



Concepts in Qlik Sense

Qlik® Sense

1.1

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1 About this document

Read and learn about the key concepts in Qlik Sense. Whether you are new to Qlik Sense or have used QlikView, the topics in the first part will help you gain a good understanding before you move on to more advanced concepts and features in the second part.

This document is derived from the online help for Qlik Sense. It is intended for those who want to read parts of the help offline or print pages easily, and does not include any additional information compared with the online help.

Please use the online help or the other documents to learn more.

The following documents are available:

- Working with Apps
- Creating Visualizations
- Discovering and Analyzing
- Loading and Modeling Data
- Data Storytelling
- Publishing Apps, Sheets and Stories
- Script Syntax and Chart Functions Guide
- Qlik Sense Desktop

You find these documents and much more at help.qlik.com.

2 The associative selection model

Making selections is the main interaction method in Qlik Sense. Selections filter out a subset of the data that is loaded into Qlik Sense. You use selections to focus on something you want to know more about. Qlik Sense responds by color coding values according to their different states.

You can think of your interaction (selections) as an input for Qlik Sense and the output as the result of Qlik Sense evaluating the selections and displaying the color codes on data values.

- The input state: the selection that you have made – whether the field value is selected or not.
- The output state: whether the field value is possible or not, given the logical inference of the selection.

2.1 Selection states

When you make selections, the colors of the values change accordingly. Color-coding is used in filter panes, selections list items, and the selections tool, with the characteristic Qlik Sense colors green, white, and gray. The colors bring you information about which field values are selected, alternative, possible and excluded, respectively.

The following table lists which colors are used for the different states.

Selected	Green, with a check mark as a selection indicator
Possible	White
Alternative	Light gray
Excluded	Dark gray
Selected excluded	Dark gray with a check mark as a selection indicator

The selected state

When you select one or more values in a filter pane and the values turn green, they are in the selected state. In the following image, the value *1910s* has been selected. The selection filters out a subset of the data that is loaded, and the filter panes *Decade* and *Year* are updated according to the selection.

Q Decade	Q Year
1910s ✓	1914
1920s	1915
1930s	1916
1940s	1917
1950s	1918
1960s	1919
1970s	1920
1980s	1921
1990s	1922

The filter panes have four states altogether. Apart from the selected state (green), there are possible values (white), light gray values (alternative), and dark gray values (excluded). These states are explained in the following sections.

The possible state

In the *Year* filter pane, the years 1914 up to 1919 are white (possible), because these values are all years from the 1910s, the selected value in *Decade*. All possible values are 'associated' with the value 1910. You could refine your selection by selecting one or more of the possible values.

Q Decade	Q Year
1910s ✓	1914
1920s	1915
1930s	1916
1940s	1917
1950s	1918
1960s	1919
1970s	1920
1980s	1921
1990s	1922

2 The associative selection model

In the following image, such a refinement has been made. The value *1918* has been selected in the *Year* filter pane.

Q Decade	Q Year
1910s ✓	1918 ✓
1920s	1914
1930s	1915
1940s	1916
1950s	1917
1960s	1919
1970s	1920
1980s	1921
1990s	1922

With selections in two filter panes, the possible values are only those that are associated both with *1910s* and *1918*. There is a logical AND condition between selections from different filter panes. A possible value must then be associated both with *1910s* and *1918*.

In the *Year* filter pane, there are no longer any values in the state possible, because none of the values are associated with both *1910s* and *1918*.

The alternative state

In the *Decade* filter pane, the value *1910s* has been selected, and all the other fields in the filter panes have a certain state, depending on their relationship to the selected value.

Q Decade	Q Year
1910s ✓	1914
1920s	1915
1930s	1916
1940s	1917
1950s	1918
1960s	1919
1970s	1920
1980s	1921
1990s	1922

All the other values in the filter pane *Decade* are light gray, meaning that they are alternative values. The alternative state is used for values that would have been possible if a selection had not already been made in that field. Before *1910s* was selected, all the values in the filter pane *Decade* were possible values.

Logically, the alternative values are excluded, but they are only excluded by a single selection (of one or more values), in the same filter pane. If you would clear the selection of *1910s* in *Decade*, all the values would have the state possible.

Even if a value is alternative, you can still select it, but that means that you are, partly, making a new selection rather than refining your original selection. What is useful with alternative values is that you know that there are alternatives available for the same set of selections. If you have a list of sales persons, the alternative values constitute sales persons that may be able to help or replace the selected person.

The excluded state

When a selection is made, values in other filter panes may automatically be excluded, because they are not associated. In the following image, *1910s* has been selected, and as a consequence the values *1920*, *1921*, and *1922* have been excluded. This is an obvious exclusion, because the years *1920*, *1921*, and *1922* are not part of the *1910s*. The other values in *Decade* are alternative, that is, they are excluded but you can still select them and thereby expand the selection. If you were to select *1920s* the value would turn green and have the state selected.

Q Decade	Q Year
1910s ✓	1914
1920s	1915
1930s	1916
1940s	1917
1950s	1918
1960s	1919
1970s	1920
1980s	1921
1990s	1922

But if you select one of the possible values in the filter pane *Year*, all the values in *Decade* that were alternative become excluded instead. When only *1910s* was selected they were alternative, but with selections in two filter panes, values that do not match the condition *1910s*AND*1918* are excluded.

The values that are alternative in *Year* are only excluded by the selection *1918*. They are all associated with the value *1910s* and had the state possible until *1918* was selected.

Q Decade	Q Year
1910s ✓	1918 ✓
1920s	1914
1930s	1915
1940s	1916
1950s	1917
1960s	1919
1970s	1920
1980s	1921
1990s	1922

The selected excluded state

When you make selections in more than one filter pane, you might run into a fifth state: selected excluded.

As mentioned previously, there are two different states for each field value:

2 The associative selection model

- The input state: the selection that you have made – whether the field value is selected or not.
- The output state: whether the field value is possible or not, given the logical inference of the selection.

A value enters the selected excluded state because the value was first selected, and then excluded by a selection in another field.

For the selected excluded state, the check mark is an indicator that the value was first selected and then excluded, in contrast to excluded values that have never been selected. A dark gray field with a check mark indicates that the value was previously a selected value, but a new selection has then rendered it selected excluded.

Example:

In the following image, the first selection was of the values *1910s* and *1920s*. The values *1910s* and *1920s* were both selected (green) and all the values in the filter pane *Year* were white (possible), since they are all years from the 1910s or 1920s and therefore logically possible values after the first selection. The second selection is of the years *1914*, *1915*, and *1916*. Now, *1920s* is no longer a part of the active selection, since the second selection logically excludes *1920s*. However, *1920s* is still a selected value and therefore it makes sense to denote it as a value that is selected excluded. It was originally selected, but a later selection excluded it. The check mark distinguishes it from the excluded values that have never been selected.

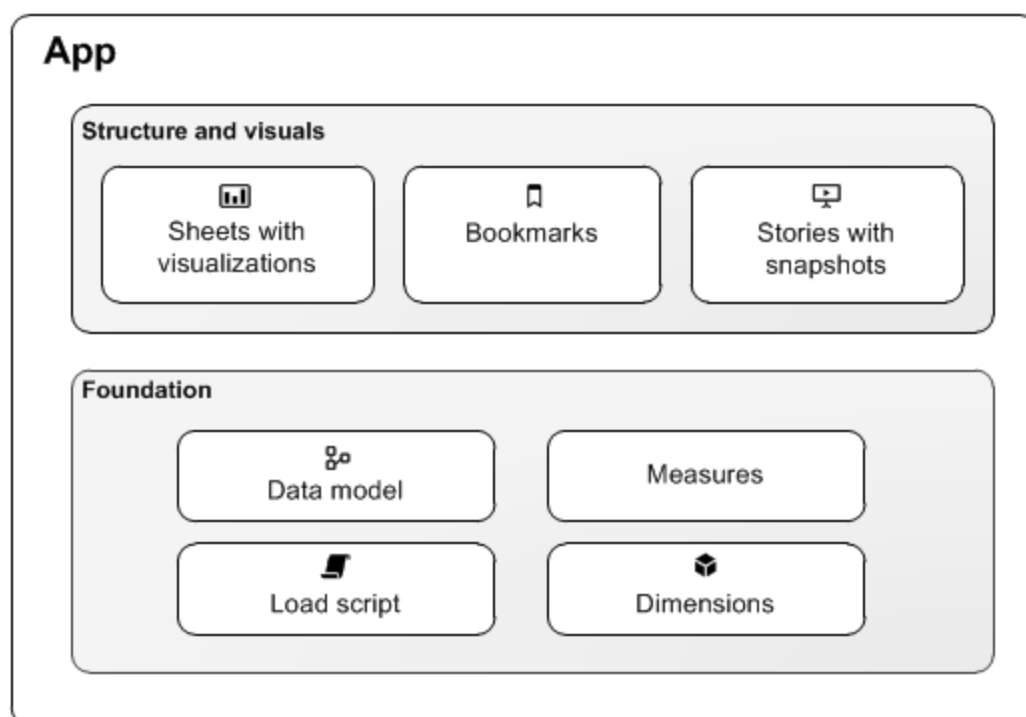
🔍 Decade	🔍 Year
1910s ✓	1914 ✓
1920s ✓	1915 ✓
1930s	1916 ✓
1940s	1917
1950s	1918
1960s	1919
1970s	1920
1980s	1921
1990s	1922

The dark gray value with a check mark is selected excluded.

3 Apps

A Qlik Sense app is a collection of reusable data items (measures, dimensions and visualizations), sheets and stories. It is a self-contained entity that includes the data to analyze in a structured data model.

The purpose of an app is to let you and others make data discoveries and decisions using data visualizations and making selections.



Building blocks of an app

3.1 Foundation

Data load script	You use a data load script to load data into the app. The script connects to a data source (database, Excel sheet, etc.) and retrieves the data.	
Data model	The loaded data is structured in a data model. You edit the data load script and reload the data to build the data model you find is best suitable for your app.	
Expressions	You can use expressions in different places in Qlik Sense. Expressions can be complex, involving functions, fields, and operators. Expressions differ from measures in that expressions have no name or descriptive data.	<i>Expressions (page 84)</i>

Measures	Measures are calculations and expressions for use in visualizations.	<i>Measures (page 71)</i>
Dimensions	Dimensions are fields for use in visualizations.	<i>Dimensions (page 68)</i> <i>Fields (page 82)</i>

3.2 Structure and visuals

Sheets	Sheets include data visualizations, such as charts and tables. You create a structure in the app by grouping visualizations with different purposes on different sheets.	<i>Sheets (page 18)</i>
Bookmarks	Bookmarks are shortcuts to a certain set of selections on a particular sheet.	<i>Bookmarks (page 76)</i>
Stories	Stories are based on snapshots of visualizations. You present your data by creating a story that guides you to new insights by combining snapshots of data at specific times and selection states.	

3.3 More about apps

The app makes it possible for people to create new visualizations based on any questions they might have, for example by using dimensions and measures that are defined in the app, thus further developing the app for personal use or to share with others.

Whoever creates an app is automatically designated as its owner. An app can be re-used, modified and shared with others, depending on access rights. Different actions can be carried out depending on if the app is published or not.



The .qvf file format is a proprietary format.

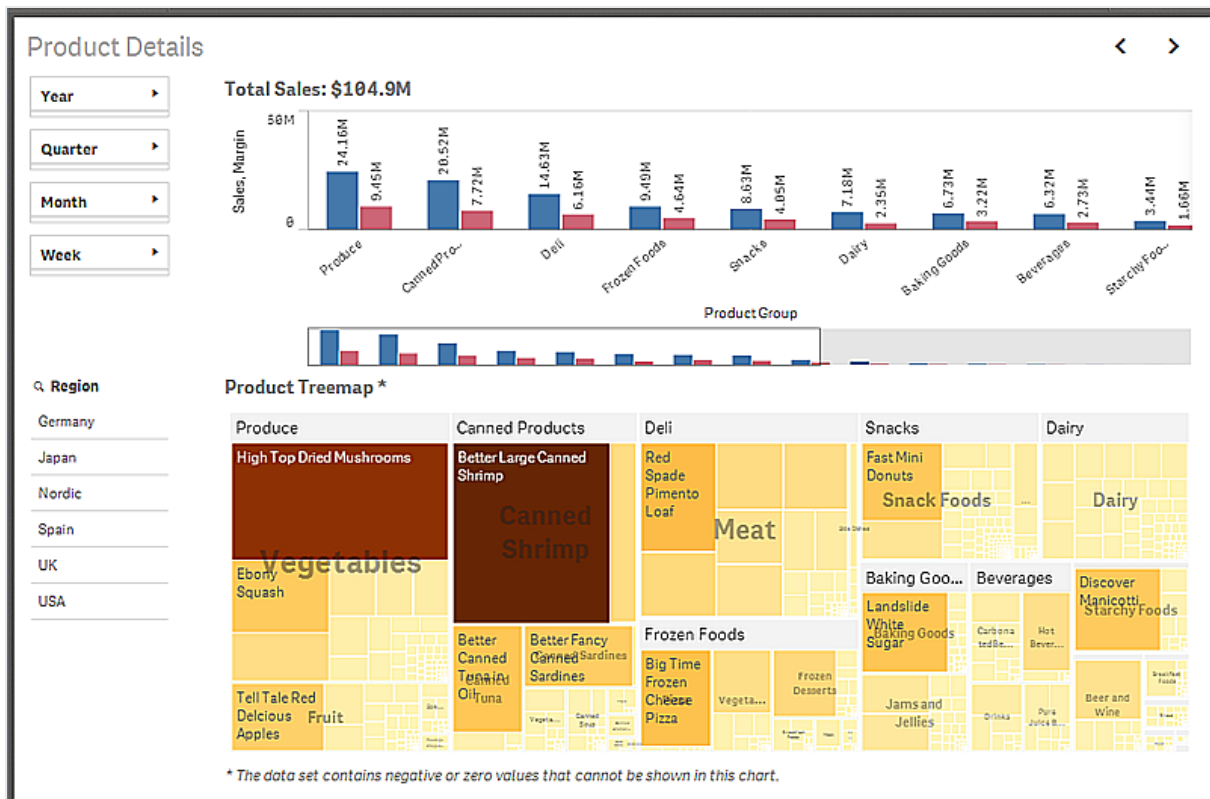


In Qlik Sense Desktop, apps are typically stored in <user>\Documents\Qlik\Sense\Apps, as <Appname>.qvf, where <Appname> is the name of the app.

4 Sheets

A sheet is where charts and tables for data visualization are placed. An app can include one or several sheets.

The sheets have no connection with the logic – the selections that you make affect visualizations regardless of which sheets they are located on.
















An example of a sheet with boxes on the left to select and filter out the data to be presented in the visualizations on the right.

5 Visualizations

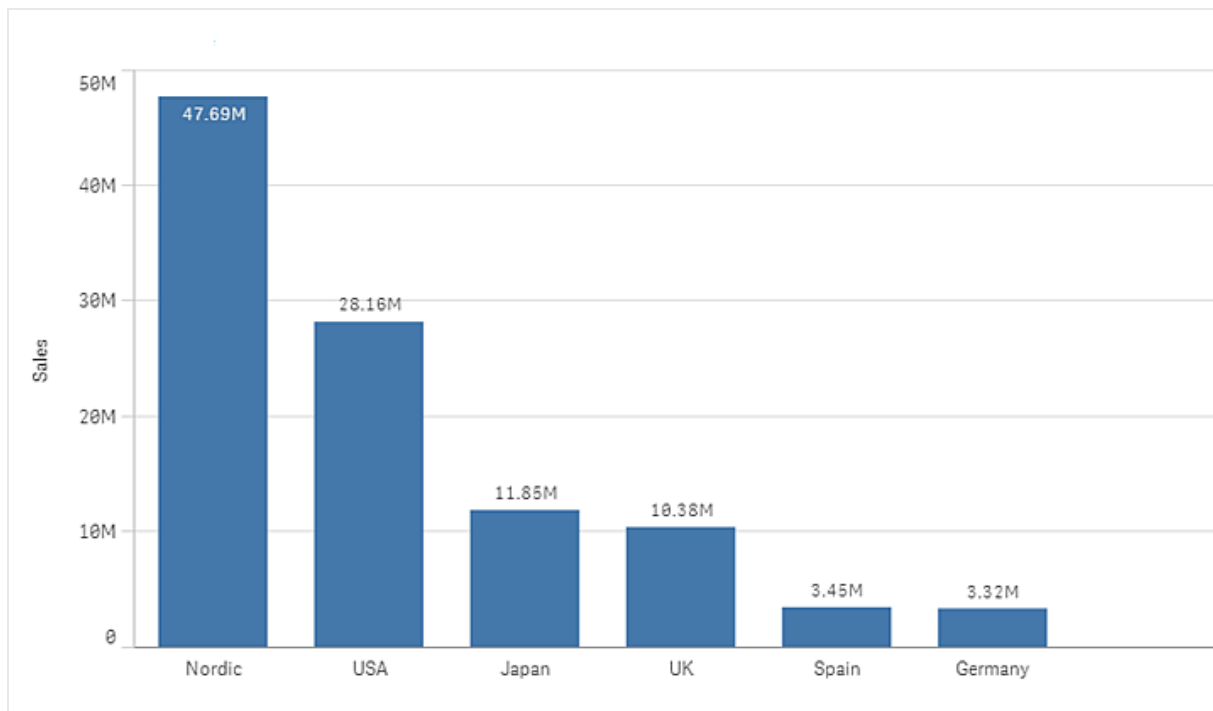
Visualizations are used to present the data that is loaded into the app. The selections you make in the app are reflected in all associated visualizations on all sheets.

Qlik Sense includes charts that you use to create visualizations. You can convert from one visualization type to another by dragging a new chart to a visualization on a sheet.

	Bar chart	The bar chart displays a bar for each dimension value. The bar length corresponds to its numerical measure value.
	Combo chart	The combo chart combines bars and lines in the same chart. The bars and lines have different axes to enable comparing percentages and sums.
	Filter pane	The filter pane allows you to control what data that is shown in the visualizations on a sheet. A filter pane can filter the data of several dimensions at once.
	Gauge	The gauge is used to display the value of a single measure, lacking dimensions.
	KPI	The KPI is used to present central performance figures.
	Line chart	The line chart displays data lines between values. Line charts are often used to visualize a trend in data over intervals of time.
	Map	The map is used to combine geographical data and measure values, such as the sales for a region or a store.
	Pie chart	The pie chart shows the relation between a single dimension and a single measure.
	Pivot table	The pivot table presents dimensions and measures as rows and columns of a table. The pivot table allows you to analyze data in multiple dimensions at a time. The data in a pivot table may be grouped based on a combination of the dimensions, and partial sums can be shown.
	Scatter plot	The scatter plot presents values from two measures. This is useful when you want to show data where each instance has two numbers, for example, country (population and population growth). An optional third measure can be used and is reflected in the size of the bubbles.
	Table	The table displays values in record form, so that each row of the table contains fields calculated using measures. Typically, a table includes one dimension and multiple measures.
	Text & image	You can use the text & image visualization to add text, images, measures and links to a sheet.
	Treemap	The treemap shows hierarchical data. A treemap can show a large number of values simultaneously within a limited space.

5.1 Bar chart

The bar chart is suitable for comparing multiple values. The dimension axis shows the category items that are compared, and the measure axis shows the value for each category item. In the image, the dimension values are different regions: Nordic, USA, Japan, UK, Spain, and Germany. Each region represents a dimension value, and has a corresponding bar. The bar height corresponds to the measure value (sales) for the different regions.



