Rasdaman Web Client Toolkit
Developer Guide

Preface

Introduction

The main purpose of this toolkit is to allow developers to create user interfaces for displaying data from a raster database.
The toolkit is developed in Javascript and uses popular libraries like jQuery to achieve its goals.

Its structure follows the principle of separating data transmission and processing from the presentation, the two main namespaces reflecting this philosophy:

- Query namespace - containing all the classes that can be used to retrieve data from a server, be it a simple HTTP server or a rasdaman server.
- Widget namespace - containing all the classes that can be used to display the data in meaningful ways

The next pages will describe how you can create widgets and modify them to suit your purposes. At the end of each widget description an example of use will be given. More examples can be found in the docs/examples folder in the toolkit package.

Throughout the document, the code fragments will be represented using italic.

Table of contents

Query Namespace

1.1 Base Query

Description

Base class for the query classes. It does nothing on its own, but is a good starting point for any class that wants to have data transport capabilities.

Attributes

Name	Type	Description
- id	Int	Unique identifier of the BaseQuery object
- query	String	The string query that will be executed.

Methods

Name	Parameters	Return Type	Description
+ getId()		Int	Standard getter for the **id** attribute.
+ getQuery()		String	Standard getter for the **query** attribute.
+ setQuery(query)	query: string	BaseQuery	Sets a new value to the query and returns the BaseQuery object on which the operation has been performed.

Examples

This class should not be used on its own, it is provided only as a means for exposing new ways of querying the data from the server. Please note that although there is no mechanism in js to enforce this any child class **should implement a transport method**(see QueryExecutor for more details)

1.2 Select Query

Description

The SelectQuery class provides an abstraction over the select query sent to the server. It allows widget developers to easy modify queries by adding new variables to the query that can be replaced with meaningful values at the transmission time.

Attributes

Name	Type	Description
- url	String	The url to the service that can execute the raster query
- query	String	The initial query attached to this object.
- variables	Object	The variables that are attached to the query, each of them can be modified using setVariable.

Methods

Name	Parameters	Return Type	Description
+ getVariable(variable)	String	String	Returns the value attached to the given variable.
+ setVariable(variable, value)	variable: string, value: mixed	[[SelectQuery]]	Assigns a value to a variable and returns the query object the action is being performed on.
+ replaceVariablesInQuery()		String	Replaces the variables from the query and returns its new value.
+ transport()		Object	Return the query in a transport format, as requested by the QueryExecutor specs.

Examples

The following code snippet creates a raster query:

```
var rasQuery =
new Rj.Query.SelectQuery("http://example.org/raster_service", "SELECT
(x.red > $red, x.green > $green) FROM collection as x", {});
rasQuery.setVariable("$red", 25);
rasQuery.setVariable("$green", 50);
rasQuery.setVariable("$red", rasQuery.getVariable("$red") + 10);
console.log(rasQuery.replaceVariablesInQuery());
```

This would output SELECT jpeg(x.red > 35, x.green > 50) FROM collection as x. Please note that in most cases **you will not need to use** the replaceVariablesInQuery method as all transport methods call it automatically.

1.3 URL Query

Description

The UrlQuery class provides an abstraction over queries sent to a server.
It allows seamless request-response transactions to a http server.

Attributes

Name	Type	Description
- baseUrl	String	The URL to start from.
- type	String	The request type (e.g. GET || POST)
- parameters	Array	An array of parameters to be used.

Methods

Name	Parameters	Return Type	Description
+ addParameter(parameter)	parameter : object	Void	Adds a parameter to the request.
+ removeParameter(parameter)	parameter : object	Void	Removes a parameter from the request.
+ transportGet()		String	Returns a formatted get string URL.
+ transport()		Object	Implements the transport method required for all objects that are handled by an executor.

Examples

The following code snippet creates an UrlQuery and modifies its parameters. Please see QueryExecutor for the data retrieval procedure

```
var exQuery = new Rj.Query.UrlQuery("http://example.org/
data_service/",  Rj.Constants.UrlQuery.POST, {
        param1 : "some value"
        param2 : "some value 2"
});
exQuery.addParameter("param3", "value 3");
exQuery.removeParameter("param2");
```

We now have a query object that retrieves data from example.org/data_service via a POST request sending several parameters(param1, param3).

