

**Data visualization 7.0**  
**2006-2014**  
**User manual**

Adam Witkowski, Matteo Garaventa, Piotr Zema

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## Abstract

Data Visualization is a tool for **importing, displaying and exporting data**. This application operates on already prepared data and its goal is to display it.

It can be combined with almost any database or any application able to export its data into files. If the report is a table of some columns and rows, then Data Visualization is a perfect tool to create ASAP a nicely looking report.

For end users it's much more useful some kind of PDF or HTML document with text formatting, company logo, page numbers etc. than a raw text. This application allows users to prepare the data layout in an easy way and to export immediately the result to any format needed.

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## 1 Three phase logic

Generally there are **3 phases**:

**Data import** In this phase users retrieve data from databases by writing an SQL query or by importing data from external files.

**Template creation** In this phase users configure the report layout. Once the template is created it can be saved and used several times.

**Final report (preview)** In this phase users behold the final read-only report containing formatted data which can be saved to file using an export method or directly printed from the preview.

In the last phase formatted data is combined into the final report which usually consists of several pages and contains all elements configured in the previous phases. Users customize the layout and see how it looks combined with imported data. If something has to be modified, there is no need to restart: the Preview window can be closed and a new report can be generated later using a different layout. Templates can be reused lots of times with different data. It's very useful to create for example a company template with its logo and the copyright information, save it and use it several times. The best way is to create and save each report type and reuse it afterwards.

## 2 Document structure

The document structure is simple - see image 1.

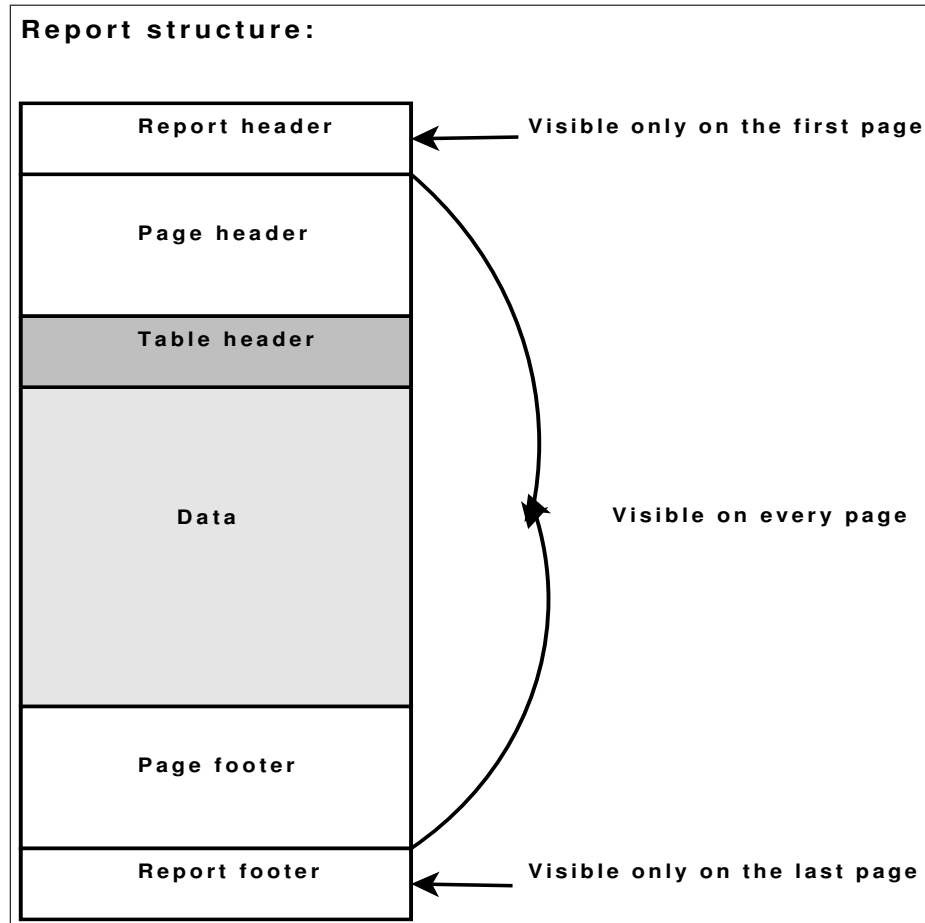


Figure 1: Document structure.

## 3 Data

The data for this application can come from external files or from a database:

1. *CSV (Comma Separated Values)* file,
2. *XLS (Microsoft Office Excel Workbook)* file,
3. *XLSX (Microsoft Office Excel Workbook 2007)* file,
4. *ODS (OpenDocument Spreadsheet)* file,
5. *XML (eXtensible Markup Language)* file,
6. database.

If no data is imported, the application will use randomly generated placeholder.

### 3.1 Data import

#### 3.1.1 Importing from external files

Data can be imported from *CSV* (with custom delimiters), *XLS(X)*, *XML* and *ODS* files. In the CSV import dialog the delimiter can be changed; new delimiters can be added as well. After changing a delimiter the data preview is refreshed so that users can verify if the data are imported correctly. Once data are imported, it's not visible in the template, but they will be used during the report creation. Supported *XLS* formats are Microsoft Excel 95, 97, 2000, XP and 2003. Supported *XLSX* format is Microsoft Excel 2007 and higher.

For importing data from *CSV* files, users can either choose from menu *Tools* → *Import data from* → *CSV* or click on the *Import CSV* button or use the **Ctrl** - **F** keyboard shortcut. After choosing the CSV file, the delimiter might have changed (users can double-check this in the data table preview). For importing data from *XLS* files, users can either choose from menu *Tools* → *Import data from* → *XLS* or click on the *Import XLS* button or use the **Ctrl** - **I** keyboard shortcut.