You can make more complex comparisons of data by using grouped or stacked bars. With grouped bars, you can easily compare two or more items in the same categorical group. Stacked bars combine bars of different groups on top of each other and the total height of the resulting bar represents the combined result.

The bar chart can be displayed horizontally or vertically.

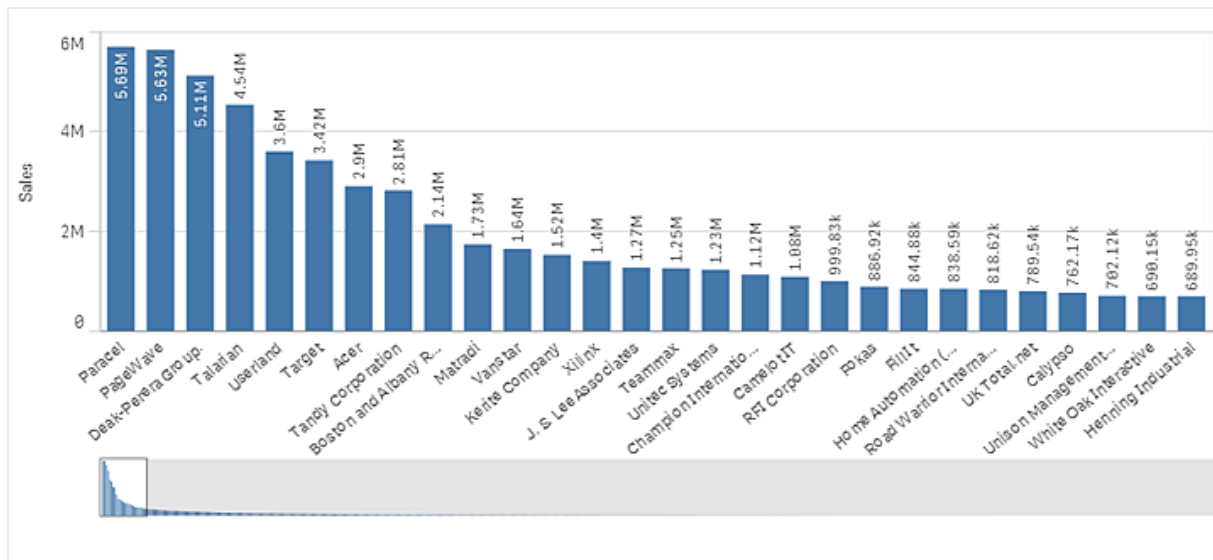
Number of dimensions and measures

In a bar chart you need at least one dimension and one measure. The following table shows the maximum limits.

When using	Max limit
1 dimension	15 measures
2 dimensions	1 measure
1 measure	2 dimensions
2 -15 measures	1 dimension

Scrolling and mini chart

When the number of dimension values exceeds the width of the visualization, a mini chart with a scroll bar is displayed. You can scroll by using the scroll bar in the mini chart, or, depending on your device, by using the scroll wheel or by swiping with two fingers. When a large number of values are used, the mini chart no longer displays all the values. Instead, a condensed version of the mini chart (with the items in gray) displays an overview of the values, but the very low and the very high values are still visible.



Bar chart with mini chart

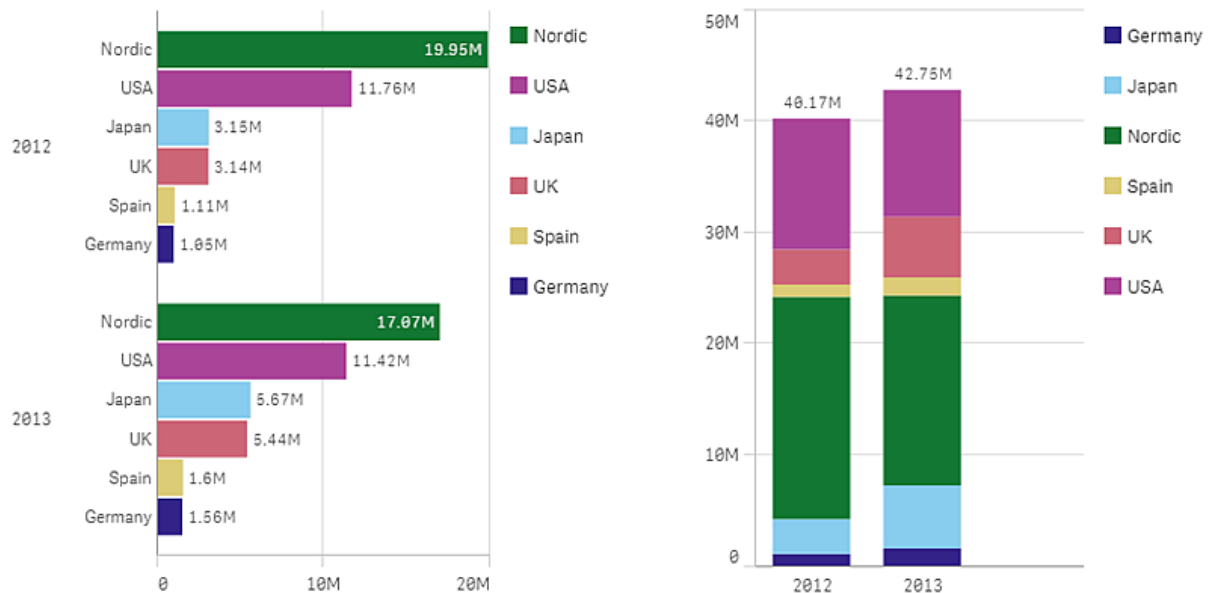
Out of range

In the properties panel, under **Appearance**, you can set a limit for the measure axis range. Without a limit, the range is automatically set to include the highest positive and lowest negative value, but if you set a limit you may have values that exceed that limit. A bar that exceeds the limit will be cut diagonally to show that it is out of range.

When a bar cannot be displayed, due to the range limits, an arrow indicates the direction of the value.

When a reference line is out of range, an arrow is displayed together with the number of reference lines that are out of range.

When to use a bar chart



Sales per region and year visualized in a bar chart with horizontal, grouped bars and a bar chart with vertical, stacked bars

Description

You can include two dimensions and one measure, or one dimension and multiple measures in a bar chart. Each bar corresponds to a dimension, and the values of the measures determine the height/length of the bars.

When to use it

Grouping and stacking bars makes it easy to visualize grouped data. The bar chart is also useful when you want to compare values side by side, for example sales compared to forecast for different years, and when the measures (in this case sales and forecast) are calculated using the same unit.

Advantages

The bar chart is easy to read and understand. You get a good overview of values when using bar charts.

Disadvantages

The bar chart does not work so well with many dimension values due to the limitation of the axis length. If the dimensions do not fit, you can scroll using the scroll bar, but then you might not get the full picture.


Selections in bar charts

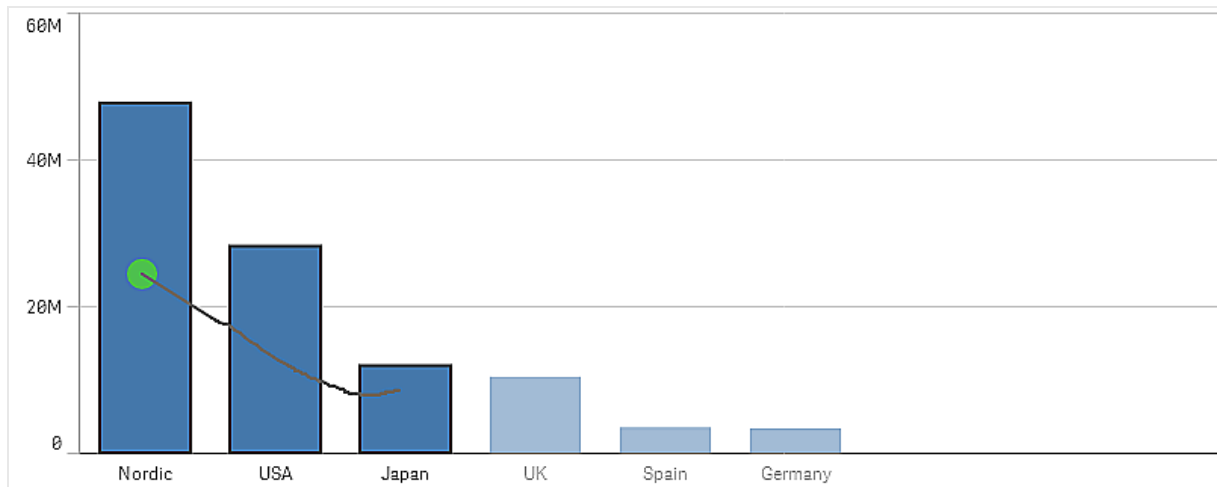
When you analyze your data, you have different ways of making selections. In a bar chart you can either use click selection, draw selection, legend selection, lasso selection, range selection, or label selection. To confirm a selection, click ✓ or outside the visualization. You can also press Enter. To cancel, click ✕ or press Esc.

Click selection


You can select bars by clicking them, one at a time. To deselect a bar, click it.

Draw selection

You can draw one or more lines in the chart to select bars. All bars that are touched by a line are selected, all other bars are dimmed. To deselect a bar, click it. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.



Lasso selection

In lasso selection, you can draw a lasso freehand to enclose an area. You must close the area properly by returning to the starting point of your selection. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

Range selection

In range selection, you can make selections either on the x-axis or the y-axis, one at a time. Select a starting point along the axis, just outside the chart area, and drag to make a selection. As soon as you start dragging, a starting point line is displayed, as well as an end point line that shows the selection. You can adjust your selection by dragging the lines, the value boxes, or the green selection area.

Label selection

You can click the dimension labels to make selections. When dimensions are grouped or stacked, the whole group or stack is selected.

Legend selection

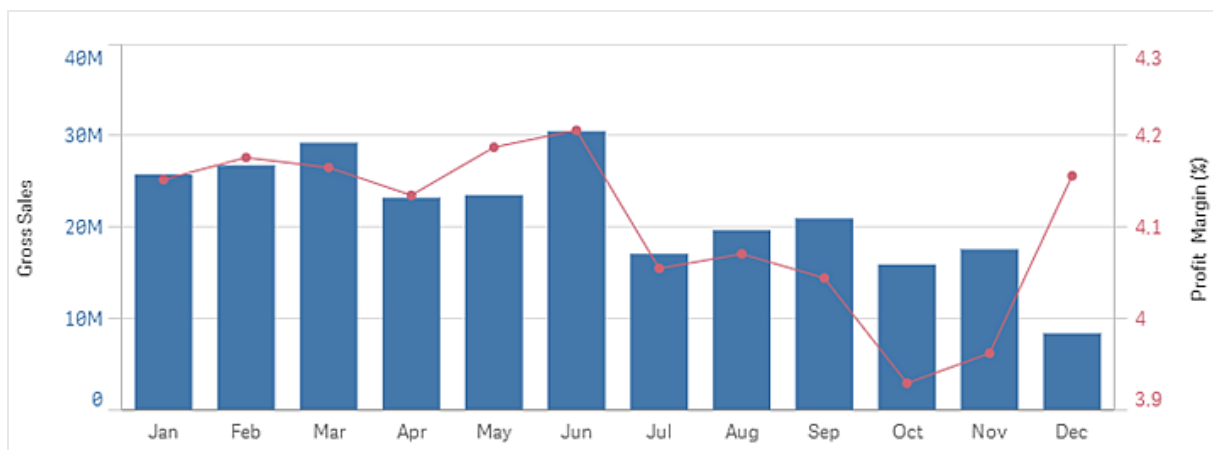
There are two legend types: box legend, with one legend item per dimension value, and range legend, with a gradient scale, where all measure values are represented. In the box legend, you select and deselect the items one at a time by clicking them. In the range legend, you drag from a starting point to an end point to enclose an area. You cannot deselect a certain item, but you can change the range.

When you have a bar chart with two dimensions and one measure (either grouped or stacked), the selection is by value and not by group or by stack. This means that only parts of a group or stack are selected.

When you have a bar chart with one dimension and two measures (either grouped or stacked), selections cannot be made.

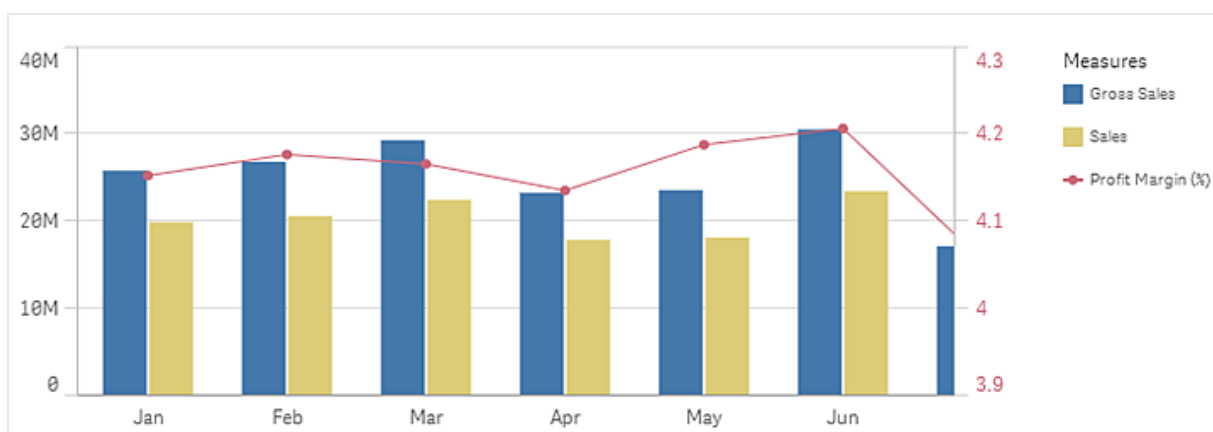
5.2 Combo chart

The combo chart is suitable for comparing two sets of measure values that are usually hard to compare because of the differences in scale. A typical example is when you have a bar chart with sales figures and want to combine these figures with the margin values (in percent). In a regular bar chart, the bars for sales would be displayed as usual, but the margin values would be almost invisible because of the very large difference between the numeric values for sales and margin.



With a combo chart you can combine these values by, for example, using bars for the sales values and a line for the margin values. By default, the bars have the measure axis on the left and the margin values have a separate axis to the right. The two measures use the same dimension (month).

If you have yet another measure, for example, gross sales, with values that are roughly in the same range as the sales values, you can add the third measure as bars and either stack or group the new measure values with the sales values. With grouped bars, you can easily compare two or more items in the same categorical group. Stacked bars combine bars of different groups on top of each other and the total height of the resulting bar represents the combined result.



Combo chart with three measures

The combo chart can only be displayed vertically.

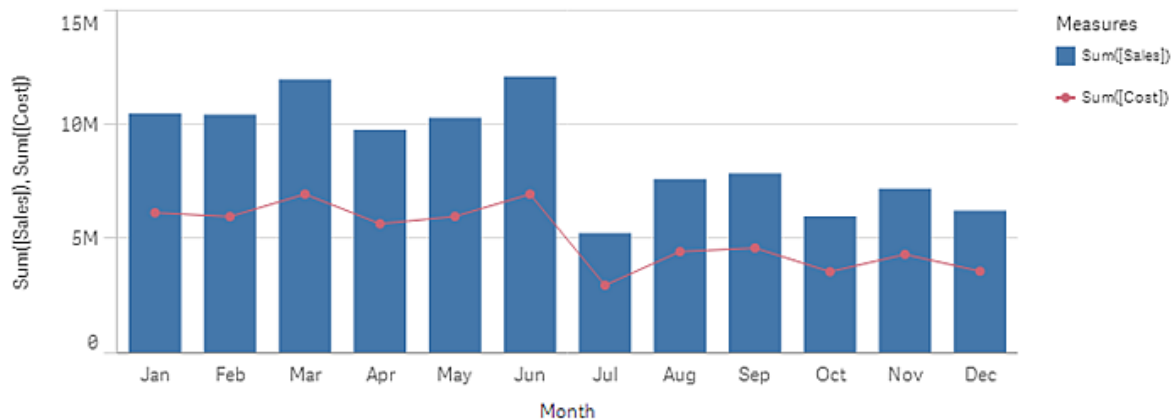
Number of dimensions and measures

In a combo chart, you need at least one dimension and one measure. You can only have one dimension but up to 15 measures.

Out of range

In the properties panel, under **Appearance**, you can set a limit for the measure axis range. Without a limit, the range is automatically set to include the highest positive and lowest negative value, but if you set a limit you may have values that exceed that limit. A bar that exceeds the limit will be cut diagonally to show that it is out of range. For a line data point value that is out of range, an arrow indicates the direction of the value.

When to use a combo chart



Sales (blue bars) compared to Cost (red line)

Description

The combo chart combines the features of the bar chart and the line chart. You can use bars and lines to represent different categorical groups in the same visualization.

When to use it

With the possibility to have different measure scales, one to the left and one to the right, the combo chart is ideal when you want to present measure values that are normally hard to combine because of the significant difference in value ranges.

But a combo chart can also be quite useful when comparing values of the same value range. In the image above, the combo chart only has one measure axis, but the relationship between the two categories sales and cost is clear.

Advantages

The combo chart is the best choice when combining several measures of different value ranges.

Disadvantages

The combo chart only supports one dimension, and can therefore not be used when you need to include two or more dimensions in the visualization.

Selections in combo charts


When you analyze your data, you have different ways of making selections. In a combo chart, you can use: click selection, draw selection, lasso selection, range selection, label selection, or legend selection. To confirm a selection, click ✓ or outside the visualization. You can also press Enter. To cancel, click ✕ or press Esc.

Click selection

You can select bars or data points on lines by clicking them, one at a time. To deselect a bar or data point, click it.


Draw selection

You can draw one or more lines in the chart to select bars and data points on lines. All bars and data points that are touched by a line are selected, all other bars and data points are dimmed. To deselect a bar or data point, click it.

When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

Lasso selection

In lasso selection, you can draw a lasso freehand to enclose an area. You must close the area properly by returning to the starting point of your selection.

When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

Range selection

In range selection, you can make selections either on the x-axis or the y-axis, one at a time. Select a starting point along the axis, just outside the chart area, and drag to make a selection. As soon as you start dragging, a starting point line is displayed, as well as an end point line that shows the selection. You can adjust your selection by dragging the lines, the value boxes, or the green selection area.

Label selection

You can click the dimension labels to make selections. When dimensions are grouped or stacked, the whole group or stack is selected.

Legend selection

There are two legend types: box legend, with one legend item per dimension value, and range legend, with a gradient scale, where all measure values are represented. In the box legend, you select and deselect the items one at a time by clicking them. In the range legend, you drag from a starting point to an end point to

enclose an area. You cannot deselect a certain item, but you can change the range.

When you have a combo chart with one dimension and two measures (either grouped or stacked), selections cannot be made.

5.3 Filter pane

You can add a filter pane to control what data that is shown in the visualizations on a sheet. A filter pane can filter the data of several dimensions at once. For example, if you have a chart of sales over time, you can use a filter pane to limit the data in the chart to only show sales from a selected time period, from certain product categories, and from a certain region.



When a dimension is added, it is placed to the right of the previous dimensions, or below, depending on the available space. As long as there is space enough, the dimensions are displayed as expanded lists, then the dimensions that were added first are turned into filter panes.