1.4 Query Executor

Description

The QueryExecutor is a singleton class that is responsible for the communication with the server. It can receive queries from any BaseQuery descendants and then send them to the server through an HTTP request responding to the requester with the result object received from the server. The requests are done asynchronous in a non-blocking way so that multiple widgets can request queries from the server without waiting one for the other.

Attributes

Name	Type	Description
- query	Object	An object of type descendant of BaseQuery Class.

Methods

Name	Parameters	Return Type	Description
+ sendRequest(data, handler)	Object data, Function handler	none	send the request to the server containing the query and calls the handler function provided with an array of results. Please note that the function doesn't return a result, but calls the handler once the server has responded

Examples

```
var rasQuery = new Rj.Query.SelectQuery("http://example.org/raster_service", "SELECT jpeg(x.red > $red, x.green > $green) FROM collection as x", {});
rasQuery.setVariable("$red", 25);
rasQuery.setVariable("$green", 50);

var executor = Rj.Query.QueryExecutor(rasQuery);
executor.callback(function(response){//We have the response from the server here
```

```
        console.log(response);
});
```

Please note that the executor is a deferrable object, similar to Future objects in Java, so that means you will get the result asynchronously, e.g. you can register a handle that will be executed when the data is retrieved from the server.

Widget Namespace

2.1 Base Widget

Description

The base widget is a wrapper class that has to be extended by any widget that want to interact with the system. It wraps an existing widget from a library like jQuery UI or any other a developer might need, providing it with a simple event-communication system and with a BaseQuery that can modify the database results.

Atrributes

Name	Type	Description
- widget	Object	The library widget that is being used. e.g. jQuery.ui.slider or google.Charts.VisualizationChart
- query	BaseQuery	The query that the widget wants to manipulate, any descendant of BaseQuery can be used
- listeners	Array	An array of events that the widget wants to listen to. Each element has to be defined as an object of form {eventName : handlerFunction}
- selector	CSS3 / XPath	A CSS3/XPath selector used as indentifier for the position of the widget.

Methods

Name	Parameters	Return Type	Description
+ renderTo(node)	DOMObject node	none	Renders the widget in the node provided. Can be anything ranging from body to a specific div
+ show()	none	none	Make the widget visible. By default widgets are rendered invisible
+ hide()	none	none	Make the widget invisible
+ fireEvent(eventName, bubble, args)	String eventName, boolean bubble, Array args	none	Fires a defined event, with the arguments specified in the third parameter. If bubble is a set to true, the event will be propagated upwards and any widgets that registered for the event will be notified
+ addListener(eventName, handler)	String eventName, function handler	none	Registers a new handler for a specific event
+ removeListener(eventName)	String eventName	none	Removes the handler of this widget for the event, the widget will not be notified of these event anymore

Examples

This is a base class for widgets so it shouldn't be initialized or used except for extending the current widget system.

2.2 Input Widget

Description

InputWidget is a simple grouper class that helps better define the relationships between widgets.

Attributes

Name	Type	Description
- value	string	The value displayed in widget.

Methods

Name	Parameters	Return Type	Description
+ getValue()		string	Standard getter for the **value** attribute.
+ setValue(value)	value : string	Void	Standard setter for the **value** attribute.

Examples

This is a base class for widgets so it shouldn't be initialized or used except for extending the current widget system.

2.3 Text Widget

Description

Defines a widget which allows the user to input text queries.

Attributes

Name	Type	Description
- rows	Int	The number of rows the widget has.
- cols	Int	The number of columns the widget has.
- submitValue	String	The value of the submit button.
- value	String	The value displayed in the widget.

Examples

Js code:
var txtWidget = new Rj.Widget.TextWidget();
txtWidget.renderTo("#text-widget-example");
txtWidget.setValue("Hello World");

Html code:
…
* The widget will be rendered here *
...

2.4 Slider Widget

Description

Defines an abstraction of a widget which allows the user to use a multiple level slider.

Attributes

Name	Type	Description
- slideLevel	Int	The current level to which the slider is.

Methods

Name	Parameters	Return Type	Description
+ getSlideLevel()		int	Standard getter for the **slideLevel** attribute.

+ setSlideLevel(slideLevel)	slideLevel: int	Void	Standard setter for the **slideLevel** attribute.

