



Customize User Console and Tools



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Introduction

This section contains a variety of instructions for post-install configuration and maintenance tasks of Pentaho software and the Pentaho Business Analytics (BA) Server. You can do these tasks in any order that you want, because the operation of the BA Server is not dependant on doing these tasks in order.

Prerequisites

Before you do any of these tasks, you must have [installed](#) the Pentaho software and [configured](#) your BA Server.

Expertise

The topics covered in this section are written for IT administrators who know where data is stored, how to connect to it, details about the computing environment, and how to use the command line interface for Windows or Linux.

Tools

We provide a web application, the User Console, which you use to perform many administration tasks.

Login Credentials

All of the tasks that use the User Console, **Administration** page, require that you [log on to the User Console](#) with the Pentaho administrator user name and password.

Pentaho User Console Styling

The User Console is the standard web application for the BA Server, and includes interactive elements of Reporting, Analysis and Dashboards. The [Administration](#) page of the console is the central framework through which your BA Server is configured and managed. You can alter the look and feel of the User Console by editing its configuration files, graphics, and CSS style sheets manually.

The Pentaho web application server must be stopped before editing anything inside of the Pentaho WAR file.

- [Location of Customizable Configuration Files](#)
- [Change Logo on Application Login Page](#)
- [Add a Logo to the Web Application](#)
- [Change the Background Image](#)
- [Make Custom User Console Themes](#)
- [Test Your CSS Changes](#)

Location of Customizable Configuration Files

MantleStyle.css

This is the structural cascading style sheet for the Pentaho User Console. It inherits some elements from the **Widgets.css** file in the same directory, so you may need to look at that as well. Modifying these styles could have dramatic impact on Pentaho User Console rendering.

/pentaho/server/biserver-ee/tomcat/webapps/pentaho/mantle/MantleStyle.css

Theme-specific local and global style sheets for PUC

These directories contain style sheets and other theme materials for each BA Server client tool.

File Name	Location	Description
globalCrystal.css	/pentaho-solutions/system/common-ui/resources/themes/crystal/	This is the main structural, theme-specific style sheet for the default theme for the User Console (Crystal).
mantleCrystal.css	tomcat/webapps/pentaho/mantle/themes/crystal/	This is the customizable presentation portion of the theme style sheet for the default theme for the Pentaho User Console (Crystal).
globalOnyx.css	/pentaho-solutions/system/common-ui/resources/themes/onyx/	This is the main structural, theme-specific style sheet for an alternate theme for the Pentaho User Console (Onyx).
mantleOnyx.css	tomcat/webapps/pentaho/mantle/themes/onyx/	This is the customizable presentation portion of the theme style sheet for an alternate theme for the Pentaho User Console (Onyx).

Product-specific theme settings for Analyzer, Dashboard Designer, and Interactive Reporting

These directories contain style sheets and other theme materials for each .

Product Name	Location	Description
Analyzer	/pentaho-solutions/system/analyzer/styles/themes/	Style sheets and theming materials for Analyzer.
Interactive Reporting	/pentaho-solutions/system/pentaho-interactive-	Style sheets and theming materials for Interactive Reporting.

Product Name	Location	Description
	reporting/resources/web/themes/	
Dashboard Designer	/pentaho-solutions/system/dashboards/themes/	Style sheets and theming materials for Dashboard Designer.
Mobile	/pentaho-solutions/system/pentaho-mobile-plugin/resources/css	Style sheets and theming materials for the Mobile application.

Change Logo on Application Login Page

You can change the **User Console** login page to display a different logo than the default one, such as your corporate logo or other image.

1. Backup and remove the file **puc-login-logo.png** from the `/pentaho/server/biserver-ee/pentaho-solutions/system/common-ui/resources/themes/images` directory.
2. Rename your own logo image to **puc-login-logo.png**.
3. Copy the image into the `/pentaho/server/biserver-ee/pentaho-solutions/system/common-ui/resources/themes/images` directory.

Your users must clear the cache on their web browsers and reboot to be able to see the new logo.

The default Pentaho logo is removed and your custom logo appears in its place.

Add a Logo to the Web Application

You can customize the Pentaho web application to display a logo. The best way to do this is to edit the **Mantle.jsp** file in the `/pentaho/server/biserver-ee/tomcat/webapps/pentaho/mantle/` folder.

In this example, the logo is added to the header on the right, but you can add it to the left or as a banner on the top or bottom of the page.

```
<div id="pucWrapper" cellspacing="0" cellpadding="0" style="width: 100%; height: 100%;">
  <div id="pucHeader" cellspacing="0" cellpadding="0">
    ...
    <div id="logo" style="float: right; padding-right: 10px"><IMG
src="mantle/logo.png"></IMG></div>
    ...
```

The `logo.png` is used as the graphic within the **pucHeader** div.

Change the Background Image

You can change the background image that appears in the content pane in the Pentaho User Console by modifying or replacing the `bg_pentaho_default.png` file in the `pentaho/system/common-ui/resources/themes/<theme-name>/images` folder. The folder and file name must be identical.

Make Custom User Console Themes

The User Console's graphical interface is built on a CSS-based theme system. The sections below contain information for theme designers and developers.

