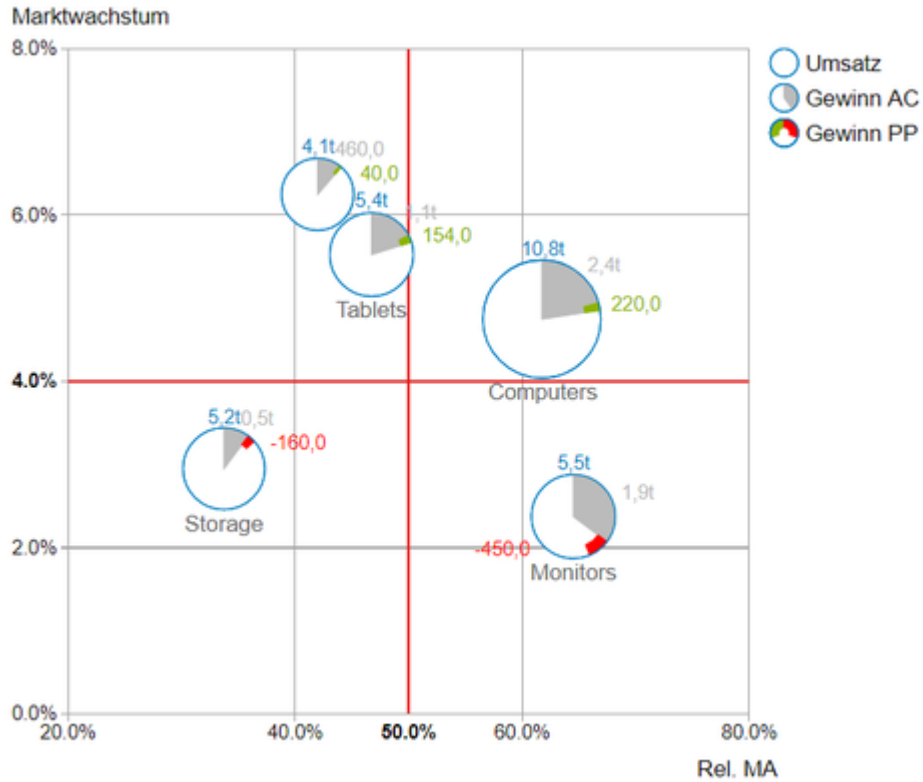


User Manual for the graphomate bubbles for SAP Analytics Cloud



Version 2020.4 – as of October 2020

<https://www.graphomate.com>

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Introduction

Meaningful portfolio analyses

Visualizations are gaining more and more importance in regards to quick and safe communication. Information presented in a simple, yet meaningful way supports deciders to find patterns and deviations. Good information design can give you a quick and efficient overview of your business. The International Business Communication Standards (IBCS) are working as a ruleset of how meaningful visualizations are used most effectively for business reporting and dash boarding.

With the graphomate bubbles we offer an additional highly configurable visualization component, which aligns itself with the IBCS concepts. The goal of the visualization is to get a **quick and easy overview of the distribution and the relationship of data points among each other**. Patterns and outliers can be recognized quickly and can be included in the interpretation and decision making.

The high density of information results from the mapping of **up to five key figures**. A two-dimensional utilization as scatterplot is possible, when two (dependent) characteristics are mapped into a chart. Of course the *graphomate bubbles* also offer many additional features you might be familiar with from other graphomate extensions. This includes a collision logic for overlapping labels, a value format configuration and optical customization.

In the following we describe the properties of the graphomate bubbles and the possibility to configure them in our user interface. This user interface is almost identical in all BI front ends - Power BI, Tableau, SAP Analytics Cloud and Lumira Designer. Formatting settings of the graphomate bubbles can be stored on the graphomate server and loaded from there, also in other BI front ends.

Installation

In the SAP Analytics Cloud the graphomate extensions are installed as so-called 'Custom Widget'.

The upload of the contribution.json is done as described below::

1. Choose from Main Menu / Browse / Custom Widgets
2. Use the '+'-symbol to select and store the graphomate JSON

The graphomate extensions can now be used as 'custom widget' in the Application Designer.

Quick Start

Using a graphomate extensions in an Analytic Application and data connection (workaround necessary)

At the moment, SAP has not yet released the data binding via the SDK of the SAC, which is why a short script is required to bind data at runtime.

Data sources in the SAC Application Designer are currently always connected with widgets. Therefore it is first necessary to connect a standard table with a data source and to execute the desired selection. Afterwards the following script text can be used in the onInitialization script to transfer the data of the standard table to the matrix.

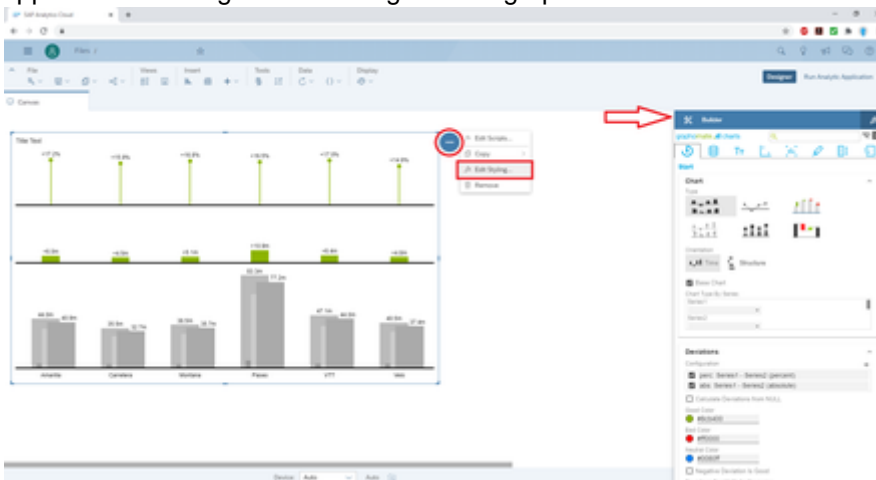
The following script should be used (for example *graphomate charts*):

```
graphomate_chart.setResultSetFromChart(Chart_1);
```

If the SAP standard chart contains configured deviations, these are interpreted as a further series and not as deviation in the graphomate chart.

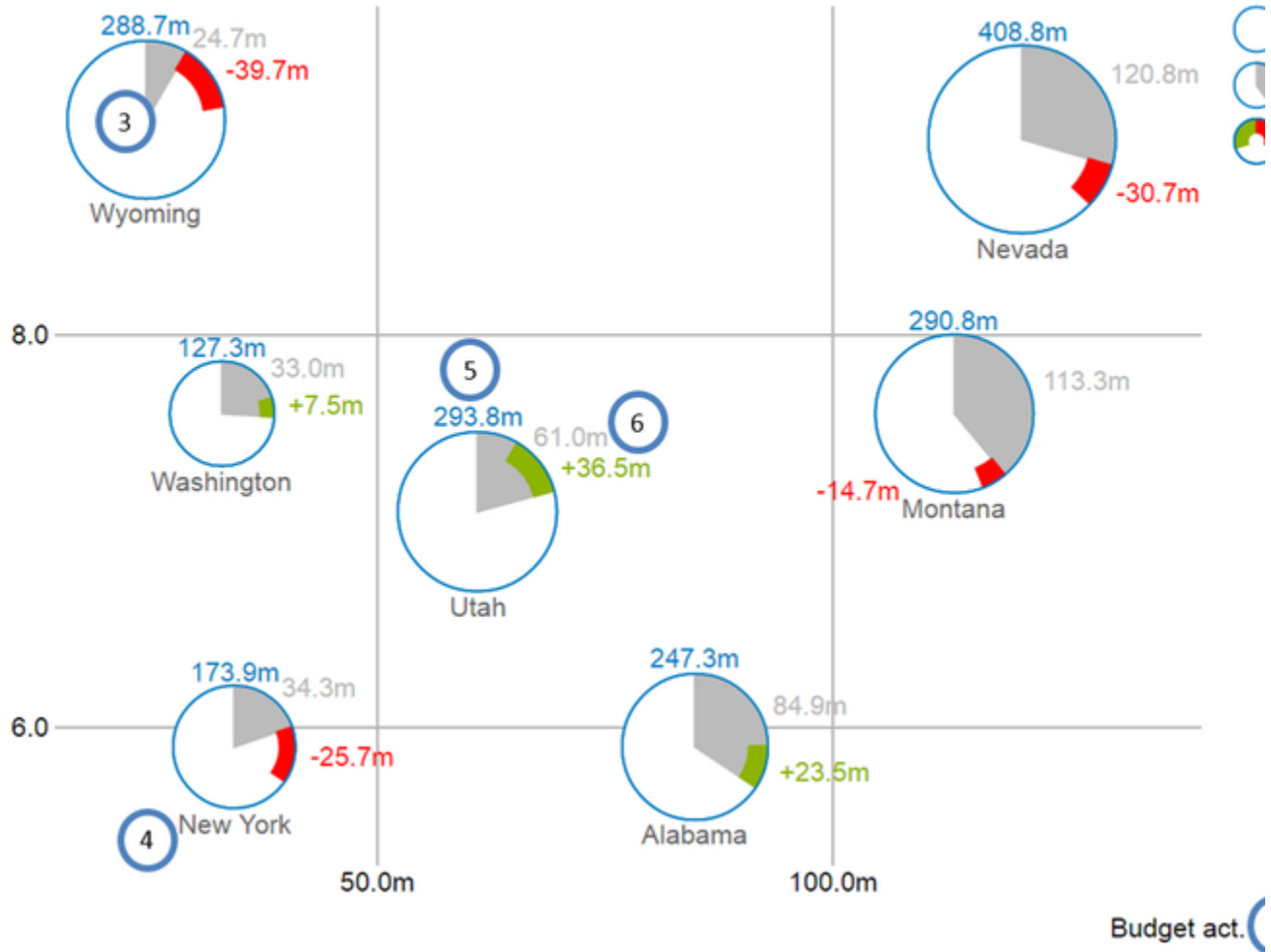
Open the graphomate property sheet (GPS)

Settings for the components are set via the graphomate property sheet. Select the graphomate extension and go to the 3 dots next to the component. Then select "Edit Styling". The Builder Panel (red arrow) with the GPS should appear. Now configure the settings on the graphomate matrix as desired.



