
GreenPoint, Inc.

WebCharts3D v5.2 Designer
User's Guide

September 9, 2007

Table of Contents

1.0 INTRODUCTION.....	4
SCOPE	4
2.0 CREATING CHARTS IN DESIGNER – LESSON 1	5
SELECTING BASE TYPE CHART	5
MODIFYING ATTRIBUTES	6
MODIFYING FRAME ATTRIBUTES	7
ADJUSTING AXES ATTRIBUTES	8
Adjusting X Axis	8
Adjusting Y Axes.....	9
EDITING BACKGROUND	11
EDITING COLORS	12
DEFINING DECORATION	13
EDITING LEGEND.....	13
3.0 CREATING CHARTS IN DESIGNER – LESSON 2	15
USING PAINTS AND PALETTES.....	16
DEFINING DATA LABELS.....	16
EDITING INDIVIDUAL SERIES ATTRIBUTES.....	17
USING LOGARITHMIC SCALES.....	19
USING CHOICE FORMATS	19
USING LABEL GROUPS	19
DISPLAYING DATA TABLE	20
EDITING TITLE AND LEGEND	20
4.0 CREATING CHARTS IN DESIGNER – LESSON 3	22
USING EMBEDDED HTTP SERVER.....	22
LAUNCHING EMBEDDED SERVER.....	22
DEFINING ANNOTATIONS AND USING POPUP.....	23
DEFINING ANIMATION ATTRIBUTES.....	24
Changing animation style	24
Changing animation order.....	24
Changing movie properties.....	24
Changing individual attributes.....	25
DEFINING ACTIONS.....	25
5.1 USING DATA EDITOR.....	27
6.0 SERVER DEPLOYMENT.....	28
SERVER SETUP	28
CHART DEPLOYMENT	28
DATA BINDING	29
7.0 USING HELP	31
8.0 WHERE TO GET ADDITIONAL HELP	32

APPENDIX A – CHART MODEL REQUIREMENTS..... 33
APPENDIX B – USING DATE/TIME SCALES..... 35
APPENDIX C – PSEUDOVARIABLES 37
APPENDIX D – GANTT CHARTS 38
APPENDIX E – GAUGE CHARTS..... 45
APPENDIX F – RADAR, POLAR AND STAR CHARTS..... 48
APPENDIX G – MAPS 50

1.0 Introduction

Scope

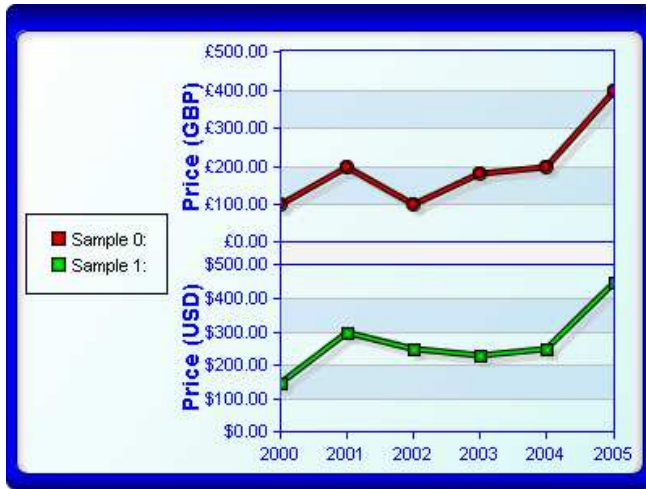
This document provides WebCharts3D users information and instructions for using WebCharts3D Designer. This document does not require you to know programming and does not cover Designer's features related to programming.

WebCharts3D Designer is an integrated package for designing charts, binding them to data sources, previewing results in the browser and deploying charts to the server. This document demonstrates the features of the Designer by using a number of examples to create and modify the charts.

If you are planning to use this product only for the purposes of creating static charts and are not familiar with web programming you might skip Chapter 6.0 "Server deployment" and instead export the charts from the Designer in the required format.

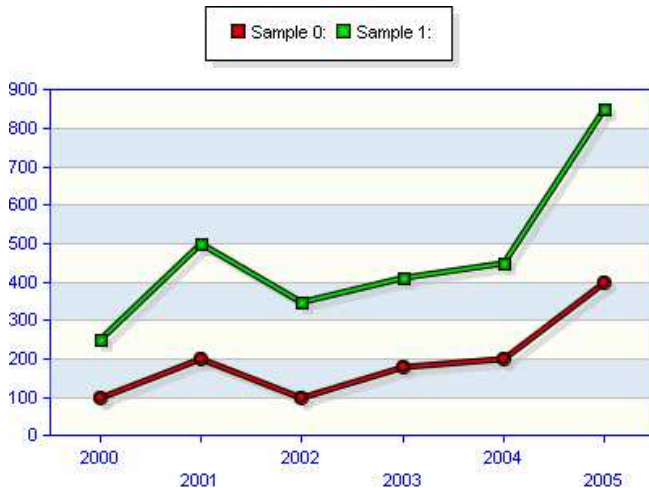
2.0 Creating charts in Designer – Lesson 1

In this section you will learn how to create a chart and modify chart's basic attributes by developing the following chart:



Selecting base type chart

To create a new chart select File>>New menu item. A Gallery window displaying a number of the templates will appear. Usually starting with the right template can greatly reduce the development time, but for the demonstration purposes we will pick the following chart as our base chart:



When a new chart is created it always has dimensions 400x300. To resize the chart drag one of the chart's handles or use UP, DOWN, LEFT and RIGHT keys to adjust the chart's size.

Modifying Attributes

The chart's attributes are displayed on the right side of the Designer in Properties Table. There are three types of the attributes:

Primitive

The primitive attributes are displayed in plain font and can be edited by clicking on the Value's cell of the corresponding attribute. These attributes are usually edited by checkbox, combo box or input field.

Property	Value
Type	Frame chart
font	Arial-11
foreground	■ black
is3D	<input type="checkbox"/>
isMultiline	<input type="checkbox"/>
isTransposed	<input type="checkbox"/>
seriesTitle	
Background	PlainColor
DataLabels	None
Decoration	None
⊕ Elements	
Frame	Simple
⊕ Insets	
Legend	Top
Paint	Shade [Standard]
Popup	MouseOver
⊕ Table	
Title	
TopYAxis	Scale
TopYAxis2	Scale
XAxis	Category
YAxis	Scale
YAxis2	Scale

Compound

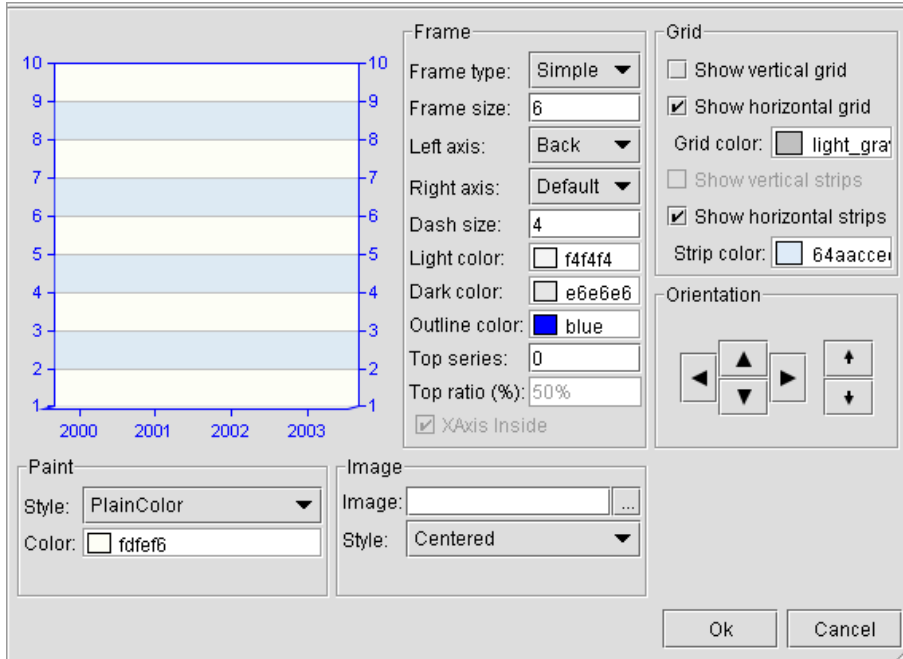
The compound attributes are displayed in Bold with a small box preceding the name of the attribute. To edit a compound attribute you need to click on this box. The '+' sign will change to '-', and all child attributes of this attribute will be displayed inside the Property table.

Object

The object attributes are displayed in bold font and can be edited by clicking on the Value's cell of the corresponding attribute. A specialized dialog will appear that allows you to define primitive attributes for this object. To adjust the dialog's position/size move the cursor over it's top/right bottom corner until move/resize cursor appears, press the left mouse button and drag the mouse to the desired location. When you are done editing, you should press "Ok" or "Cancel" button to accept/cancel all modifications.

Modifying Frame Attributes

The chart we are trying to design has different frame attributes. To edit frame attributes, click on the Frame's value cell in the Properties Table, the following dialog will appear:

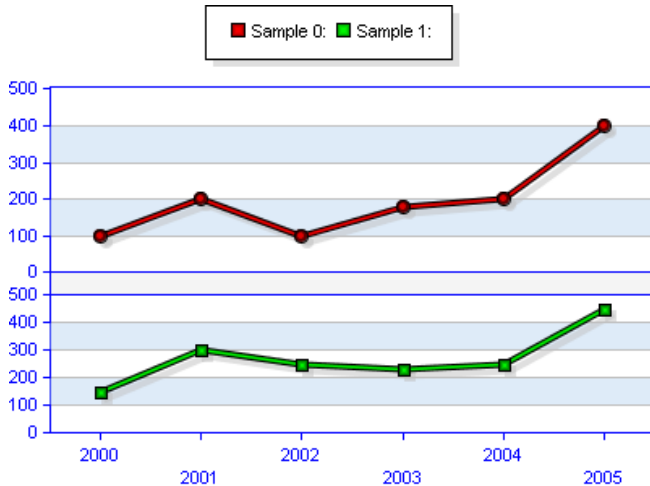


First, we need to split the frame into two views. In the 'Top Series' input field enter 1. This will tell the engine to place first series of data into the top view. You will need to leave the field (by clicking on some other element or pressing Tab key in order for the preview to be refreshed).

Second, we want X axis to be placed at the bottom of the chart. Uncheck 'X Axis Inside' checkbox. If this checkbox is grayed out you need to make sure that you left 'Top series' field.

Finally, we need to set the frame's background to transparent in order to be able to specify the background for the entire chart later on. Click on the 'Style' combobox located in 'Paint' subpane at the bottom of the dialog, and select 'Transparent'.

