters or linking content in one dashboard panel to content on another dashboard panel. For example, suppose you create a pie chart and you want to filter details associated with an exploded pie slice in the adjoining data table as shown in the example below. In this instance, you must use a parameter that allows the data table to update when a dashboard consumer clicks on a pie slice. Optionally, you can parameterize the query condition so that the content is updated based on a user interaction, such as changing a filter value.

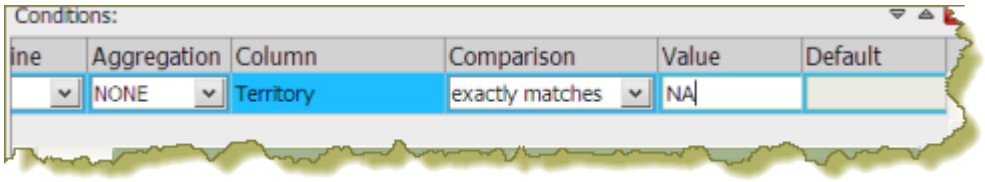


To create a parameter, in the **Value** field, type the name of the parameter inside curly braces, as in **{Parameter Name}**. In the example below, the designer created a parameter called, *{TERRITORY}*; the default value, or source, for the parameter is, "NA" (North America). When a chart or data table renders, it displays data associated with North America. Remember that this a *default value*. When you enclose a parameter name with curly braces, you are creating a *parameter query*. That means, that users can change the query dynamically by replacing the default, "NA," with a different territory acronym, (for example, EMEA), when the query runs.



You can define multiple default parameter values by adding a pipe (|) between the values, as in NA|EMEA|APAC.

Suppose a dashboard designer chooses to limit the data to North America (NA) exclusively? In this instance, he or she would not include the curly braces around "NA," (as shown in the example below), and **Default** (value) is disabled. This is an example of a static query.

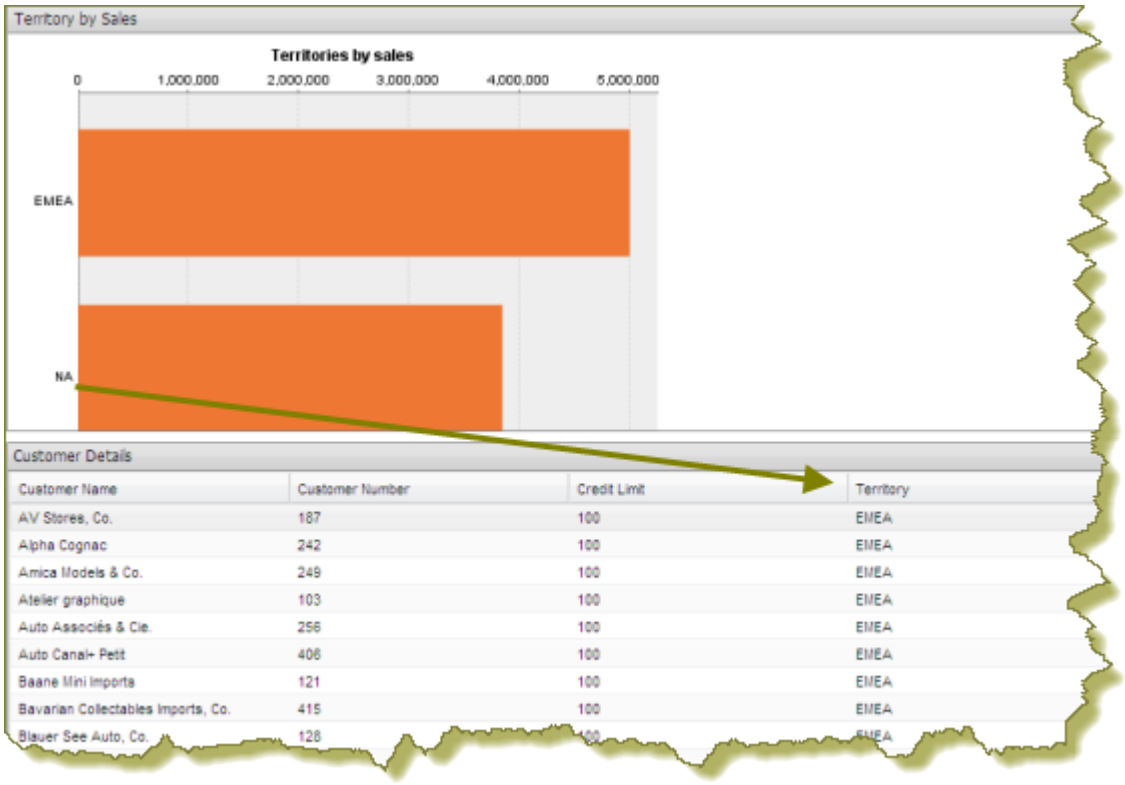


Linking an Action Sequence Parameter to Content in other Dashboard Panels

To complete this task you must have an action sequence (.xaction) that contains at least one parameter. For information about defining parameters in an action sequence see the *Creating Action Sequences* guide available in the *Knowledge Base*.

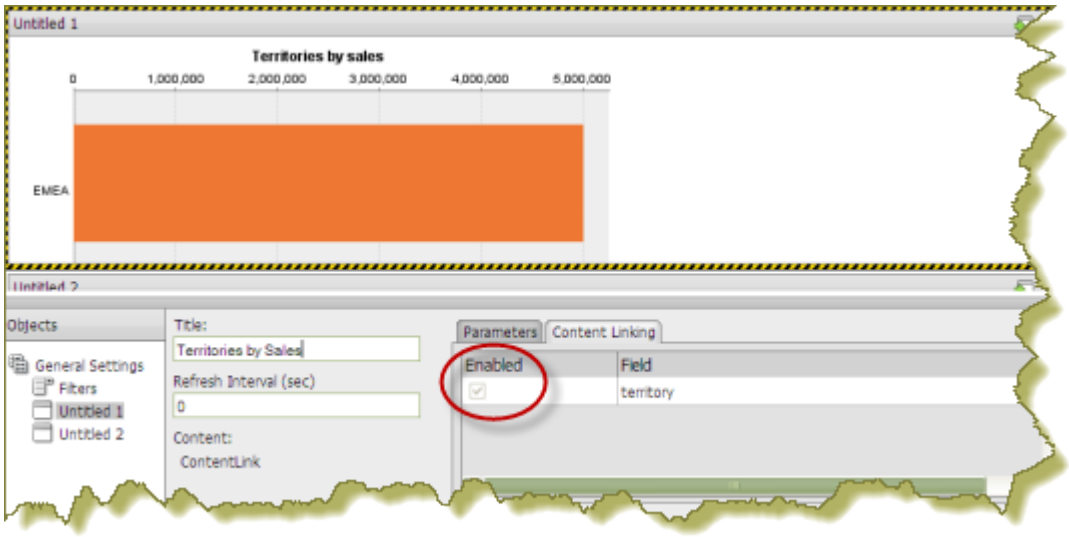
Below are general instructions for allowing an Action Sequence parameter to drive the filter associated with content in another dashboard panel. You must adjust the instructions when working with your own data.

1. Create a simple dashboard that contains an action sequence file and a data table. At this point, none of the content has been linked and you have a "static" dashboard.



Notice the chart (action sequence file) in the example above. You want dashboard consumers to click on a territory (APAC, EMEA, etc.), bar and have the data table update with information about that territory specifically.

2. Under **General Settings**, select the action sequence file and click **Content Linking**. If parameters have been defined in the action sequence, they will appear as values to be enabled for content linking. Parameters are hard-coded in the action sequence and cannot be changed.

