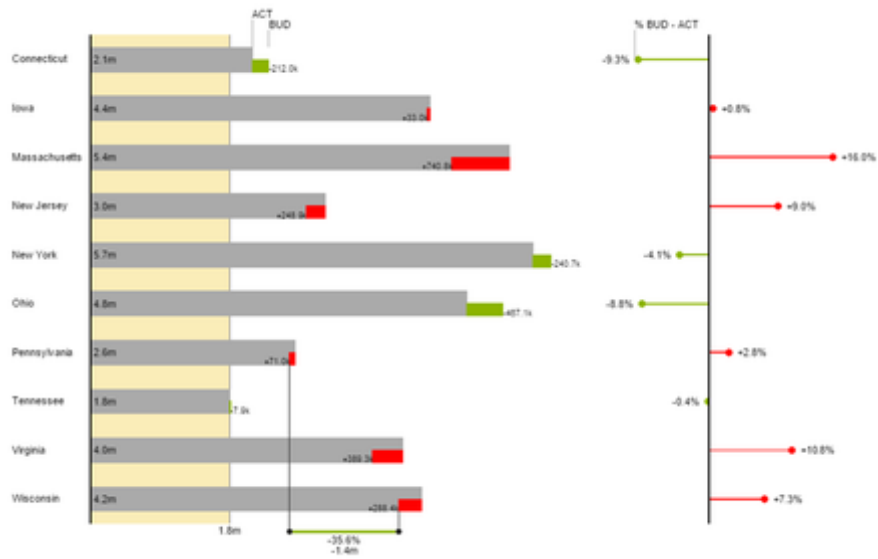


## User Manual for the graphomate charts 2.0 for SAP Lumira 2.0 Discovery



Version 2.0 – as of October 2017

<https://www.graphomate.com>

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## Introduction

The topic of data 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.

The *graphomate charts for Discovery* follow the rules for a meaningful information design. It is a ported version of our *graphomate charts* extension for SAP Business Objects Design Studio.

The *graphomate charts for Discovery* extension needs **SAP Lumira Discovery 2.0 SP3+**.

## Introductory Examples

### Chart Types

graphomate charts for Discovery 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:

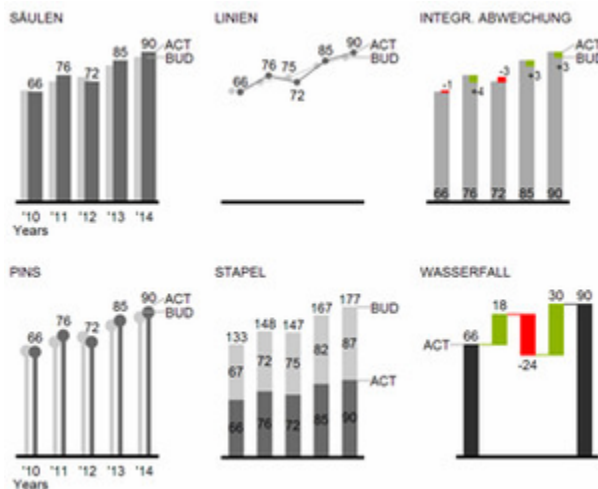


Fig. 1 Visualization of development over time

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:

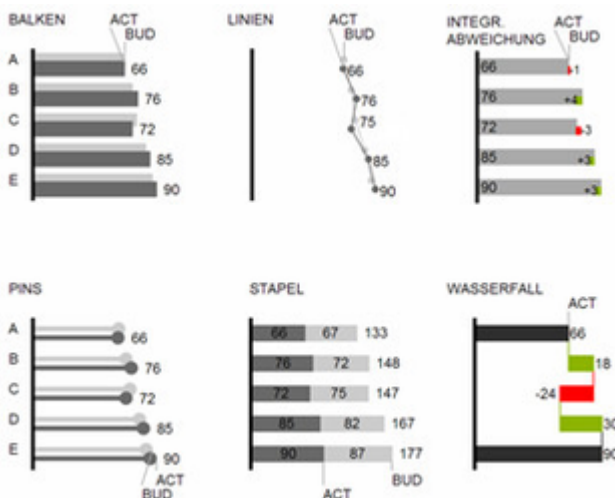
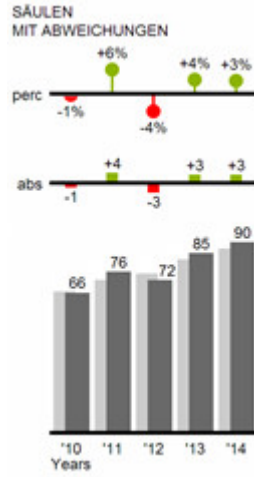


Fig. 2: Visualization of hierarchies

All charts can 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 6 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.