Examples

The following example will dipslay a slider with values from 1000 to 11000 with a step size of 500. When the slider is moved a message will be printed to the console

```
var thresholdSlider = new Rj.Widget.SliderWidget(1000, 11000,
Rj.Constants.WidgetSlider.VERTICAL, 500, 8000);//min, max,
orientation, step size, default
thresholdSlider.renderTo("#thr");
//Using the changevalue event to detect modification to the slider
thresholdSlider.addListener("myAppName", "changevalue",
function(value){
        console.log("This is the new value: " + value.toString();
});
```

2.5 Knob Widget

Description

Defines a knob widget.

Attributes

Name	Type	Description
- min	Int	The lower bound of the knob.
- max	Int	The higher bound of the knob.
- value	Int	The initial value of the knob.
-reverse	Bool	If true, the values are distributed backwards (from 360 degrees to 0 degrees).
- snap	Int	The number of degrees from which the knob is snapped to 0.

Methods

Name	Parameters	Return Type	Description
+ getValue()		Int	Standard getter for the **value** attribute.

Examples

The following code creates a Knob object within a * * element:

```
var knob = new Rj.Widget.Knob(0, 10, 5, false, 20);
knob.renderTo("knob");
```

2.6 Output Widget

Description

OutputWidget is a simple grouper class that helps better define the relationships between widgets.

Attributes

Name	Type	Description
- query	Object	The query object used for getting the results displayed by the widget.
- widget		Identifier of the widget.

Methods

Name	Parameters	Return Type	Description
+ refresh()			Stub method for the extending classes.

2.7 Map Widget

Description

Defines an a widget used for displaying maps composed of several layers.
The implementation is based on the OpenLayers library <http://http://openlayers.org/>

Attributes

Name	Type	Description
- map	Object	The raw OpenLayers map.