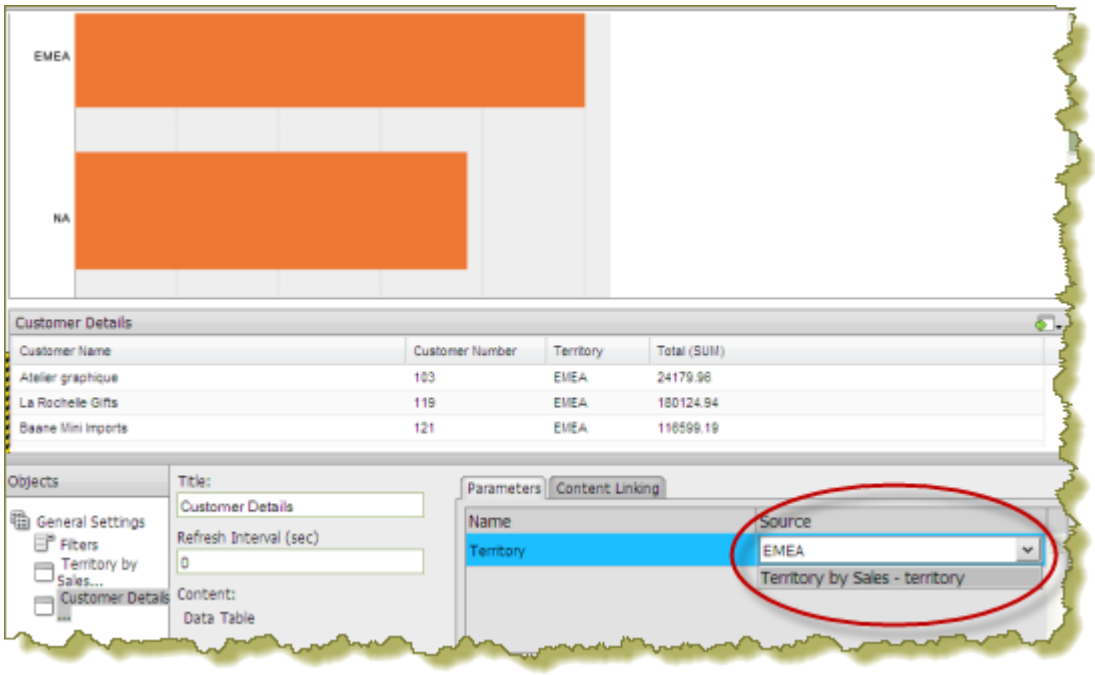


3. Add a parameterized condition to the query for the data table by specifying a parameter name in curly braces in the **Value**text box; then, provide a default value for that parameter in the **Default** text box.

Note: Parameterizing a query, as described here, allows you to pass values dynamically and update the chart based on events triggered by other elements of the dashboard such as a user

selecting an item from a filter control or following links defined in content associated with another panel in the dashboard.

Under **General Settings**, click the data table and examine its available parameters. In the example below, there is an available parameter called **TERRITORY** with a default source value of EMEA. A drop-down arrow in the **Source** text box indicates that there is an additional value to control the available parameter. The value comes from the parameter in the action sequence.



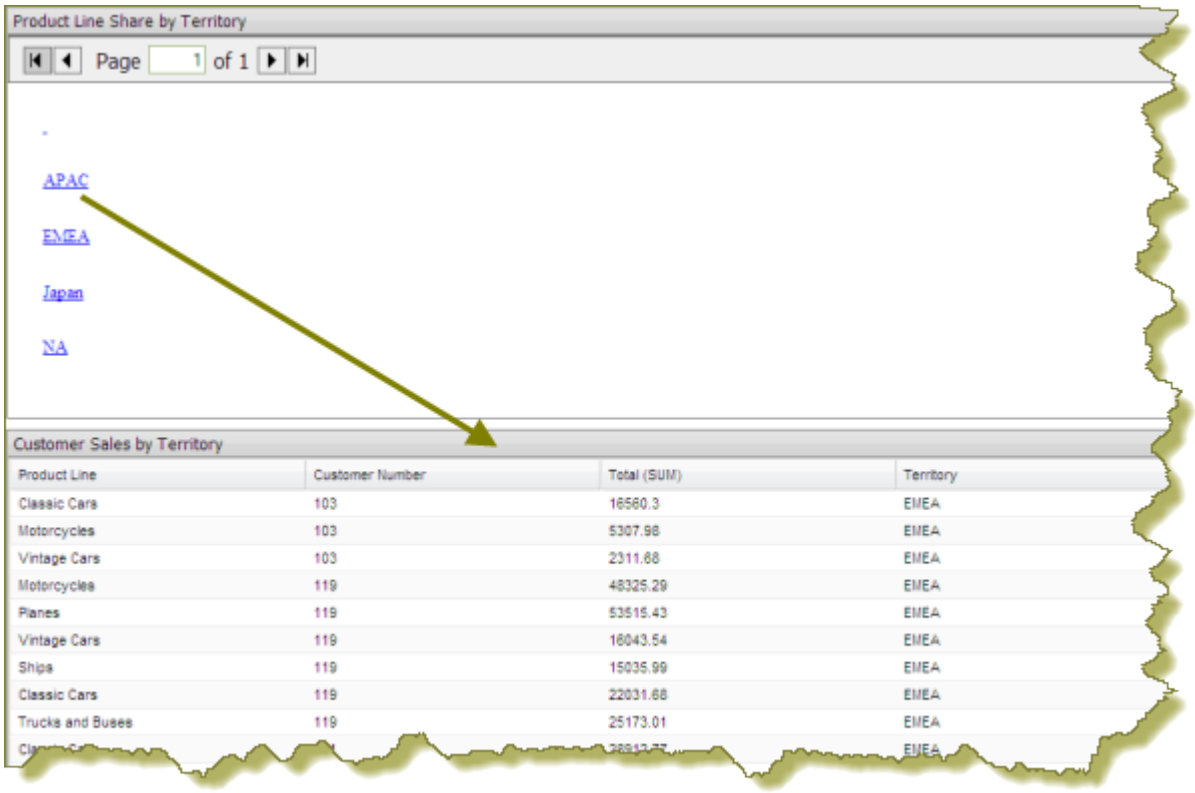
4. Save your dashboard. See *Saving Your Dashboard*.
5. In the action sequence file click on an object such as a bar as shown in the example above. The content in the data table updates in response to the object that was clicked in the action sequence.

Controlling a Dashboard Parameter From a PRPT Hyperlink

You must have a report (.prpt) that contains a hyperlink before you can complete this task. See the *Report Designer User Guide*, (available in the Pentaho Knowledge Base), for instructions about adding hyperlinks to a report.

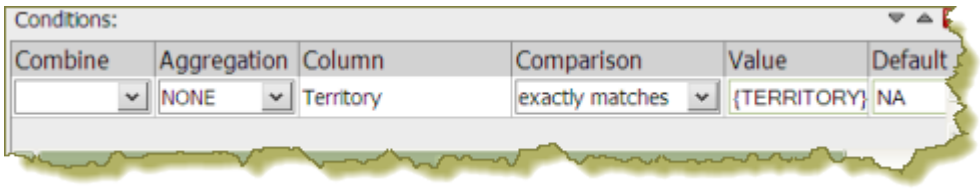
The instructions that follow show you how a link inside a Report Designer report (.prpt) can drive a parameter in content on another dashboard panel. You must adjust the instructions when working with your own data.