- [Theme System Overview](#)
- [Create a New Theme](#)
- [Set the Default Theme](#)
- [Switch Console Themes](#)

Theme System Overview

The CSS-based theme system allows you to change the look of the BA Server and its client tools by creating and adding your own themes. This is accomplished by working with just a few key configuration files.

The style sheets that make up the look and feel of the User Console, Dashboard Designer, Analyzer and Interactive Reporting are mostly in one location. These styles and scripts combine to make the default system theme, **Crystal**. This theme is located in the Common UI plug-in directory: `/pentaho/server/biserver-ee/pentaho-solutions/system/common-ui/resources/themes`.

There are two different kinds of themes: **system** and **local**. System themes provide common styles and scripts that apply across the entire BA Server. For instance, buttons are defined in the default system theme, Crystal. A change to the Crystal system theme will change the way buttons look in all applications. Local themes are defined for a particular area or "context" of the BA Server. Contexts include BA Server plug-ins as well as the names of the top-level directories in the Pentaho WAR. Resources for local themes take effect only in their particular area of the BA Server.

Any page shown by the BA Server that includes the **webcontext.js** script will automatically have all of the active theme's JavaScript and CSS files included. For instance, below is a sample theme containing one CSS and JavaScript file:

```
<themes root-folder="style">
  <crystal display-name="Crystal" system="true">
    <file>crystalStyles.css</file>
    <file>crystalScripts.js</file>
  </crystal>
</themes>
```

When the Crystal theme is active, the following are added to the HTML page:

```
<script type="text/javascript" src="/pentaho/common-ui/themes/crystal/
crystalStyles.js"></script>
<link rel="stylesheet" type="text/css" href="/pentaho/common-ui/themes/crystal/
crystalStyles.css"/>
```

This automatic insertion of theme resources makes it possible to change themes without having to edit the main content HTML documents to include the theme resource's tag individually. The theme system will include any number of JavaScript and CSS files defined for your theme.

You can add local styles in a similar fashion. The only requirement is that you tell the system what context you need to load. This is done by adding **?context=myPlugin** to the **webcontext.js** script where **myPlugin** is the name of your plug-in or root WAR folder:

```
<script type="text/javascript" src="webContext.js?context=myPlugin"></script>
```

Create a New Theme

The best way to create a new theme is to copy an existing theme folder, and use that to create your new theme.

On startup, the BA Server searches for **themes.xml** files in every plug-in and root-level folder in the Pentaho WAR. Multiple themes can be defined in one themes.xml file, and they can be system, local, or a combination of both. The following example defines a system and local theme named Crystal.

```
<themes root-folder="resources/themes">
  <crystal display-name="Crystal" system="true">
    <file>crystalStyles.css</file>
    <file>crystalScripts.js</file>
  </crystal>
  <crystal display-name="Crystal" system="true">
    <file>localCrystalStyles.css</file>
  </crystal>
</themes>
```

Notice that the **<themes>** node has a **root-folder** attribute. The value of this attribute is the name of the directory (relative to the Web application context) where your themes are stored. For WAR-based contexts, this is simply a

directory name inside the WAR. For instance, if your theme is located in the `/pentaho.war/accounting/` folder, the resources would be loaded from `/pentaho.war/accounting/resources/themes/`.

Plug-in resource loading is different than WAR-based loading in that the plug-in controls how resources are mapped to the URL. If the theme file from above was located in a plug-in called **accounting**, then the resources would be accessed from the following URL: `/pentaho/context/accounting/resources/themes/`. This kind of resource mapping is most commonly implemented in BA Server plug-ins through **static-path** entries:

```
<static-paths>
  <static-path url="/accounting/resources" localFolder="resources"/>
</static-paths>
```

Set the Default Theme

The default system theme is defined in the `/pentaho-solutions/system/pentaho.xml` configuration file through the `default-theme` node. The BA Server ships with Crystal as the default theme; changing the value to another theme name will set the default active theme for all User Console users.

Switch Console Themes

If you have created an alternate theme and/or localized message bundle, you can switch to it through the **View** menu in the Pentaho User Console.



Note: You can prevent themes from appearing in this menu by adding a **hidden="true"** property to the theme node.

You can manually specify a theme for a particular page by including a **theme=** URL parameter. This will affect only the requested page. The following will load the **debug** system and local themes if available:

```
http://localhost:8080/pentaho/content/myPlugin/index.html?theme=debug
```

If either the system or local debug theme is not found, the resources for the current active theme loads instead. This is particularly useful when testing out new themes and for loading debug versions of scripts and styles.

It is also possible to set the session variable **pentaho-user-theme** to the desired theme name. This is usually done in a start-up action to have per-user themes in multi-tenancy scenarios.

Test Your CSS Changes

The style sheet files explained earlier in this section contain many style definitions, which makes it difficult to map the CSS classes to what you see in the application at runtime. To make this task easier, we recommend that you use the [DevTools](#) for Chrome, [Web Inspector](#) for Safari, or [Firebug](#) for Firefox to inspect the UI elements you want to style.

Once you've selected an element, you can view all of the CSS properties that apply to it, then change the CSS and watch your changes take immediate effect. This allows you to quickly and easily find the appropriate CSS to edit and gives you the ability to preview your changes in real time.