Number of dimensions

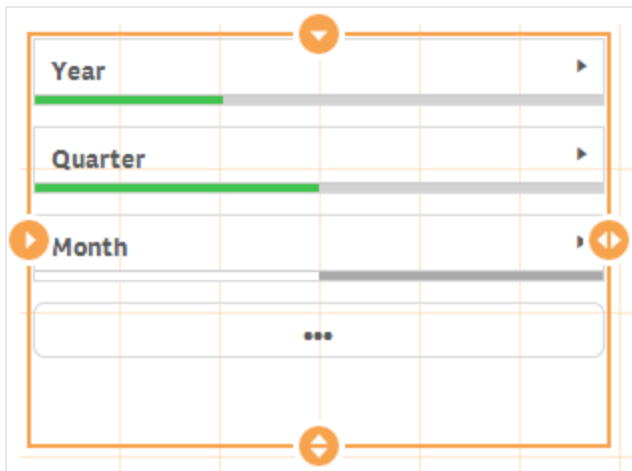
In a filter pane you can have a large number of dimensions on a sheet, and before you reach the theoretical maximum, you will have reached the limit for what is manageable on a sheet.

Responsive design

The filter pane has a responsive design and renders as many dimensions as possible. When space is limited, this could involve reducing the size of each dimension so that all dimensions are displayed.

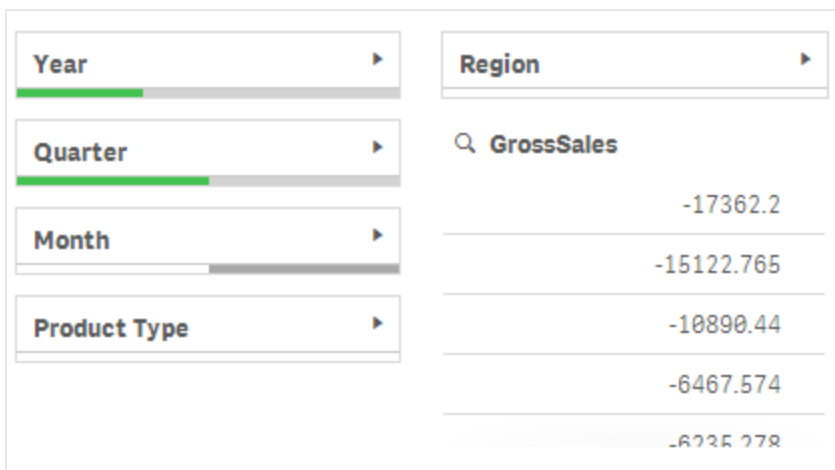
Example:

The following image shows a filter pane while it is being edited. Only two out of five dimensions are displayed. The other dimensions are replaced by a button with an ellipsis (...), indicating that there are more dimensions that are not displayed. You can click the button to open the filter pane in full screen view.



Six dimensions as displayed when editing the filter pane

But when you have finished editing, you will see the filter pane with all dimensions displayed, although the space is unchanged.



Six dimensions as displayed when analyzing data


If all items cannot be shown, the ellipsis box is displayed to indicate that there are more dimensions.

Full screen view


In full screen view, the filter pane is maximized and displays as many dimensions as possible expanded. When not all dimensions can be displayed expanded, the priority order is that the most recently added dimensions are expanded to the right. You can change the priority order in the properties panel, under **Dimensions**. Drag the dimensions to change the order.

Full screen view on a touch device

Do the following:

1. Long-touch the visualization.
The touch item menu is displayed.
2. Tap .


The visualization is displayed in full screen.

Close the full screen view and return to the sheet view by clicking .


Full screen view on a computer (mouse interaction)

By default the full screen icon is hidden.

Do the following:


1. Hover over the visualization that you want to expand.
2. Click  at the top right of the visualization.

The visualization is displayed in full screen.

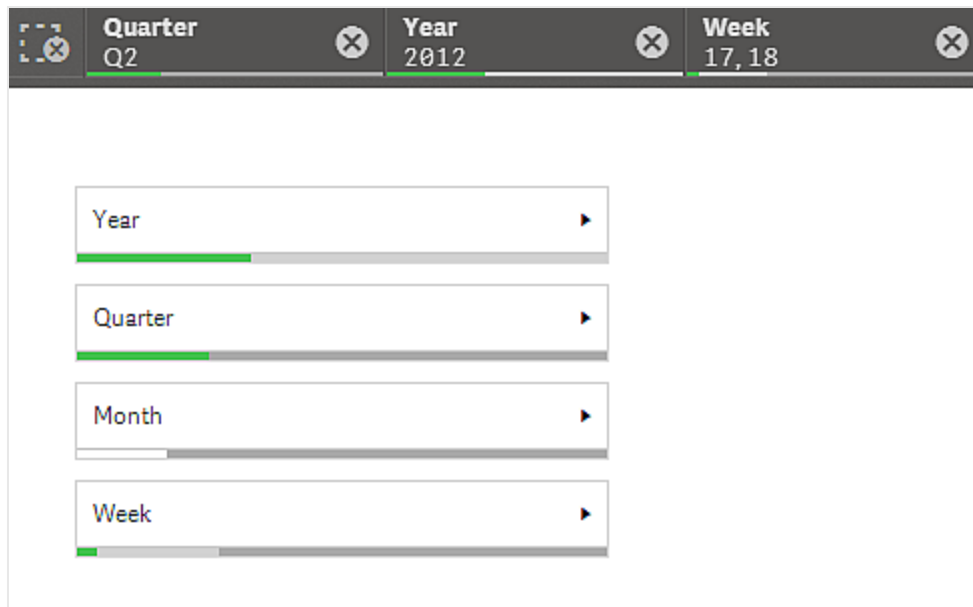
Close the full screen view and return to the sheet view by clicking .

The selections tool

The selections tool offers an option to get an overview of the fields and dimensions in an app. In the selections tool you can make selections in all the fields and dimensions in the app, regardless of whether they are used in the app or not.

During analysis, the selections tool is available to the right in the selections bar. Click  to open the selections tool.

When to use a filter pane



Selections have been made in the dimensions Year, Quarter, and Week

Description

The filter pane helps you control what data that is reflected in the visualizations on a sheet.

When to use it

With filter panes, you can easily make several selections to define your data set exactly like you want it. With your well-defined data set, you can explore data of particular interest.

By using the selection menu options in the filter panes (select possible, select alternative, and select excluded), you can make adjustments to the data set and compare the results with the previous selection.

Advantages

Filter panes are good for making selections and defining data sets. But they also show the relationship between different values, the associations. The green, white, and gray colors reflect the data associations that exist - and that do not exist. And by analyzing those associations, you can make new discoveries, for example, that a sales representative has too many customers, or that a region lacks a sales representative.

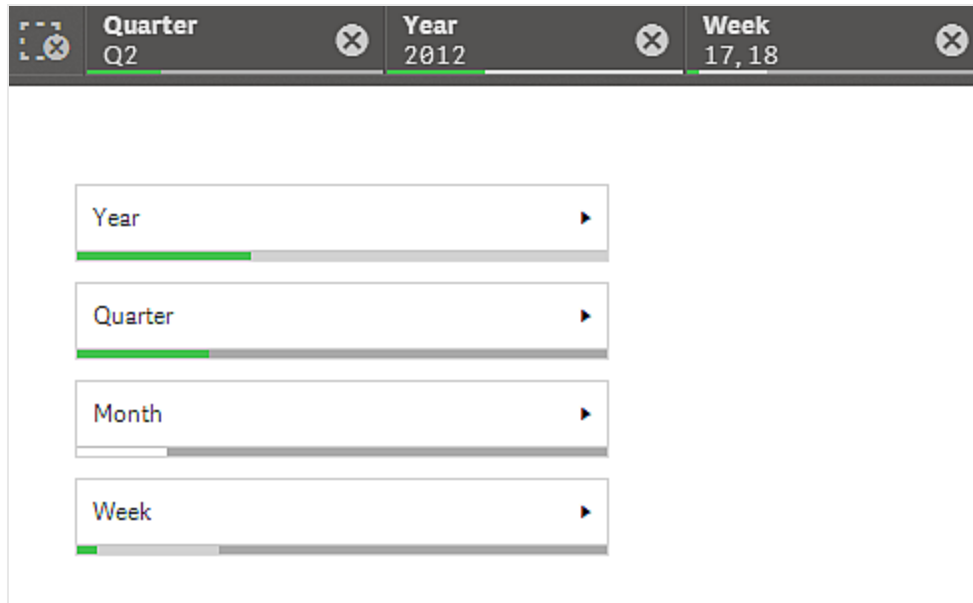
Disadvantages

When the dimensions contain a very large amount of values, it may be harder to manage the data.

Selections in filter panes

During analysis you click a compressed filter pane dimension to open a selection list.

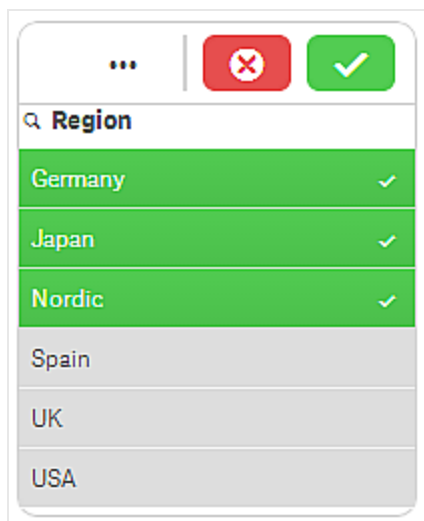
When you make a selection, it is reflected in the small bars at the bottom of each filter pane dimension. Four states can be displayed in the bars: selected (green), possible (white), alternative (light gray), and excluded (dark gray). Locked values are indicated by a lock icon. The details of the selections are displayed in the selections bar, above the sheet. You can click an item to see the details and change your selection.



Fields are filtered out from each dimension to be shown in the visualizations on the sheet.

Making selections in filter pane lists

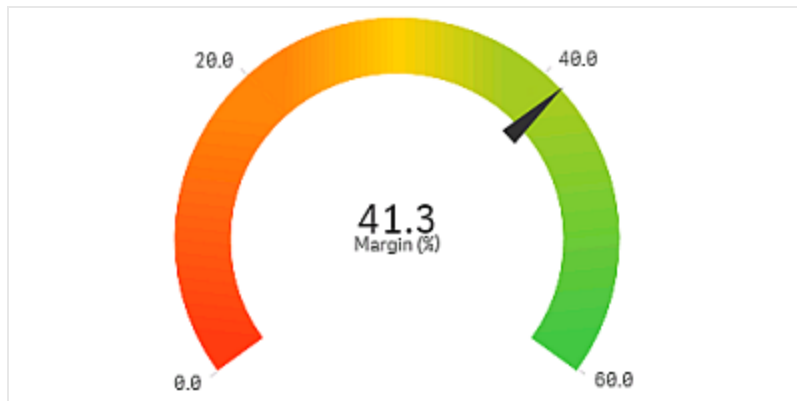
When there is space enough in a filter pane, the dimension values are displayed in a list. In lists, you can click to select a single value or draw to select several values. On a touch device, you can two-finger-tap in the list to select a range of values.



Filter pane with expanded list

5.4 Gauge

The gauge is designed to show a single measure value and visualize how to interpret that value.



Default settings for a gauge

The following settings are used by default in a gauge:

- A radial gauge.
- A single (blue) color.
- Range limits: min (0), max (100).
- No segments.
- Label and title are displayed.

You can change the radial gauge to a bar.

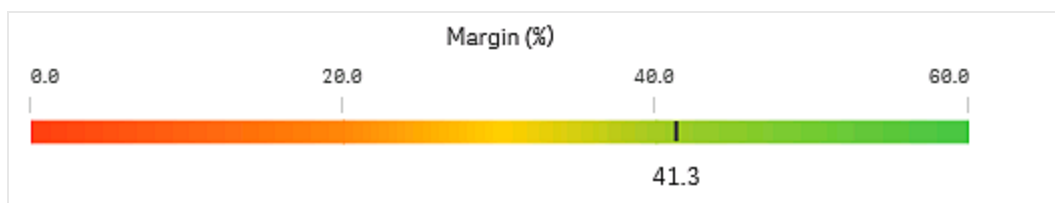
With segments, another color is introduced. You can set the color for each segment.

You can use expressions for the range limits. When a measure value is outside the range limits, an arrow indicates whether the measure value is higher or lower than the range values.

Number of dimensions and measures

In a gauge you can only have one measure and no dimensions.

When to use a gauge



Description

The gauge displays the value of a single measure.

When to use it

The gauge is often used to present KPIs, for example, on an executive dashboard, and together with segmenting and color coding, it is an effective way of illustrating a performance result.

It is important to set relevant max and min values to support the interpretation of the value. You can use a reference line to provide additional context.

Advantages

A gauge is easy to read and understand and gives an instant indication of the performance within an area.

Disadvantages

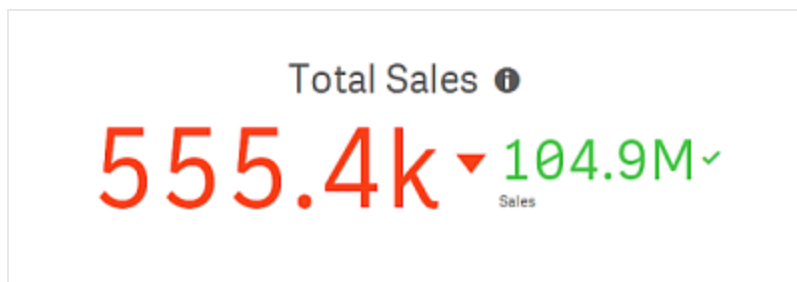
The gauge is quite space-demanding in relation to the single value it visualizes.

Although visually compelling, the gauge is not always the best choice for presenting a single measure value. Problems when deciding the max and min values can indicate that some other visualization should be used.

If you only want to show a performance value, without a gauge, consider using a KPI instead.

5.5 KPI

The KPI shows one or two measure values, and is used to track performance.



Default settings for a KPI

The following settings are used by default in a KPI:

- Centered alignment.
- Black text color.
- Medium font size.
- No titles.
- Measure label displayed.
- Conditional colors off.
- No link to sheet.

Conditional colors


With conditional colors, you get the following additional options:

- Set range limits.
- Add limits to create subsections with different colors to indicate performance, for example, good (green), below expectations (yellow), or critical (red).
- Add glyphs to the values.
- Use gradient coloring between color sections.

You can use expressions for the limits.

Link to sheet

You can link from the KPI visualization to a sheet in the app. When making data analysis and clicking the visualization, you can click a second time to go to a predefined sheet. The sheet is opened in a new tab.

When hovering over , the name of the sheet is displayed. The icon is only displayed when **Show title** is selected, under **Presentation**.

Number of dimensions and measures

In a KPI, you can have one or two measures and no dimensions.

With two measures, the second value automatically becomes a complementary value with smaller font size.

When to use a KPI

Description

Key performance indicators (KPIs) are used to evaluate the performance in a company or an organization. The KPIs show to what extent a number of goals have been reached. Different organizations have different goals, and it is important that the goals are well defined so that they are valid and reliable.

When to use it

Use KPIs to get an overview of performance values that are central to an organization. Use color coding and glyphs to indicate how the figures relate to the expected results.

Advantages

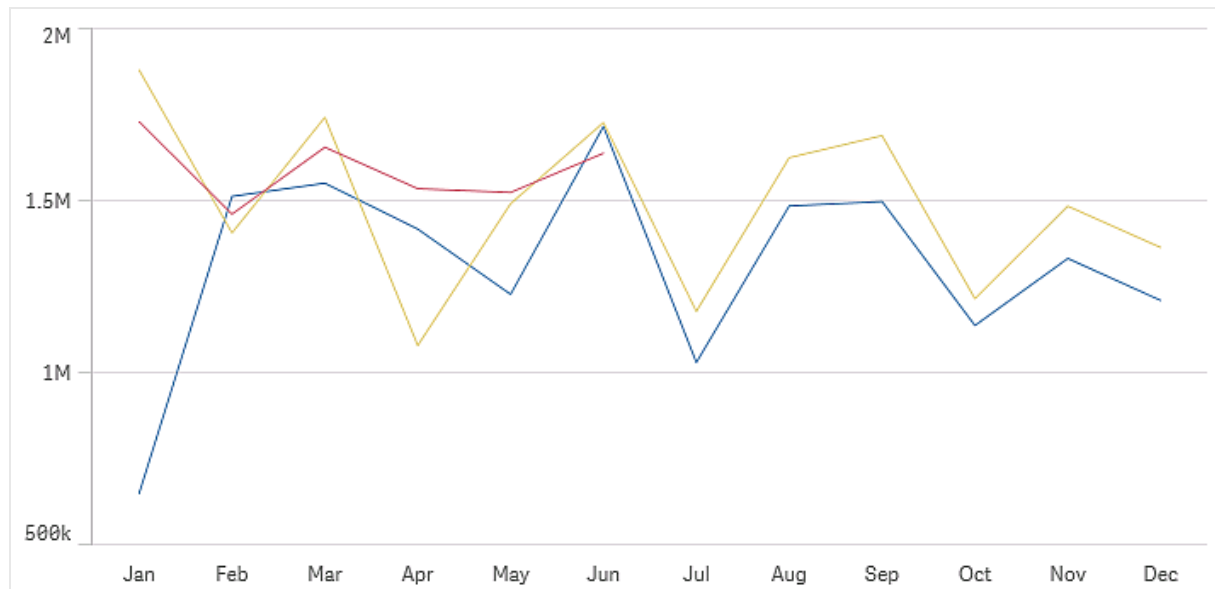
KPIs give a quick understanding of the performance within an area.

Disadvantages

The KPI is somewhat limited when it comes to graphical components. You can use the glyph to illustrate the performance, but if you want a more conspicuous component, consider using a gauge.

5.6 Line chart

The line chart is used to show trends over time. The dimension is always on the x-axis, and the measures are always on the y-axis. The orientation cannot be changed to vertical.



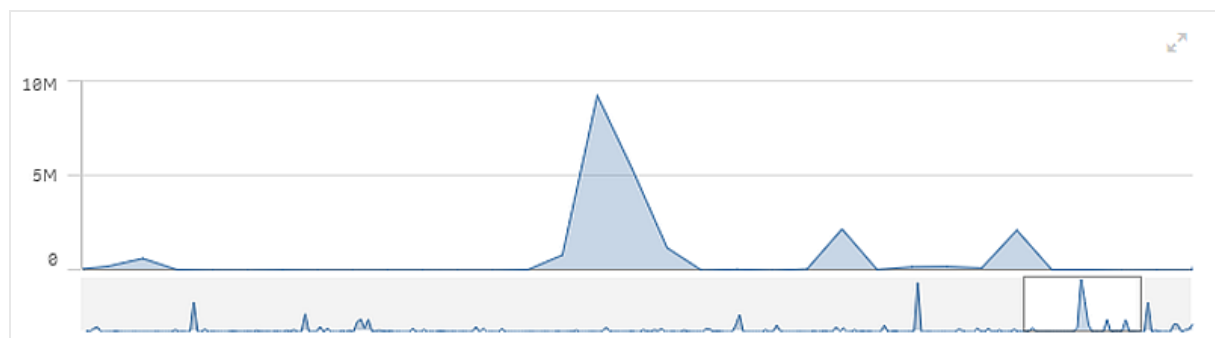
Number of measures and dimensions

In a line chart you need at least one dimension and one measure. The following table shows the maximum limits. When using more than three measures the chart may be difficult to interpret.

When using	Max limit
1 dimension	15 measures
2 dimensions	1 measure
1 measure	2 dimensions
2 -15 measures	1 dimension

Scrolling and mini chart

When the number of dimension values exceeds the width of the visualization, a mini chart with a scroll bar is displayed. You can scroll by using the scroll bar in the mini chart, or, depending on your device, by using the scroll wheel or by swiping with two fingers. When a large number of values are used, the mini chart no longer displays all the values. Instead, a condensed version of the mini chart (with the items in gray) displays an overview of the values, but the very low and the very high values are still visible.