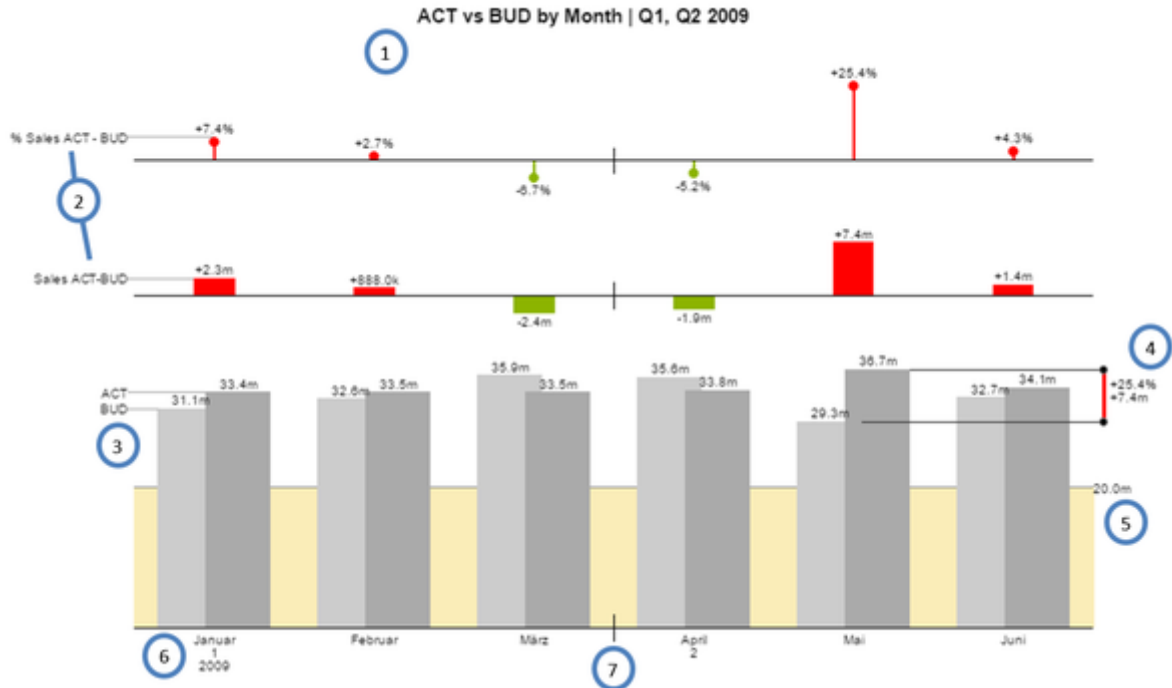
### Deviation Axes

*graphomate charts* enables you to set additional axes above all chart types, which display the percentage or absolute deviations between two data series.



### Overview of all visual elements

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



### Overview of visual objects of the graphomate charts

1. Chart title
2. Percentage and absolute deviation between data series with data series labels.
3. Column chart with two data series (-labels). The color of each series can be configured separately.
4. Emphasize the difference between two elements with the function *Highlight*.
5. Scaling helper shows different scales of charts or marks specific thresholds.
6. Multi-line axes labels are automatically copied from the source data.
7. 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* 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* refer to the [appendix](#). It is, of course, possible to add deviation axes and to use the waterfall horizontally or vertically, just like all other charts.

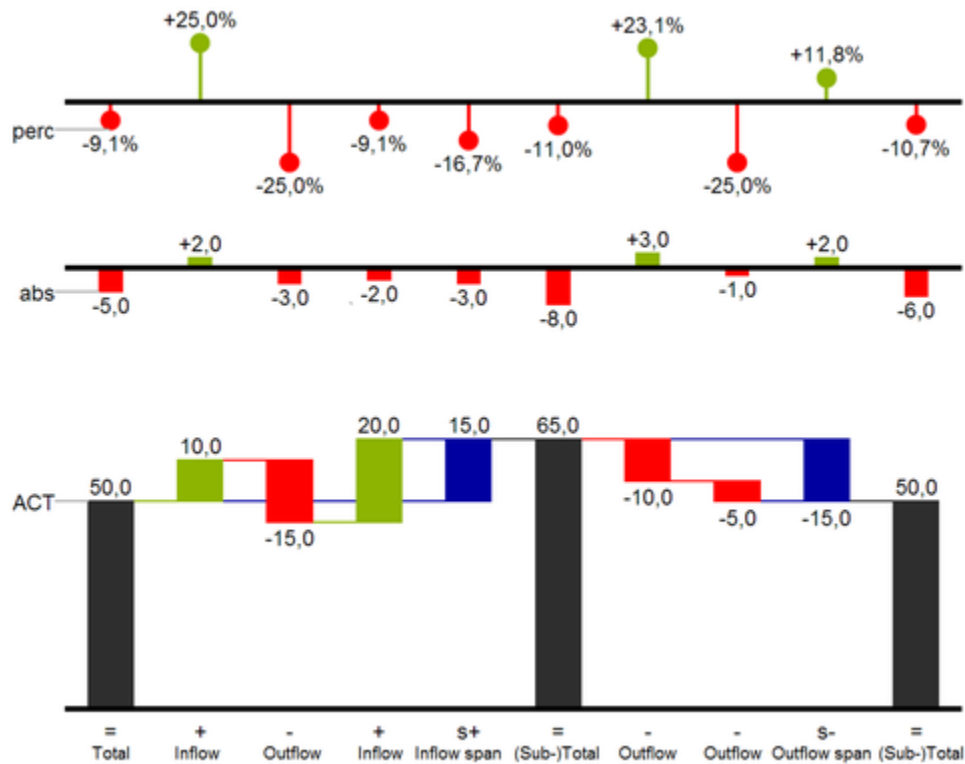


Fig.8: Waterfall chart showing the option for the calculation path

In Fig. 8 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
<b>(Sub-)Total</b>	=	Value is shown beginning at the axis.
<b>Inflow</b>	+	Increase of previous value and data label on the element.
<b>Outflow</b>	-	Decrease of previous value and data label on the element.
<b>Inflow Span</b>	s+	Positive overall change based on a totals item.
<b>Outflow Span</b>	s-	Negative overall change based on a totals item.
<b>Neutral</b>	0	Neutral position with own color scheme
<b>Standard</b>	„	Difference to previous value according to data value sign (+/-).

## Installation

### Local installation of the extension to Lumira Discovery

You have installed Lumira Discovery 2.0 SP03+ on your computer.