Overview Visual Objects

- 1 Average Customer Rating and Net Sales by Area and Budget (\$)
- 2 Customer Rating



1. Title for the diagram (may contain more than one row).
2. Series Labels, one for each data series. They are automatically generated from the data selection. The Series Labels of the data series X Axis und Y Axis (see above, Budget act. And Customer Rating) are displayed on the respective axis. They are called Axis Labels. The Series Labels for the data series Circle, Arc and Deviation (see above, Net Sales, Budget act. and Budget prev.) are displayed as a legend on the right.
3. Bubbles: The elements of this diagram are called Bubbles and represent a set of information according to the selected data series.
4. The Category Label is the label for a Bubble, which is generated from the data selection of the x axis series.
5. The Circle Label of a Bubble specify the value of its Circle Dimension, which is the data series that defines this Bubbles' area.
6. The Value Labels of a Bubble specify the values of Arc dimension (see above, grey area) and the deviation from the dimension Deviation (see above, red and green bars).

Overview Data Dimensions

With the *graphomate bubbles* you will be able to visualize up to five data dimensions. These data series are the following.

Dimension	Description
<i>X Axis</i>	A series of values which will represent the coordinates on the x axis of the data points. The x axis represents the main dimension and serves as source for the extraction of diagram labels.
<i>Y Axis</i>	A series of values which will represent the coordinates on the y axis of the data points. The y axis represents the subordinate dimension which contains a matching value for each element of the x axis.
<i>Circle</i>	A series of values representing the area of the <i>Bubbles</i> . Setting data of this series is <u>optional</u> , but it requires the previously described series to be set. If no data is set here the chart will be drawn as a <i>Scatterplot</i> .
<i>Arc</i>	A series of values representing the area of the grey segment of each bubble (see picture below). This optional segment show the share of the corresponding value of the <i>Circle</i> series. Hence it is obligatory that the <i>Circle</i> series is set, if you want to use the <i>Arc</i> series.
<i>Deviation</i>	A series of values, also optional, which represents yet another segment of the whole circle. This segment is intended for a previous year value. This value's deviation from the <i>Arc</i> value is displayed by a red or green bar (see picture below) for a positive or negative deviation respectively. This series can only be used if the previously described series are set.

Please take care that you do not select data series with different offsets. For example, do not select the members January to June for the x axis and July to December for the y axis. You should select values of the same members for the y axis to ensure the values to match each other and the diagram labels to be extracted correctly.

graphomate property sheet (GPS)


- Data Tab
- Labels Tab
- Bubble Elements Tab
- Axes Tab
- Scaling Tab
- Emphasis Tab
- Input Output Tab


The following usage structure can be found in all graphomate extensions with the graphomate property sheet (GPS):

Search field



Use the search field to quickly find a setting (example "Title") and change it.

Connection to the graphomate server

 active connection to graphomate server








 no active connection to the graphomate server

Info Tab

In the header of the GPS there is an info symbol (). Click on the  icon to open a tab with relevant information:

- the version number of the installed extension (important information for the support)
- link to the graphomate Support Desk
- to the general terms and conditions
- to the graphomate website and
- a list of the software libraries used (Credits)


graphomate .ll bubbles


      

Input Output

Server ^

URL

https:// 



Info

Version: 2020.3.0

[Documentation](#)

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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v

CLOSE

Checkboxes

An active property is indicated by a white check mark in the checkbox. To deactivate it, click on the checkbox again.

Additional Information

- Legend
- Tooltip

Color Picker

You can enter the color value as HEX code or click on the colored circle.

Use the Color Picker or enter color values as HEX, RGB, or HSL code. You switch between these color models using the small arrows on the right side of the color picker.

Deviations

Good Color

#8CB400

Bad Color

#FF0000

Invert

Good Color




OK

Adding new elements to lists

Click on the  icon to create new elements in a list.

Removing elements from a list

Hover over the element to delete an object. The following symbol appears . Click on the icon to delete the selected entry.

Scenario Definition

- AC
- PP
- BU

Import / Export

W3sic2hvcnQioiJBQyIsIr

Filter Option

In some cases, it is necessary that several settings are only applied to certain key figures, dimensions or dimensional characteristics. You can use the filter option to define the combination to which the setting is to be applied.

In the example on the left, the desired setting is only applied to the key figure "budget". This can be, for example, a certain number formatting, a scenario or a certain icon for displaying the key figure.

Filter states can be defined in the following settings of graphomate extensions:

- graphomate matrix
 - Value Format
 - Calculations/Deviations
 - Scenario Assignment
 - Bar Chart Assignment
 - Pin Chart Assignment
 - Background Bar Assignment
- graphomate bubbles
 - Value Format
- graphomate pictograms
 - Pictograms/Icon Assignment

Measures



Dimension
Measures

Members +

budget

OK

Input mode: Field / comma separated list (csv)

Properties with the  symbol allow the definition of settings on the graphomate property sheet in two variants. The mode can be changed by clicking on the  symbol. The following modes are available:

1. per field: The value is entered per field. After one field has been filled, another field is created automatically.
2. As a list: The entry is made as a comma-separated list.


Example: Application of the scenarios to elements of a series (see picture)

The first series contains two forecast values (FC) and two budget values (BU). The second series contains only values from the previous period (PP). You can enter the assignment of the scenarios as follows:


Variant per field for series 1: FC (field 1), FC (field 2), BU (field 3), BU (field 4)

Variant as list for series 2: PP,PP,PP,PP,

Scenario Assignment

Scenarios 1 

FC FC BU BU

Scenarios 2 

PP,PP,PP,PP,

Scenarios 3

Scenarios by Series +

no items

Scenarios In Axis

Scenario Legend Enabled








Scenarios In Deviations

Data Tab

Data Binding

Connect the data with the *X Axis*, the *Y Axis*, the circular area (*Circle*), the *Arc* and the arc segment (*Deviation*).

graphomate .nl bubbles

Data

Data Binding

X Axis
Auto

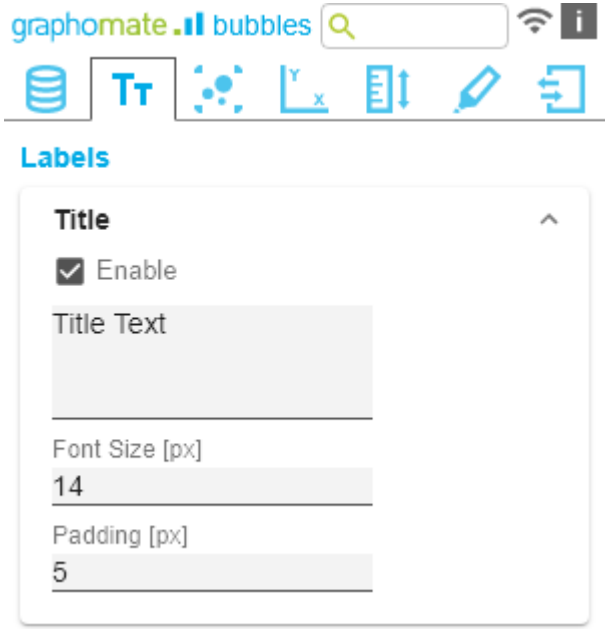
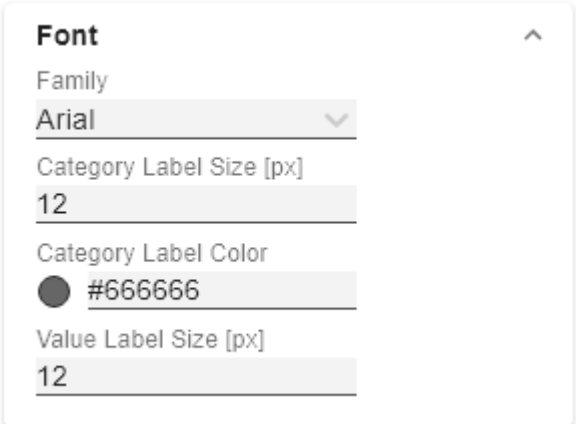
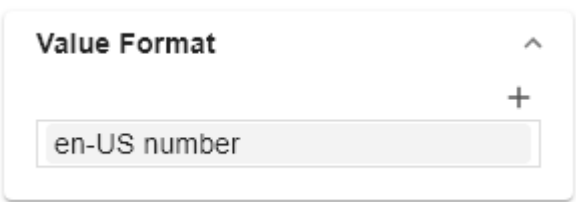
Y Axis
Auto

Circle
Auto

Arc
Auto

Deviation
Auto

Labels Tab

<p>Title</p> <p>Titel Text</p> <p>Enter the title for the bubble chart in this field. Multiple-line texts are reproduced accordingly, i.e. the line break is adopted.</p> <p>Font Size</p> <p>Sets the font size of the title in [px].</p> <p>Padding</p> <p>Set the distance of the title to the diagram in [px] here.</p>	 <p>graphomate .nl bubbles <input type="text" value=""/></p> <p>Labels</p> <p>Title ^</p> <p><input checked="" type="checkbox"/> Enable</p> <p>Title Text <input type="text"/></p> <p>Font Size [px] <input type="text" value="14"/></p> <p>Padding [px] <input type="text" value="5"/></p>
<p>Font</p> <p>Family</p> <p>Define the global font. You can choose between <i>Arial</i>, <i>Tahoma</i>, <i>Lucida Console</i>, <i>Verdana</i> and <i>Calibri</i> or type in the name of a font which is installed on your system.</p> <p>Category Labels Size [px]</p> <p>Specify the size of the Category Labels in [px] here.</p> <p>Category Label Color</p> <p>Select the color for the Category Label using the color picker or by entering the HEX code.</p> <p>Value Label Size [px]</p> <p>Specify the size of the axis and element labels in [px] here.</p>	 <p>Font ^</p> <p>Family <input type="text" value="Arial"/></p> <p>Category Label Size [px] <input type="text" value="12"/></p> <p>Category Label Color <input type="text" value="#666666"/></p> <p>Value Label Size [px] <input type="text" value="12"/></p>
<p>Value Format</p> <p>With the Value Format you define the way the values are displayed in the bubble chart. You access the configuration by clicking on an element in the list. You can create and define additional formats using the + symbol.</p>	 <p>Value Format ^</p> <p><input type="text" value="en-US number"/> +</p>

Multiple Value Format Rules (Assignments) are prioritized in descending order, i.e. definitions that are lower in the list overwrite those above them when their filters overlap. Therefore, the generally valid format of the bubbles labels should be defined at the top of this list without any further filters. Value Formats defined below, restricted by filters, overwrite the formatting defined above - "From General to Special".