Click 'Ok' to close the dialog and accept new values. The chart will change to:

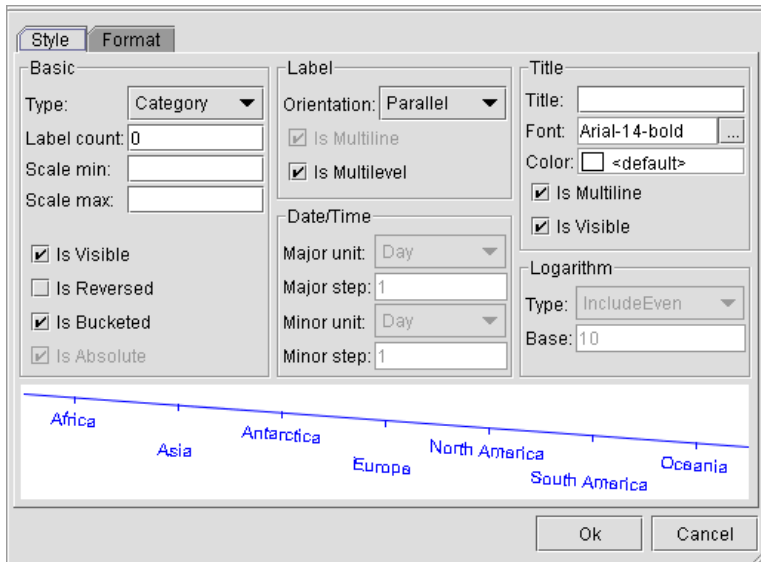


Adjusting Axes attributes

We will need to adjust attributes for the X axis and both top and bottom Y axes.

Adjusting X Axis

In the Properties Table click on the xAxis cell. The following dialog will appear:

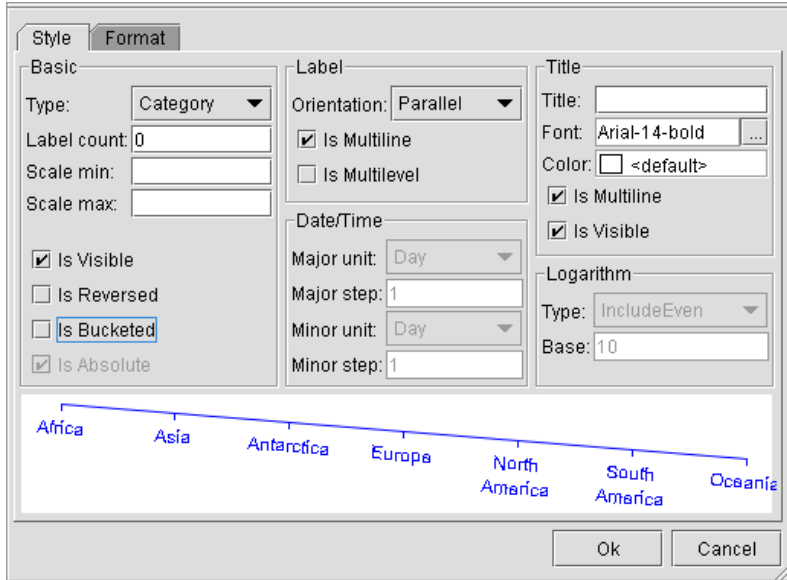


Axis editor dialog has two subpanes and displays the axis's preview at the bottom of it. To make X axis to look the desired way we need to:

1. Turn off placement of labels on the different levels. To do so, click on 'Is Multilevel' checkbox in 'Label' subpane.

2. Place the labels at the edges of the axis. In 'Basic' subpane uncheck 'Is Bucketed' checkbox.

After these modifications the dialog will look the following way:

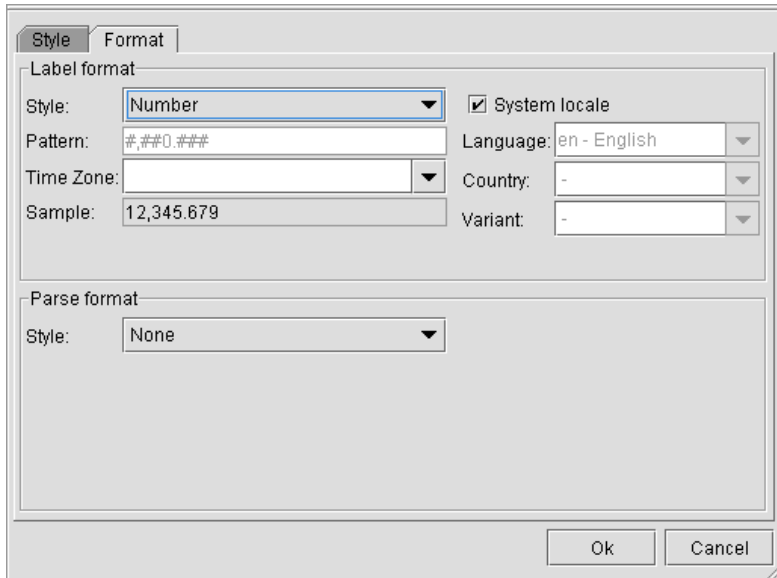


Press 'Ok' button to accept the new values and close the dialog.

Adjusting Y Axes

First we will adjust the bottom view Y axis:

1. In the Property Table click on YAxis cell. The Axis dialog will appear.
2. Enter 'Price (USD)' into 'Title' input box.
3. Click on 'Format' tab on the top of the dialog. The dialog will change to:

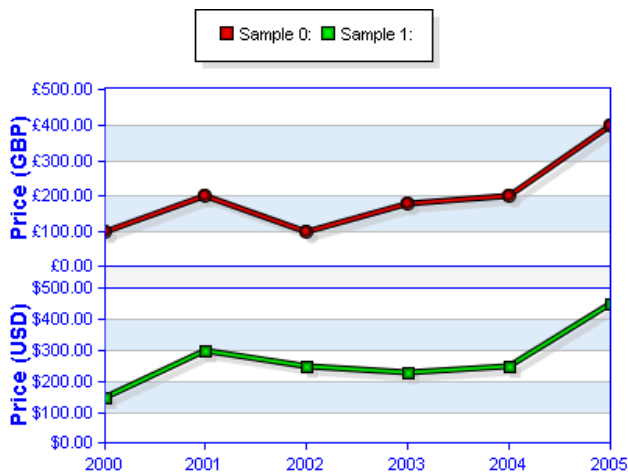


4. In the Style combobox select 'Currency' and press 'Ok' button to close the dialog.

To adjust the top view's yAxis:

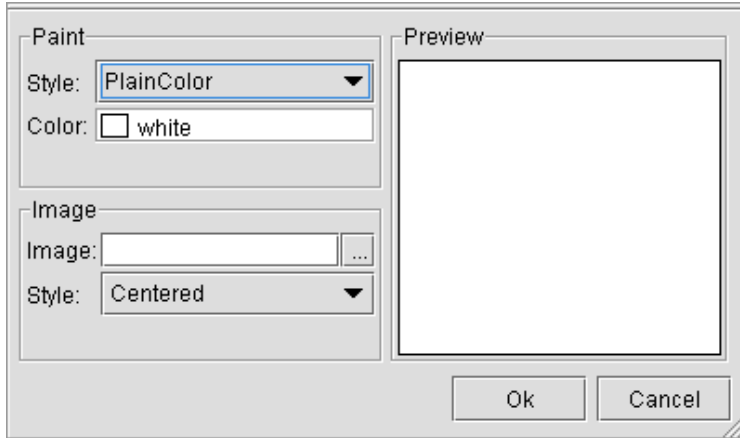
1. In the Property Table click on 'topYAxis' cell.
2. In the axis dialog switch to the Style tab and enter 'Price (GBP)' into 'Title' input box.
3. Switch to 'Format' tab and select 'Currency' in the Style combobox.
4. Uncheck 'System Locale' checkbox and select 'en-English' as the language and 'GB-United Kindom' as the country.
5. Click 'Ok' button to close the dialog.

Your chart should new look like:



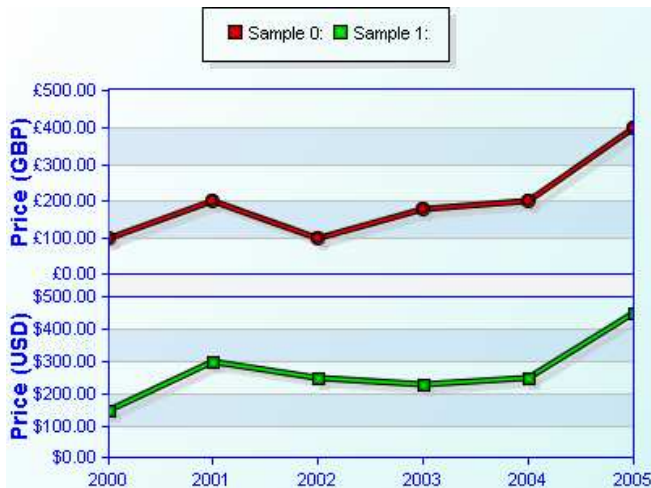
Editing Background

To specify chart's background click on 'Background' cell in the Properties Table. The following Dialog will appear:



To define gradient background:

1. Select appropriate gradient type in the Style combobox. For this chart you should select DiagonalLtRbGradient style. (Diagonal LeftTop RightBottom).
2. Define first and last colors by clicking on Min and Max color field and selecting the appropriate colors as it is discussed in the next section. In our example we set Max color to RGB(218, 248, 246).
3. Close the dialog by pressing 'Ok' button. The chart should look like:



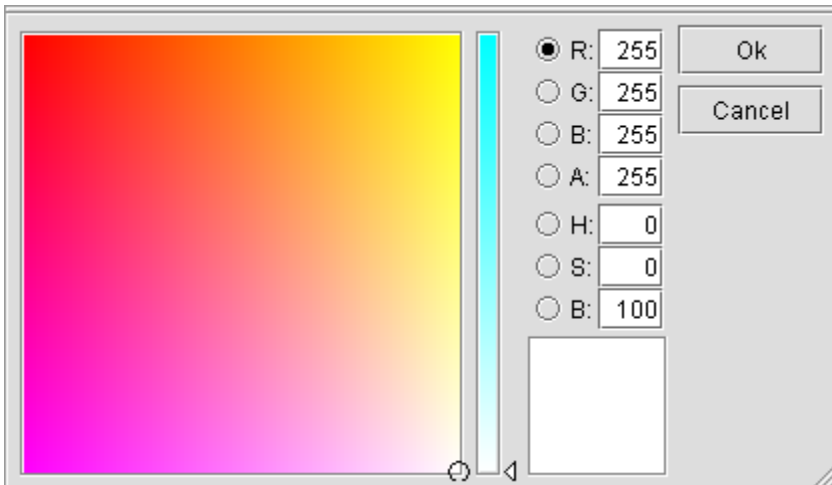
Editing Colors

To edit a color you need to click on the corresponding color box. The following popup will be displayed:



This popup contains two parts – the top part is a preset set of colors defined by the current palette. The bottom part contains user defined colors that were used in this project. To select a color left click on one of the colors. To define a custom color, right click on one of the colors to use it as an initial color or click on one of the empty custom slots. The Custom color dialog will be displayed. Once a custom color is defined it will be shown in all color popups in this project.