1. Save the zipfile *graphomate\_charts\_x.x.x.x\_LmDi2.x.zip* to a folder of your choice.
2. Start Lumira Discovery and select menuextensions (or use the shortcut strg+J)
3. Click on the "+" icon in the upper right corner and select the zip-file
4. Restart Lumira Discovery

If you installed a new version of our extension and the new features are not available or if you installed it for the first time and can't select it from the chart picker, the reason could be Lumira Discovery's extension cache. To make sure an installed extension is available after restarting Lumira Discovery, you can deactivate the extension cache by performing the following steps:

- Navigate to the installation directory of Lumira Discovery and open the settings file. Its default path is: *C:\Program Files\SAP BusinessObjects Lumira\Lumira Discovery\Desktop\SBOPLumiraDiscovery.ini*
- Change the value of line *-Dhilo.cef.cache.enabled* from *true* to *false*
- Save the file (administrator rights needed)

### Removing the extension from Lumira Discovery

1. Start Lumira Discovery and select menuextensions (or use the shortcut strg+J)
2. Hover above the list entry "graphomate charts" and select the trash icon on the right
3. Restart Lumira Discovery

In case of deinstallation issues you can delete the extension files manually. Per default they are located in the following directory: *C:\Users\<User>\.sapvi\_2\extensions*

In the extensions directory you can delete the following files and directories to completely uninstall the extension:

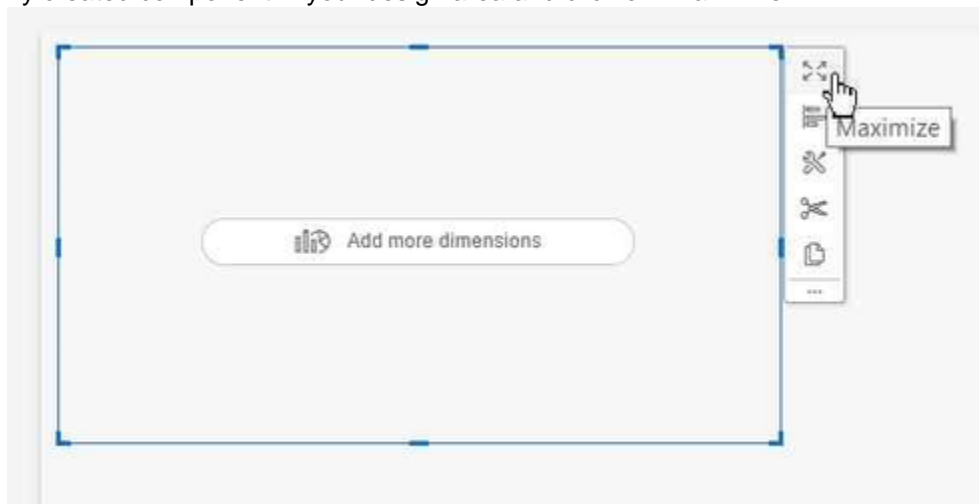
- The file *leclipse\plugins\graphomate.viz.ext.charts\_x.x.x.x.jar*
- The whole directory *lfeatures\graphomate*



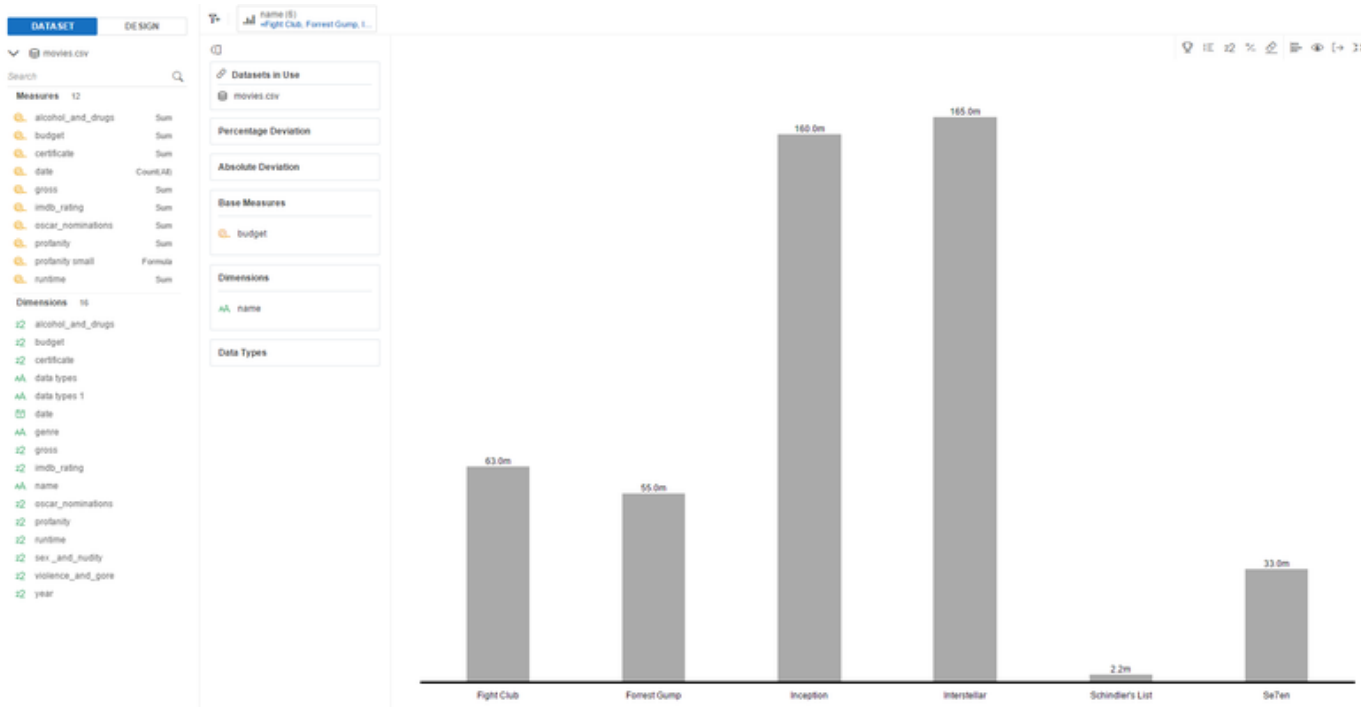
## Quick Start

You have imported a data source into your project and now want to visualize your data using *graphomate charts for Discovery*.