Value Format Pop-Up

Define the number format using the following options:

en-US number

Locale
en-US

Format Type
number

Abbreviations
auto

Negative Sign
minus

Prefix

Suffix

Thousand Separator

Decimal Separator

Total Digits (approx.)

Decimal Digits
1

Scaling Factor
1

Zero Format

Null Format

Infinity Format
∞

Rounding Method
commercial

Explicit Positive Sign

Filter (optional) +
no items

Description (optional)

OK

- **Locale:** Defines abbreviations, decimal and thousand separators for the respective language. You can choose between *en*, *de*, *fr* and *auto*.
- **Format Type:** Defines the type of number output. You can choose between *number* (decimal number), *percent* (percentage) and *ordinal* (ordinal number).
- **Abbreviations:** Defines the type of abbreviations for all numbers to be formatted. You can choose between *mean* (abbreviation of the mean value), *min* (abbreviation of the minimum value), *max* (abbreviation of the maximum value), *auto* (best-suited abbreviation for the respective number), *trillion* (trillion abbreviation), *billion* (billion abbreviation), *million*, *thousand* and *none* (no abbreviation at all).
- **Negative Sign:** Defines how negative numbers are displayed. You can choose between *minus*, *parenthesis*, and *none* (no sign).
- **Prefix:** The input value is placed before the number.
- **Suffix:** The input value is placed after the number.
- **Thousands Separator:** Replaces the thousand separator set by the selected *locale*.
- **Decimal Separator:** Replaces the decimal separator set by the selected *locale*.
- **Total Digits:** Defines how many digits the number may consist of. *Total Digits* is prioritized over *Decimal Digits*.
- **Decimal Digits:** Defines how many decimal places of the formatted number are displayed.
- **Scaling Factor:** The value of each data point is multiplied by the entered number to scale values.
- **Zero Format:** When the checkbox is activated, any data value equal to 0 (the number zero) is replaced by the entered value.
- **Null Format:** Any data value that equals *NULL* (no value) is replaced by the entered value.
- **Error Format:** If a data value is undefined or the result of an arithmetic error such as dividing by 0 (zero), the data value is replaced by the entered value.
- **Rounding Method:** Defines the rounding method. You can choose between *half up* (23.5 24, -23.5 -23), *commercial* (23.5 24, -23.5 -24) and *trim* (23.5 23, -23.5 23).
- **Explicit Positive Sign:** Defines whether a positive number should always be preceded by a + (plus sign).
- **Description:** Defines a description for the set configuration.

Additional Information

Legend

If the checkbox is activated, a legend is displayed if data has been selected for one of the fields *Circle*, *Arc* or *Deviation*.

Tooltip

If the tooltip is activated, the data of the respective bubble is displayed when hovering on element.

In Power BI the activation of the tooltips of the graphomate bubbles is done as the following: In Power BI, in the Visualization pane, go to the Format (Formatting, paint roller symbol) symbol and choose the *Quick Info* option.

Additional Information

Legend

Tooltip



Visibility

Circle Labels

Switches the *Circle Labels* permanently on (*Always*), off (*Never*) or leaves the decision to the collision logic (*Auto*). In *Auto* mode, *Circle Labels* are hidden in case of collision. *Circle Labels* have higher priority than *Value Labels*, but lower priority than *Category Labels* or other bubbles. This order is applied accordingly in the collision logic.

Arc and Deviation Labels

Defines whether the values of the deviations and arc segments should be displayed.

Category Labels

Switches the *Category Labels* permanently on (*Always*), off (*Never*) or leaves the decision to the collision logic (*Auto*). In *Auto* mode, *Circle Labels* are hidden in case of collision. *Circle Labels* have higher priority than *Value Labels*, but lower priority than *Category Labels* or other bubbles. This order is applied accordingly in the collision logic.

Axis Labels

Sets whether the *Axis Labels* are displayed or hidden.

Label visibility priority (from high to low) for collisions:

- Category Labels
- Circle Labels
- Arc and Deviation Labels

Visibility

Circle Labels

always auto never

Arc and Deviation Labels

Category Labels

always auto never

Axis Labels

Manual Series Labels

At this point, strings can be assigned for the data series. The checkboxes activate the manually set label, otherwise the automatically generated labels are used.

The *Manual Series Labels* are also used for the legend.

Manual Series Labels

X-Axis

X-Axis

Y-Axis

Y-Axis

Circle

Circle

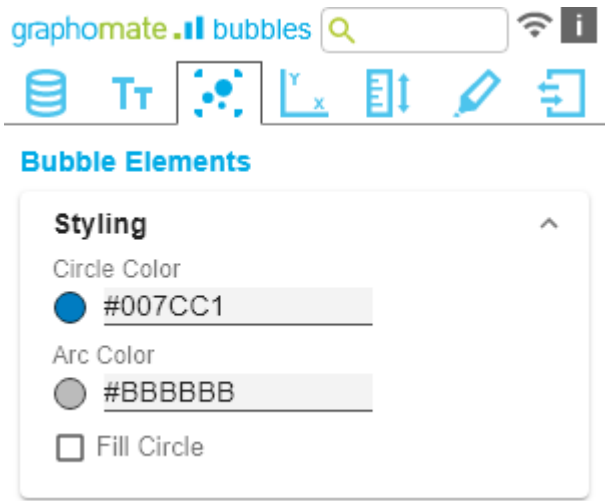
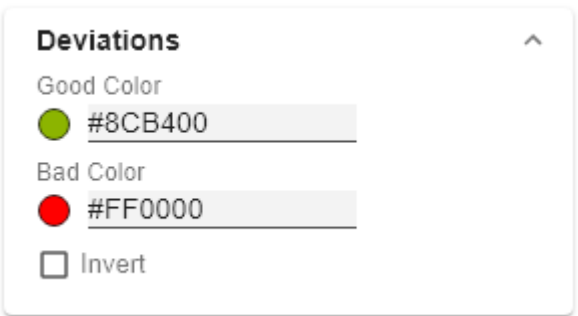
Arc

Arc

Deviation

Deviation

Bubble Elements Tab

<p>Styling</p> <p>Circle Color</p> <p>Here you can set the color of the circle area line by clicking on the corresponding color field or by entering a HEX code.</p> <p>Arc Color</p> <p>Here you can set the color of the arc by clicking on the corresponding color field or by entering a HEX code.</p> <p>Fill Circle</p> <p>If <i>Fill Circle</i> is activated, the area of the circle is filled with the <i>Circle Color</i>.</p>	
<p>Deviations</p> <p>Good Color</p> <p>Here you can set the colors for positive (<i>Good Color</i>) connected deviations by clicking on the corresponding color field.</p> <p>Bad Color</p> <p>Here you can set the colors for negative (<i>Bad Color</i>) connected deviations by clicking on the corresponding color field.</p> <p>Invert</p> <p>If the checkbox <i>Invert</i> is activated, positive deviations are evaluated as negative and thus get the color for negative deviations (and vice versa).</p>	
<p>Conditional Formatting</p> <p>Configuration</p> <p>This configuration allows the appearance of the bubbles to be adjusted based on conditions. With a click on the +- symbol a dialog opens in which the conditions is defined,</p> <p>Configuration Pop-Up</p> <p>For each bubble, the value from the selected series (<i>Source</i>) is compared with the operand(s) (<i>Operator</i>). If the condition applies, the selected (optical) <i>Effect</i> is applied. Depending on the selected <i>Operator</i>, between none and 2 operands must be selected.</p>	

- **Description:** Enter the name of the condition here.
- **Operator:** Defines the condition for comparing the value with the operand(s).
 - *equal*: Is the value equal to the operand?
 - *not equal*: Is the value not equal to the operand?
 - *less*: Is the value smaller than the operand?
 - *less or equal*: Is the value smaller or equal to the operand?
 - *greater*: Is the value greater than the operand?
 - *greater or equal*: Is the value greater or equal to the operand?
 - *between*: Is the value between the two operands?
 - *not between*: Is the value not between the two operands?
 - *always*: The effect is always applied regardless of the data.
 - *contains*: Does the value contain the operand? (for *Labels*)
- **Source:** Determines with which data series the operand or operands are compared.
 - *x*: The data value from which the position of the bubble on the X-axis results.
 - *y*: The data value from which the position of the bubble on the Y-axis results.
 - *circle*: The data value from which the area of the bubble results.
 - *arc*: The data value from which the area of the circular arc of the bubble results.
 - *dev*: The data value from which the deviation circle section of the bubble results.
 - *label*: The caption shown below the bubbles.
- **Value:** Determines with which values are going to be compared to the values from the data series.
 - *Value 1*: Not required for *Operator always*.
 - *Value 2*: Not required for operator always, contains, >=, >, <=, <, != and =
- **Effect:** Is applied if the condition is evaluated positively.
 - *circle color*: Changes the fill color of the circle.
 - *stroke color*: Changes the color of the circle border.
 - *stroke width*: Changes the thickness of the circle border.
 - *css class*: Adds the specified CSS class.

Conditional Formatting ^

Configuration +

circle-less: 10000

circle-less: 10000

Enable

Description

Operator

less

Source

circle

Value 1

10000

Value 2

Effect

circle-color

Characteristic

#FF0000

OK

- Characteristics: Depending on which effect was defined, the following values can be stored
 - *circle color*: HEX code of a color.
 - *stroke color*: HEX code of a color.
 - *stroke width*: An integer that represents the line width in [px].
 - *css class*: Here you define the CSS class to be used.