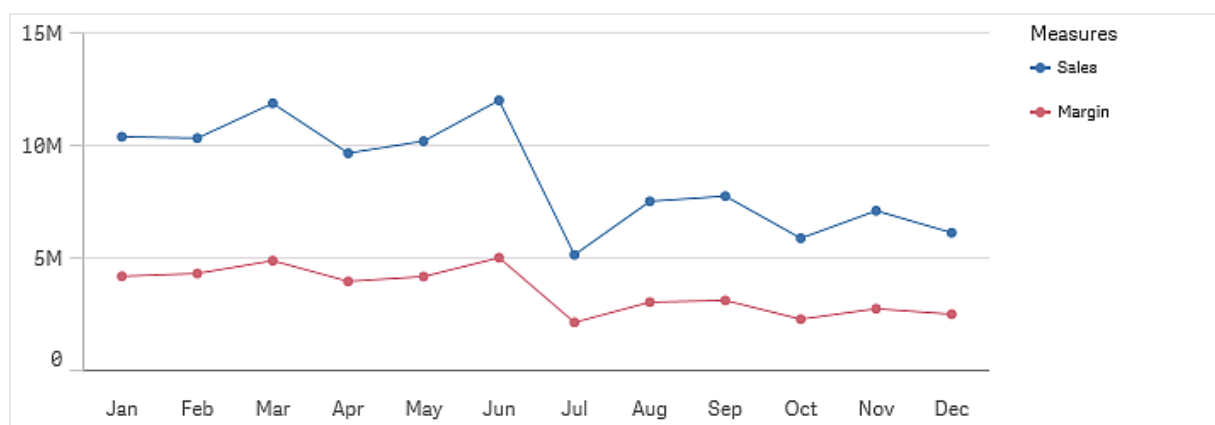
Line chart with mini chart

Out of range

In the properties panel, under **Appearance**, you can set a limit for the measure axis range. Without a limit, the range is automatically set to include the highest positive and lowest negative value, but if you set a limit you may have values that exceed that limit. When a data point value cannot be displayed, due to the range limits, an arrow indicates the direction of the value.

When a reference line is out of range, an arrow is displayed together with the number of reference lines that are out of range.

When to use a line chart



Line chart that shows trends for the measures sales and margin on a monthly basis

Description

You can include one dimension and several measures in a line chart.

Data can be presented in different ways in a line chart: as lines, as an area, or as a stacked area, when you have more than one measure.

When to use it

The line chart is primarily suitable when you want to visualize trends and movements over time, where the dimension values are evenly spaced, such as months, quarters, or fiscal years.

Your data set must consist of at least two data points to draw a line. A data set with a single value is displayed as a point.

If, you have a data set where data is missing for a certain month, you have the following options for showing the missing values:

- As gaps
- As connections
- As zeros

When a month is not present at all in the data source, it is also excluded from the presentation.

Advantages

The line chart is easy to understand and gives an instant perception of trends.

Disadvantages

Using more than a few lines in a line chart makes the line chart cluttered and hard to interpret. For this reason, avoid using more than two or three measures.

Selections in line charts

When you analyze your data, you have different ways of making selections. In a line chart you can either use range selection, lasso selection, draw selection, click, or legend selection. To confirm a selection, click ✓ or outside the visualization. You can also press Enter. To cancel, click ✕ or press Esc.

Range selection

In range selection, you can make selections either on the x-axis or the y-axis, one at a time. Select a starting point along the axis, just outside the chart area, and drag to make a selection. As soon as you start dragging, a starting point line is displayed, as well as an end point line that shows the selection. You can adjust your selection by dragging the lines, the value boxes, or the green selection area.

Lasso selection

In lasso selection, you can draw a lasso freehand to enclose an area. You must close the area properly by returning to the starting point of your selection. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking P at the top of the visualization. On a computer you can also press Shift and make the selection.

Draw selection

In draw selection, you can make a selection by drawing one or more lines in the chart. All data points that are touched by a line are selected. To deselect a data point, click it. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking P at the top of the visualization. On a computer you can also press Shift and make the selection.

Click selection

In click selection, you can make a selection by clicking the data points, one at a time. To deselect a data point, click it.

Legend selection

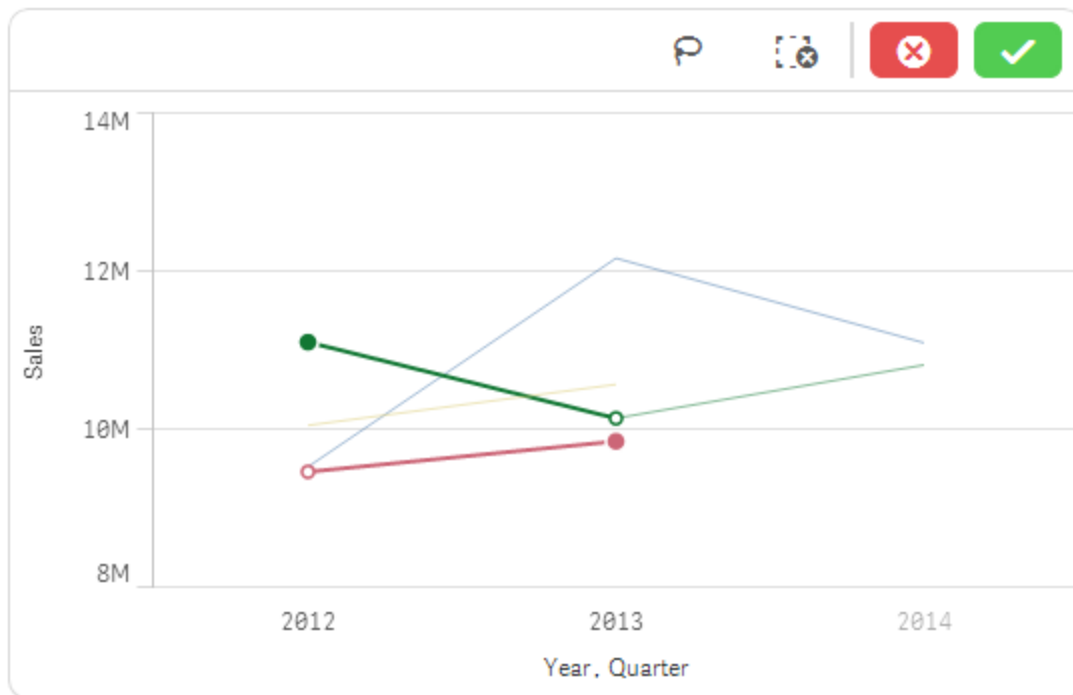
In the box legend, you select and deselect the items one at a time by clicking them.

Label selection

You can click the dimension labels to make selections. When dimensions are grouped or stacked, the whole group or stack is selected.

Indirect selection

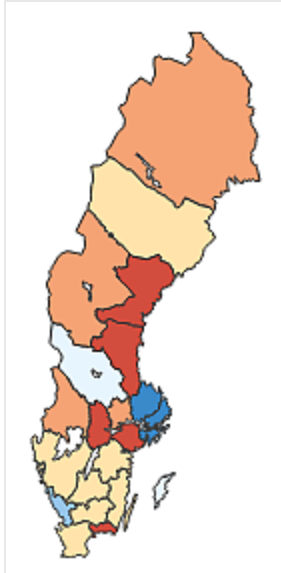
When you have a line chart with two dimensions and make a selection of two measure values for two different dimension values, as illustrated in the image, Qlik Sense makes indirect selections of the corresponding dimension values, so that the selection becomes the same as you would achieve when using range selection for the area. The data values selected by Qlik Sense are unfilled.



Indirect selection of the values that are unfilled

5.7 Map

Maps can be used for a wide variety of purposes. A common use in business intelligence is to plot sales data per region or per store.



You can create a map by using either a point layer or an area layer. If you use a point layer, you also need a background map to provide the context for the points, otherwise you will only have a collection of points on an empty background. By default, a Mapbox background map is added to a point layer. If you want to, you can use a map from a different provider.

See: *Slippy map servers (page 43)*

You can add a measure value or an expression to the dimension values, and use the size of the points or color by measure to reflect the size of the measure. If you use an area layer, you often do not need a background map, but there is support for complementing an area layer with a background.

The background map is of the type 'slippy map' in which you can zoom, pan around, and make selections.

🔗 http://wiki.openstreetmap.org/wiki/Slippy_Map

Loading data

You can load map data from .kml files and Excel files. You load the data, either through the quick data load or the data connection. By default, all fields are selected in the data selection dialog, even if they do not contain any data. A .kml file could contain, for example, area data but no point data. Although there is nothing wrong with loading empty fields, it can be inconvenient to have empty fields when you are working with the map visualization. Adding a dimension without any data to a map will not generate any visual output and could confuse a user. Therefore, you should clear the selections of all empty data fields in the data selection dialog, before you load the data.

Creating a map from data in a .kml file

Normally, a .kml file contains point data, area data, or both. In the following screenshot, from the data selection dialog, you can see that the selection of the field *FloridaCounties.Point* has been cleared because the field does not contain any data. By clearing the field you will not run the risk of creating map dimensions without any data.

Select data from FloridaCounties.kml

Preview script

Tables

File format

Fields

Florida Counties K...	2	Fields			
<input checked="" type="checkbox"/>	FloridaCounties.Name	<input type="checkbox"/>	FloridaCounties.Point	<input checked="" type="checkbox"/>	FloridaCounties.Area
	Citrus				[[[-82.426628,28.694908],[-82.4
	Brevard				[[[-80.493599,28.413055],[-80.4
	Franklin				[[[-85.021421,29.823213],[-85.6
	Broward				[[[-80.29704,26.334356],[-80.29
	Hamilton				[[[-83.055898,30.619483],[-83.6
	Jackson				[[[-85.432857,30.703505],[-85.4
	Okeechobee				[[[-80.982471,27.238772],[-80.9
	Monroe				[[[-80.894429,24.852241],[-80.8
	David				[[[-81.216712,20.401676],[-81.2

```

LOAD
    FloridaCounties.Name,
    FloridaCounties.Area
FROM 'lib://Tutorial source/FloridaCounties.kml'
(kml, Table is [Florida Counties KML]);

```

Cancel Insert script

When you click **Insert script**, the following script is generated:

```

LOAD
    FloridaCounties.Name,
    FloridaCounties.Area
FROM 'lib://data 7/FloridaCounties.kml'
(kml, Table is [Florida Counties KML]);

```

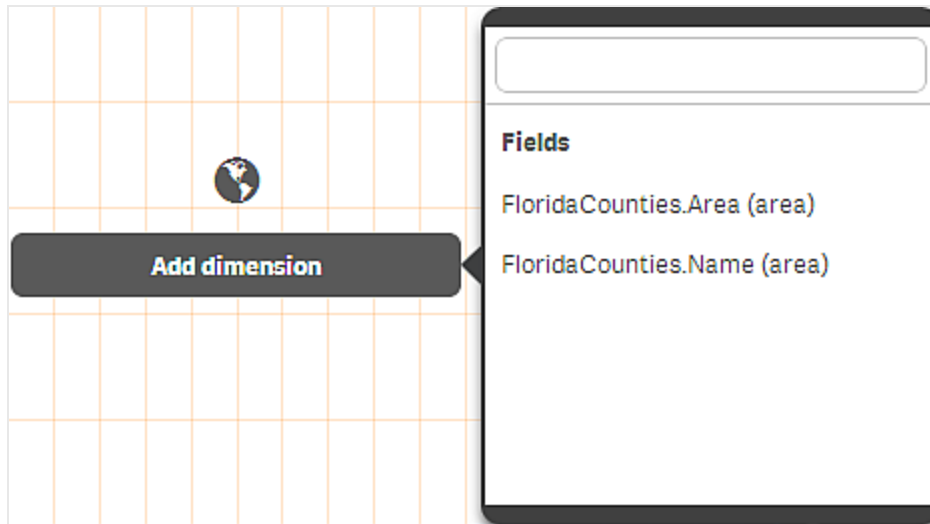
If the selection of the empty field had not been cleared, the script would also have contained the following string:

```

FloridaCounties.Point,

```

When you run the script and add a map chart to the sheet, you can add either *FloridaCounties.Area* (area) or *FloridaCounties.Name* (area) as a dimension.



Although you will get the same visual result with either of the fields (a map with the counties), there will be a difference when you hover over a county. If you select *FloridaCounties.Name (area)*, the name of the county is shown as a tooltip, and if you select *FloridaCounties.Area (area)* the area data is shown. The name of the county is undoubtedly more interesting. In addition, loading the field *FloridaCounties.Area* is much slower than loading the field *FloridaCounties.Name*.

Optionally, you can also add a measure and use coloring by measure to reflect the difference in measure value between the different counties.



If the .kml file contains neither point data nor area data, you cannot load data from that file. If the .kml file is corrupt, an error message is displayed, and you will not be able to load the data.

Creating a map from point data in an Excel file

You can create a map by using point data (coordinates) from an Excel file.

Point data formats

Point data can be read from Excel files. Two formats are supported:

- One format where the point data is stored in one column. Each point is specified as an array of x and y coordinates: '[x, y]'. With geographical coordinates, this would correspond to '[longitude, latitude]'. When using this format, you need to tag the point data field with `$geopoint;`.
- One format where the point data is stored in two columns, one for latitude and one for longitude. The function `GeomakePoint()` can generate a point based on this format.

In the following examples we assume that the files contain the same data about the location of a company's offices, but in two different formats.

Example 1:

The Excel file has the following content for each office:

- Office
- Location
- Number of employees

The load script could look as follows:

```
LOAD
    Office,
    Location,
    Employees
FROM 'lib://Maps/Offices.xls'
(biff, embedded labels, table is (Sheet1$));
```

The field `Location` contains the point data and it is necessary to tag the field with `$geopoint`; so that it is recognized as a point data field. Add the following string after the last string in the **LOAD** command:

```
    TAG FIELDS Location WITH $geopoint;
```

The complete script then looks as follows:

```
LOAD
    Office,
    Location,
    Employees
FROM 'lib://Maps/Offices.xls'
(biff, embedded labels, table is (Sheet1$));

TAG FIELDS Location WITH $geopoint;
```

Run the script and create a map visualization. Add the point dimension to your map.

Example 2:

The Excel file has the following content for each office:

- Office
- Latitude
- Longitude
- Number of employees

The load script could look as follows:

```
LOAD
    Office,
    Latitude,
    Longitude,
    Employees
FROM 'lib://Maps/Offices.xls'
(biff, embedded labels, table is (Sheet1$));
```

With the data in the fields `Latitude` and `Longitude`, you define a new field for the points. Add the following string above the **LOAD** command:

```
LOAD *, GeoMakePoint(Latitude, Longitude) as Location;
```

The function `GeoMakePoint()` joins the longitude and latitude data together.

The complete script then is as follows:

```
LOAD *, GeoMakePoint(Latitude, Longitude) as Location;
LOAD
    office,
    Latitude,
    Longitude,
    Employees
FROM 'lib://Maps/Offices.xls'
(biff, embedded labels, table is (Sheet1$));
```

Run the script and create a map visualization. Add the point dimension to your map.


Number of points

For performance reasons, there is a limit to the number of points that can be displayed. By making selections, you can reduce the amount of data to display.

Adding a background map

If you have added a point layer to your map, a Mapbox background map is automatically added. If you want to, you can use maps from other providers.

Do the following:

1. In the toolbar, click  **Edit**.
2. In the properties panel to the right, click **Background**.
3. Click the **Map service** button.
The button is set to **Custom**.
4. From the slippy map servers list below, copy a URL and paste it in the **URL** text box.
5. From the same list, copy the attribution string that corresponds to the URL and paste the string in the **Attribution** box.

Slippy map servers

These are the available URLs and attribution strings for the background map.

OpenStreetMap

URL	<code>http://tile.openstreetmap.org/{z}/{x}/{y}.png</code>
Attribution string	<code>&copy; OpenStreetMap contributors</code>

OpenCycleMap

URL	http://a.tile.opencyclemap.org/cycle/{z}/{x}/{y}.png http://b.tile.opencyclemap.org/cycle/{z}/{x}/{y}.png http://c.tile.opencyclemap.org/cycle/{z}/{x}/{y}.png
Attribution string	© OpenCycleMap . Map data © OpenStreetMap contributors

MapQuest OSM

URL	http://otile1.mqcdn.com/tiles/1.0.0/map/{z}/{x}/{y}.png http://otile2.mqcdn.com/tiles/1.0.0/map/{z}/{x}/{y}.png http://otile3.mqcdn.com/tiles/1.0.0/map/{z}/{x}/{y}.png http://otile4.mqcdn.com/tiles/1.0.0/map/{z}/{x}/{y}.png
Attribution string	Data, imagery and map information provided by MapQuest, OpenStreetMap and contributors, CC-BY-SA

MapQuest Open Aerial

URL	http://otile1.mqcdn.com/tiles/1.0.0/sat/{z}/{x}/{y}.png http://otile2.mqcdn.com/tiles/1.0.0/sat/{z}/{x}/{y}.png http://otile3.mqcdn.com/tiles/1.0.0/sat/{z}/{x}/{y}.png http://otile4.mqcdn.com/tiles/1.0.0/sat/{z}/{x}/{y}.png
Attribution string	Tiles Courtesy of MapQuest . Portions Courtesy NASA/JPL-Caltech and U.S. Depart. of Agriculture, Farm Service Agency.

MapBox Natural Earth (only supports the first five zoom levels)

URL	http://a.tiles.mapbox.com/v3/mapbox.natural-earth-hypso-bathy/{z}/{x}/{y}.png http://b.tiles.mapbox.com/v3/mapbox.natural-earth-hypso-bathy/{z}/{x}/{y}.png http://c.tiles.mapbox.com/v3/mapbox.natural-earth-hypso-bathy/{z}/{x}/{y}.png http://d.tiles.mapbox.com/v3/mapbox.natural-earth-hypso-bathy/{z}/{x}/{y}.png
Attribution string	Tiles © MapBox

Number of dimensions and measures

You can only use one dimension type, point or area. In the dimension, you can create an expression. If you add a measure from the master items to the map, the measure is added in the expression box under **Layers** > **<layer type>** in the properties panel.

Zooming and panning

In a map, you have options for zooming and panning. The interaction differs depending on what device you are using. Sometimes when you zoom, you may experience that the zooming is partly stepwise. That happens when the background map is updated.

Touch device interaction

On a touch device you pinch apart to zoom and swipe to pan.

You can reset the zoom by tapping , which appears in the top-right corner when you start zooming.

Computer (mouse) interaction

With a computer, you use the mouse to zoom and pan in the visualization. Use the scroll wheel to zoom in and out. The zooming is made on the area where the pointer is. You pan around by dragging.

You can also use the navigation tool for zooming and panning. Right-click in the map and select **Navigation** to open the tool.

You reset the zoom by clicking the scroll wheel or by clicking  in the navigation tool.

When to use a map

Description

You can use an area layer or a point layer when you create a map. Each point or sub-area corresponds to a dimension value.

When to use it

You can use a map to show the geographical distribution of offices, stores, and other sites of business interest. You can visualize not only locations but also sales values and other measures and display the value differences by bubble size or color.

With a point layer

In a simple implementation of a map with a point layer, all bubbles look the same. But by using an expression or a measure, you can let the bubble size reflect the measure value. In the properties panel, add an expression to the point layer, or drag a measure from **Master items** in the assets panel to the visualization.

You can also use coloring by measure to show differences in values.

With an area layer

With an area layer, each subarea is a dimension value. By using colors, you can differentiate between measure values. In the properties panel, under **Colors and legend**, click the **Colors** button to change to **Custom** where the option **By measure** is available.

Advantages

The map is a versatile visualization that efficiently presents the geographical distribution of key values related to location or area.