1. Create a simple dashboard that contains a .prpt report and a data table. At this point, none of the content has been linked and you have a "static" dashboard.



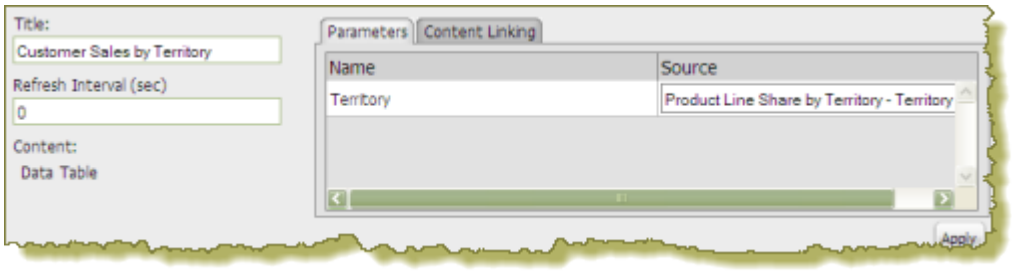
Notice the report (.prpt) in the example above. You want dashboard consumers to click on a territory (APAC, EMEA, etc.), hyperlink and have the data table update with information about that territory specifically.

2. Under **General Settings**, select the report (.prpt) and click the **Content Linking** tab. Click the checkbox next to the field you want used for content linking.
3. Add a parameterized condition to the query for the data table by specifying a parameter name in curly braces in the **Value**text box; then, provide a default value for that parameter in the **Default** text box. In the example below, a parameter called **TERRITORY** with a default value of **NA** has been created.



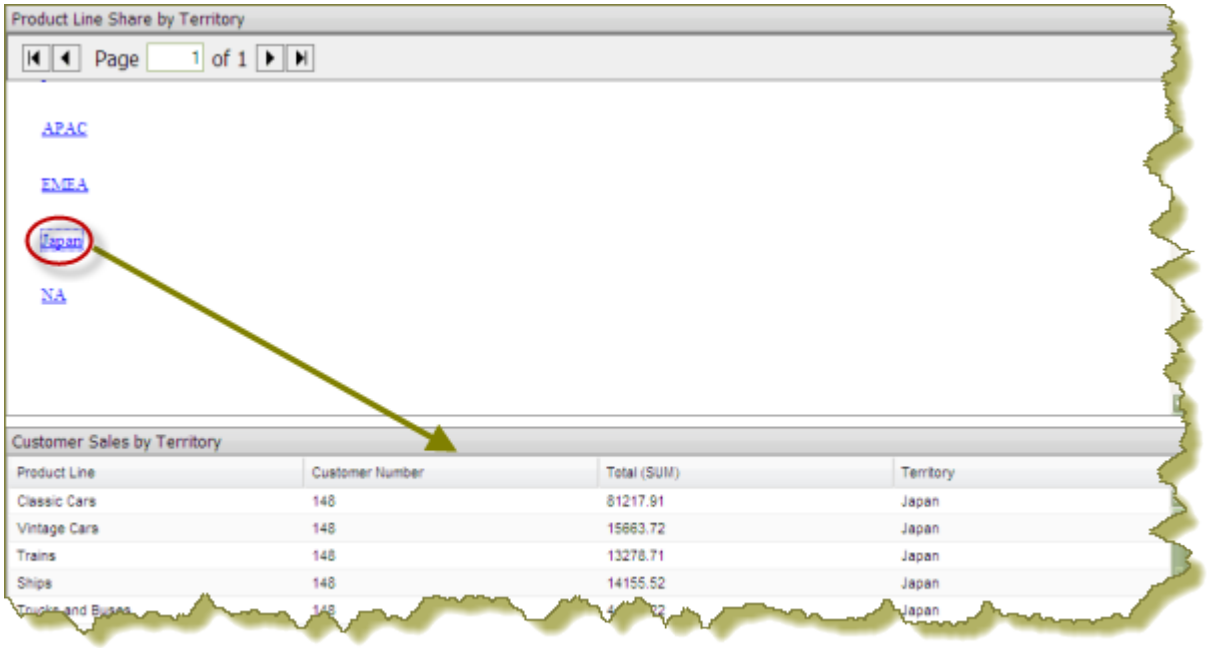
Note: Parameterizing a query, as described here, allows you to pass values dynamically and update the data table based on events triggered by other elements of the dashboard such as a user selecting an item from a filter control or following links defined in content associated with another panel in the dashboard.

4. Under **General Settings**, select the data table and click the **Content Linking** tab. Click the drop-down arrow, in the **Source** text box to display another source for the parameter you created. In the example below, notice that **Product Line Share by Territory - Territory** , (this is the name of the dashboard panel that contains the .prpt), is now selected as a source for the **Territory** parameter.



5. Save your dashboard. See *Saving Your Dashboard*.

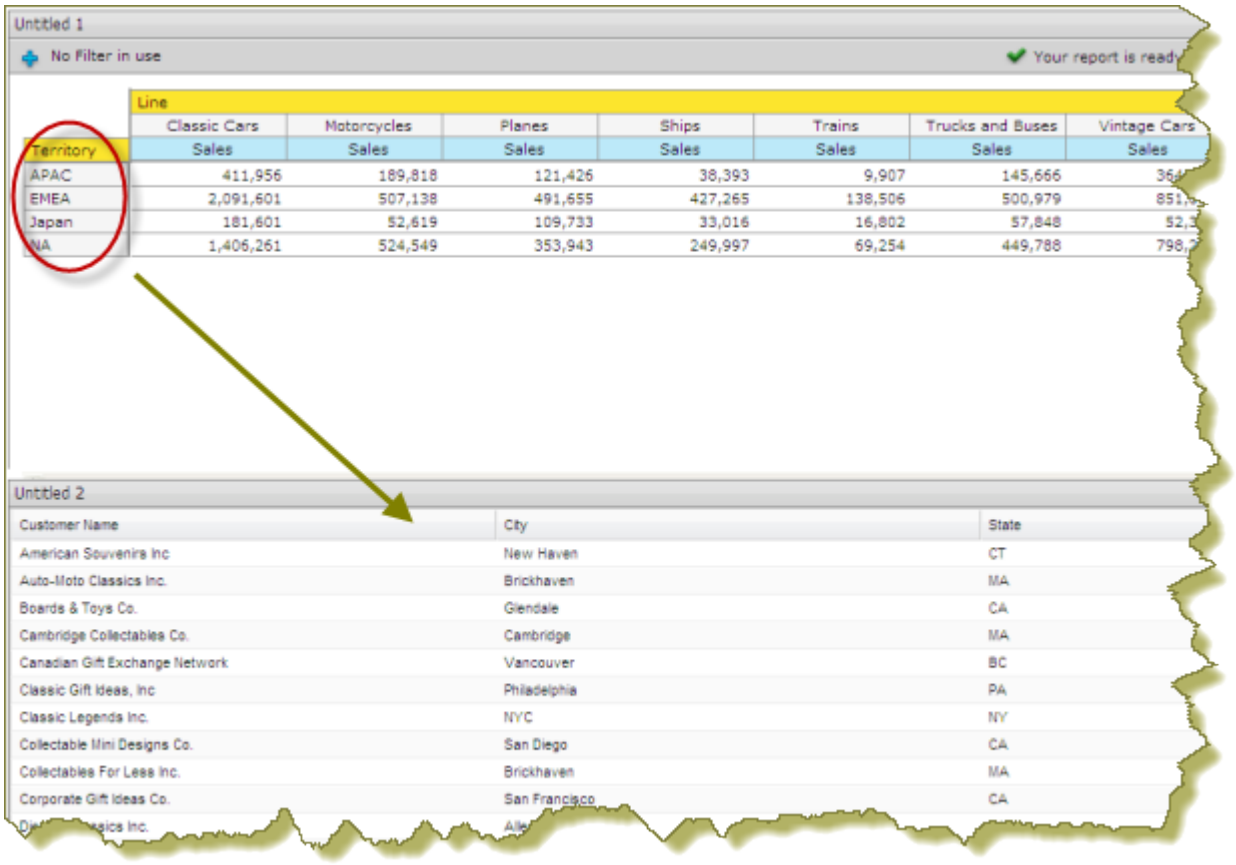
When content linking is achieved, the data table updates when a link in the report (.prpt) is clicked as shown in the example below.



