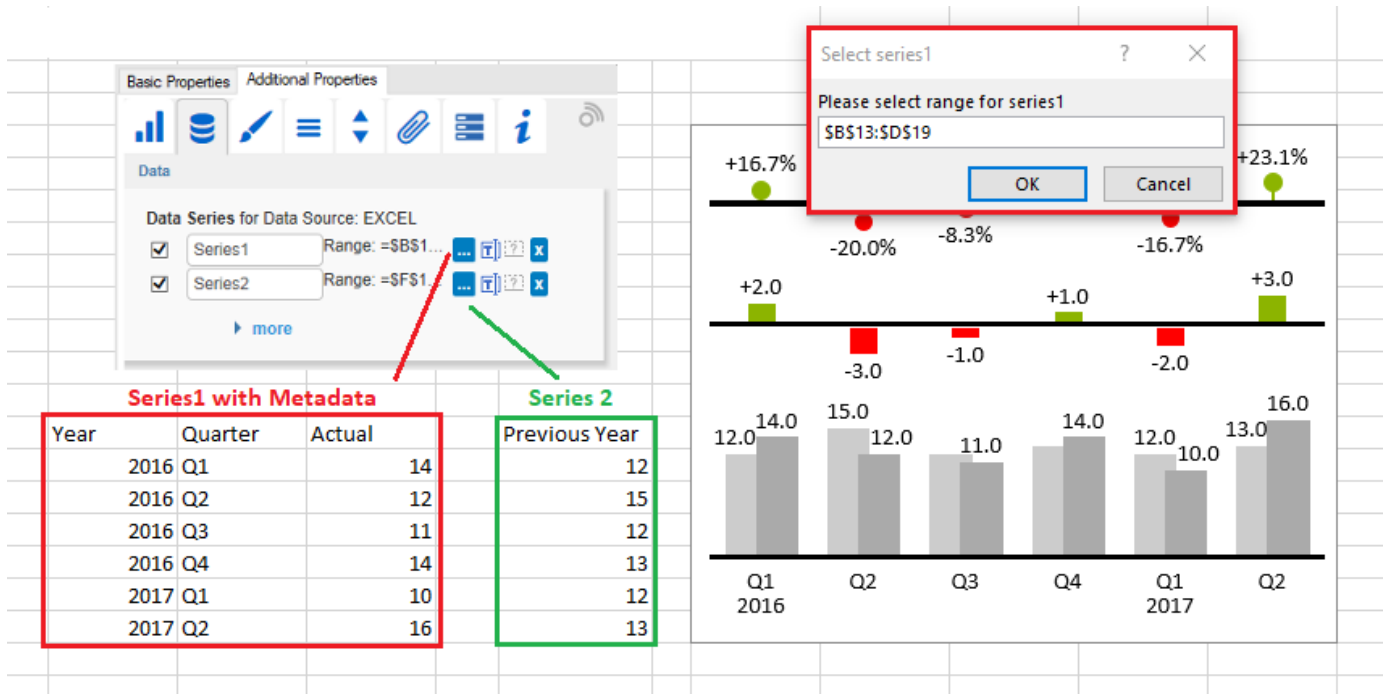


User manual for the graphomate charts for Microsoft Excel



Version 1.8.3 - as of April 2021

<https://www.graphomate.com>

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Introduction

The topic of visualization is becoming more and more important for a fast and secure communication of information. Simple but meaningful representations of information support the decision maker better in capturing correlations, patterns or outliers than tables or decorative elements could - such as pie charts or speedometers. Good information design allows a quick and effective overview on their business.

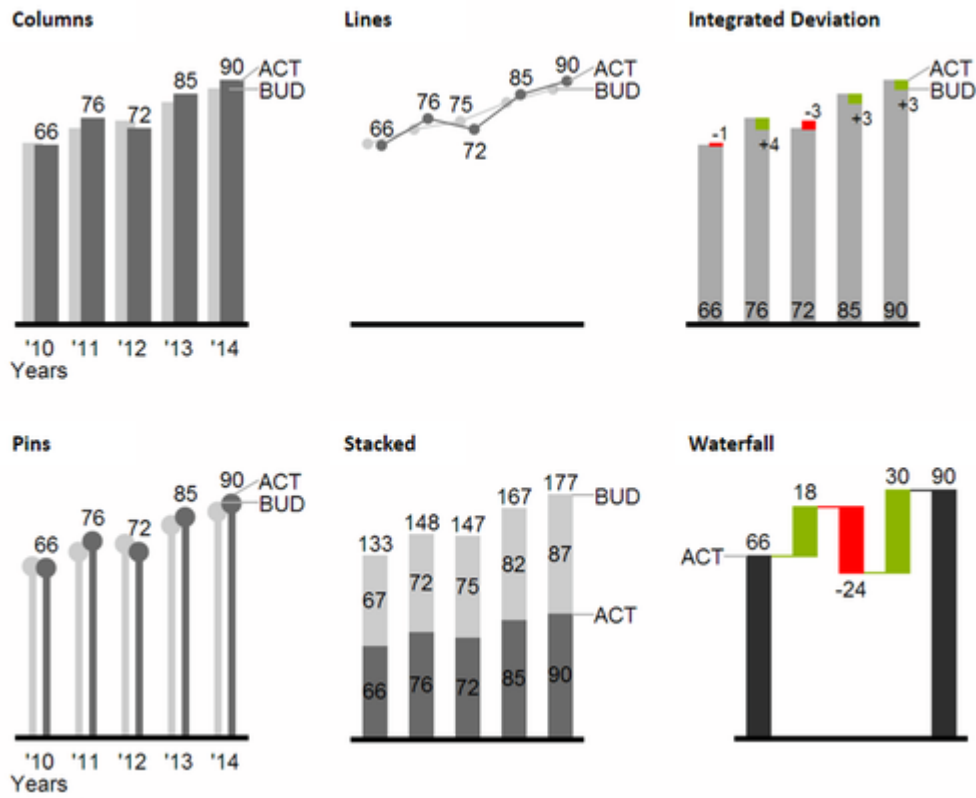
Hichert@SUCCESS is a set of rules by Rolf Hichert which build a guideline for the correct use of meaningful visualizations in reporting. With our *graphomate charts* extension, we cast Hichert@SUCCESS into a piece of software which is easy to use and fully integrated in SAP Lumira Designer. With this extension it is easy to represent the rules of Information Design according to Edward Tufte and Stephen Few. Our customers quickly voiced the wish for similarly simple to use solution for Microsoft Excel. Technologically, we used the same (HTML5) code base, so that *graphomate charts for Excel* can be used exactly as our SAP Lumira Designer extension: most settings can be changed in the easy-to-use *Additional Properties Sheet*, with further customizations being available in the *Basic Properties*.

If you have found errors or want to express wishes for further development, we would like to invite you to our [Support Desk](#), where you can file bug reports or feature requests. The latest version of the add-in contains a closer integration of SAP Analysis for Microsoft Office, the possibility to export charts directly from SAP Lumira Designer to Excel, including data, as well as a more dynamical integration of Microsoft PowerPoint.

Introductory Examples

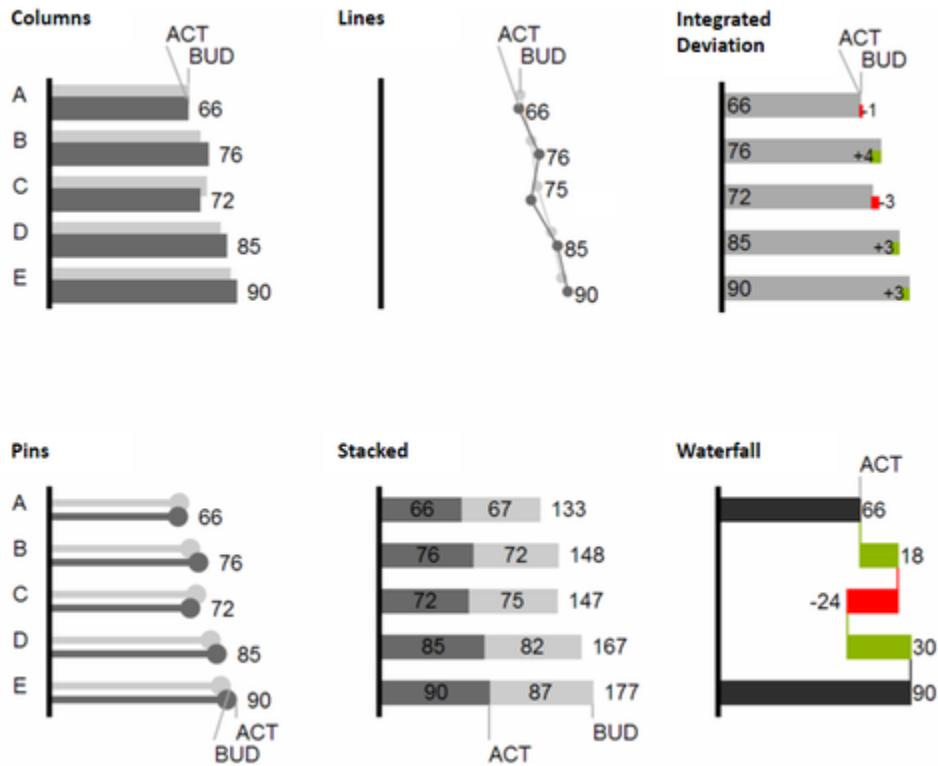
Chart Types

graphomate charts for Excel offer a whole range of new chart types which can be extensively customized according to your reporting requirements. We distinguish between the following chart types:



We recommend these chart types for visualization of developments over time.

For the comparison of structures or hierarchies we recommend the use of charts with a vertical category axis:

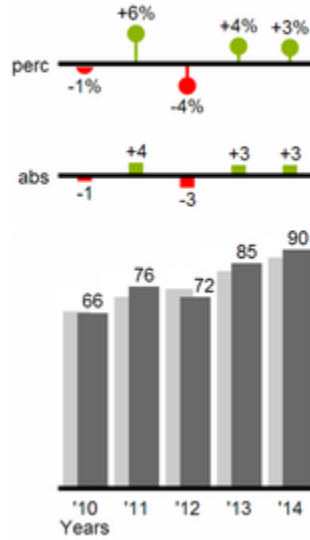


All charts can always be used in vertical or horizontal orientation. The *Comparison Group* enables you to use the same scales. Each chart must be assigned to the same *Comparison Group*. It is possible to use up to 10 data series – either consecutively or – in a stacked chart - on top of each other. The name of a data series can be displayed at the data series itself or alternatively on the axis of the base chart.

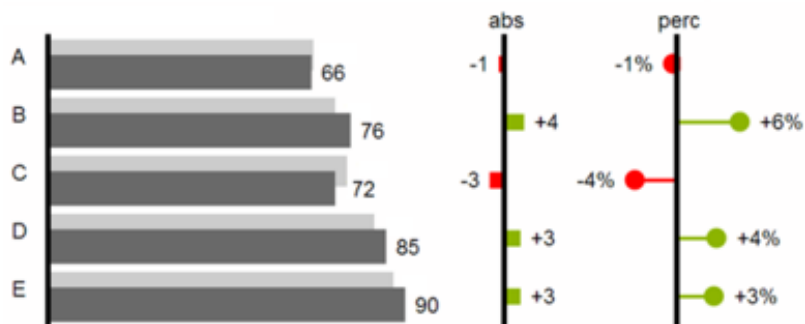
Deviation Axes

With a simple mouse click, *graphomate charts for Excel* enables you to set additional axes above all chart types, which display the percentage or absolute deviations between two data series. Of course you can name the deviation series and display the names in the chart.

columns with deviation axes



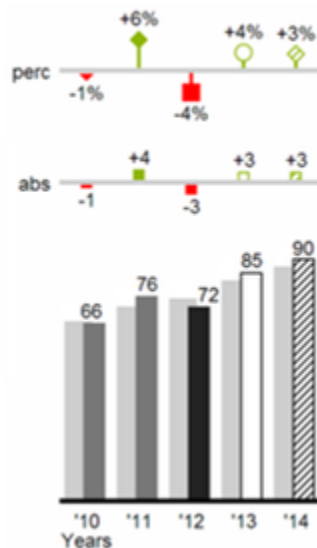
columns with deviation axes



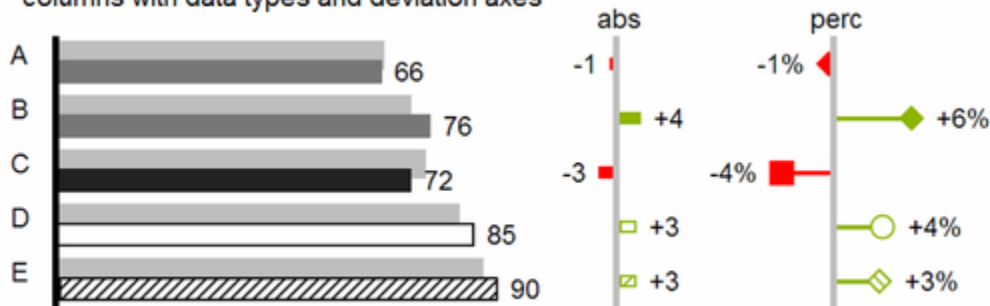
Data Types

Furthermore, each element of a chart can be formatted independently. This is achieved by using the *Data Types*. These *Data Types* enable you to use a customized visual language for your company. *Data Types* are defined in the *Data Types Editor* and then they are attributed to each element of a *Data Series* on the tab *Data*. The color, filling, shape and width of the chart elements can be defined by using *Data Types*. Please note that the use of *Data Types* affects the deviation axes: The *Data Type* of the *Measures* can be seen in the elements, the *Data Type* of the *Base values* is used in the axis – as long as the axis has a thickness of at least 3 px.