Disadvantages

With a large number of values, it may be hard to get a good overview. Values may be placed on top of each other and not visible until zoomed in.


Selections in maps

When you analyze your data, you have different ways of making selections. In a map you can either use lasso selection, draw selection, or click selection. To confirm a selection, click ✓ or outside the visualization. You can also press Enter. To cancel, click ✕ or press Esc.

Lasso selection

In lasso selection, you can draw a lasso freehand to enclose an area. You must close the area properly by returning to the starting point of your selection. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

Draw selection

In draw selection, you can make a selection by drawing one or more lines in the visualization. All data points that are touched by a line are selected, and all other data points are dimmed. To deselect a data point, click it. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

Click selection

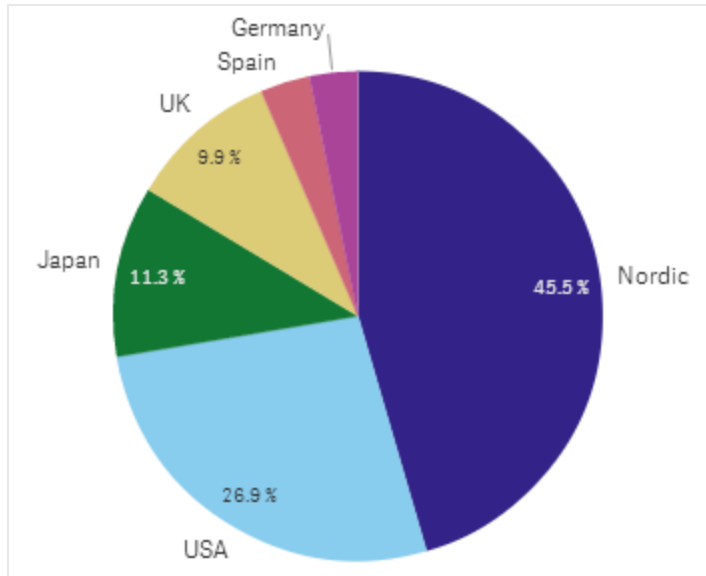
In click selection, you can make a selection by clicking data points, one at a time. To deselect a data point, click it.

Legend selection

When you are using a point layer, you can make selections in the legend. There are two legend types: box legend, with one legend item per dimension value, and range legend, with a gradient scale, where all measure values are represented. In the box legend, you select and deselect the items one at a time by clicking them. In the range legend, you drag from a starting point to an end point to enclose an area. You cannot deselect a certain item, but you can change the range.

5.8 Pie chart

The pie chart displays the relation between values as well as the relation of a single value to the total. You can use a pie chart when you have a single data series with only positive values.



Sales per region in a pie chart

Default settings for a pie chart

The following settings are used by default in a pie chart:

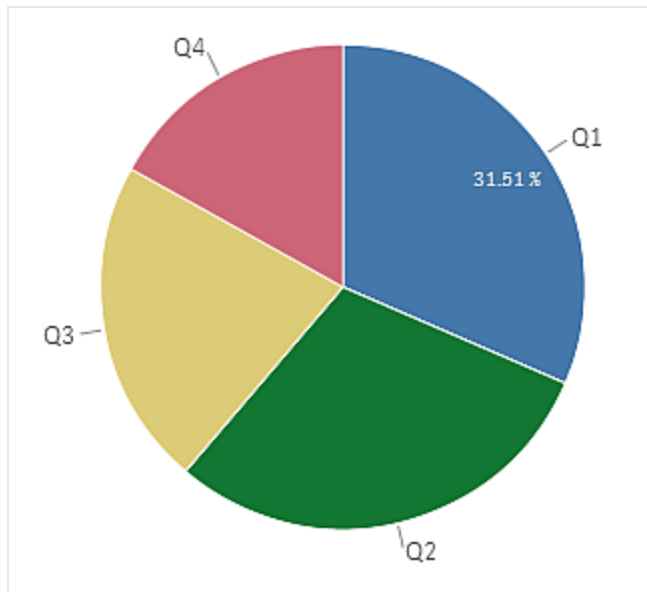
- The top 10 sectors are presented in descending size order, clockwise.
- Colors are presented by dimension.
- Value labels are presented in percent.

All these settings can be changed in the properties panel.

Number of dimensions and measures

A pie chart is built from one dimension and one measure only.

When to use a pie chart



Description

In the pie chart, the dimensions form sectors of the measure value.

You can include one measure and one dimension in a pie chart.

When to use it

The primary use of a pie chart is to compare a certain sector to the total. The pie chart is particularly useful when there are only two sectors, for example yes/no or queued/finished.

Advantages

The pie chart provides an instant understanding of proportions when few sectors are used as dimensions. When you use 10 sectors, or less, the pie chart keeps its visual efficiency.

Disadvantages

It is often hard to compare the results of two pie charts with each other, and therefore you should not do it.

It may be difficult to compare different sectors of a pie chart, especially a chart with many sectors.

The pie chart takes up a lot of space in relation to the values it visualizes.


Selections in pie charts

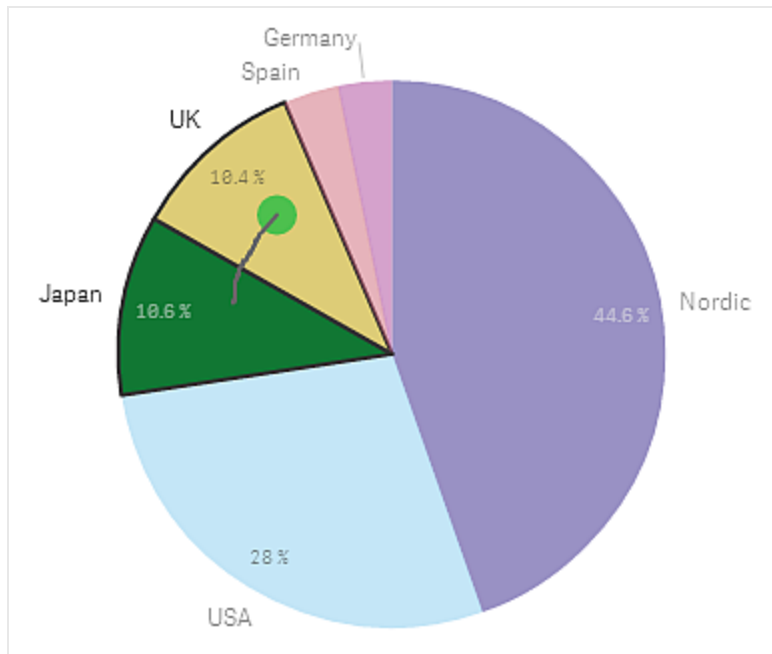
When you analyze your data, you have different ways of making selections. In a pie chart you can either use click selection, draw selection, legend selection, or lasso selection. To confirm a selection, click ✓ or outside the visualization. You can also press Enter. To cancel, click ✕ or press Esc.

Click selection

In click selection you can make a selection by clicking sectors, one at a time. To deselect a sector, click it.

Draw selection


In draw selection you can make a selection by drawing one or more lines in the chart. All sectors that are touched by a line are selected, all other sectors are dimmed. To deselect a sector, click it. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.



Legend selection

There are two legend types: box legend, with one legend item per dimension value, and range legend, with a gradient scale, where all measure values are represented. In the box legend, you select and deselect the items one at a time by clicking them. In the range legend, you drag from a starting point to an end point to enclose an area. You cannot deselect a certain item, but you can change the range.

Lasso selection

In lasso selection, you can draw a lasso freehand to enclose an area. You must close the area properly by returning to the starting point of your selection. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

Label selection

You can click the dimension labels to make selections.

5.9 Pivot table

The pivot table presents dimensions and measures as rows and columns in a table. In a pivot table you can analyze data by multiple measures and in multiple dimensions at the same time. You can rearrange the measures and dimensions to get different views of the data. The activity of moving measures and dimensions interchangeably between rows and columns is known as 'pivoting'.

Example:

The efficiency of a pivot table can be illustrated by comparing a regular table with a pivot table that has the same data. In the following table, you have three dimensions: Customer, Product Group, and Item, and two measures: Quantity and Sales. The table shows the sales of some food products. If you want to rearrange the data to simplify analysis, the options are somewhat limited. You can change the order of the columns, but that does not improve the overview. You can also set the sorting order, either in the sorting section in the properties panel, or by clicking the dimension columns. However, the problem persists. The customers, product groups, and items are all presented more than once, and it is not possible to get a good summary of the data.




Customer	Product Group	Item	Quantity	Sales
Totals				55,5
Abbott	Baking Goods	BBB Best Brown Sugar	9	3,38
Abbott	Dairy	Club Blueberry Yoghurt	7	2,67
Benedict	Baking Goods	Landslide Oregano	3	1,72
Benedict	Vegetables	Ebony Green Pepper	8	1,71
CAPCON	Dairy	Club Blueberry Yoghurt	7	2,67
CAPCON	Snack Foods	Best Choice Cheese Crackers	6	2,24
Fifth Moon	Dairy	Carlson Head Cheese	5	5,41
Fifth Moon	Snack Foods	Best Choice Frosted Donuts	3	4,83
Helius	Dairy	Carlson Head Cheese	2	5,41
Helius	Vegetables	Ebony Green Pepper	7	1,71
Nanao	Dairy	Gorilla Head Cheese	8	4,37
Nanao	Vegetables	Imagine Frozen Carrots	6	1,42
Paracel	Baking Goods	BBB Best Brown Sugar	4	3,38
Paracel	Baking Goods	Landslide Oregano	4	1,72
QualityLogic	Dairy	Gorilla Head Cheese	3	4,37
QualityLogic	Snack Foods	Best Choice Frosted Donuts	8	4,83
TICOR	Snack Foods	Best Choice Cheese Crackers	2	2,24
TICOR	Vegetables	Imagine Frozen Carrots	3	1,42

Here is the same data in a pivot table.

			Measures	
Customer	Product Group	Item	Sum(Quantity)	Sales
Totals (\$)			95	55,5
⊕ Abbott			16	6,05
⊕ Benedict			11	3,43
⊕ CAPCON			13	4,91
⊕ Fifth Moon			8	10,24
⊕ Helius			9	7,12
⊕ Nanao			14	5,79
⊕ Paracel			8	5,1
⊕ QualityLogic			11	9,2
⊕ TICOR			5	3,66










As you can see, the pivot table presents the data in a much more condensed way, which simplifies analysis and comparison. Compared to the regular table, the number of rows has been halved in the pivot table and the number of columns is three instead of five.

One of the advantages of a pivot table is the interchangeability, that is, the ability to move row items to columns and column items to rows. This flexibility is very powerful and enables you to rearrange the data and have several different views of the same data set. Depending on what you want to focus on, you move the dimensions and measures to bring forward data of interest and hide data that is either too detailed, or irrelevant for the analysis.

The pivot table shows the dimensions *Customer*, *Product Group*, and *Item*, and the measures *Quantity* and *Sales*. In this view, you have a summary of quantity and sales for each customer. If you want to know which items and product groups that the customers bought, you need to expand the customer fields by clicking . A  icon indicates that a field can be further expanded and present more details, while a  icon indicates that the field can be collapsed, to reduce the number of fields and details.

Pivoting

When you want to rearrange your data to get a new view, you drag the items to the new place, either to a column or a row. In the following pivot table, the dimension *Customer* has been dragged to the position after *Product Group* and the dimension *Item* to the position before *Product Group*. As a consequence, the dimensions are now sorted by *Item*, primarily. Focus has shifted from *Customer* to *Item*. By expanding the dimensions you can find out the quantities and sales for each customer, but there is another way to achieve that goal.

			Measures	
Item	Product Group	Customer	Sum(Quantity)	Sales
 BBB Best Brown Sugar			13	6,76
 Best Choice Cheese Crackers			8	4,48
 Best Choice Frosted Donuts			11	9,66
 Carlson Head Cheese			7	10,82
 Club Blueberry Yoghurt			14	5,34
 Ebony Green Pepper			15	3,42
 Gorilla Head Cheese			11	8,74
 Imagine Frozen Carrots			9	2,84
 Landslide Oregano			7	3,44

By moving the dimension *Customer* from rows to columns, you retain focus on the dimension *Item*, but you also get the distribution of items per customer. The move has made the pivot table more information dense.

		Customer		Measures					
Item	Product Group	Totals (\$)		Abbott		Benedict		CAPCON	
		Sum(Quant	Sales	Sum(Quant	Sales	Sum(Quant	Sales	Sum(Quant	Sales
⊕ BBB Best Brown Sugar		13	6,76	9	3,38	-	-	-	-
⊕ Best Choice Cheese Crackers		8	4,48	-	-	-	-	6	-
⊕ Best Choice Frosted Donuts		11	9,66	-	-	-	-	-	-
⊕ Carlson Head Cheese		7	10,82	-	-	-	-	-	-
⊕ Club Blueberry Yoghurt		14	5,34	7	2,67	-	-	7	-
⊕ Ebony Green Pepper		15	3,42	-	-	8	1,71	-	-
⊕ Gorilla Head Cheese		11	8,74	-	-	-	-	-	-
⊕ Imagine Frozen Carrots		9	2,84	-	-	-	-	-	-
⊕ Landslide Oregano		7	3,44	-	-	3	1,72	-	-

Measure grouping

As you may have noticed, *Quantity* and *Sales* are not presented as separate measures in the top column row. Next to the dimension *Customer*, you find an item called *Measures*. When you use more than one measure, the measures are automatically grouped together forming a measure group, *Measures*, which as a whole can be added to the rows section or the columns section. The measure group is not editable in the table. You cannot split the measure item and use one measure as a row and another as a column, nor can you change the order in which the measures are presented. Changes to the *Measures* item are made in the properties panel.

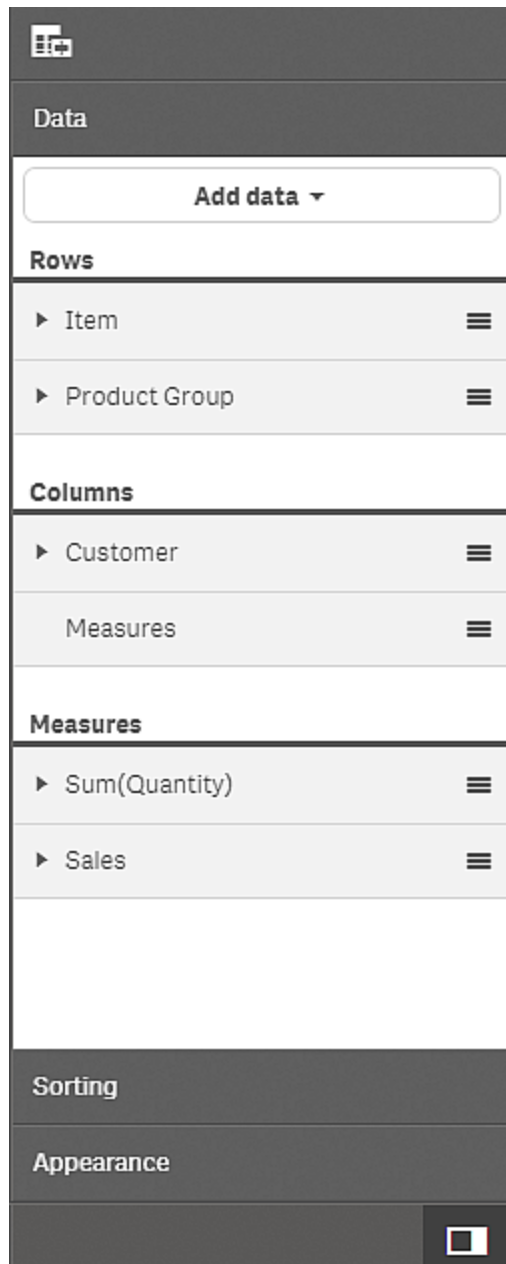
Different ways of pivoting

Essentially, pivoting involves dragging the dimensions and measures from rows to columns and columns to rows, but you have two options for performing the pivoting.

- In the pivot table (both when editing and when analyzing).
- In the properties panel (only when editing).

Pivoting using the properties panel

In the properties panel, you can add measures and dimensions to the pivot table, and also move the dimensions and measures to rows or columns. When you use more than one measure, the measures are grouped and a *Measures* item is created. You can change the internal order of the dimensions and measures, but when you have more than one measure, it is always the whole measure group that you move.



When to use a pivot table

Description

The pivot table presents dimensions and measures as rows and columns of a table. The pivot table allows you to analyze data by multiple measures and in multiple dimensions at the same time. The data in a pivot table may be grouped based on a combination of the dimensions. You can pivot by dragging and dropping dimensions in the table.

When to use it

The pivot table is particularly useful when you want to include several dimensions or measures in a single table, and then want to reorganize them to see different subtotals.

Advantages

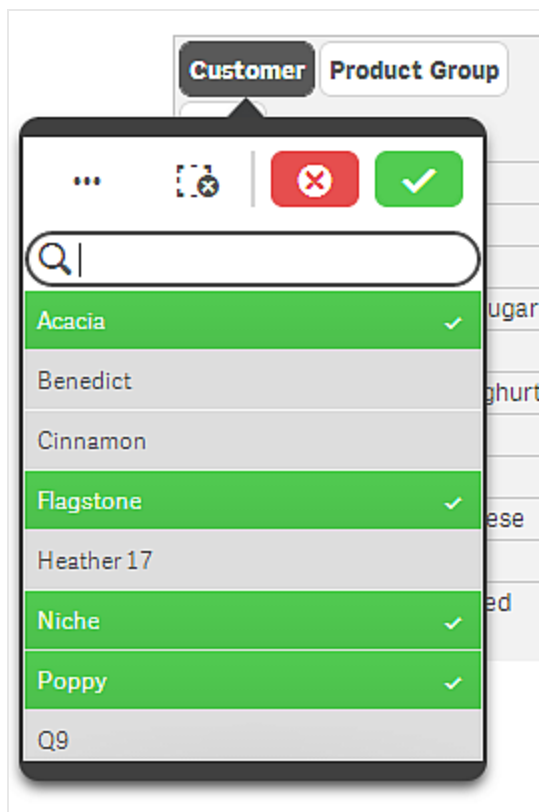
The pivot table is very powerful when you want to analyze multiple dimensions and measures at once, and then reorganize them to get a different perspective on your data. Another advantage is that you can expand the rows you are interested in while keeping the rows in the rest of the table collapsed.

Disadvantages

The pivot table may seem a bit complicated, and does not give insights at a glance.

Selections in pivot tables

In a pivot table, you make selections in the list that appears when you click a dimension item.



Dimension list during selection

The list displays the values from the chosen dimension. You can select fields by clicking or by drawing. All selected fields are marked green. To deselect a field, click it. To confirm a selection, click ✓ or outside the visualization. You can also press Enter. To cancel, click ✕ or press Esc. If you confirm, the selection is reflected in all objects related to the pivot table.