Create Design Tool Templates

The following Pentaho products have customizable templates:

- Report Designer (Report Design Wizard)
- Interactive Reporting
- Dashboard Designer
- Community Dashboard Framework (CDF)

This section explains how to modify the default templates and, where applicable, how to create your own.

Create 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 BA 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 BA Server.
9. Test your new template and adjust its configuration accordingly.

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

You must copy the template files by hand if you upgrade the BA 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.

Create Reporting Templates

Both the Report Design Wizard and Interactive Reporting use templates for rapid report creation. The template creation process is similar for both RDW and PIR -- in both cases, you use Pentaho Report Designer to create a report with

certain template options selected, then deploy it to the client tools that will use it. The instructions below explain how to create templates, how reports are generated from templates, and how to display templates within RDW and PIR.

Report Design Wizard Template Design Guidelines

Methodology

To create a new RDW template, you must use Report Designer to create a report with certain template-specific properties enabled. The resultant PRPT file is then deployed to the Report Designer and/or Pentaho Data Integration template directory.

Requirements

The **generated-content-marker** attribute in the **wizard** group is the flag that turns a normal report into a template. This attribute can only be applied to a band (group header, group footer, details header, details footer, details, or sub-band).

RDW will insert its auto-generated content into the first band with the **generated-content-marker** set to true. This applies to the group header, group footer, details header, details footer, and the details bands. In the event there are more groups defined in the Report Design Wizard than defined in the template, it repeats the last defined group header and footer in the template.

Formatting Inheritance

Formatting styles are inherited, so any formatting applied to a band will also be applied to the elements used within it. Formatting is applied in three ways and in the following order:

1. Through the template via band inheritance
2. Through query data where it is defined in Pentaho Metadata
3. As defined by RDW users through the RDW interface

Inheriting Styles from the Data Query

The **query-metadata** section of the Attributes tab contains options that determine whether formatting styles can come from the data query and be applied to the detail header, details, or detail footer band. This must be set directly on the detail header, detail footer, or details band; and the **style-format** option must be set to **true** for it to work. You must also disable any individual formatting styles (enable-style-*=true) that you don't want to come from the query.

Padding and Grid Lines

Since the Details band is dynamically generated, you have to specify grid line and padding settings in the template definition. This is done through the **wizard** attribute group for the band that has the **generated-content-marker** enabled.

Updating

An RDW template is only a set of initial defaults for a report, so if a template is updated, completed reports that were based on that template will not be affected; there is no connection between the template and the report once the report is saved. If you want to update an RDW-based report to reflect template changes, you can edit the report with Report Design Wizard, make any necessary selections, and re-save it.



Note: Interactive Reporting templates have the opposite behavior because the report links itself to the template; when an IR template is changed, all reports based on that template will automatically inherit the updated template.

Interactive Reporting Template Design Guidelines

Methodology

To create a new Interactive Reporting template, you must use Report Designer to create a report with certain template-specific properties enabled. The resultant PRPT file is then deployed to the IR plugin's template directory.

Requirements

The **generated-content-marker** attribute in the **wizard** group is the flag that turns a normal report into a template. This attribute can only be applied to a band (group header, group footer, details header, details footer, details, or sub-band).

RDW will insert its auto-generated content into the first band with the **generated-content-marker** set to true. This applies to the group header, group footer, details header, details footer, and the details bands. In the event there are more groups defined in the Report Design Wizard than defined in the template, it repeats the last defined group header and footer in the template.

Formatting Inheritance

Formatting styles are inherited, so any formatting applied to a band will also be applied to the elements used within it. Formatting is applied in three ways and in the following order:

1. Through the template via band inheritance
2. Through query data where it is defined in Pentaho Metadata
3. As defined by IR users through the Interactive Reporting interface

Inheriting Styles from the Data Query

The **query-metadata** section of the Attributes tab contains options that determine whether formatting styles can come from the data query and be applied to the detail header, details, or detail footer band. This must be set directly on the detail header, detail footer, or details band; and the **style-format** option must be set to **true** for it to work. You must also disable any individual formatting styles (enable-style-*=true) that you don't want to come from the query.

Padding and Grid Lines

Since the Details band is dynamically generated, you have to specify grid line and padding settings in the template definition. This is done through the **wizard** attribute group for the band that has the **generated-content-marker** enabled.

Updating

A template is not just a set of initial defaults for a report -- it is the basis for that report. So if a template is updated, completed reports that were based on that template will also change.



Note: Report Design Wizard templates have the opposite behavior; when an RDW template is changed, none of the reports based on that template will be automatically be updated with those changes. Instead, you will have to edit each report, apply the new template, and save it.

Dynamic Element Positioning in Templates

Use the following methods to accommodate for multiple page sizes in reports:

Percentages

Express the height, width, x position, and y position in percentages.

Block, inline, or row

Switch the band's layout mode from canvas to either block, inline or row:

layout-mode	value
canvas	Uses the x and y position to place the element in the band.
block	Stacks elements vertically according to the layer order in a band; width is set to 100%.
inline	Stacks elements horizontally according to the layer order in a band; width is determined by the length of the text in the field, and wraps within the band.

layout-mode	value
row	Stacks elements horizontally in one row according to the layer order in the band.