columns with data types and deviation axes

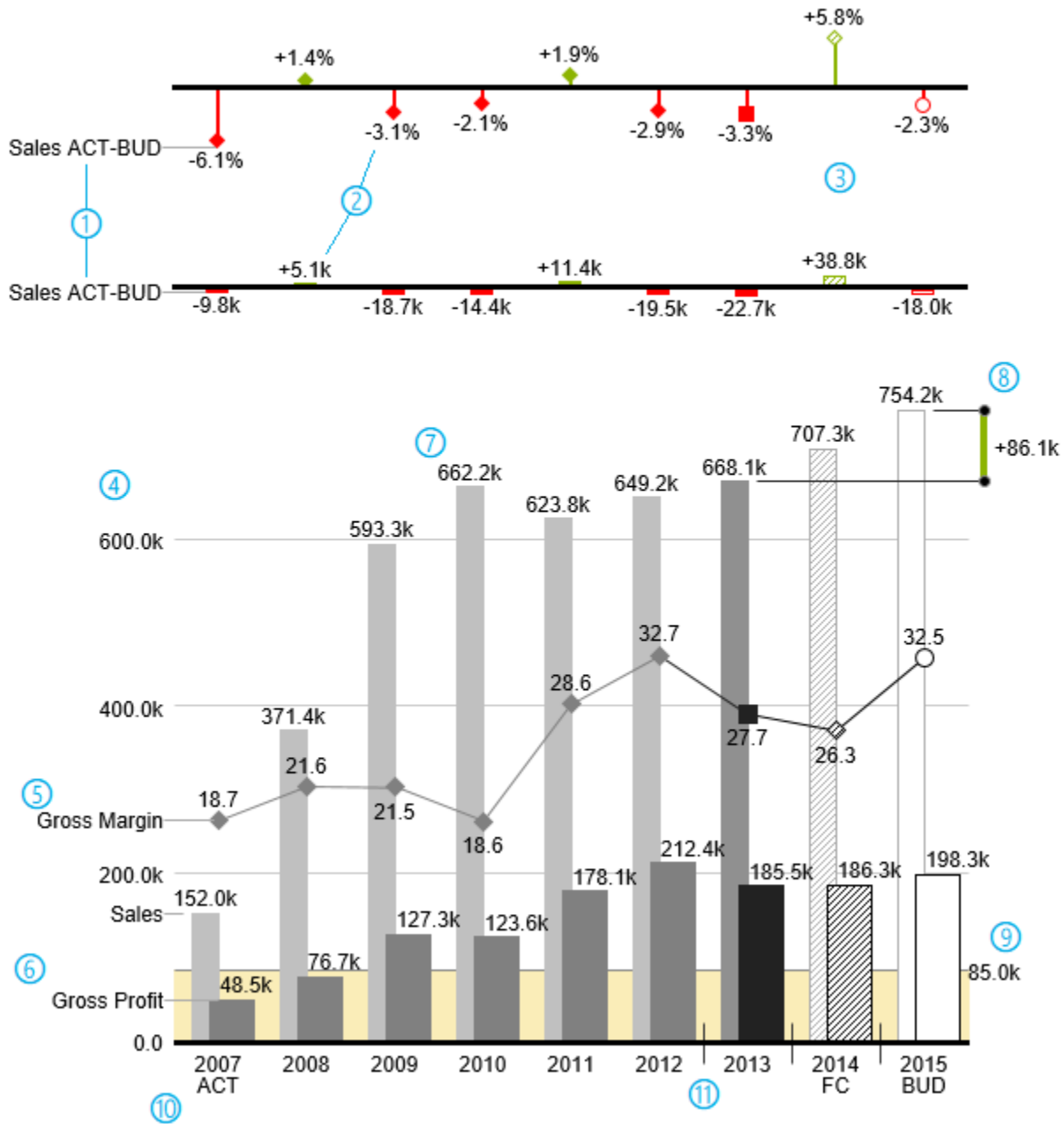


columns with data types and deviation axes



Visual Elements of the graphomate charts

These examples are valid for all chart types – in structure and time depictions.

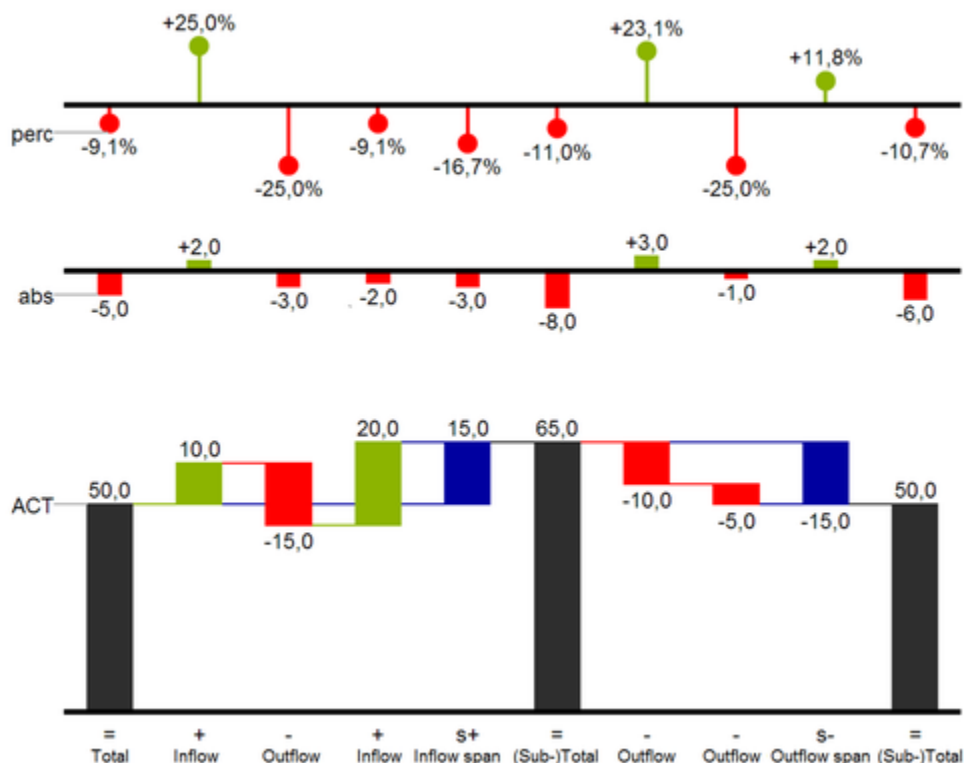


1. Percentage and absolute deviation between data series with data series labels.
2. Percentage and absolute data labels can be formatted independently.
3. By using Data Types, the chart elements and axis carry information: deviation of forecast (hatched) to budget data is shown. Therefore the deviation axis is hollow.
4. A value axis with help lines can be displayed optionally for all charts.

5. Charts can be superimposed, thus enabling you to depict combination charts - in this case a line chart with data series labeling and data types for previous periods (grey rhombus), actual (black square), forecast (hatched rhombus) and planned data (hollow).
6. Column chart with two data series (-labels) and use of data types. Sales are shown with lighter and narrower columns, which can be controlled centrally by the use of *Data Types*.
7. Data labels are free to define. For example, use the apostrophe for the representation of millions.
8. Emphasize the difference between two elements with the function *Highlight*.
9. Scaling helper show different scales of charts.
10. Multi-line axes labels are automatically copied from the source data.
11. So-called *Separators* help to structure the category axis.

Waterfall Charts

A waterfall chart – often also called a flying bricks chart or, in finance, a bridge shows how an initial value is increased (inflow) or decreased (outflow) by a series of values, which lead to a final value – if necessary with subtotals and spans. For a flexible use of the waterfall in *graphomate charts for Excel* an additional *Data Series* has to be defined: the *Waterfall Calculation Path*. This *Data Series* determines, whether the value to be shown is an in- or an outflow value. For further information to the *Waterfall Calculation Path* see [appendix](#). It is, of course, possible to use the waterfall horizontally or vertically, just like all other charts. Additional deviation axes are also possible. Furthermore, *Data Types* can be used for formatting. Please note that *Data Types* will overwrite the colors of in- and outflows as well as the colors of sums and spans which have been defined on the tab *Appearance*.



Above you can see a visualization of the operators for the calculation path and their effects on the elements of the waterfall chart. The following table gives some more explanations:

Function	Sign	Display
(Sub-)Total	=	Value is shown beginning at the axis.
Inflow	+	Increase of previous value and data label on the element.
Outflow	-	Decrease of previous value and data label on the element.
Inflow Span	s+	Positive overall change based on a totals item.
Outflow Span	s-	Negative overall change based on a totals item.
Neutral	0	Neutral position with own color scheme
Standard	„"	Difference to previous value according to data value sign (+/-).

Installation

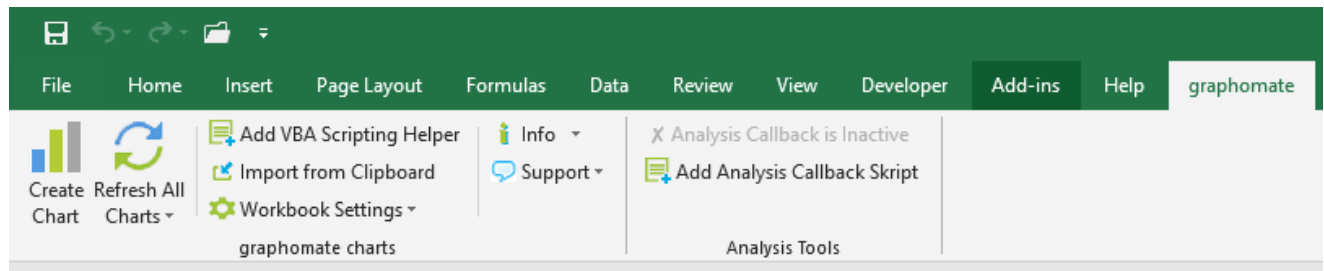
Installing charts for Excel

You have downloaded *graphomateChartsForExcel-Installer-1.8.x.msi*.

i *graphomate charts for Excel* can be used with Excel 2010 and higher versions and with Microsoft 365 Excel Desktop – Excel 2007 is not supported by our add-in!

Please note that the Internet Explorer 11 is required.

1. Start the installation process by double-clicking on *graphomateChartsForExcel-Installer-1.8.x.msi*.
2. Follow the on-screen instructions
3. After the setup process is finished, you will find an entry *graphomate charts for Excel* in the Control Panel under *Programs and Features*.
4. After restarting Excel and, on prompt, entering your license key, a new *graphomate* tab appears in the ribbon menu. This holds the following commands:



i At the moment there are 3 installers for *graphomate charts for Excel* available:

- Single-User-Version, installation possible without administrator rights
- Admin-Version, you need to have administrator rights or for a machine-wide installation, Office 32-Bit-Versions
- Admin-Version, you need to have administrator rights or for a machine-wide installation, Office 64-Bit-Versions

i Since version 1.4 all admin setups are setting the ALL_USERS option while installing. This is required for some enterprise environments.

Uninstalling the graphomate charts for Excel

1. Go to *Programs and Features* in the Control Panel
2. Locate the entry *graphomate charts for Excel* and uninstall it via the context menu/right click, or the appropriate button in the Control Panel.