Creating Content to Content Links in an Analyzer Report

Below are general instructions for creating content links in an Analyzer report, (inside a dashboard), that can be used to drive the parameter values of content in other dashboard panels. You must adjust the instructions when working with your own data.

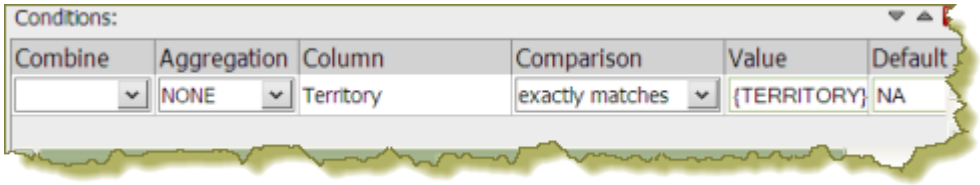
1. Create a simple dashboard that contains an Analyzer Report and a data table. At this point, none of the content has been linked and you have a "static" dashboard.



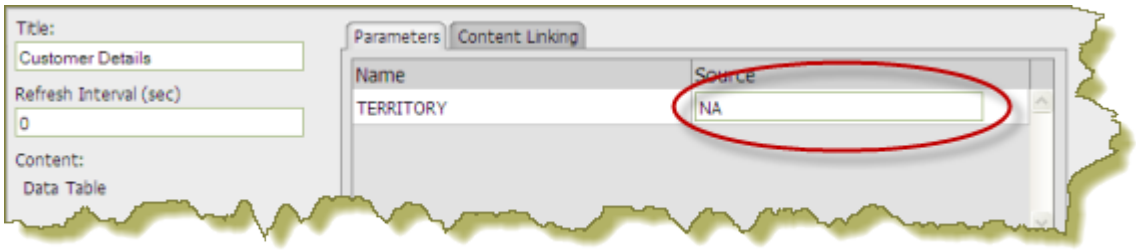
In the example above, when content linking is achieved, the list of territories (APAC, EMEA, Japan, and NA) will become hyperlinks that, when clicked, will update customer details data table. To get the correct filter display, a parameterized query that drives the content in the data table must be created.

2. Add a parameterized condition to the query for the data table by specifying a parameter name in curly braces in the **Value**text box; then, provide a default value for that parameter in the **Default** text box. In the example below, a parameter called **TERRITORY** with a default value of **NA** has been created.

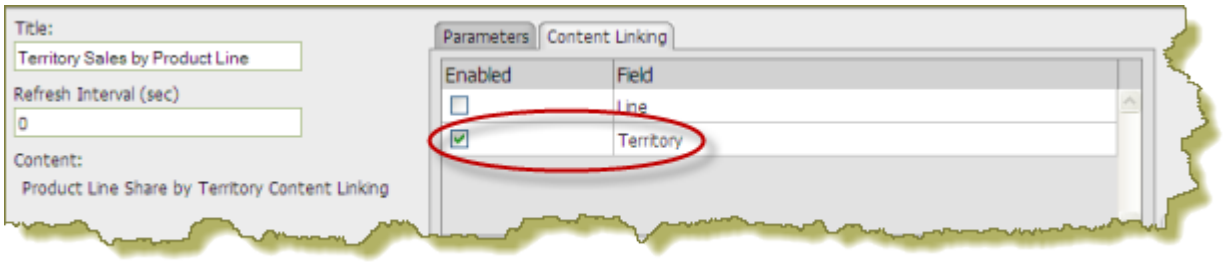
Note: Parameterizing a query, as described here, allows you to pass values dynamically and update the chart based on events triggered by other elements of the dashboard such as a user selecting an item from a filter control or following links defined in content associated with another panel in the dashboard.



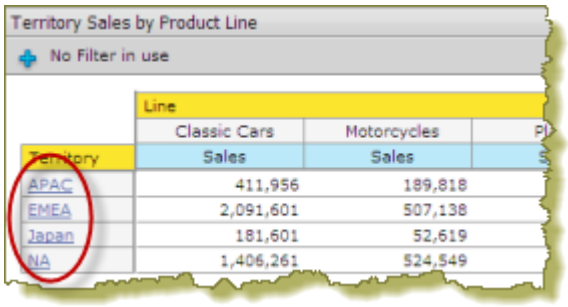
Under **General Settings**, click the data table and examine its available parameters. In the example below, there is an available parameter called **TERRITORY** with a default source value of NA (North America). A drop-down arrow in the **Source** text box indicates that there are additional values to control the available parameter. In this example, there are no additional source values that control the TERRITORY parameter.



3. Under **General Settings**, select the Analyzer report. Click the **Content Linking** tab then click the check box next to the field/column name you want enabled for content linking. Click **Apply**.