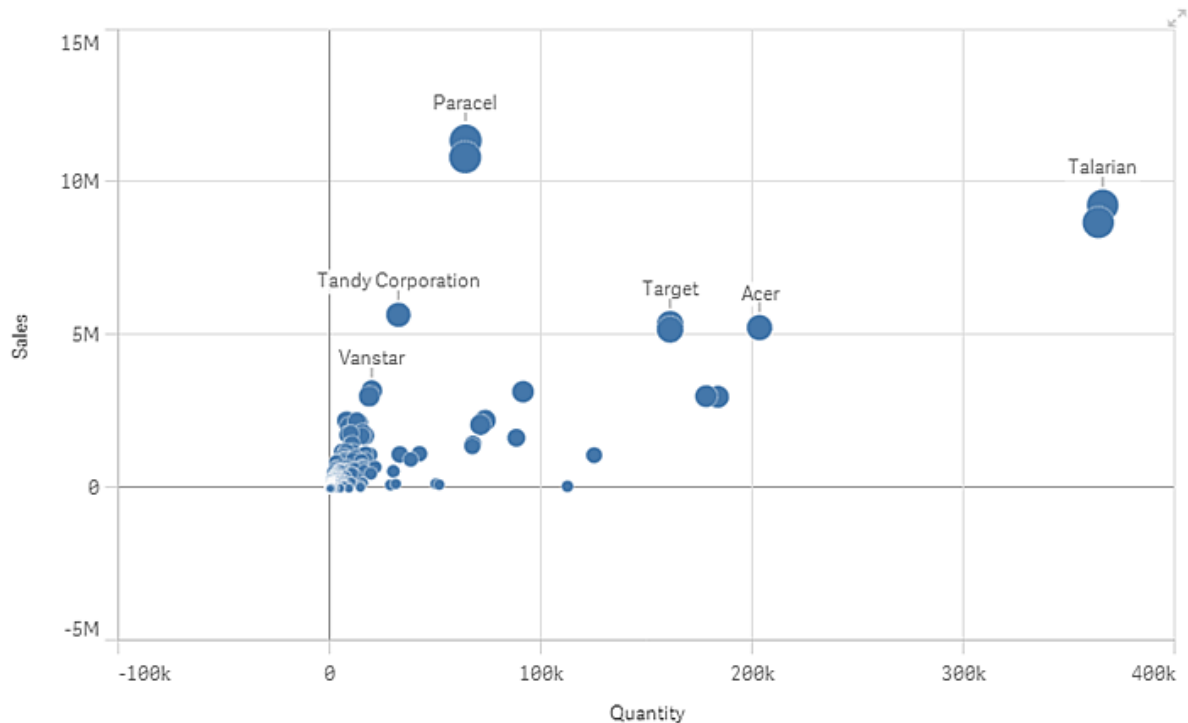
You cannot select dimension values that are null. Null values in a pivot table are presented as dashes (-). Rows without valid dimension values will not be included in the selection.



You cannot make selections in measures.

5.10 Scatter plot

The scatter plot presents pairs of values from two or three measures. This is useful when you want to show data where each instance has two numbers, for example, the relationship between Sales and Quantity per Customer. In this scatter plot, a third measure (Cost) is used to generate the bubble size.



Number of dimensions and measures

In a scatter plot you need one dimension and at least two measures. You can have maximum one dimension and three measures.

Number of plots

For performance reasons, the maximum number of plots that can be displayed is limited. You can reduce the amount of data to display by making selections.

Zooming and panning

In a scatter plot, you can zoom and pan around in your data. The interaction differs depending on what device you are using.

Touch device interaction

On a touch device you pinch apart to zoom and swipe to pan. Plots that are outside the visible range are visualized as small dots along the axis lines.

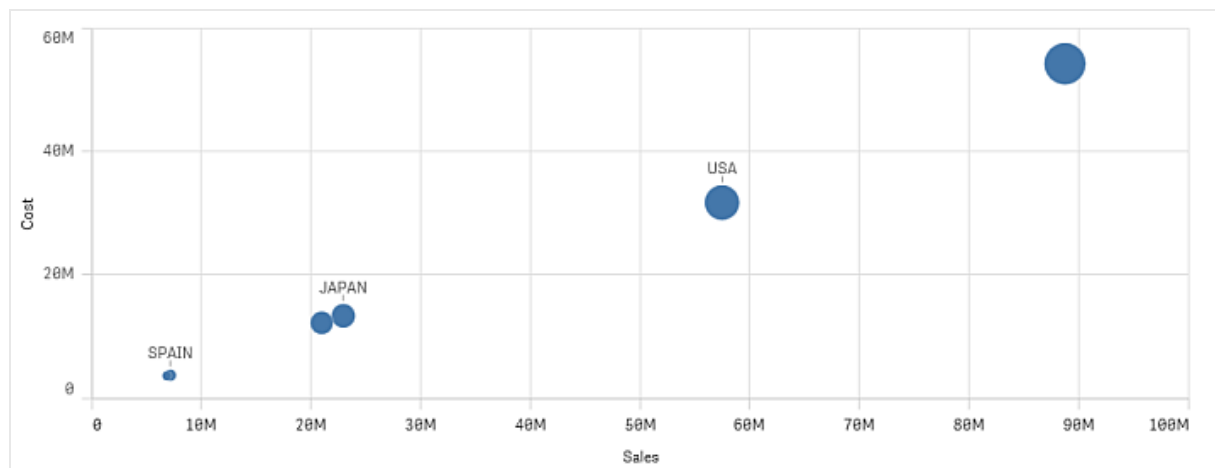
With a three-finger tap you reset the zoom. You can also reset the zoom by tapping 🏠, which appears in the top right corner when you start zooming.

Computer (mouse) interaction

With a computer you use the mouse to zoom and pan in the visualization. Use the scroll wheel to zoom in and out. The zooming is made on the area where the pointer is. Plots that are outside the visible range are visualized as small dots along the axis lines.

You reset the zoom by clicking the scroll wheel or by clicking 🏠, which appears in the top right corner when you start zooming. You pan around in the chart by dragging. You also have the option of using the navigation tool that is available in the shortcut menu. Right-click in the scatter plot and select **Navigation** to open the tool.

When to use a scatter plot



Scatter plot showing cost and sales per region. The third measure (generating the bubble size) is gross sales.

Description

The scatter plot presents values from different measures over one dimension as a collection of points. In most charts, you find your dimension on one of the axes, but for a scatter plot, the dimension is represented by the points in the chart, and the measures are found on each of the two axes. When a third, optional, measure is used, its value is reflected in the bubble size.

When to use it

Scatter plots are ideal when you have a data set with a great many points, thousands or more. The scatter plot helps you find potential relationships between values, and visualize irregularity from a group. The scatter plot is also useful when you want to show data where each instance has two metrics, for example, average life expectancy and average gross domestic product per capita in different countries.

Advantages

The scatter plot is the only chart type that can show the correlation of two or more measures at the same time. The third measure is an efficient way of differentiating between values and simplifying the identification of, for example, large countries, large customers, large quantities, and so on.

Disadvantages

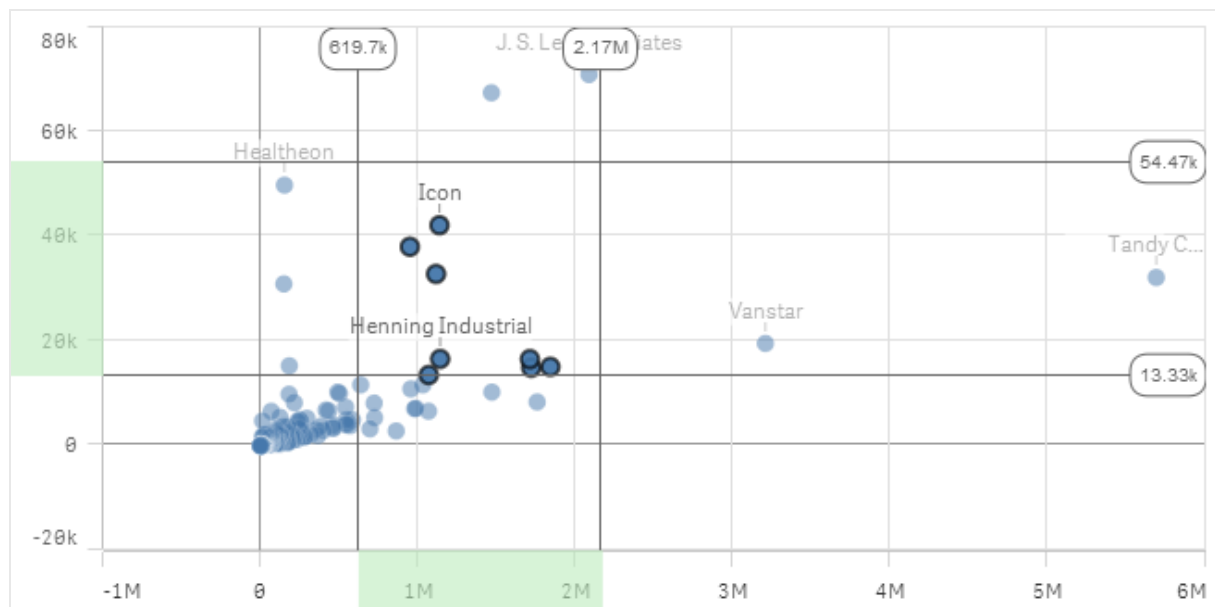
The scatter plot may be difficult to understand for an inexperienced user, because it has measure value on both axes, and the third, optional, measure adds complexity to the interpretation. Make sure a novice can interpret the scatter plot correctly.

Values may be placed on top of each other and not visible until zoomed in.

Selections in scatter plots


When you analyze your data, you have different ways of making selections. In a scatter plot you can either use lasso selection, range selection, draw selection, or click selection. To confirm a selection, click ✓ or outside the visualization. You can also press Enter. To cancel, click ✕ or press Esc.

Range selection




In range selection, you can make selections on the x-axis or the y-axis, or both together. Select a starting point along the axis, just outside the chart area, and drag to make a selection. As soon as you start dragging, a starting point line is displayed as well as an end point line that shows the selection. You can adjust your selection by dragging the lines, the value boxes, or the green selection area.

Lasso selection

In lasso selection, you can draw a lasso freehand to enclose an area. You must close the area properly by returning to the starting point of your selection. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

Draw selection


In draw selection, you can make a selection by drawing one or more lines in the chart. All data points that are touched by a line are selected, and all other data points are dimmed. To deselect a data point, click it. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

Click selection


In click selection, you can make a selection by clicking data points, one at a time. To deselect a data point, click it.

5.11 Table

The table shows several fields simultaneously, where the content of each row is logically connected. Typically, a table consists of one dimension and several measures.

Customer 	Sales	Quantity	Profit Margin (%)	# of invoices	Average Sales per Invoice
Totals	\$203,619,273	4090335.05	41.09	71061	\$2,865.42
A-2-Z Solutions	\$343,039	5373	37.69	76	\$4,513.67
A-ARVIN Laser Resources	\$8,431	103	40.99	24	\$351.31
A Superior System	\$206,122	1852	41.05	287	\$718.20
A&B	\$233,533	4516	44.47	29	\$8,052.86
A&G	\$29,407	764	47.95	28	\$1,050.24
A&R Partners	\$94,298	371	34.88	10	\$9,429.79
A1 Datacom Supply	\$719,334	14705	39.05	182	\$3,952.39
a2i	\$1,603	38	56.12	11	\$145.73
A2Z Solutions	\$118,897	1907	41.13	130	\$914.59
AA-Wizard	\$210,151	5667	47.67	78	\$2,694.25
Aadast	\$559,991	2133	36.68	59	\$9,491.37

You can use a table when you want to view precise values rather than visualizations of values, and when you want to compare individual values. A table is particularly useful when drill-down groups are used as a dimension.

You only make selections in the dimension columns. All dimension columns have a search icon () in the header.

Number of rows and columns

In a table, you can have millions of rows and virtually any number of columns with dimensions and measures. But because huge tables are impractical and hard to manage, the limit for what is practical is far less than the theoretical maximum. In most cases, it is desirable to see all the columns without scrolling horizontally.

Data alignment

Column data is aligned according to data type. Text values are left-aligned and number values, including date related values, are right-aligned.

Sorting

You can adjust both the order of the dimensions and measures from left to right (column sorting), and the sorting priority order of the rows (row sorting). In addition, you also have an internal sorting option.

During analysis, you can also use interactive sorting to change the row sorting.

Column sorting

By default, the order in which columns are sorted is set by the order in which dimensions and measures are added to the table. If you add the measure *Sales* first, it is presented first (leftmost) in the table. The next dimension or measure that is added is presented in the second column, and so on. The column sorting order can be changed in the properties panel, under **Columns**.

Row sorting

By default, rows are sorted by the first added dimension or measure, numeric values descending, text values ascending. A small arrow under the column header shows by which column the table is sorted.

You can change the row sorting in the properties panel, under **Sorting**. Drag the dimensions and measures to change the sorting priority order. In many cases, sorting is not only affected by the first dimension or measure in **Sorting**, but also the following ones.

Example:

In the following screenshot, the rows are first sorted by *Customer*, then by *Month*, and then by *Product Type*. As you can see, the columns *Customer* and *Month* have several rows with the same values (*A-2-Z Solutions* and *Month*). The rows in *Product Type* are ordered alphabetically, but only those that were sold in January to the customer *A-2-Z Solutions* are displayed.

Customer	Product Type	Month	Sales
Totals			203619272.95
A-2-Z Solutions	Baking Goods	Jan	633.23
A-2-Z Solutions	Beer and Wine	Jan	129.25
A-2-Z Solutions	Breakfast Foods	Jan	68.29
A-2-Z Solutions	Canned Soup	Jan	110.64
A-2-Z Solutions	Carbonated Beverages	Jan	187.42
A-2-Z Solutions	Dairy	Jan	8262.54
A-2-Z Solutions	Fruit	Jan	4119.55

By changing the sorting order, so that secondary sorting is by *Product Type*, followed by *Month*, all *Product Type* items sold to the customer *A-2-Z Solutions* are presented in alphabetical order, whereas only the months when they were sold are displayed under *Month*.

Customer	Product Type	Month	Sales
Totals			203619272.95
A-2-Z Solutions	Baking Goods	Jan	633.23
A-2-Z Solutions	Baking Goods	May	138.32
A-2-Z Solutions	Baking Goods	Jun	97.05
A-2-Z Solutions	Baking Goods	Jul	1318.04
A-2-Z Solutions	Baking Goods	Nov	644.83
A-2-Z Solutions	Beer and Wine	Jan	129.25
A-2-Z Solutions	Beer and Wine	Feb	24.6

Internal sorting

Each dimension and measure has a default (**Auto**) internal sorting order, which can be changed. Under **Sorting**, click the item you want to change and click the button to switch to **Custom** sorting. Changes made to the internal sorting of an item may not have any effect if the sorting is in conflict with an item with higher priority.

Interactive sorting

During analysis, you can set which column to sort on by clicking the column header. The first click sorts the table according to the default sorting of the selected item. A second click reverses the sorting order. Interactive sorting is session based and is not saved. If you want your changes to the sorting to be persistent, you need to make the changes in the properties panel.

Column picker

When space is limited and not all dimensions and measures can be displayed in a table, the column picker appears on the right in the table. When you click the column picker, a list is displayed with all dimensions and measures in the table. You can temporarily change the order of the columns by dragging them in the list, and you can make selections in all displayed dimensions, as usual.

The order changes that you make in the column picker are not permanent and do not affect the column order or the sorting order set in the properties panel.

Totals

By default, the totals of numeric values are displayed under the column names. In the properties panel, you can change this to display the totals at the bottom of a column, or not at all.

Search

The usual search options are available when you want to perform a search in a table.

You can use the following options:

- Text search
- Numeric search
- Expression search
- Fuzzy search

When to use a table

Description

The table displays values in record form, so that each row of the table contains fields calculated using measures. Often a table consists of a single dimension, for example, customers, and multiple measures, such as sales, quantity, margin, and invoice figures.

When to use it

Use a table, when you want to view detailed data and precise values rather than visualizations of values. Tables are good when you want to compare individual values. Drill-down group dimensions are very efficient in tables. Within a limited space, you can drill down to the next level of detail and analyze the updated measure values.

Advantages

You can filter and sort the table in different ways. Many values can be included in a table, and when you drill down in a table, you make good use of a limited space of the sheet. A table is excellent when you want to see exact values rather than trends or patterns.


Disadvantages

If the table contains many values, it is difficult to get an overview of how values are related. It is also hard to identify an irregularity within the table.

Searching in tables

In a table, you can search the dimension columns, and make selections in the resulting list.

Do the following:


1. Click  in the dimension column that you want to search in.
A selection popup is displayed.
2. Type your search string.
While you type, the list is filtered to only display matching items.
3. Make a selection by clicking or drawing.
4. Confirm your selection.



You can confirm the selection of all matching items by pressing Enter.

The new selection is active and reflected in all associated visualizations.



You can remove the search string by clicking  or pressing Esc. The search string is always removed when you press return/Enter.

Selections in tables

Customer	Sales	Profit Margin (%)	# of invoices	Average Sales per Invoice
Totals	\$203,619,273	41.09	71061	\$2,865.42
A-2-Z Solutions	\$343,039	37.69	76	\$4,513.67
A-ARVIN Laser Resources	\$8,431	40.99	24	\$351.31
A Superior System	\$206,122	41.05	287	\$718.20
A&B	\$233,533	44.47	29	\$8,052.86
A&G	\$29,407	47.95	28	\$1,050.24
A&R Partners	\$94,298	34.88	10	\$9,429.79
A1 Datacom Supply	\$719,334	39.05	182	\$3,952.39
a2i	\$1,603	56.12	11	\$145.73
A2Z Solutions	\$118,897	41.13	130	\$914.59

Table with selected fields in green

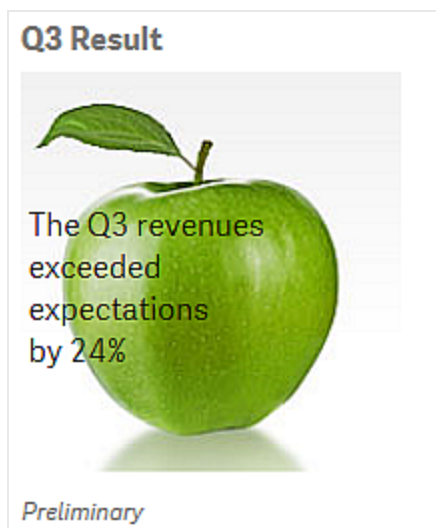
You can make selections in a table by clicking or drawing in the dimension columns. Measure values cannot be selected. When you make a selection, it is always the dimension values that you select. You can only make selections in one column at a time.

To deselect a row, click it. To confirm a selection, click ✓ or outside the visualization. You can also press Enter. To cancel, click ✕ or press Esc. If you confirm, the selection is reflected in all visualizations associated with the table.

You cannot select dimension values that are null. Null values in a table are presented as dashes (-). Rows without valid dimension values will not be included in the selection.

5.12 Text & image

The text & image visualization complements other visualizations by offering options to add text, images, hyperlinks, and measures.



You can format and color the text and align the paragraphs. The background image has sizing and positioning options. You can also set the responsive behavior for text and images.

When to use a text & image

Description

The text & image visualization is intended for presentation purposes, and does not support selections. However, the measures in the text & image visualization are updated when selections are made.

When to use it

Use on the first sheet of an app for essential information.

Display a company image, or use a background image together with formatted text and measure values to present figures in a compelling way.

Link to sites with additional information.

Use the responsive behavior to ensure that the visualization renders well on all devices.