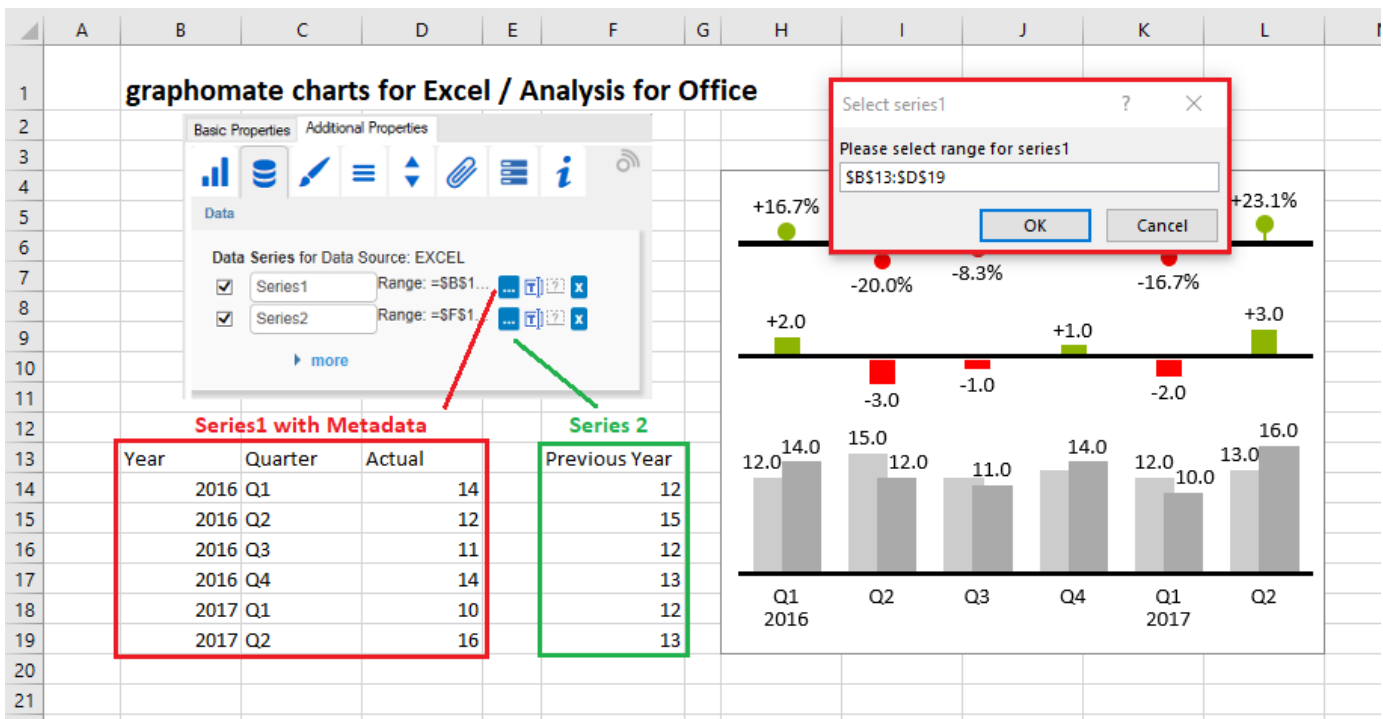
- When installing the single-user-msi, please install as a user, not as an admin, otherwise the graphomate Add-in is not available in Microsoft Excel.
- When updating from version 1.2.x (or lower) to the version 1.4.x (or newer), firstly you must install 1.3.x and start your reports and save them as 1.3.x format, to migrate them to the new internal format. Then you can upgrade to the preferred version.

Quick Start

Create a Chart

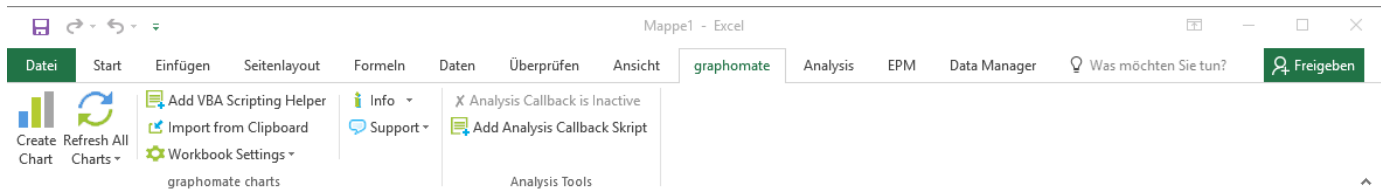
You have installed *graphomate charts for Excel* and now want to create a chart.

1. Select a cell range to draw the chart in.
2. Click on *Create* in the *graphomate* tab of the ribbon menu. After the initial chart is created, select it and in the appearing *Additional Properties Sheet* on the right, choose the desired chart type and deviation charts as appropriate.
3. On the second tab *Data*, assign the data series to be depicted. Click on  and choose the appropriate cell range for the first data series.
Important: the first data series has to contain the category labels as strings, so that they can be interpreted as labels for the category axis.
4. Now choose the cell range for the second data series with the button  - without category labels – and continue to do so for further data series.



The Excel chart areas of our *graphomate charts for Excel* are rendered in so-called shapes, making it possible to copy them and use parts individually. All parameters of the *graphomate charts for Excel* can be changed in the *Additional Properties Sheet* to the right; a few parameters can be also changed with the Excel chart menu.

User Interface




- **Create Chart**
- The **Refresh button** triggers a complete redraw of a *graphomate chart*, e. g. if the data changes, or chart elements were moved by accident.
- In the (not recommended) case you have a workbook that contains a great amount of graphomate charts you can use the feature **Load All Deferred Charts**. It can be activated separately for each workbook in a sub menu of the refresh button. It improves the performance when opening an Excel file that contains a lot of graphomate chart instances because it prevents the add-in from loading every chart on startup. Thus the charts are not activated on startup and need to be updated when data or properties changed in order to show the changes. This can be achieved by selecting them separately or by clicking the "Load All Deferred Charts" Button.
- **Add VBA Scripting Helper** This options adds a helper script code, which simplifies the usage of a graphomate chart.
- With the **Import from Clipboard** button, individual *graphomate* charts from SAP Lumira Designer can be imported into MS Excel. As described in this manual, these charts can then be dynamically used, e.g. inserted in MS PowerPoint presentations. Please note that this import functionality from SAP Lumira Designer is only possible if our graphomate charts are installed in Lumira Designer as well. To enable the export, the checkbox *Excel export* available on the tab *Behavior* of the graphomate charts for SAP Lumira Designer needs to be enabled. Further instructions on how to proceed in SAP Lumira Designer can be found in the manual for the [graphomate charts for Lumira Designer](#).
- **Workbook Settings** In this area it is possible to adjust the following settings of the workbook:
 - **Defer Chart Loading** When this option is checked, all charts contained in this workbook, are not activated on load. Instead, they are activated when the user selects each chart.
 - **Use DPI Scaling** If activated, the scale of your system for your display is used for the charts and the *Additional Properties Sheet*.
 - If **Enable Analysis Callback** is clicked the "AfO Callback" Module is added.
 - **Property Sheets active** decide wether or not the Excel user can see the property sheets or not, if a graphomate chart is selected.
- **Info** displays a dialog box containing information about the *graphomate chart add-in* as well as the current system environment. The dialog box also provides the possibility to enter a license key.
- **Support** button
 - **Collect Support Data** opens a folder in the Windows Explorer where debug information is collected. If you experience faulty behavior of a *graphomate chart*, please send us the zip file along with an error description.
 - **Show Error Log** displays the error-log-file of the Workbooks
 - Open Manual directs to the User Manual for the graphomate charts for Excel.
- **Analysis Tools** is displayed, only if SAP Analysis for Office is installed
 - **Analysis Callback is Active/Inactive** shows, wheather automatic updates with AfO data is activ
 - **Add Analysis Callback Script** can be used to insert the update script for AfO into the current workbook

Usage Information

Co-workers who have not installed *graphomate charts for Excel* can of course use workbooks containing *graphomate charts*, but will not be able to edit the charts. Instead, these charts are static, shapes-based Excel charts. The situation is the same if a *graphomate chart* is opened with an older version of the add-in than the one it was created with: a warning displayed, and the chart being inactive.


- The Excel **undo** button cannot be used for actions taken with the add-in (i.e. deletes within a data series).
- In earlier versions of *graphomate charts for Excel*, it was necessary, to use the addin-specific **copy and paste** buttons in the ribbon menu. From version 1.2.x on, this is no longer the case, and the standard Excel buttons as well as the key combinations Strg+C, Strg+X and Strg+V can be used.
- Also, please bear in mind that **data** is written into the Excel target cells analogous to the initial view of the Lumira Designer datasource. Since the alignment of the data is relevant for the *graphomate charts* in Excel, there may occur undesired side effects for certain selections in Lumira Designer, such as selections of multiple rows or columns for a single data series, or "checkerboard" selections.
- Since version 1.3.x a popup shows up informing you that your limited version (if you use one) will expire. It will show up if there are less than 4 Weeks left

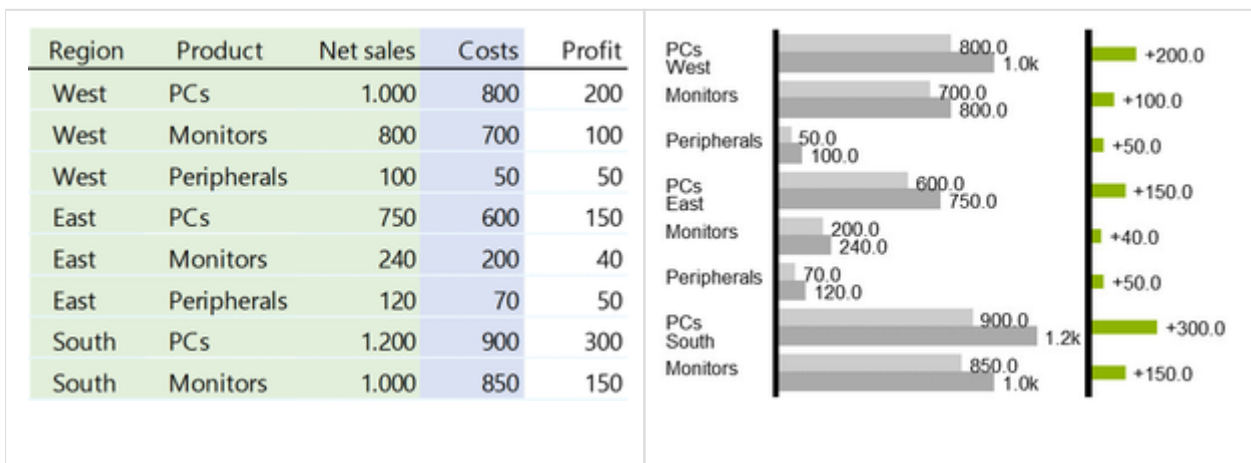
Data Series Selection

Each series button  is used to select exactly one data series.

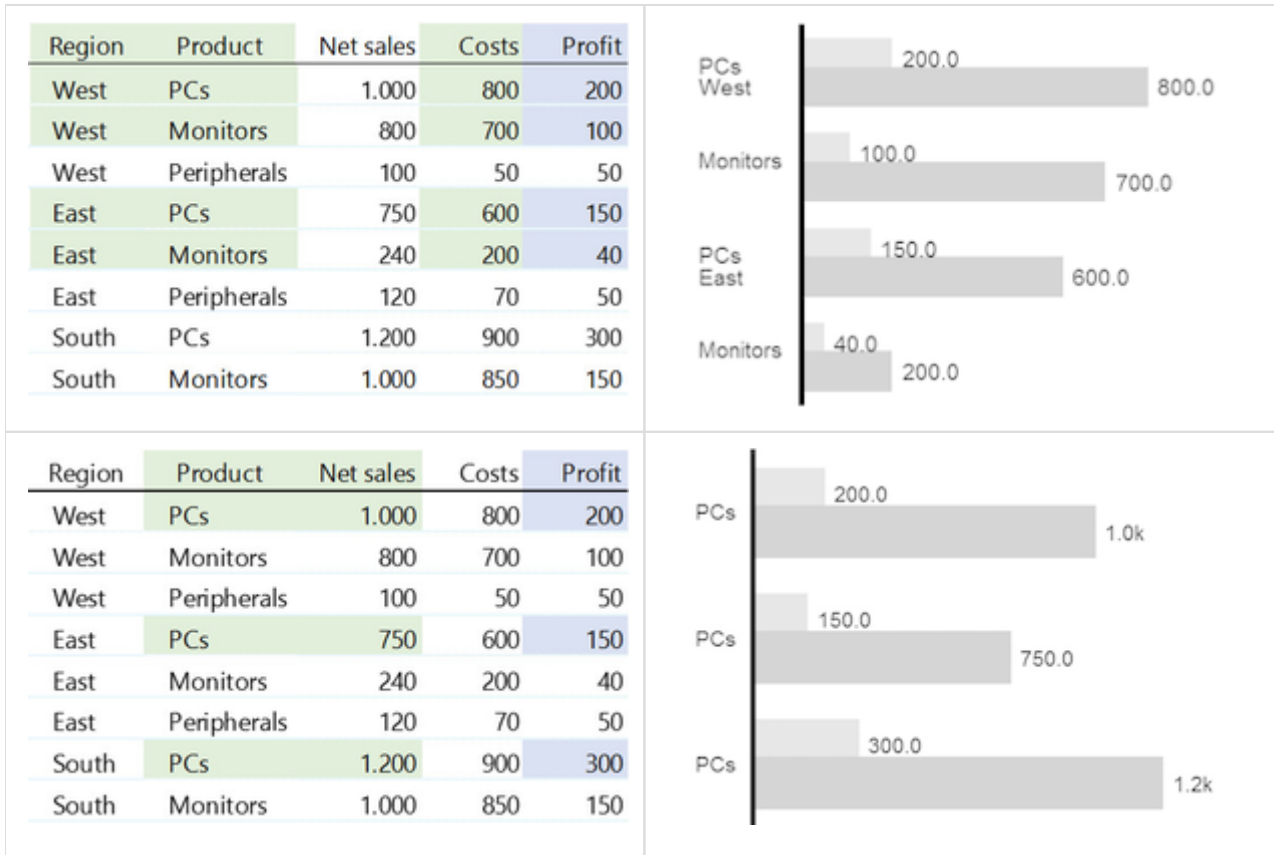
Important: Series 1 needs to include the category labels for all data points; all other series take their labelling from this selection according to their position in the cell selection. Please make sure that cells containing labels are formatted as text. If you want to use year dates as category labelling, convert them to text with a leading apostrophe ('). Otherwise, these will be interpreted as values, which can lead to unintended behavior. We recommend a column-oriented data layout with at least one category label at the start of each row (see picture below).