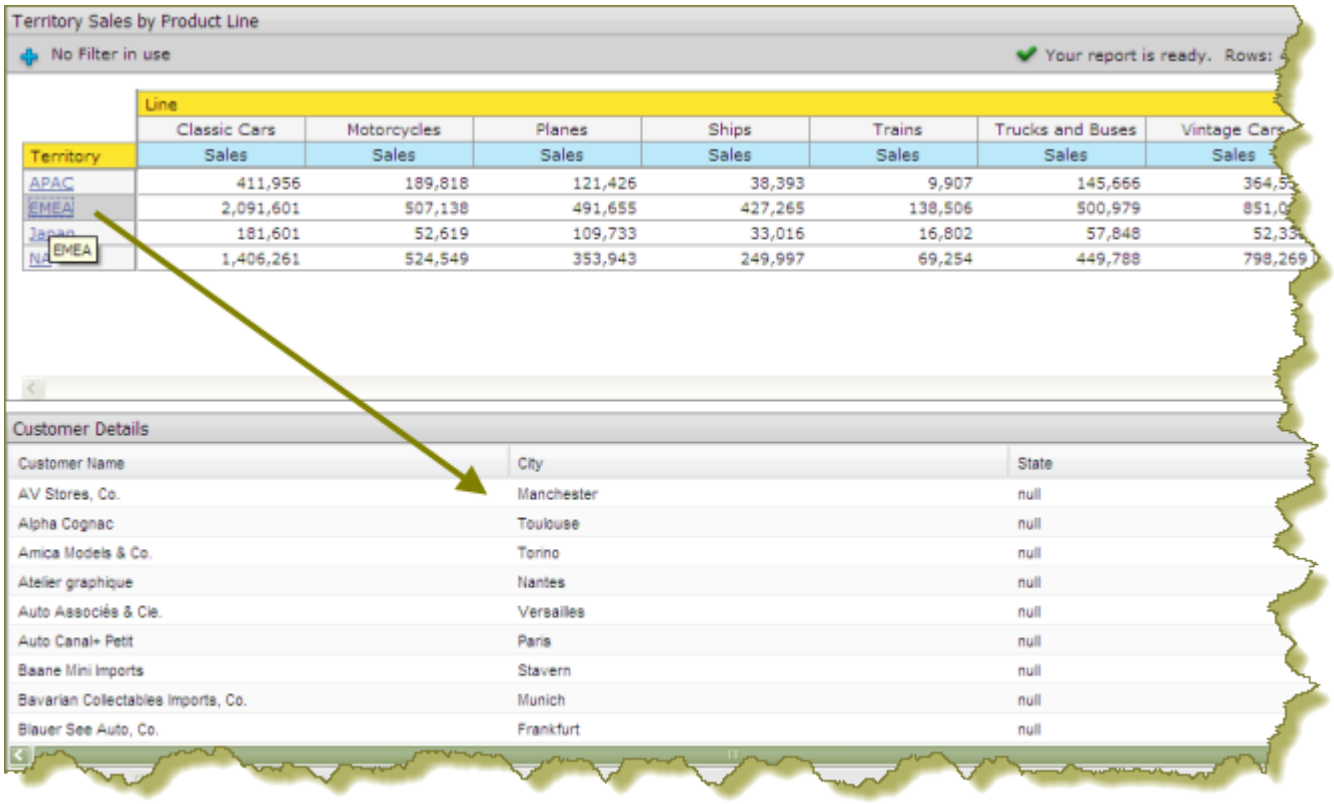


In the Analyzer report, the values under the **Territory** become hyperlinks.



4. Under **General Settings**, select the data table and examine its available parameters. Notice that there is a drop-down arrow in the **Source** text box. Click the down arrow to display and select a new source value for the available parameter. Click **Apply**.
5. Save your dashboard. See *Saving Your Dashboard*.

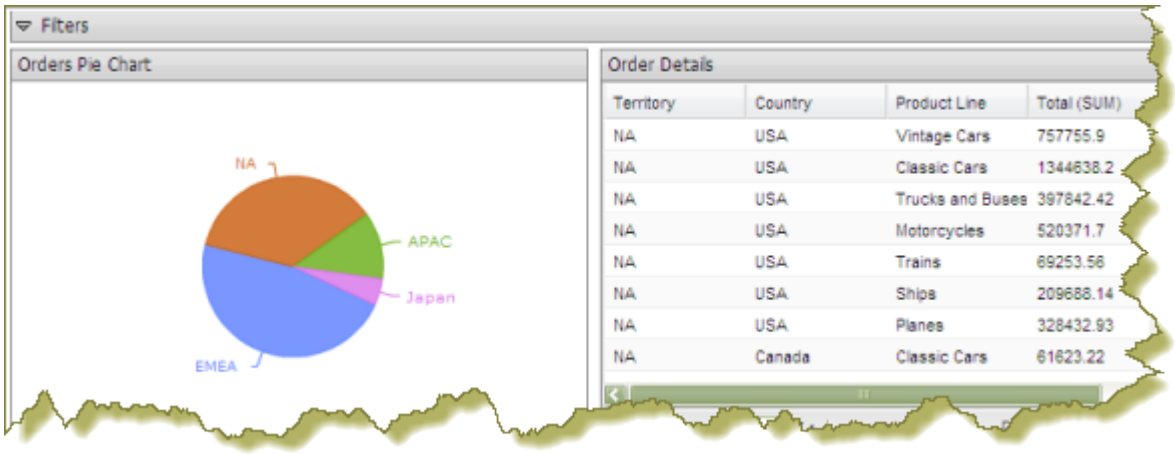
In the example below, content linking was applied. When users click on a territory hyperlink in the Analyzer report, the data table updates and displays customer-related details associated with that specific territory exclusively.



Linking Charts and Data Tables

Below are general instructions for linking charts and data tables in a dashboard. This is just an example. You must adjust the instructions when working with your own data.

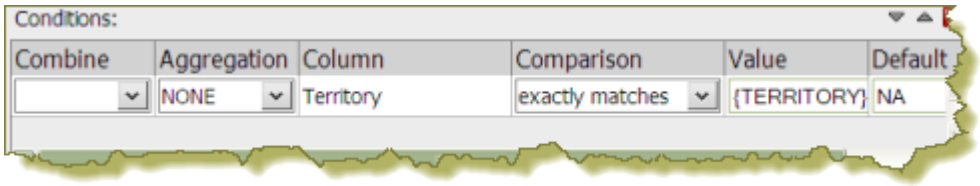
1. Create a simple dashboard that contains a chart and a data table. At this point, none of the content has been linked and you have a "static" dashboard.



Notice the pie chart in the example above. You want dashboard consumers to click a slice (NA, APAC, Japan, EMEA) and have the data table on the right update with the values associated with that slice exclusively. For example, if a report consumer clicks the EMEA slice, the data table will display values associated with EMEA and nothing else. To get the correct filter display, you must first create a parameterized query that drives the content in the data table.

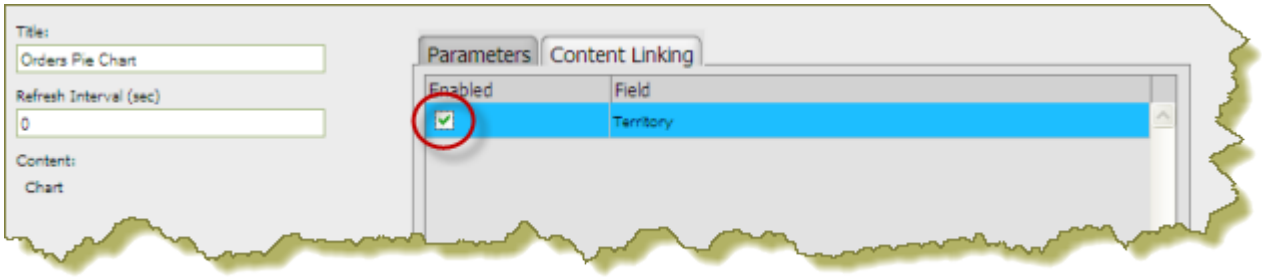
2. Add a parameterized condition to the query for the data table by specifying a parameter name in curly braces in the **Value** text box; then, provide a default value for that parameter in the **Default** text box. In the example below, a parameter called **TERRITORY** with a default value of **NA** has been created.

> **Note:** Parameterizing a query, as described here, allows you to pass values dynamically and update the chart based on events triggered by other elements of the dashboard such as a user selecting an item from a filter control or following links defined in content associated with another panel in the dashboard.



In the Pentaho User Console, click the data table and examine its available parameters. In the example below, there is an available parameter called **TERRITORY** with a default source value of NA (North America). There are no more other sources that control the TERRITORY parameter.

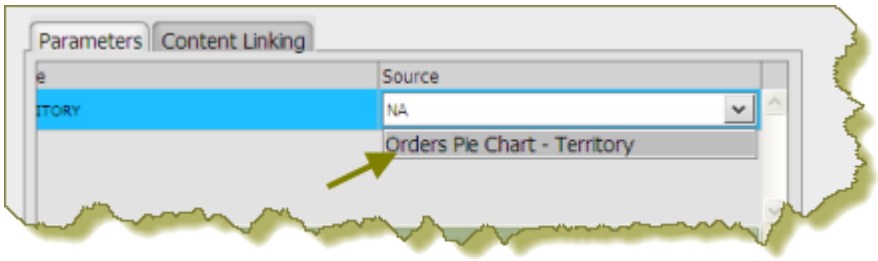
3. To enable content linking, select the chart. Click the **Content Linking** tab then click the check box next to the field name you want enabled for content linking. Click **Apply**.