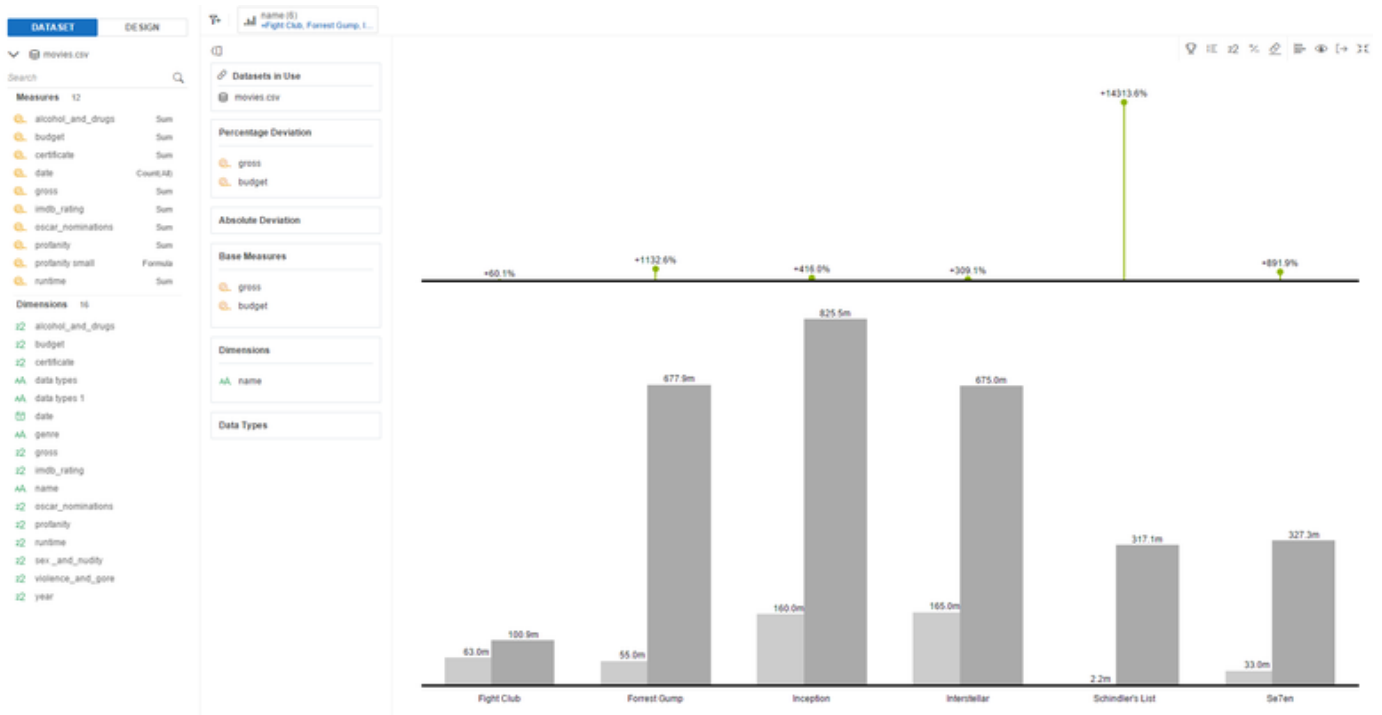
1. Select "gm charts" from the chart picker's extension tab.
2. Select the newly created component in your design area and click on "Maximize".



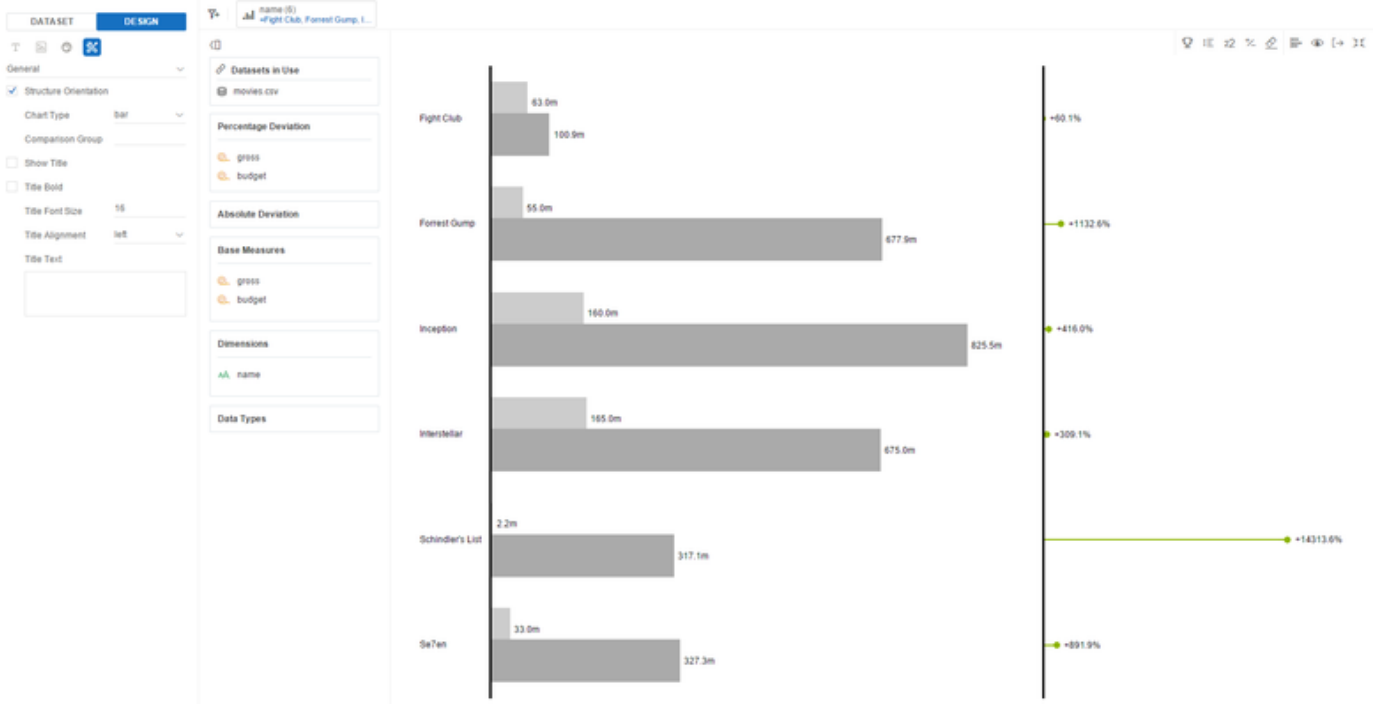
3. Now you can drag&drop at least one dimension to the Dimensions feed and at least one measure to the Base Measures feed.