Region	Product	Net sales	Costs	Profit
West	PCs	1.000	800	200
West	Monitors	800	700	100
West	Peripherals	100	50	50
East	PCs	750	600	150
East	Monitors	240	200	40
East	Peripherals	120	70	50
South	PCs	1.200	900	300
South	Monitors	1.000	850	150

In this example, the first column contains the dimension *Region* with three characteristics. The second column contains the dimension *Product*, equally with three characteristics. The last three columns hold the data series *Net Sales*, *Costs* and *Profit*. Please note that cells containing category labels can't be grouped – you can't join the three cells with the label *West* to a single cell. Now, if you want to assign data to a series, first click on one of the series buttons  and select one of the data columns. If you want to use category labels – the first two columns in our example – select them *only with the first data series*. An example is shown below: series 1 is shaded in green, series 2 is shaded in blue.

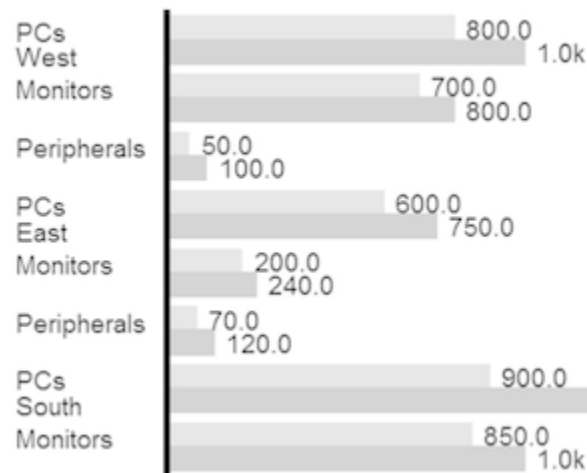


The category labels selected with the first data series are mapped internally to all other data series. Please note that with the first series is linked to data as well as all category labels. It is possible to include column headers in your selection; these are currently ignored, though. It is also possible to select only parts of a table. This can be done by pressing STRG/CTRL while selecting individual cells or cell ranges with the mouse. Likewise, the connection between data and labels is constructed via the row index – see the examples below.



Basically, *graphomate charts for Excel* support the selection of rows as data series – see below. However, this can lead to misinterpretation of the data and is not recommended. We advise to utilise the layout described above, with data aligned in columns.

Region	West	West	West	East	East	East	South	South
Product	PCs	Monitors	Peripherals	PCs	Monitors	Peripherals	PCs	Monitors
Net sales	1.000	800	100	750	240	120	1.200	1.000
Costs	800	700	50	600	200	70	900	850
Profit	200	100	50	150	40	50	300	150



Changes to data or labels will be automatically updated in the chart – when using *SAP Analysis for Office*, please see the notes under [Usage with SAP Analysis for Office](#). An exception to the automatic update is cutting and pasting of data: in this case, the selection is not automatically adjusted to the new range. We recommend to release the selection with a click on X prior to moving the data, and reassign it to the new cell range.

⊗ special data for waterfall chart:

	AC	BU	ΔBU	ΔBU%	Calculation
				%	Path
Lic. Revenue	103,0	98,0	5,0	5%	=
Sup. Revenue	20,0	21,0			
Var. Costs	-60,0	-61,0	1,0	2%	
CM1	63,0	58,0	5,0	9%	=
Adm. Costs	-10,0	-8,0	-2,0	-25%	
Log. Costs	-6,0	-5,0	-1,0	-20%	
Other Costs	-3,0	-4,0	1,0	25%	
Fix Costs	-19,0	-17,0	-2,0	-12%	S+
CM2	44,0	41,0	3,0	7%	=

Properties

Basically, there are two possibilities to maintain the features of *graphomate charts for Excel*: with the *Basic Properties Sheet*, which lists all parameters in a structured list or with the *Additional Properties Sheet*. The latter provides a user-friendly interface. There are some special features, which can only be maintained on the *Basic Properties Sheet*.

The Checkboxes next to the features in the *Additional Properties Sheet* are used to control the visibility of chart elements.

General Tab

Orientation

All charts can be used in horizontal or vertical orientation:

- horizontal for development over time,
- vertical for structure comparison.

Use the toggle button to select *Structure/Time*.

Chart Type

Choose the preferred chart type via mouse click on the corresponding icon. With the *Checkbox Base Chart* you can display or hide the *Base Chart*. This way, you may use deviation charts without the *Base Chart*.

Stacked Bar Mode

This option is visible, if the stacked bar chart is selected. It switches between the different stacked bar chart modes.

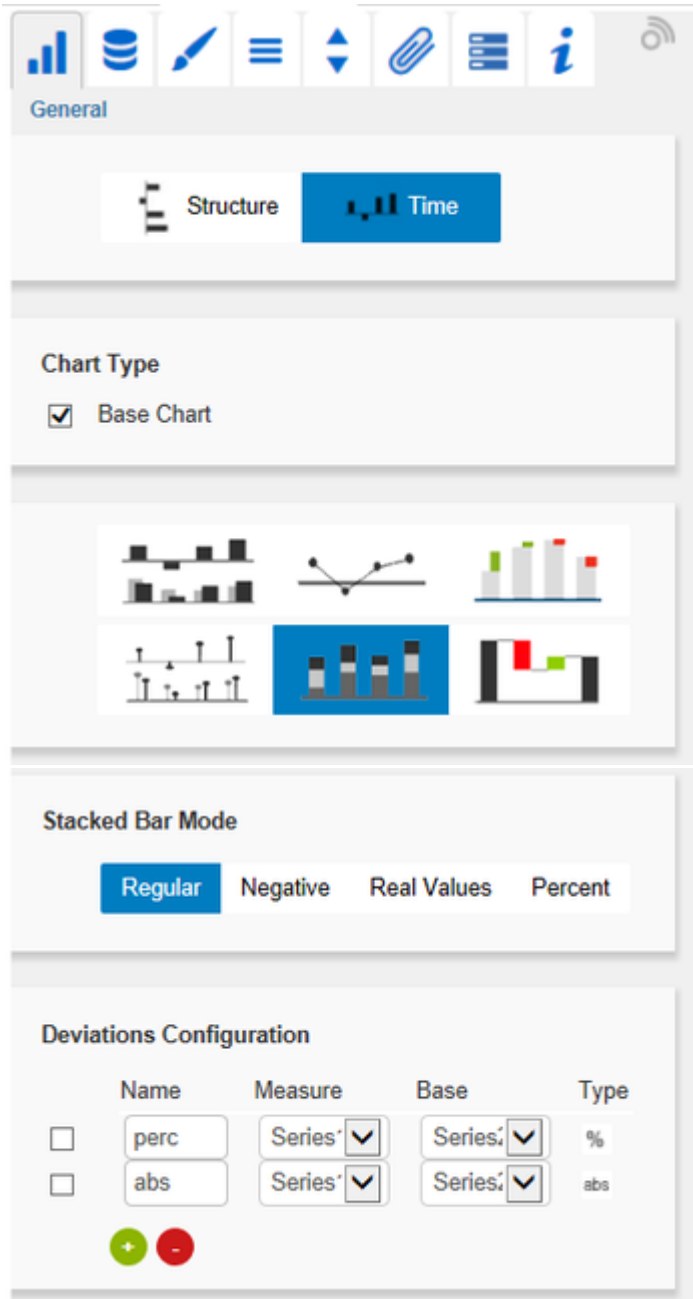
The modes are explained under *Standard Properties*.

Deviations Configuration

These Checkboxes activate - additionally to the *Base Chart* - axes for absolute or percentage deviations of two *Data Series*. A click on *Name* enables the renaming of the deviation series. This *Name* is also used as a legend.

Use the *dropdown boxes* to choose the *Data Series* for the calculation of deviations according to the formulas on the right. Click the button *Type* for selecting between absolute and percentage deviation.

Delete deviation series by using the red button and add new by using the green button, which will be shown above the *Base Chart*. The order of the display corresponds with the order in the *Deviations Configuration*.



Formula for calculation of absolute deviation:


$$(Measure - Base)$$

Formula for calculation of percentage deviation:


$$\left(\left(\frac{(Measure - Base)}{abs(Base)} \right) * 100 \right)$$


Data Tab

Data Series

Here you can link up to 10 *Data Series* from the *Data Source* that you want to display by clicking the corresponding  button. The Checkbox next to the *Data Series* determines its visibility in the chart. Change the name of the *Data Series* by clicking on it. The given names are also used for

the Data labels. With the  button you delete the assignment of the *Data Series*.

With a click on the blue  buttons you can toggle the labelling of the according series selectively.

If you click the question mark icon , you can toggle the chart type for each series separately. By default (question mark selected), the setting from the general tab is used. With this feature you can get automatic chart layering.

Category Labels

Category Labels are shown in the chart, when the Checkbox is activated. Category Labels are automatically created from the meta data of the Data Source.

Base Chart Axis Labels

Define additional axis labeling here. To show these labels the Checkboxes on the *Helper* Tab must be activated.

Data Types

Specify here the Data Type of each element of the selected Data Series. Each element can be formatted individually.

Data Types are defined on the tab Data Types.

The entered Data Types are converted to uppercase in the background, so they are not case-sensitive in order to prevent possible sources of errors.

Waterfall Calculation Path

Values for the Waterfall Calculation Path:

To use a waterfall flexibly, it must be first determined whether the value to be displayed is either a total or an in- or outflow using an additional *Data Series*. This is carried out by using our so-called *Waterfall Calculation Path* (see input options on the right).

- „=” (Sub-)Total
- „” Standard
- „+” Inflow
- „-” Outflow
- „S+” Inflow Span
- „S-” Outflow Span
- „0” Neutral Position

Appearance Tab

Labels

Set the font size, the font family and the font color for labels in the chart. In addition, shadows with defined colors can be added to accentuate the labels if the background is colored.

Shadows

If activated, a rect is drawn behind the Element Labels. With *Shadow color* you can define the color value.

Element Labels

If the Checkbox is activated, all elements of the chart will be labeled. The toggle buttons Fix/Auto determines the visibility of the labels:

- *Fix*
Data labels are always visible
- *Auto*
Labels are hidden or moved in case of overlaps – adjustable with the property Collision Adjustment – see in the standard properties.

Value Format

Select the format of the Category Labels:

- *Basic*
Select the format of the absolute and percentage values according to guidelines of numeral.js.
- *Extended*
If a fixed format is preferred, put the format for absolute and percentage values here. Choosing a “(“ in the box Negative Sign will show negative values in brackets: (1234). The parameter in the box Scaling is used as a divisor for scaling the data label. The resulting format string can also be set via scripting language – for further details see the [Number Formatting](#).
- *Locale*
sets the label country format in the Basic mode. DE, FR, EN and AUTO are available options. Choosing *AUTO* the Locale is retrieved from the Data Source.

Pick Labels

The screenshot shows the 'Appearance' tab of a software interface. It contains four main sections:

- Labels:** Includes input fields for 'Font Size (px)' (set to 11), 'Font Family' (set to Calib), and 'Font Color' (set to black).
- Shadows:** Includes a checkbox for 'Shadows' (unchecked) and a 'Shadow color' field (empty).
- Element Labels:** Includes a checked checkbox for 'Labels' and two toggle buttons: 'Fix' and 'Auto' (selected).
- Value Format:** Includes two tabs: 'Basic' (selected) and 'Extended'. It has input fields for 'Percentage' (0.0%), 'Absolute' (0.0a), and 'Locale' (en). A note below the Absolute field reads 'Format string according to numeral.js'.

If this option is activated, the underlying options controls, which labels are shown. Only those labels are shown, which meet one of the criteria. The following options can be picked:

First: The first label of each series is shown

Last: The last label of each series is shown

Min: The minimum value of each series is displayed

Max: The maximum value of each series is displayed

Before Separators: All values leading a separator are shown. This option depends on the setting under *separators*.

Peaks: When this option is checked, local minimum and maximum values are shown. What is interpreted as a minimum/maximum can be controlled with the option *Minimum Peak Size in %*.

Peaks from Leading Values: The peak calculation only considers leading values; subsequent values are no longer considered

Minimum Peak Size in %: Defines, how large the difference to the neighboring values must be, to consider the value as a maximum/minimum

Waterfall

The colors of the elements of a waterfall can be set here - corresponding to the calculation path. Please note that the use of *Data Types* overlap this standard format.

Deviations

Set the colors for deviations. If positive deviations between measures and base values are not regarded as positive, for example for comparisons of actual vs. budget costs, activate the *Checkbox Invert*.

Outlier Mode

Choose the appearance of the outliers here. In the mode *Short* the outliers are shown as small triangles on the axis. In the mode *Long* they are drawn over the entire available area – according to the rules by IBCS.

Series Styles Editor

Value Format

Basic Extended

	abs	%
Decimal Sep.	. ▼	. ▼
Thousands Sep.	. ▼	. ▼
Negative Sign	- ▼	- ▼
Scaling	1 ▼	1 ▼
Decimal Places	1 ▼	1 ▼
Prefix		
Suffix		%

Pick Labels

- First
- Last
- Min
- Max
- Before Separators
- Peaks
- Peaks from Leading Values

Minimum Peak Size (%)

Waterfall

+	<input type="checkbox"/>
-	<input type="checkbox"/>
0	<input type="checkbox"/>
=	<input type="checkbox"/>
s+	<input type="checkbox"/>
s-	<input type="checkbox"/>

In this editor the appearance of the Data Series is determined, as long as you do not use Data Types. Data Types overwrite the Series Styles. The handling is similar to the definition of Data Types on the Data Types tab, the name is derived from the data series name. Color, Fill and Shape determine the appearance of the elements. Shape refers to the pin heads. Navigate via mouse click through the alternative representations. Width determines the width of the elements. The values can be given in percentage of the category width as well as in absolute values in [px] – just toggle % /abs.

- i** The parameter Width can only be used in bar or column charts. If necessary, please use the parameter Bar Width in the Standard Properties Sheet for the elements width of other chart types.






Deviations

Good	
Bad	
<input type="checkbox"/> Invert	
Neutral	

Outlier Mode

Short Long

Series Styles Editor

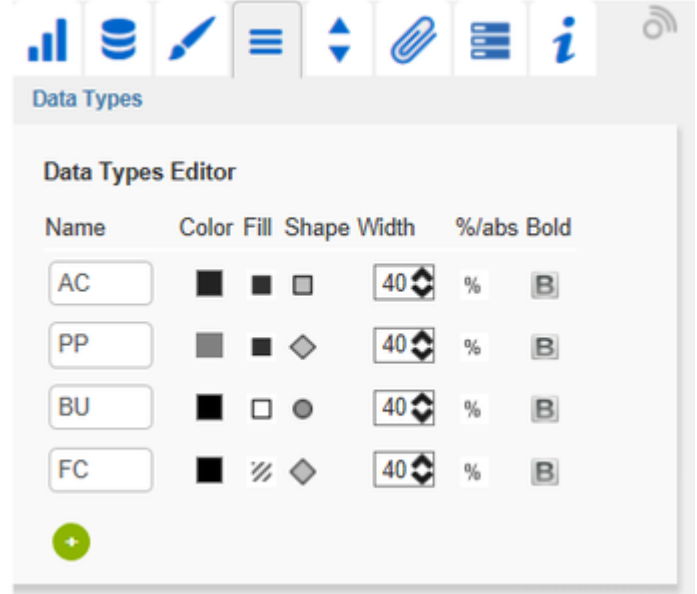
Name	Color	Fill	Shape	Width	% / abs
Series1				<input type="text" value="40"/>	%
Series2				<input type="text" value="40"/>	%

[▶ more](#)

Data Types Tab

Data Types Editor

This editor is used to define *Data Types*. The abbreviations can be used on the tab *Data* and it is possible to format each element individually. The abbreviations are defined in the column *Name*. *Color*, *Fill* und *Shape* define the appearance of the elements. *Shape* refers to pin or line heads. Navigate via mouse click through the alternative representations and view the changes in the chart, after you assigned the corresponding *Data Type*. The column *Width* determines the width of the elements. The values can be given in percentage of the category width as well as in absolute values in [px] – just toggle *%/abs*. The last column *Bold* sets the font type of the label of the *Data Type* to bold. With the red button next to *Data Type* you delete *Data Types* and with the green one you add new *Data Types*. *Data Types* are used globally within an Excel workbook. For this reason *Data Types* will automatically be adopted for all other *graphomate* components which use *Data Types*.



Behavior Tab

Scaling

The default *Auto* scales the chart according to the Min and Max-values of all selected data.

Several charts can be scaled identically by using the same *Comparison Group*, which is activated by the Checkbox. That way the Min and Max of the data basis in this group is used.

Comparison Groups are used inside a worksheet.

Alternatively it is possible to set the Min and Max scaling values under *Manual*. *Retrieve values* proposes valid values!

Chart Min values > "0" cut the value axis. The script method *getClickedPositionValue* enables an interactive zooming.

See example in the script documentation.

Padding in [px] gives a margin to the chart. *Spacing* also in [px] denotes the space between base and deviation chart.

Category Axis

Activate the Checkbox to show the category axis. *Size* defines the thickness of the axis in [px].

With *Category Width* the width can be defined as *Fix* in [px] or automatically set with *Auto*.

The parameter *Element Offset* determines the shift of elements on the *Category Axis*. Using the toggle button *%/abs* allows you to set the value in percent or absolute in [px]. Use negative values for a shift in the opposite direction.

Data Types in Axis

If the Checkbox is activated, *Data Types* of the first *Data Series* are shown in the axes as long as the *Size* is at least 3 [px].

Suppress Zero Labels

If the Checkbox is activated, the labels of zero values are hidden – both in the *Base Chart* and in the deviation charts.

The screenshot displays the 'Behavior' tab settings for a chart. At the top, there is a toolbar with icons for chart types, data, editing, and help. The main settings are organized into sections:

- Scaling:**
 - Buttons for 'Auto' (selected) and 'Manual'.
 - Checkbox for 'Comparison Group' (unchecked).
 - A row of buttons labeled 'A' through 'H', with 'A' selected.
- Padding and Spacing:**
 - 'Padding (px)' input field with value '5'.
 - 'Spacing (px)' input field with value '0'.
- Category Axis:**
 - Checkbox for 'Category Axis' (checked).
 - 'Size (px)' input field with value '3'.
 - 'Category Width (px)' input field with value '50'.
 - Buttons for 'Auto' (selected) and 'Fix'.
 - 'Element Offset (%)' input field with value '30'.
 - Buttons for '%' (selected) and 'abs'.
 - Checkbox for 'Data Types in Axis' (unchecked).
- Suppress Zero Labels:**
 - Checkbox for 'Suppress Zero Labels' (unchecked).

Helper Tab

Series Labels

Activate the Checkboxes to show the data label on the Data Series.

Axis Labels

Activate the Checkboxes to show the legend at the axes.

Highlight

This function enables you to highlight the absolute or percentage difference between two elements. Activate the Checkbox and set an index for elements where the highlighting should start and end.

Choose between a *Single highlighting* on the side and the *highlighting of Multiple elements* above the graph. If you select Single, the first element of the list is displayed and all other elements are ignored. You can also choose whether the absolute and/or percentage values should be displayed.

Value Axis/Flip Value Axis

Activate the Checkbox *Value Axis* to show value axes and help lines approximately according to the interval.

Activating the Checkbox *Flip Value Axis* flips the Axis – from right to left and from top to bottom). If *Force Axis Interval* is active, the tick interval is calculated exactly according to the entered value.

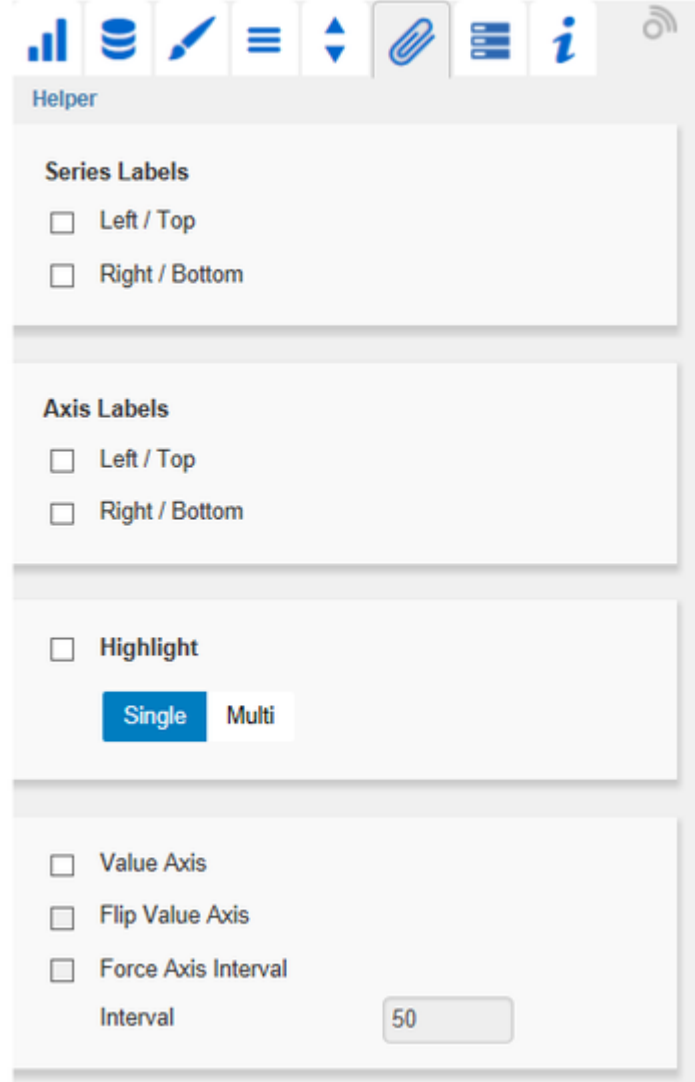
Separators

You have the option to set so-called *Separators* in the chart. These can be set automatically in case of changed Data Types or Categories, or they can be set Manually – according to the selected toggle button.

Source Row determines the category row and Series the Data Series according to which Data Type the Separators are shown. Furthermore, you can define the *Length*, *Thickness* and *Color* of the Separators in [px].

Scaling Helper

Activate the appearance – *line* or *area* – and the position of the Scaling Helper at this point. Retrieve Value proposes valid values!



Threshold Lines Configuration

In this panel you can configure custom horizontal lines, e.g. to indicate certain thresholds. You can define the thickness, color and style of the line and label it.

Separators

Categories Data Types Manual

Source Row

Length (px)

Thickness (px)

Color

Scaling Helper

Line **Area**

Value

Retrieve Value

Threshold Lines Configuration

	Label	Type	Value	Size	Color	Style
<input checked="" type="checkbox"/>	<input type="text"/>	Thresh <input type="text"/>	<input type="text" value="100"/>	<input type="text" value="1"/>	<input type="color" value="#000000"/>	<input type="text" value="-"/>

Server Tab (Also see [Server Properties](#))

Server Configuration

Here you can enter the *Server URL* to which the component should connect and from which it should retrieve the templates.

If you have specified the URL to the server, a check mark indicates that a connection could be established.

If another server is used later, you can also press the button next to the Save button and edit the *Server URL*.

The hyperlink below the buttons allows you to jump to the admin.

Templating Configuration

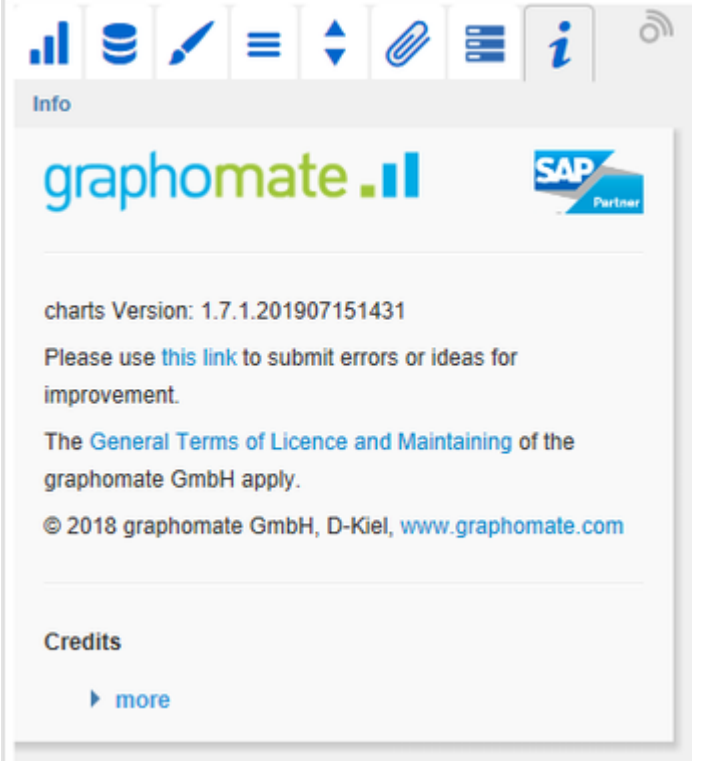
If the current settings are to be saved as a template, a new template name can be entered in the input field with the name *Create Template* and confirmed by clicking the *Save current State* button. If the naming convention entered is correct, the template is saved on the server and a toast with the corresponding message is displayed in the lower part of the *Additional Properties Sheet*. However, if the name entered does not meet the expected naming conventions, a toast with the permitted characters is displayed accordingly.

Templates stored on the server can be retrieved and applied via the Template List. Just select the desired template and press the *Apply* button. If you want to delete a template, select the template in the list and press the *Delete* button. If changes have been made to the templates on the server side, the list must be updated via the *Refresh List* button. Changes should then be visible.

The screenshot shows the 'Server' configuration panel. At the top, there is a toolbar with icons for charts, data, editing, navigation, and help. Below the toolbar, the 'Server' section contains a 'Server URL' input field, a 'Save' button, and an edit icon. The 'Create Template' section has a 'Name' input field and a 'Save current State' button. The 'Template List' section features a dropdown menu with 'Please select ...' and a 'v' icon, along with 'Apply', 'Delete', and 'Refresh List' buttons.

Info Tab

Here you will find the version number of our *graphomate charts* as well as a link where you may report bugs or propose wishes for new features. A list of all open-source libraries that we used can be found under *Credits*.



The screenshot shows the 'Info' tab interface. At the top, there is a toolbar with icons for chart types, data sources, editing, and help. Below the toolbar, the 'Info' tab is active, displaying the graphomate .ll logo and the SAP Partner logo. The main content area contains the following text:

charts Version: 1.7.1.201907151431

Please use [this link](#) to submit errors or ideas for improvement.

The [General Terms of Licence and Maintaining](#) of the graphomate GmbH apply.

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Below this text, there is a section titled 'Credits' with a 'more' link indicated by a right-pointing arrow.