This step enables content linking on the chart series; in this example, the chart series is **Territory**. When you enable content linking on a chart series, you make the series value available as a source of parameters for content in other dashboard panels.

> **Note:** For bar, line, and area charts, content linking can be enabled on the **Series** column. It can also be enabled on the **Category** column if the Category column is defined.

4. Click the data table to display the available parameter, then click the down arrow, (in the **Source** text box), to display a new source for the parameter. Select the new source. In the example below, the new source is **Orders Pie Chart - Territory**. Click **Apply**.



The new source for the parameter corresponds to the title of the dashboard panel that contains the chart as shown in the example above. This new source will now drive the display in the data table.

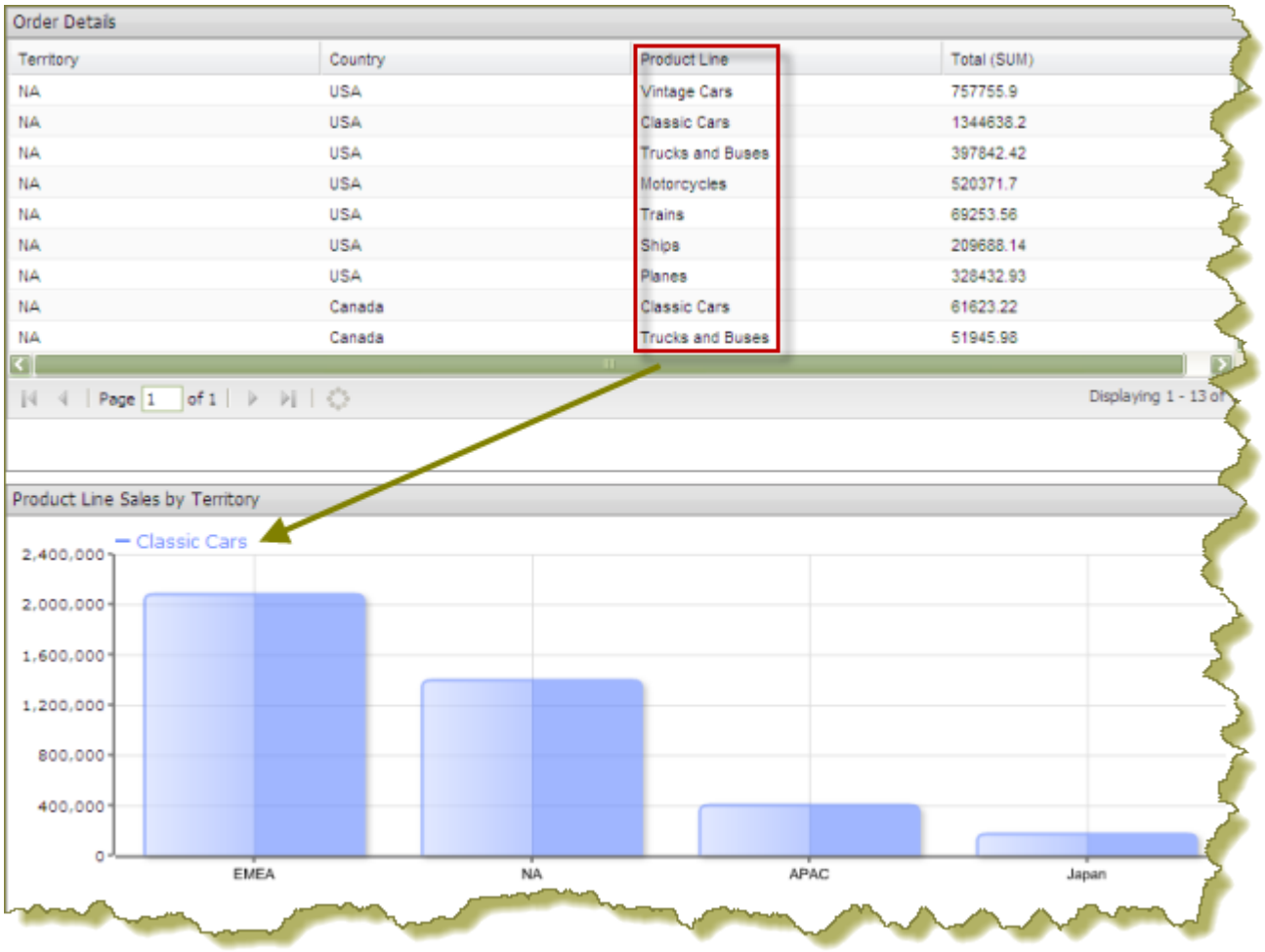
5. Save your dashboard. See *Saving Your Dashboard*.

When users click a pie slice or bar in a chart, the data table displays content associated with that specific pie slice or bar.

Linking Columns in a Data Table to Content in other Dashboard Panels

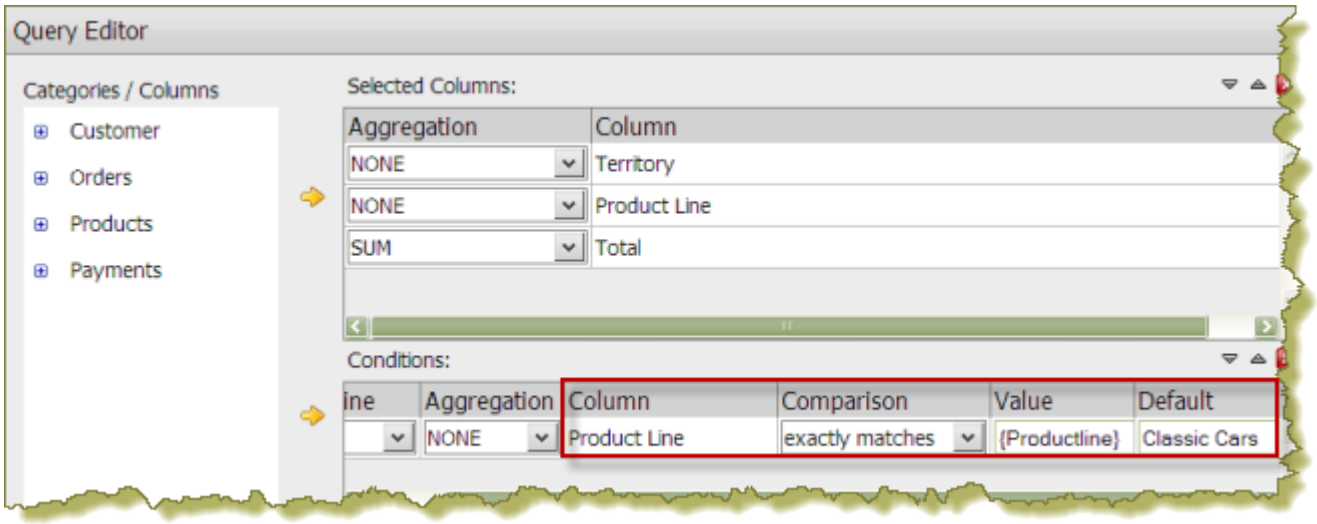
The instructions that follow show you how to link a chart to a column in a data table. You must adjust the instructions when working with your own data.

1. Create a simple dashboard that contains a data table and a bar chart. At this point, none of the content has been linked and you have a "static" dashboard.