The Custom color dialog shown below allows you to define a new color by either picking it from the color square, or entering RGBA or HSB values into the corresponding input boxes. In order to enter hexadecimal values you can use #XX notation where XX are hexadecimal digits. For example, to introduce white color you can enter either 255 or #FF as red, green and blue values.

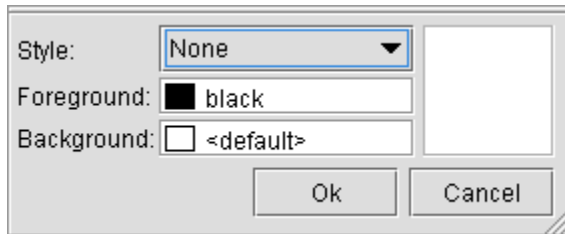


WebCharts3D Designer allows you to disable color space editing by unchecking 'Use Color Spaces' in the Setup dialog. When this option is disabled, the custom color dialog is immediately displayed when the user clicks on the color box.

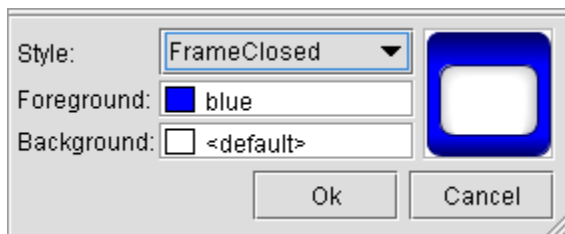
Defining Decoration

WebCharts3D allows you to create decoration around the chart and its individual elements. To define chart's decoration:

1. Click on the Decoration cell in the Property Table. The following Dialog will be displayed:



2. Click on the Style combobox and select 'FrameClosed' decoration. Change foreground to blue. The dialog will look like:

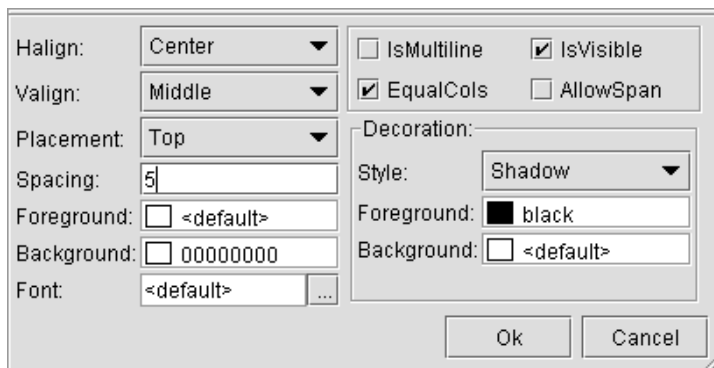


Click 'Ok' Button to accept the new values and close the dialog.

Editing legend

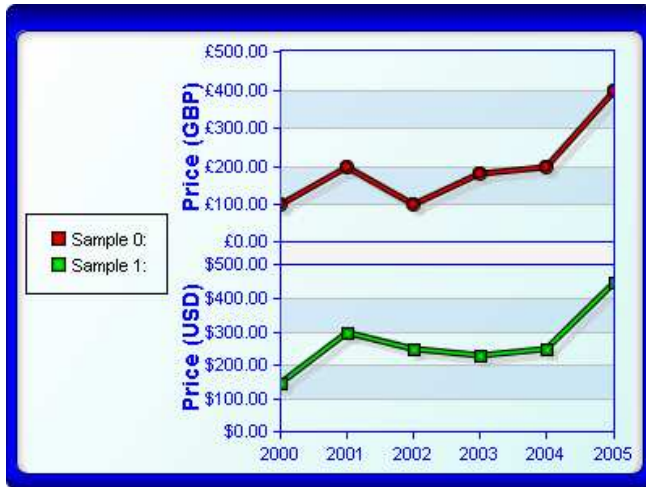
Finally, we need to change the legend placement and decoration:

1. Click on the Legend cell in the Properties Table. The following dialog will appear:



2. Select 'Left' in the Placement combobox.
3. Select 'Simple' in the Decoration's Style combobox
4. Press Ok button to close the dialog.

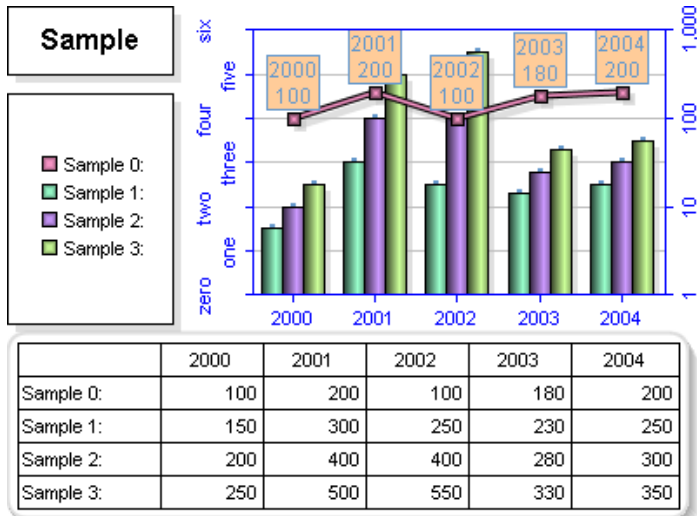
Your chart should now look like the chart shown below:



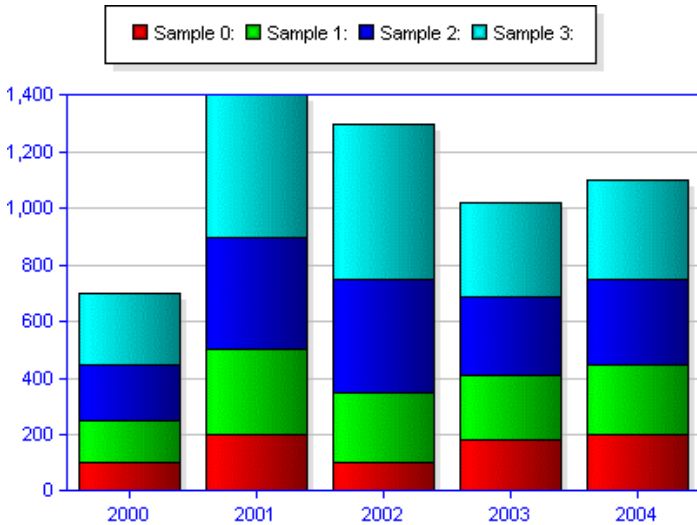
This concludes the first lesson that demonstrated creating charts and editing basic chart styles.

3.0 Creating charts in Designer – Lesson 2

In this section you will learn how to specify advanced chart's attributes and attributes that can be overridden for each series or each element. The goal of this chapter is to design the following chart:



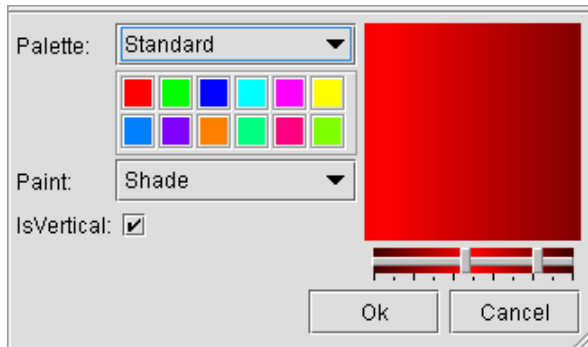
We will start development with the following template chart:



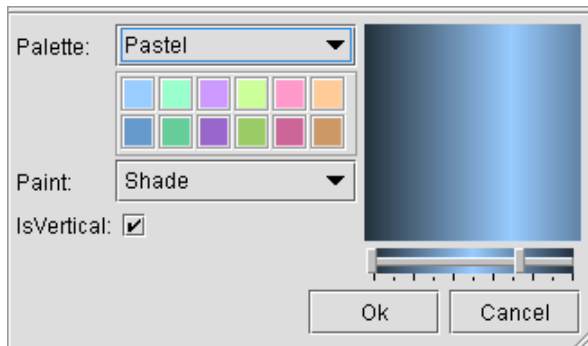
Using Paints and Palettes

To change the chart's paint and colors:

1. Click on the Paint cell of the Properties Table. The following dialog will appear:



2. In the palette combobox select 'Pastel'. That will switch the Designer's and chart's default colors to Pastel.
3. Drag the left handle below the preview box to the leftmost position. Your dialog should now look like:



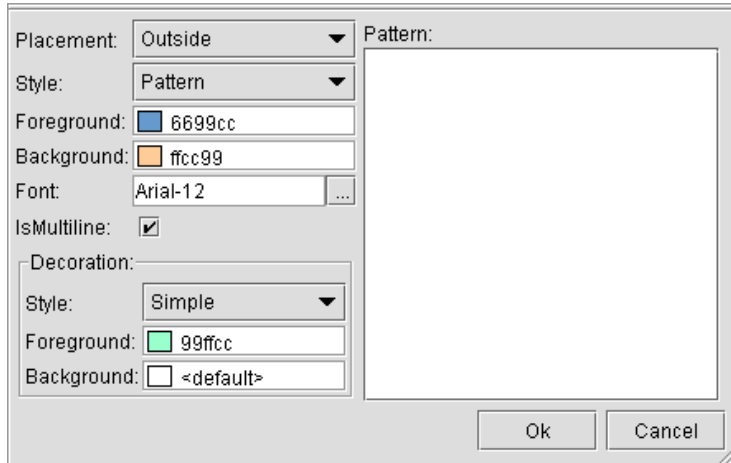
Press Ok to close the dialog.

Defining Data Labels

Data Labels are labels placed inside the chart. WebCharts3D supports different types of the Data Labels. The most flexible one is Pattern that allows you to define your own text (possibly including pseudo-variables, see APPENDIX C.) as data label.

To define data labels:


1. Click on the Data Labels cell of the Properties Table. The Data Label editor dialog will show up.
2. Set Placement to Outside, Style to pattern, and define other attributes to match the picture shown below:

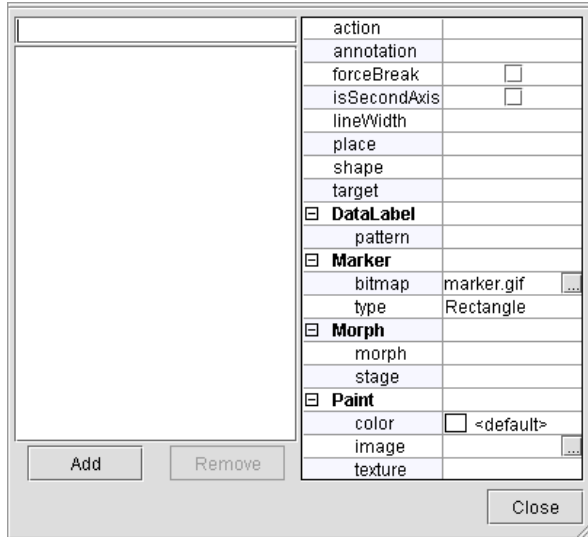


3. In the Pattern textbox enter: \$(. The text will change to \$() and the popup with the available pseudo-variables will appear. Select 'value' from the popup. The text in the Pattern textbox will change to \$(value).
4. Click ok to close the dialog.

Editing Individual Series Attributes

To define a custom color for the series:

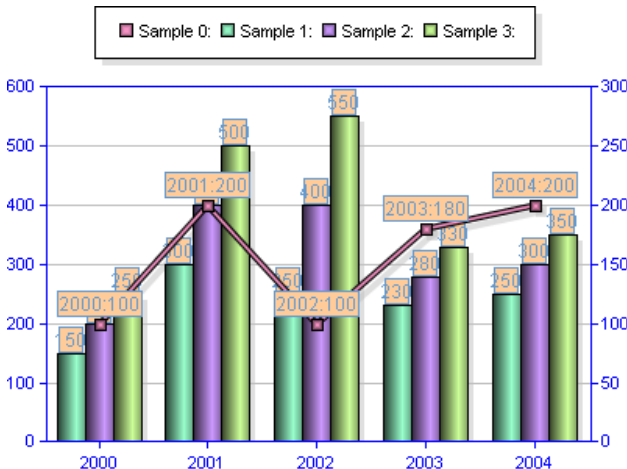
1. Click on  box of the Element's cell. The plus sign will change to minus and the Properties Table will expand
2. Click on the 'series' cell of the Properties Table. The following dialog will show up:



3. Enter 0 into the input box and click 'Add' button.
4. Click on the Color field located under Paint cell of the Dialog's Property Table and select one of the colors.
5. Change Shape cell to Line, Place cell to Default and check isSecondAxis checkbox.
6. Click on the pattern child of DataLabel element and enter into the text box (in two lines):

\$(colLabel)
\$(value)
7. Click Close button to close the Dialog.

Your chart should now look like:



At this point, go back to Data Labels attribute of the Properties Table and clear its pattern field. As a result, only data labels for the line (series with index 0) will be displayed.

Using Logarithmic Scales

The chart we are trying to design uses logarithmic scale with vertical orientation of labels as second Y axis. To setup this axis:

1. Click on YAxis2 cell of the Properties Table.
2. Select Logarithmic as the axis's type and set scale's minimum to 1 and scale's maximum to 1000.
3. In the Logarithm subpane select ExcludeMinor as type.
4. Change the label orientation to Vertical.
5. Close the Axis editor dialog.

Using Choice Formats

Choice formats allow you to display arbitrary text instead of the numeric labels. For the detailed description of this format, please refer to the documentation included with the Designer. This section demonstrates the use of such format.

1. Open Axis Editor by clicking on the yAxis cell of the Properties Table and switch to the Format pane.
2. Set Label Format's style to Choice and enter in the Pattern field:
0#zero | 100#one | 200#two | 300#three | 400#four | 500#five | 600#six
3. Switch to the Style pane by clicking on the Style tab, check Is Multilevel box and change label orientation to vertical.
4. Close the dialog by pressing 'Ok' button.

Using label groups

WebCharts3D allows you to group sequential labels and display their subtitles for all types of scales. To create labels groups for category scale you need to define separator string and provide labels in the format GroupName<separator>label. For example, when you have quarterly sales data for a number of years, you might want to display Q1, Q2, Q3 and Q4 as labels and the actual year as subtitle. To do so, you can define separator as underscore and provide such labels as 2003_Q1, 2003_Q2,...2006_Q1,...

You can also define groups for scale and date/time axes, but in this case you need to define group format. Consecutive label values that after formatting will yield the same string will be grouped together.

Displaying Data Table

Data Table that shows underlying chart's data can be optionally displayed at the bottom of the chart. To display Data Table:

1. Click on box of the Table cell of the Properties Table.
2. Check isVisible's cell checkbox. The Data Table should appear at the bottom of the chart.

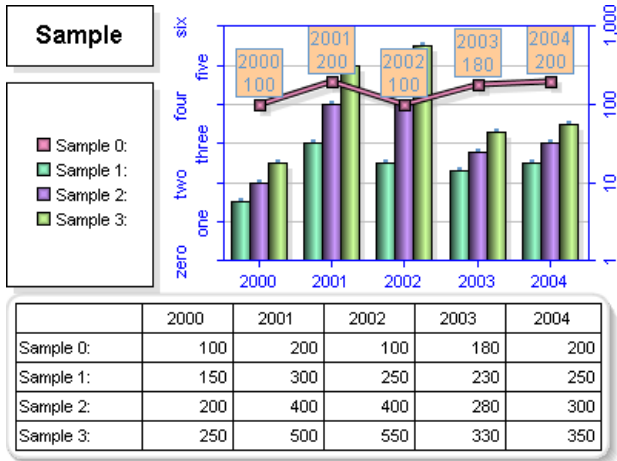
Data Table has a large number of attributes allowing you to display table as heatmap, define zebra background, specify alignments and colors for individual elements, show or hide row/column labels, choose different types of grids, define formats, and more. This attributes are mostly self-explanatory and are not covered in this manual.

Editing Title and Legend

WebCharts3D supports multi-line chart's titles. Both the titles and the legends can be placed on top, bottom, left and right sides, and have vertical and horizontal alignments. When the title and the legend are placed on the same side and have opposite alignments (for example, both are placed on top and have alignments left and right correspondingly), then they are displayed in one line or column.

To achieve this result:

1. Open Title editor by clicking on Title cell and enter 'Sample' as Text.
2. Set Placement to Left, VAlign to Top, HAlign to Center, and close Title editor.
3. Open Legend Editor and set Placement to Left, VAlign to Bottom, and HAlign to Center.
4. Close Legend editor. Your chart should look like:



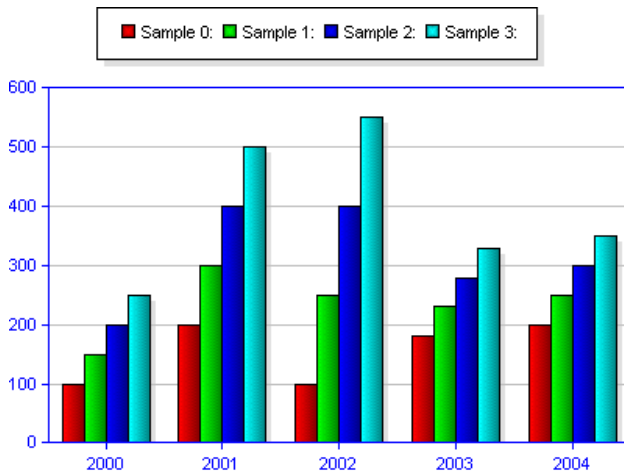
This concludes the second lesson that demonstrated advanced chart's attributes and attributes that can be overridden for each series or each element.

4.0 Creating Charts in Designer – Lesson 3

In this section you will learn about interactive and animation features of WebCharts3D. To demonstrate these features you will need to launch embedded HTTP server and connect to it using browser.

Using Embedded HTTP Server

WebCharts3D includes an embedded HTTP server that can be used for previewing charts. Note that this server is not intended to be used in production environment and is provided solely for testing purposes. For the purposes of demonstration we will use the following chart available in the chart gallery:



Launching Embedded Server

To launch embedded server:

1. Switch to Console pane by clicking on the Console tab located at the bottom of WebCharts3D Designer's screen.
2. Click 'Start' button. The following message will be displayed:

```
WebCharts3D Image Server v5.1  
Copyright (C) GreenPoint, Inc. 1998-2004. All rights reserved.
```

3. Wait until the server is started and the message:

```
Server started <date> on port 8802
```

4. Open a web browser and enter the following address into the browser's address bar:

<http://localhost:8802>

5. Press enter. The chart displayed in the Designer should appear in the browser's window. You will be able to view this chart in different formats by clicking on the hyperlinks located at the bottom of the chart.

Defining Annotations and using Popup

WebCharts3D provides popup window that can be displayed when the user moves mouse over the chart element or presses the mouse button. The text displayed inside the popup is called annotation.

You can control the popup's behavior and decoration by using Popup editor dialog that can be opened by clicking on the Popup cell in the Properties Table. The annotation can be defined by expanding Elements cell and entering a value for annotation cell. Similarly to data labels, annotations can include pseudo-variables (see APPENDIX C). If the annotation is not defined, the default annotation is used.

In this example we will demonstrate defining custom annotation for the first series of data. To define this annotation:

1. Open Series Editor by clicking on the 'series' cell (child element of the Elements cell).
2. Select 0 from the list of the series and click on the annotation cell of the local Properties Table.
3. Enter the following text (in two lines) into the textbox (use tab to separate text from pseudo-variable):

```
In the year    $(colLabel)
result was    $(value)
```

4. Click Ok button to close the dialog. Click Close button to close Series dialog.

Move mouse over the line's markers. The custom annotation will be displayed in the popup window.

NOTE. When you use tab to separate words in the annotation, WebCharts3D will display text in multiple columns. It is not required for pseudo-variables to be separated by tabs or any other characters.

Defining Animation Attributes

WebCharts3D provides animation for some of the chart's formats. In this lesson we will be using Flash file format. To view Flash file format, switch to the browser window that you opened when launching embedded server and click on SWF link at the bottom of the page. You will see how groups of bars grow one by one.

Changing animation style

To change animation style:

1. Open Elements group by clicking on the box of the Element cell in the Properties Table.
2. Open Morph group by clicking on the box of the Morph cell inside Elements group.
3. Change morph element to Blur. Go to the browser window and click the Refresh button. You should see blurring effect.

Changing animation order

To change animation order:

1. Open Elements group by clicking on the box of the Element cell in the Properties Table.
2. Open Morph group by clicking on the box of the Morph cell inside Elements group.
3. Change stage element to Rows. Go to the browser window and click the Refresh button. You should see how different sets of bars are blurring in together this time.

Changing movie properties

To change movie properties:

1. Open Elements group by clicking on the box of the Element cell in the Properties Table.

2. Open Movie group by clicking on the box of the Movie cell inside Elements group.
3. Set `replayDelay` to 0 to make movie loop. Adjust `stageDelay` to introduce the delay between stages. Change `frameCount` and `framesPerSecond` to adjust the length and the quality of the animation.
4. Go to the browser window and click the Refresh button.