#### 3.1.2 Importing from databases

For importing data from a database, first of all a connection must be set. In order to configure it, following fields must be filled:

- server address,



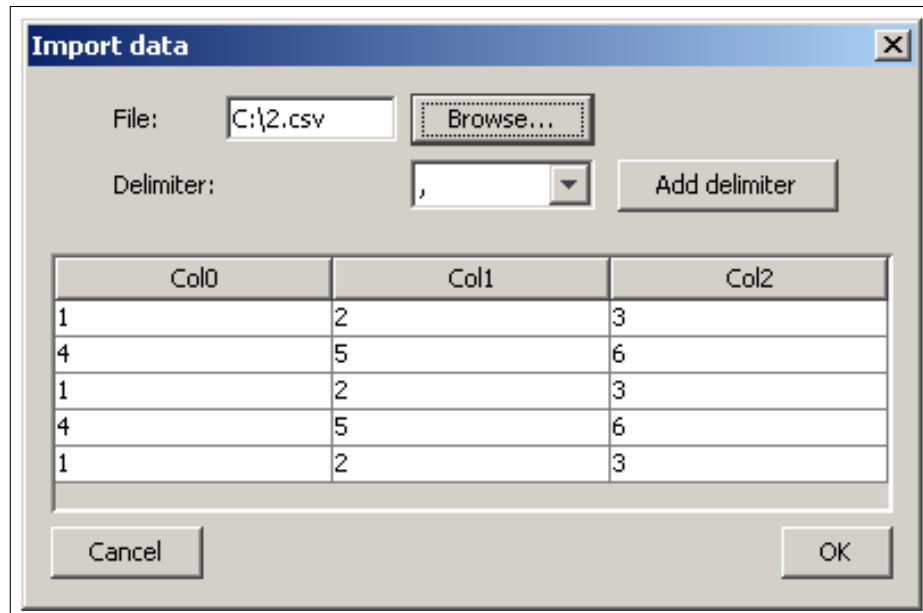


Figure 2: CSV import dialog running on Windows XP.

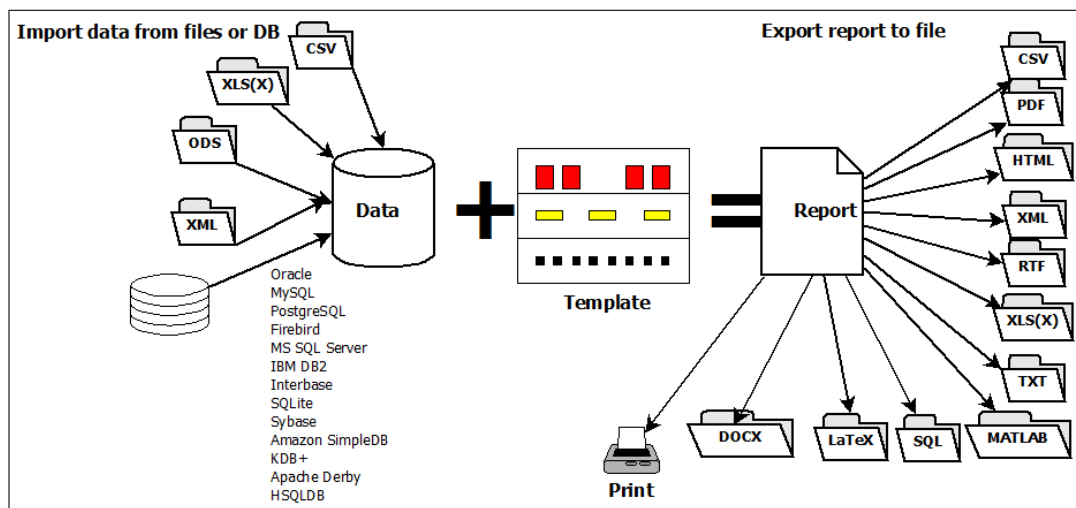


Figure 3: Data flow.

- database name,
- port (in case of setting the port number to 0 - default port will be used),
- user name,
- password,
- database type (for example Oracle).

Once the connection has been created, it may be tested (using the *Test* button) and used to perform a **Select** query. The query might also be loaded from an external file or be pasted into the dialog. There is a simple keyword highlighting which helps users to write the proper query. The **Code Assist** (which helps to complete a table or a view name) can be triggered by using the **Ctrl + Space** shortcut. In order to find out what are the tables, views and columns in the connected DB, press the *DB browser* button. The *DB Browser* window shows all user (non-system) tables and views. There is the possibility to see all columns (with their names and SQL types) for a given table or view and to copy them to the clipboard. Table and view data preview is also available. Following databases are supported:

- Oracle<sup>TM</sup>10g or higher,
- MySQL<sup>TM</sup>4.x or higher,
- PostgreSQL<sup>TM</sup>7.x or higher,
- Firebird<sup>TM</sup>1.x or higher,
- Interbase<sup>TM</sup>6.x or higher,
- Microsoft SQL Server<sup>TM</sup>2000, 2005 and 2008,
- IBM DB2<sup>TM</sup>8.x or higher,
- SQLite<sup>TM</sup>3.x or higher,
- Sybase SQL Anywhere<sup>TM</sup>12.x or higher,
- Sybase Adaptive Server Enterprise<sup>TM</sup>15 or higher,
- HyperSQL<sup>TM</sup>,
- Apache Derby<sup>TM</sup>,

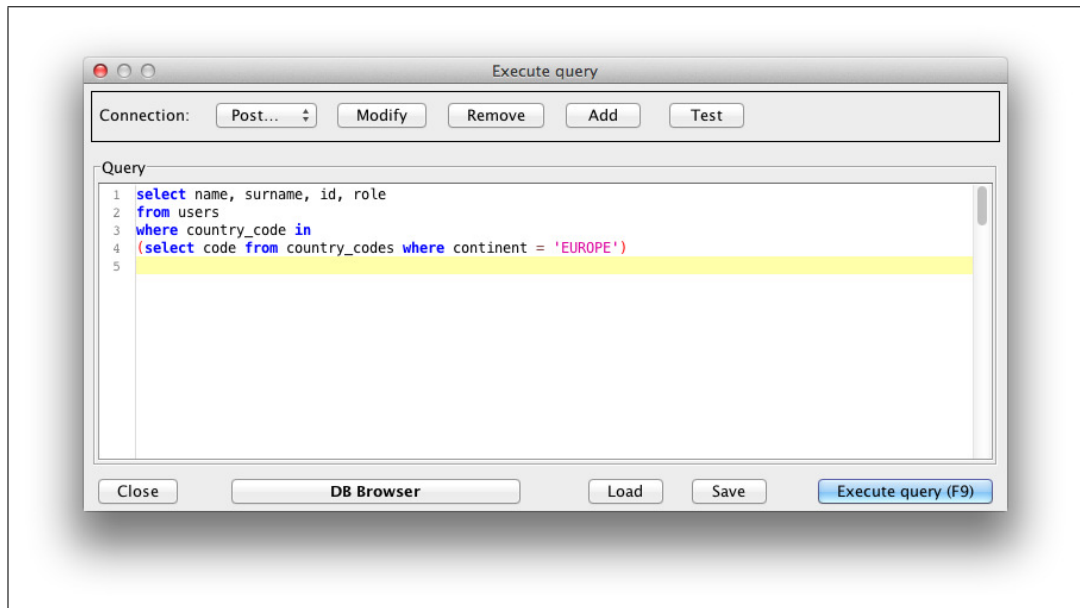


Figure 4: Importing data from a database.

- MariaDB™,
- Amazon SimpleDB™,
- VoltDB™.

For importing data from a database, use the **Ctrl - K** keyboard shortcut or go to the menu *Tools* → *Import data from* → *Data base*.

**Security** There are two major questions about database security in third party software contexts:

1. Can database data be damaged by third party software?
2. Are connections from third party software secure?

Data Visualization answers positively both questions.

1. Data Visualization is designed to perform **SELECT** statements only so it does not modify data. Other **SQL** statements like **UPDATE** or **INSERT** are simply not allowed and will fail. Consequently the first answer is **Yes**.

2. Of course in order to use a database connection details like user name and password are necessary, but there is an option that allows the end user to decide whether to store the password or not. If stored, the password is encrypted so the second answer is **Yes**.

**Browsing DB** Once we have a working DB connection we can browse items like:

1. tables,
2. views,
3. table and view columns with SQL types,
4. supported functions: system, string and numerical,
5. procedures.

## 4 Template creation

### 4.1 Objects

There are varied object types that can be used to create report templates:

- text,
- image,
- data table.

The data table object is always just one and cannot be removed. All other objects can be as many as users want. In order to edit objects' contents, right-click on the object and choose the option from the popup. All objects have the *Area* property that may be also changed using the popup menu. The *Fit to grid* option helps aligning objects without changing their area explicitly. It's possible to fit to grid all objects (right-click on the editor background and choose *Fit all to grid* option). Each object has a name which isn't however displayed in the final report; it's just used to identify it univocally when using the *Copy from* option. Such option might be used to copy some object properties into the selected object. All objects above the data table are considered page header and all those below are considered page footer (see image 1).

#### 4.1.1 Text objects

Text objects contain formatted text. In order to modify a text right-click on the object and choose the *Change text* option or double click on it. In order to change formatting use the *Properties* option. In order to copy the objects' settings right-click on the destination and choose *Copy from*. The list of available fonts depends on the user's operating system.

#### 4.1.2 Image objects

Image objects contain images. In order to set an image right-click on the object and choose the *Change image* option or double click on it. Among supported image formats there are *PNG*, *GIF*, *BMP* and *JPEG*. In order to see image details right-click on it and choose *Image details*. All image objects can be copied to Clipboard or to file. In order to do it right-click on the object and choose the *Copy to* option.

### 4.1.3 Table objects

Table objects contain formatted data. In order to change formatting use the *Properties* option. In order to change column text or formatting right-click on the column header and choose the specific option. Column width can be edited (double clicking on headers). In order to change the grid properties right-click on the table body and choose *Grid properties*.

### 4.1.4 Report header

The report header is a report part visible only on the first page and can be edited in the report header tab. Text and image objects can be added and also report header width and height header can be adjusted in its popup menu.

### 4.1.5 Report footer

The report footer is a report part visible only on the last page and can be edited in the report footer tab. Text and image objects can be added and also report footer width and height can be adjusted in its popup menu.

## 4.2 Clipboard integration

The use of the **Ctrl - V** keyboard shortcut allows the automatic creation of:

1. a new text object (if the system clipboard contains any text),
2. a new image object (if the system clipboard contains any image).

New objects are added to the current tab. All text fields in the application contain right-click popup menus allowing system clipboard operations like copy, cut and paste. All image objects can be copied to clipboard as well.

## 4.3 Saving and loading

Templates can be saved as files with **\*.tpl** extension. In order to save a template click on the *Save* button or go to the menu *File* → *Save* or use the **Ctrl-S** keyboard shortcut. In order to load a template do it similarly. All external resources like images are stored in the tpl file.

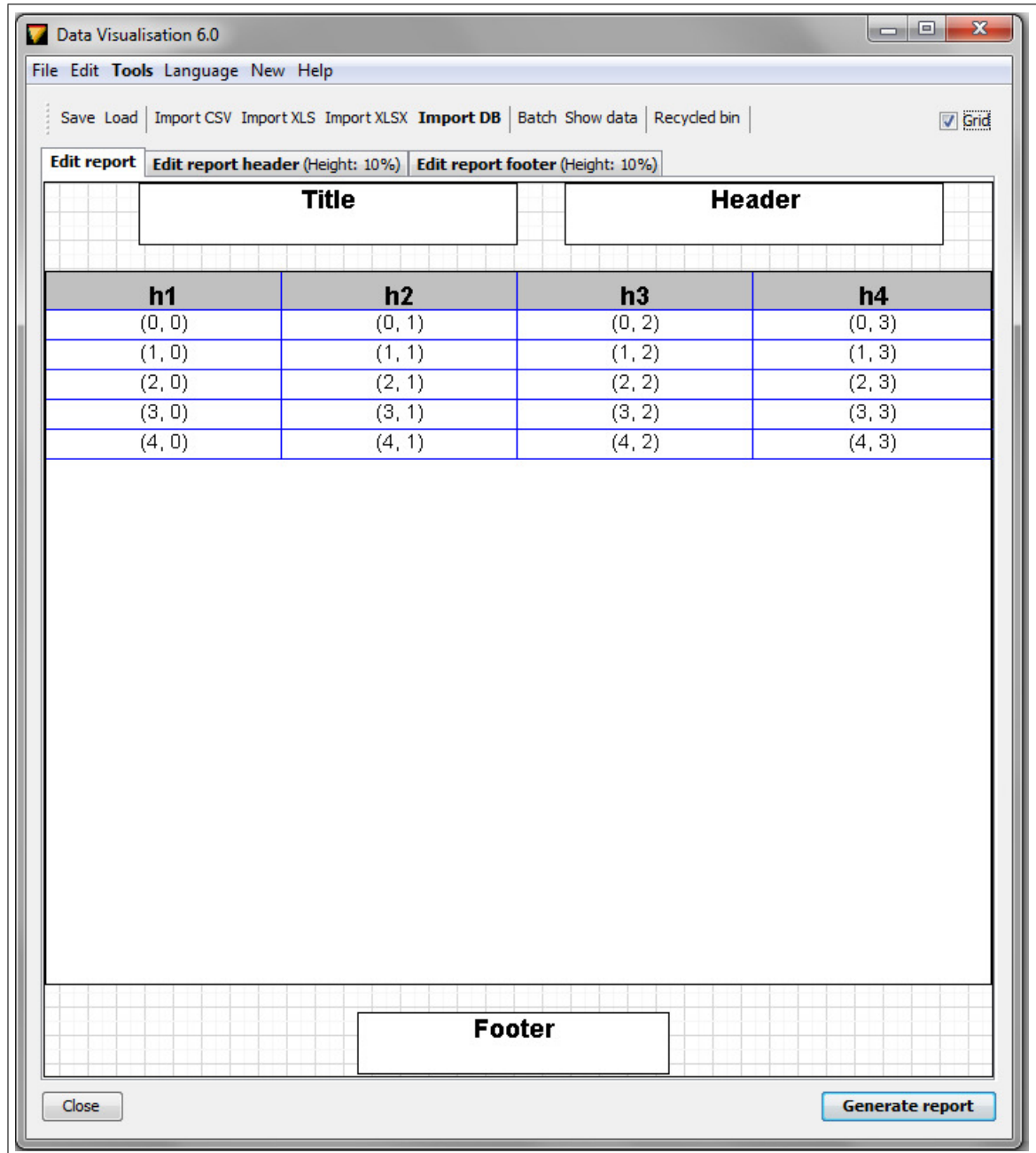


Figure 5: Template designer running on Windows 7.

## 4.4 Column Manager

The Column Manager is a tool which allows users to add, remove and modify report columns. Each column header and width (%) can be adjusted. The maximum allowed number of columns is 16. In order to launch the Column Manager go to the menu *Tools* → *Column Manager* or right-click on the report table and choose *Column Manager*.

## 4.5 Page numbers

Page numbers might be either on the upper or on the lower right corner. Text formatting, i.e. font type, font size, color and style can be customized. It's possible to choose if there should be a page number displayed on the first page. In order to edit the page number position go to the menu *Edit* → *Page numbers*.

## 4.6 Default properties

Default properties contain all the text formatting, color information etc. used to create new objects. If a new text object is added, all its properties are copied from the default ones. It's a good practice and time-saving to configure default properties at the beginning. They are very useful when all created templates are made according to a specific standard, for example if all components have the same font or the same background color.

## 4.7 Z order

All components have a *Z order* property (by default it's 0). This property is an integer between 0 and 100 corresponding with *Z* variable (depth). The lower it is, the deeper the component will be. So, for example, let's say that the component *A* has *Z order* property = 10 and another component *B* has 25. In this case, if they overlap each other, the component *B* will be placed over the component *A*. The value of this property might be modified by right-clicking on the specific component and choosing *Set Z Order*.

## 4.8 Variables

Variables can be used in text components; their values are calculated while report is being generated. Note that all variables begin with the \$ character. The list of all available variables can be seen in figure 3. Values of following variables: \$author, \$title, \$subtitle, \$major, \$minor and \$description may be modified in the *Template info* window.



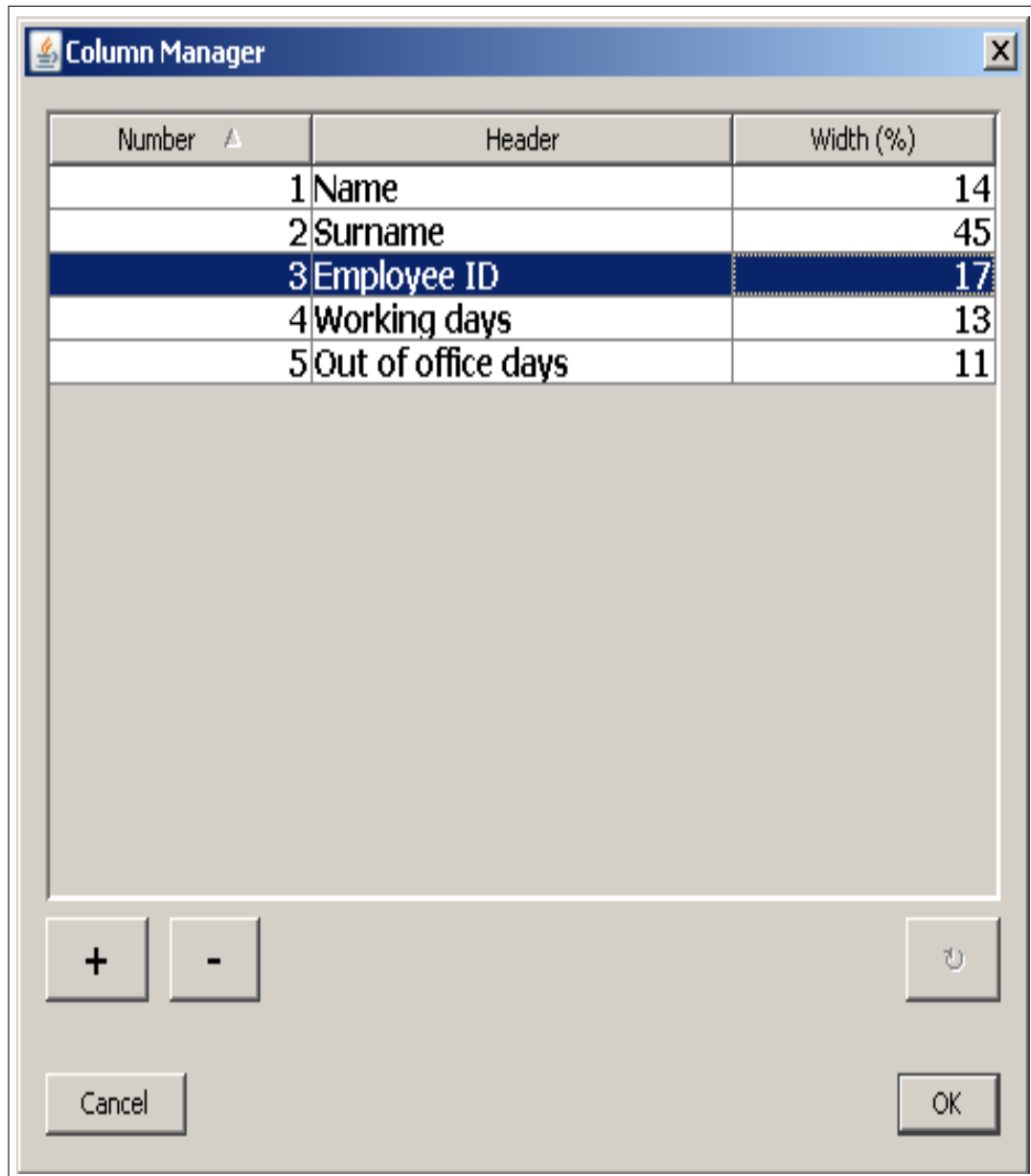


Figure 6: Column Manager running on Windows XP.

Variable name(s)	Value
\$date or \$today	Current date
\$now or \$time	Current time
\$author	Author
\$title	Title
\$subtitle	Subtitle
\$major	Major version
\$minor	Minor version
\$description	Description
\$rows	Number of rows

Figure 7: Available variables.

## 4.9 Object Browser

The Object Browser is a tool for viewing all components in a report template. It's divided into two panels; the left panel contains an object tree and the right one contains the details of the selected object. The component information displayed contains:

- name
- type
- Z order
- specific component details (depending on component type)

In order to run the Object Browser go to the menu *Tools* → *Object Browser*.

## 4.10 Recycled bin

The Recycled bin is a container storing all removed components. Components in the Recycled bin can be restored or removed forever. In order to enter the Recycled Bin click on the *Recycled bin* button or press the **Ctrl - R** keyboard shortcut.

## 4.11 Grid

The grid helps to visually adjust components' location and size. Of course it's never as precise as adjusting the specific location inserting numeric parameters; it rather helps to verify if any components are not aligned correctly

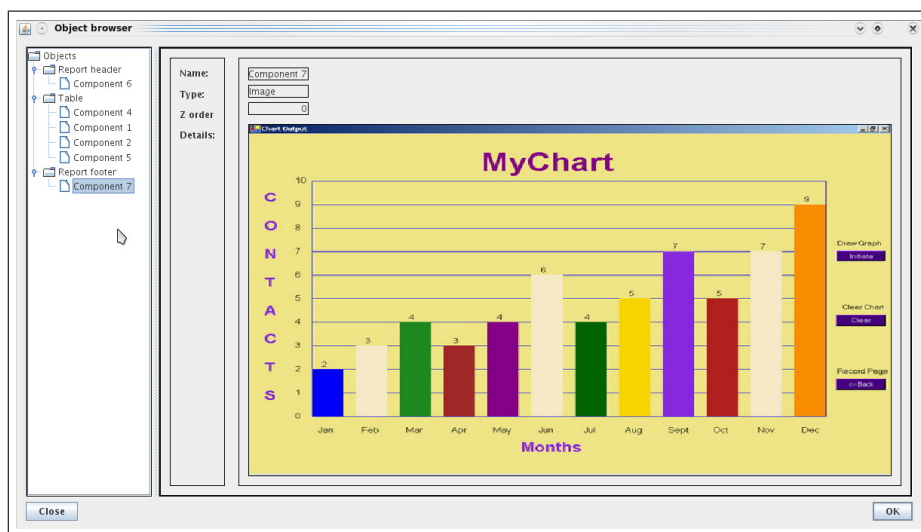


Figure 8: Object Browser running on Kubuntu 9.04 and KDE 4.2.2.

with others. The grid might be turned on/off by clicking on the Grid check box in the upper right corner of the template creation window.

## 4.12 Template Info

The Template info contains data like author, title, subtitle, description and major/minor version. The values once put here may be used via variables like \$author, \$title, \$subtitle, \$description, \$major and \$minor. In order to edit the Template info go to the menu *Tools* → *Template Info* or use the **Ctrl + P** keyboard shortcut.

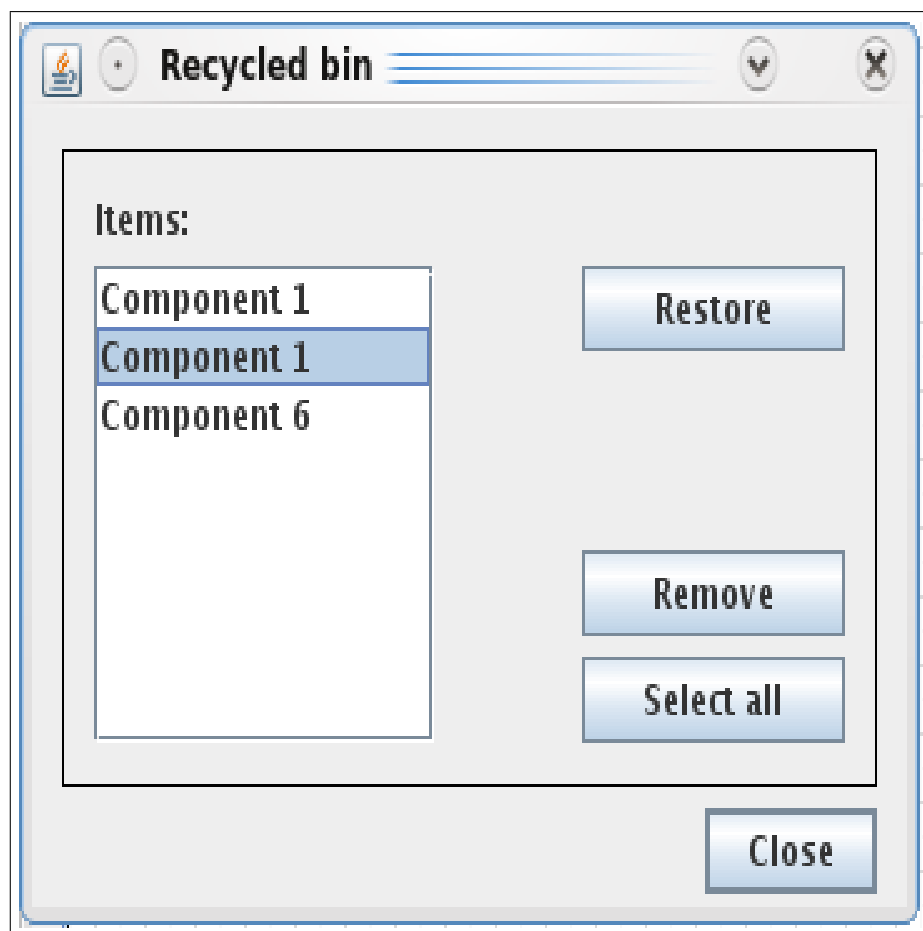


Figure 9: Recycled bin running on Kubuntu 9.04 and KDE 4.2.2.

## 5 Preview

In order to generate a report click on the *Generate report* button. The report preview is the sum of the configured template and the imported data (see image 1). In order to browse use the *First page*, *Previous page*, *Next page* and *Last page* buttons. There is also a zoom feature available. The margin in the preview may be enabled/disabled and this does not influence the exported documents.

### 5.1 Export

There are many export methods available in the *Preview* menu like:

- *PDF (Portable Document Format)*,
- *XML (eXtensible Markup Language)*,
- *CSV (Comma Separated Values)*,
- *RTF (Rich Text Format)*,
- *XLS (Microsoft Office Excel Workbook)*,
- *XLSX (Microsoft Office Excel Workbook 2007)*,
- *TXT (Plain text)*,
- *HTML (HyperText Markup Language) with CSS (Cascading Style Sheets)*,
- *MATLAB (MATLAB m File)*,
- *DOCX (Microsoft Word 2007)*,
- *L<sup>A</sup>T<sub>E</sub>X*,
- *SQL statements*,
- *YAML (YAML Ain't Markup Language)*,
- *JSON (JavaScript Object Notation)*,
- *DocBook*,
- *Markdown*,
- *Clipboard*.

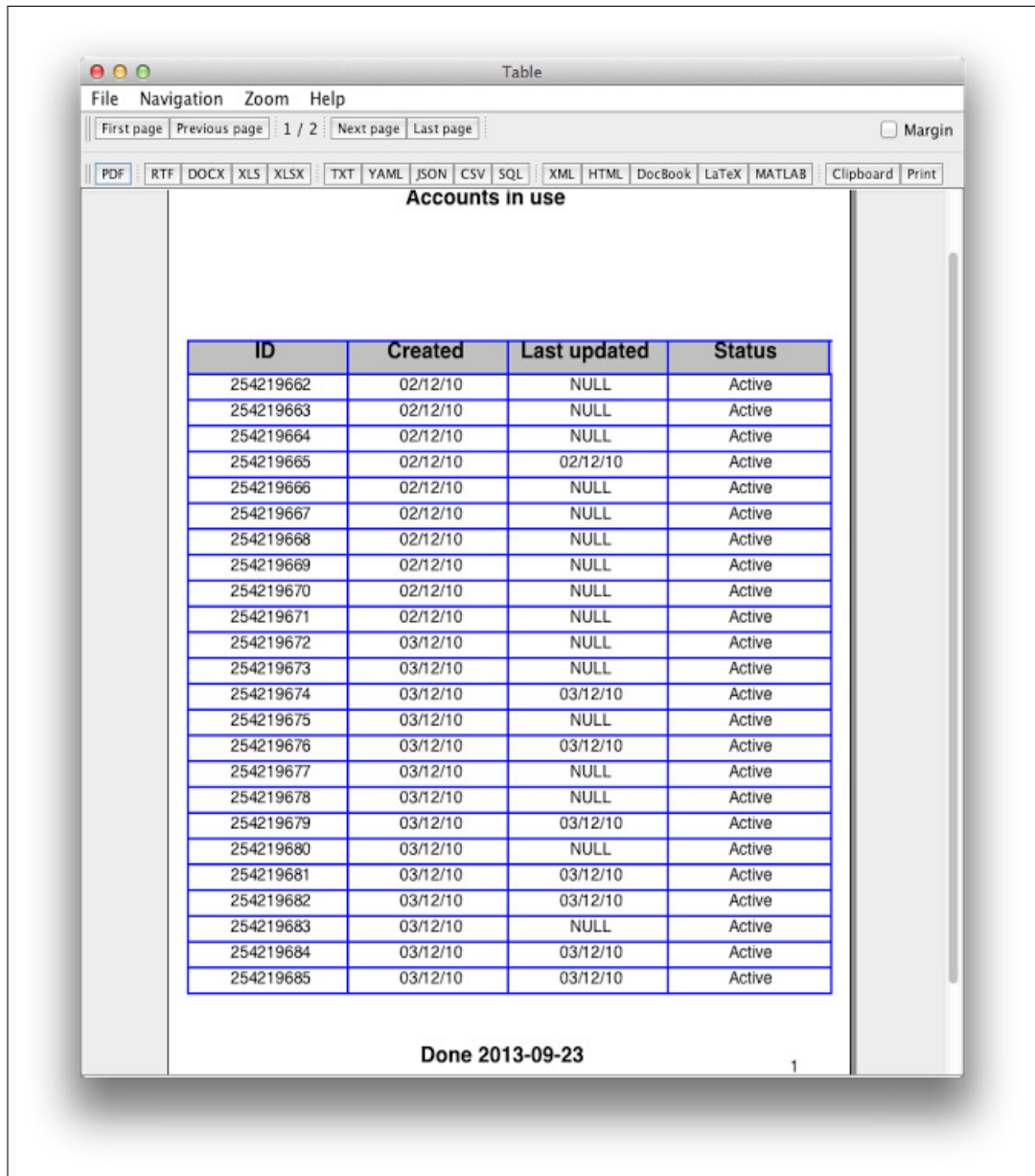


Figure 10: Preview running on MacOS

Exported PDF files are of course fully searchable and can be protected by password. Export settings like encoding, new line delimiters, version, etc. depend on the chosen format. Some export methods like MATLAB or YAML support only data without any formatting. Data Visualization tries to create documents as similar as possible to the layout chosen by user and also gives a wide parameter choice.

## 5.2 Printing

In order to print a report go to the menu *File*  $\rightarrow$  *Print*, where the printers dialog will be shown. This dialog depends on user's operating system.

## 6 Batch

This tool allows users to:

1. import lots of *CSV* and *XLS(X)* files
2. create lots of reports containing imported data and current report templates
3. export final reports to lots of formats (the ones available also for the standard export feature)

For example you can import 200 (let's say 100 *CSV* and 100 *XLS*) files to the current report template and then export it to *PDF*, *XML* and *XLS* creating in few minutes 600 files automatically. This option should be used when lots of documents with the same layout, but different data, need to be created. As the result folder might contain a huge number of files, the "Zip results" option is recommended. If this option is enabled, all results will be zipped into one zip file. The names of imported files might have duplicates - in the export results the duplicates will be automatically renamed by adding numbers at the end of the filename. If some imported files don't match the current template dimension (number of columns), they will not be used. When the batch is complete, specific information for each file processed is displayed, i.e. if:

- the import succeeded,
- the export succeeded for each chosen export method.

There is also the possibility to import data from a database by selecting *\*.sql* files containing queries. In order to run a Batch click on the *Batch* button or go to the menu *Tools*  $\rightarrow$  *Batch*.

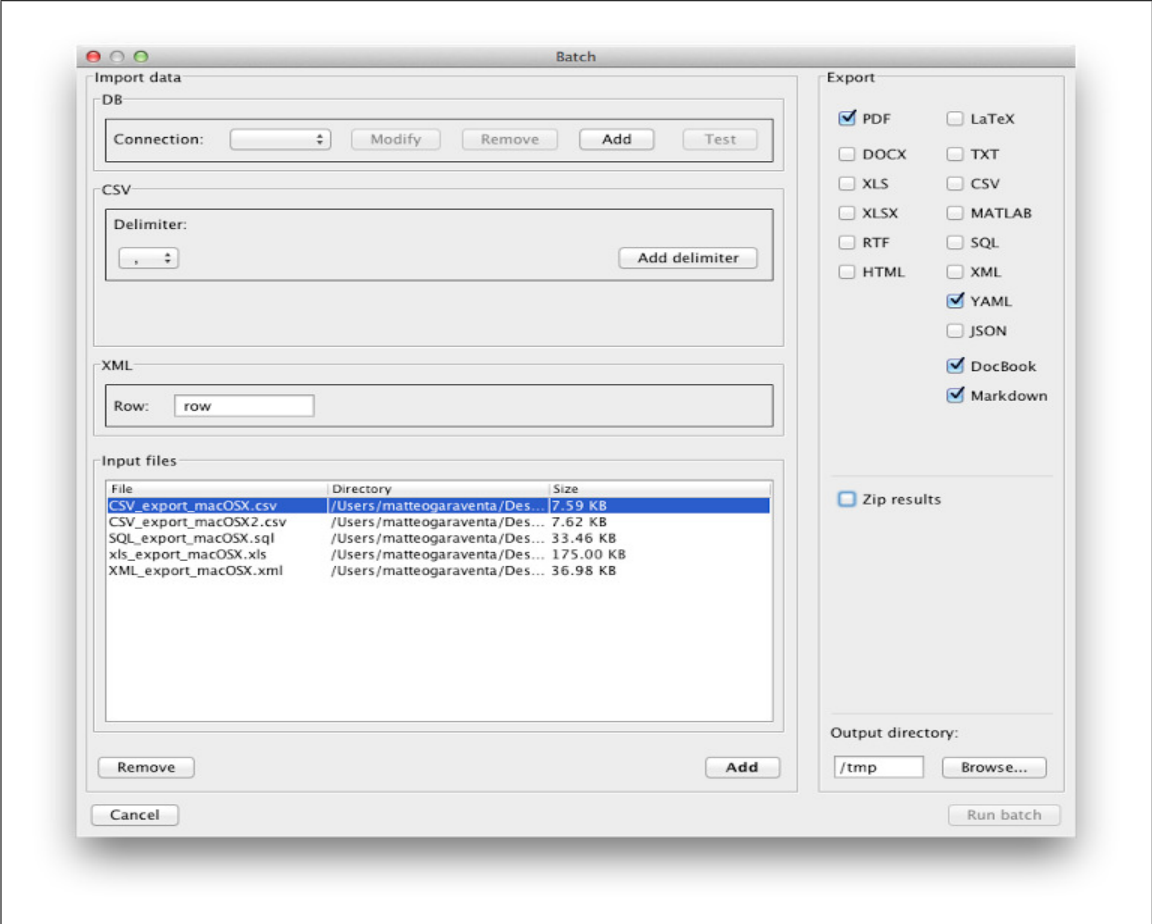


Figure 11: Batch running on Mac.



## 7 Application Localization

Currently supported languages there are:

- English,
- Polish,
- Spanish,
- Italian,
- German,
- French,
- Czech,
- Portuguese.

Chosen language influences only the translations of all labels in the Data Visualization application. It doesn't influence neither the date format, nor the hour format, nor decimal separators etc.. These formats are fixed and they don't depend on anything.

In order to change the language go to the *Language* menu. The application should be restarted in order to apply language changes.

More languages and localized date, hour and numeric format support will be added in future versions.

## 8 Keyboard shortcuts

Shortcut	Action
Ctrl - I	Import data from XLS
Ctrl - A	Import data from XLSX
Ctrl - B	Import data from ODS
Ctrl - F	Import data from CSV
Ctrl - K	Import data from database
Ctrl - S	Save template
Ctrl - L	Load template
Ctrl - G	Generate report
Ctrl - C	Close application
Ctrl - R	Recycled bin
Ctrl - G	Generate report
Ctrl - D	Default properties
Ctrl - M	System info
Ctrl - J	Environment info
Ctrl - H	Show logs
Ctrl - O	Documentation
Ctrl - E	Edit page numbers
Ctrl - T	Show tips
Ctrl - N	Column Manager
Ctrl - Y	Batch
Ctrl - W	Show data
Ctrl - T	Reset template
Ctrl - M	New image object
Ctrl - X	New text object
Ctrl - P	Template info

Figure 12: Template phase shortcuts.

Shortcut	Action
+	Zoom in
-	Zoom out
*	100% zoom
Ctrl - P	Print report
P or Ctrl-Minus	Previous page
F or Ctrl-F	First page
N or Ctrl-N	Next page
L or Ctrl-L	Last page
Ctrl - H	Export to HTML
Ctrl - D	Export to PDF
Ctrl - X	Export to XLS
Ctrl - S	Export to XLSX
Ctrl - H	Export to HTML
Ctrl - V	Export to CSV
Ctrl - M	Export to XML
Ctrl - R	Export to RTF
Ctrl - H	Export to HTML
Ctrl - T	Export to TXT
Ctrl - B	Export to MATLAB
Ctrl - C	Close report preview
Ctrl - T	Show tips
Ctrl - A	About
Ctrl - M	System info
Ctrl - H	Show logs
Ctrl - O	Documentation

Figure 13: Preview phase shortcuts.

## 9 Requirements

### 9.1 Software

Since Data Visualization is written in Java, it needs a 32 or 64 bit Java Runtime Environment (version 7 or higher) to run. Following operating systems supported by Oracle's Java Virtual Machine have been tested:

- Linux with GNOME or KDE installed,
- Microsoft Windows 2000/XP/Vista/2003, 2008 Server, 7 and 8.
- Oracle Solaris 10 or higher with Java Desktop System or CDE desktop environment,
- Mac OS X or higher.

Both 32 and 64 bit operating systems are supported. Tested Linux distributions are Kubuntu with KDE and Debian with GNOME. In order to download the Java Runtime Environment go to following link:

<http://www.oracle.com/technetwork/java/javase/downloads/index.html>.

In order to see details about Java supported environments go to following link:

<http://www.oracle.com/technetwork/java/javase/system-configurations-135212.html>. In order to read this documentation a PDF viewer has to be installed.

### 9.2 Hardware

Hardware requirements:

**RAM** 512 MB or more,

**CPU** 1 GHz AMD/Intel or faster,

**Free disk space** at least 100 MB.

## 10 Bug reporting

In order to report bugs please send the System Info file (*Help* → *System info*) and the logs (*Help* → *Show log*) to the author's e-mail address: <adamwitkowski3@gmail.com>. The up-to-date list of open bugs can be found here:

<http://sites.google.com/site/datavisualizationapplication/bug-tracking>.

## 11 Future development

Several new features are scheduled for future Data Visualization versions:

1. more supported languages,
2. more exports supported like: ODS and SVG,
3. more data sources supported like: MongoDB, Neo4j, SQLFire, VoltDB, Mimer SQL and SmallSQL
4. custom JDBC driver support,
5. data base diagram visualization,
6. charts,
7. lots of GUI improvements.

All suggestions might be sent to the author's e-mail address:

<adamwitkowski3@gmail.com>. The up-to date list can be found here:

<http://sites.google.com/site/datavisualizationapplication/to-dos>.

## 12 Author

Data Visualization is created by Adam Witkowski <adamwitkowski3@gmail.com>.

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## 13 The team

The Data Visualization team:

- Adam Witkowski (Project Manager, Developer and Translator),
- Matteo Garaventa (QA Engineer and German Translator),
- Piotr Zema (Developer and Release Engineer),
- Andrzej Witkowski (Portuguese and Spanish Translator),
- Tomasz Rumak (UNIX Admin, Developer and Release Engineer).

More details can be found here:

<http://sites.google.com/site/datavisualizationapplication/the-team>.

## 14 Official website

<http://sites.google.com/site/datavisualizationapplication/>

## 15 Notes

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