Troubleshooting

Performance Limit

Sets the limit for the maximum number of bubbles up to which no performance problems occur. Using values greater than 100 is not recommended. If the limit is reached, a performance-optimized display is used for the bubbles. Only the X and Y dimensions are used here. The individual data points are displayed transparently, so that accumulations of data points appear darker and therefore focal points can be recognized. To identify outliers, a tooltip is displayed when moving the mouse over a bubble.

Draw Boundaries

This option is intended for test purposes. If it is activated, its limits are drawn for each element. These boundaries are used by the collision logic to hide overlapping labels.

Troubleshooting

Max Bubble Count

100

Draw Element Boundaries

Axes Tab

Fixation

You can use the *Start of X/Y Axis* option to have the scaling of the axis start at 0 or any other arbitrary value. Similarly, you can use the *End of X/Y Axis* option for the corresponding axis to let the scaling of the axis end at any value.



Axes

Fixation

Start of X-Axis

0

End of X-Axis

0

Start of Y-Axis

0

End of Y-Axis

0

Guides

To highlight threshold or target values, the so-called *Guides* can be added, whose appearance can be extensively customized.

Guides Pop-Up

With the + button *Guides* definitions can be added. The following options are available for each guide:

- *Description*: Enter the name of the guide here.
- *Value*: Defines the position of the guideline on the axis. If the character string *mean* is entered instead of a numerical value, the average of the data series on which the axis is based is taken as the value.
- *Color*: Opens the Color Picker to select a color for the line or defines the color using HEX code.
- *Width [px]*: Sets the width of the guideline in [px].
- *Label*: Are displayed on the axis at the position of the guideline. If *auto* is defined for the label, the line is provided with a label corresponding to the axis value at the position. If *none* is defined for the label, no label is displayed. Any other inserted text is displayed as label.
- *Bold Label*: Bestimmt, ob das Label Fett gezeichnet wird.

Guides ^

X-Axis +

mean

Y-Axis +

mean

mean

Enable

Description

Value

mean

Color

#000000

Width [px]

2

Label

auto

Bold Label

OK

Basic Grid Lines

Segments

If segments are deactivated, no *Grid Lines* of the coordinator system are drawn.

Border

When Border is activated, a frame is always displayed around the coordinate system.

Basic Grid Lines ^

Segments

Border

Custom Grid Lines

It is possible to display additional lines in the grid. These are defined either by the size of the intervals (*Interval*) or the number of steps (*Steps*). The size of the intervals describes the line distance in the unit of the respective axis. The number of steps defines how many parts the respective axis consists of. For a meaningful representation the feature *Segments* should be deactivated.

Custom Grid Lines ^

Interval X-Axis

0

Interval Y-Axis

0

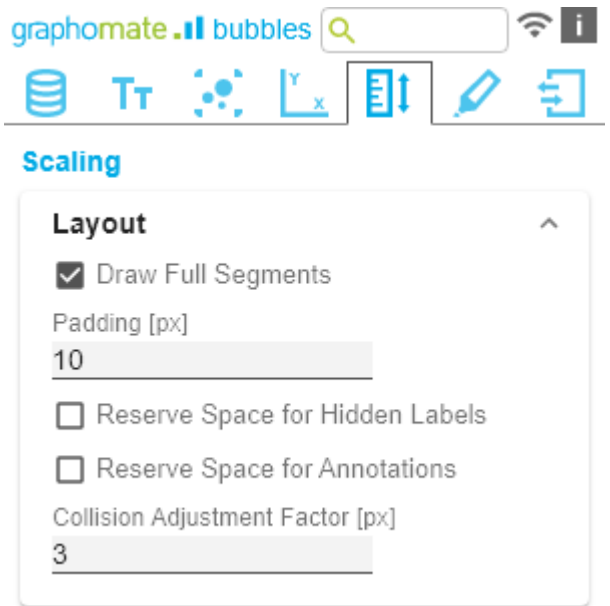
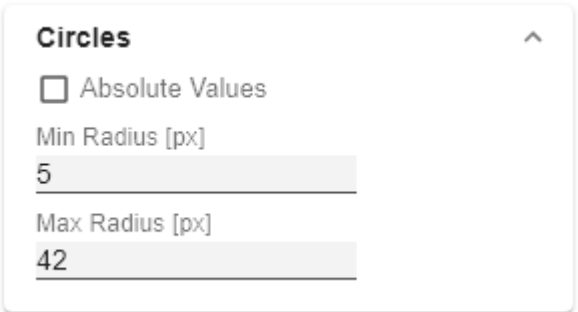
Steps X-Axis

0

Steps Y-Axis

0

Scaling Tab

<p>Layout</p> <p>Draw Full Segments</p> <p>If the <i>Full Segments</i> checkbox is activated, the scaling of the axes is selected so that all quadrants of the grid have the same size. If it is deactivated, the axes are scaled so that the available space is optimally used. However, half quadrants may be created. For optical reasons, the outer lines of the grid (<i>Borders</i>) at the top and right are hidden.</p> <p>Padding</p> <p>Set a distance in [px] for the padding that surrounds the entire diagram.</p> <p>Reserve Space for Hidden Labels</p> <p>If Reserve Space for Hidden Labels is activated, the scaling is selected so that all bubbles including their labels fit into the diagram. This also includes labels hidden by collision.</p> <p>Reserve Space for Annotations</p> <p>If Reserve Space for Annotations is activated, the distance of the axes from the edge of the component is selected so that all axis labels can be displayed. This particularly includes annotations that are displayed on the axis due to runtime interactivity and represent the value of a bubble.</p> <p>Collision Adjustment Factor</p> <p>Use the Collision Adjustment Factor to define a value in [px] that specifies by how many pixels labels may overlap each other until they are hidden by the collision logic.</p>	 <p>graphomate .ll bubbles</p> <p>Scaling</p> <p>Layout</p> <p><input checked="" type="checkbox"/> Draw Full Segments</p> <p>Padding [px]</p> <p>10</p> <p><input type="checkbox"/> Reserve Space for Hidden Labels</p> <p><input type="checkbox"/> Reserve Space for Annotations</p> <p>Collision Adjustment Factor [px]</p> <p>3</p>
<p>Circles</p> <p>Absolute Values</p> <p>If this option is activated, the amount for each value of the Circle series is calculated and used as the data basis for the display. This is useful if negative values occur in the selection that should actually be displayed as positive.</p> <p>Min and Max Radius [px]</p> <p>Define the upper and lower limits for the radius of the bubbles in [px]. This means that no bubble with a radius greater or smaller than the min. or max. radius exists.</p>	 <p>Circles</p> <p><input type="checkbox"/> Absolute Values</p> <p>Min Radius [px]</p> <p>5</p> <p>Max Radius [px]</p> <p>42</p>

Zoom

Four different zoom modes can be selected. You can choose between *none*, *rect*, *magnify* and *scale*.

Zoom



none selection magnify scale

Emphasis Tab

Emphasising

On Hover

With this option, certain bubbles can be highlighted directly without moving the mouse over them.

Category Emphasis

A bubble is selected based on a portion of the contents of the category label. Several selectors are possible simultaneously. The entry is made per field or as comma-separated notation.

For example, if the cardinal point is part of the category label and all bubbles from west and north are to be highlighted, the value of the property would be as follows: North,West

Opacity of other Bubbles

This value determines to what extent bubbles that are not highlighted should be hidden. The value starts at 0.0 (completely hidden) and ranges up to 1.0 (completely visible).

Annotations

If this option is activated, *Annotations* are displayed at runtime when the mouse is moved over a bubble. Annotations are temporary labels that are connected to the bubble by lines and represent the respective value on the axis.



Emphasis

Emphasising

On Hover

Category Emphasis CSV

Opacity of other Bubbles

0,15

Annotations

Connection

Related Bubbles

If this feature is enabled, bubbles are connected in the order in which they appear in the data. This can be used, for example, to display temporal progressions or to mark the assignment of bubbles to each other more clearly. How bubbles are assigned to each other is defined by the *Matcher Index*. Redundant elements in the *Category Label* are hidden if possible and only displayed at the first element.

On Hover

Determines whether the bubbles should be connected initially, or (if this option is activated) as soon as a bubble is highlighted with the mouse.

Matcher Index

This index defines how bubbles should be assigned to each other. The value -1 means that all bubbles are connected to each other. All values from 0 to n define the position of the category label of the element to be assigned. For example, if there are two bubbles, the first one has the category label "*South, Internet*" and the second one "*South, Computers*" and you want to assign all bubbles from the south to each other, select index 0 to use the first element of the category label.

Connection

Related Bubbles

On Hover

Category Matcher Index

-1

Ranges

Ranges can be added to highlight complete areas of the X or Y dimensions. This is done by clicking on the +-symbol. Alternatively, one of the existing sample definitions can be activated and adjusted. The *Ranges* are divided into areas that should be marked on the X- or Y-dimensions. The checkbox in front of the definitions activates the respective range. Furthermore the following options are available:

- *Enabled:* (De)Activates the Range.
- *Description:* Descriptions can be inserted here.
- *Start:* Defines the position as data value where the *Range* should start. Instead of a numerical value, the following wildcards are available: *min*, *mean* and *max*. This defines the minimum, average or maximum of the respective data series as the starting point of the Range.
- *End:* Defines the position as a data value at which the *Range* should end. Instead of a numerical value, the following wildcards are available: *min*, *mean* and *max*. This defines the minimum, average or maximum of the respective data series as the end point of the Range.
- *Opacity:* Sets the transparency of the Range in values from 0 (completely transparent) to 1 (not transparent).
- *Color:* Sets the color of the range.

Ranges ^

X-Axis +

500-1000

Y-Axis +

500-1000

500-1000

Enable

Description

Start

500 v

End

1000 v

Opacity

0.5

Color

#999999

OK

Trend

The checkbox activates the trend line. It is intended to visualize the trend of the development of the displayed data points and to make connections recognizable. This line is the regression line known from statistics, which represents the linear relationship of values in a Cartesian coordinate system. The following options are available:

- *Color:* Determines which color the trend line should have.
- *Width [px]:* Defines the width of the trend line.
- *Correlation:* Activates the display of the correlation coefficient under the legend of the bubbles. This indicates how precisely the course of the trend line can be determined. The value varies between 1 (absolutely accurate trend line) and 0 (trend line not meaningful).