Changing individual attributes

You can change animation attributes for the individual series by going to the series dialog and editing morph and stage attributes of the particular series. To edit individual morphing attributes:

1. Open Elements group by clicking on the box of the Element cell in the Properties Table.
2. Open series dialog by clicking on series cell inside Properties Table.
3. Select an existing series or add a new series and modify morph and stage attributes of the local Properties Table.

Defining Actions

WebCharts3D allows you to attach parameterized event handlers to the chart elements. The event handler is defined by the action and the optional target. The action can be any valid url or javascript: handler. The target is the name of the target frame as it is specified in HTML manual or empty string for the current frame.

To define a simple action that will popup a dialog telling you what element was clicked, you can:

1. Open Elements group by clicking on the box of the Element cell in the Properties Table.
2. Enter the following string as the action:

```
javascript:window.alert('$(colLabel) $(rowLabel) was clicked')
```

3. Go to the browser window and click the Refresh button. The new chart should display a small popup when you click on one of the chart's elements.

Similarly to annotations and data labels, actions can be defined on the individual level by using series or column editors.

NOTE: Avoid using double quotes inside the action handler – double quotes are used internally by HTML to introduce handlers.

5.1 Using Data Editor

WebCharts3D Designer's Xml Model pane shows the data used to produce the chart displayed in the Design pane of the Designer. This data can be loaded from XML files, delimited files and databases. This data is static and will not be automatically updated when the underlying data source changes. To learn how to create dynamic charts please refer to the Programmer's manual and to the "Server Deployment" section of this document.

The top part of the Xml Model pane displays the data in tabular format. You can modify the data by clicking on the particular cell and by adding/removing rows and columns.

You can edit the XML directly in the bottom pane. When this pane is modified, two additional buttons are shown – Apply and Reset. You need to press one of them for the changes to be accepted or rejected.

To load data from the Database click "Load from Database" button and in the Database dialog:

1. Fill out the Connection name. If your ODBC connection is called MyDatabase, then this field should be set to jdbc:odbc:MyDatabase.
2. Fill out username and password.
3. Enter SQL statement.
4. If your query returns the data in crosstab format where every row contains row label, column label and value, then make sure that Crosstab checkbox is checked.
5. If your query contains row labels in the first column, then make sure that Row labels checkbox is checked.
6. Click Ok to close the dialog.

To load data from the delimited file click "Import from file" button and in the Import File dialog:

1. Enter full path to the file.
2. Fill other fields and checkboxes.
3. Click ok to close the dialog.

6.0 Server deployment

This section describes the process of deploying the chart to the web server by using WebCharts3D Designer. You can also deploy the charts to the web or application server manually and we recommend you to read Programmer's Guide that explains this process in details.

Server setup

To setup WebCharts3D module on a JSP compliant server:

1. Open Setup dialog by selecting Setup from the File menu.
2. In the Setup dialog switch to the Server tab.
3. Locate the application root of your application. You might need to check with your system administrator or refer to the server documentation. In our example we will consider that your application root is

`C:\Tomcat5.1\webapps\ROOT`

4. Enter the application root into Application home input field and press tab key. Jar and configuration file location and taglib location will change to .../WEB-INF/lib and .../WEB-INF.
5. Click Deploy Jar, Deploy Configuration and Deploy taglib buttons. Once you clicked Deploy Configuration, this button will change to Edit Configuration.
6. Click Deploy button under Page retrieval url field.
7. Click Edit Configuration button. Enter the server-side license or keep it blank for the evaluation. You can modify other server attributes here, but we recommend you to refer to the Programmer's Guide in order to understand the server settings.
8. Close Server Configuration dialog and the Setup Dialog.

Chart Deployment

Once you used Setup dialog to install WebCharts3D runtime on the server you can start using Code Pane to deploy the charts to the server.

In order to deploy a chart to the server using Designer:

1. Switch to Code Pane by clicking Code Pane tab located at the bottom of the Designer.
2. Click Save button. A file dialog will appear pointing to your application root. Name the page mychart.jsp and click Save button.
3. Open web browser and enter url to the save file. This url will look like `http://...../mychart.jsp`.

The JSP file you saved contains code that will produce the chart. Usually you would want to copy this code into a real JSP page or include it by using JSP's include statement.

The code pane gives you an option of embedding the chart's styles into the page or storing them in a separate file. If you prefer to store the styles in a separate file:

1. Switch to Xml Style pane by clicking on the Xml Style tag located at the bottom of the Designer's window.
2. Click Save button and store the Xml file into an xml file.
3. Switch back to Code Pane and click Options button.
4. In the Options dialog uncheck 'Embed Styles' checkbox and enter the full path to the xml style file into Style location field.
5. Press Ok button to close the dialog.

Data binding

The code pane allows you to establish dynamic binding between the chart and its data source. To establish a dynamic binding:

1. Click Option button and in the Option dialog select the appropriate data source type from Model combobox.
2. Press Database Properties or Import File Properties button to display data source properties dialog.
3. Follow the procedure outlined in Using Data Editor chapter of this document to define data source properties.

4. Close data source properties dialog and then close Options dialog by pressing Ok button.
5. Deploy the new code to the server.

7.0 Using Help

To view Designer's Help, switch to the Help pane by clicking on the Help tab located at the bottom of the Designer's window. You can navigate Help by selecting items from the Table of Contents, or by searching for a keyword.

To navigate the help using Table of Contents:

1. Make sure that Contents button located at the top of the left pane is pressed.
2. Navigate to the desired help topic by either clicking on the topic's name or using UP, DOWN and ENTER keyboard keys.

To navigate the help using Search Panel:

1. Make sure that Search button located at the top of the left pane is pressed.
2. Type the keyword or the beginning of the keyword in the text box.
3. Refine the search by double-clicking on one of the keywords in the upper listbox.
4. Double-click on the topic in the lower listbox, or click on the topic and press "Display" button.

Inside Help window you can follow hyperlinks displayed in **dark red** color by clicking on them. To go back to the one of the previous topics use the menu associated with right mouse button.

8.0 Where to get additional help

WebCharts3D distribution includes Designer documentation for more information about Designer's panes not described in this document.

For more information about WebCharts3D please contact support@gpoint.com.

APPENDIX A – CHART MODEL REQUIREMENTS

Frame charts

The number of the required rows for frame chart depends upon the shapes displayed inside of it. To see the number of the required rows for a particular shape click [here](#). Stock shapes require elements in the order specified by its name. For example, HIGHLOWOPENCLOSE element requires 4 elements in the high-low-open-close order. Bubble shape requires 2 series - first series defining the Y coordinate of the bubble center and the second - defining its relative size. The size can be any number, but larger values will result in larger bubbles than the smaller values, and equal values will result in the bubbles of equal size.

NOTE. When your X-axis style is set to scale, logarithmic or date/time, the column labels are treated as values along this axis.

Pie charts

Pie charts can take any number of rows and columns and depending upon the type will either render multiple pies or combine all rows into one doughnut.

Radar charts

Radar charts can take any number of rows and columns, but for this chart to display anything you need to have at least 3 columns in your model.

Dial Charts

Dial charts require two series of data. The first series defines the position of the dial hand and only the first element in it is currently used. Other elements can be specified to set the range of the dial, but we recommend to set the range of the dial in the axis attribute of its style instead. The second series of data defines the ranges on the dial. Each value is a percentage of the dial that will be colored using the corresponding element color. For example, values 50, 30 and 20 will result in half of the dial being red, 30% green and 20% blue. If the second row is not specified, the edge of the dial will remain uncolored.

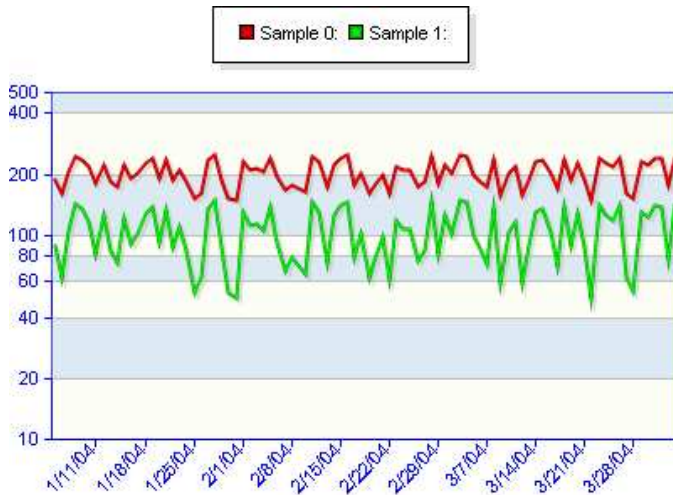
Statistical Charts

Statistical charts provide basic charts for statistical data visualization. These charts usually apply some calculations to the raw data prior to displaying it, show statistical information in the chart's legend and can optionally display statistical axes with step equal to the standard deviation of the underlying distribution. In addition, some charts can calculate and show Value-At-Risk for the specified level.

- Histogram** - Uses one row of data. Automatically buckets data into the number of buckets defined by the number of XAxis labels. If the number of labels is 0, then Sturge's rule is used. The chart plots the histogram itself and the normal distribution density function fit to the underlying distribution mean and standard deviation. Can optionally plot Value at Risk as a shaded area under the normal curve.
- Timeline** - Uses one row of data. Displays timeline for the provided series of data. Can optionally plot band specified by the VaR level.
- Profile** - Uses one row of data. Displays profile for the provided series of data and cumulative normal fitted to the underlying distribution parameters.
- Regression** - Uses two series of data. The first series is used as X axis (independent) coordinates, the second series is used as Y axis coordinates. Displays provided data points as dots and plots linear regression function obtained using least squares method. The chart's legend displays the regression's alpha and beta.

APPENDIX B – USING DATE/TIME SCALES

X Axes can use date/time style to render dates and times. These axes can use different parse and label formats and provide control over the label placement. This appendix demonstrates using this type of scales by modifying one of the standard charts. To start, pick the following chart from the chart gallery (available in the line section):



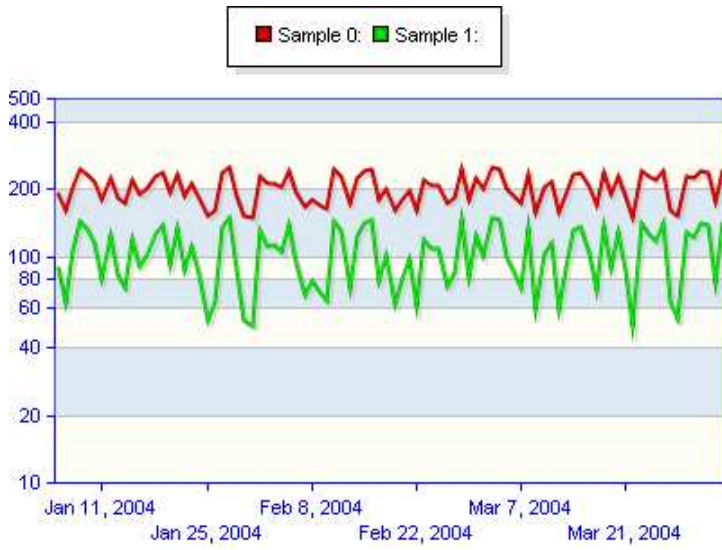
This chart already has X axis set to Date/Time. Click on xAxis cell of the Properties Table to open the axis editor and:

1. In the Format tab change Label format to MediumDate in order to specify MMM dd, yyyy format. Note that parse format in this case should not be changed since our data xml specifies dates in this format.
2. In the Style tab check Is Multilevel checkbox and change label's orientation to Horizontal.
3. We need to adjust the label step. In Style tab in Date/Time subpane there are two steps – minorStep and majorStep.

