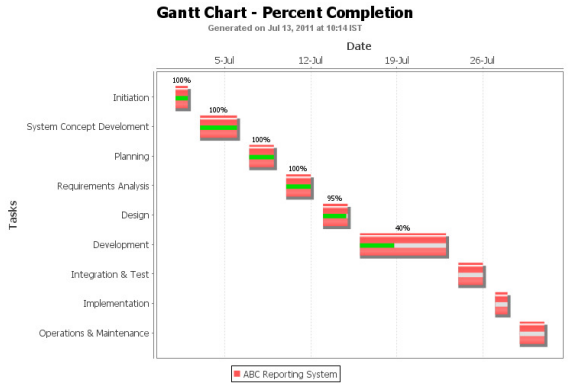
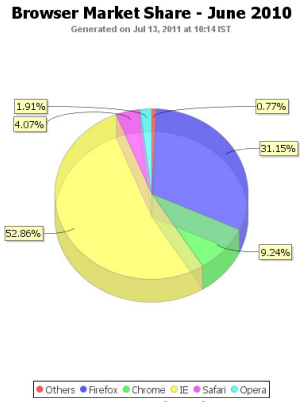
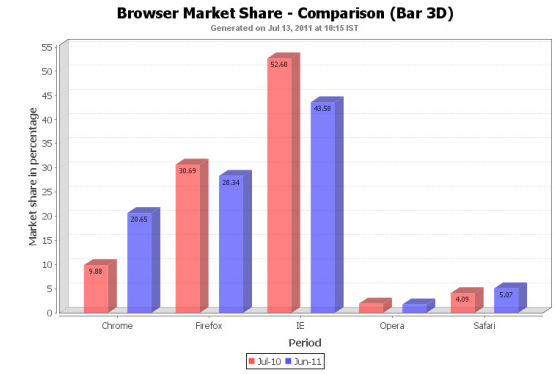
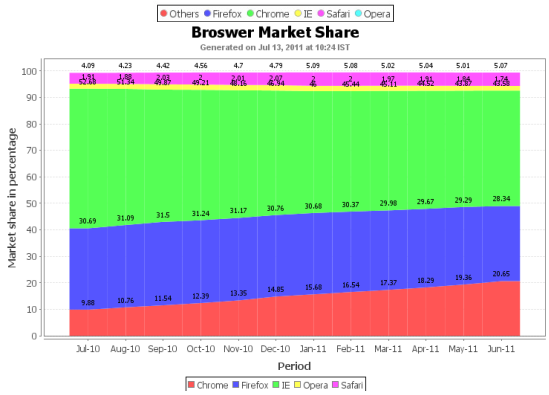
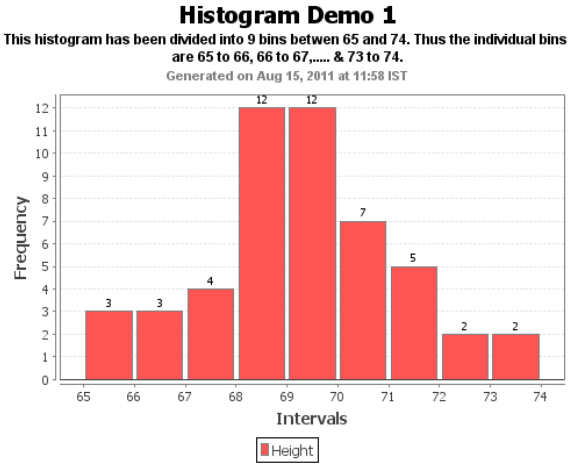
Java Charts v1.3

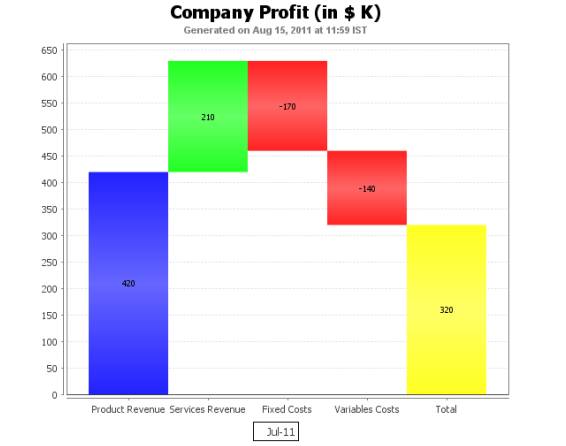


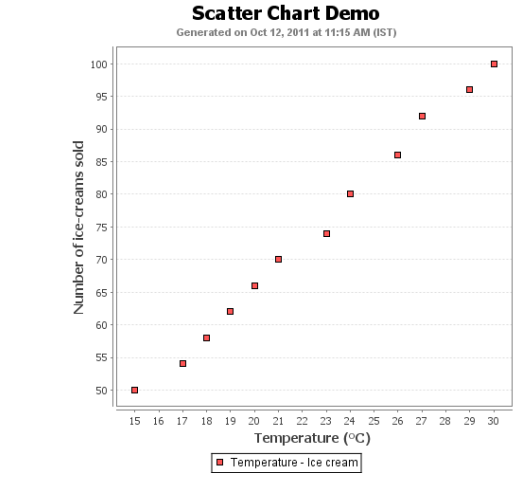


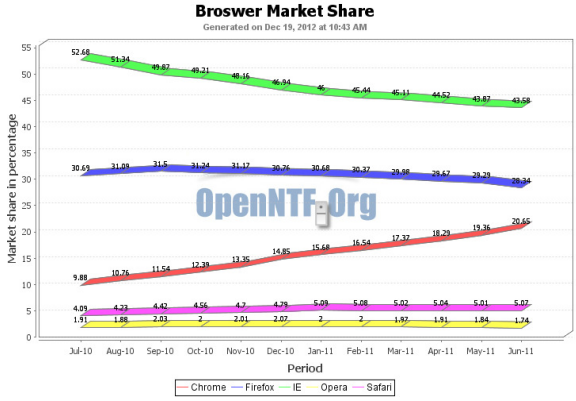












About

Java Charts enables you to create various types of charts and display them on your XPage. It also provides you with ability to export these charts to PDF file.

Java Charts uses **JFreeChart** (http://www.jfree.org/jfreechart/) to create charts and **iText** (http://itextpdf.com/) to export those charts to PDF file.

Key features:

1. Java Charts v1.1 and above is available under **LGPL3** so that you can use it in your proprietary applications.
2. Renders chart as image so that you **save them on your PC** or **put them in your Document / Presentation**.
3. As the charts are rendered as images, it **works on all browsers & across all versions**.
4. **Export the charts to PDF** files for archiving.
5. You can include the date/time on which the chart was generated for reference.

Following types of charts are available:

1. Pie
2. Pie 3D
3. Ring
4. Gantt
5. Area
6. Bar
7. Bar 3D
8. Bar layered
9. Line
10. Line 3D
11. Stacked Area
12. Stacked Bar
13. Waterfall
14. Histogram
15. Scatter Diagram

Requirements

This application has been developed using Domino Designer 8.5.3. From version 1.2, Java Charts uses capabilities which are present in 8.5.3, so higher versions may not work on 8.5.1. If your server is 8.5.1 then I would recommend using version 1.0 or 1.1, but new features and bug fixes would not be present in those versions.

Implementing Java Charts

To implement Java Charts in your database follow these steps:

1. Copy the JAR files `iText-2.1.7.jar`, `jcommon-1.0.16.jar` & `jfreechart-1.0.13.jar`, paste it in your "lib" directory of your database inside "WebContent → WEB-INF" and add the JARs to your build path. I have explained the detailed steps for adding JARs in your application in a separate file – **"Adding JARs of Java Charts to your database.pdf"**.

Make sure you perform this step before copying any design elements in your database as Java code uses classes from these JARs.

2. Open the database “JavaCharts.nsf” in Domino Designer.

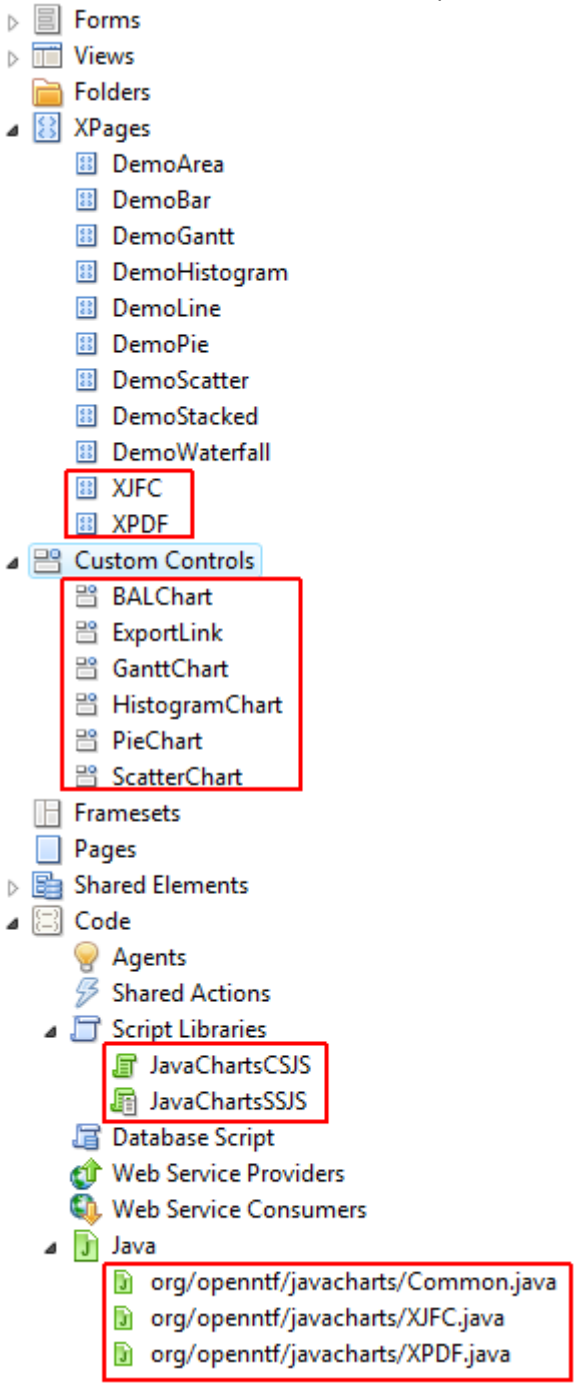
3. Copy the XPage – `XJFC` & `XPDF` and paste it in your database.

4. Copy the Custom Controls – `BALChart`, `ExportLink`, `GanttChart`, `HistogramChart`, `PieChart` & `ScatterChart` and paste it in your database.

5. Copy the script libraries – `JavaChartsCSJS`, `JavaChartsSSJS` and paste it in your database.

6. Copy the files of `Common.java`, `XJFC.java` and `XPDF.java` from “Code > Java” section.

7. Below is the screenshot of all the components that need to be copied.

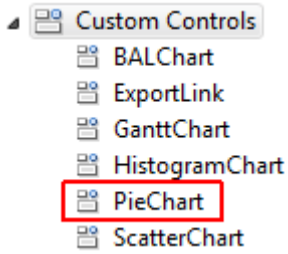


8. The other XPages – `DemoArea`, `DemoBar`, `DemoGantt`, `DemoHistogram`, `DemoLine`, `DemoPie`, `DemoStacked`, `DemoWaterfall` & `DemoScatter` show sample charts.

NOTE: If you need to use "JavaCharts.nsf" on your server then make sure you sign the database (especially XPages) with appropriate ID.

- Signing XPages: http://publib.boulder.ibm.com/infocenter/domhelp/v8r0/index.jsp?topic=/com.ibm.designer.domino.ui.doc/wpd_forms_sign.html
- Security Exception when opening an XPages database: http://www-10.lotus.com/ldd/nd85forum.nsf/0/4c89c53b57e974cd85257547003c6b44?OpenDocument

Pie charts (Custom Control → `PieChart`)



To include a pie chart in your XPage you need to use the `PieChart` custom control. There are three types of charts that can be generated using this control:

1. Pie
2. Pie 3D
3. Ring

Property	Type	Description
title	String	The title for the chart.
width	int	Width of the chart in pixels.
height	int	Height of the chart in pixels.
includeGeneratedDateTime	String	Display the date and time on which this chart was generated. You can choose either to display only date or date with time or hide it completely. Options are: 1. Date 2. Date & time 3. Date & time with time zone 4. Do not show

chartItems *	Array	Items which need to be included in the chart. These items are displayed in the legend of the chart. For e.g.
		`new Array(...)`
		`@Explode(...)`
		`@DbColumn(...)`
		`@DbLookup(...)`
		Any subclass of `java.util.Collection` like `Vector`, `ArrayList`, etc.

chartValues *	Array	Values for the items which were entered in the property "chartItems" at the corresponding positions. For e.g.
		`new Array(...)`
		`@Explode(...)`
		`@DbColumn(...)`
		`@DbLookup(...)`
		Any subclass of `java.util.Collection` like `Vector`, `ArrayList`, etc.

type	String	Type of the chart to be displayed. Options are: 1. Pie 2. Pie 3D 3. Ring
enableExport	boolean	Whether links to export the chart to PDF should be visible. If set to true then links will be visible else it won't.

displayPieValues	String	Indicates how the values / percentage should be displayed in the chart. Options are: 1. Only values 2. Only percentage 3. Values and percentage 4. None
subTitle	String	A short description of the chart; appears below the title.
legendPosition	String	Position of the legend in the chart. It can be placed at bottom, left, right, top or can be hidden.

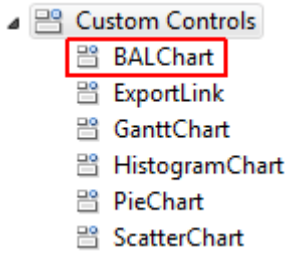
* The number of items in these properties should be same. Refer the example given below.

Example:

	Array / List/ Vector					
chartItems	IE	Firefox	Chrome	Safari	Opera	Others
chartValues	43.58	28.34	20.65	5.07	1.74	0.62

The sample Pie charts are displayed in the XPage – `DemoPie`.

Bar, Area & Line charts (Custom Control → `BALChart`)



To include a bar, line, area or waterfall charts in your XPage you need to use the `BALChart` custom control. There are nine types of charts that can be generated using this control:

1. Area
2. Bar
3. Bar 3D
4. Bar Layered
5. Line
6. Line 3D
7. Stacked Area
8. Stacked Bar
9. Waterfall

Property	Type	Description
title	String	The title for the chart.
width	int	Width of the chart in pixels.
height	int	Height of the chart in pixels.
includeGeneratedDateTime	String	Display the date and time on which this chart was generated. You can choose either to display only date or date with time or hide it completely. Options are: 1. Date 2. Date & time 3. Date & time with time zone 4. Do not show

chartCategories *	Array	Categories which need to be included in the chart. These items are displayed in the legend of the chart. For e.g.
		`new Array(...)`
		`@Explode(...)`
		`@DbColumn(...)`
		`@DbLookup(...)`
		Any subclass of `java.util.Collection` like `Vector`, `ArrayList`, etc.

chartSeries *	Array	Series for each of the categories defined in the property "chartCategories". These values are displayed in the X-axis of the chart. For e.g.
		`new Array(...)`
		`@Explode(...)`
		`@DbColumn(...)`
		`@DbLookup(...)`
		Any subclass of `java.util.Collection` like `Vector`, `ArrayList`, etc.

chartValues *	Array	Values for each of the series and categories defined in the properties “chartSeries” & “chartCategories” at the corresponding positions. For e.g.
		`new Array(...)`
		`@Explode(...)`
		`@DbColumn(...)`
		`@DbLookup(...)`
		Any subclass of `java.util.Collection` like `Vector`, `ArrayList`, etc.

type	String	Type of the chart to be displayed. Options are: 1. Area 2. Bar 3. Bar 3D 4. Line 5. Line 3D 6. Stacked Area 7. Stacked Bar 8. Waterfall
orientation	String	Orientation of the chart. Options are: 1. Horizontal 2. Vertical
enableExport	boolean	Whether links to export the chart to PDF should be visible. If set to true then links will be visible else it won’t.
labelx	String	Label to be shown on the X-axis.
labely	String	Label to be shown on the Y-axis.
subTitle	String	A short description of the chart; appears below the title.
displayValues	Boolean	Whether or not to display the values in the chart.
legendPosition	String	Position of the legend in the chart. It can be placed at bottom, left, right, top or can be hidden.
backgroundColor	String	Background color of the chart. It needs to be expressed in hexadecimal form. For e.g. FFFFFF.
gridLineColor	String	Grid line color of the chart. It needs to be expressed in hexadecimal form. For e.g. FFFFFF.
yAxisTickUnit	String	Unit after which ticks would be generated on the Y-Axis. For e.g. If the value is set to "5" then ticks on Y-Axis would be "0-5-10-15-20 and so on". Set the value to "Auto-generated" if you want JFreeChart to determine the tick units.
backgroundImage	String	Select the background image to be displayed in chart. If this property is set then "backgroundColor" property will not have any effect.
backgroundImageAlignment	String	Select where you want the background image to be aligned. This property will not have any effect if "backgroundImage" property is not set. Options are: 1. Center 2. East 3. North

		4. North-East 5. North-West 6. South 7. South-East 8. South-West 9. West
backgroundImageFit	String	Select how you want the background image to be fit on the chart. This property will not have any effect if "backgroundImage" property is not set. Options are: 1. Do not fit 2. Fit entire chart 3. Fit horizontally 4. Fit vertically
yAxisStartPoint	String	The number from which the Y-axis should start. For e.g. Set the value to "50" so that Y-axis starts from there. Set it to "Auto-generated" so that JFreeChart will decide that.

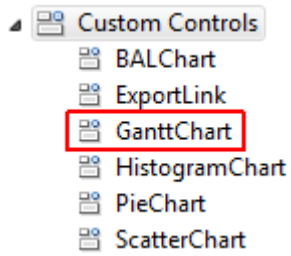
* The number of items in these properties should be same. Refer the example given below.

Example:

	Array / List / Vector									
chartCategories	Jul-10	Jun-11	Jul-10	Jun-11	Jul-10	Jun-11	Jul-10	Jun-11	Jul-10	Jun-11
chartSeries	Chrome	Chrome	Firefox	Firefox	IE	IE	Opera	Opera	Safari	Safari
chartValues	9.88	20.65	30.69	28.34	52.68	43.58	1.91	1.74	4.09	5.07

The sample charts are shown in the XPages – `DemoArea`, `DemoBar`, `DemoLine`, `DemoStacked` & `DemoWaterfall`.

Gantt charts (Custom Control → `GanttChart`)



To include a Gantt chart in your XPage you need to use the `GanttChart` custom control. There are two types of charts that can be generated using this control:

1. Gantt
2. Gantt – with percent completion

Property	Type	Description
title	String	The title for the chart.
width	int	Width of the chart in pixels.
height	int	Height of the chart in pixels.
includeGeneratedDateTime	String	Display the date and time on which this chart was generated. You can choose either to display only date or date with time or hide it completely. Options are: 1. Date 2. Date & time 3. Date & time with time zone 4. Do not show
enableExport	boolean	Whether links to export the chart to PDF should be visible. If set to true then links will be visible else it won't.
labelX	String	Label to be shown on the X-axis.
labelY	String	Label to be shown on the Y-axis.
taskCompletionData	boolean	Whether completion data is to be entered for each of the task in individual "taskSeries". If true then a new list "taskPercentCompletionList" will be visible.
subTitle	String	A short description of the chart, appears below the title.
displayStartEndDates	boolean	Determines whether start and end dates will be displayed on top of each task or not.
legendPosition	String	Position of the legend in the chart. It can be placed at bottom, left, right, top or can be hidden.
backgroundColor	String	Background color of the chart. It needs to be expressed in hexadecimal form. For e.g. FFFFFF.
gridLineColor	String	Grid line color of the chart. It needs to be expressed in hexadecimal form. For e.g. FFFFFF.
taskSeries	Group	This group consists of properties required for a task – name, task name list, task start date list, task end date list & task percent completion list.
- taskSeriesName	String	Name of task series. This name appears in the legend of the chart.

- taskNameList *	Array	Array of names of tasks in the series. This value appears in the Y-axis of the chart. For e.g.
		`new Array(...)`
		`@Explode(...)`
		`@DbColumn(...)`
		`@DbLookup(...)`
		Any subclass of `java.util.Collection` like `Vector`, `ArrayList`, etc.

- taskStartDateList *	Array	Array of start dates for the tasks corresponding to the list defined in the property “taskNameList”. For e.g.
		`new Array(...)`
		`@Explode(...)`
		`@DbColumn(...)`
		`@DbLookup(...)`
		Any subclass of `java.util.Collection` like `Vector`, `ArrayList`, etc.
		NOTE: The array should be of either `java.util.Date` or `lotus.domino.DateTime`

- taskEndDateList *	Array	Array of end dates for the tasks corresponding to the list defined in the property “taskNameList”. For e.g.
		`new Array(...)`
		`@Explode(...)`
		`@DbColumn(...)`
		`@DbLookup(...)`
		Any subclass of `java.util.Collection` like `Vector`, `ArrayList`, etc.
		NOTE: The array should be of either `java.util.Date` or `lotus.domino.DateTime`

- taskPercentCompletionList *	Array	Array of percentage completion for the tasks corresponding to the list defined in the property “taskNameList”. For e.g.
		`new Array(...)`
		`@Explode(...)`
		`@DbColumn(...)`
		`@DbLookup(...)`
		Any subclass of `java.util.Collection` like `Vector`, `ArrayList`, etc.

backgroundImage	String	Select the background image to be displayed in chart. If this property is set then "backgroundColor" property will not have any effect.
backgroundImageAlignment	String	Select where you want the background image to be aligned. This property will not have any effect if "backgroundImage" property is not set. Options are: 1. Center 2. East 3. North

		4. North-East 5. North-West 6. South 7. South-East 8. South-West 9. West
backgroundImageFit	String	Select how you want the background image to be fit on the chart. This property will not have any effect if "backgroundImage" property is not set. Options are: 1. Do not fit 2. Fit entire chart 3. Fit horizontally 4. Fit vertically

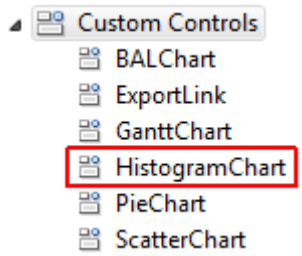
* The number of items in these properties should be same. Refer the example given below.

Example:

	Array / List / Vector					
taskNameList	Initiation	System Concept Development	Planning	Requirement Analysis	Design	Development
taskStartDateList	1-Jul-11	4-Jul-11	8-Jul-11	11-Jul-11	17-Jul-11	21-Jul-11
taskEndDateList	3-Jul-11	7-Jul-11	10-Jul-11	16-Jul-11	20-Jul-11	31-Jul-11
taskPercentCompletionList	100	100	100	50	0	0

The sample charts are shown in the XPage – `DemoGantt`.

Histogram (Custom Control → `HistogramChart`)



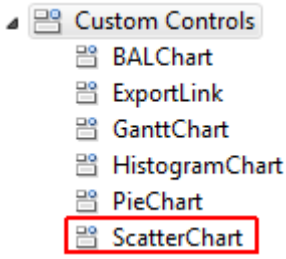
To include a Histogram in your XPage you need to use the `HistogramChart` custom control.

Property	Type	Description
title	String	The title for the chart.
width	int	Width of the chart in pixels.
height	int	Height of the chart in pixels.
includeGeneratedDateTime	String	Display the date and time on which this chart was generated. You can choose either to display only date or date with time or hide it completely. Options are: 1. Date 2. Date & time 3. Date & time with time zone 4. Do not show
enableExport	boolean	Whether links to export the chart to PDF should be visible. If set to true then links will be visible else it won't.
subTitle	String	A short description of the chart; appears below the title.
labelx	String	Label to be shown on the X-axis.
labely	String	Label to be shown on the Y-axis.
displayValues	boolean	Whether or not to display the values in the chart.
type	String	Type of the Histogram to be displayed. Three type are available: 1. Frequency 2. Relative Frequency 3. Scale Area to 1
legendPosition	String	Position of the legend in the chart. It can be placed at bottom, left, right, top or can be hidden.
backgroundColor	String	Background color of the chart. It needs to be expressed in hexadecimal form. For e.g. FFFFFF.
gridLineColor	String	Grid line color of the chart. It needs to be expressed in hexadecimal form. For e.g. FFFFFF.
histogramData	Group	This group consists of properties required to create a single histogram. Multiple instances of this group can be created.
- observations	Array	The raw observations. It should be a array / list of numbers. For e.g. new Array(...) @Explode(...) @DbColumn(...) @DbLookup(...)

		Any subclass of java.util.Collection like Vector, ArrayList, etc.
- bins	Integer	The number of bins in which the data in "observations" would be equally divided between "binRangeLower" & "binRangeUpper".
- binRangeLower	Double	Lower value for the bin range. The X-Axis would start at this position.
- binRangeUpper	Double	Upper value for the bin range. The X-Axis would end at this position.
- observationsLabel	String	The label for the observations displayed in the Histogram.
yAxisTickUnit	String	Unit after which ticks would be generated on the Y-Axis. For e.g. If the value is set to "5" then ticks on Y-Axis would be "0-5-10-15-20 and so on". Set the value to "Auto-generated" if you want JFreeChart to determine the tick units.
backgroundImage	String	Select the background image to be displayed in chart. If this property is set then "backgroundColor" property will not have any effect.
backgroundImageAlignment	String	Select where you want the background image to be aligned. This property will not have any effect if "backgroundImage" property is not set. Options are: 1. Center 2. East 3. North 4. North-East 5. North-West 6. South 7. South-East 8. South-West 9. West
backgroundImageFit	String	Select how you want the background image to be fit on the chart. This property will not have any effect if "backgroundImage" property is not set. Options are: 1. Do not fit 2. Fit entire chart 3. Fit horizontally 4. Fit vertically

The sample charts are shown in the XPage – `DemoHistogram`.

Scatter Chart (Custom Control → `ScatterChart`)



To include a Histogram in your XPage you need to use the `ScatterChart` custom control.

Property	Type	Description
title	String	The title for the chart.
width	int	Width of the chart in pixels.
height	int	Height of the chart in pixels.
includeGeneratedDateTime	String	Display the date and time on which this chart was generated. You can choose either to display only date or date with time or hide it completely. Options are: 1. Date 2. Date & time 3. Date & time with time zone 4. Do not show
enableExport	boolean	Whether links to export the chart to PDF should be visible. If set to true then links will be visible else it won't.
subTitle	String	A short description of the chart; appears below the title.
labelx	String	Label to be shown on the X-axis.
labely	String	Label to be shown on the Y-axis.
legendPosition	String	Position of the legend in the chart. It can be placed at bottom, left, right, top or can be hidden.
orientation	String	Orientation of the chart. Options are: 1. Horizontal 2. Vertical
scatterDisplay	String	The shape of the points displayed in the scatter chart. Options are: 1. Dots 2. Shapes
backgroundColor	String	Background color of the chart. It needs to be expressed in hexadecimal form. For e.g. FFFFFF.
gridLineColor	String	Grid line color of the chart. It needs to be expressed in hexadecimal form. For e.g. FFFFFF.
scatterData	Group	This group consists of properties required to create a single scatter chart. Multiple instances of this group can be created.
- scatterDataLabel	String	The label for the data to be displayed in Scatter chart.
- xPoints	Array	The X-Axis points for scatter chart. It should be a list of numbers. For e.g.

		new Array(...) @Explode(...) @DbColumn(...) @DbLookup(...) Any subclass of java.util.Collection like Vector, ArrayList, etc. NOTE: The number of elements in "xPoints" & "yPoints" should be same.
- yPoints	Array	The Y-Axis points for scatter chart. It should be a list of numbers. For e.g. new Array(...) @Explode(...) @DbColumn(...) @DbLookup(...) Any subclass of java.util.Collection like Vector, ArrayList, etc. NOTE: The number of elements in "xPoints" & "yPoints" should be same.
yAxisTickUnit	String	Unit after which ticks would be generated on the Y-Axis. For e.g. If the value is set to "5" then ticks on Y-Axis would be "0-5-10-15-20 and so on". Set the value to "Auto-generated" if you want JFreeChart to determine the tick units.
backgroundImage	String	Select the background image to be displayed in chart. If this property is set then "backgroundColor" property will not have any effect.
backgroundImageAlignment	String	Select where you want the background image to be aligned. This property will not have any effect if "backgroundImage" property is not set. Options are: 1. Center 2. East 3. North 4. North-East 5. North-West 6. South 7. South-East 8. South-West 9. West
backgroundImageFit	String	Select how you want the background image to be fit on the chart. This property will not have any effect if

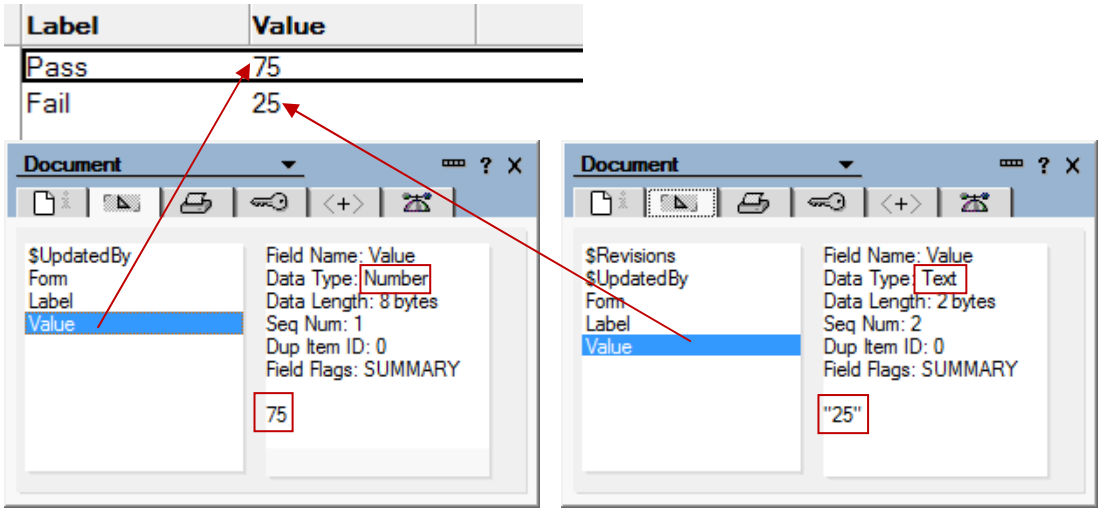
		"backgroundImage" property is not set. Options are: 1. Do not fit 2. Fit entire chart 3. Fit horizontally 4. Fit vertically
xAxisStartPoint	String	The number from which the X-axis should start. For e.g. Set the value to "50" so that X-axis starts from there. Set it to "Auto-generated" so that JFreeChart will decide that.
yAxisStartPoint	String	The number from which the Y-axis should start. For e.g. Set the value to "50" so that Y-axis starts from there. Set it to "Auto-generated" so that JFreeChart will decide that.

Other XPages, Custom controls & Java classes

1. XPages:
    a. XJFC: This XPage is used to create the chart and render it as PNG file. The image that displays the chart in custom controls uses this XPage as its source attribute.
    b. XPDF: This XPage is used to create PDF of the charts.
2. Custom Control:
    a. ExportLink: This custom control is NOT added to the UI Controls Palette. This control basically contains the links to export the charts to PDF and is used inside other custom controls – `BALChart`, `PieChart`, `GanttChart`, `HistogramChart` & `ScatterChart`.
3. Java classes:
    a. org.openntf.javacharts.XJFC
        i. This Java class generates the chart using the **JFreeChart v1.0.13** (http://www.jfree.org/jfreechart/) library.
    b. org.openntf.javacharts.XPDF
        i. This Java class generated the PDF file of the chart using the **iText v2.1.7** (http://itextpdf.com/) library.
    c. org.openntf.javacharts.Common
        i. This Java class contains common static methods which are called by both of the above classes.

Known Issues

1. **Issue with `@DbColumn(...)` and `@DbLookup(...)`**



If the chart is displaying data from a column using `@DbColumn(...)` or `@DbLookup(...)` then make sure all the data stored in that column is in same format. For e.g. in the picture shown above the data "75" is stored as number while "25" is stored as text. If this data is used then it will NOT work. Make sure either you store "75" as text or "25" as number. I haven't been able to find a solution for this as of now, but I am working on it. If you are able to find a solution for this then I will be more than happy to incorporate the same! ☺

2. **Exporting charts to PDF**

   Some times while exporting a chart to PDF you may see the following message on screen.

   Sorry, unable to create PDF!

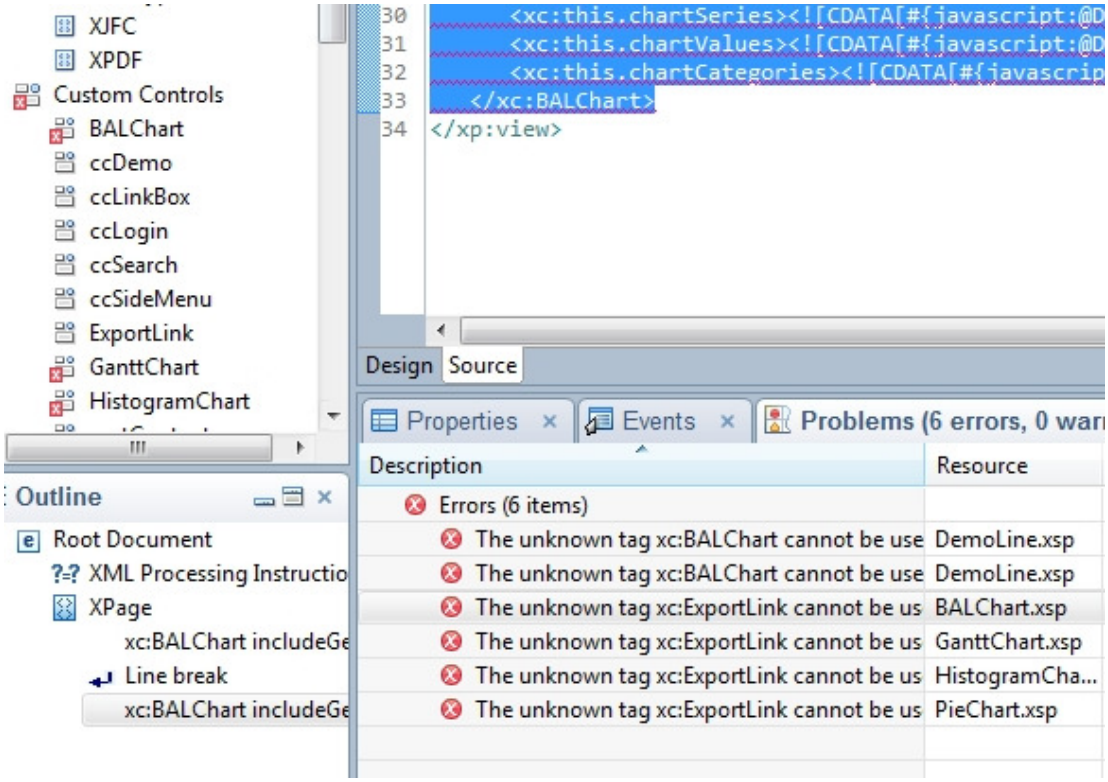
   Try to refresh the page on which chart was shown and then try again to export to PDF.

   Close this window.

   Java Charts uses `sessionScope` to store chart information. If users session times out then this data would get cleared and user would see this message. If you want to customize this message then you need to modify the XPage – `XPDF`.

3. **Compilation issues**

   Thom Rosario had posted a problem he was facing while using Java Charts. Basically even after adding all the required components he was getting errors like – `The unknown tag xc:ExportLink cannot be used as a control, The unknown tag xc:GanttChartcannot be used as a control, The unknown tag xc:HistogramChart cannot be used as a control`, and so on. Below is the screenshot for his error.



After some discussion with him, which is posted here → http://www.openntf.org/internal/home.nsf/discussion.xsp?action=openDocument&documentId=725FA04E721A6B888625790400821B09, we were finally able to resolve the issue using "Project → Clean" in the Domino Designer menu.