Advantages

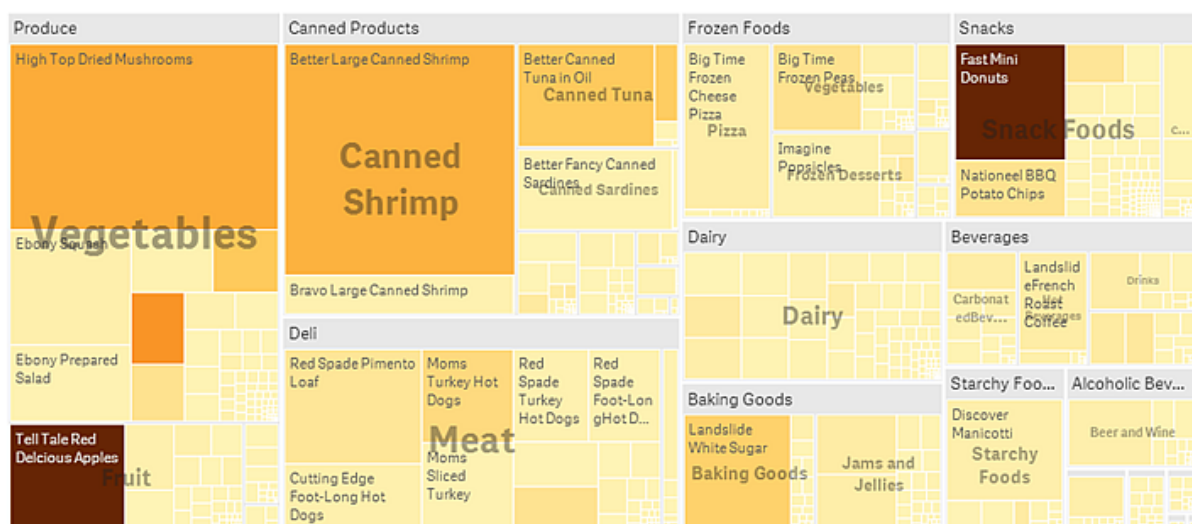
The text & image visualization contrasts with the other visualizations. You have many options for making the text & image visualization stand out next to more regular charts.

Disadvantages

You are limited to a few measure values and rather short texts, otherwise the text & image visualization will be cluttered.

5.13 Treemap

Treemaps display hierarchical data by using nested rectangles, that is, smaller rectangles within a larger rectangle.



Description

Treemaps are used to display hierarchical data. You can drill down in the data, and the theoretical number of levels is almost limitless. You reach the practical limit before you reach the theoretical limit.

When to use it

Use a treemap when space is constrained and you have a large amount of hierarchical data that you need to get an overview of. Treemaps should primarily be used with values that can be aggregated.

Advantages

Treemaps are economical in that they can be used within a limited space and yet display a large number of items simultaneously.

When there is a correlation between color and size in the tree structure, you are able to see patterns that would be difficult to spot in other ways, for example, when a certain color is particularly relevant.

Disadvantages

Treemaps are not good when there is a big difference in the magnitude of the measure values. Nor is a treemap the right choice when mixing absolute and relative values.

Negative values cannot be displayed in treemaps.


Selections in treemaps

When you analyze your data, you have different ways of making selections. In a treemap you can either use click selection, draw selection, or lasso selection. To confirm a selection, click ✓ or outside the visualization. You can also press Enter. To cancel, click ✕ or press Esc.


Click selection

You can select treemap branches by clicking them, one at a time. To deselect a branch, click it.

Draw selection

You can draw one or more lines in the treemap to select branches. All branches that are touched by a line are selected, all others are dimmed. To deselect a branch, click it. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

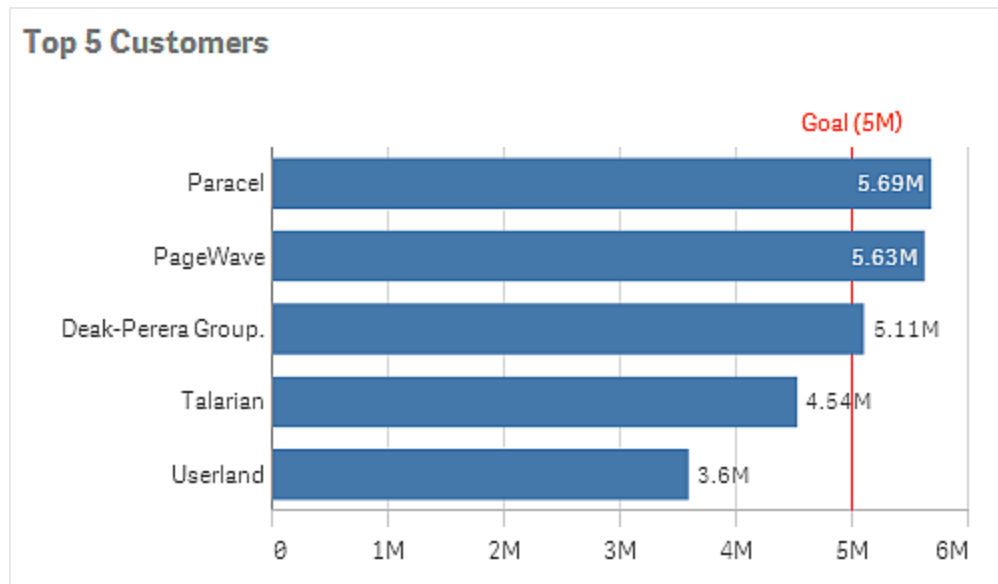
Lasso selection

In lasso selection, you can draw a lasso freehand to enclose an area. In a treemap you can make lasso selections, but in most cases it is easier to use draw selections to select more than one branch. When you want to make a draw or lasso selection, you must first click inside the visualization and turn on lasso selection by clicking  at the top of the visualization. On a computer you can also press Shift and make the selection.

5.14 Reference lines

A reference line is a line intersecting the chart area from a given point on the measure axis. You can use a reference line to indicate a certain level of chart data. The reference line is only drawn if it falls within the current range of the measure axis. You can have several reference lines in the same chart.

Reference lines are available in bar charts, combo charts, gauges, line charts, and scatter plots.



Bar chart with a reference line at 5M

Reference line expression

You can either set the reference line expression to an absolute numeric value, or enter an arbitrary numeric expression.

5.15 Null values in visualizations

Data is sometimes missing or cannot be calculated, because the fields contain values that are null or not a number (NaN). In the visualizations, null and NaN values are displayed in different ways, according to the following table.

	Null values in dimensions	NaN values in measures
Bar chart	–	– (when labels are enabled in the properties panel, otherwise empty)
Combo chart	–	A combination of the NaN value for the bar and the line.
Filter pane	No representation	N/A
Gauge	N/A	–

KPI	N/A	–
Line chart	–	Empty
Map	No representation	gray
Pie chart	–	Empty
Scatter plot	–	Empty
Table	–	–
Text & image	N/A	–
Treemap	–	Empty

6 Dimensions

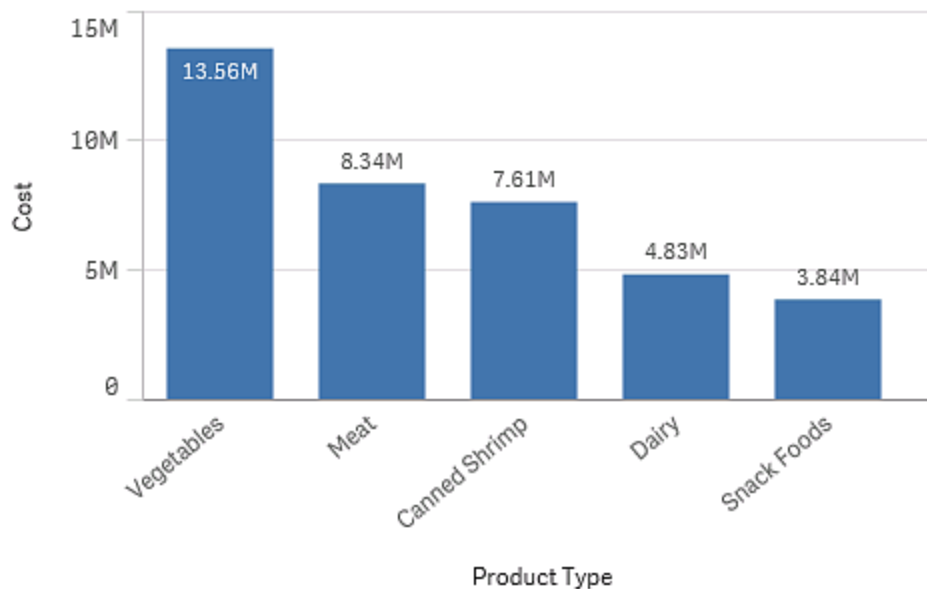
Dimensions determine how the data in a visualization is grouped - for example total sales per country or number of products per supplier. You typically find a dimension as the slices in a pie chart or on the x-axis of a bar chart with vertical bars.

Dimensions are created from fields in the data model tables.

Example:

Product Type is a field in the *Product* table that is loaded into the app. The values of this field are the different types that products are grouped into.

You can, for example, create a bar chart to visualize the cost of each type, by adding the *Product Type* dimension to the chart. To complete the visualization, you must add a measure (in this case Cost), which is grouped by the *Product Type* dimension.



6.1 Field groups as dimensions

One main difference between Qlik Sense and many other database viewers and online analytical processing tools (OLAP systems), is that in Qlik Sense, you do not need to predefine any hierarchies in the input data. The unique internal logic of Qlik Sense gives you the complete freedom to access any field as a full dimension in any order you like.

For most purposes, the built-in functionality is fully satisfactory, but in some situations, a predefined hierarchy can help you to display data more efficiently. In Qlik Sense, you can achieve this by defining hierarchic groups of fields as drill-down dimensions.

Any fields or calculated dimensions can be grouped together.

6.2 Drill-down groups

When several fields form a natural hierarchy, it can make sense to create a drill-down group.

Example 1:

Organization: Company, Department, Employee

Example 2:

Geography: Continent, Country, State, City

When you use a drill-down group as a dimension in a chart, the chart uses the first field in the group's list of fields that has more than one possible value. If the currently made selections cause the field to have only one possible value, the next field in the list is used instead, provided that it has more than one possible value. If no field in the list has more than one possible value, the last field is used anyway.

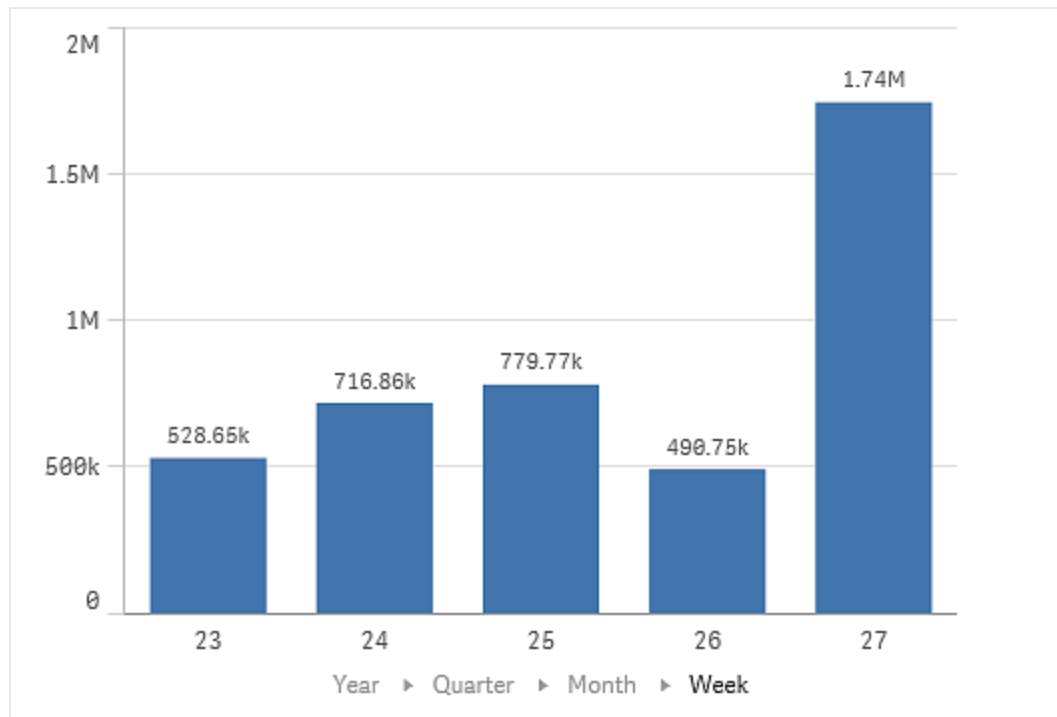
In the first example above, *Company* will be used as chart dimension until a single company is selected. The chart will then show *Department*. If a single department is selected, the chart will switch to *Employee*.

As selections are reverted, so that more than one value becomes possible in the upper fields of the group's field list, the chart is automatically drilled back up.

Drill-up

The drill-up function is available in bar charts, pie charts, and line charts. Other visualizations reflect the changes made in the charts, but cannot themselves be used to drill up through the different dimensions. When you drill down in a dimension group, breadcrumbs provide links back to the previous dimensions. Click the dimension that you want to drill up to.

In the following bar chart, the breadcrumbs *Year > Quarter > Month* enable drilling up.



6.3 Calculated dimensions

You can use expressions to create calculated dimensions. A calculated dimension consists of an expression involving one or more fields. All standard functions may be used.



For performance reasons, it is recommended to perform all calculations in the data load editor. When dimensions are calculated in the chart, Qlik Sense first calculates the dimension values, and then aggregates the measures for these calculated values, which affects the performance more than calculations in the load script.

There are cases when calculated dimensions are powerful in data analysis, for example, if you want to generate the dimensions values during analysis, when dimension values are dependent on the selections.

Calculated dimensions are also useful if you want to modify a field.

Once you have created a calculated dimension, you can use it as any other dimension.

Example:

You have a field called Calendar Month that includes each of the months of the year. In your app, you want include a table that shows the sales for each of the first 6 months of the year. For the rest of the months, you want to see a total. You can use an expression to create this calculated dimension.

Syntax:

```
If ([Calendar Month] < 7, [Calendar Month], 'Rest')
```

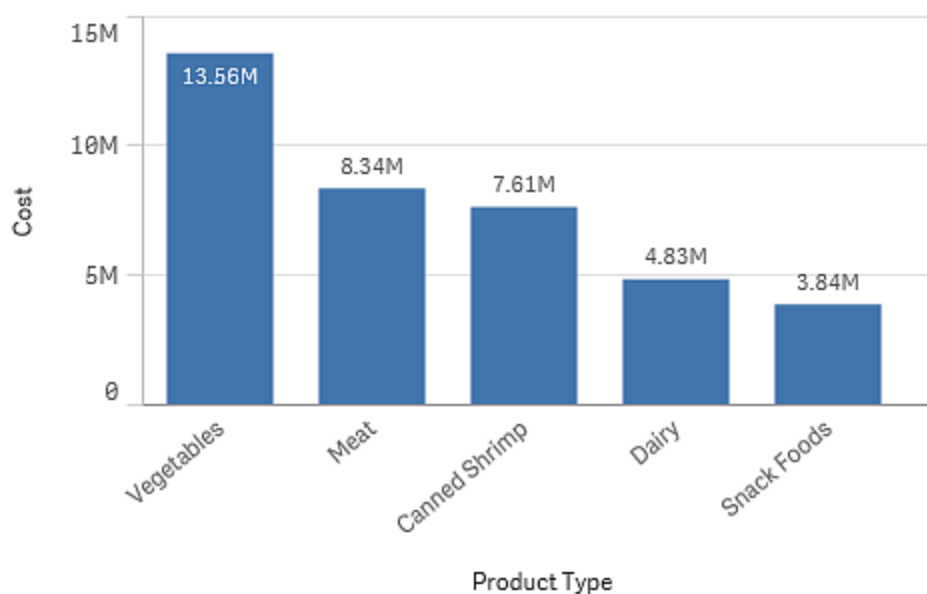
7 Measures

Measures are calculations used in visualizations, typically represented on the y-axis of a bar chart or a column in a table. Measures are created from an expression composed of aggregation functions, such as **Sum** or **Max**, combined with one or several fields.

A measure must have a name, and may also be supplied with descriptive data such as description and tags.

Example:

You can, for example, create a bar chart to visualize the cost of each type, by adding the *Product Type* dimension to the chart, and the measure *Cost*, which is made from the expression **Sum(Cost)**, that is the result of the calculation of the aggregation function **Sum** over the field **Cost**. The results are grouped by the *Product Type* dimension.



8 Data search

Data search makes it easier for you to find or filter in filter panes, selection items, and tables, and make selections in the resulting list.



Special conditions apply to the search tool that is available in the selections bar.

8.1 Search tool

The search tool is available when you are analyzing data on a sheet. The search tool works similar to a text search, with the difference that it must consist of at least two characters and you cannot use wildcards, expressions, operators, or anything similar to modify the search.

Example:

In the screenshot, the five strings in the text box generate five separate searches, although the two different categories *Region* and *Product Sub Group/Item Desc* will present the associated combinations of matches that are available in the database.

The screenshot displays the Qlik Sense search tool interface. At the top, a search bar contains the text "Milk Coffee bread eggs Nordic". Below the search bar, the results are displayed in two sections. The first section, titled "SEARCH STRINGS MATCHED: 5", shows results for "Region" (Nordic) and "Product Sub Group" (Milk, Eggs, Sliced Bread, Coffee). The second section, titled "SEARCH STRINGS MATCHED: 4", shows results for "Region" (Nordic) and "Product Sub Group" (Milk, Eggs, Coffee). The background of the screenshot shows a blurred view of a Qlik Sense dashboard with various charts and tables.

8.2 Text search

As you type your search string, Qlik Sense filters the field values and displays the matching items. If you perform a normal search (without wildcards), strings that match the search string are displayed. If you use several strings, separated by blanks, each of these is interpreted as a separate search string and displays all field values that contain either of the strings. If you want the separate search strings to be interpreted as only

one string, use quotation marks (" ") to link the strings together. You can also use a plus sign (+) for a similar result. By using a plus sign, you set the condition that strings with a plus sign must be included in the matching items. However, the strings need not necessarily be next to each other, nor in the same order as they were entered.



Search is not case sensitive.

Example	Result
"orange juice"	Only finds field values that contain the whole string 'orange juice'.
orange juice	Without the quotation marks, all fields that contain either 'orange' or 'juice' would be displayed.
+orange +juice	Finds matches such as 'orange juice', 'orange and apple juice' and 'juice from oranges'

Wildcards

You can use one or several wildcards in a search string. The following wildcards can be used:

Wildcard	Representation
*	Zero or more characters, including blank. This wildcard is flexible and matches any character or any block of characters in a specific position.
?	A single character, including blank. This wildcard is useful when you suspect that a string may be misspelt, when you are unsure of the spelling, or when the string contains special characters that may be difficult to reproduce correctly.



*If you use wildcards, only those records that match the entire search string are displayed, that is, a blank does not imply a logical OR. The search string '*creamed' does not get a match on 'Rocky's creamed corn' since the value does not end with 'creamed'. Neither does 'creamed*' result in a match on 'Rocky's creamed corn', since the value does not start with 'creamed'.*

Example	Result
a*	Finds all values that begin with the letter 'a', including strings with several words where the first word begins with an 'a'.
*b	Finds all values that end with the letter 'b', including strings with several words where the last word ends with a 'b'.
c	Finds all values that contain the letter 'c', including strings with several words.

<code>r?ck</code>	Finds all values that have four letters and start with an 'r', followed by any character, and ending with 'ck', for example, 'rack', 'rick', 'rock', and 'ruck'
<code>r?? ???d</code>	Finds all values that consist of a three-letter word beginning with an 'r' and a five-letter word ending with a 'd'



*Space in a search string makes a difference. If you search for '*corn' you get matches on strings ending with, for example, 'popcorn' as well as 'corn'. If you use a space in your search string, '* corn', you only get matches that end with 'corn'.*

8.3 Fuzzy search

Fuzzy search is similar to a normal search, with the difference that it compares and sorts all field values according to their degree of resemblance to the search string. Fuzzy search is especially useful when items may be misspelled. Fuzzy search can also help you find multiple values that are nearly identical.

Begin your search string with a tilde " ~ " character. While typing, all values are sorted by the degree of resemblance to the search string, with the best matches at the top of the list. If you press Enter, the first value in the list is selected.