3. You can drag two comparable measures to a deviation feed to create a deviation chart. You can also drag additional measures to the Base Measure feed.



4. By switching to the Design tab you are able to change the chart's properties like switching the orientation from temporal to structural. Select the "tool" icon on the design tab to access the property editor. Then use the drop down menu to navigate to different property categories.



## Data Feeds

Lumira Discovery enables you to assign data to extension components using so called data feeds. Unfortunately dragging and dropping measures and dimensions directly onto the chart's axis is not supported with extension components. The chapter [Quick Start](#) covers how to access the data feeds.

The image shows five stacked configuration panels for data feeds in Lumira Discovery. Each panel has a title and a list of items with a small icon to its left.

- Datasets in Use**: Contains one item, 'movies.csv', with a document icon.
- Percentage Deviation**: Contains two items, 'measure' and 'base', both with a magnifying glass icon.
- Absolute Deviation**: This panel is currently empty.
- Base Measures**: Contains two items, 'measure' and 'base', both with a magnifying glass icon.
- Dimensions**: Contains two items, 'level 1' and 'level 2', both with a green 'AA' icon.

### Percentage Deviation

This feed is optional and takes exactly two measures. The first measure we call *base* and the second one will be referred to as just *measure*. If you assign data to this feed, an additional deviation axis will be shown in the chart. It displays the percentage deviation between base and measure calculated using the following formula:  
 $100 * (\text{measure} - \text{base}) / \text{abs}(\text{base})$

### Absolute Deviation

This feed is optional and takes two measures as well. If you assign data to this feed, an additional deviation axis will be shown in the chart. It displays the absolute deviation between base and measure calculated using the following formula:  $\text{measure} - \text{base}$

### Base Measures

You should assign at least one measure to this feed to display the base chart. It takes up to five measures which will be displayed as data series of the base chart. With a clear and meaningful visualization in mind, we recommend to use the same measures for the base chart as for the deviations, but of course you could assign additional data series or completely new ones to the base chart.

### **Dimensions**

This feed takes an arbitrary amount of dimensions. They are displayed as category labels at the chart's main axis. If you assign more than one dimension, the chart displays them as hierarchical category labels one level below the other.

## Properties

The properties of the *graphomate charts for Discovery* can be edited within the "Properties Sheet". You can access it on the side pane's Design Tab. It provides a number of property categories which you can select from by using the topmost dropdown menu.

General	
<p><b>Structure Orientation:</b> You can use a chart in horizontal orientation for displaying temporal data or in vertical orientation for structural comparisons.</p> <p><b>Chart Type:</b> Select the preferred chart type. The different chart types are featured in chapter <a href="#">Introductory Examples</a>.</p> <p><b>Comparison Group:</b> Assign a comparison group id to this chart. All charts with the same comparison group id will scale identically.</p> <p><b>Show Title:</b> Activate or deactivate the chart's title.</p> <p><b>Title Bold:</b> If activated, the title's font weight will be bold.</p> <p><b>Title Font Size:</b> Set the font size of the title in px.</p> <p><b>Title Alignment:</b> Select, whether the title should be centered or aligned left or right.</p> <p><b>Title Text:</b> Set the text that will be displayed as the chart's title. You can write multi line text and use HTML-Syntax to style it.</p>	<div style="border-bottom: 1px solid #ccc; padding-bottom: 5px;"> <b>General</b> <span style="float: right;">▼</span> </div> <div style="padding: 5px;"> <input checked="" type="checkbox"/> <b>Structure Orientation</b> </div> <div style="padding: 5px;"> <b>Chart Type</b> <span style="float: right;">bar</span> <span style="float: right;">▼</span> </div> <div style="padding: 5px;"> <b>Comparison Group</b> <span style="float: right;">_____</span> </div> <div style="padding: 5px;"> <input type="checkbox"/> <b>Show Title</b> </div> <div style="padding: 5px;"> <input type="checkbox"/> <b>Title Bold</b> </div> <div style="padding: 5px;"> <b>Title Font Size</b> <span style="float: right;">16</span> </div> <div style="padding: 5px;"> <b>Title Alignment</b> <span style="float: right;">left</span> <span style="float: right;">▼</span> </div> <div style="padding: 5px;"> <b>Title Text</b> <div style="border: 1px solid #ccc; height: 40px; margin-top: 5px;"></div> </div>

## Display

**Transparent Background:** Deactivate the background color to see through the chart in case you want to layer multiple charts on top of each other.

**Padding:** Define the width of the chart's padding in px.

**Spacing:** Define the space between chart elements like title, deviation chart and base chart in px.

**Bar Width:** Set the width of the chart's bars relative to the category width. Use values between 0 and 1, where a value of 1 will cause the bars to be the same width as the categories.

**Pin Width:** Set the width of pins (of pin chart or the percentage deviation chart) in px.

**Element Offset:** Set the offset of the elements of different data series. Use Values between 0 and 1 where a value of 1 will, for example, cause the bars of different data series to be displayed exactly next to each other.

**Series Colors:** Select the colors of the 5 assignable data series.

### Display ▼

Transparent Background

Padding 15

Spacing 0

Bar Width 0.5

Pin Width 3

Element Offset 0.3

Series 1 

Series 2 

Series 3 

Series 4 

Series 5 

Labels																																					
<p><b>Label Position:</b> Select, whether all element labels (fix) or only the ones which do not overlap each other will be displayed (auto).</p> <p><b>Font Size:</b> Set the font size of all labels in px.</p> <p><b>Font Family:</b> Set the font family of all labels.</p> <p><b>Font Color:</b> Set the font color of all labels.</p> <p><b>Abs. Format:</b> Define the number format of all absolute labels. Please refer to the <a href="#">Number Formatting</a> chapter.</p> <p><b>Perc Format:</b> Define the number format of all percentage labels.</p> <p><b>Locale:</b> Set the locale to change the appearance of thousand and decimal separators as well as abbreviations. The value "auto" will read the locale from your system settings.</p> <p><b>Show Series Labels:</b> If activated the measure's names will be annotated to the chart's data series.</p> <p><b>Show Category Labels:</b> Set the visibility of the category axis' labels.</p> <p><b>Rotation Angle:</b> Set an angle between 0 and 180 degree to rotate the category labels.</p> <p><b>Suppress Repeating Category Labels:</b> Set, whether repeating category labels will be displayed only once or on each occurrence.</p> <p><b>Suppress Zero Labels:</b> Set, whether repeating 0-labels will be displayed only once or on each occurrence.</p>	<div style="border-bottom: 1px solid #ccc; padding-bottom: 5px;"> <p><b>Labels</b> <span style="float: right;">▼</span></p> </div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"><b>Label Position</b></td> <td style="width: 20%;"><b>auto</b></td> <td style="width: 20%; text-align: right;">▼</td> </tr> <tr> <td><b>Font Size</b></td> <td><b>12</b></td> <td></td> </tr> <tr> <td><b>Font Family</b></td> <td><b>Arial</b></td> <td></td> </tr> <tr> <td><b>Font Color</b></td> <td><span style="display: inline-block; width: 15px; height: 15px; background-color: black; vertical-align: middle;"></span></td> <td></td> </tr> <tr> <td><b>Abs. Format</b></td> <td><b>0.0a</b></td> <td></td> </tr> <tr> <td><b>Perc. Format</b></td> <td><b>0.0%</b></td> <td></td> </tr> <tr> <td><b>Locale</b></td> <td><b>en</b></td> <td style="text-align: right;">▼</td> </tr> <tr> <td colspan="3" style="padding-top: 10px;"> <input type="checkbox"/> <b>Show Series Labels</b> </td> </tr> <tr> <td colspan="3" style="padding-top: 5px;"> <input checked="" type="checkbox"/> <b>Show Category Labels</b> </td> </tr> <tr> <td><b>Rotation Angle</b></td> <td><b>0</b></td> <td></td> </tr> <tr> <td colspan="3" style="padding-top: 10px;"> <input checked="" type="checkbox"/> <b>Suppress Repeating Category Labels</b> </td> </tr> <tr> <td colspan="3" style="padding-top: 5px;"> <input type="checkbox"/> <b>Suppress Zero Labels</b> </td> </tr> </table>	<b>Label Position</b>	<b>auto</b>	▼	<b>Font Size</b>	<b>12</b>		<b>Font Family</b>	<b>Arial</b>		<b>Font Color</b>	<span style="display: inline-block; width: 15px; height: 15px; background-color: black; vertical-align: middle;"></span>		<b>Abs. Format</b>	<b>0.0a</b>		<b>Perc. Format</b>	<b>0.0%</b>		<b>Locale</b>	<b>en</b>	▼	<input type="checkbox"/> <b>Show Series Labels</b>			<input checked="" type="checkbox"/> <b>Show Category Labels</b>			<b>Rotation Angle</b>	<b>0</b>		<input checked="" type="checkbox"/> <b>Suppress Repeating Category Labels</b>			<input type="checkbox"/> <b>Suppress Zero Labels</b>		
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<input checked="" type="checkbox"/> <b>Suppress Repeating Category Labels</b>																																					
<input type="checkbox"/> <b>Suppress Zero Labels</b>																																					

Axes	
<p><b>Show Category Axis:</b> Set the visibility of the base chart's category axis.</p> <p><b>Axis Thickness:</b> Set the width of the category axis in px.</p> <p><b>Show Value Axis:</b> Set the visibility of the value axis, which contains reference lines according to the tick distance.</p> <p><b>Flip Value Axis:</b> If activated, the value axis will be displayed on the other side of the chart.</p> <p><b>Tick Distance:</b> Set the distance of the value axis' reference lines in px.</p> <p><b>Show Axis Labels:</b> Set the visibility of the axis labels, which can be defined below.</p> <p><b>Axis Label:</b> Define the text that should be displayed as an axis label for each axis of the chart.</p>	<div style="border-bottom: 1px solid #ccc; padding-bottom: 5px;"> <p><b>Axes</b> <span style="float: right;">▼</span></p> </div> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Show Category Axis</li> <li style="margin-left: 20px;">Axis Thickness <span style="float: right;">3</span></li> <li><input type="checkbox"/> Show Value Axis</li> <li><input type="checkbox"/> Flip Value Axis</li> <li style="margin-left: 20px;">Tick Distance <span style="float: right;">50</span></li> <li><input type="checkbox"/> Show Axis Labels Left</li> <li><input type="checkbox"/> Show Axis Labels Right</li> <li style="margin-left: 20px;">Perc. Chart Label <span style="float: right;">_____</span></li> <li style="margin-left: 20px;">Abs. Chart Label <span style="float: right;">_____</span></li> <li style="margin-left: 20px;">Base Chart Label <span style="float: right;">_____</span></li> </ul>



## Deviations

*Good / Bad Color:* Set the color of the positive and negative deviation bars and pins.

*Negative Deviation is Good:* If activated, the appearance of positive and negative deviation bars and pins is switched.

*Deviation Pin Line Black:* Define, whether the percentage chart's deviation pin line should be black or the respective deviation color.

### Deviations

---

Good Color



Bad Color



Negative Deviation is Good

Deviation Pin Line Black

## Data Types

*Data Types:* Assign a data type to each element of a data series. Use comma separated lists of the data type names defined below. In case you want to apply the styling of data type "AC" to each of, for example, 5 bars, you would enter the following list in the first text field: AC,AC,AC,AC,AC.

*Data Types Config:* The styling definition of all data types can be edited using this list. You can edit existing data type definitions or create new ones. The list will be synchronized between all charts of your project. This Synchronization enables you to only create a data type definition once and use it in each chart. The following style settings are available:

- Name: Id of the data type which can be assigned to your chart elements
- Color: Color of elements assigned to this data type
- Fill: Fill pattern of elements assigned to this data type
- Shape: Shape of the pin heads or line dots assigned to this data type
- Bold: If activated, labels of elements assigned to this data type will be displayed bold

### Data Types

Data Types 1













Data Types 2

Data Types 3

Data Types 4

Data Types 5

### Data Types Config

Name	Color	Fill	Shape	Bold
AC				<input checked="" type="checkbox"/>
PP				<input type="checkbox"/>
BU				<input type="checkbox"/>
FC				<input type="checkbox"/>
+				

### Highlight

*Highlight Mode:* Activate or deactivate the single highlighting that enables you to highlight a single deviation between elements of the base chart.

*Start Element:* Set the 1-based index of the first element that should be used for the deviation calculation.

*End Element:* Set the 1-based index of the second element that should be used for the deviation calculation.

*Start Series:* Set the 1-based index of the data series that contains the start element.

*End Series:* Set the 1-based index of the data series that contains the end element.

*Show Label in Highlight:* Define which deviation should be displayed by the highlight label.

#### Highlight ▼

Highlight Mode none ▼

Start Element 1

End Element 2

Start Series 1

End Series 1

Show Perc. Label in Highlight

Show Abs. Label in Highlight

### Scaling

**Scale Mode:** The default value "auto" scales the chart regarding to the minimal and maximal data value. Scale mode "manual" enables you to define your own minimal and maximal value for absolute and percentage scales below.

**Outlier Mode:** Select the style of outlier. The mode "short" displays small triangles at the axis when a value exceeds the scale's maximal or minimal value. The mode "long" displays longer triangle shaped pins according to the new IBCS standard.

**Outlier Size:** Set the size of outlier in px.

Scaling		▼
Scale Mode	automatic	▼
Absolute Max.	150	
Absolute Min.	-150	
Percentage Max.	20	
Percentage Min.	-20	
Outlier Mode	short	▼
Outlier Size	7	

## Separators

**Separator Mode:** 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 according to the selected mode.

**Thickness:** Set the thickness of the separator lines in px.

**Length:** Set the length of the separator lines in px.

**Color:** Set the color of the separator lines.

**Source Series:** Enter a 1-based index. In the mode "Data Types" the index refers to the series whose data types will be used to display separators. In mode "Category Labels" it refers to the hierarchy level of category labels that will be used to display separators.

Separators		▼
Separator Mode	none	▼
Thickness	1	
Length	10	
Color		
Source Series	1	

## Scaling Helper

*Mode:* The scaling helper displays a fix value as a line next to the chart or as a filled area in the base chart.

*Value:* The value that will be displayed by the scaling helper.

*Line Color:* Set the color of the scaling helper line.

*Line Thickness:* Set the thickness of the scaling helper line.

Scaling Helper		▼
Mode	none	▼
Value	100	
Line Color		
Line Thickness	2	

### Chart Type Specific

**Offset Labels on Top:** Change the positions of labels in the offset bar chart, to prevent them from overlapping with the category axis.

**Show Stack Sums:** Set the visibility of the stacked bar chart's sum labels.

**Negative Stack Values:** If activated, negative values will be grouped to their own negative stack below the stacked bar chart's category axis.

**Stack Label Position:** Set the position of the stacked bar chart's element labels.

**Waterfall Calculation Path:** Define the waterfall calculation path. Please refer to the chapter [Waterfall Calculation Path](#).

**Waterfall Colors:** Set the colors of the different element types of the waterfall chart. The colors will be applied to the bars according to the waterfall calculation path.

#### Chart Type Specific ▼

Offset Labels on Top

Show Stack Sums

Negative Stack Values

Stack Label Position middle ▼


Waterfall Calc. Path


Plus 

Minus 

Sum 

Neutral 

Span Plus 

Span Minus 

## Known Issues

- The *graphomate charts for discovery* are not compatible with the *graphomate charts for Designer*. Therefore you shouldn't use them in the same application.