Dynamic height message elements

Set **dynamic-height=true** on message elements. This will allow the element size to grow according to line height. Also, setting the following Reporting engine configuration option will allow the element size to grow according to the font size used:

```
org.pentaho.reporting.engine.classic.core.layout.fontrenderer.UseMaxCharBounds = true
```

Proportional column widths

To support varying window sizes in a Web browser, enable the use of proportional column widths so that the resulting table will have a width of 100% and the columns will have the proportional equivalent of their static widths as width. The relevant Reporting engine option to set this globally is:

```
org.pentaho.reporting.engine.classic.core.modules.  
output.table.html.ProportionalColumnWidths = true
```

Template Properties

The following band properties affect RDW and PIR report templates. Notice that many properties have a different effect in RDW than in PIR.

Band	Report Design Wizard	Interactive Reporting
page header	None	Edit message elements
report header	None	Edit message elements
group headers	Inserts a message element with the value of: fieldname: \$(fieldname)	Edits any message elements within the band. Inserts a message element with the value of: fieldname: \$(fieldname)
detail header	1: Inserts a column header label for every field used. Default value for the label is the fieldname. 2: Edits any label within the band.	1: Inserts a column header label for every field used. Default value for the label is the fieldname. 2: Edits any label within the band.
details	Inserts the appropriate fields defined	Inserts the appropriate fields defined
detail footer	Insert a numeric field in the same x-position and width of the details field that the summary calculation is applied.	None
group footer	None	1: Inserts a numeric field in the same x-position and width of the details field that the summary calculation is applied. 2: Inserts a message element in the x-position of the details field with no summary calculations applied.
report footer	None	1: Inserts a numeric field in the same x-position and width of the details field that the summary calculation is applied. 2: Inserts a message element in the x-position of the details field with no summary calculations applied.

Band	Report Design Wizard	Interactive Reporting
		3: Edit any message elements within the band
page header	None	Allows the modification of message elements

Deploy a Template to Report Design Wizard

Once you've created a template for RDW, you must follow the below process to deploy it to Report Design Wizard in Report Designer and Pentaho Data Integration.

1. Shut down Report Designer and Pentaho Data Integration if either of them are currently running.
2. Create an icon for your template, in PNG format, with the same name as the template file.
The size of the icon doesn't matter; RDW will scale it to fit the correct dimensions. However, you can avoid unusual scaling issues by creating a square-shaped (equal width and height) graphic. If you'd like further guidance, take a look at the default template icons that Pentaho provides in the templates directory.
3. Copy the icon and the PRPT template files to the following directories:
 - /pentaho/design-tools/report-designer/templates/
 - /pentaho/design-tools/data-integration/plugins/spoon/agile-bi/templates/

Your template is now deployed to Report Design Wizard and will be available when you next start Report Designer or Data Integration.

Deploy a Template to Interactive Reporting

Once you've created a template for PIR, you must follow the below process to deploy it to the Interactive Reporting plugin.

1. Shut down the BA Server if it is currently running.
2. Create an icon for your template, in PNG format, with the same name as the template file.
The size of the icon doesn't matter; PIR will scale it to fit the correct dimensions. However, you can avoid unusual scaling issues by creating a square-shaped (equal width and height) graphic. If you'd like further guidance, take a look at the default template icons that Pentaho provides in the templates directory.
3. Copy the icon and the PRPT template files to the /pentaho-solutions/system/pentaho-interactive-reporting/resources/templates/ directory.
4. Edit the /pentaho-solutions/system/pentaho-interactive-reporting/resources/messages/messages.properties file and add a new line for your template with the **template_** prefix, the name of your template file, and a friendly name for the template as you'd like it to appear in the PIR interface, as in the following example (given a template filename of **template_demo.prpt**):

```
template_template_demo=Template Demo
```

Your template is now deployed to Pentaho Interactive Reporting.