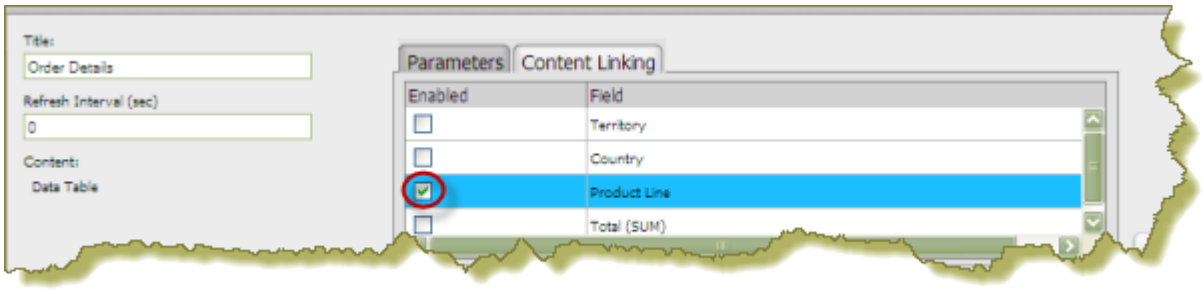


Notice the data table in the example above. You want dashboard consumers to click on a product in the **Product Line** column and have the bar chart update with information about sales by territory for that specific product line.

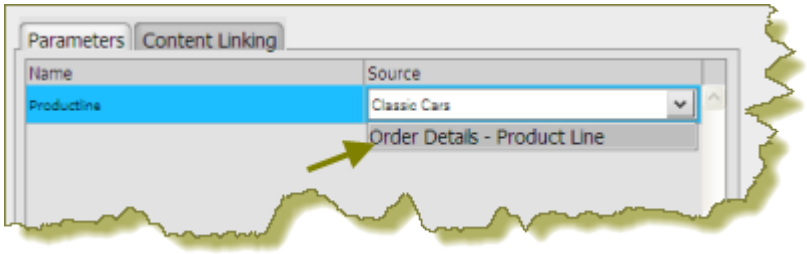
2. Add a parameterized condition to the query for the bar chart by specifying a parameter name in curly braces in the **Value** text box; then, provide a default value for that parameter in the **Default** text box. In the example below, a parameter called **Productline** with a default value of **Classic Cars** has been created.



3. In the Chart Designer, set the data definitions for the series, category and values columns associated with your bar chart and click **OK**.
4. Under **General Settings**, select the data table and click the **Content Linking** tab. Enable content linking on the column in your data table that will filter content in your chart. Each of the columns in a data table are able to broadcast values to other dashboard components.

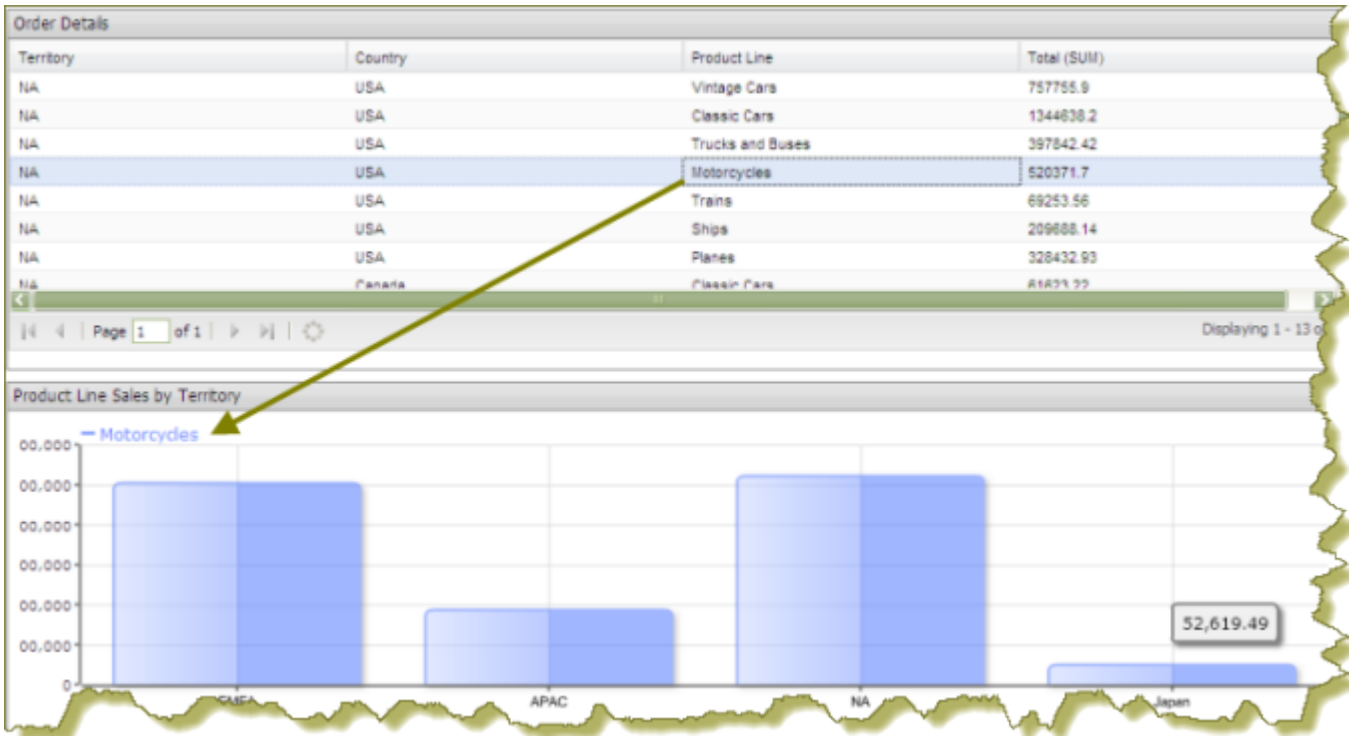


5. Under **General Settings**, select the chart and click the **Parameters** tab. Click the down arrow, in the **Source** text box to display another source for the parameter you created. In the example below, notice that **Order Details - Product Line** , (this is the name of the dashboard panel that contains the data table), can now be selected as a source for the **Productline** parameter.



6. Save your dashboard. See *Saving Your Dashboard* for instructions.
7. In the data table, select an item in the column that has content linking enabled.
   The content in the chart updates in response to the item that was clicked in the data table.

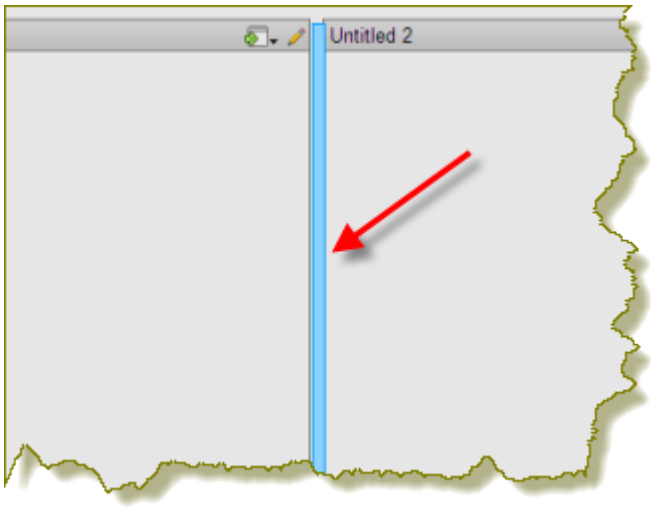
In the example below, the **Product Line** column was enabled for content linking.



Adjusting Whitespace in Dashboard Panels

Sometimes you must adjust the whitespace in dashboard panels, (or the filter panel), so that content appears correctly. Follow the instructions below to adjust whitespace.