## Number Formatting

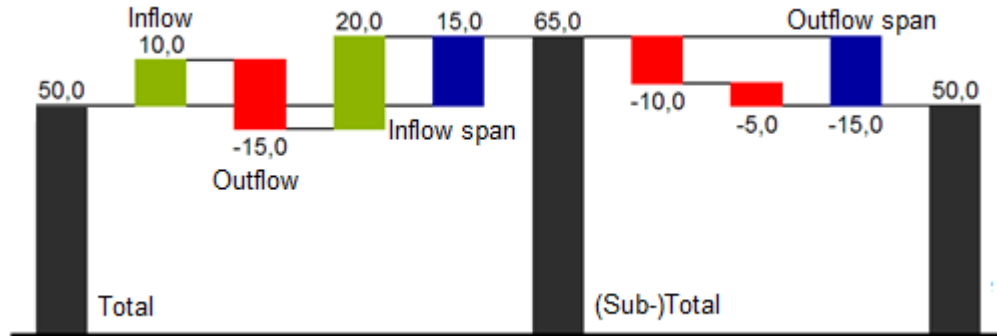
### Possible Input for The numeral.js Format String

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 <sup>st</sup>
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

## 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:

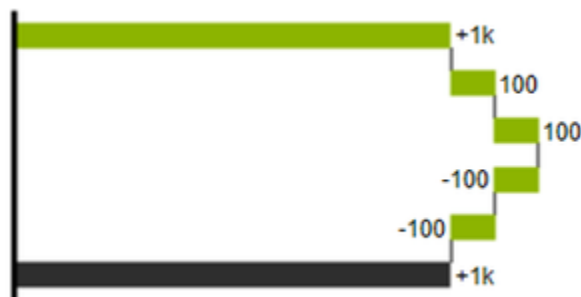
- negative values are interpreted as outflow values,
- + positive values are interpreted as inflow values

Currently SAP Lumira Discovery automatically applies a sorting to the data series. Unfortunately this feature can't be switched off and results in the fact that you can't display your data in the same order it had in the original data source. In case of using structural data you could include the positional information as a prefix in the category names (eg. A\_logCosts, B\_admCosts, C...) to achieve the preferred order by sorting them alphabetically. As an alternative solution you could create a custom hierarchy with an additional level that holds positional information.

By defining the *Waterfall Calculation Path* the appearance and the sign of each waterfall element can be controlled independently. The following options can be used:

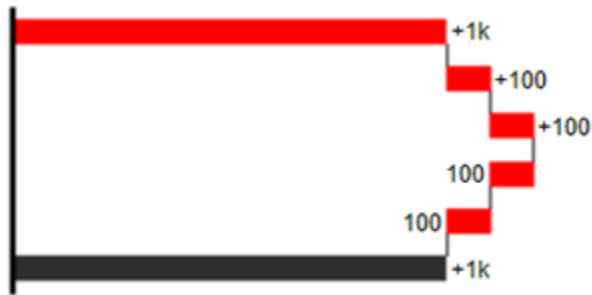
### + = inflow

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



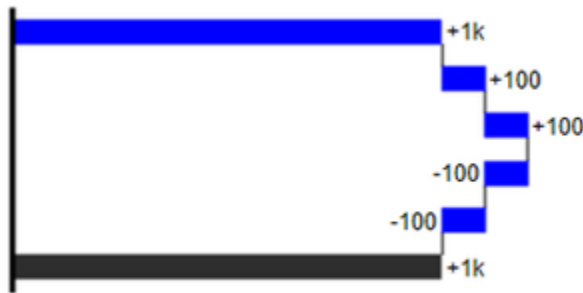
### - = outflow

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



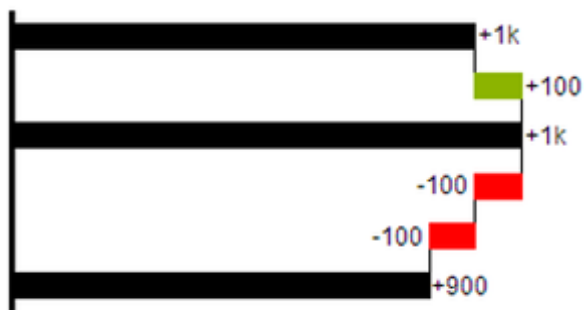
**0 = neutral position**

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



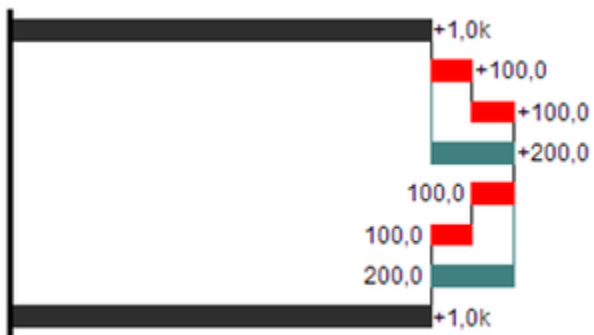
**= = (Sub-)total**

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



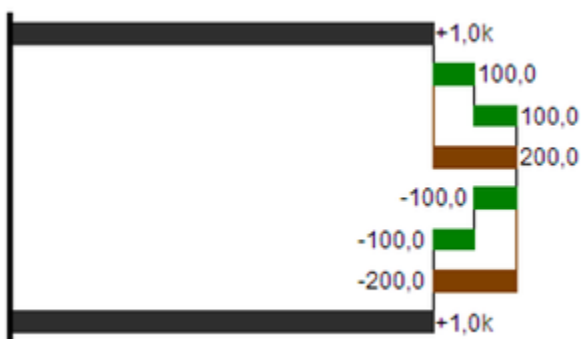
**s- = outflow span**

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.



Please note:

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.