8.4 Numeric search

Numeric search is very similar to text search. The only difference is that the search string must begin with one of the relational operators ">", ">=", "<" or "<=".

Example	Result
<code>>900</code>	Finds all values greater than 900.
<code><=900</code>	Finds all values less than or equal to 900.
<code>>900<1000</code>	Finds all values greater than 900 and less than 1000.
<code><900>1000</code>	Finds all values less than 900 or greater than 1000.

8.5 Expression search

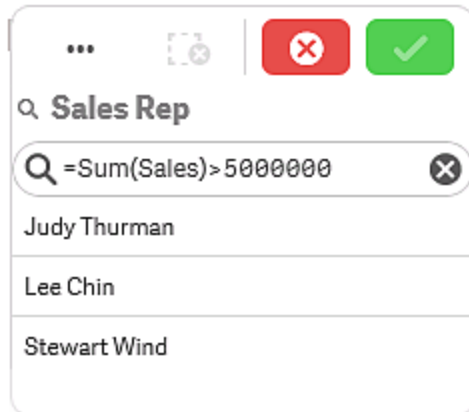
You can use expressions to search and select in filter panes and selection items.

An expression search always begins with an equals sign (=). The expression is evaluated for each field value in the search field. All values for which the search expression returns a non-zero value are selected.

In a filter pane with Sales values, you can use a search such as: `=Sum(Sales) > 1000000` to find values larger than 1,000,000. This is a simple search and you could get the same result by using the numeric search: `>1000000`. Often, an expression search is the only choice. For example, if you want to search for values in associated fields, you have to use an expression search.


Example:

Let us assume that you have a filter pane for sales representatives. You can then use an expression search for the sales representatives who have sales larger than, for example, 5,000,000. The search string is similar to the previous one: `=Sum(Sales) > 5000000`. Because the sales values are associated with the sales representatives, you can perform the search in the Sales Rep filter pane.



Sales representatives with sales larger than 5,000,000

9 Bookmarks

You can add bookmarks to save your selections and a particular location. The bookmarks can later on be opened to restore the selections to a former state. When you use the bookmark, you arrive at the sheet you were exploring when you created the bookmark. All bookmark tools are reached with  in the toolbar.

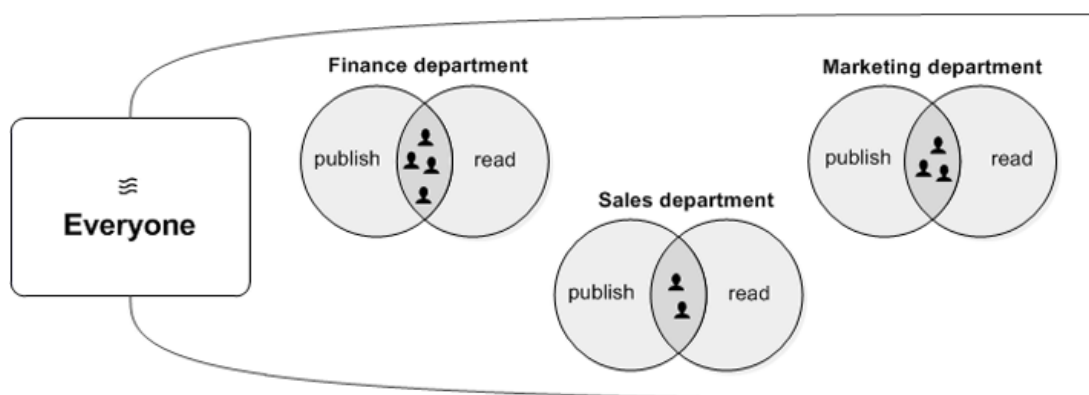
10 Streams

The content in the hub is organized in streams. A stream is a collection of apps that a group of users has specific access to. The users of the stream can have different access rights. Some users might only be able to read the content in the stream, while others might have the rights to publish their content to the stream.

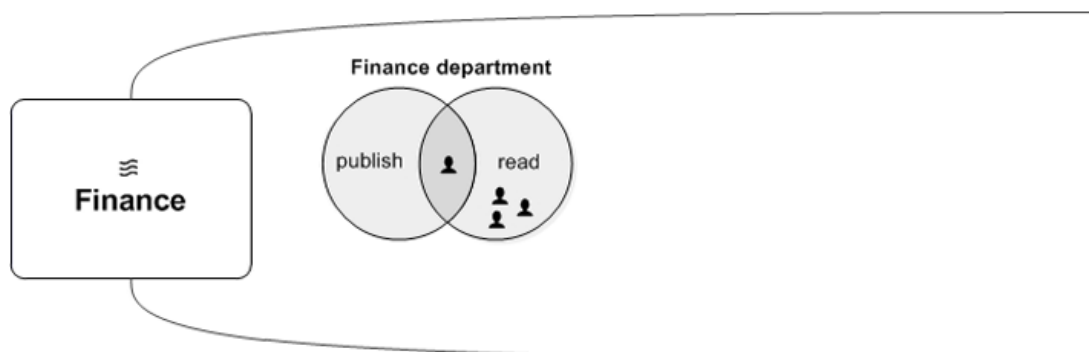
By default, Qlik Sense includes a stream called Everyone, which all users have both read and publish rights to.



An app can only be published to one stream. To be able to publish an app to another stream the app must first be copied and then published to the second stream.



In this example there are different departments within a company. All users within all departments have both read and publish rights in the stream Everyone.



Only users who belong to the finance department have access to the stream Finance. Some of the users have both publish and read rights and some only have read rights.

11 Publishing

Apps including sheets and stories can be published to streams. Additional sheets and stories can be published as a part of an app that is already published. Access rights control which users are allowed to publish different kinds of content.

11.1 Publishing apps

When you publish an app, the sheets and stories of the app will become available to the other users that have access to the stream that your published app belongs to.

When your app is published, it will be locked. This means that others will not be able to edit your published sheets and stories, but can use them to analyze the data. You can update sheets that you have published, and republish them.

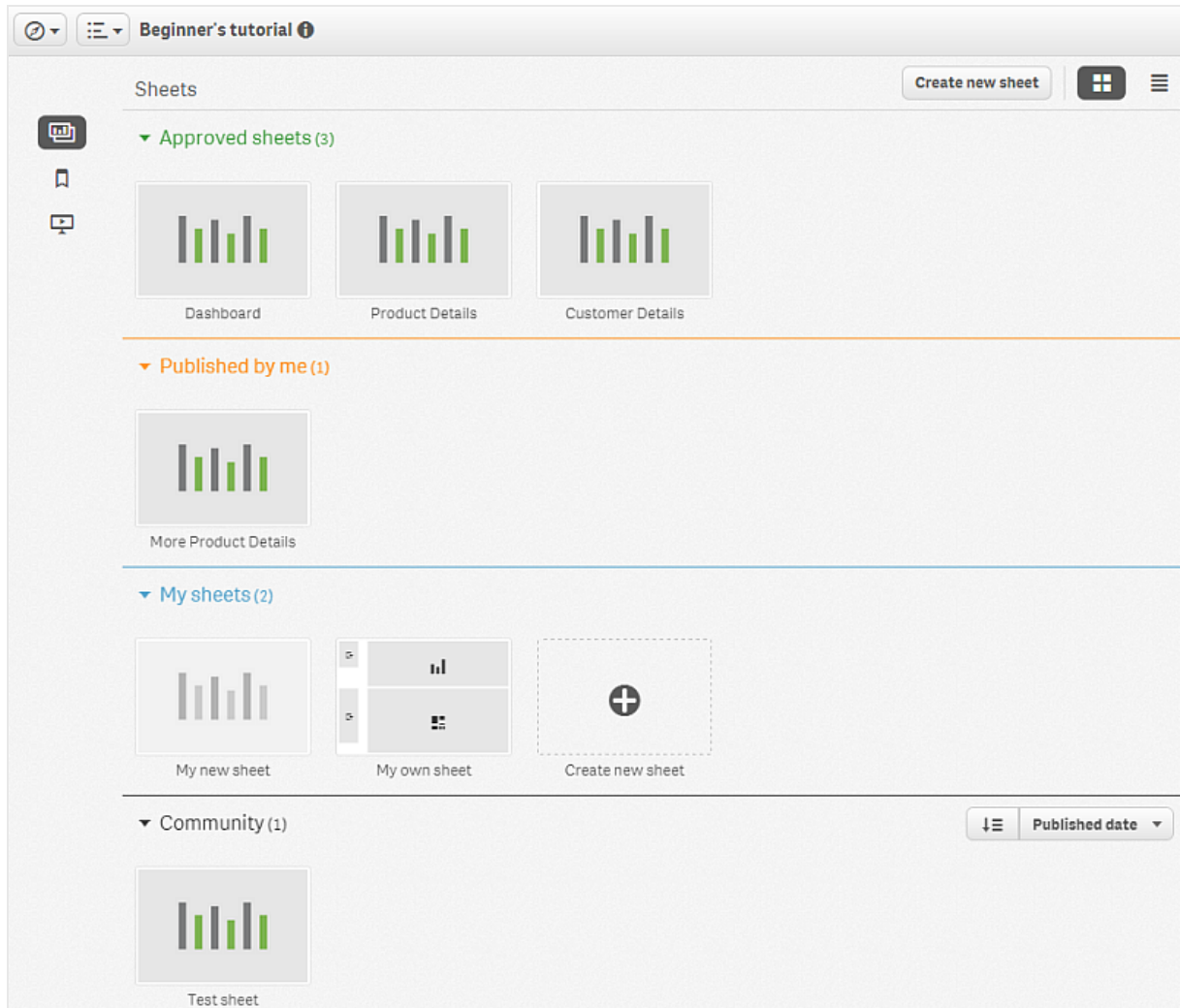
No one can edit the stories that were published with the app, but if you have the correct access rights, you can add private stories to a published app. When an app is published, only the master items and charts will be available, in the library panel, when editing your private sheets.

Apps are published from the Qlik Management Console.

11.2 Publishing sheets and stories

The private sheets and stories that you create as a part of a published app can be published, to be made available to all other users of the published app.

When working with a published app, sheets and stories are organized in sections in the app overview depending on their status.



Approved sheets / Approved stories	Sheets and stories that were included in the app when it was published. All users of the app have access to these.
Published by me	Sheets and stories that you have created and then published so that all the users of the app can access them. The other users will find these in their Community section.
My sheets / My stories	Sheets and stories that you have created but not published. No one else can see these.
Community	Sheets and stories that someone else has created and published to the app that you have access to.

12 Authorization and access

What you can see and do in Qlik Sense depends on what access rights your Qlik Sense system administrator has granted you. The access control includes controlling user authorization, setting up permissions and resources (for apps, sheets, and so on) but does not control what data you have access to.

Qlik Sense has a default behavior, for example:

- Only the owner of an unpublished app can see it.
- An app cannot be modified once it has been published.
- Only users with access to a stream can see the apps in that stream.

This means that you can see some parts of the user interface or perform some actions only when the app is in a specific state or when access has been granted to you.

Your Qlik Sense system administrator controls authorization and access to make Qlik Sense behave in a particular way. This is configured in the Qlik Management Console.

13 More concepts

Once you have learned about the fundamental concepts in Qlik Sense you can move on to read about more concepts for advanced features.

13.1 Data model

When you have loaded your data into Qlik Sense, you need to look at how the data is structured and arrange it to mirror the kind of data model you want to achieve.

Your goal should be to create a data model that enables efficient handling of the data in Qlik Sense. Usually this means that you should aim for a reasonably normalized star schema or snowflake schema without any circular references, that is, a model where each entity is kept in a separate table. In other words a typical data model would look like this:

- a central fact table containing keys to the dimensions and the numbers used to calculate measures (such as number of units, sales amounts, and budget amounts).
- surrounding tables containing the dimensions with all their attributes (such as products, customers, categories, calendar, and suppliers) .



In many cases it is possible to solve a task, for example aggregations, either by building a richer data model in the load script, or by performing the aggregations in the chart expressions. As a general rule, you will experience better performance if you keep data transformations in the load script.



It's good practice to sketch out your data model on paper. This will help you by providing structure to what data to extract, and which transformations to perform.

13.2 Data load script

Qlik Sense uses a data load script, which is managed in the data load editor, to connect to and retrieve data from various data sources. In the script, the fields and tables to load are specified. It is also possible to manipulate the data structure by using script statements and expressions.

During the data load, Qlik Sense identifies common fields from different tables (key fields) to associate the data. The resulting data structure of the data in the app can be monitored in the data model viewer. Changes to the data structure can be achieved by renaming fields to obtain different associations between tables.

After the data has been loaded into Qlik Sense, it is stored in the app. The app is the heart of the program's functionality and it is characterized by the unrestricted manner in which data is associated, its large number of possible dimensions, its speed of analysis and its compact size. The app is held in RAM when it is open.

13.3 Variables

A variable in Qlik Sense is a named entity, containing a single data value. A variable typically acquires its value from a **Let**, **Set** or other control statement. The value of a variable can normally be changed by the user at any time. Variables can contain numeric or alphanumeric data.

13.4 Fields

Fields hold the data that is used in Qlik Sense. Fields can be thought of as the data loaded from the load script. Fields contain one or more values, called field values, and at the basic level, correspond to columns in a database table, but can also exist in more than one table. Field values consists of numeric or alphanumeric data. When loaded from the load script, fields can be represented as a table visualization.

Example of data in a load script:

```
Temp:
LOAD * inline [
Customer Product UnitSales UnitPrice
Imagine Film 4 16
Imagine Film 10 15
Imagine Shutter 9 9
PhotoInc Shutter 5 10
PhotoInc Lens 2 20
PhotoInc Magnifier 4 25
Gallery Film 8 15
Gallery Lens 7 19
] (delimiter is ' ');
```

The fields represented in a data model table after having loaded the data:



Temp
Customer
Product
UnitSales
UnitPrice

The same fields as columns in a table visualization on a sheet:

Customer ▲	Product	UnitPrice	UnitSales
Gallery	Film	15	8
Gallery	Lens	19	7
Imagine	Film	15	10
Imagine	Film	16	4
Imagine	Shutter	9	9
PhotoInc	Lens	20	2
PhotoInc	Magnifier	25	4
PhotoInc	Shutter	10	5

13.5 Date & time fields

The date & time fields are derived fields, which are defined by a calendar template in the data load script, and generated when the script is run. The date & time fields appear in the assets panel and you can use them in visualizations.

13.6 Functions

A function is a type of procedure or routine that performs a specific task on data in apps. Qlik Sense provides several hundred functions that can be used for various purposes, such as: to perform calculations, interpret data or system information, determine conditions, and so on.

Many functions can be used both in the data load editor and in visualizations. Some functions are specific to visualizations (chart functions), and others are specific to the data load editor (script functions).

Functions are often, but not always, used in expressions.

The following list shows some examples of functions:

- **Max**: an aggregation function that can be used in scripts and charts.
For example: **Max(Sales)** calculates the highest value in the field Sales.
- **IF**: a conditional function that can be used in scripts and charts.
For example: **IF(Amount>0, 'OK','Alarm')** determines if the condition 'is the value of Amount greater than zero?' is met. If it is, OK is written, otherwise Alarm is written.
- **Date#**: an interpretation function that can be used in scripts and charts.
For example **Date#(A)** takes the input value **A** and evaluates it as a date.



For detailed reference regarding script functions and chart functions, see the Qlik Sense online help.

13.7 Expressions

An expression is a combination of fields, variables, operators, functions, numbers, and mathematical symbols put together according to a special syntax in order to calculate a value. Expressions are used both in scripts and in chart visualizations. They can be simple, involving only basic calculations, or complex, involving functions fields and operators.

In a script, an expression is evaluated as the script execution passes it by. In visualizations (including charts and tables), expressions are evaluated automatically whenever any of the fields, variables or functions that the expression contains change value or logical status.

Expressions can be used in several different situations. The difference between measures and expressions is that expressions have no name or descriptive data.



A few differences exist between script expressions and chart expressions in terms of syntax and available functions.



For detailed reference regarding script functions and chart functions, see the Qlik Sense online help.

13.8 Master items

Master items are reusable assets such as visualizations, dimensions and measures that you can use throughout your app. You create and use master items to apply global changes to your visualizations, dimensions and measures.

Master items are very useful, you can use, for example, a master dimension in as many of your visualizations as you like and maintain it in just one place. Any updates you make to the master item will be applied everywhere the master item is used.

13.9 Story

In data storytelling, you use a story to collect and present insights and ideas to your audience. A story is presented as a timeline with one or more slides, and can be based on traditional data storytelling structures (such as a three-act play, hero's journey, and so on).

Stories are contained within an app. As there is a connection from a story to its app it is possible for you to access the live data to discover new and hidden stories.

To build a story you use time-based snapshots of your data visualizations and embedded sheets and place them on the story's timeline.

You can, for instance add text and shapes, put emphasis on certain insights with visual effects, apply styling, and so on, to make the story compelling and engaging, and its purpose very clear.

13.10 Snapshot

A snapshot is a graphical representation of the state (type and data) of a data object at a certain point in time that you can use when you build stories. The snapshot you take is a copy of the state. This means that the state of the snapshot does not change when the state of the corresponding data object gets updated.

Snapshots capture individual objects on a sheet during the analysis process. They store the visualization and data as you see it at that time enabling you to use them at a later point in time to tell a story. Each snapshot contains a bookmark back to the original context so that you quickly get access to the live data.



A snapshot's state and selections will not be updated at a data reload. It will always reflect the data that existed at the point in time the snapshot was taken.

13.11 Embedded sheet

If you use embedded sheets in a story you can make selections in the embedded sheets, while playing the story. This means that you can show your insights for your audience by making selections, without going to the app itself.

When you play a story you can make and reset selections in the embedded sheets just as you can in a sheet, in sheet view.

13.12 Qlik Cloud

Qlik Cloud is a platform for sharing Qlik Sense apps, so that you can collaborate with others and make data discoveries together. Additionally, users can access the app from any device, including mobile devices, with an Internet connection and a modern web browser.

After building an app in Qlik Sense Desktop, you can upload it to Qlik Cloud. Once uploaded, you, as the owner of the app, can share the app with others. All users see the same app, with the same data. Once shared, you can leverage the rich set of analytical features available in the full version of Qlik Sense. However, apps shared using Qlik Cloud are only available for interaction, that is, users can make selections in the data, but apps shared to the cloud cannot be updated or developed further.

You manage how your apps are shared from the Qlik Cloud hub. From this hub, you can invite other users to view your apps. You can also monitor which users have accepted their invitation and registered to view the apps in Qlik Cloud. If necessary, you can stop sharing with users as you choose.

13.13 Direct Discovery

The Direct Discovery capability in Qlik Sense expands the potential use cases for Business Discovery, enabling business users to conduct associative analysis on larger data sources. It provides the complete associative experience of Qlik Sense on top of data coming directly from larger external data sources, and enables users to combine that big data with data stored in memory. With Direct Discovery, you can leverage any data useful for analysis without scalability limitations.

The Direct Discovery capability combines the associative capabilities of Qlik Sense in-memory data set with a query model where not all of the source data is directly loaded into the Qlik Sense data model. The aggregated query result is passed back to user interface so the Direct Discovery data set is part of the associative experience. You can navigate both on the in-memory data and the Direct Discovery data as a unified set.

You can create visualizations to analyze data from the combined data sets, make selections in either of the in-memory or Direct Discovery data, and see associations across them with the same characteristic Qlik Sense colours; green, white, and grey.

In order to use Direct Discovery in Qlik Sense, you must use special functions in the data load script. The way you create visualizations from Direct Discovery fields differs somewhat from working with other data sources, and since all the data is not kept in-memory, there may be performance issues when large amounts of data are retrieved.