Trend ^

Enable

Color

#0000FF

Width [px]

2

Correlation

Graphs

For orientation in the coordinate system, various graphs can be added according to their function and then drawn. This is done by clicking on the + button. Alternatively one of the existing sample definitions can be activated and adapted. The checkbox in front of the definitions activates the respective graph. Furthermore the following options are available:

- *Enabled:* (De)Activates the graph.
- *Description:* Descriptions can be inserted here.
- *Function:* The function that determines the appearance of the graph. They can be written following the specifications of expr-eval and depend on the variable x . For example x , x^2 , $\sin(x)$, \sqrt{x} , $\log(x)$.
- *Color:* The color of the line of the graph.
- *Width:* The width of the line of the graph in pixels.

Graphs

Definitions +

x^2

x^2

Enable

Description

Expression

x^2

Color

#000000

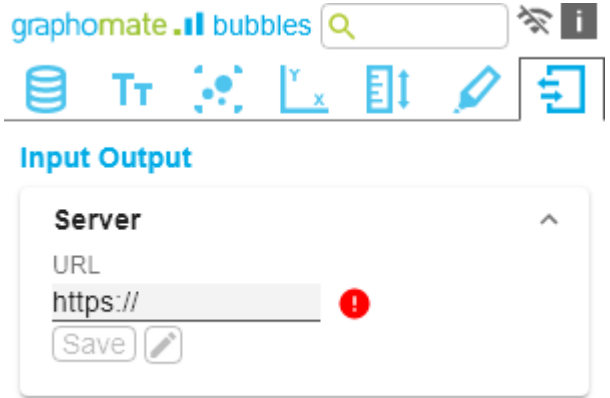
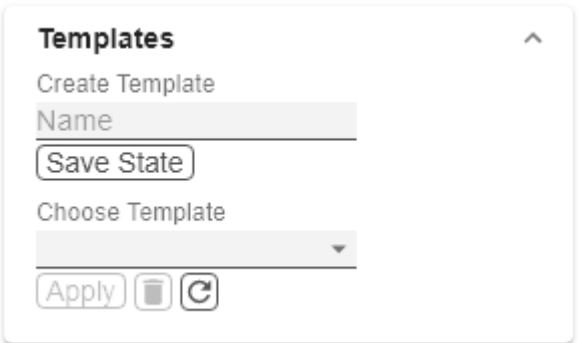
Width [px]

2

OK

Input Output Tab

The functions of this tab are used to exchange templates for the graphomate bubbles. Connect to the graphomate server - a free component of graphomate GmbH - to store or load a graphomate bubbles template. This way you can exchange preconfigured graphomate bubbles designs between BI frontends that support the graphomate server. These are currently Power BI, Tableau, SAP Analytics Cloud, SAP Lumira Designer and SAP Web Intelligence.

<p>Server</p> <p>Here you enter the URL of the graphomate server to which the component should connect and from which you want to save or retrieve templates.</p> <p>If you have entered the URL to the server, a green check mark indicates that a connection could be established.</p> <p>If another server is used later, the button next to the save button can be pressed and the server URL can be edited.</p> <p>The hyperlink "<i>Admin</i>" allows you to jump to the admin area of the graphomate server.</p>	
<p>Templates</p> <p>If the current settings are to be saved as a template, a new template name can be entered in the input field labeled <i>Create Template</i> and confirmed by clicking the <i>Save State</i> button. If the entered name complies with the naming convention, the template is saved on the server and a toast with the corresponding message is displayed in the lower part of the <i>graphomate property sheet</i>.</p> <p>However, if the entered name does not meet the expected naming conventions, an error message with the permitted characters is displayed accordingly.</p> <p>With <i>Choose Template</i> templates stored on the server can be retrieved and applied. To do this, the desired template must only be selected and the <i>Apply</i> button must be pressed. If you want to delete a template, you have to select the template in the list and press the <i>Delete (bin symbol)</i> button. If changes have been made to the templates on the server side, you have to click on the <i>Refresh</i> button. Changes should then be visible.</p>	

Runtime Interactivity

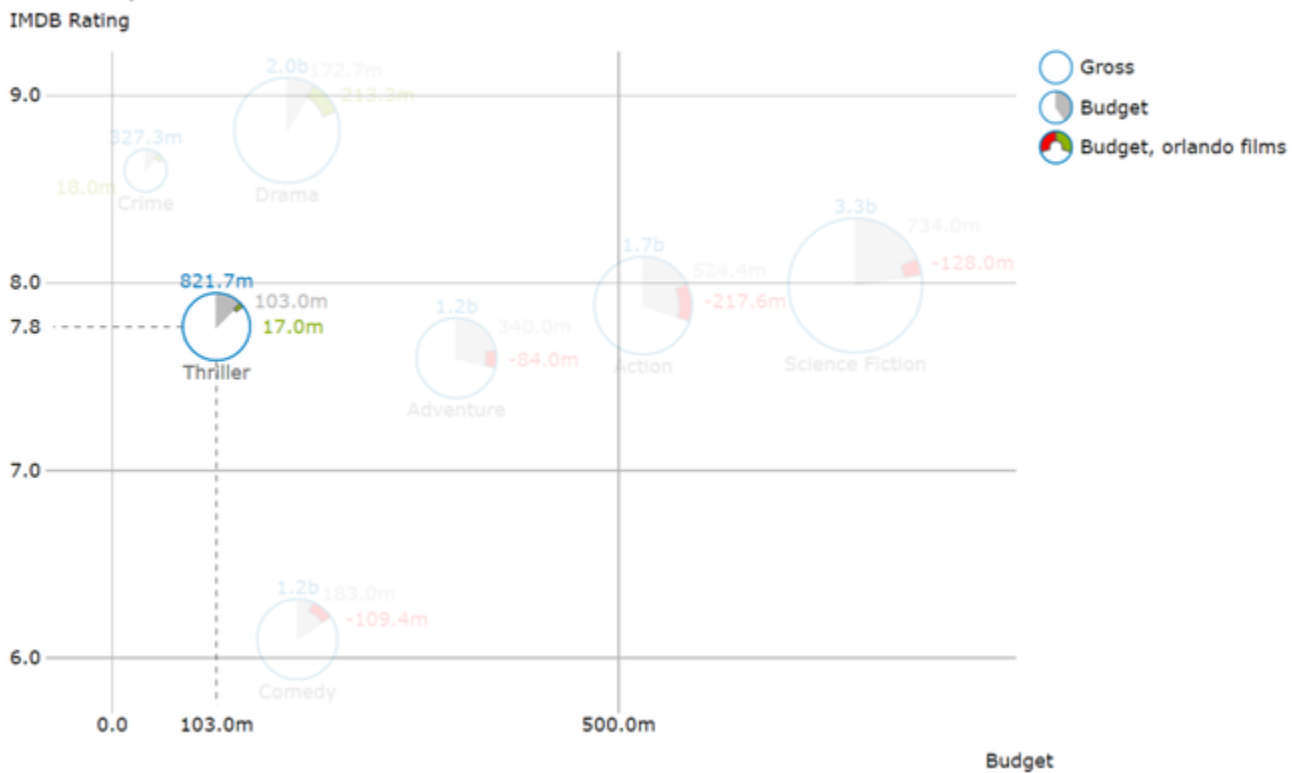
- Hover
- Clustering
- Zoom Modi

Hover

Highlight on Hover

The *graphomate bubbles* provide the functionality to selectively show all the information associated with a single *Bubble*. To highlight a data point use your mouse to hover over a single *Bubble*. Now all the values, labels and annotations will be displayed. This state can be fixed with **CTRL+Click**. If the *Connection - Related Bubbles* and *Connection - Bubbles On Hover* options are activated, all associated bubbles will also be highlighted and the connection will be displayed sequentially.

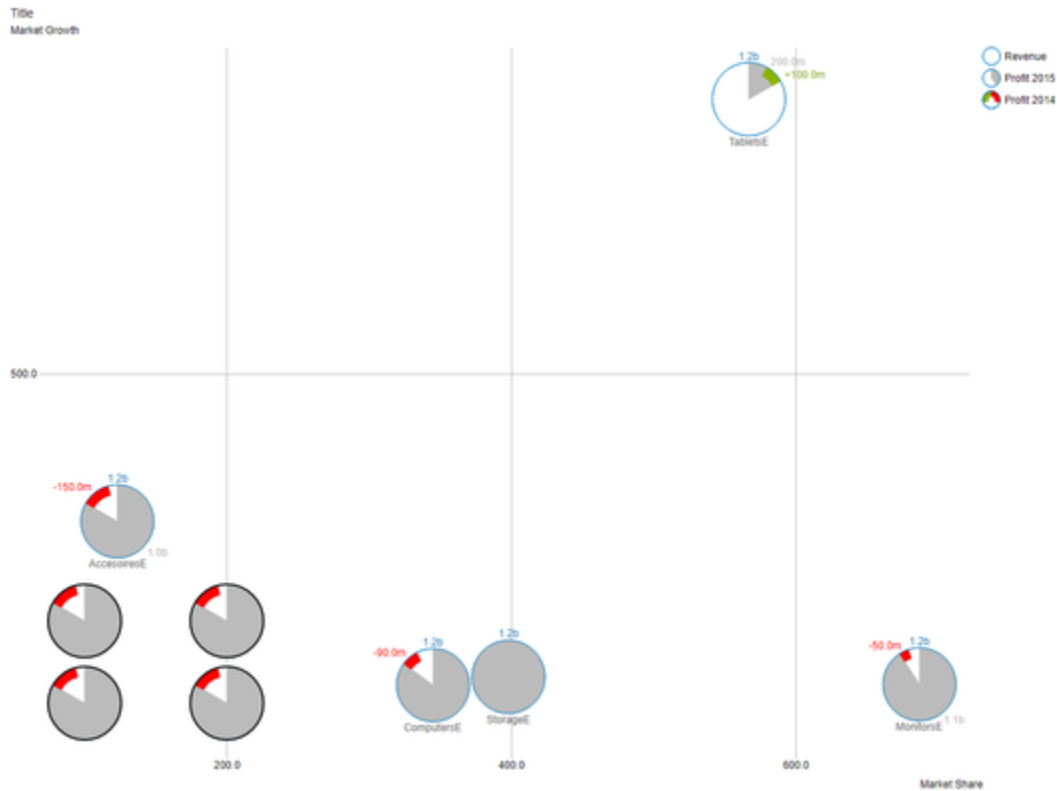
Average IMDb Rating, worldwide Gross by Genre and Budget (\$) studio 90, 2016