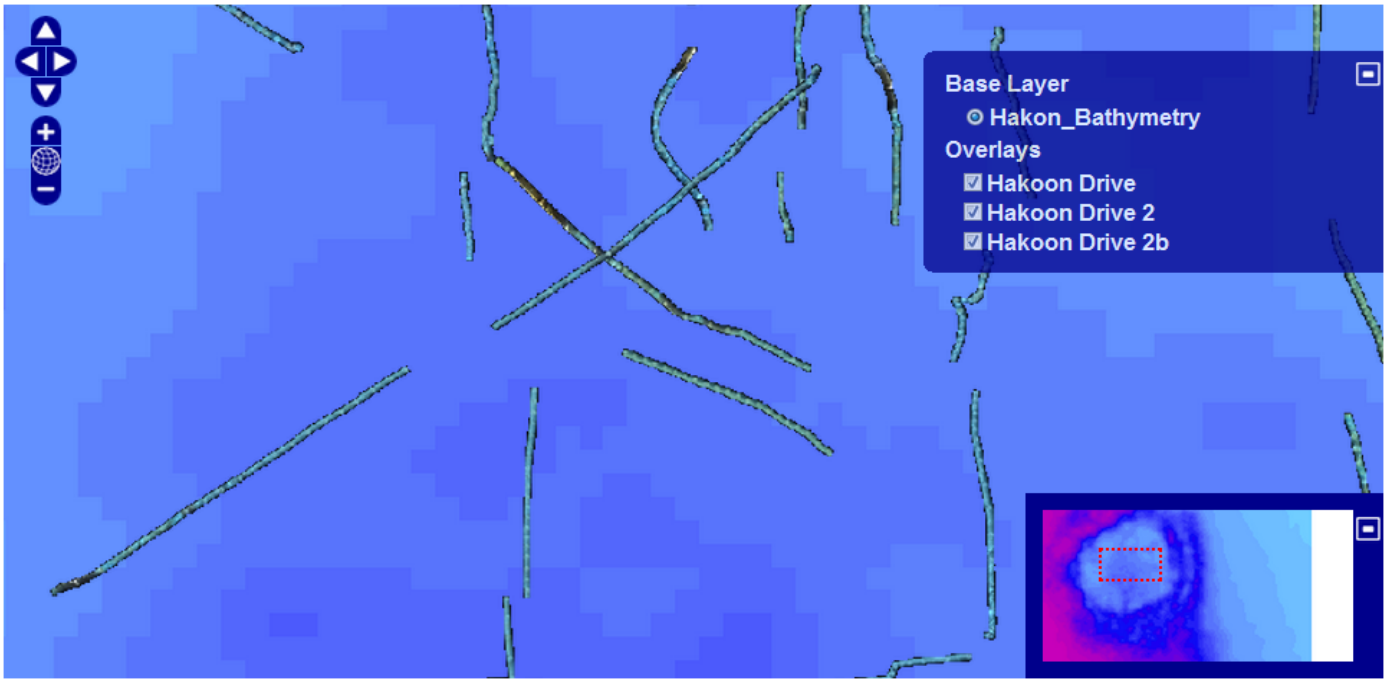
Methods

Name	Parameters	Return Type	Description
+ getRawMap()		Object	Returns the raw OpenLayers Map.
+ addLayers()		Void	Adds layers to the map.

Examples

The following code will display a map with one layer

```
//Define the map widget and the coordinate system
 var map = new Rj.Widget.MapWidget({
     projection : "EPSG:32633",
maxExtent : new
OpenLayers.Bounds(489750,7988500,492750,7990000),
     tileSize : new OpenLayers.Size(500, 500),
     numZoomLevel : 4
   });
//Define a new base layer for the map. Any WMS service url will work
var HakoonBathymetryLayer = new
Rj.Widget.LayerWidget("Hakon_Bathymetry", ”http://
212.201.49.173:8080/rasogc/rasogc”, {
     layers: 'Hakon_Bathymetry',
     styles: 'colored',
     format : "image/png",
     version : "1.1.0",
     exceptions : 'application/vnd.ogc.se_xml',
     customdem : 'minLevel,maxLevel,T'
   },{
     transitionEffect : 'resize'
   });

//Add the layer to the map
map.addLayers([HakoonBathymetryLayer]);
//... and render it to the #maps div
map.renderTrasraso("#maps");
```



2.8 Diagram Widget

Description

Defines a widget used as a base for all charts.

Attributes

Name	Type	Description
- title	String	The title of this diagram.
- xAxisTitle	String	The title of the X axis.
-yAxisTitle	String	The title of the Y axis.

Methods

Name	Parameters	Return Type	Description
+ setData	data: Array	Boolean	Sets the data attribute and fires two events: datapreload - before the data is loaded datapostload - fired once the data is loaded

+ getData		Array	Returns the data assigned to the widget
+ addDataSeries	serie: Array name: String	Int	Adds a data series to the diagram as an array of form [[x,y] , [x1, y1]] and returns an index of the new data serie
+ removeDataSeries	index: Int	Int	Removes a series from the diagram. The index is the same as the one returned by addDataSeries
+ configure	cfg: Object	Object	Configures the chart object before rendering. All subclasses should override this method in order to add their specific configurations.
+ renderTo	selector: String, cfg: Object		Renders the widget to a given DOM element.

Examples

This is a base class for graphs so it shouldn't be initialized or used except for extending the current graph system.

2.9 Linear Diagram

Description

Defines a widget used for displaying linear graphs.

Methods

Name	Parameters	Return Type	Description
+ configure	cfg: Object	Object	Configures the chart object before rendering..