Set the Default Interactive Reporting Template

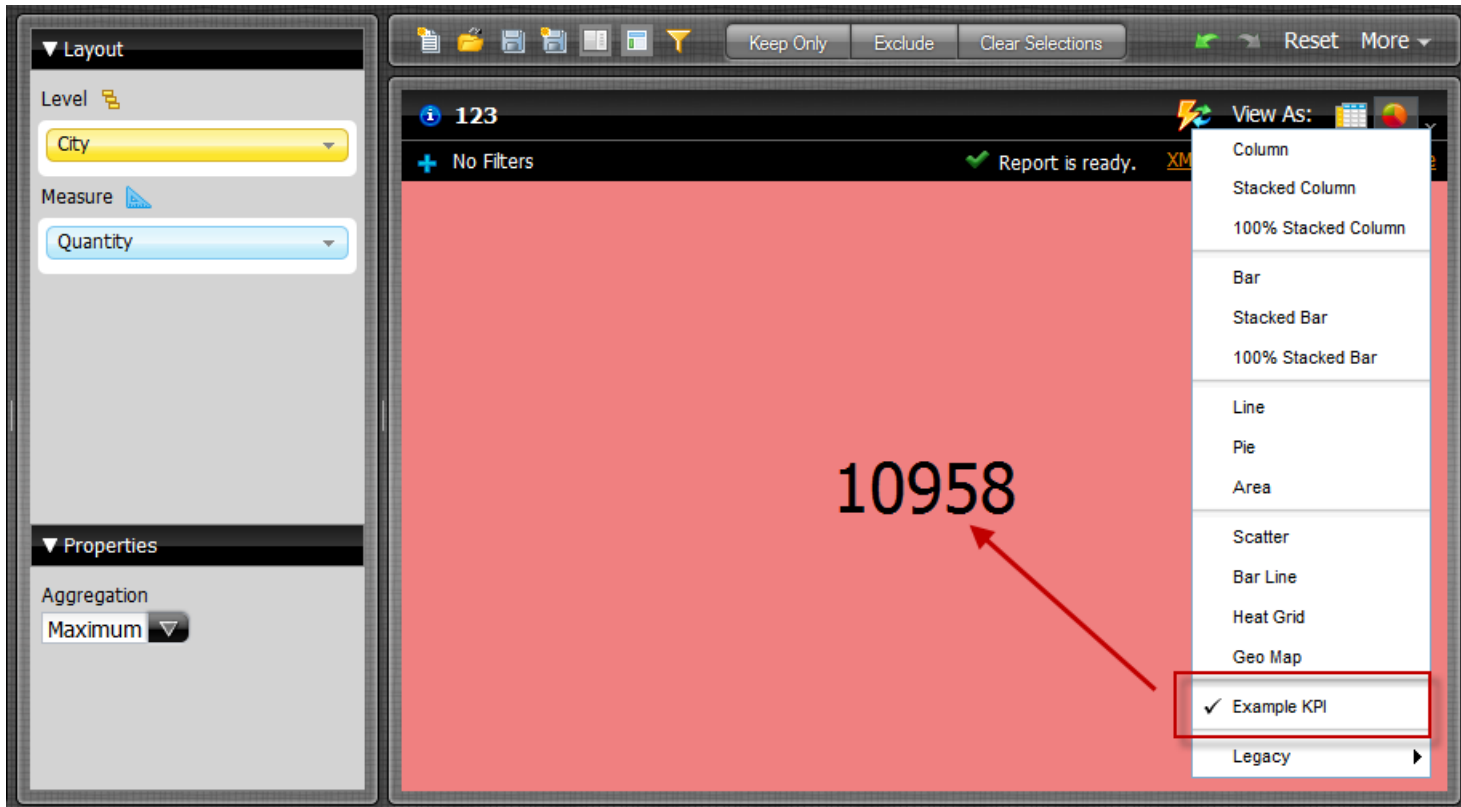
To change the default template for Interactive Reporting, edit the /pentaho-solutions/system/pentaho-interactive-reporting/settings.xml file and change the value of the **<default-template>** node. You do not have to provide a path to the template PRPT file -- just the filename.

```
<!-- default template -->
<default-template>1_jade_1_left_aligned.prpt</default-template>
```

Extend Pentaho Analyzer with Custom Visualizations

You can develop third-party visualizations and integrate them into Pentaho Analyzer. This section will show you how to create an example KPI Visualization. The example will show you how to generate a simple Key Performance Indicator (KPI) which calculates a minimum, maximum, or average on a single measure across a single level.

In this example, you create this visualization:



This visualization generates a simple KPI that calculates a minimum, maximum, or average on a single measure across a single level.

To extend a custom visualization, perform these actions in order:

1. Create a Pentaho BA Server Plug-in
2. Define the custom visualization
3. Register the visualization with Pentaho Visualization API
4. Register the visualization with Pentaho Analyzer
5. Register the created JavaScript files with Pentaho Analyzer
6. Restart the BA Server and test the visualization

Create a Pentaho BA Server Plug-in

Ensure that you are running BA Server with the Pentaho Analyzer plug-in installed.

1. Create a location for the new visualization in the BA Server by creating a new folder in the `pentaho-solutions/system` directory.
2. Within the new folder, create a `plugin.xml` file that will contain metadata about the plug-in.

```
<?xml version="1.0" encoding="UTF-8"?>
<plugin title="example-visualization">
  <static-paths>
    <!-- this translates to /pentaho/content/example-visualization/resources/* -->
```

```

    <static-path url="/example-visualization/resources" localFolder="resources"/>
  </static-paths>
</plugin>

```

This basic plug-in exposes static files in the resources folder to authenticated users.

Custom Visualizations

Visualizations in Pentaho Analyzer are rendered on the client and are JavaScript based.

You must define a constructor and two key functions in the visualization JavaScript class so that Pentaho Analyzer can render it properly. The constructor of the visualization class will be passed in an HTML element, which acts as the parent node of your visualization.

The first function is `resize(width,height)`. The `resize` function is called every time the visualization renders as a different size, and allows the visualization to adjust calculations.

The second function is `draw(datView, vizOptions)`. This function is called when rendering the visualization. The `datView` object contains a multi-dimensional result set returned from the server, and the `vizOptions` object contains any customized options specified by the user when configuring the visualization.

Define the Custom Visualization

This example creates a very basic KPI visualization.

1. Create a file in the `example-visualization/resources` folder called `example.js`.
2. Add the following content to the file:

```

/* define a namespace for this sample to live in */
pentaho.sample = {};
/* define the KPI Class, which renders a single KPI */
pentaho.sample.KPI = function(canvasElement) {
  this.canvasElement = canvasElement;
  this.numSpan = document.createElement("span");
  this.numSpan.style.fontSize = "42px";
  this.numSpan.style.position = "relative";
  this.canvasElement.appendChild(this.numSpan);
};

/* Calculate the location of the KPI relative to the canvas */
pentaho.sample.KPI.prototype.resize = function(width, height){
  this.numSpan.style.left = ((this.canvasElement.offsetWidth -
  this.numSpan.offsetWidth) / 2) + 'px';
  this.numSpan.style.top = ((this.canvasElement.offsetHeight -
  this.numSpan.offsetHeight) / 2) + 'px';
};

/* Render the KPI */
pentaho.sample.KPI.prototype.draw = function(datView, vizOptions) {
  // extract the values from the result set
  var rows = datView.dataTable.jsonTable.rows;
  var dataArray = [];
  for(var i=0; i<rows.length; i++){
    dataArray.push(rows[i].c[1].v);
  }

  // calculate the KPI to display
  var value = 0;

  // note that the vizOptions contains an aggregate option,
  // this is a custom property specific for this visualization type.
  switch(vizOptions.aggregate){
    case "MAX":
      value = Number.MIN_VALUE;
      for(var i=0; i< dataArray.length; i++){

```

For a more advanced example, see the Community Chart Components components here:

These charts include the heat grid, which is enabled by default in Pentaho Analyzer.

After defining the visualization, register the visualization with Pentaho's Visualization API. The Visualization API is only accessible from within Pentaho Analyzer.

- [illegible]


```

    name: 'Default',
    reqs :
    [
      {
        id: 'rows',          // ID of the data element
        dataType: 'string',  // data type - 'string', 'number', 'date',
                             // 'boolean', 'any' or a comma separated
        list
        dataStructure: 'column', // 'column' or 'row' - only 'column'
        supported
        // so far
        caption: 'Level',      // visible name
        required: true,        // true or false
        allowMultiple: false,
        ui: {
          group: 'data'
        }
      },
      {
        id: 'measures',
        dataType: 'number',
        dataStructure: 'column',
        caption: 'Measure',
        required: true,
        allowMultiple: false,
        ui: {
          group: "data"
        }
      },
      {
        id: 'aggregate',
        dataType: 'string',
        values: ['MIN', 'MAX', 'AVG'],
        ui: {
          labels: ['Minimum', 'Maximum', 'Average'],
          group: 'options',
          type: 'combo', // combo, checkbox, slider, textbox, gem,
                        // gemBar, and button are valid ui types
          caption: 'Aggregation'
        }
      }
    ]
  },
  menuOrdinal: 10001,
  menuSeparator: true,
  maxValues: [1000, 2000, 3000]
});

```

2. To enclose the required API call, you must define `});` at the end of the `example.js`

All defined values are essential to registering the visualization with Pentaho's Visualization API.

The `datareqs` subcomponent is especially critical because it defines the data requirements for the visualization, which are used by Pentaho Analyzer to determine which fields are displayed in the field list.

Use `menuOrdinal` to specify the location of the visualization in Analyzer's chart drop-down menu. The default chart types such as Bar chart start at `menuOrdinal` 100 and then increment by 100. If you want your visualization to appear last, use a value greater than 10000.

`menuSeparator` can be set to `true` to insert a menu separator before the visualization in the menu.

Use `maxValues` to increase the available list of maximum plot values. This setting appears in Chart Options > Other > Domain Limit. If your visualization supports a very large number of values, then you would increase the value so the data table provided in the draw method includes more rows or columns.

Register the Visualization with Pentaho Analyzer

After registering the component with the Visualization API, you need to register the component with Pentaho Analyzer. This step is necessary so that Analyzer can customize its layout panel for the visualization, and to manage the serialization of the visualization's metadata.

To register with Analyzer, create a file in the `example-visualization/resources` folder called `example_analyzer_plugin.js`, and add the following content to the file:

```
var analyzerPlugins = analyzerPlugins || [];
analyzerPlugins.push(
{
  init:function () {

    // Register visualizations to display in Analyzer
    cv.pentahoVisualizations.push(pentaho.visualizations.getById(
      'pentaho_sample_KPI'));

    /*
     * Helpers contain code that knows about the Analyzer specific context. The one
     * function that's required "generateOptionsFromAnalyzerState" is called so the
     * visualization can set its own options based on Analyzer's current report.
     */
    cv.pentahoVisualizationHelpers['pentaho_sample_KPI'] = {
      // Use one of Analyzer's stock placeholder images.
      placeholderImageSrc: CONTEXT_PATH
        + 'content/analyzer/images/viz/VERTICAL_BAR.png',

      /*
       * This method allows a visualization to generate visualization specific
       * options based on Analyzer's report definition. In the following example,
       * this visualisation is setting a background color using the same background
       * color setting in Chart Options. You can figure out the existing chart
       * options by looking at the report XML by clicking the XML link in Analyzer.
       * @return a hash object containing the custom state of your visualization.
       */
      generateOptionsFromAnalyzerState:function (report) {
        return {myBackgroundColor:
          report.reportDoc.getChartOption("backgroundColor")};
      }
    };

    /*
     * LayoutConfig objects manage the interaction between Analyzer's Layout Panel
     * and the visualization's settings.
     */

    // Declare a new class which extends the built-in version from Analyzer.
    dojo.declare("SampleConfig", [analyzer.LayoutConfig], {

      /**
       * @param config The parse Configuration object which serves
       * as the model of the Panel.
       * @param item The item in the panel which originated the event.
       * @param eventName The name of the event (clicked, value, etc).
       * @param args A Hash Object containing relevent values (prevVal,
       * newVal, etc).
       */
      onModelEvent: function(config, item, eventName, args) {

        if (eventName == "value") {
          // This component has a single argument, so we assume if this event is
          // fired it is for the aggregate option.
          // This will update the visualization args with the new value for
          // aggregate. Also note that when the Analyser report is saved, a
```

```

// snapshot of the visualization args will be saved to the report XML.

this.report.visualization.args['aggregate'] =
    config.byId('aggregate').value;

//Add a report state item to the undo/redo history stack.

this.report.history.add(new cv.ReportState("Update KPI Aggregation"));

//Trigger a report refresh so that the visualization is updated with the
//change.
this.report.refreshReport();
}
this.inherited(arguments);
// Let super class handle the insertAt and removedGem events.
}
});

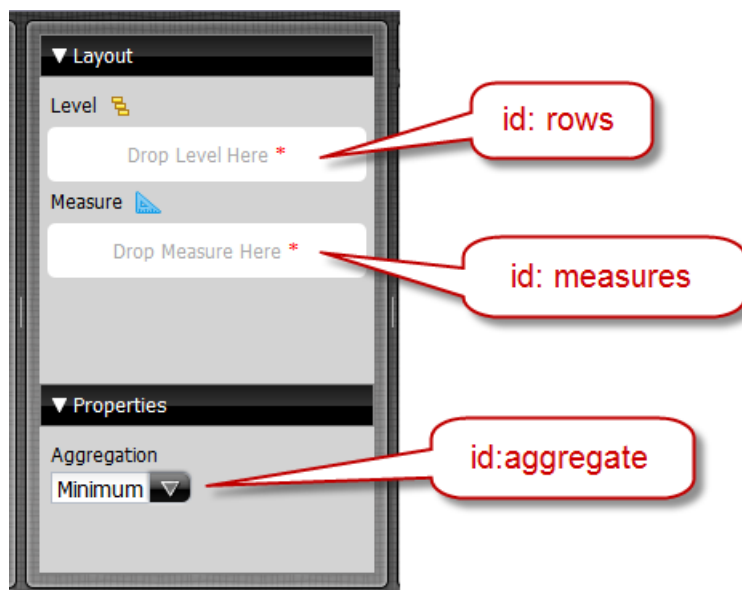
// Register the Layout Panel Configuration Manager.
// Note that the string entry matches 'JSON_' plus the visualization id
// defined earlier.
analyzer.LayoutPanel.configurationManagers['JSON_pentaho_sample_KPI'] =
    SampleConfig;
}
}
);

```

In this example, you register a single visualization with Analyzer. The object definition in this JavaScript contains three main components. The first is the `init()` method call, this is called when Analyzer initializes the visualization. In this method, the visualization registers all the necessary handlers for working directly with Analyzer. The two handlers are the `VisualizationHelper` object and the `LayoutConfig` class.

The `VisualizationHelper` object contains code that is specific to getting your visualization to work in the context of Analyzer. The key function is to implement `generateOptionsFromAnalyzerState`, which is used to extract settings from the Analyzer report XML which can then be used in your own visualization.

The Layout Panel in Analyzer is generated dynamically from the JSON data requirements definition of the visualization, which was defined in *Pentaho Visualization API Registration*. For example, notice that the visualization automatically generated Level, Measure, and Aggregation components based on the rows, measures, and aggregate dataReq items:



In order for your visualization to respond to changes made in the panel, you registered the `SampleConfig` configuration manager with Analyzer.

Configuration Managers may extend the following methods:

<code>getConfiguration():</code>	Returns the layout panel definition. Normally, you will not need to extend this method. The default implementation in <code>LayoutConfig</code> will create gembars for dataReqs with <code>dataStructure = column</code> or <code>row</code> and restore the state by looking at the report XML attributes and measures. For custom properties such as the Aggregation dropdown in the above example, the default implementation will retrieve the current value from either the <code>generateOptionsFromAnalyzerState</code> function or from the <code>visualization.args</code> hash map.
<code>updateConfiguration(config):</code>	This is called on every report change and allows you to modify the layout panel state based on the current configuration. An example use case would be to make all gembars no longer required if any one of them contained at least one gem item.
<code>checkAcceptance(source, nodes, silent):</code>	Called by Drag and Drop operations in the panel. Return true if the operation is allowed. Normally you would not need to extend this method.
<code>onModelEvent(config, item, eventName, args):</code>	<p>All layout panel interactions result in <code>onModelEvent</code> calls to the active Configuration Manager. These events will typically do one of three things:</p> <ul style="list-style-type: none"> • Add, remove or move gems. The base <code>LayoutConfig</code> will handle these events, update the report definition, and refresh the report. • Update report chart properties. When <code>eventName == 'value'</code> and the <code>item.id</code> matches the property defined in the visualization dataReq, you can manually update the corresponding chart option in the report XML. The benefit of saving state in chart options is that it can be shared across visualizations. You can only set chart options that were previously supported in Analyzer, such as background color or label fonts/colors. • Update visualization args. When <code>eventName == 'value'</code> and the <code>item.id</code> matches the property defined in the visualization dataReq, you can manually update the current visualization args. These changes will be passed back to you in the draw method's <code>vizOptions</code> parameter. Anything stored in <code>visualization.args</code> will be saved with the Analyzer report and is specific to your visualization only.

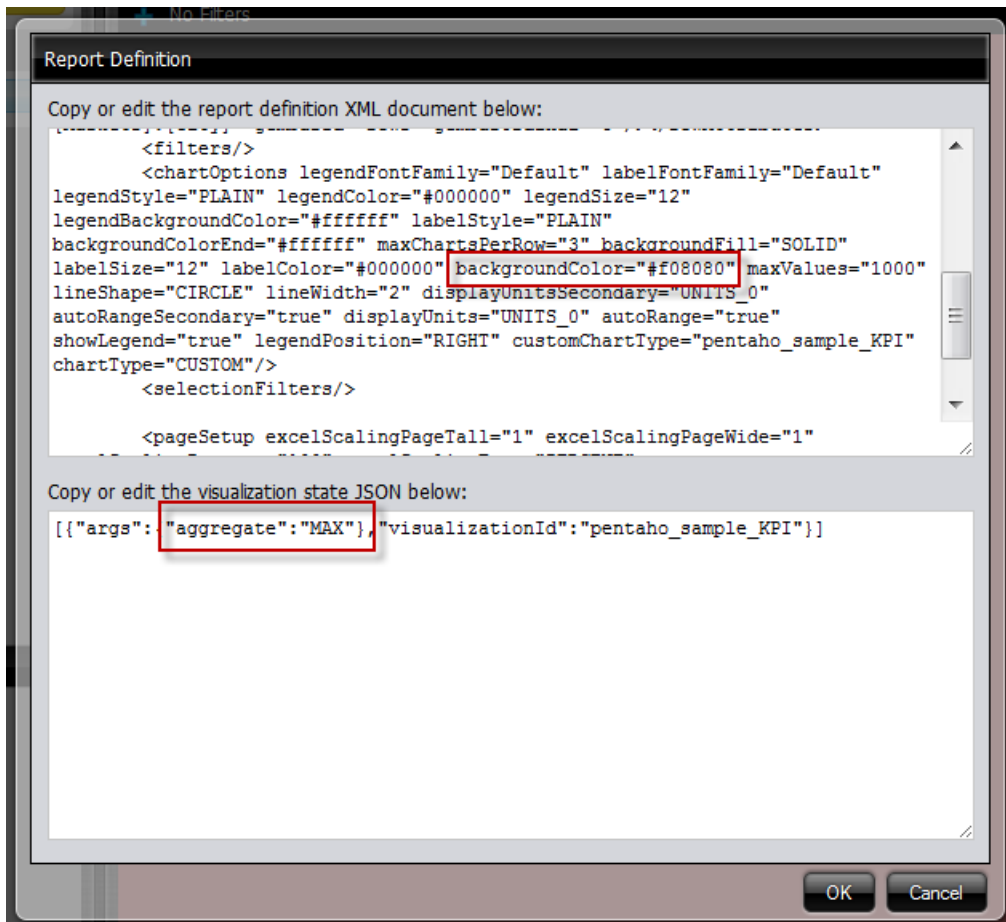
Register the Created JavaScript Files with Pentaho Analyzer

You must notify Pentaho Analyzer about the JavaScript files you have created. By adding the following child element of `plugin` to the `plugin.xml` file defined earlier, the JavaScript files will be included in Pentaho Analyzer.

```
<external-resources>
  <file context="analyzer">content/example-visualization/resources/example.js</file>
  <file context="analyzer">content/example-visualization/resources/
example_analyzer_plugin.js</file>
</external-resources>
```

Restart the BA Server and Test the Visualization

Restart the BA Server. Once the server has restarted, you will see the visualization **Example KPI** registered in the list of Visualizations when creating an Analyzer report. Create a new report with the custom visualization selected. If you save the report and re-open it, and the visualization settings are remembered. Click on the XML link to view the report XML and visualization state JSON which is helpful in debugging state saving issues:



Test your visualization in the various browsers that will be used. You can add the XML text in the **Report Definition** dialogue box.

More complex examples included in the Pentaho BA Server noted in [Define the Custom Visualization](#) on page 15. These examples go beyond this section, including functionality such as server-side printing, lasso'ing, and selections.

Additional Resources

Here are some additional custom visualizations resources, as well as some community examples of visualization plugins:

- [Providing Javascript Plugins via External Resources](#)
- [Twelve Days of Visualizations Zip File](#)



Note: These community examples are not supported by Pentaho Customer Support.