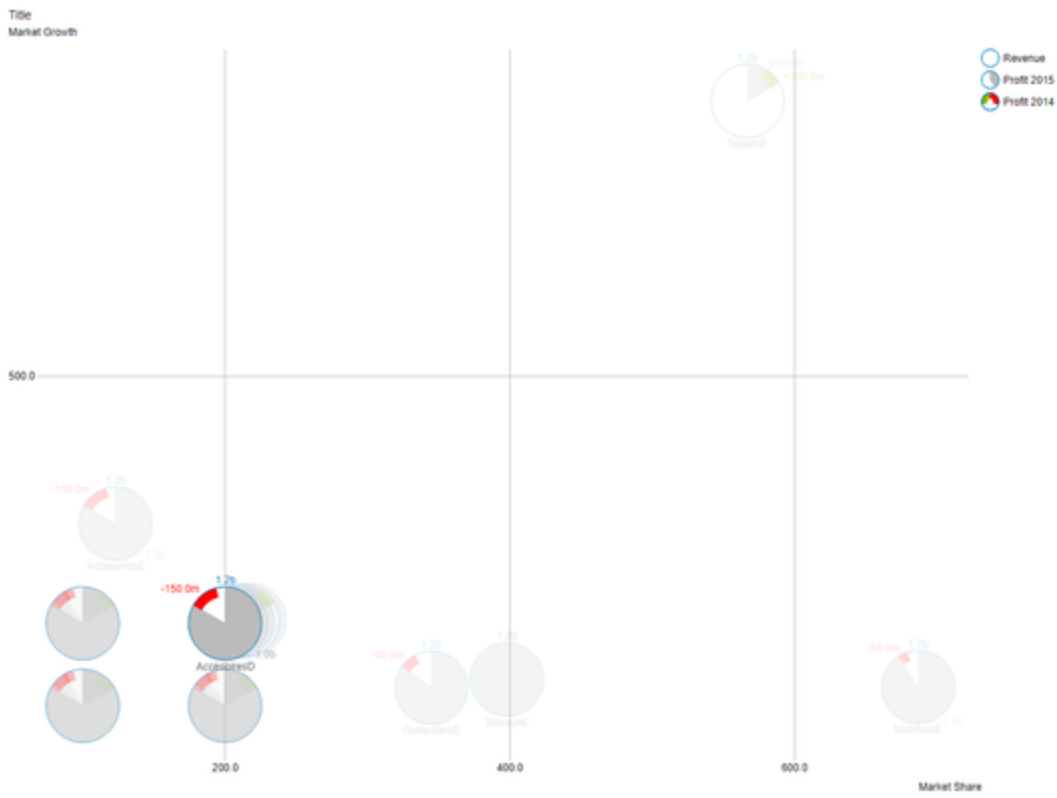
Clustering

Clustering

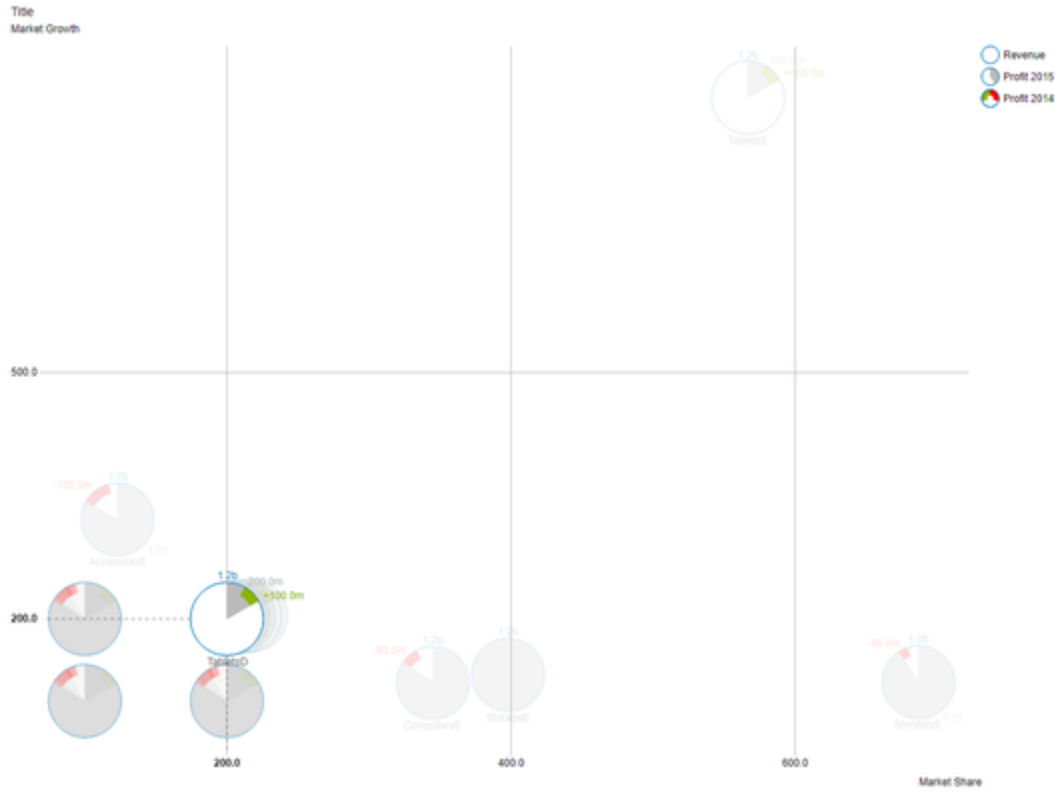
Depending on the data set, Bubbles can be drawn with the same X and Y position and the same radius. The accumulations of bubbles are then characterized by the fact that they lack any labeling and the border is drawn thicker.



If the mouse is hovered over such a **Cluster** of bubbles, the underlying bubbles fan out aside. The front bubble is displayed completely including their labels.



If one of the fanned bubbles is now hovered, this one is brought to the foreground and displayed in the correct (original) position with its labels.



Zoom Modi

Zoom-Modi

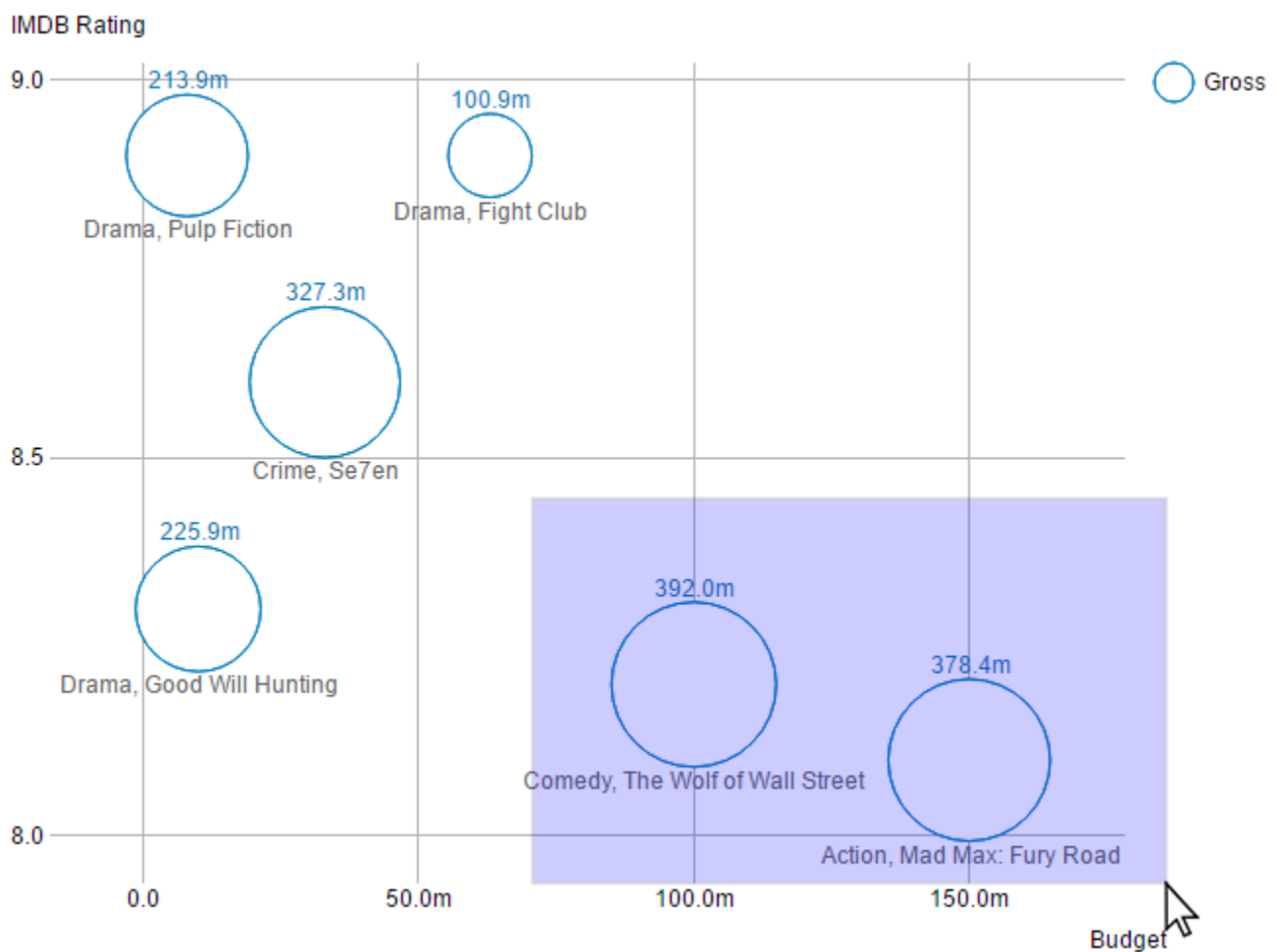
The following four zoom modes Rectangular Selection, Rectangular Section, Magnification and Scaling Adjustment can be set in the graphomate property sheet in the tab *Scaling* under **Zoom**.

The selection **None** and **Selection** both activate the rectangular selection, whereby **Selection** only displays the previously selected sections on the axes, **Magnify** the magnification and **Scale** the scaling adjustment.

Die Auswahl **None** und **Selection** aktivieren beide jeweils die Rechteck-Selektion, wobei bei *Selection* auf den Achsen nur noch die vorher selektierten Abschnitt dargestellt werden, **Magnify** die Vergrößerung und **Scale** die Skalierungsanpassung.

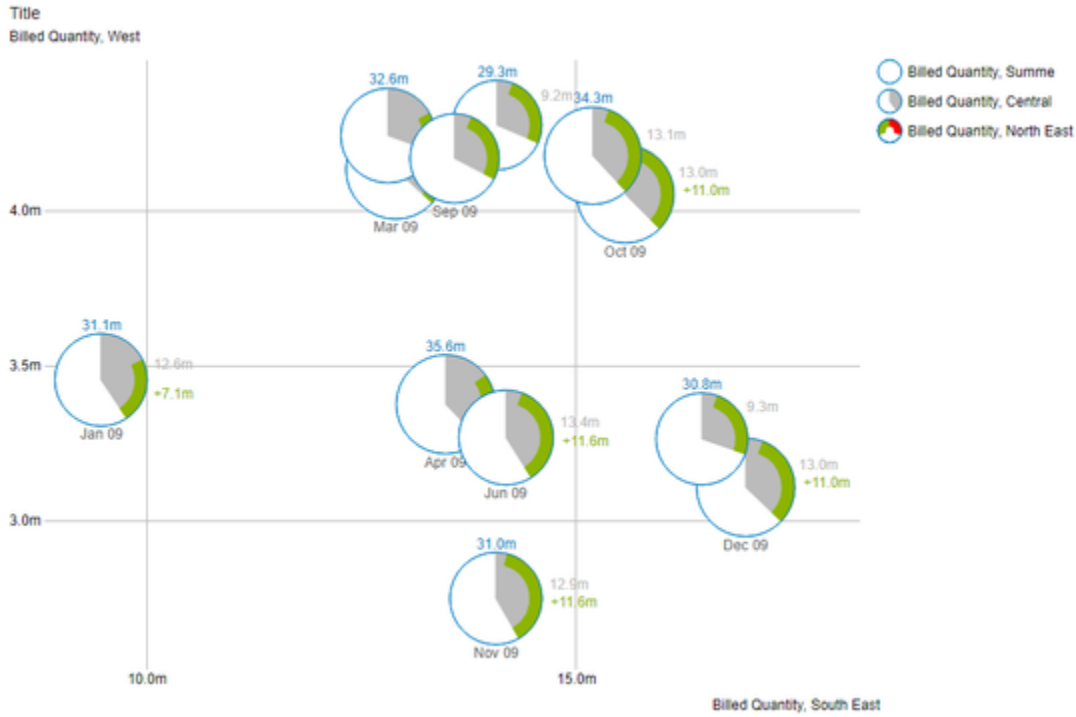
None

At runtime it is possible to select a set of bubbles in rectangular form using click&drag.

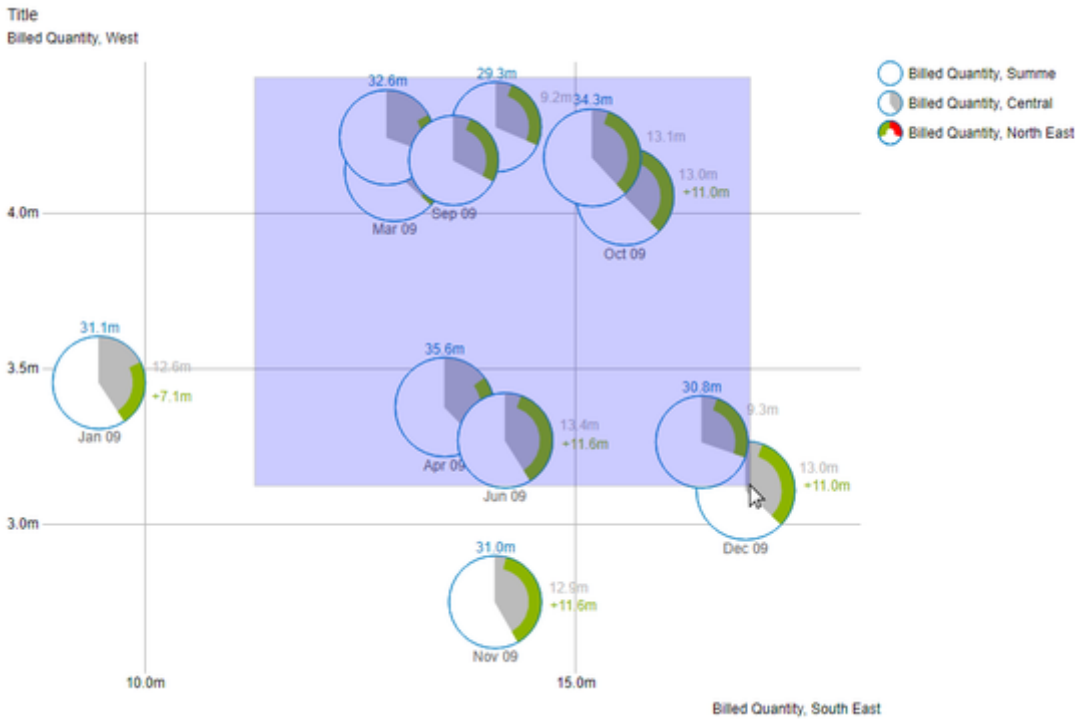


Rectengular Selection

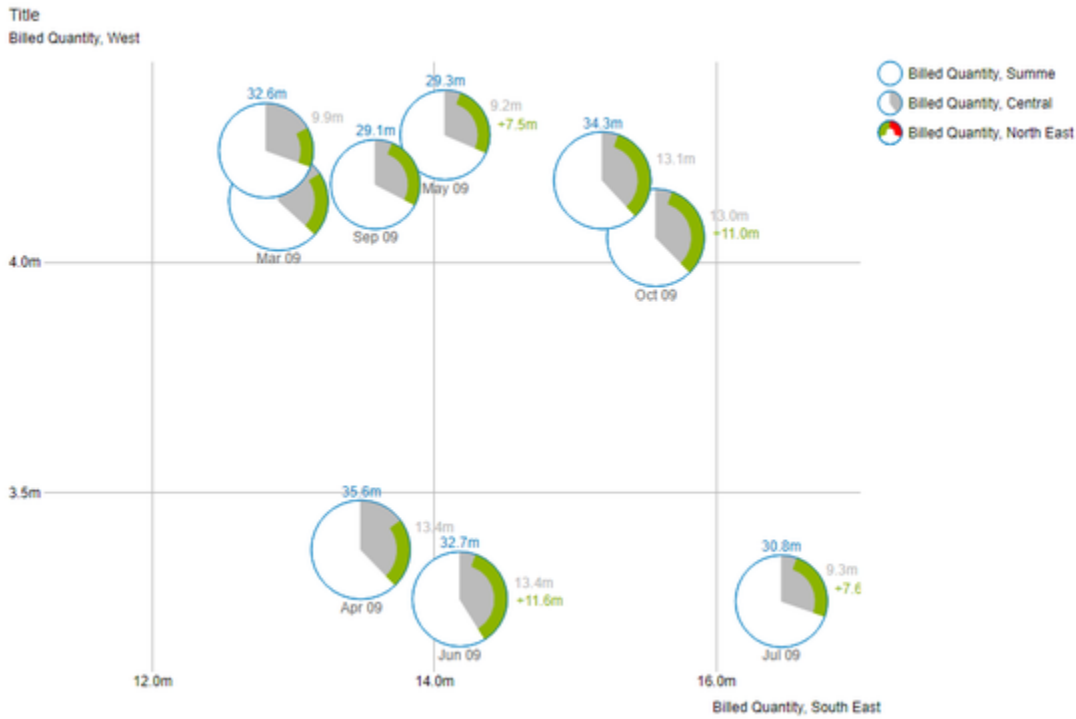
The rectangle selection behaves exactly like the **None** setting.



In addition, after the selection has been made (release the mouse button), the scaling is changed.

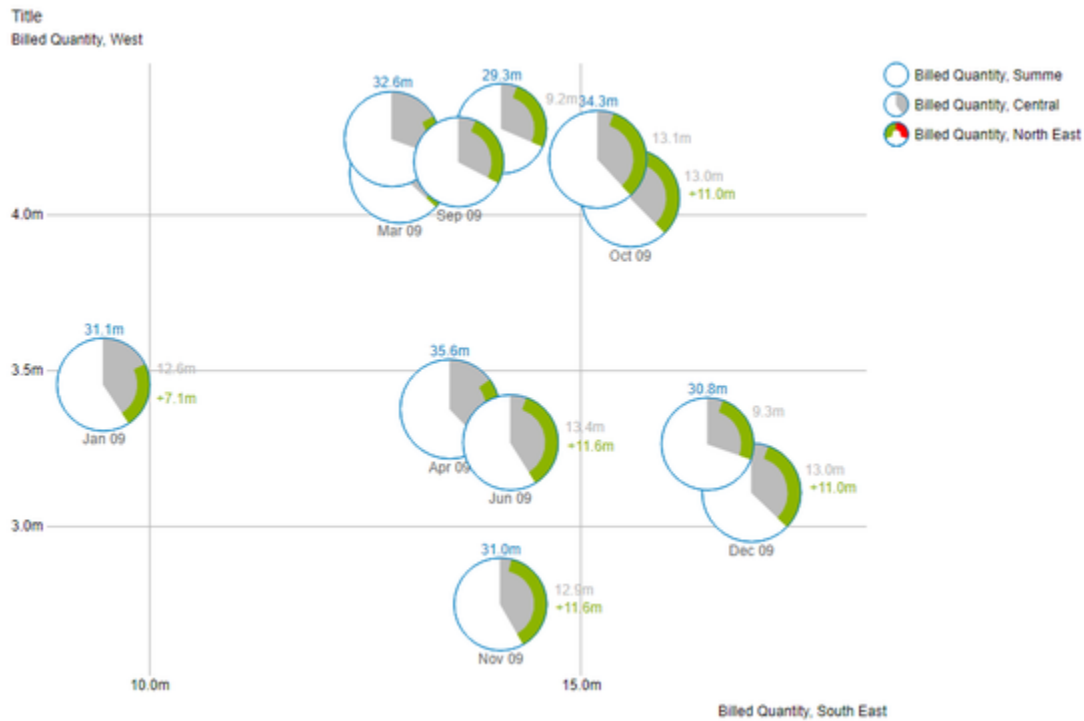


This way, only the bubbles that are located in the selected area are displayed.