Examples

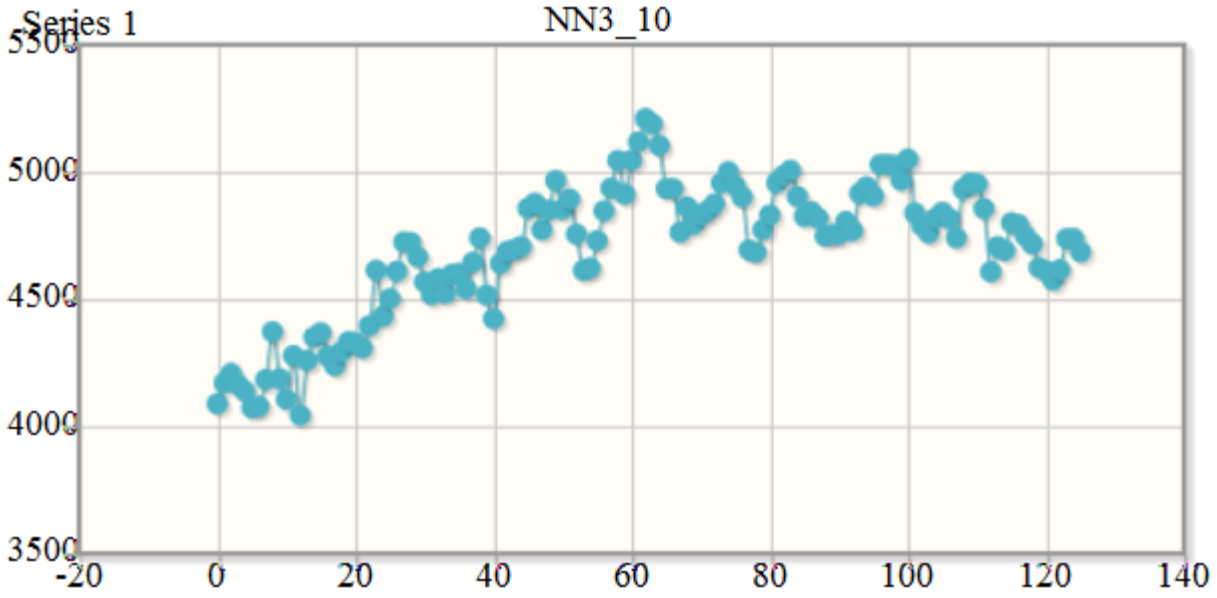
JS Code:

//Initialize the query - we are using an URL Query object

```
    var source = “NN3_10”;
    var query = new Rj.Query.UrlQuery("wcpsParser.php", 'GET', {
      'coverageId': source
    });
    //Create the widget
    var diagram = new Rj.Widget.LinearDiagram(query, "#chartPlace",
source);

    // Get the diagram axis and labels before the data is rendered by
listening to the datapreload event
    diagram.addListener('wcps','datapreload', function(response){

      //Check if any errors occurred, and if so display a nice error message
      if(response.error){
        $("body").append("<div id='dialog'>"+response.error+'</div>');
        $( "#dialog" ).dialog({
          modal : true,
          title : 'Parse Error'
        }).show();
        throw "Error while processing the data";
      }

      var values = [];
      for(var i = 0; i < response.data.length; i++){
        values.push([i, parseInt(response.data[i], 10)]);
      }

      //Configure the widget axes
      this.configure({
        axes : {
          xaxis:{
            title : response.domainInfo.axisLabel
          },
          yaxis : {
            title : "Values"
          }
        }
      });
      return {
        data : [values]
        };
    });

    //load the data and render the widget
    diagram.loadData(true);
```

HTML Code:

```
 <div id=’chartPlace’ style=’width:600px; height:500px;’>
    <!-- The chart will go here -->
</div>’
```



2.10 Area Diagram

Description

Defines a widget used for displaying area graphs.

Methods

Name	Parameters	Return Type	Description
+ configure	cfg: Object	Object	Configures the chart object before rendering..