Expert Properties

Some (expert) features can only be controlled in the *Basic Properties Sheet*.

Axes

CategoryCount

If this value is not equal to 0, it indicates how many categories are shown. Excessive elements are cut off and missing elements filled up with empty categories.

Value Axis Tick Distance

Describes the space between the ticks of the value axis. But this is more a guideline as the ticks are always positioned on "even" values.

Deviations

Deviation Bar Size Factor

The percentage width of the deviation bars in dependence of the element width in the *Base Chart* (only possible if *Data Types* are used).

Deviation Pin Line Black

Defines the color of the deviation pin line as black (or red/green).

Deviations Config

A JSON, which is depending on the settings of the deviations.

Display

Bar Width

Thickness of the elements in stacked bar, waterfall and integrated deviation charts.

Ending Line Overlap

Right and left overlapping of the KPI-Ending-Lines above the bar.

Ending Line Thickness

Thickness of Ending-Lines.

Ending Line Color

Color of KPI-Ending-Lines.

Ending Line Visible

Should be Ending-Lines shown?

Line Dot Radius X, Line Dot Radius Y, Pin Head Radius X, Pin Head Radius Y

Specify the X- and Y-radius of the pin and line chart. The distinction into X and Y allows to create ellipses and suchlike.

Pin Width

Thickness of pin lines used within pin charts. With a *Pin Width* = "0" it is possible to realize a dot chart.

Space Factor Base Chart

Space occupied by the *Base Chart*. Formula for calculation of space: $\text{Factor} / (\text{Sum of all factors})$

Space Factor Deviation Chart

Space occupied by a deviation chart. Formula for calculating the space: Factor / (Sum of all factors)

Labels

Collision Adjustment This property can be used to fine tune the collision algorithm used in the *AUTO mode* of the *Element Labels* position. The smaller the value, the more sensitive it is to collisions. Also negative values are possible.

Line Break Category Labels

The character or string at which point *Category Labels* are split into several lines. For example, using a space would change the label "ACT Jan 2001" in a label with three lines.

Line Break Axis Labels

The character or string at which point *Axis Labels* are split into several lines (similar to the property *Line Break Category Labels*).

Max Series Labels Width

Maximal width of data series labels, until the point where the *Padding* scales, too. If this value is exceeded the labels will be cut off.

Signed Labels

+/- sign of ALL values are shown.

Supress Zero Labels

Hiding *Category Labels* in case of zero values.

Supress Repeating Category Labels

Defines in which row of the *Category Labels* repeating labels should be suppressed. Expects the following format "true,false,true" and alike.

Offsetbar Chart

Offsetbar Deviation Labels On Top

Always show the labels of deviations in offset bar charts at the top. Otherwise, negative deviation labels will be shown within the bar.

Offsetbar Labels on Top

Show the labels of the offset bars above the bar and not within.

Offsetbar Offset on Left

Show the deviation bar of the offset bar chart on the left, not on the right.

Outliers

Negative /Positive Outlier Threshold

This is the value up to which everything in the chart automatically scales (if automatic scaling is selected). If one of the values in the data exceeds this value, it is then used as maximum. All values above the maximum value are represented as outliers accordingly.

Outlier Size

The dimension of the outlier sign in pixels.

Use Outlier Threshold

Determines whether the outlier threshold should be used (only in scale mode *auto*).

Scaling Helper

Scaling Helper Bar Line Width Specifies the thickness of the *Scaling Helpers* (see *Helper Tab*) when the type of the *Scaling Helper* is *Line*.

Stacked Bar Chart

Stacked Bar Negative Values

Should be negative values possible in stacked bar charts?

Stacked Bar Label Position

Determines where labels should be shown in a stacked bar chart: within or on the right side.

Stacked Bar Sums Visible

Should be sums shown above the stacked bars?

Synchronize

Synchronize Axes Position

Specifies whether the axis positions are adopted from the *Comparison Group* or whether these should be determined independently for the chart.

Synchronize Scaling

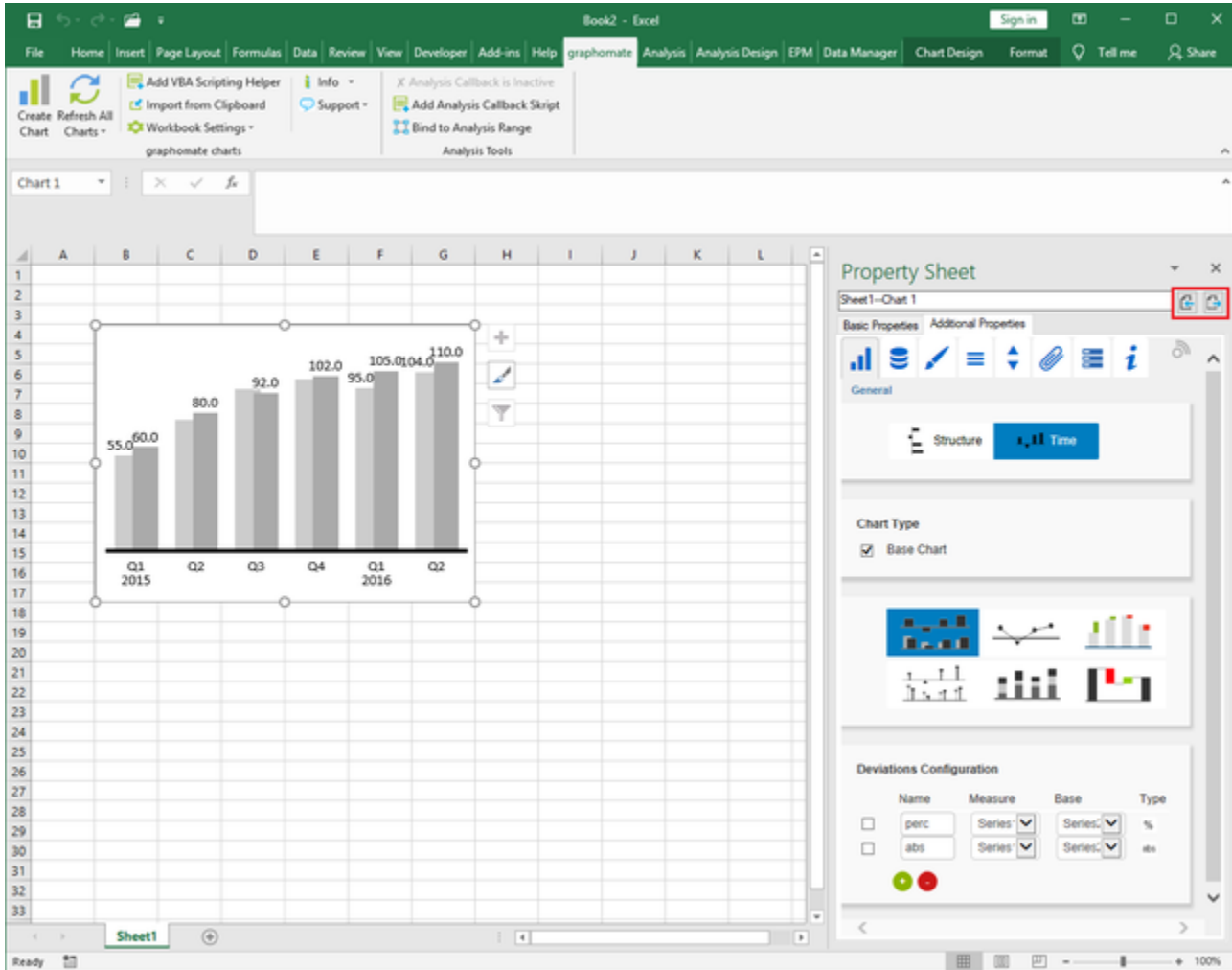
Specifies whether the scaling is adopted from the *Comparison Group* or whether it should be determined independently for the chart.

Synchronize Padding

Specifies whether the padding is adopted from the *Comparison Group* or whether it should be determined independently for the chart.

Using Templates

graphomate charts for Excel allows to save the settings of a chart in a JSON file. Use the icons next to the name of the chart for import and export a JSON file.



Property Cellbinding

Since the *graphomate charts for Excel* version 1.4 it is possible to bind cell entries directly from the excel workbook to all basic properties. Therefore you need to go to the *Basic Properties Sheet* and select the [...] -button next to the property. In the following step you mark the desired cellrange and click *Ok* in the dialog. Any modifications in the selected cellrange are applied directly to the connected chart.

- ✘ If the cell content starts with something that usually introduces a formula in Excel, then the input must be preceded by a single apostrophe ' as a string. This behaviour occurs when the *Property Cellbinding* is used to define the *Extended Number Format* for example.

Possible usage of *Property Cellbinding*:

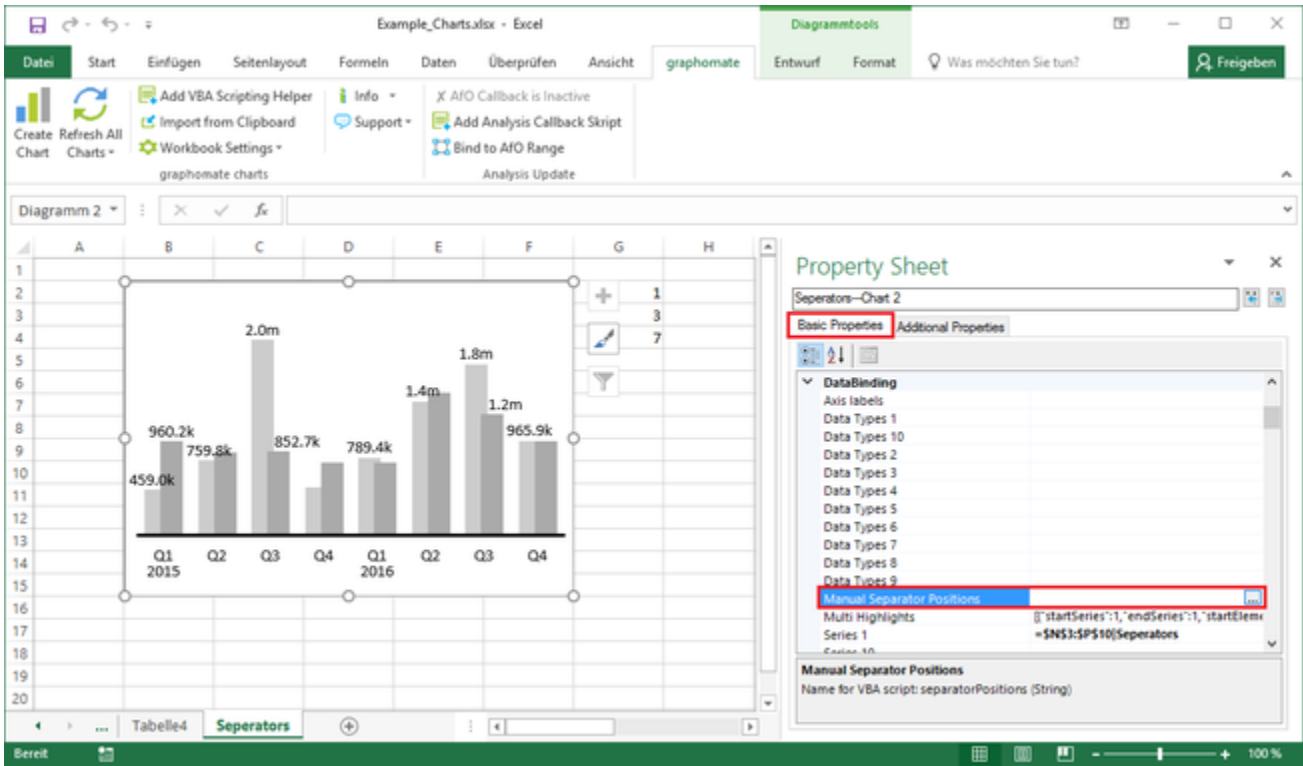
Manual Seperator Position:

1. After creating a graphomate chart you can add seperators per cellbinding. Pick the chart and switch in the *Additional Properties Sheet* to *Helper Tab*. Activate the property *Separators* and choose *Manual*. Please don't insert any values in the empty cells.

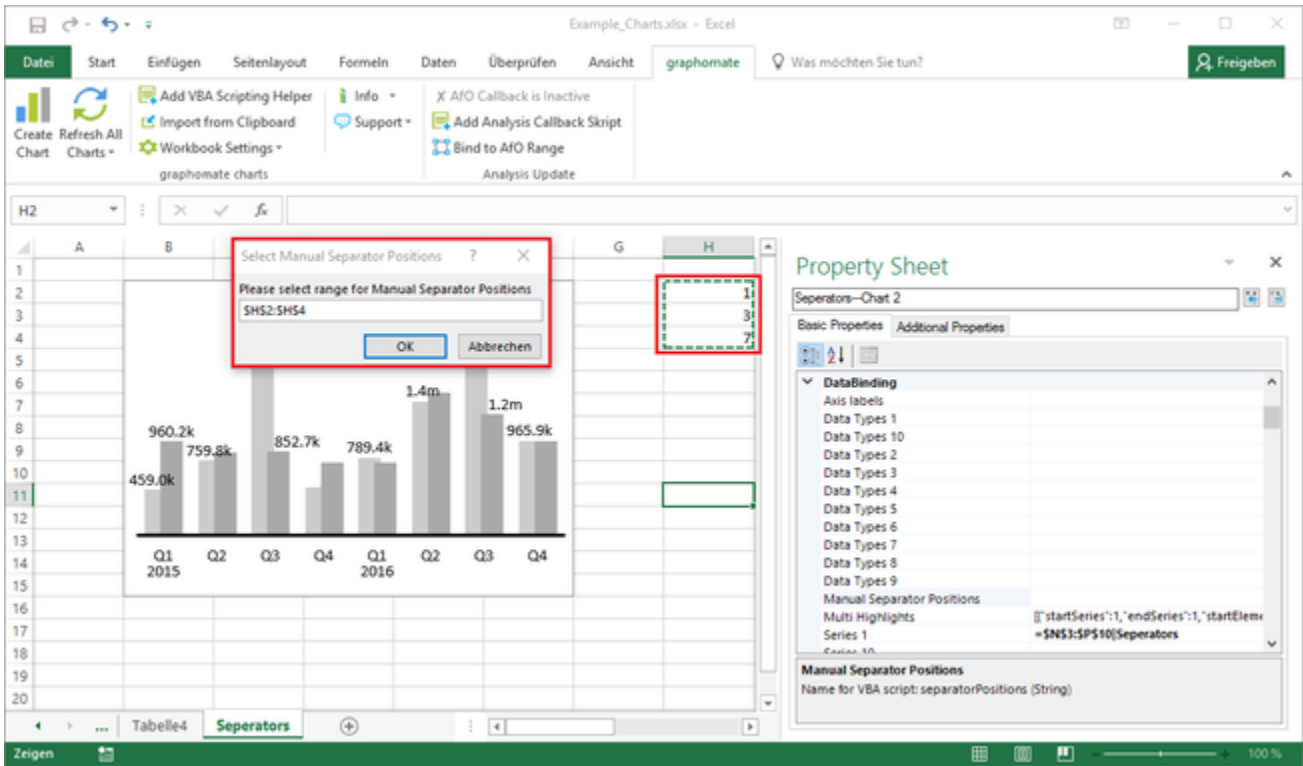
The screenshot shows an Excel spreadsheet with a bar chart and a 'Property Sheet' pane. The chart displays data for quarters Q1 2015 to Q4 2016. The values are: Q1 2015 (459.0k), Q2 (759.8k), Q3 (852.7k), Q4 (789.4k), Q1 2016 (1.4m), Q2 (1.8m), Q3 (1.2m), and Q4 (965.9k). The Property Sheet for 'Seperators-Chart 2' is open, showing 'Basic Properties' and 'Additional Properties' tabs. The 'Separators' checkbox is checked, and the 'Manual' option is selected under 'Data Types'. The 'Interval' is set to 50 and the 'Length' is set to 10.

Quarter	Value
Q1 2015	459.0k
Q2	759.8k
Q3	852.7k
Q4	789.4k
Q1 2016	1.4m
Q2	1.8m
Q3	1.2m
Q4	965.9k

2. In the next step you go to the *Basic Properties Sheet* and click into the empty space ([.]-button) right next to the property *Manual Separator Position*.



3. Following up you need to mark the cellrange which provides the values for the property. In this case the position of each separator. Confirm the dialog with **OK**.



4. The Separators are now drawn directly into the chart. Likewise changes within the selected cellrange are applied directly, even the chart is not selected.

The screenshot displays an Excel spreadsheet with a bar chart. The chart has data labels on top of each bar and vertical separator lines between the bars. The Property Sheet on the right shows the 'Manual Separator Positions' property set to the formula `=S$12:$H$4!Separators`. Red lines indicate the mapping from the property to the chart's separator lines.

Quarter	Value
Q1 2015	459.0k
Q2 2015	759.8k
Q3 2015	2.0m
Q4 2015	852.7k
Q1 2016	789.4k
Q2 2016	1.4m
Q3 2016	1.8m
Q4 2016	965.9k

Usage with SAP Analysis for Microsoft Office

Bind chart to Analysis range

Since version 1.4 it is possible to bind a chart to an Analysis crosstab. This binds the columns of the crosstab to the series and if the count of cells changes, the series length gets adjusted automatically.

To use this functionality, please select a chart and then press the button *Bind Analysis Range* in the ribbon group *Analysis Tools*. A window will be shown, where you can select a named range provided by Analysis.

Pressing the button *Unbind Analysis Range* disables the automatic range selection - though the series will still be bound to cells.

⚠ The ribbon menu group *Analysis Tools* will only be shown, if you have *SAP Analysis for Microsoft Office* installed. If it is not shown, despite having *SAP Analysis for Microsoft Office* installed, it can be forced to be displayed by setting the system environment variable GRAPHOMATE_AFO_OPTIONS to the value of "1".

Automation of data updates with SAP Analysis for Microsoft Office

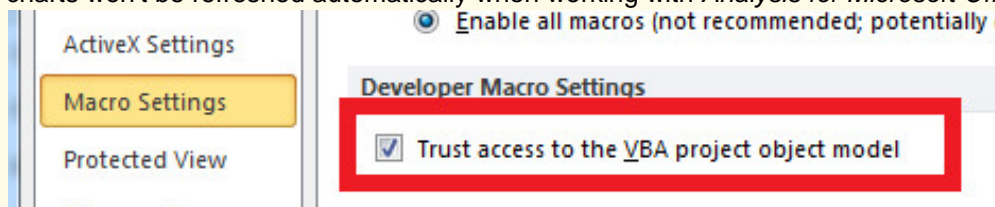
Since SAP Analysis deactivates data update events in Excel for technical reasons, you have to use VBA as a workaround to have automatic updates with new data from SAP Analysis. Otherwise charts will not be redrawn, when SAP Analysis writes new data to Excel cells. Since version 1.4 we created the necessary VBA scripts automatically.

But because this caused problems for some users, we changed the mechanics to a manual activation. From now on, for each single workbook the option *Enable Analysis Callback* in the menu *Workbook Settings* has to be checked, if the automatic Analysis callback ought to be used. For this to work, there has to exist a VBA script inside the workbook, which can be added manually by pressing the button *Add Analysis Callback Script* - or which will be added when activating this callback.

If the Analysis callback is active, is shown in the ribbon menu group *Analysis Update*.

⚠ If *graphomate charts for Excel* are used alongside *SAP Analysis for Microsoft Office (AO)*, please take into account the following guidelines:

1. Important: Please make sure that the option „Trust access to the VBA project object model“ under File > Options > Trust Center > Trust Center Settings > Macro Settings is enabled. Otherwise, graphomate charts won't be refreshed automatically when working with *Analysis for Microsoft Office*.

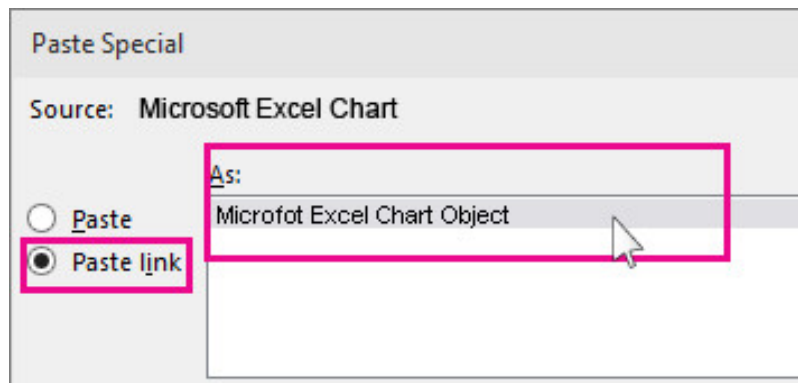
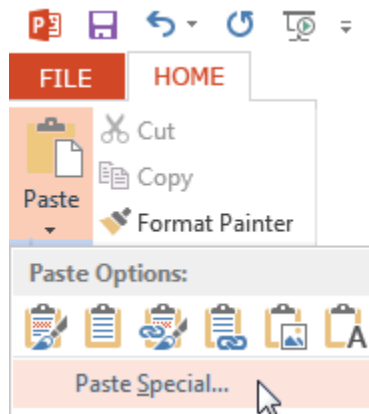


2. Please start AO first, and open the Excel file to be edited only after that. Also, please close the workbook before exiting Excel. Macro warnings during closing can be ignored; the workbook is saved as .xlsx without problems.
3. *graphomate charts for Excel* only support *SAP Analysis for Microsoft Office 2.0SP4* and later versions; earlier versions of AO are not supported.

graphomate charts as an embedded OLE object

Charts that have been created using *graphomate charts for Excel* can be embedded in other MS Office applications, e.g. PowerPoint as OLE objects.

1. Copy the respective chart with CTRL+C (or CTRL+V) to the clipboard.
2. Switch to the target application, e.g. PowerPoint and select on *Home > Paste > Paste special* the following: *Paste link* (on the left side) as *Microsoft Excel Chart Object*

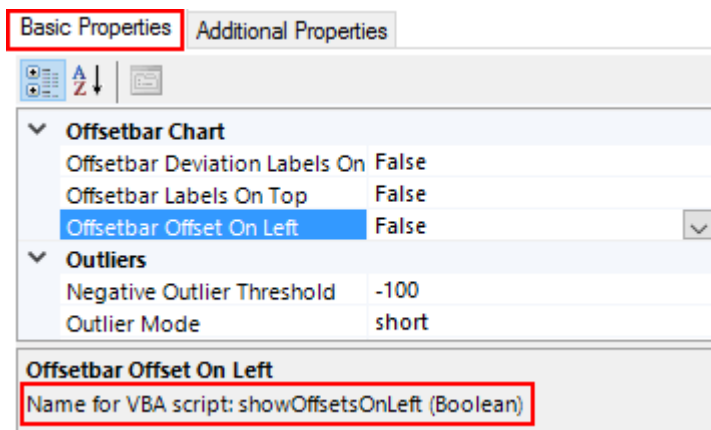


Now, the *graphomate chart for Excel* is embedded into the PowerPoint slide as OLE object, and can be refreshed if the data in Excel changes.

Please note: The original charts has to be opened already in Excel. If PowerPoint respectively Word are opened first, the automated startup of the Excel workbook will result in a row of error messages, as in this case, a connection to the graphomate add-in cannot be established.

Visual Basic Scripting

The *graphomate charts for Excel* add-in supports *Visual Basic* scripting, making it possible to use the chart interactively. Use cases are the setting of new data, change the appearance, or apply a different scaling. In *Visual Basic*, properties need to be addressed by their technical names. These can be read out in the *Basic Properties*; when a property is selected, a small info box appears at the bottom, containing the technical name as well as the datatype of the property.



Addressing Charts from VBA

To address a chart in a script, a connection with the add-in has to be established. This is done with the following code snippet.

```
Dim addIn As COMAddIn
Dim automationObject As Object
Set addIn = Application.COMAddIns("graphomate.charts")
Set automationObject = addIn.Object
```

The variable *automationObject* is then used to address the individual charts. To read out or change the properties of a given chart, the following commands exist:

```
getProperty (String chart, String propertyName)
setProperty (String chart, String propertyName, newValue)
```

Depending on the datatype of the property to be set, different formats have to be used:

boolean	either <i>true</i> or <i>false</i>
string	string of characters, e.g. <i>northwest</i>
integer	integer numbers, e.g. <i>0</i> or <i>16</i>
float	decimal numbers, e.g. <i>0.5</i> or <i>12.8</i>

Usually, the parameter *newValue* is a string, but in the case of int or float properties, it is possible to pass a number instead of a string. The following calls are equivalent:

```
Call automationObject.setProperty ("chart1", "pinWidth", 4)
Call automationObject.setProperty ("chart1", "pinWidth", "4")
```

```
Call automationObject.setProperty ("chart1", "barWidth", 0.5)
Call automationObject.setProperty ("chart1", "barWidth", "0.5")
```

Examples

The following exemplary script reads the chart type from one chart, saves it to a variable, and then sets it in another one:

```
Sub Schaltfläche1_Klicken()
    ' Verbindung zum Add-in herstellen
    Dim addIn As COMAddIn
    Dim automationObject As Object
    Set addIn = Application.COMAddIns("graphomate.charts")
    Set automationObject = addIn.Object
    ' Variable c mit dem Wert der Property "chartType" von chart1 setzen
    Dim c As String
    c = automationObject.getProperty("chart1", "chartType")
    ' ausgelesenen Chart-Typen auf chart2 setzen
    Call automationObject.setProperty("chart2", "chartType", c)
End Sub
```

To set data, the properties series1, series2 ... series10 can be used:

```
Call automationObject.setProperty("chart1", "series1", "$D$1:$F$21")
```

If the addressed cell range contains category labels, these will be interpreted by the add-in. Please note that the cell selection always relates to the worksheet which contains the element the script is run from. Thus, it is advisable to add the worksheet address to the selection:

```
Call automationObject.setProperty("chart1", "series1",  
"$D$1:$F$21|Worksheet1")
```

If the chart isn't refreshed correctly (e. g. after data updates from Analysis for Office), the chart can be refreshed via VBA. The functionality of this command is identical to that of the refresh button in the ribbon menu:

```
Call automationObject.refreshChart("chart1")
```

Addressing Charts from VBA with helper scripts

The way of addressing charts described above did lead to some issues in the past. It was not possible to create two charts with the same name neither in the same nor in different workbooks. Since Version 1.2.20 only charts in the same workbook have to be named differently. To still address a chart uniquely you have to state it's workbook because the add-in can't detect the workbook that called the script. Therefore we implemented a helper script that can be configured by clicking the *Add VBA Module* Button in the Ribbon. It inserts VBA helper scripts in the current workbook enabling you to only need the following helper functions:

```
Sub SetChartProperty(chartName As String, propertyName As String, value  
As String) ...  
Function GetChartProperty(chartName As String, propertyName As String)...
```

The snippet that retrieves and uses the *automationObject* is implemented in these helper scripts. Their usage is described subsequently:

```
Call SetChartProperty("Tabelle1---Chart 1", "rotated", "true")  
myVar = GetChartProperty("Tabelle1---Chart 1", "rotated")
```

i Please consider that the usage of the helper scripts enables you to execute VBA scripts in the current workbook only.