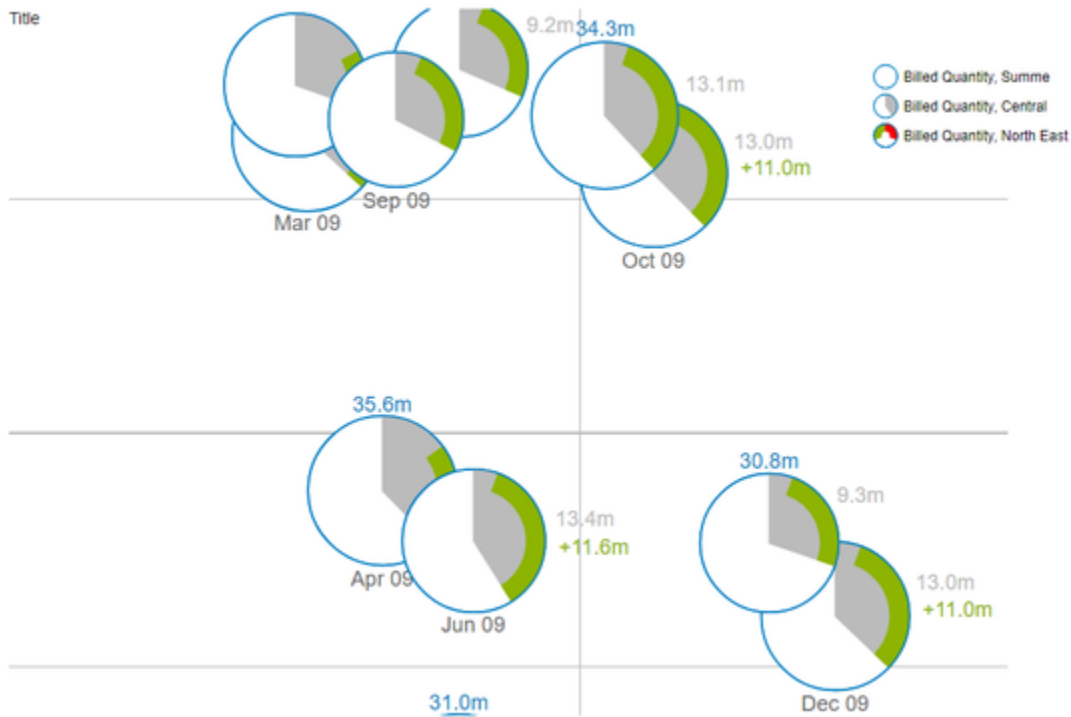


Magnification

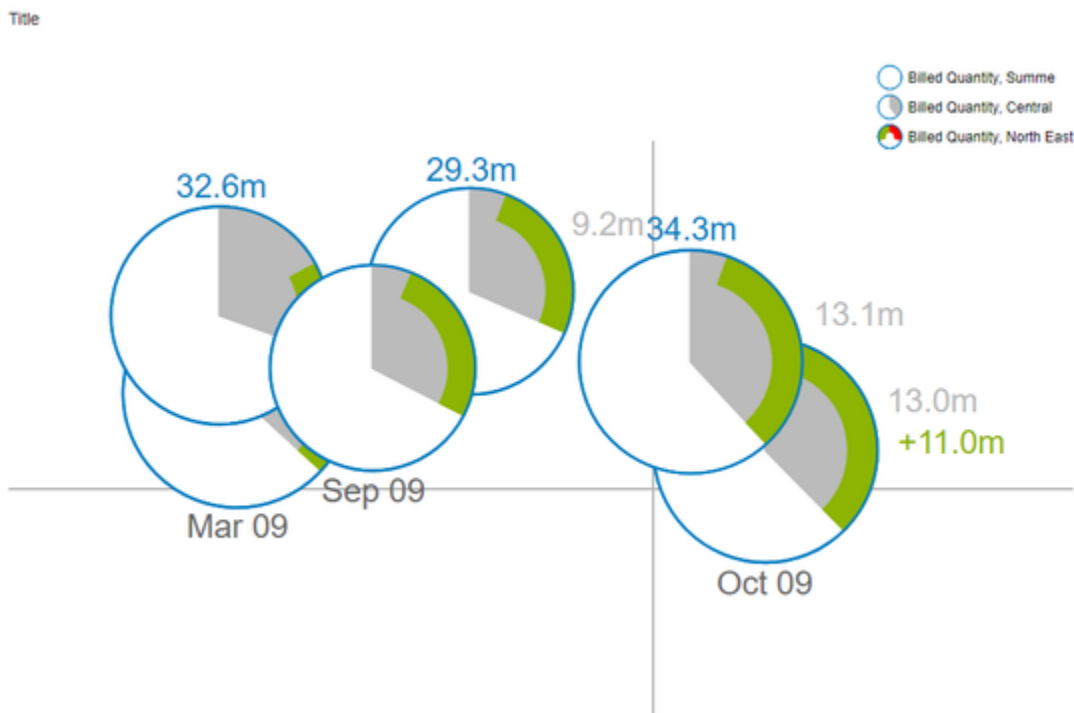
A section of the bubbles can be enlarged by means of the mouse wheel (scrolling).



The point at which the magnification is directed is determined by the position of the mouse pointer.

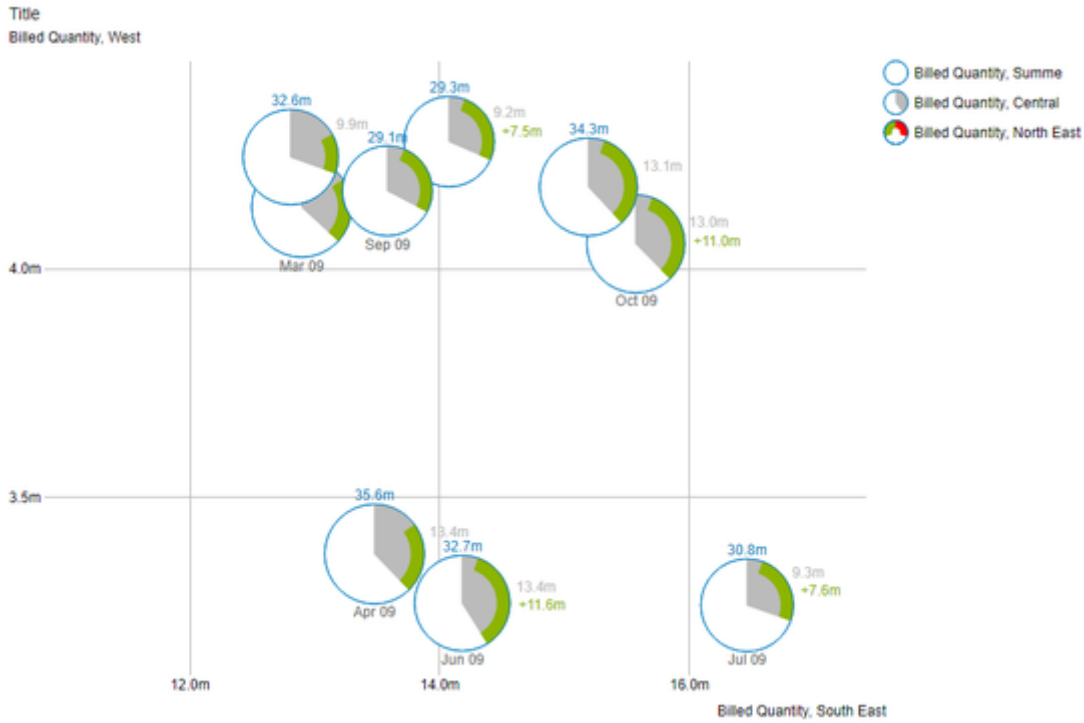


In addition, the displayed section can be moved by drag & drop



Scale Adjustment

This mode is similar in operation to the **Magnification** mode, i.e. using the mouse wheel (scrolling) and Drag&Drop. The scaling of the axes is then adjusted so that only a section of the bubbles is displayed. This section is determined by the position of the mouse pointer.



The displayed section can be moved by drag & drop.



For technical reasons, this mode is more complex and thus consumes more resources while expanding. As a result, too many bubbles lead to a delay in drawing. Internet Explorer also leads to a noticeable slowdown.

Trellis Mode

To draw a Scatter- or Bubble-Diagram Data for the X- and the Y-Axis is necessary to be set in correlation. If one or both of these measures is missing, an alternative mode will be used to draw the Bubbles. The so called *Trellis Mode*



In this mode all data points will be drawn sorted by the *Circle-Measure* from high to low in small tiles. If there are too many data points to be drawn, the smaller ones will be summarized in the *Rest* tile.

Some options and features that are usable in the normal mode are deactivated while the Bubbles are in *Trellis Mode*.

Known Issues (bubbles)

Tooltips in Power BI

- Tooltips are enabled in Power BI (Web and Desktop) on the *Visualizations pane* in the *Format pane* (color scroll icon) under "*QuickInfo*".
- The number formatting in the tooltips cannot be modified.

Known Issues (SAC)

- SAP has not yet released the data binding via the SDK of SAC, which is why a short script for data binding at runtime is required. See *Quickstart*.