Examples

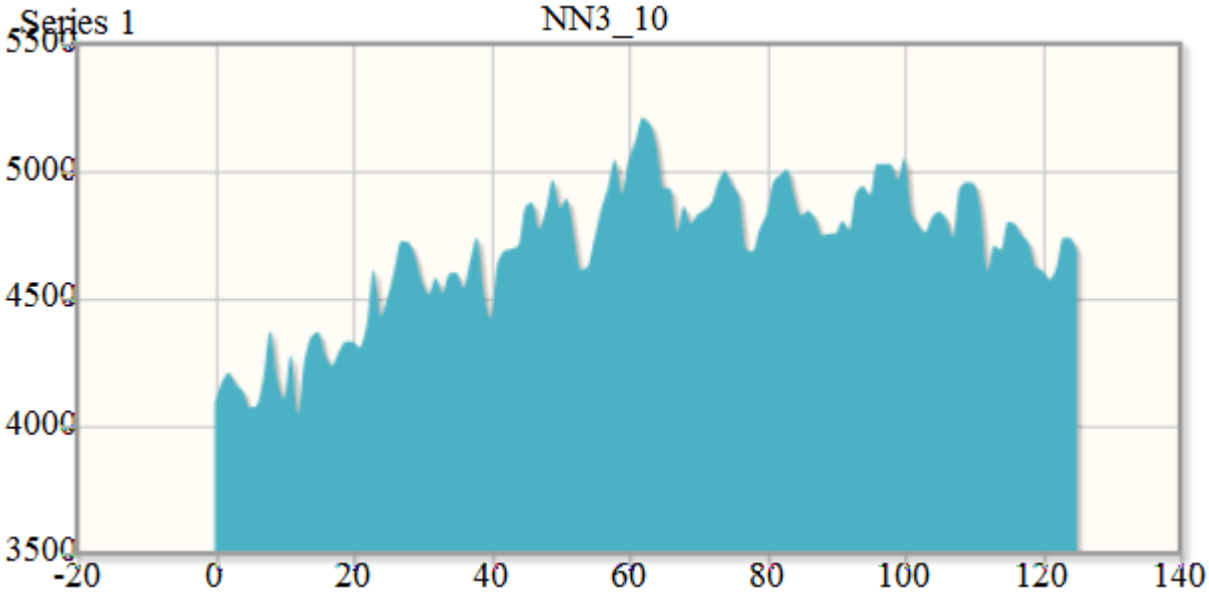
JS Code:

```
   var source = “NN3_10”
//Initialize the query - we are using an URL Query object
   var query = new Rj.Query.UrlQuery("wcpsParser.php", 'GET', {
     'coverageId': source
   });
   //Create the widget
   var diagram = new Rj.Widget.AreaDiagram(query, "#chartPlace",
source);

   // Get the diagram axis and labels before the data is rendered
   diagram.addListener('wcps','datapreload', function(response){
```

```
    var values = [];
    for(var i = 0; i < response.data.length; i++){
      values.push([i, parseInt(response.data[i], 10)]);
    }

    //Configure the widget labels
    this.configure({
      axes : {
        xaxis:{
          title : response.domainInfo.axisLabel
        },
        yaxis : {
          title : "Values"
        }
      }
    });
    return {
      data : values
      };
  });
  //Load the data and render the widget
  diagram.loadData(true);
```

HTML Code:

```
 <div id='chartPlace' style='width:600px; height:500px;'>
   <!-- The chart will go here -->
</div>'
```



2.11 Scatter Diagram

Description

Defines a widget used for displaying scattered graphs.

Methods

Name	Parameters	Return Type	Description
+ configure	cfg: Object	Object	Configures the chart object before rendering..

Examples

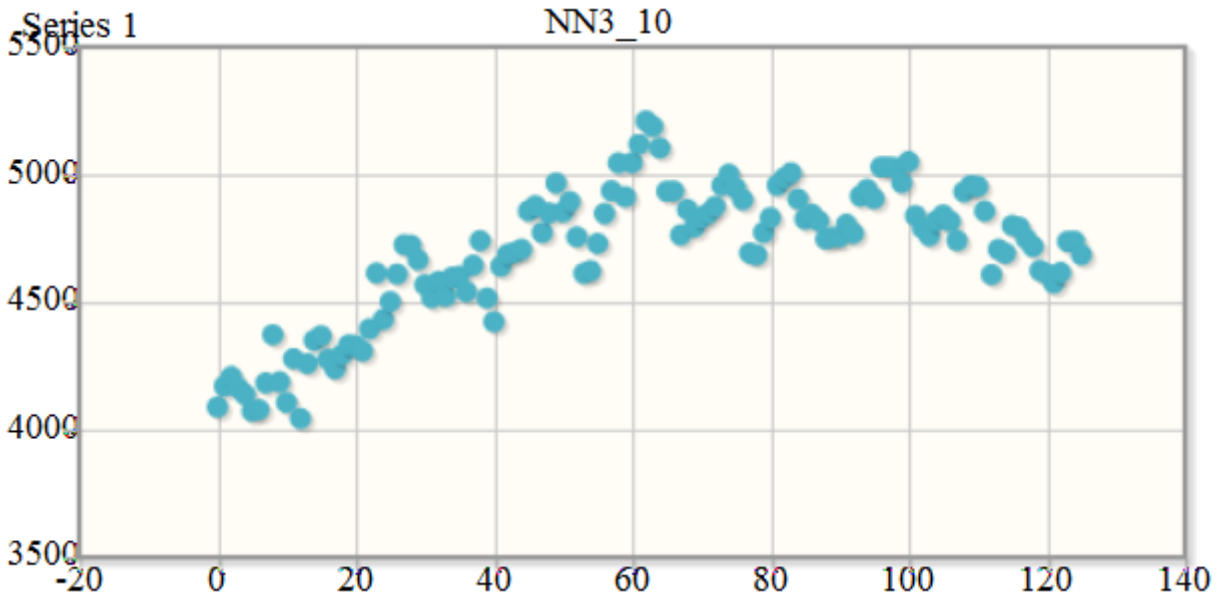
JS Code:

```
//Initialize the query - we are using an URL Query object
   var source = “NN3_10”
   var query = new Rj.Query.UrlQuery("wcpsParser.php", 'GET', {
     'coverageId': source
   });
   //Create the widget
   var diagram = new Rj.Widget.ScatterDiagram(query, "#chartPlace",
source);

   // Get the diagram axis and labels after the data is loaded by listening
to the datapreload event
   diagram.addListener('wcps','datapreload', function(response){

     var values = [];
     for(var i = 0; i < response.data.length; i++){
       values.push([i, parseInt(response.data[i], 10)]);
     }

     //Configure the widget labels
     this.configure({
       axes : {
         xaxis:{
           title : response.domainInfo.axisLabel
         },
         yaxis : {
           title : "Values"
         }
```

```
    }
  });
  return {
    data : values
    };
});

  diagram.loadData(true);
```