Screen Scaling

The menu "Workbook Settings" contains the option "Use DPI Scaling". If this option is checked (by default), the screen scale of the operating system (125%, 150%, ...) is used to scale the charts. The property sheet is also scaled according to the screen scale. If this option is unchecked, all elements are drawn as before.

i In workbooks, that have been created prior to version 1.4.0, this option is deactivated by default. This is the case, so old workbooks and their layouts stay intact. It can be activated afterwards of course.

Known Issues

- When updating from version 1.2.x (or lower) to the upcoming version 1.4.x (or newer), firstly you must install 1.3.x and start your reports and save them as 1.3.x format, to migrate them to the new internal format. Then you can upgrade to the preferred version.
- *Data SeriesWidth* in the *Data Series Style Editor* is, at the moment, only possible for bar/column charts. Please use the parameter *Bar Width* in the properties for waterfall, stacked and offset bar charts. Also the *Width* of the *Data Types* cannot be used for waterfall and stacked bar charts.
- *Series Labels Right/Bottom* of the waterfall and the stacked bar chart are not always drawn correctly.
- For technical reasons, the *Title* field known from *graphomate charts for Lumira Designer* is not available in Excel. Also, the Lumira Designer functions *Manual Data Input*, *CSS Export for Data types*, *PNG-Export* as well as *Tooltips* are not supported in Excel.
- If two different workbooks containing identically named charts are opened, an error message is displayed. The duplicated chart names have to be changed in either one workbook, so both can be displayed at the same time.
- If the cell content starts with something that usually introduces a formula in Excel, then the input must be preceded by a single apostrophe ' as a string. This behaviour occurs when the *Property Cellbinding* is used to define the *Extended Number Format* for example.
- If *graphomate charts for Excel* are inserted as OLE objects into other MS Office applications, these can only be refreshed if the original chart has already been opened in Excel. If PowerPoint respectively Word are opened first, the automated startup of the Excel workbook will result in a row of error messages, as in this case, a connection to the graphomate add-in cannot be established.
- Chart loses connection to the property sheet after reopening.
- Guideline to umlauts, special characters and blank spaces In general umlauts, special characters and blank spaces Umlauts are percent encoded for technical reasons in the Additional Properties Sheet (see: <http://en.wikipedia.org/wiki/Percent-encoding>).

Example: *Nestlé - Development of sales in % compared to the previous year* becomes: *Nestl%C3%A9%20%20Development%20of%20sales%20in%20%25%20compared%20to%20the%20previous%20year*

This makes it necessary to percent encode string values even while transferring them from the scripting language or Basic Properties Sheet. (On the Internet there are many free tools for en-/decoding, for example: <http://www.url-encode-decode.com/>.) Lots of tools to do this are available on the internet, e.g. <http://www.url-encoder.de>.

i From version 1.4.6 on, logs are no longer saved in the folder *User/documents/graphomate_debug_info* but in the folder *User/documents/graphomate*.

Number Formatting

Possible Input for The numeral.js Format String

Floating point		
Number	Format String	Output
10000	'0,0.0000'	10.000,0000
10000.23	'0,0'	10
-10000	'0,0.0'	-10.000,0
-0.23	'00'	-,23
-0.23	'(.00)'	(,23)
0.23	'0.00000'	0,23000
0.23	'0.0[0000]'	0,23
1230974	'0.0a'	1,2m
1460	'0 a'	1 k
1	'0o'	1 st
Currency		
Number	Format String	Output
1.000.234	'\$0,0.00'	\$1.000,23
1000.2	0,0[.]00 \$'	1.000,20 \$
1001	'\$ 0,0[.]00'	\$ 1.001
Percentage		
Number	Format String	Output
1	'0%'	100%
-0.43	'0 %'	-43%

[Source](#)

Possible Input for The Extended Number Format String

Percentages and absolute numbers are formatted separately. For this two format strings are used, which follow the same rules and structure. In general the strings of characters in the format string are simply replaced in the input number. Exceptions to this rule would be scaling factors and the number of decimal places.

The elements of the format string are separated by the "|" character. Format strings with less than 7 elements (or 6 "|" characters) are considered invalid and therefore ignored. In this case the standard format without scaling and with one position after the decimal point is used.

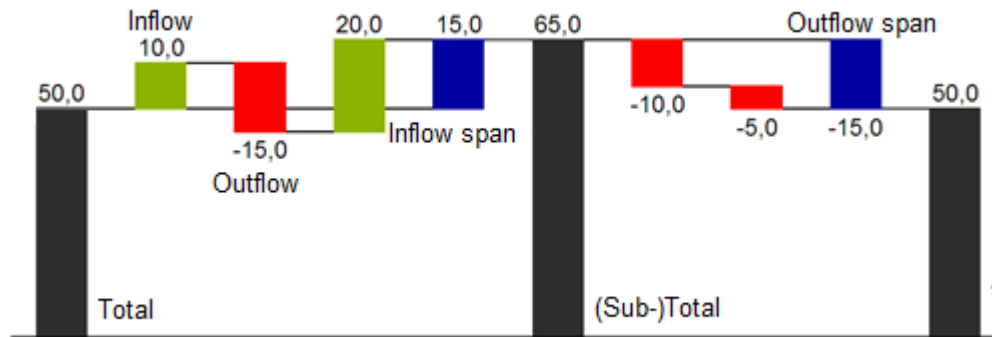
The format string consists of the following elements, the ordering is obligatory and cannot be changed:
Negative|Prefix|Thousands|Decimal|Scaling|PointsAfterDecimal|Suffix

Negative	The prefix for negative numbers. The string "(") will result in the number placed inside parentheses, including eventual prefixes and suffixes. If <i>None</i> is used, the absolute number will be shown.
Prefix	A prefixed string of characters, for example a currency symbol or an identifier for the scaling factor.
Thousands	A separator for thousands.
Decimal	A separator for the decimal places.
Scaling	The scaling factor for the value. This can be given as a whole number or a power, formatted as n^m . A whole number will be calculated as a power to the basis 10 internally. In case of a given power the value will be divided by it directly. Even negative numbers are possible, for example "-3" or "10^-3"; in this case the value will get adequately higher. Non numeric inputs are ignored. <i>Please note:</i> given a "0" or a "1" will result in a scaling factor of 1. The only way to achieve a scaling by 10 is to set the input to "10^1".
PointsAfterDecimal	The number of places after the decimal.
Suffix	A suffix for the value, analogous to the prefix.

Appendix

Waterfall Calculation Path

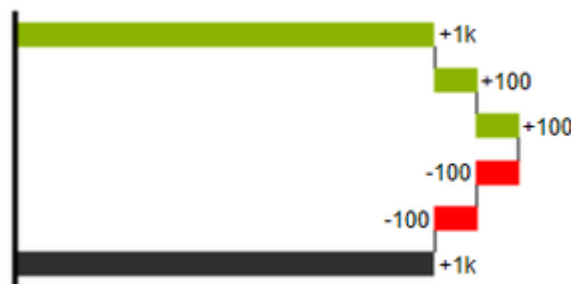
A waterfall chart – often also called a flying bricks chart – shows how an initial value is increased (inflow) or decreased (outflow) by a series of values, which lead to a final value – if necessary with subtotals and spans.



For a flexible use of the waterfall in *graphomate charts* an additional *Data Series* has to be defined: the Waterfall Calculation Path. This *Data Series* determines, whether the value to be shown is an in- or an outflow value, a (sub-) total or a span. In general, the sign of the data series value determines the effect on the (sub-) totals of the waterfall. Negative values are interpreted as outflow values, positive values are interpreted as inflow values and colored according to the color scheme on the *Appearance* tab.

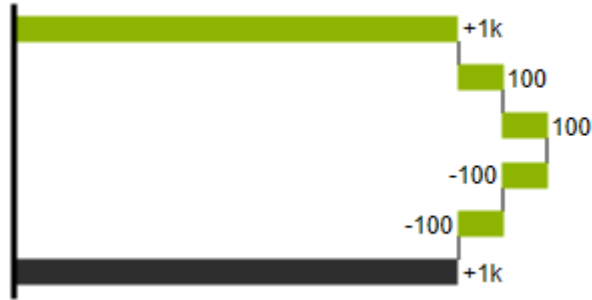
i In case of using *Data Types* the colors of the *Data Types* overwrite the color scheme of the *Appearance* tab.

By default, the last element of a waterfall is interpreted as the sum total. A waterfall without entries in the *Waterfall Calculation Path* would therefore look like this. By defining the *Waterfall Calculation Path* the appearance and the sign of each waterfall element can be controlled independently - even via scripting language. The following options can be used:



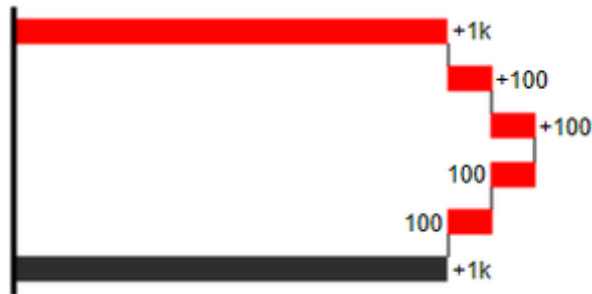
+=inflow

Positive signs are suppressed, the **+**-color is applied to the elements.



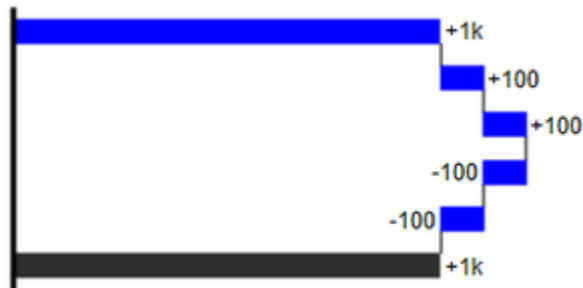
-=outflow

Negative signs are suppressed, the **-**-color is applied to the elements.



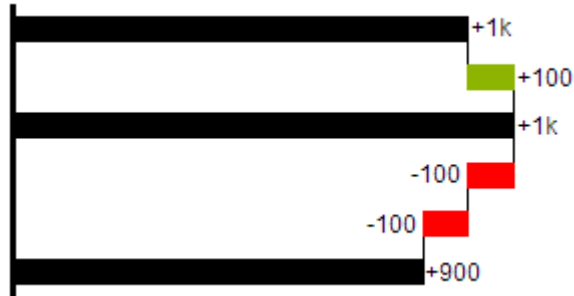
0 =neutral position

All signs are shown, the (0)-color is applied to the elements.



==(Sub-)total

The element starts at the value axis and the (=)-color is applied to those elements.

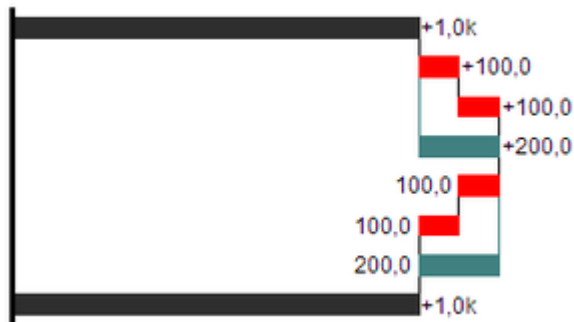


s-=outflow span

With the help of a span single changes can be summarized starting from a (sub-)total.

With an outflow span single cost items can be aggregated to a total cost.

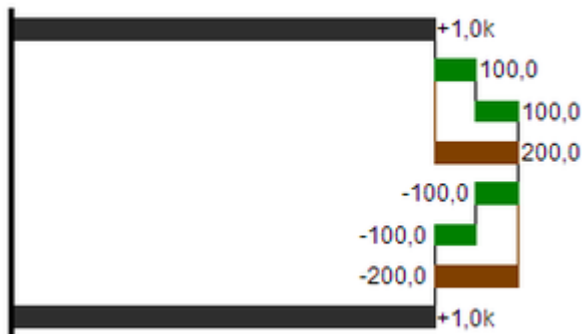
Corresponding to outflow elements (see above) negative signs are suppressed and the (s)-color is applied to the elements.



s+=inflow span

With an inflow span single inflow items can be aggregated starting from a (sub-)total.

Corresponding to inflow elements (see above) positive signs are suppressed and the (s+)-color is applied to the elements.



i The (-) and (s-)values in the Waterfall Calculation Path also have an effect on the corresponding deviation charts: For negative values, which are now shown without signs based on the (-) and (s)-entries, the sign and the orientation of the deviation is reversed by necessity. Otherwise there is a risk of misinterpretation.