1. Open an existing dashboard.
2. In the lower pane, click **General Settings** and then click the **Properties** tab.
3. Click **Resize Panels**.
   The whitespace between the dashboard panels turns blue.
4. Adjust the panel size by clicking and holding the left mouse button down as you move the blue lines (whitespace) around. Release the mouse button when you are satisfied with the positioning of the panel.

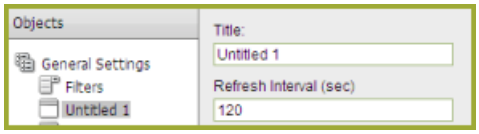


5. Click **Close** in the lower right corner of the dashboard to exit resize layout mode.
6. Examine the dashboard contents to make sure they are placed correctly. You can return to the resize layout mode if you need to make additional changes.
7. Save your dashboard.

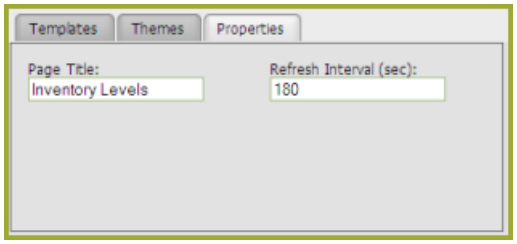
Setting the Refresh Interval

The content in your dashboard may need to be refreshed periodically if users are examining real-time data. You can set refresh intervals for individual panels on your dashboard or for the entire dashboard.

To set the refresh interval for *individual panels* in the dashboard, select the panel that contains the content you want refreshed. Under **Refresh Interval (sec)** enter the interval time in seconds and click **Apply**.



If you want the *entire dashboard* to refresh, click the **Properties** tab in the dashboard and set your refresh interval.



Creating a Dashboard Designer Template

Follow the directions below to create a new Pentaho Dashboard Designer template.

Note: You will have to migrate this template by hand if/when you upgrade Dashboard Designer, since the template files will be stored in the Dashboard Designer plugin directory. The upgrade procedure that Pentaho provides does not typically cover customizations like this one, except to mention that they must be migrated by hand.

1. Stop the BI Server.
2. Navigate to the `/pentaho/server/biserver-ee/pentaho-solutions/system/dashboards/templates/xul/` directory.
3. If you want to remove all templates that you know will never be used, you can safely delete their corresponding XUL files now. When you are done, also remove the corresponding files from the **html** sibling directory.
4. Copy the existing XUL file that most closely resembles the template layout you want to create, giving the new XUL file a name that starts with a two-digit number that represents the template's order in the hierarchy, followed by a short description of its dimensions.

   All Dashboard Designer templates follow this naming convention.
5. Create a **.properties** file that corresponds to the one you just copied in the previous step, and put one item in it: **name=Description here**, where "Description here" represents the display name of this template.
6. Create a thumbnail graphic that fits the same dimensions as the other PNG thumbnails in this directory, and give it the same name as the previous two files, with a PNG extension.

   You should now have three new files, all with the same name, with three different extensions: .xul, .properties, and .png.
7. Edit the new **.xul** file and change the **box** attributes to match your template specifications.

   A **vbox** node creates a column; an **hbox** node creates a row; a **box** element defines an individual panel in each row.

   height and **width** define static widths in pixels; the **flex** size attribute defines a percentage of the total width of the dashboard. If you'd like more extensive definitions of XUL elements, refer to the official XUL documentation: *http://developer.mozilla.org/en/XUL_Reference*.

   Note: Ensure that each box, vbox, and hbox node has its own unique **id**.
8. Save and close all open files, then start the BI Server.
9. Test your new template and adjust its configuration accordingly.

You now have a custom Dashboard Designer template deployed to your BI Server.

You must copy the template files by hand if you upgrade the BI Server or Dashboard Designer in the future. You may want to back up your custom templates to a safe location right now just in case you forget to copy them over during a future upgrade.

Community Dashboard Framework (CDF)

CDF dashboards are extremely flexible and work well with Pentaho content, but it takes a good understanding of HTML, CSS, and JavaScript to develop them. This section explains how to view some Pentaho-supplied CDF examples, how to create a simple dashboard, and how to create a dashboard template.

This document represents the only official, maintained, and up-to-date documentation that Pentaho provides on the Community Dashboard Framework. If you need further assistance, contact your Pentaho support representative and ask about a consulting engagement. Additionally, CDF architect Pedro Alves offers more in-depth documentation and examples for a fee: *http://store.kagi.com/cgi-bin/store.cgi?storeID=6FHAR_LIVE*.

Creating a Community Dashboard Framework (CDF) Template

Note: This section is incomplete because the original source material is out of date. Will try to update it for 4.0-GA.

Templates enable you to separate presentation details from dynamic content. A template can be applied to any number of solutions to standardize their look and feel. Follow the directions below to create a new Community Dashboard Framework (CDF) template.

Note: You will have to migrate this template by hand if/when you upgrade CDF, since the template files will be stored in the CDF plugin directory. The upgrade procedure that Pentaho provides does not typically cover customizations like this one, except to mention that they must be migrated by hand.

1. Navigate to the `/pentaho/server/biserver-ee/pentaho-solutions/system/pentaho-cdf/` directory.
2.
```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
    <head>
      <link rel="stylesheet" type="text/css" href="template.css"/>
 </head>
 <body>
      <div id="outerouter">
               <div id="outer">
                    <div id="header“></div>
                <div id = "content">
                     <div id = "primaryContentContainer">
                         <div id="primaryContent">
               <br>
               {content}
                         </div>
                     </div>
                     <div class="clear"></div>
                </div>
                <div id="footer"></div>
          </div>
      </div>
 </body>
</html>
```

You now have a custom Community Dashboard Framework template.

Exploring the CDF Sample Content

Pentaho ships sample CDF dashboards with the archive package and graphical installer for the BI Server. By default, the samples are not exposed in the solution repository. To make them visible, edit the `/pentaho-solutions/bi-developers/index.xml` file and set the value of the **<visible>** element to **true**, then refresh your solution repository.

Once you've exposed the samples, you can find the CDF content in the **cdf-samples** directory within bi-developers. Each example is minimally self-documented; you should examine each sample to read the comments in the code and in the rendered dashboard to find our more about how CDF works.

Custom JSP Dashboards

Creating your own JSP to display Pentaho content is the nuclear option in terms of dashboards; it is more of a custom Web application than a simple repackaging of existing content. The only good reason to choose this path is to integrate Pentaho data or content with outside services. An example that is included with the Pentaho sample data is the **Google Maps** dashboard. This takes data generated from a Pentaho action sequence and feeds it to the Google Maps API to generate a map with waypoints on it.

If you have your own Web application that you want to integrate with Pentaho content, or if you want to mix Pentaho with some outside API, the most appropriate dashboard approach is to develop your own JSP.

All of the Pentaho APIs that are relevant to JSP dashboard design are documented in the *Integrating With the Pentaho BI Server* guide, which is available upon request from your Pentaho representative.

Enterprise Dashboard Support

If you have a Dashboards Enterprise Edition subscription, Pentaho will provide support related to Dashboard Designer. Pentaho also provides support for CDF in terms of how it interfaces with the BI Server. Beyond that, CDF and custom JSP development are not covered under the Dashboards support agreement.

While support can assist with very specific and isolated issues with CDF and JSPs, the development of a solution based on custom JSP code and CDF falls under consulting. If you require assistance with your development efforts you should contact your Pentaho support representative to find out more about a consulting engagement.