Minor step is used to define the chart's granularity and when it is set to Day all dates and times will be rounded to a day. In other words 1/1/2001 1:00PM and 1/1/2001 4:PM will be considered the same values. Since our data does not use time, we can continue using Day as a minorStep.

Major step is used to define the label's spacing and is currently set to 1 Week. This tells the engine to display weekly labels using local first day of week as the day of week to display. You need to set the majorUnit to 2 in order to display every other week.

The resulting chart will look like:



APPENDIX C – PSEUDOVARIABLES

Data labels, legend, annotations and actions can contain special parameters in the format $\${name}$ or $\$(name)$. (The latter notation was introduced to avoid conflicts with other software that might use the former syntax for its own needs). These parameters are expanded during run-time and replaced with their corresponding values. For example, you can specify:

$\$(colLabel)$ $\$(value)$ is $\$(colPercent)$ of $\$(colTotal)$

to display the name of the column, the value of the element, percent and column's total value.

The following table shows currently supported parameters:

colIndex	- Index of the column
rowIndex	- Index of the row
colLabel	- Label of the column
rowLabel	- Label of the row
value	- Value formatted using appropriate yAxis labelFormat
nextvalue	- Value in the next series formatted using appropriate yAxis labelFormat
colTotal	- Sum of all absolute values in this column
rowTotal	- Sum of all absolute values in this row
colPercent	- Percent relative to the column total
rowPercent	- Percent relative to the row total
colTitle	- column title (XAxis title)
rowTitle	- row title (seriesTitle attribute)
valueTitle	- value title (YAxis title)

In addition, $\$(value)$ pseudo-variable supports optional syntax:

$\$(value[row,col])$

where row and col are optional increment/decrement for the current index. For example, $\$(value[1,])$ is the same as $\$(nextvalue)$ and will return the value in the next series with the same column index, while $\$(value[,1])$ will return the value in the next column.

WebCharts3D uses axis's format to format values inside parameters. To override this behavior you can specify optional semicolon-separated pattern inside the parameters. For example the following reference will display all values with two decimal places:

$\${value;#.00}$

APPENDIX D – GANTT CHARTS

A Gantt chart is a horizontal bar chart developed as a production control tool in 1917 by Henry L. Gantt, an American engineer and social scientist. Frequently used in project management, a Gantt chart provides a graphical illustration of a schedule that helps to plan, coordinate, and track specific tasks in a project.

A Gantt chart allows to track either whole projects or tasks that has to be accomplished to achieve project goals within multiple projects.

Models for Gantt charts are implemented by MxGanttModel class and contain start/end time pairs associated with the task name and optional type with optional date/time format and locale information. Xml representation of Gantt chart's model has the following format:

```
<xml [pattern="<date/time pattern>"] [locale="<langcode>-
<countrycode>"]>
    <item name="<name>" type="<type>" from="<from>" to="<to>"/>
    . . . .
</xml>
```

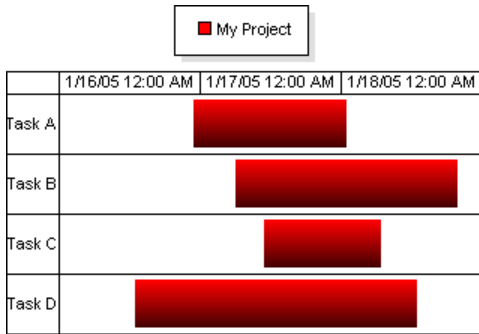
where

date/time pattern	- is a standard Java Date/Time pattern
langcode	- is a standard ISO two character language code
countrycode	- is a standard ISO two character country code
name	- is a task name
type	- is a project name

For example, the following XML model

```
<xml pattern="M/d/yy hh:m a" locale="en-US">
    <item name="Task A" type="My Project" from="1/16/05 11:04 PM"
to="1/18/05 1:44 AM"/>
    <item name="Task B" type="My Project" from="1/17/05 6:44 AM"
to="1/18/05 8:44 PM"/>
    <item name="Task C" type="My Project" from="1/17/05 11:44 AM"
to="1/18/05 7:44 AM"/>
    <item name="Task D" type="My Project" from="1/16/05 1:44 PM"
to="1/18/05 1:44 PM"/>
</xml>
```

will produce the chart that will look like:



Xml Style:

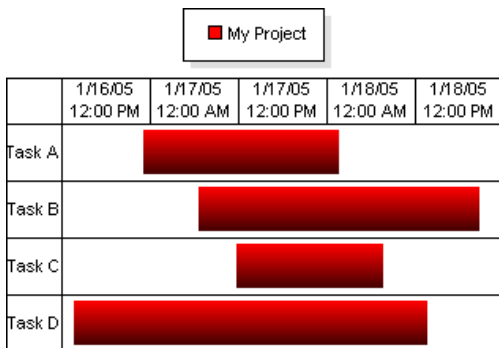
```
<gantt>
  <xAxis>
    <dateTimeStyle minorUnit="Hour"/>
  </xAxis>
</gantt>
```

Creating single-project Gantt Chart

Creating a basic single-project Gantt chart is fairly simple. You will need to make sure that your X-axis (date/time axis) style is set up correctly to display your data range. WebCharts3D provides two sets of attributes to do so - major that define what is rendered as a label and minor that define what is the least significant part of the date. Usually you will need to set major attributes in such a way that only a reasonable number of labels is displayed.

For the model presented above you might want to set your major attributes in such a way that the chart displays only days or half days along X axis. To do so, click on XAxisstyle in the Properties panel and look under DateTimeStyle. When major unit is set to Day you will see the picture shown in the previous section. Let us set major unit to Hour and major step to 12 to display two periods per day.

You should see the following picture (we set multiline mode for Xaxis to avoid label overlapping):



Creating multi-project Gantt Chart

A multi-project Gantt chart contains elements with more than one type in its data model, for example:

```
<xml pattern="M/d/yy hh:m a" locale="en-US">
  <item name="Task A" type="My Project"
    from="1/16/05 11:04 PM" to="1/18/05 1:44 AM"/>
```

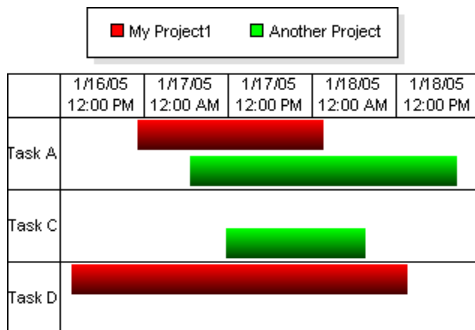
WebCharts3D v5.2 Designer User's Guide

```

<item name="Task A" type="Another Project"
  from="1/17/05 6:44 AM" to="1/18/05 8:44 PM"/>
<item name="Task C" type="Another Project"
  from="1/17/05 11:44 AM" to="1/18/05 7:44 AM"/>
<item name="Task D" type="My Project"
  from="1/16/05 1:44 PM" to="1/18/05 1:44 PM"/>
</xml>

```

This model defines two projects - MyProject containing tasks A and D, and AnotherProject containing tasks A and C. Your chart should now look like



Xml Style:

```

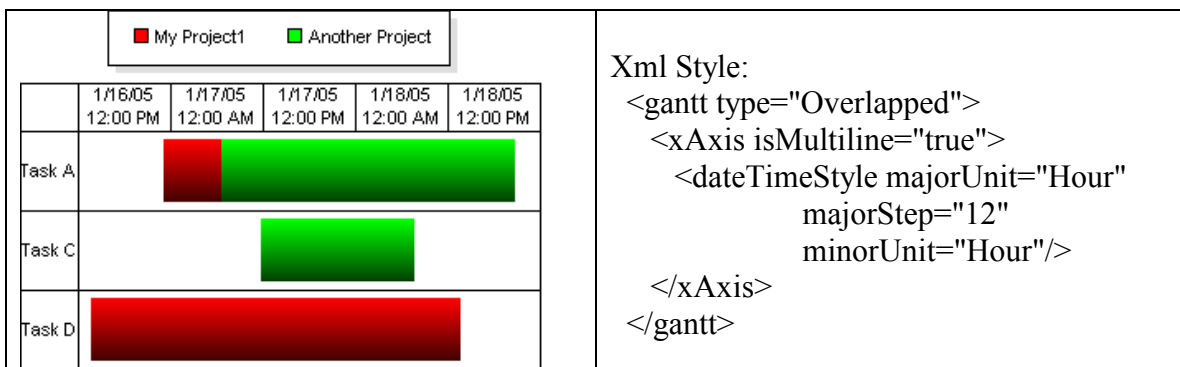
<gantt>
  <xAxis isMultiline="true">
    <dateTimeStyle majorUnit="Hour"
      majorStep="12"
      minorUnit="Hour"/>
  </xAxis>
</gantt>

```

Multi-project Gantt charts can be displayed in two modes:

- Clustered - when each project task is allocated its own space inside each task bucket and
- Overlapped - when all project tasks are displayed overlapped inside each task bucket.

Usually when using overlapped mode you should either ensure that the project tasks for the same task do not overlap or use transparent colors. To change the Gantt type to overlapped click on type combobox and select Overlapped. The chart will look like:



Xml Style:

```

<gantt type="Overlapped">
  <xAxis isMultiline="true">
    <dateTimeStyle majorUnit="Hour"
      majorStep="12"
      minorUnit="Hour"/>
  </xAxis>
</gantt>

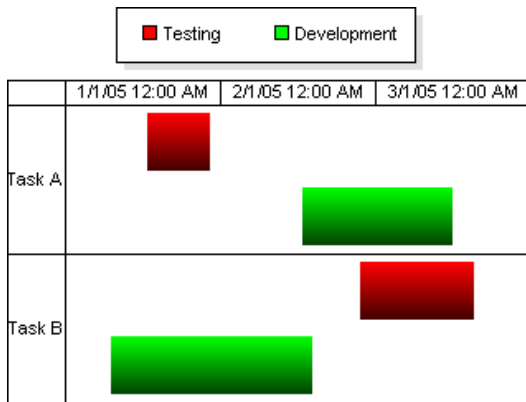
```

Customizing Gantt charts

Gantt charts can be customized to give them a unique look. In this section we will start with a basic chart that uses the following model:

```
<xml pattern="M/d/yy hh:m a" locale="en-US">
  <item name="Task A" type="ProjectA"
    from="1/17/05 9:00 AM" to="1/29/05 9:44 AM"/>
  <item name="Task A" type="ProjectB"
    from="2/16/05 9:20 AM" to="3/17/05 9:00 AM"/>
  <item name="Task B" type="ProjectB"
    from="1/10/05 11:00 AM" to="2/18/05 9:45 AM"/>
  <item name="Task B" type="ProjectA"
    from="2/27/05 9:25 AM" to="3/21/05 9:25 AM"/>
</xml>
```

With major unit for Y axis set to Month the chart with the above data looks like:

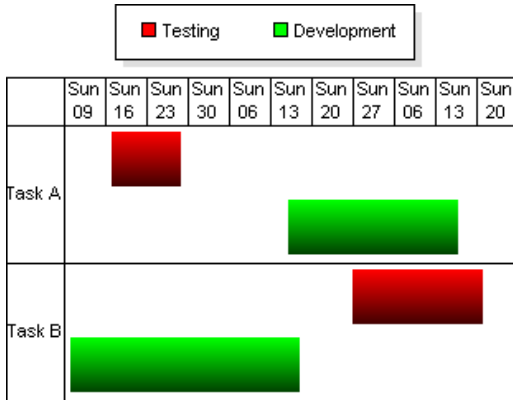


Xml Style:

```
<gantt>
  <xAxis>
    <dateTimeStyle majorUnit="Month"/>
  </xAxis>
</gantt>
```

Customizing X Axis labels and groups

First, let's change the labeling to be Weekly by changing major step in DateTimeStyle for X axis from Month to Week. We will also define a new label format for the labels. Click on Label Format, change style to DateTimePattern and enter 'EEE dd' as the format. This will tell the engine to show three character day of week abbreviation along with the day of month. Close the dialog. Your chart should look like:



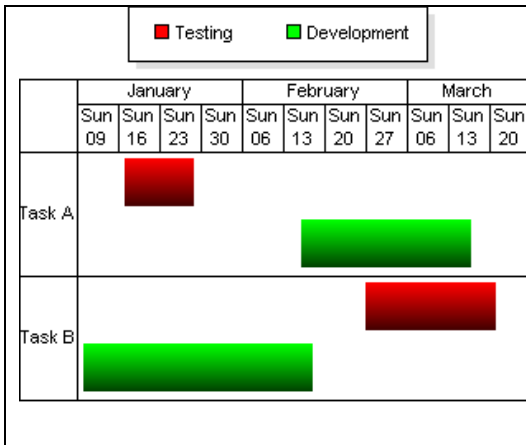
Xml Style:

```

<gantt>
  <xAxis>
    <labelFormat
      style="DateTimePattern"
      pattern="EEE dd"/>
    <dateTimeStyle majorUnit="Week"/>
  </xAxis>
</gantt>

```

This looks better but now there is no way to see the month. You can add month to the format but this would duplicate month name in every label. A better way is to define grouping for the elements. In XAxis format click on GroupFormat and change its style from None to DateTimePattern. Enter MMMM (or MMM for three character month abbreviation) into the Pattern field and close the dialog. Your chart should change to:



Xml Style:

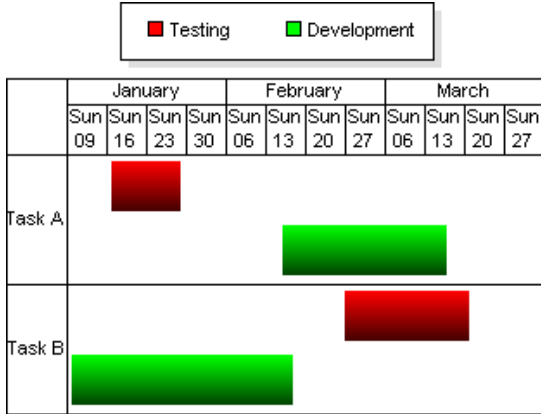
```

<gantt>
  <xAxis isMultiline="true">
    <groupFormat
      style="DateTimePattern"
      pattern="MMMM"/>
    <labelFormat
      style="DateTimePattern"
      pattern="EEE dd"/>
    <dateTimeStyle majorUnit="Week"/>
  </xAxis>
</gantt>

```

Customizing X Axis range

If you want to ensure that a particular range is always shown, you need to define X Axis scale max and/or scale min. In our model we do not have data for the last week of March. In order to include this week into the chart you can set scale max attribute of X axis to '3/31/05 0:00 AM'. Note that the date should be in the format defined by the model. The chart will change to:



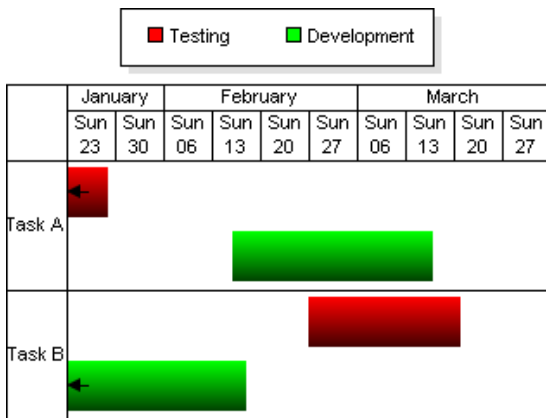
Xml Style:

```

<gantt>
  <xAxis
    scaleMax="3/31/05 0:00 AM"
    isMultiline="true">
    <groupFormat
      style="DateTimePattern"
      pattern="MMMMM"/>
    <labelFormat
      style="DateTimePattern"
      pattern="EEE dd"/>
    <dateTimeStyle majorUnit="Week"/>
  </xAxis>
</gantt>

```

Scale max and scale min attributes are used to expand the chart's range defined by the chart's model. What if you need to show only a subset of the Gantt chart - you projects might go for over a year, but you need to show only a few months? To tell the chart to ignore the input data range and to use range defined by scale min and scale max values turn useModelRange flag off. Now, if we enter '1/25/05 0:00 AM' as scale min our picture will change to:



Xml Style:

```

<gantt>
  <xAxis scaleMax="3/31/05 0:00 AM"
    scaleMin="1/25/05 0:00 AM"
    userModelRange="false"
    isMultiline="true">
    <groupFormat
      style="DateTimePattern"
      pattern="MMMMM"/>
    <labelFormat
      style="DateTimePattern"
      pattern="EEE dd"/>
    <dateTimeStyle majorUnit="Week"/>
  </xAxis>
</gantt>

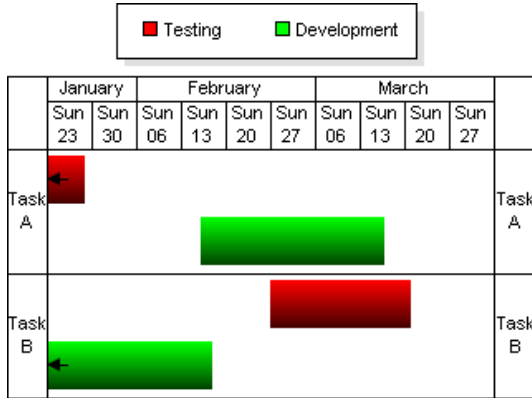
```

Note that now both Testing in Task A and Development in Task B have arrows pointing back to denote that these tasks started earlier than it is shown.

When you want to show a Task that does not have a yet defined end date you can use empty string as a date in your XML data model. In this case an arrow pointing forward will be displayed at the end of the task bar regardless of the X axis range.

Customizing Y Axis

Y axis in Gantt chart can be placed on the Left, Right or Both edges of the chart. Similarly to X axis, you can make Y axis multi-line.



Xml Style:

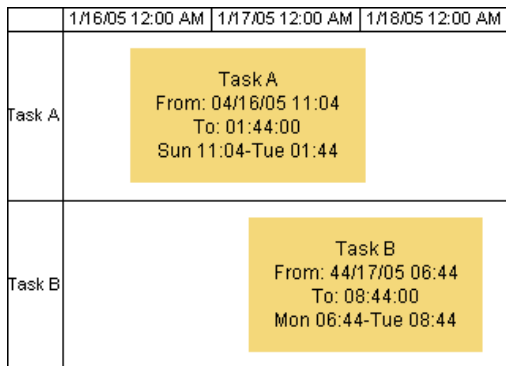
```
<gantt>
  <xAxis
    scaleMax="3/31/05 0:00 AM"
    scaleMin="1/25/05 0:00 AM"
    userModelRange="false"
    isMultiline="true">
    <groupFormat style="DateTimePattern"
      pattern="MMMMMM"/>
    <labelFormat style="DateTimePattern"
      pattern="EEE dd"/>
    <dateTimeStyle majorUnit="Week"/>
  </xAxis>
  <yAxis isMultiline="true" showOn="Both"/>
</gantt>
```

Using Pseudo-variables

Gantt charts treat pseudo-variables used by annotations and data labels in a different way than other charts do. The following table summarizes the pseudo-variables and their formats supported by Gantt charts:

- $\{colLabel\}$ - Project/type
- $\{rowLabel\}$ - Task/name
- $\{prevValue[;format]\}$ - From date/time
- $\{nextValue[;format]\}$ - To date/time
- $\{value[;format]\}$ - From - To string

The following chart demonstrates usage of the Gantt pseudo-variables:



Xml Style:

```
<gantt>
  <dataLabels style="Pattern"><![CDATA[
    $(rowLabel)
    From: $(prevValue;mm/dd/yy hh:mm)
    To: $(nextValue;hh:mm:ss)
    $(value;EEE hh:mm)
  ]]></dataLabels>
  .....
</gantt>
```

APPENDIX E – GAUGE CHARTS

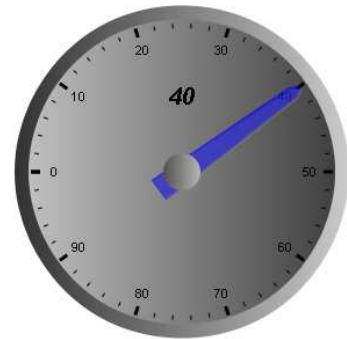
Gauge charts are effective when you need to display a single or a number of single variables at some moment in time. These charts are often used as parts of digital dashboards to present key indicators to the end-users.

Data Model

WebCharts3D Gauge charts use standard MxChartModel with a single row of data representing chart's values. An optional second row can be used to map these values to the different axes as described in this manual.

Changing Dial Style

A Gauge chart consists of outer edge, inner edge, multiple axes, hands and a knob. The picture on the right shows a basic gauge chart with default attributes. This is a 360 degrees dial chart with one axis.



WebCharts3D allows you to define the angle for the chart's dial by customizing `startAngle` and `sweepAngle` for the dial style. All angles are measured in degrees starting from 3 o'clock position with clockwise angles being positive and counterclockwise ones - negative. For example, the following chart has `startAngle` of 220 and `sweepAngle` of -260.



Dial is surrounded by two borders with attributes defined by edge style. The combination of these borders allows you to produce a large number of custom decorations, such as shown in the pictures below:



Xml Style:
`<gauge>
 <dialStyle startAngle="220" sweepAngle="-260">
 <paint minColor="#333333" maxColor="#CCCCCC"/>
 </dialStyle>
 <edgeStyle outerSize="2" outerSide="2"
 innerSize="3" innerSide="3">
 <inner minColor="#CCCCCC" maxColor="#333333"/>
 </edgeStyle>
</gauge>`

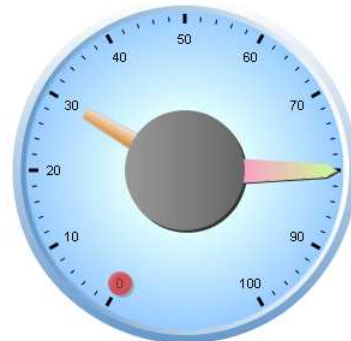


Xml Style:
`<gauge>
 <dialStyle startAngle="220" sweepAngle="-260">
 <paint outlineColor="#6699CC" minColor="#99CCFF"
 maxColor="white" angle="90"/>
 </dialStyle>
 <edgeStyle outerSize="7" outerSide="1" innerSize="5"
 innerSide="10">
 <outer minColor="#6699CC" maxColor="white" angle="90"/>
 <inner minColor="#99CCFF" angle="180"/>
 </edgeStyle>
</gauge>`

When you create gauge charts with sweep angles less than 180 degrees you can choose between showing the entire chart, or just the chart's segment by toggling isFull attribute of dial style on or off. Clip attributes in knob style control the hand and knob clipping for such charts.

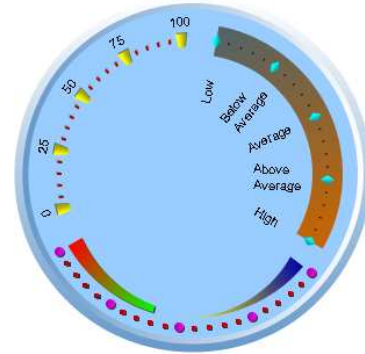


Hand and knob attributes allow you to further customize the chart. A chart can have only one knob but multiple hands. The default hand attributes are specified by Hand Style. You can override these default attributes by adding more styles to Hand Styles collection. For example, the chart on the right has three hands with row, bar and dot styles.



An axis consists of tick area, label area and optional limit area. The axis's range in case of gauge charts never automatically includes the actual value and should be explicitly specified by scale min and scale max attributes. Unless angle margin is specified the entire range available for the axis is used to draw it.

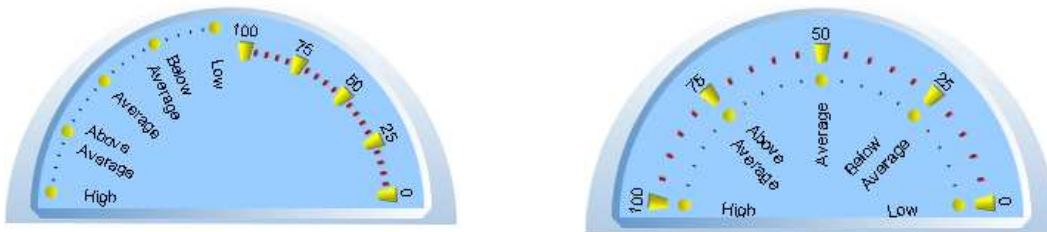
All axis elements are highly customizable. You can choose label placement and orientation, label format, major and minor tick shape and colors, axis background and define custom limits. The gauge on the right shows three different axis that demonstrate some of the axis's attributes.



Gauge charts can have multiple axes. You can create multiple axes by adding new styles to axis styles collection. The axis with the largest index defines the total number of axes.

To bind your data to different axes you need to provide a second row of data in your model. The values in this row will be used as indexes to define what axis the corresponding value should be rendered against.

Multiple axes can be enclosed one inside other or placed side by side as the following two pictures demonstrate.



Each axis can have a title and each hand can have a data label associated with it. A title is just a string and a data label is represented by a pattern that can use standard WebCharts3D pseudo-variables such as $\${value}$. You can control both title and data label placement by using its angle and ratio attributes.

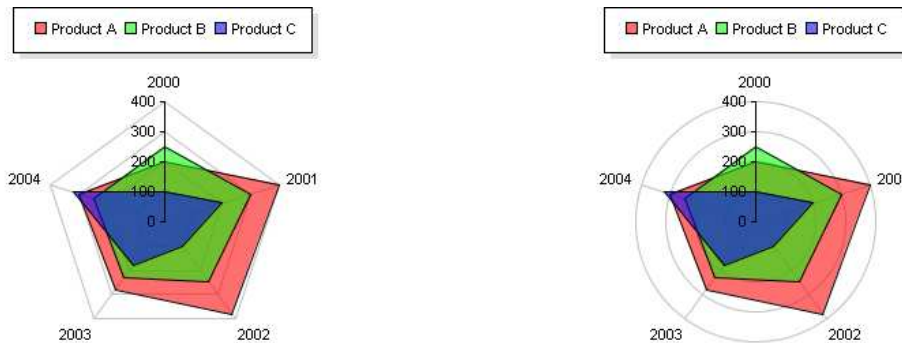
Data labels can be displayed using fonts or emulated 7 or 16 LED. For example, the chart on the right uses LED7 to display the value as data label. Note that LED7 can be used to display numbers only.



APPENDIX F – RADAR, POLAR AND STAR CHARTS

Radar, Polar and Star charts are used to compare values across multiple categories in a radial layout. They are most useful when you have relatively few alternatives (2-4) that you would like to compare based on a few different criteria (3-8). WebCharts3D supports Radar, Polar and Star charts.

Usually Radar Charts either show only outlines or use transparent palettes to allow multiple layers presented on the chart to be visible at the same type. The following pictures shows simple radar and polar charts with transparent colors:



Star charts (shown on the right) are similar to Radar charts but they use two rows of data to render a single element, the first row specifying the value along axis, and the second row specifying the relative width of the element's base. All attributes applicable to Radar/Polar charts can be applied to Star charts.

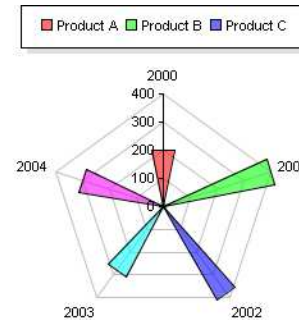
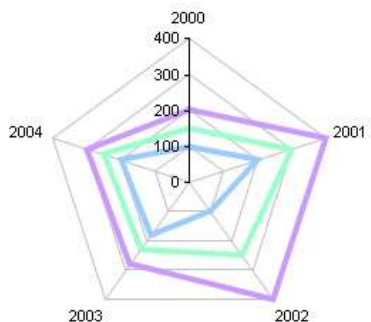
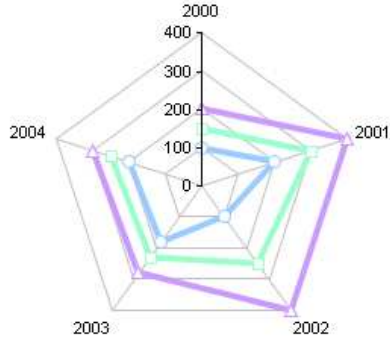


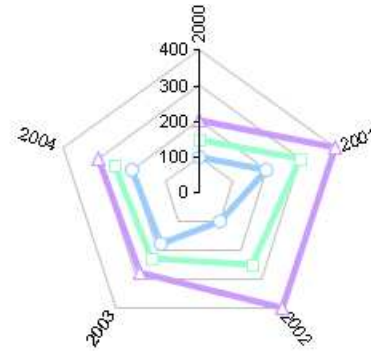
Chart style determines the shape of the elements displayed inside radar charts. WebCharts3D supports FillArea, DrawArea and Polyline element styles. To change the chart's shape style click on *style* combobox in the Properties panel. For example, the following chart uses DrawArea style:



Like many other charts, radar charts can display markers at the data points. To turn markers on set marker size in Elements to a positive number and make sure that useMarkers is turned on. The following picture shows Radar chart with marker size set to 4 and type of Polyline:



Radar chart has only one axis and you can control grid, label rendering and orientation using Axis Properties Panel the same way you can do it with other charts. Radar charts have two grids - normal, that can be presented as concentric circles or polylines and radial. You can change the label orientation by changing label placement attribute. For example, the chart on the right has radial label placement style with radial grid turned off.



A number of properties can be used to improve your chart's look and feel. You can show shadows, change *line width*, and define radar background.



APPENDIX G – MAPS

WebCharts3d allows you to develop custom diagrams and maps. The map structures are treated as resources - i.e. they are defined and stored outside of XML Styles. To edit these resources you can use Map Editor that can be launched from the command line by typing:

```
java -jar wc50.jar --mapedit
```

When you create a new Map you'll need to define the location of the .map file created by Map Editor or included with this product. Map files represent a tree consisting of items that can contain other elements and terminal nodes (such as areas, texts, and images). Map models can contain exactly the same information as the Map files and are used to override the default parameters defined in the maps. For example, to change the color of California state you can type in the model:

```
<map name="USA">
  <item name="States" popup="$(title)\n$(value)">
    <item name="CA" backColor="red"/>
  </item>
</map>
```

Map elements can have the following attributes: *name*, *title*, *value*, *backColor*, *foreColor* and *popup*. All attributes with exception of the name can be overridden in the map's model. The name is used as a key and can be modified in the .map resource files only.

Both text leaves and popup attribute can contain plain text and pseudo-variables \$(name), \$(title), and \$(value), that will be replaced with the actual values. In addition, a special pseudo-variable \$(pattern) refers to the pattern defined in XML styles. This pattern can in turn contain pseudo-variables. This functionality is used to allow you to develop a map in Map Editor that refers to pattern that will be later defined by the developer in WebCharts3D Designer. For example, the US map provided with this product contains \$(pattern) in each text field associated with the state. If you will change pattern in WebCharts3D designer from \$(name) to \$(title), then all states will start displaying their actual names instead of the two-character state abbreviation.

To define a popup text you can either define some custom text for each item or define popup attribute with pseudo-variables for the root element. For example, the US map provided with this product defines popup for the root element inside the map's model as "\$(title)\n\$(value)".