HTML Code:

```
<div id='chartPlace' style='width:600px; height:500px;'>
  <!-- The chart will go here -->
</div>'
```



2.12 Gauge Widget

Description

Defines a circular gauge widget.

Attributes

Name	Type	Description
- value	Int	The initial value displayed.
- labelSuffix	String	The string displayed after the label value.
- taco	Bool	Sets a custom display.

Methods

Name	Parameters	Return Type	Description
+ getValue()		Int	Standard getter for the **value** attribute.
+ setValue(value)	value: Int	Void	Standard setter for the **value** attribute.

Examples

The following example will display a gauge within a * * element.

```
var gauge = new Rj.Widget.Gauge(null,24);
gauge.renderTo("gauge");
```

2.13 JGauge Widget

Description

Defines a semi-circular gauge widget.

Attributes

Name	Type	Description
- title	String	The title of the widget.
- label	String	The label of the widget.
- min	Int	The lower bound of the displayed values.
- max	Int	The upper bound of the displayed value
- showMinMax	Bool	Shows or hides the bounding values.
- value	String	The initial value displayed.
- width	Float	The scale at which the widget is displayed. 1 is the reference point.
- shadow	Bool	Shows or hides the shadow of the upper part of the widget.
- color	String	The background color of the widget.
- titleColor	String	The color of the title.
- valueColor	String	The color of the value.
- labelColor	String	The color of the label.

Methods

Name	Parameters	Return Type	Description
+ getValue()		int	Standard getter for the **value** attribute.
+ setValue(value)	value: int	Void	Standard setter for the **value** attribute.

Examples

The following example will display a JGauge object within a * * element.

```
var jGauge = new Rj.Widget.JGauge(“JGauge”, “Degrees”, 0, 180, 90, 1,
true, #fff, #000, #000);
jGauge.renderTo("jgauge");
```

2.14 Led Widget

Description

Defines a led counter widget.

Attributes

Name	Type	Description
- value	Float	The initial value displayed.
- numIntegralDigits	int	The number of digits of the display.
- numFractionalDigits	Bool	The number of fractional digits to display.

Methods

Name	Parameters	Return Type	Description
+ getValue()		Float	Standard getter for the **value** attribute.
+ setValue(value)	value: Float	Void	Standard setter for the **value** attribute.

Examples

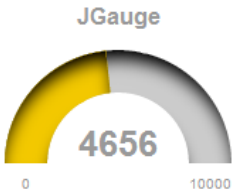
The following example will display a led within a * </ div>* element.

```
var led = new Rj.Widget.Led(100.54, 3, 2);
led.renderTo(“led”);
```

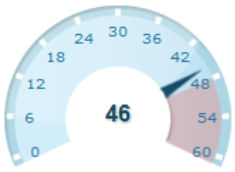
Knob:

8

Led:



Gauge without "taco":



Guage with "taco" option: