



Creating Visualizations

Qlik® Sense

1.1

Copyright © 1993-2015 QlikTech International AB. All rights reserved.



Copyright © 1993-2015 QlikTech International AB. All rights reserved.

Qlik®, QlikTech®, Qlik® Sense, QlikView®, Sense™ and the Qlik logo are trademarks which have been registered in multiple countries or otherwise used as trademarks by QlikTech International AB. Other trademarks referenced herein are the trademarks of their respective owners.

1 About this document	7
2 Creating sheets for structure	8
2.1 Creating a new sheet	8
2.2 Changing the title and description of a sheet	8
2.3 Changing the thumbnail of a sheet	9
2.4 Copying, replacing and moving items on sheets	10
Copying items	10
Replacing items	10
Moving items to another sheet	11
2.5 Duplicating a sheet	11
Duplicating a sheet from app overview	11
2.6 Renaming a sheet	12
Renaming a sheet in grid view	12
Renaming a sheet in list view	12
2.7 Deleting a sheet	12
Deleting a sheet in grid view	12
Deleting a sheet in list view	12
3 Designing visualizations	14
3.1 The purpose	14
3.2 Understand the data	14
3.3 Use well-known design patterns	14
3.4 Design individual elements to reveal the data	14
3.5 Avoid the pitfalls of data visualization	15
Color abuse	15
Misuse of pie charts	15
Visual clutter	15
Poor design	15
Bad data	15
3.6 When to use what type of visualization	15
3.7 Guidelines for visualizations, fields, and naming	16
Max number of visualizations	16
Upper limits on name lengths	16
Naming dimensions and measures	16
Conventions for number and time formats	17
Number formats	17
Special number formats	17
Dates	18
Times	19
Time stamps	20
3.8 Create new visualizations	20
Creating a new bar chart	20
Creating a new combo chart	21
Creating a new filter pane	21
Creating a new gauge	22

Creating a new KPI	22
Creating a new line chart	23
Creating a new map	23
Creating a new pie chart	24
Creating a new scatter plot	24
Creating a new table	25
Creating a new pivot table	25
Creating a new text & image	25
Creating a new treemap	26
Creating a new visualization using master items	26
Adding a chart to a sheet	26
Adding a master dimension	27
Adding a master measure	27
Adding a master measure to a combo chart	27
Creating a new visualization from fields	27
Adding a chart to a sheet	27
Adding a dimension from a field	28
Adding a measure from a field	28
Using system fields in a visualization	28
Using date & time fields in a visualization	30
3.9 Editing a visualization	31
Change the appearance of a visualization	31
General	32
Presentation	33
Colors and legend	35
X-axis and Y-axis	36
Coloring by expression	37
Visualizations that support color by expression	37
Supported expression formats	37
Creating an expression	38
Change the data of a visualization	40
Adding dimensions	40
Adding measures	40
Master items	42
Editing a dimension	42
Editing a measure	43
Invalid dimensions and measures	43
Deleting dimensions and measures	43
Adding a dimension	43
Adding a dimension from master items or fields	44
Adding a measure	44
Change the sorting of a visualization	45
Sorting in the dimensions and measures sections	46
Internal sorting	46
Default sorting	47

Unlinking from a master dimension	48
Unlinking from the properties panel	48
Unlinking from a master measure	48
Unlinking from the properties panel	48
Changing the title of a visualization	49
3.10 Editing a text & image	49
Creating a link	49
Removing a link	50
Adding an image	50
Adding a measure	50
Deleting a measure	51
3.11 Converting a visualization	51
3.12 Copying a visualization	51
3.13 Moving a visualization	52
3.14 Replacing a visualization	52
3.15 Resizing a visualization	53
3.16 Showing a visualization in full screen	53
Touch device interaction	53
Computer (mouse) interaction	54
3.17 Unlinking from a master visualization	54
Unlinking using é	54
Unlinking from the shortcut menu	54
3.18 Deleting a visualization	54
4 Using expressions in visualizations	56
4.1 Working with the expression editor	56
Inserting an expression by selecting from the Fields panel	57
Adding or editing an expression by typing	57
Rules for expressions	58
Detailed syntax help	58
4.2 Using functions in charts	58
4.3 Set analysis and set expressions	59
Creating set expressions	59
Identifiers	60
Operators	61
Modifiers	61
5 Working with master items	63
5.1 Create master dimensions	63
Creating a master dimension from a field	63
Creating a master dimension from the assets panel	64
Creating a drill-down dimension	65
Creating a calculated dimension	66
Using a common function	67
Adding an expression by typing	67
Adding an expression through the properties panel	67

Detailed syntax help	68
Adding the descriptive data for the dimension	68
5.2 Create master measures	68
Creating a master measure from a field	68
Creating a master measure with a common aggregation function	69
Creating a master measure by typing the expression	70
5.3 Creating a master visualization	71
5.4 Editing a master dimension	72
5.5 Editing a master measure	72
5.6 Editing a master visualization	73
5.7 Tagging master items	73
Adding tags to a master item	73
Previewing tags	74
5.8 Deleting a master dimension or master measure	75
Replacing an invalid dimension or measure	76
5.9 Deleting a master visualization	76
Replacing an invalid visualization on a sheet	77
Deleting an invalid visualization	77
6 Searching in the assets	78
7 Designing visualizations with Direct Discovery	79
7.1 Direct Discovery fields in visualizations	79
DIMENSION	79
MEASURE	79
DETAIL	79

1 About this document

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.

Read and learn how to create and customize sheets and visualizations in your app. You will also learn about creating reusable master items, and about expressions in visualizations.

Make sure to see the Concepts in Qlik Sense guide to learn more about each visualization, to find what visualization is most useful for different purposes, and much more.

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:

- Concepts in Qlik Sense
- Working with Apps
- 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 Creating sheets for structure

Sheets provide a way of structuring your ideas and purposes for your app. When you create an empty app, it is good practice to first build a structure of empty sheets, where each sheet represents an idea or a goal. This will give you, and others who you will share your app with, a good overview of the app.

For example, let us say that you want an overview of your business's key metrics, an analysis of revenues, and a way to show how each sector and salesperson is performing each month, quarter, and year. Instead of having all this information in one place, you could structure it by having one sheet for the key metrics, one for the revenues, and one for the performances.

My sheets





Each sheet has a purpose and an idea of its own

This section describes how you can create and modify sheets, add descriptions, change the properties of sheets, and much more.

2.1 Creating a new sheet


You can create a new sheet to the app from the app overview or from the sheet navigator.

Do the following:

1. From the app overview, click  to view the sheets.
2. Click  or **Create new sheet**.
3. Give your sheet a title and add a description.
4. Click outside the text area to save the title and description.

A new sheet is created.








You access the sheet navigator from the sheet view by clicking  in the toolbar.

2.2 Changing the title and description of a sheet

You can change the title and description of your sheets.

Do the following:

1. In the app overview, click  to view the sheets.
2. Do one of the following:
 - If you are in grid view, , click the sheet title followed by clicking .
 - If you are in list view, , click .
3. Edit **Title** and **Description**.
4. Click outside the text area.

The changes you made are saved.










You can also change a sheet's title and description in the sheet navigator at the top right or in the properties panel.

2.3 Changing the thumbnail of a sheet

You can replace the default thumbnail of a sheet with another thumbnail, to make it easier to distinguish between sheets in the app overview and in the sheet navigator. You can use one of the default images, or an image of your own.

Do the following:

1. In the app overview, click  to view the sheets.
2. Do one of the following:
 - If you are in grid view, , click the sheet title followed by clicking .
 - If you are in list view, , click .
3. Click  on the default thumbnail.
A folder with images opens.
4. Select the image you want to use as a thumbnail for the sheet and click **Apply**.
5. Click  again.

The image you selected is now used as a thumbnail for the sheet, and is visible in the sheet navigator and in the app overview.



You can also change a sheet's thumbnail in the sheet navigator at the top right or in the properties panel.




The optimal aspect ratio of a thumbnail is 8:5 (width:height).



For Qlik Sense: If the folder is empty, or you want to add your own images, you need to use the Qlik Management Console to upload images to the folder.

For Qlik Sense Desktop: If the folder is empty, or you want to add your own images, you find the folder at: <user>\Documents\Qlik\Sense\Content\Default

The following formats are supported: .png, .jpg, .jpeg, and .gif.




If you want to revert to the default thumbnail, click  in the upper left corner of the thumbnail while editing the sheet details.



You can only add or change the thumbnail of an unpublished sheet.

2.4 Copying, replacing and moving items on sheets



You can copy, replace and move items on a sheet and between sheets. You can do this in the following ways:

- Using the edit bar on the sheet (,  and )
- Using the shortcut menu options **Cut**, **Copy** and **Paste** (or **Paste and replace**).
- With the keyboard shortcuts Ctrl+C, Ctrl+X and Ctrl+V.

Copying items

Follow this procedure when you want to make a copy of an existing item.

Do the following:

1. While editing a sheet, click on the item you want to copy.
The item is highlighted.
2. On the edit bar, click .
3. To insert the item on another sheet, navigate to the sheet via the sheet navigator.
4. Click  to paste the item.

The copied item is added to the sheet.





If there is no empty space on the sheet, then the largest item will reduce in size by half to make space for the copied item.

Replacing items

Follow this procedure when you want to replace an existing item with the one you have just copied.

Do the following:

1. While editing a sheet, click on the item you want to copy.
The item is highlighted.
2. On the edit bar, click .
3. Click on the item you want to replace.
The item is highlighted.
4. Click  to replace the highlighted item with the copied one.

The copied item replaces the highlighted one.





If you want to deselect the visualizations on the sheet, press Esc.

Moving items to another sheet

To move an item between two sheets you first cut it out from one sheet and then paste it onto another sheet.

Do the following:

1. While editing a sheet, click on the item you want to move from one sheet to another.
The item is highlighted.
2. On the edit bar, click .
3. Navigate to the sheet you want to move the item to.
4. Click  to paste the item.

The moved item is added to the other sheet.


2.5 Duplicating a sheet

You can duplicate any sheet, regardless of whether it is a sheet that belongs to the app or a sheet you have created yourself. The purpose of duplicating sheets is to save time by reusing content, and to allow you to modify the duplicate so that it fits your needs better.

A duplicated sheet contains the same visualizations as the original sheet, and is linked to the same master items. The duplicated sheet is a standalone sheet with no connection to the original sheet. Duplicated sheets appear under **My sheets** in app overview and in the sheet navigator.

Duplicating a sheet from app overview

Do the following:

1. Click  on the left-hand side to show the sheets in the app.
2. Long-touch/right-click a sheet.
The shortcut menu opens.
3. Click **Duplicate**.

The new sheet is created, and you find it under **My sheets**.





You can also duplicate a sheet from the global menu in app overview or in sheet view, or, when in sheet view, using the sheet navigator.

2.6 Renaming a sheet

You can rename your sheets in the app overview.

Renaming a sheet in grid view



Do the following:

1. Click the title of the sheet you want to edit.
An area is expanded with detailed information about the item.
2. Click  in the expanded area.
3. Change the title.
4. Click  again.

The new title is saved.

Renaming a sheet in list view

Do the following:

1. Click  for the sheet you want to edit.
2. Change the title.
3. Click  again.



The new title is saved.

2.7 Deleting a sheet

You can delete sheets from the app overview.

Deleting a sheet in grid view

Do the following:



1. Click the title of the sheet you want delete.
2. Click .
3. Click .
4. In the dialog, click **Delete**.

The sheet is deleted.

Deleting a sheet in list view

Do the following:

2 Creating sheets for structure

1. Click  for the sheet you want to edit.
2. Click .
3. In the dialog, click **Delete**.

The sheet is deleted.



*In grid view as well as in list view, you can also long-touch/right-click on a sheet and select **Delete sheet**.*

3 Designing visualizations

3.1 The purpose

The point of a visualization is to communicate its data in a quick and meaningful way while remaining 100 % accurate. A visualization should serve a clear purpose and not overwhelm the users with unnecessary details. If possible, a visualization should be designed to encourage the users to compare its various elements so as to give insight into the meaning behind the data.

So, to design a data visualization to get its message through, you need to first understand the data itself. Then use well-known design patterns and use the type of visualization that reveals the data in the best way.

3.2 Understand the data

To design an effective visualization with a clear purpose, you should thoroughly understand your data. The following points will help you find the information you want to convey with your data:

- What kind of data is it? Nominal, ordinal, interval, or ratio data?
- How different parts of the data relate to each other?
- Can you organize the data in a way that makes it easy for you to create your visualizations?
- What do you want to communicate with your data?

It's easy to start thinking about how the visualization should look, but when you have answered these questions it will be easier to decide what kind of visualization you should use and how it will look and communicate its data.

3.3 Use well-known design patterns

When you have understood the data, how it is organized, and how its parts relate to each other, you should consider using well-known design patterns to communicate your data. For example, if you want to show how a measure behaves over time, you should use a line chart because its strength is that it tells your users a lot without their having to look at the specific details.

3.4 Design individual elements to reveal the data

Apart from the design pattern you choose, an effective visualization is also about how you design and make individual data elements stand out and reveal the data. In other words, the design of the individual elements of a visualization should reveal the data to your users in a quick and intuitive way. An easy way of achieving this is to use a different color on one of the dots in a group of many dots. The different color makes it much easier for you to find the dot and reduces your load of information. Other examples of intuitive design are:

- Position
- Orientation
- Size

- Shape
- Color hue, brightness and saturation

3.5 Avoid the pitfalls of data visualization

To experience the benefits of data visualizations you must avoid the pitfalls. Here are some common pitfalls:

Color abuse

Do not overdo colors. Be aware that the wrong color in the wrong place might cause confusion rather than clarity.

Misuse of pie charts

Avoid having pie charts side by side to compare. Try not to squeeze too much information into them.

Visual clutter

Too much information defeats the purpose of clarity. Use a maximum of nine KPIs and remove all visual clutter.

Poor design

A beautiful visualization is not necessarily the most effective. Use design best practices at all times.

Bad data

Spot and correct issues with your data before you present it. Do not let your visualization take the blame for bad information.

3.6 When to use what type of visualization

You use different charts and tables to present the data in a quick, understandable and meaningful way.

Charts present relationships among many values efficiently, and provide you with a way to analyze data at a glance. The best choice of chart type depends on the purpose of the visualization. For instance, tables are useful when you need to view precise values, and when you want to compare individual values to each other.

Here you find which visualizations that are suitable for different purposes.

Purpose	Recommended visualization type
Compare data side by side	Bar chart
Combine absolute and relative values	Combo chart
Make selections to reduce data set	Filter pane
Indicate ratio	Gauge
Display a performance value	KPI

Display trends over time	Line chart
Display point and area data	Map
Display ratio to total	Pie chart
Display correlation of measures	Scatter plot
Display numbers and values	Table
Display text, images, links, and measures	Text & image chart
Display hierarchical data	Treemap

3.7 Guidelines for visualizations, fields, and naming

There are certain conventions and limitations you need to be aware of when working with Qlik Sense. For example: the maximum number of characters to use in names, descriptions, and expressions, as well as characters reserved for use by Qlik Sense only.

Max number of visualizations

The maximum number of visualizations there can be on a sheet is limited to the number of cells on a sheet, that is, 288 (24x12). The maximum practical number will be less than this because of the limited use for visualizations that are made up of only 1 cell.

Upper limits on name lengths

The following limits apply to the number of characters that can be used in various situations in Qlik Sense:

Names (title, dimension, footnote...)	Max. 255 characters
Descriptions	Max. 512 characters
Expressions	Max. 8,192 characters
Tags	Max 31 characters per tag and max 30 tags per master item
Text & image chart	Max 12,000 characters

Naming dimensions and measures

When you name your dimensions and measures, it is recommended to avoid using some characters reserved for system purposes, as unpredictable results and errors could occur.

Avoid using the following characters in dimension and measure names:

Colon	:
Equals sign	=
Left bracket	[

Right bracket]
Left brace	{
Right brace	}
Dollar sign	\$

Conventions for number and time formats

In many interpretation and formatting functions it is possible to set the format for numbers and dates by using a format code. This topic describes the conventions used to format a number, date, time or time stamp.

These conventions apply both to script and chart functions.

Number formats

- To denote a specific number of digits, use the symbol "0" for each digit.
- To denote a possible digit, use the symbol "#". If the format contains only # symbols to the left of the decimal point, numbers less than 1 begin with a decimal point.
- To mark the position of the thousands separator or the decimal separator, use the applicable thousands separator and the decimal separator.

The format code is used for defining the positions of the separators. It is not possible to set the separator in the format code. Use the **DecimalSep** and **ThousandSep** variables for this in the script.

It is possible to use the thousand separator to group digits by any number of positions, for example, a format string of "0000-0000-0000" (thousand separator="-") could be used to display a twelve-digit part number as "0012-4567-8912".

Examples:

# ##0	describes the number as an integer with a thousands separator.
###0	describes the number as an integer with a thousands separator.
0000	describes the number as an integer with at least four digits. For example, the number 123 will be shown as 0123.
0.000	describes the number with three decimals.
0.0##	describes the number with at least 1 decimal and at most three decimals.

Special number formats

Qlik Sense can interpret and format numbers in any radix between 2 and 36 including binary, octal and hexadecimal. It can also handle roman formats.

Binary format	To indicate binary format the format code should start with (bin) or (BIN).
Octal format	To indicate octal format the format code should start with (oct) or (OCT).

Hexadecimal format	To indicate hexadecimal format the format code should start with (hex) or (HEX). If the capitalized version is used A-F will be used for formatting (for example 14FA). The non-capitalized version will result in formatting with a-f (for example 14fa). Interpretation will work for both variants regardless of the capitalization of the format code.
Decimal format	The use of (dec) or (DEC) to indicate decimal format is permitted but unnecessary.
Custom radix format	To indicate a format in any radix between 2 and 36 the format code should start with (rxx) or (Rxx) where xx is the two-digit number denoting the radix to be used. If the capitalized R is used letters in radices above 10 will be capitalized when Qlik Sense is formatting (for example 14FA). The non-capitalized r will result in formatting with non-capital letters (for example 14fa). Interpretation will work for both variants regardless of the capitalization of the format code. Note that (r02) is the equivalent of (bin), (R16) is the equivalent of (HEX), and so on.
Roman format	To indicate roman numbers the format code should start with (rom) or (ROM). If the capitalized version is used capital letters will be used for formatting (for example MMXVI). The non-capitalized version will result in formatting with lower cap letters (mmxvi). Interpretation will work for both variants regardless of the capitalization of the format code. Roman numbers are generalized with minus sign for negative numbers and 0 for zero. Decimals are ignored with roman formatting.

Examples:

num(199, '(bin)')	returns	11000111
num(199, '(oct)')	returns	307
num(199, '(hex)')	returns	c7
num(199, '(HEX)')	returns	C7
num(199, '(r02)')	returns	11000111
num(199, '(r16)')	returns	c7
num(199, '(R16)')	returns	C7
num(199, '(R36)')	returns	5J
num(199, '(rom)')	returns	cxcix
num(199, '(ROM)')	returns	CXCIX

Dates

You can use the following symbols to format a date. Arbitrary separators can be used.

D	To describe the day, use the symbol "D" for each digit.
M	<p>To describe the month number, use the symbol "M".</p> <ul style="list-style-type: none"> • Use "M" or "MM" for one or two digits. • "MMM" denotes short month name in letters as defined by the operating system or by the override system variable MonthNames in the script. • "MMMM" denotes long month name in letters as defined by the operating system or by the override system variable LongMonthNames in the script.
Y	To describe the year, use the symbol "Y" for each digit.
W	<p>To describe the weekday, use the symbol "W".</p> <ul style="list-style-type: none"> • "W" will return the number of the day (for example 0 for Monday) as a single digit. • "WW" will return the number with two digits (e.g. 02 for Wednesday). • "WWW" will show the short version of the weekday name (for example Mon) as defined by the operating system or by the override system variable DayNames in the script. • "WWWW" will show the long version of the weekday name (for example Monday) as defined by the operating system or by the override system variable LongDayNames in the script.

Examples: (with 31st March 2013 as example date)

YY-MM-DD	describes the date as 13-03-31.
YYYY-MM-DD	describes the date as 2013-03-31.
YYYY-MMM-DD	describes the date as 2013-Mar-31.
DD MMMM YYYY	describes the date as 31 March 2013.
M/D/YY	describes the date as 3/31/13.
W YY-MM-DD	describes the date as 6 13-03-31.
WWW YY-MM-DD	describes the date as Sat 13-03-31.
WWWW YY-MM-DD	describes the date as Saturday 13-03-31.

Times

You can use the following symbols to format a time. Arbitrary separators can be used.

h	To describe the hours, use the symbol "h" for each digit.
m	To describe the minutes, use the symbol "m" for each digit.
s	To describe the seconds, use the symbol "s" for each digit.
f	To describe the fractions of a second, use the symbol "f" for each digit.
tt	To describe the time in AM/PM format, use the symbol "tt" after the time.

Examples: (with 18.30 as example time):

hh:mm	describes the time as 18:30
hh.mm.ss.ff	describes the time as 18.30.00.00
hh:mm:tt	describes the time as 06:30:pm

Time stamps

The same notation as that of dates and times above is used in time stamps.

Examples: (with 31th March 2013 18.30 as example time stamp):

YY-MM-DD hh:mm	describes the time stamp as 13-03-31 18:30
M/D/Y hh.mm.ss.ffff	describes the time stamp as 3/31/13 18.30.00.0000

3.8 Create new visualizations

You use visualizations to present the data that is loaded into an app. You create visualizations, on sheets, from pre-defined charts and add dimensions and measures to make the visualizations complete.

There are various ways to create new visualizations, according to your preferences and depending on if the app is published or not.

When you have added the visualization to the sheet, you may want to adjust its appearance using the properties panel.

Creating a new bar chart

You can create a new bar chart on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty bar chart to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. Click **Add measure** and select a measure or create a measure from a field.

You can add dimensions and measures to the chart in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>



If you double-click or drag a measure from the panel on the left-hand side, a bar chart is added on the sheet using the measure. You only need to add a dimension to make the bar chart complete.

When you have created the bar chart, you may want to adjust its appearance and other settings in the properties panel.

Creating a new combo chart

You can create a new combo chart on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty combo chart to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. Click **Add measure** and select a measure or create a measure from a field.

You can add a dimension and one or more measures to the chart in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the combo chart, you may want to adjust its appearance and other settings in the properties panel.

Creating a new filter pane

You can create a new filter pane on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty filter pane to the sheet.
2. Click **Add dimension** and select a dimension or a field.

You can add dimensions to the filter pane in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>



If you double-click or drag a field or a dimension from the panel on the left-hand side, a filter pane is added to the sheet using the dimension. If you then double-click more dimensions, they are automatically added to the new filter pane.

When you have created the filter pane, you may want to adjust its appearance and other settings in the properties panel.

Creating a new gauge

You can create a new gauge on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty gauge to the sheet.
2. Click **Add measure** and select a measure or create a measure from a field.

You can add a measure to the gauge in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the gauge, you may want to adjust its appearance and other settings in the properties panel.

Creating a new KPI

You can create a new KPI on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty KPI chart to the sheet.
2. Click **Add measure** and select a measure or create a measure from a field.

You can add measures to the KPI in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the KPI, you may want to adjust its appearance and other settings in the properties panel.

Creating a new line chart

You can create a new line chart on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty line chart to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. Click **Add measure** and select a measure or create a measure from a field.

You can add dimensions and measures to the chart in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the line chart, you may want to adjust its appearance and other settings in the properties panel.

Creating a new map



To be able to create a map, you need to load point data or area data as described in the topic [Map in the Concepts in Qlik Sense guide](#).

You can add a new map to the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty map to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. Add a measure to the map (optional).

You can add a dimension to the chart in different ways:

From a data field. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the map, you may want to adjust its appearance and other settings in the properties panel.

Creating a new pie chart

You can create a new pie chart on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty pie chart to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. Click **Add measure** and select a measure or create a measure from a field.

You can add a dimension and a measure to the chart in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the pie chart, you may want to adjust its appearance and other settings in the properties panel.

Creating a new scatter plot

You can create a new scatter plot on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty scatter plot to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. Click **Add measure** and select a measure or create a measure from a field.
4. Click **Add measure** and select a measure or create a measure from a field.

You can add a dimension and measures to the chart in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the scatter plot, you may want to adjust its appearance and other settings in the properties panel.

Creating a new table

You can create a new table on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty table to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. Click **Add measure** and select a measure or create a measure from a field.

You can add dimensions and measures to the chart in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the table, you may want to adjust its appearance and other settings in the properties panel.

Creating a new pivot table

You can create a new pivot table on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty pivot table to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. Click **Add measure** and select a measure or create a measure from a field.

You can add dimensions and measures to the chart in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the pivot table, you may want to adjust its appearance and other settings in the properties panel.

Creating a new text & image

You can create a new text & image visualization on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty text & image chart to the sheet.
2. Click the text & image chart to open the editing toolbar.
3. Add and format text, images, hyperlinks or measures to the text & image chart.



If you double-click a text & image chart in the panel on the left-hand side, it is added to the sheet immediately.

Creating a new treemap

You can create a new treemap on the sheet you are editing.

Do the following:

1. From the panel to the left, drag an empty treemap to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. Click **Add measure** and select a measure or create a measure from a field.

You can add dimensions and a measure to the treemap in different ways:

From one or more data fields. (The Fields section is not available in a published app.)	<i>Creating a new visualization from fields (page 27)</i>
From master items.	<i>Creating a new visualization using master items (page 26)</i>
From the properties panel.	<i>Adding a dimension (page 43)</i>

When you have created the treemap, you may want to adjust its appearance and other settings in the properties panel.

Creating a new visualization using master items


When you are working with an unpublished app, you can create and use master dimensions and measures.

When you are working with a published app, you cannot create master items, but you have access to any master dimensions and measures that were included in the app when it was published.

Adding a chart to a sheet

You start creating a visualization by dragging a chart onto a sheet.

Do the following:

1. Click  **Edit** in the toolbar.
You find charts in the panel that opens on the left-hand side.
2. Drag a chart onto a sheet.

You can drop it in an empty location on the sheet, split the area of an existing visualization into two, or replace an existing visualization. You can also convert an existing visualization to another kind of visualization.



If you double-click a chart, it is added to the sheet immediately.

Adding a master dimension

You find the master dimensions in the left-hand panel when you are editing a sheet.

Do the following:

- Drag a dimension from the **Dimensions** category and drop it on the visualization.

The dimension is added to the visualization.

Adding a master measure

You find the master measures in the left-hand panel when you are editing a sheet.

Do the following:

- Drag a measure from the **Measures** category and drop it on the visualization.

The measure is added to the visualization.

You now have a complete visualization that you can start using while exploring the data in the app.

Adding a master measure to a combo chart

The procedure is slightly different when creating a combo chart.

Do the following:

1. Drag a measure from the **Measures** category and drop it onto the visualization.
2. Click **Add "<measure name>"**.
3. Select how to visualize the measure by clicking one of the following: **As bar**, **As line** or **As marker**.

The measure is added to the visualization.


Creating a new visualization from fields

When you are editing a sheet in an unpublished app, you find charts and fields in the assets panel on the left-hand side. You can use fields to quickly add dimensions and measures to a visualization.

Adding a chart to a sheet

You start creating a visualization by dragging a chart onto a sheet.

Do the following:

1. Click  **Edit** in the toolbar.
You find charts in the panel that opens on the left-hand side.
2. Drag a chart onto a sheet.
You can drop it in an empty location on the sheet, split the area of an existing visualization into two, or replace an existing visualization. You can also convert an existing visualization to another kind of visualization.




If you double-click a chart, it is added to the sheet immediately.

Adding a dimension from a field

You find all the fields in the data model on the **Fields** tab of the assets panel.

Do the following:


1. Click  in the assets panel to open the **Fields** tab.
2. Drag a field onto the visualization.
3. Select to use the field as a dimension.

The field is added to the visualization as a dimension.

Adding a measure from a field

You can use fields to quickly add measures based on some common aggregation functions.

Do the following:

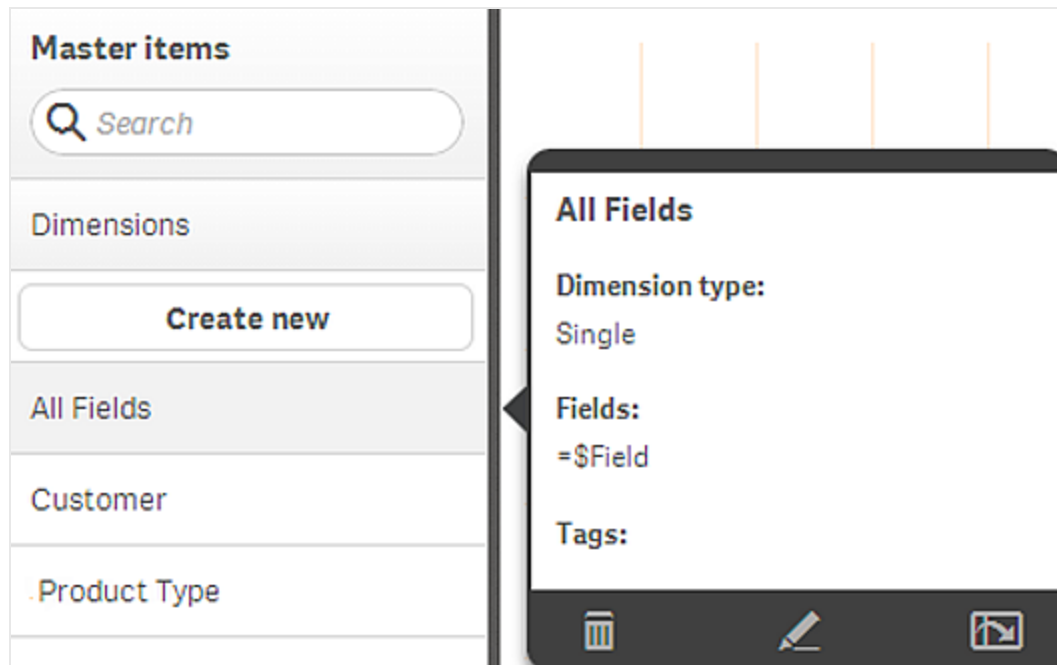
1. Click  in the assets panel to open the **Fields** tab.
2. Drag a field onto the visualization.
3. Select to use the field as a measure.
4. Select one of the common aggregation functions to use in combination with the field to create an expression.

The expression is added to the visualization as a measure.

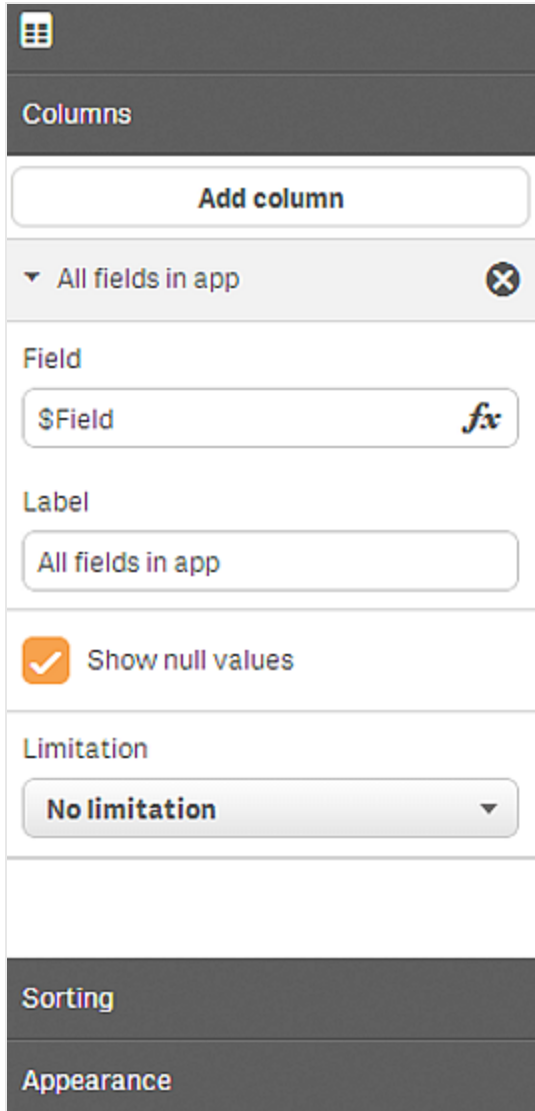
You now have a complete visualization that you can start using while exploring the data in the app.

Using system fields in a visualization

You can use system fields in a visualization. System fields are created by Qlik Sense when the data load script is generated, and include information about the fields and tables in the loaded data. A system field begins with "\$", and you need to reference it by typing the field name including the "\$" manually. You can use a system field to create a dimension either as a master item or from the properties panel.



Preview of a dimension based on a system field

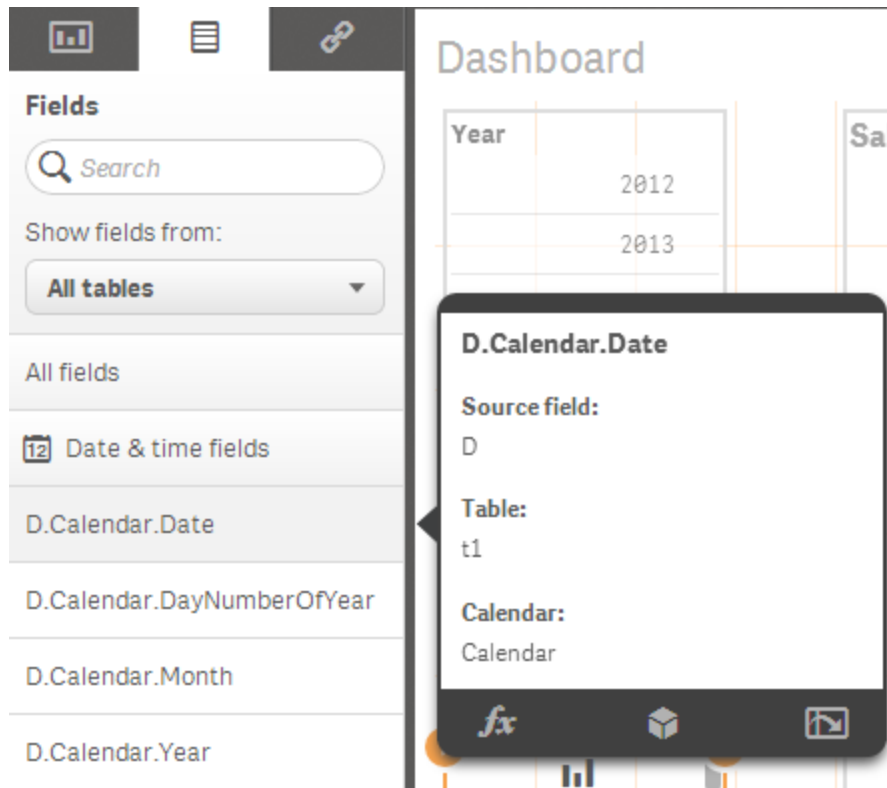


The image shows a screenshot of the Qlik Sense properties panel. The 'Columns' section is active, displaying a list of fields. The 'Field' dropdown is set to '\$Field' with a formula icon. The 'Label' dropdown is set to 'All fields in app'. The 'Show null values' checkbox is checked. The 'Limitation' dropdown is set to 'No limitation'. Below the 'Columns' section are 'Sorting' and 'Appearance' sections.

A system field added as dimension in the properties panel

Using date & time fields in a visualization

You can use date & time fields in visualizations. These 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 in the **Fields** tab in the **Date & time fields** section.






Preview of a derived date & time field

3.9 Editing a visualization

To make a visualization look its best and show the data in a way that is easy to understand, you can edit its properties in the properties panel. This could, for instance, be titles, descriptions, vertical or horizontal presentation and colors. It could also be how to sort the data (by measure, by dimension), which labels to show, and so on.

Do the following:

1. Click  **Edit** in the toolbar.
The properties panel for the sheet opens to the right. (If it is hidden, click  in the lower right-hand corner.)
2. Click the visualization that you want to edit.
The properties panel now shows the properties of the visualization.
3. Make your changes in the properties panel.
4. Click  **Done** in the toolbar.

Change the appearance of a visualization

The **Appearance** section in the properties panel offers several options to set and modify the appearance of a visualization. Many of the settings have **Auto** options that support an optimal presentation of the

visualization, taking into account the number of dimensions and measures and the type of data used. Normally, you do not need to change these settings, unless you have a special reason for doing so, for example, when space is very limited.

Appearance can be affected by the sorting of the dimensions and measures.

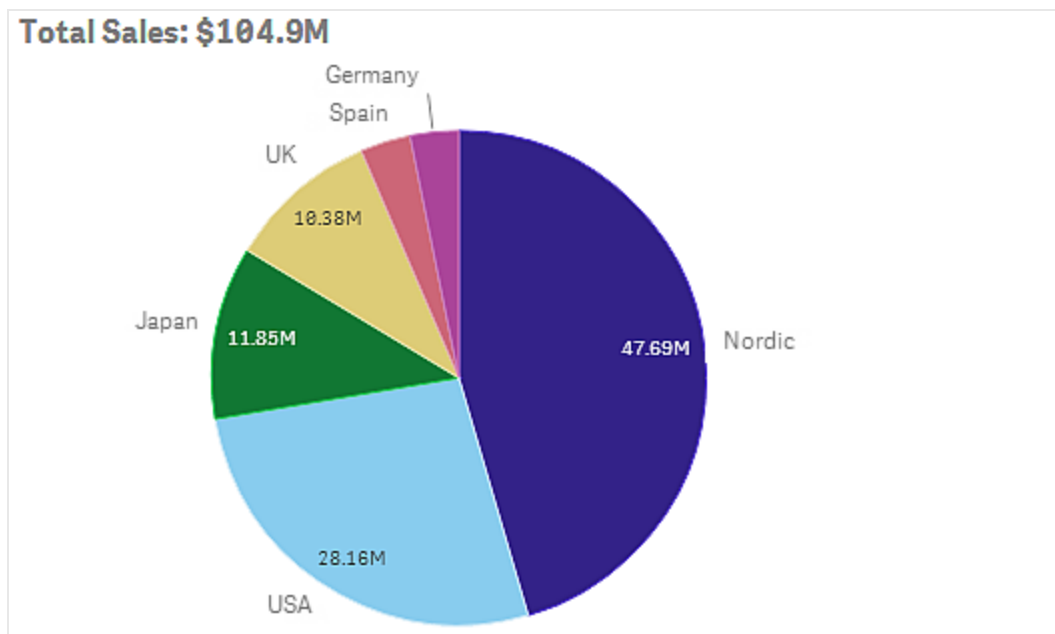
General

Show titles: On by default in all visualizations except filter panes and text & image visualizations. Filter panes have the name of each dimension, and in most cases do not need any additional title. The text & image visualization includes an editing toolbar with many options to format the text, and therefore the title field can be used for other purposes.

Title, Subtitle, and Footnote: Apart from the obvious use of title, subtitle, and footnote as text fields, you can use these fields to also display an expression, which provides additional information that complements the measure in the visualization. You could, for example, show the totals in the title field, so that the totals of the selected values are always available.

Example:

In the following image, the total sales are calculated and used in the title. When a selection is made, the total sales are updated accordingly.



The following string was used to add the *Total Sales* expression to the field **Title**:

```
= 'Total Sales: $' & Round(Sum(Sales)/1000000, 0.1) & 'M'.
```

Because the title field is primarily a text field, it is necessary to start the string with an equals sign (=), to signify that the string contains an expression.

Because *'Total Sales: \$'* is a text string when it is used in an expression, the string must be surrounded by single quotation marks.

& is used to concatenate the string and the expression.

Round(Sum(Sales)/1000000, 0.1) is the expression. The aggregation *Sum(Sales)* is divided by 1000000 and the function *Round (x,0.1)* reduces the number of decimals to one.

& 'M', finally, concatenates the expression with the unit *M* for million.

For the title there are three options for adding an expression:

- Directly in the title field of a visualization. Start the string with an equals sign (=).
- Directly in the box **Title** under **Appearance** in the properties panel. Start the string with an equals sign (=).
- Through the expression editor in the box **Title**. Click *fx* to open the expression editor. No equals sign is needed.

For the subtitle and footnote only the last two options are available.

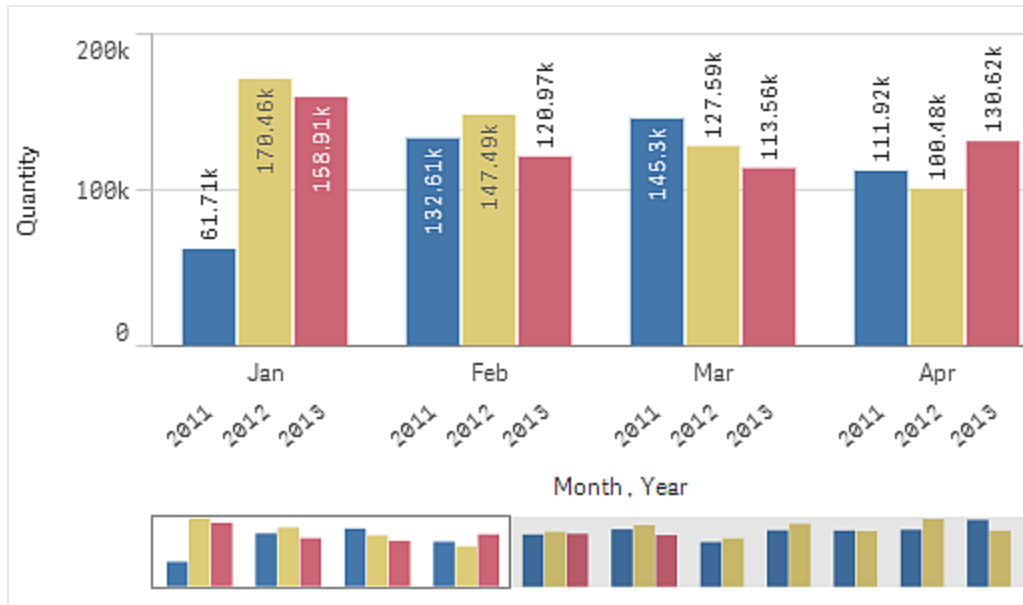
Presentation

Many of the presentation settings only apply to a certain visualization.

Bar chart	Set the bars to be displayed grouped or stacked, vertically or horizontally.
Gauge	Set the gauge to be displayed as a radial or a bar. You can set range limits and use segments with limits.
Line chart	Set the line chart to be displayed as a line or an area.
Pie chart	Set the pie chart to be displayed as a pie or a donut.
Scatter plot	Set the size of the bubbles in a scatter plot.
Table	Set the totals to be displayed at the top, bottom, or not at all.
Treemap	Set the headers, labels, overlay labels, and leaf values. Select to show the data values.

Example:

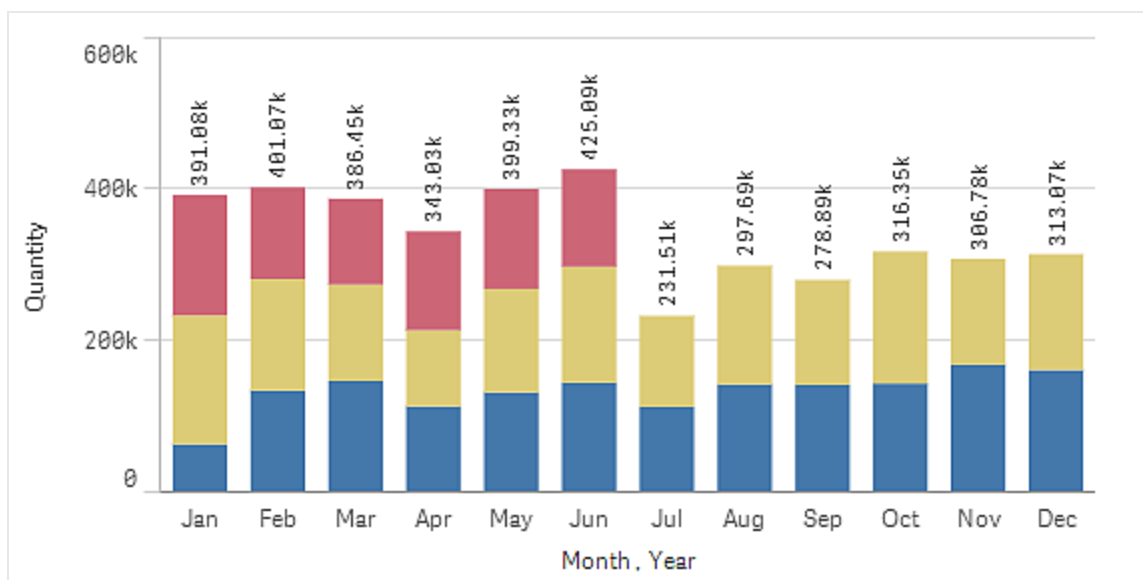
A bar chart with two dimensions is by default presented with the bars grouped.



Let us assume that you want to compare the total monthly quantity for these years. Then it would be a good idea to switch to a stacked bar chart.

In the properties panel, under **Appearance > Presentation** there is an option **Stacked**.

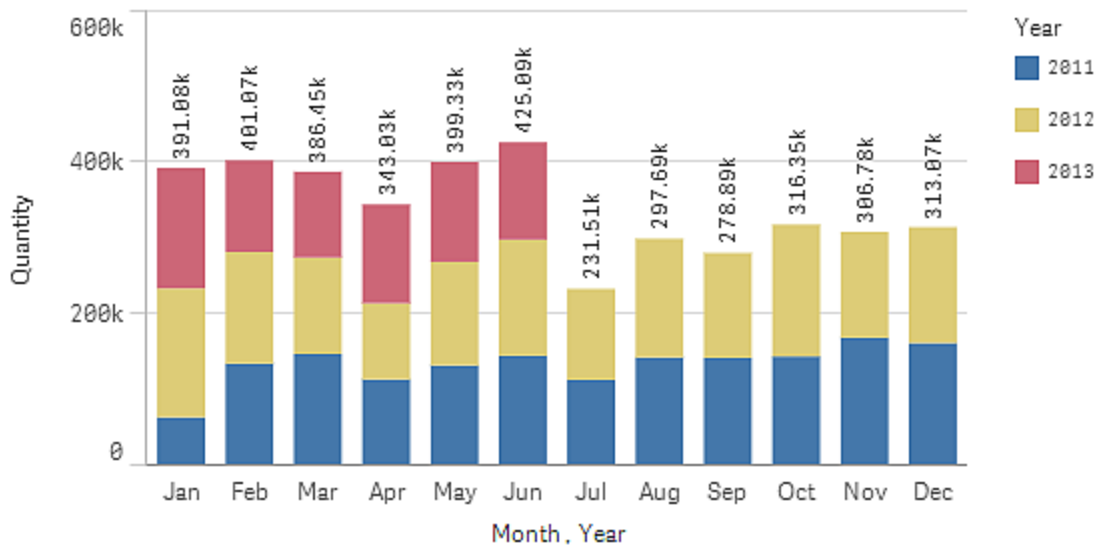
With stacked bars it is easier to compare the quantity between different months.



Now it is quite easy to compare the quantities per month, but the years are no longer visible. You can add a legend to display the years.

In the properties panel, under **Colors and legend** there is a **Show legend** button.

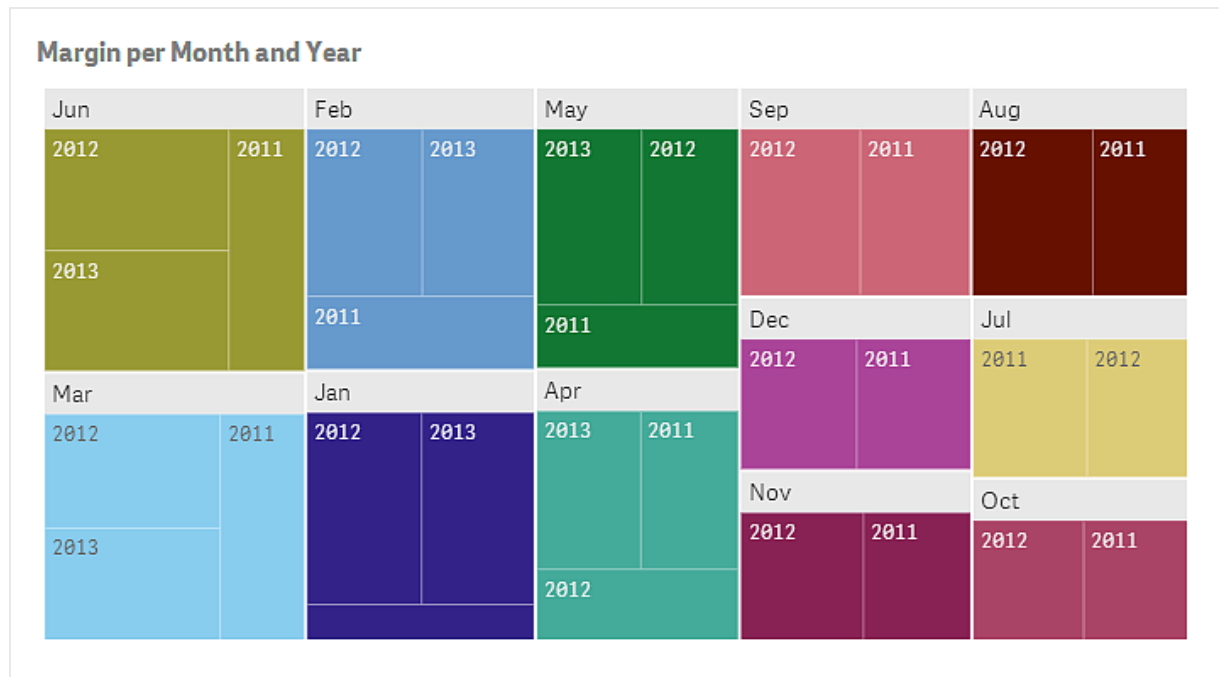
Show legend is set to **Auto**, which means that the legend is displayed when there is enough space. In the properties panel, you can also set where to display the legend and whether to display the legend title.



There is only data for the first half of 2013 (red bars).

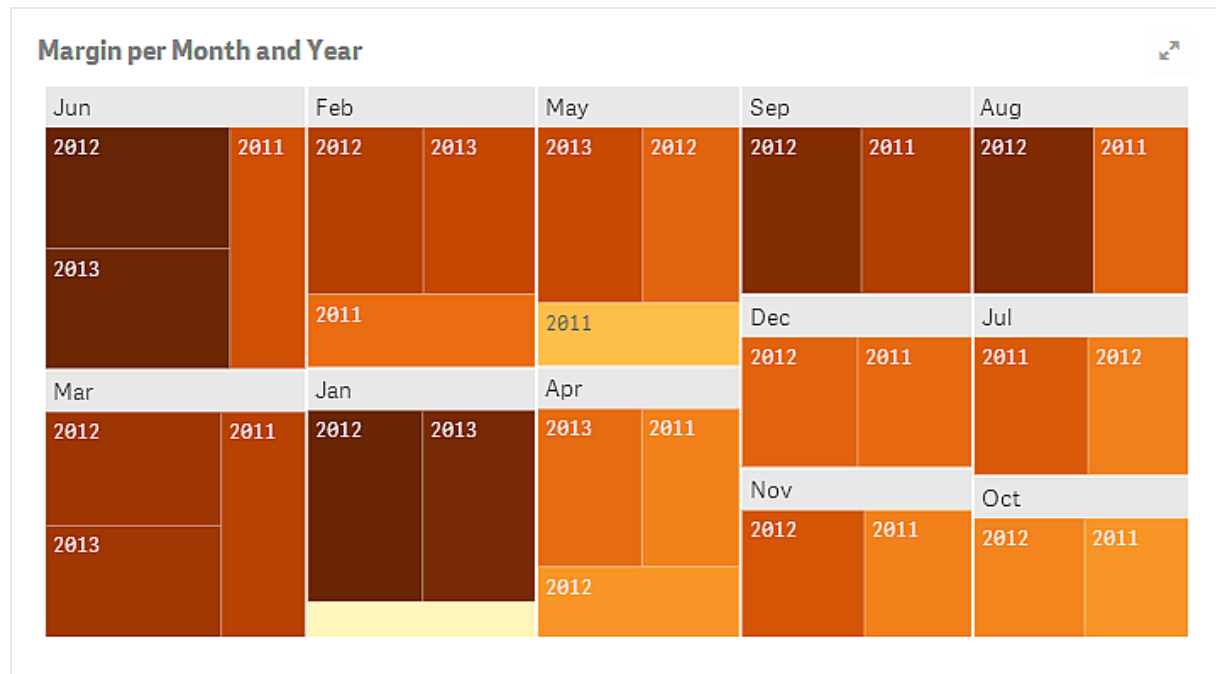
Colors and legend

In the following treemap, the margin values are presented per month and year. The months are sorted by margin value, descending, top down, left to right. By default, the coloring is by dimension with 12 colors, one for each month. The **Auto** option sets a sensible coloring for the visualization given the input data. In most cases the automatic setting does not need to be changed. However tempting it may be to "add some color" to a visualization, it is important remember that different colors should only be used when they serve a purpose.



Let us assume that you still want to change coloring to display the differences in the margin values. In that case you need to change from the automatic coloring to coloring by measure.

In the properties panel, under **Appearance > Colors**, there is a **Colors** button. After clicking that button you can select the option **By measure**.



The margin values are now colored by size, the darker the color, the higher the value. If you also want to differentiate between values with the same color, you can display each margin value. Under **Presentation**, there is an option **Show values** to show each margin value.

X-axis and Y-axis

For both the x-axis and the y-axis, you have options for deciding what combination of labels and title to display, as well as their orientation and position. Sometimes it may feel unnecessary to have labels and/or title, because the visualization is self-explanatory and then it would be good to be able to hide them. Furthermore, when you create a visualization that is very small, for example, three by three squares, the labels are automatically hidden.

Range: The measure axis (usually the y-axis) has an option to set the range of the axis. By default, the range is adjusted according to the highest positive or the lowest negative measure value, but if, for example, a single measure value is much larger than all the other values, you may want to set a range that is suitable for the lower values. In the properties panel, under **Appearance > Y-axis <measure name>**, there is a button for **Range**, which is set to **Auto**. Click the button to switch to **Custom**. Now you can set the range for **Max**, **Min**, or both. In a bar chart, the bars that are out of the range are cut diagonally to indicate that they are out range. In a line chart, only the parts that are within the range are visible.

Coloring by expression

In the properties panel, you have options for changing the color settings of a visualization. The option **By expression** gives you great freedom to decide how to color the measure values in a visualization. In the expression you can define what colors to use and have different colors for different value ranges. In a table you can define both the color of the background and the text color, and color different measure columns individually. Other charts receive a single color across all measures (if multiple measures exist).

Correctly used, coloring by expression is a very efficient way of accentuating values of particular interest, or differentiating between values that do and do not meet a limit value.

The expression is a color code: Selected by default, because, normally, you want to use the expression as a color code. When this option is cleared, the expression evaluates to a number, which in turn is plotted against one of the chart gradients. If you use the same expression as the measure in the visualization, you will have the same coloring as **By measure**.

Visualizations that support color by expression

The following visualizations support color by expression:

- Bar chart
- Combo chart
- Line chart
- Map
- Pie chart
- Scatter plot
- Table
- Treemap

Supported expression formats

The following formats are supported when you create your expressions.

RGB

With RGB colors you enter an integer value between 0 and 255 (or an expression that evaluates to such a value) for each of the colors red, green, and blue. The resulting color is produced by adding the three colors together.

Example:

`rgb(0,0,255)`

This example generates the color blue. Many of the RGB colors have a corresponding keyword in plain text that can be used instead of the RGB code. If you use `'blue'` as expression, you would get exactly the same color. Hexadecimal numbers are also supported, and the color blue has the string `'#0000ff'`.

ARGB

The ARGB color model has the same support as the RGB color model, but extends it with an additional alpha value to set the opacity of a color.

Example:

argb(125,0,0,255)

The first value (125), sets the alpha value. The value 0 generates full transparency and the value 255 full opacity.

HSL

In HSL, the color is defined by a hue value, a saturation value, and a luminosity value. You use values between 0 and 1. Hue is represented as an angle of the color circle (that is, the rainbow represented in a circle). Saturation is full with the value 1 and a shade of gray with the value 0. Lightness with the value 1 is white, and black with the value 0. The value 0.5 is commonly used.

Example:

hsl(0,0.5,0.5)

This example generates a red color with medium saturation and lightness.

Qlik Sense color functions

The following color functions can be used in the expressions.

- `black()`
- `darkgray()`
- `lightgray()`
- `white()`
- `blue()`
- `lightblue()`
- `green()`
- `lightgreen()`
- `cyan()`
- `lightcyan()`
- `red()`
- `lightred()`
- `magenta()`
- `lightmagenta()`
- `brown()`
- `yellow()`

Creating an expression

You create expressions for colors in the properties panel.

Do the following:

1. In the properties panel, open **Appearance > Colors and legend**.
2. Click the **Colors** button to switch to **Custom**.
3. In the drop-down list, select the option **By expression**.
An expression text box is opened.
4. Enter your expression in the text box, or click **fx** to open the expression editor.

If the expression is valid, the visualization is updated.

Examples

Here are a few examples to show what you can do with expressions by color.

Example 1:

```
if(sum([Budget Amount]) > 1000000, 'cornflowerblue', magenta())
```

In this example there is a condition. If `sum([Budget Amount])` is greater than 1 million, the corresponding measure values will be colored 'cornflowerblue', otherwise they will be colored magenta.

'cornflowerblue' is the keyword for the color rgb(100, 149, 227).

magenta() is the function that generates a magenta color.

Example 2:

```
argb(255,rand()*255,rand()*255,rand()*255)
```

This example starts with alpha value for full opacity, and then uses the `rand()` function to generate random values for the red, green, and blue colors.

Example 3:

In the properties panel for a table, under **Columns > <Measure name>**, you have color expression options both for the background color and the text color. If you set a background color that is dark, the text color will automatically become white instead of black to improve readability.

The following screenshot shows the use of expressions for background color and text color. Measure values in *Sales* that are lower than \$10000 have a red background color, all other values have a green background. In addition, the values that are higher \$200000 are have the text color 'gold'.

Customer KPIs					
Customer	Q	Sales	Quantity	Margin (%)	# of Invoices
A-2-Z Solutions		\$196,298.49	1,418	38.4	58
A-ARVIN Laser Resources		\$4,053.05	25	37.9	13
A Superior System		\$103,728.12	868	40.7	167
A&B		\$92,120.60	891	42.0	18
A&G		\$12,502.61	133	47.1	12
A&R Partners		\$30,392.45	156	34.1	6
A1 Datacom Supply		\$259,599.52	5,830	40.3	111
a2i		\$451.64	14	59.8	9
A2Z Solutions		\$69,977.36	454	41.2	94
AA-Wizard		\$94,209.44	917	46.6	41
Aadast		\$351,243.31	881	37.1	35
Aaron D. Meyer & Associates		\$90,017.11	1,869	44.0	58

Use the following links to find out more about CSS colors:

✎ <http://www.w3.org/TR/CSS21/syndata.html#value-def-color>

✎ https://developer.mozilla.org/en-US/docs/Web/CSS/color_value

Change the data of a visualization

In most visualizations, dimensions and measures are essential parts. The dimensions and measures define what the visualizations display, and by adding more than one dimension or measure you can compare or group data in different ways.

Adding dimensions

In the properties panel, under **Data**, you can add a dimension. Click **Add data** and select **Dimension** to open a list of available **Dimensions** and **Fields**. The dimensions are those that exist as master items and the fields are those that have been loaded into the app.

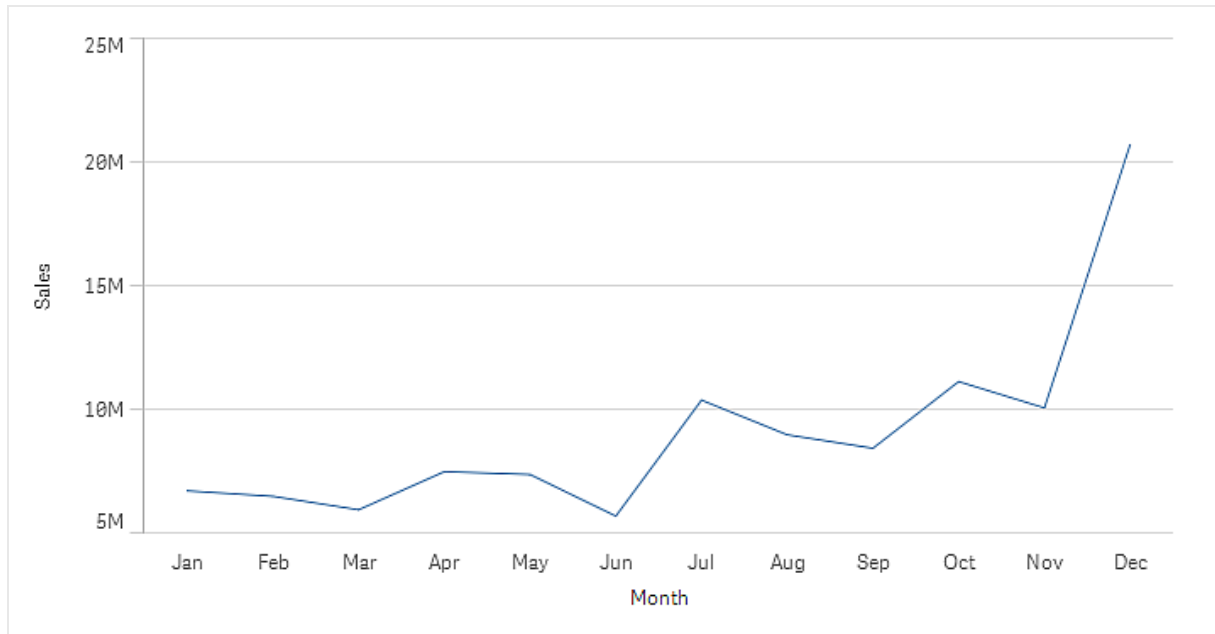
Let us assume that you create a dimension by clicking **Add data**, selecting **Dimension** and typing *Month*. You select the field *Month* from the list to create a new dimension. You can edit the dimension after it has been created.

Adding measures

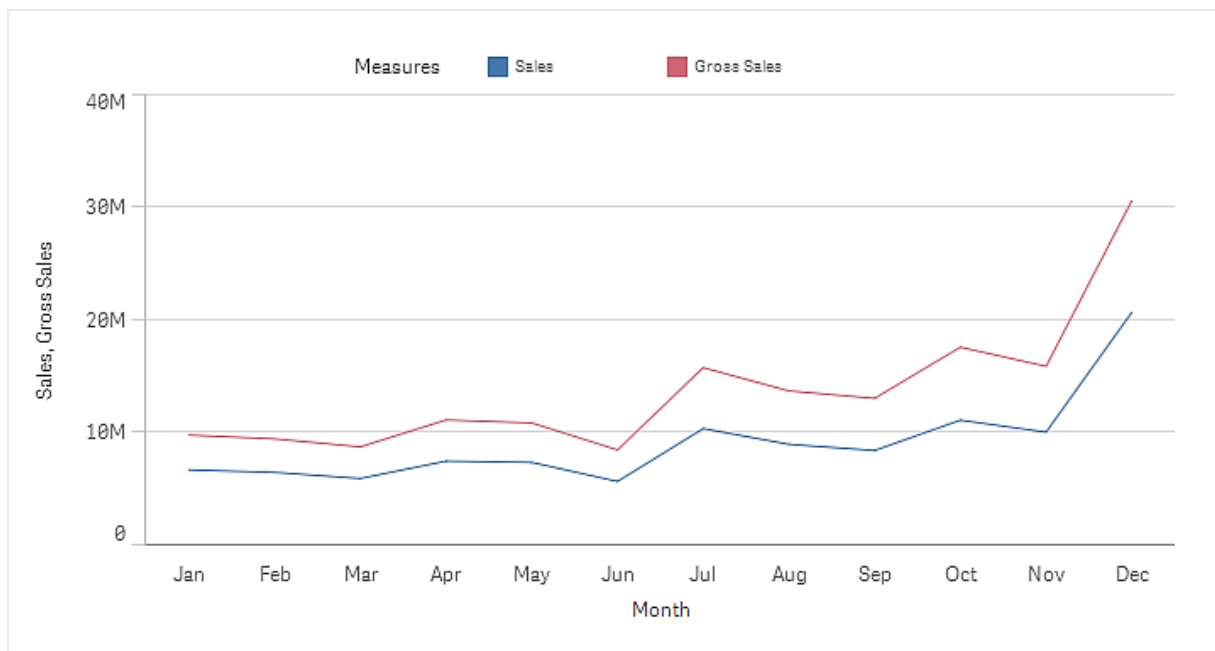
In the properties panel, under **Data**, you can add a measure. Click **Add data** and select **Measure** to open a list of available **Measures** (if any).

Let us assume that you create a measure by clicking **Add data**, selecting **Measure** and typing *Sum(Sales)* to create a new measure that calculates the sum of sales. You can edit the measure after it has been created.

In the following line chart, a measure *Sales* and a dimension *Month* have been added.



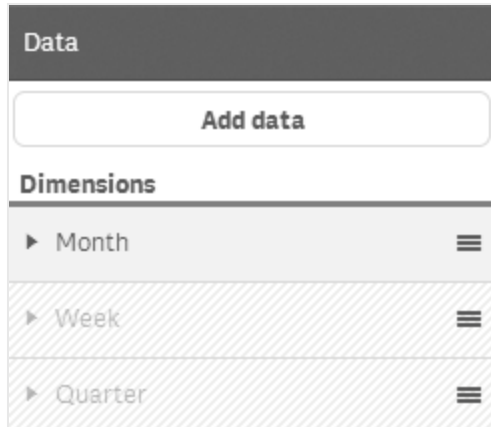
You can add a second measure, *Gross Sales*, to compare with *Sales*.



Line chart with the measures Sales and Gross Sales


Many visualizations have limitations on how many dimensions and measures that can be displayed at the same time. A line chart with two or more measures can only have one dimension, and a line chart with two dimensions can only have one measure. However, even if there are limitations on a visualization, you may sometimes have more dimensions or measures than those that are used in the visualization. This can happen when you have converted from one visualization to another, and some of the dimensions and measures are not used in the new visualization. The unused dimensions and measures are not displayed in the visualization, but they are visible in the properties panel under **Dimensions** and **Measures**, respectively.

In the following screenshot from the properties panel, there are three dimensions: *Month*, *Week*, and *Quarter*. The screenshot shows that the dimension *Month* is in use, but by dragging *Quarter* or *Week* to the top, that dimension will be used instead.




Properties panel for a chart with two unused (dimmed) dimensions: Week and Quarter

Master items


Dimensions and measures that are linked to a master item are displayed with a  in the properties panel. If you want to edit a linked dimension or measure, you have two options: either updating the master item in the assets panel, or unlinking the item and making the changes in the properties panel. An update of the master item is reflected in all linked items.

Even if linked items cannot be edited in the properties panel, you still have a few settings that can be edited. These are related to the presentation of the items.

A visualization that is linked to a master item is displayed with a  on the sheet. You can edit a linked visualization, either by editing the master item or by unlinking the visualization. The unlinked visualization is independent of the master item and can be edited, but it can still contain dimensions or measures that are linked to master items.

Editing a dimension

You can edit dimensions in the properties panel. If you want to edit a master item, you must first unlink the dimension from the master item. In the properties panel, click the dimension that you want to edit. If the dimension is dimmed, it is not part of the current visualization and must be moved (temporarily) to the top in **Dimensions** to be editable.

Field: Start typing the field name to display a list of matching fields to choose from. You can also click  to open the expression editor, where you can create a calculated dimension.

Label: Enter a name for the dimension.

Show null values: If, for example, you have sales figures but do not have any information about what company the figures belong to, the figures will be added to the measure value for the null value dimension. The null value dimension is presented as a gap or a dash, depending on the visualization that is used.

Limitation: You can limit the number of dimension values that are displayed.

Show others: When you have set a limitation for the number of dimension values displayed, you have an option to summarize the measure values for the remaining dimensions by selecting **Show others**.

Editing a measure

You can edit measures in the properties panel. If you want to edit a master item, you must first unlink the measure from the master item. In the properties panel, click the measure that you want to edit. If the measure is dimmed, it is not part of the current visualization and must be moved (temporarily) to the top in **Measures** to be editable.

Expression: Enter the expression. You can also click *fx* to open and use the expression editor.

Label: Enter a name for the measure. The label is not automatically updated when you make changes in **Expression**.


Number formatting: Set the number formatting for the measure values. The options **Number** and **Date** offer custom formatting options for defining your own format pattern.

Invalid dimensions and measures

If you create an invalid dimension or edit an existing one so that it becomes invalid, the dimension is presented in the properties panel as dimmed with a red hue to indicate that the dimension is invalid. If you use an invalid dimension in a visualization, the visualization cannot be displayed.


If you create an invalid measure or edit an existing one so that it becomes invalid, the **Expression** text box under **Measures** in the properties panel is presented with a red border to indicate that the measure is invalid.

Deleting dimensions and measures

In the properties panel, you can delete a dimension or measure. Long-touch/right-click the dimension or measure and select **Delete** in the dialog. Alternatively, click the dimension or measure and click **Delete** . If you delete an instance of a master item, the master item is still available in the assets panel.


Adding a dimension

Adding dimensions to a visualization can be done from the properties panel.

You open the properties panel for a visualization by clicking  **Edit** in the toolbar and clicking the visualization that you want to edit.

If the properties panel is hidden, click  in the lower right-hand corner to open it.



If the visualization has  in the upper right-hand corner, the visualization is linked to a master item. You cannot edit a linked visualization, but you can edit the master item. You can also unlink the visualization to make it editable.

Adding a dimension from master items or fields

Do the following:

1. In the properties panel, click the **Data** tab.
The **Data** tab is expanded.
2. Click **Add data** and select **Dimension**.
A dialog with a text box opens. Below the text box all available dimensions are listed, grouped into **Dimensions** (that is master items) and **Fields**.
3. Start typing in the text box.
A list of matching fields and dimensions is displayed.




*You can also create a dimension by entering an expression directly in the text box, or by clicking **fx** to create a dimension in the expression editor.*

4. Select the field or dimension that you want to use.

The dimension is added to the visualization and the new dimension's settings are shown in the properties panel.


Adding a measure

Adding measures to a visualization can be done from the properties panel.

You open the properties panel for a visualization by clicking  **Edit** in the toolbar and clicking the visualization that you want to edit.

If the properties panel is hidden, click  in the lower right-hand corner to open it.



If the visualization has  in the upper right-hand corner, the visualization is linked to a master item. You cannot edit a linked visualization, but you can edit the master item. You can also unlink the visualization to make it editable.

Do the following:

1. In the properties panel, click the **Data** tab.
The **Data** tab is expanded.
2. Click **Add data** and select **Measure**.
A dialog with a text box opens. Below the text box all available measures are listed, grouped into **Measures** (that is master items) and **From a field**.
3. Start typing in the text box.
A list of matching measures is displayed.



*If no measure is displayed, you need to create one. You can enter an expression directly in the text box, or you can click **fx** to create a measure in the expression editor.*

4. Select the measure that you want to use.

The measure is added to the visualization and the new measure's settings are shown in the properties panel.

Change the sorting of a visualization

When you are working with a visualization, you will occasionally want to change the sorting order of the dimensions and measures so that your data is presented in the way you intend. Most visualizations have a

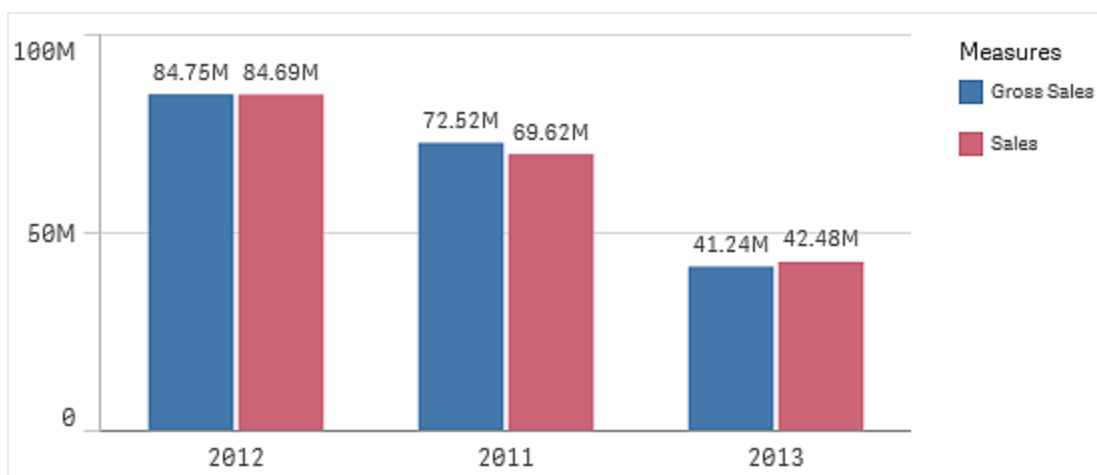
Sorting section in the properties panel where you can put the cursor on the ≡ drag bars and drag the dimension or measure to rearrange the sorting order. In visualizations without a sorting section, you can still adjust the sorting to some extent.

In the following screenshot, the primary sorting is on the measure *Gross Sales*.

Sorting	
1	► Gross Sales
2	► Year
3	► Sales

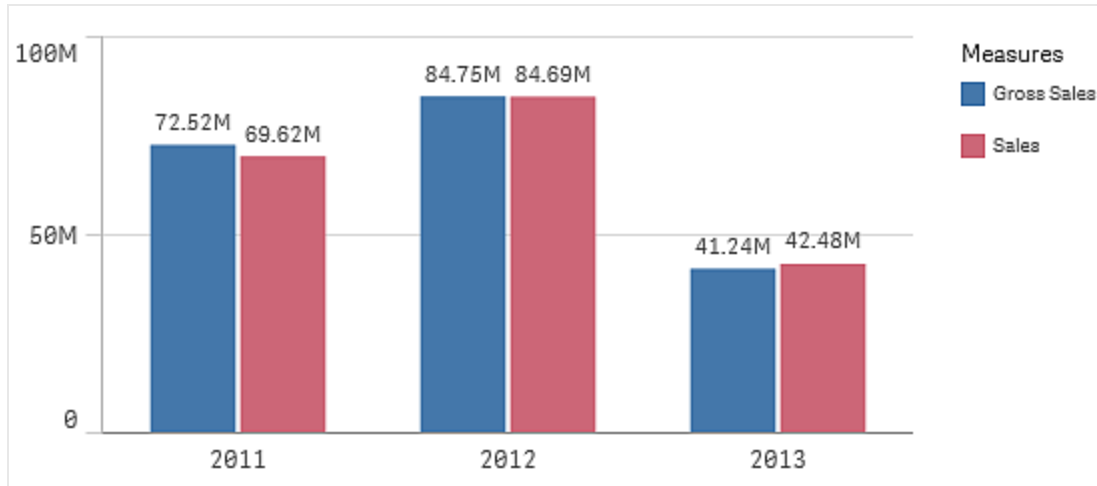
Sorting section in the properties panel

A bar chart with that sorting order will look as follows.



Since there are two measures, *Gross Sales* and *Sales*, the bars are by default grouped. *Gross Sales* is presented first, because it has sorting priority 1. If you were to drag *Sales* to the top of **Sorting**, the first bar would be *Sales* and the second bar *Gross Sales*.

To sort by *Year*, instead, you need to drag *Year* to the top in **Sorting**. The bar chart is then updated and sorted by *Year*.



Bar chart sorted by Year



*In bar charts with multiple dimensions, sorting is locked to the first dimension. This dimension is what groups and stacks are based on, and sorting on a different dimension or a measure would break up these groups in an undesirable way. If you still want to sort by the measure value, try using the option **Sort by expression** on the first dimension under **Sorting**.*

Sorting in the dimensions and measures sections

Although it is primarily under **Sorting** that you set the sorting order, you can also adjust the order in the properties panel section **Data** under **Dimensions** and **Measures**. In **Dimensions** you can change the priority order between the different dimensions by dragging them, and, likewise, in **Measures**, you can drag the measures to change the sorting order. Put the cursor on the ≡ drag bars and drag the dimension or measure to rearrange the order. Changes are reflected in the visualization.

Internal sorting

Apart from setting the sorting order between dimensions and measures, you can also set the internal sorting order, under **Sorting**.

Click the dimension or measure name to open the settings and click the sorting button to switch to **Custom** sorting. The following table shows the internal sorting priority order and sorting options. The sorting is either **Ascending** or **Descending**.

Sorting options	Comment
-----------------	---------

Sort by expression	Enter an expression to sort by. Only available for dimensions.
Sort numerically	
Sort alphabetically	

Default sorting

By default, the dimensions and measures are sorted in the order they were added, with the most recently added item last. Each dimension is sorted internally in the most common way for that type of data. Numbers are sorted numerically, ascending. Text is sorted alphabetically, ascending.

Bar chart	<p>By default, a bar chart with one measure and one dimension is presented with vertical bars sorted descending on the measure.</p> <p>When a dimension has less than 10 values, the sorting is by dimension, alphabetically.</p>
Combo chart	Sorted by the first item added, either the dimension or the measure.
Filter pane	By default, data in filter panes is presented ascending.
Gauge	A gauge only uses a single measure value, the first one under Measures .
KPI	By default, the first added measure becomes the main value.
Line chart	By default, a line chart is sorted by the dimension.
Map	A map can only have one dimension and one measure.
Pie chart	A pie chart uses one measure and one dimension. By default, a pie chart is sorted by the measure in descending order.
Scatter plot	The scatter plot does not have any sorting section, but the order of the measures decides where they are used. The first measure is used on the x-axis, the second measure is used on the y-axis, and the third (optional) measure is used for the bubble size in the scatter plot. You can only have one dimension in a scatter plot.
Table	<p>By default, the column presents the dimensions and measures in the order they were added.</p> <p>Sorting order of rows: By default, the table is sorted in ascending order by the first dimension or measure under Sorting. You can temporarily change the sorting by clicking the header of the row you want to sort on. One click - ascending order , two clicks - descending order.</p>
Text & image	The text & image visualization does not have any sorting section, but you can drag the measure tokens in the visualization to change the order.
Treemap	The treemap does not have any sorting section. The sorting is automatically by measure size.



Unlinking from a master dimension

If you want to make changes to a dimension that is linked to a master dimension, you must first unlink it from the master dimension. The dimension in your visualization is then independent with no connection to the master dimension in the assets panel.

Unlinking from the properties panel

A linked dimension that is used in a visualization can be unlinked from the properties panel.

Do the following:

1. Click  **Edit**.
The properties panel opens on the right-hand side.
2. Select the visualization on the sheet.
The properties for the selected visualization are displayed in the properties panel.
3. Click the **Dimensions** heading in the properties panel to expand the category, and click the dimension.
4. Click  next to the dimension.
A dialog is displayed that you are about to unlink from a master dimension.
5. Click **OK**.

The dimension used in the visualization can now be edited and the changes will not affect any other dimensions.



You can only unlink from a single dimension, not to a drill-down dimension.



Unlinking from a master measure

If you want to make changes to a measure that is linked to a master measure, you must first unlink it from the master measure. The measure in your visualization is then independent with no connection to the master measure in the assets panel.

Unlinking from the properties panel

A linked measure that is used in a visualization can be unlinked from the properties panel.

Do the following:

1. Click  **Edit**.
The properties panel opens on the right-hand side.
2. Select the visualization on the sheet.
The properties for the selected visualization are displayed in the properties panel.
3. Click the **Measures** heading in the properties panel to expand the category, and click the measure.
4. Click  next to the measure.
A dialog is displayed that you are about to unlink from a master measure.
5. Click **OK**.


The measure used in the visualization can now be edited and the changes will not affect any other measures.

Changing the title of a visualization

You can change the title of a visualization by editing it directly on the sheet. You change the title by clicking it and making your changes.

You need to be in sheet view to edit the title.

Do the following:

1. Click  **Edit** in the toolbar.
2. Click the title that you want to edit.
The cursor appears.
3. Enter a title.
4. Click outside the title area.

The title is changed.



*The text **Click to add title** is only visible in while editing the sheet. By default, the visualizations do not have a title.*

3.10 Editing a text & image

In the text & image visualization you can add and format text, images, measures, and links in various ways.

When you are editing a sheet and the text & image visualization does not have focus, you need to click twice to open the editing toolbar. In the editing toolbar, you can format text properties such as color, size, and style, and also align the text. Additionally, you have options for adding links and images.





Editing toolbar

Creating a link

You can mark a text section and use it for a link.

If you do not add a prefix, <http://> is added automatically, assuming that you are adding a web address.

Do the following:


1. Select the text section that you want to use for the link.
2. Click  in the editing toolbar to open the link dialog.
3. Enter the web address that you want to link to.
4. Click .

The link is created.

Removing a link

You can remove a link from a text section.

Do the following:

1. Click the link so that the cursor is somewhere inside it.
2. Click  in the editing toolbar to open the link dialog.
3. Click **Remove**.

The link is removed, but not the text.

Adding an image

You can add an image through the editing toolbar.

Do the following:

1. Click  in the editing toolbar to open the media folder.



For Qlik Sense: If the folder is empty, or you want to add your own images, you need to use the Qlik Management Console to upload images to the folder.

For Qlik Sense Desktop: If the folder is empty, or you want to add your own images, you find the folder at: <user>\Documents\Qlik\Sense\Content\Default

The following formats are supported: .png, .jpg, .jpeg, and .gif.

2. Select the image that you want to add.
3. Click **Apply**.

The image is added.



In the properties panel, you can add a background image, which, for example, can be used when you want to insert text in the image. The images added through the editing toolbar are not background images.

Adding a measure


You can add a measure in the following ways:

- By dragging a field from the assets panel and adding it as a measure.
- By dragging a measure from **Master items**.
- By adding a measure (existing or new) from the properties panel.

When you are editing the measure, it is displayed as a token, which can be styled and moved around in the visualization. You can also apply number formatting to it. When you leave the editor, the measure value is displayed. Values that cannot be aggregated are shown as a hyphen (-).

Deleting a measure

You can delete a measure in the following ways:

- Place the cursor before the token and press Delete.
- Place the cursor after the token and press Backspace.
- In the properties panel, long-touch/right-click the measure and select **Delete** in the dialog.
- In the properties panel, click the measure and click **Delete** .

3.11 Converting a visualization

You can convert from one visualization type to another by dragging a chart from the panel on the left-hand side onto the visualization that you want to convert. All properties that the original visualization has are transferred to the new type. The new visualization uses the dimensions, measures, and settings that are applicable to that visualization type, but all properties from the original visualization are saved, even if they are not available or visible in the new visualization. This means that properties can become available again if you decide to convert to yet another visualization type where those properties are used.

Do the following:

1. While editing a sheet, drag a new chart from the panel on the left-hand side onto the visualization that you want to convert.
The shortcut menu opens.
2. Select the conversion option.

The new visualization is displayed, using the data from the original visualization.



When you convert to a new visualization type, some of the settings from the original visualization may not be optimal for the new visualization, for example, the sorting order. Therefore, you may need to make some changes in the properties panel, so that the new visualization is displayed as you want.



You cannot convert to or from a KPI, a map, or a text & image visualization, nor can you convert a master visualization.

3.12 Copying a visualization

You can copy a visualization:

- Within the same sheet
- Between sheets in the same app
- Between sheets belonging to different apps.



For a copied visualization to work in a different app, the same dimensions and measures have to be a part of the target app as well.

Do the following:

1. While editing a sheet, click on the item you want to copy.
The item is highlighted.
2. On the edit bar, click
3. To insert the item on another sheet, navigate to the sheet via the sheet navigator.
4. Click

The copied item is added to the sheet.



Depending on what situation you are in, different things will happen when you paste the copied visualization on a sheet:

- *If a visualization is selected, then the selected visualization will be replaced.*
- *If no visualization is selected, then the pasted visualization will be placed in the largest empty space.*
- *If there is no empty space, then the largest visualization on the sheet will be split in half to make space for the pasted visualization.*

3.13 Moving a visualization

You can move a visualization on a sheet.

Do the following:

1. Click **Edit** in the toolbar.
2. Drag the visualization to where you want to move it.






If you drag a visualization to the center of another visualization, they will swap places. If you drag a visualization towards one of the sides of another visualization, they will resize and share the existing space.

3.14 Replacing a visualization

You can copy a visualization on a sheet and then replace a different visualization with the copied visualization. You can replace a visualization that is located on any sheet in any app.

Do the following:

1. Click  **Edit**.
2. Long-touch/right-click the visualization you want to copy and select  **Copy**.
3. Long-touch/right-click on the visualization you want to replace and select  **Paste and replace**.

The visualization is replaced.




If you select a visualization, you can replace that visualization with a copied visualization by pressing Ctrl+V.

3.15 Resizing a visualization

You can resize a visualization on a sheet. You can only use the available space when resizing. Other visualizations are not moved or resized when you resize a visualization.

Do the following:

1. Click  **Edit** in the toolbar.
2. Click the visualization that you want to resize.
3. Use the handles on the edges to resize the visualization.

The resize causes the visualization to use progressive disclosure.




Progressive disclosure. When you increase the size of a visualization, its information is disclosed progressively. If you reduce the size, the visualization's information is reduced, which allows you to focus on the essential information and avoid cluttering the visualization with too much information in too little space.

3.16 Showing a visualization in full screen

You can expand a visualization on a sheet to see the details.

Touch device interaction

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 .


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 .



3.17 Unlinking from a master visualization

If you want to make changes to a visualization that is linked to a master visualization, you must first unlink it from the master visualization. The visualization on your sheet is then independent with no connection to the master visualization in the assets panel.

Unlinking using

A linked visualization can be unlinked using  that is located in the top right corner of a linked visualization.

Do the following:


1. Click  **Edit**.
2. Click  in the top right corner of a linked visualization on the sheet.
A dialog is displayed that you are about to unlink from a master visualization.
3. Click **OK**.

The visualization on the sheet can now be edited and the changes will not affect any other visualizations.

Unlinking from the shortcut menu

A linked visualization can be unlinked from the shortcut menu.

Do the following:



1. Click  **Edit**.
2. Long-touch/right-click a linked visualization on the sheet.
The shortcut menu opens.
3. Select **Unlink visualization**.
A dialog is displayed that you are about to unlink from a master visualization.
4. Click **OK**.

The visualization on the sheet can now be edited and the changes will not affect any other visualizations.

3.18 Deleting a visualization

You can delete a visualization from a sheet.

Do the following:

1. In sheet view, click  **Edit** in the toolbar.
2. Long-touch/right-click the visualization.
The shortcut menu opens.
3. Click  **Delete**.



You can also delete a visualization by selecting it, and then clicking the wastebasket that is available when you are editing a sheet.

4 Using expressions in visualizations

Visualizations in Qlik Sense are built from charts, which in turn, are built from dimensions and measures, depending on the type of chart. Visualizations can have titles, subtitles, footnotes, and other elements to help convey information. All of the elements that make up a visualization can be simple: a dimension consisting of a field representing data, a title consisting of text, for example.

For visualizations that contain measures, the measures are calculations based on fields, for example **Sum(Cost)**, which means all the values of the field **Cost** are aggregated using the function **Sum**. In other words, **Sum(Cost)** is an expression.

An expression is a combination of functions, fields, and mathematical operators (+ * / =). Expressions are used to process data in the app in order to produce a result that can be seen in a visualization. They are not limited to use in measures. You can build visualizations that are more dynamic and powerful by using expressions for titles, subtitles, footnotes, and even dimensions.

This means, for example, that instead of the title of a visualization being static text, it can be made from an expression whose result changes depending on the selections made.

Expressions can be used in a visualization wherever the symbol **fx** is seen in the properties panel while editing a visualization. The **fx** symbol indicates an expression field. By clicking **fx**, you enter the expression editor, which is designed to help you build and edit expressions. Expressions can also be entered directly into the expression field, without using the expression editor.

An expression cannot be saved directly as a master item, but if an expression is used in a measure or dimension, which is then saved as a master item, with its descriptive data, such as name, description, and tags, the expression in the measure or dimension is preserved.

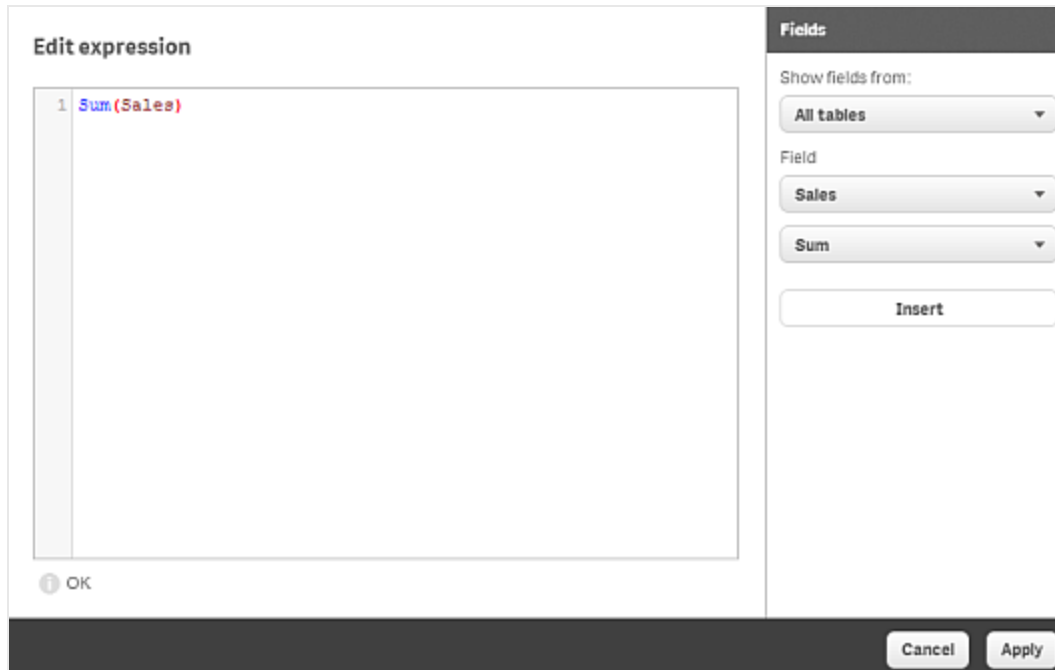


For detailed reference regarding script functions and chart functions, see the Qlik Sense online help.

4.1 Working with the expression editor

You can enter the expression editor to add or edit an expression wherever you see the symbol **fx** in the properties panel while editing a visualization. The **fx** symbol indicates an expression field. Click **fx** to enter the expression editor.

You can add expressions in two ways. Simple expressions can be inserted directly from the **Fields** panel by making selections from the available fields and functions. You can add more complex expressions by typing directly into the expression field.



Inserting an expression by selecting from the Fields panel

You can insert an expression by making selections from the **Fields** panel at the right-hand side of the expression editor dialog.

Do the following:

1. Select a field from the **Field** drop-down list.
2. If you want to limit the available fields to those from a particular table in your data model, select a table from the drop-down list marked **Show fields from table**.
3. Select the aggregation function you want to use. The functions available are from the group of basic aggregation functions.
4. Click **Insert** to insert the field and the function into the expression editor.



If you do not select an aggregation function, only the field will be inserted into the expression.

5. Click **Apply** to close the **Add expression** dialog.
For a dimension or measure, you continue by adding descriptive data for the dimension or measure.

Adding or editing an expression by typing

Do the following:

1. Type the expression directly in the expression editor.
The field names you use in the expression are checked, and the syntax of the expression is validated.



As you type in the expression editor, the expression is validated. If there is an error, you see a hint about what is incorrect. Additional error information may be available by clicking the icon next to the hint.

When you type the name of a function in the expression, a tooltip appears that provides information to help you enter the function correctly, including argument names and qualifiers.



The tooltip for some chart functions shows the ALL qualifier. It is recommended that you do not use the ALL qualifier. Instead, use the set expression {1}.

Each line in the expression editor is numbered and syntax highlighting is used.

2. Click **Apply** to close the **Add expression** dialog.

For a dimension or measure, you continue by adding descriptive data for the dimension or measure.

Rules for expressions

The following rules apply for chart expressions:

- All expressions return a number and/or a string, whichever is appropriate.
- Logical functions and operators return 0 for False, -1 for True. Number-to-string conversions and string-to-number conversions are implicit.
- Logical operators and functions interpret 0 as False and all else as True.
- Expressions that cannot be correctly evaluated, for example as a result of incorrect parameters or functions, return NULL.

Detailed syntax help

You can open the online help with the full description of how to use the current function by double-clicking the function name in the expression editor and pressing Ctrl+H on the keyboard. This feature becomes available after having entered the first parenthesis of the expression after the function name.



This feature is supported only when using a computer with a keyboard.

4.2 Using functions in charts

Qlik Sense contains several hundred ready-made functions that can be used in charts when creating visualizations. Functions can be, for example, mathematical, logical, can operate on financial or date and time information, can be used to manipulate strings, and other situations.

Functions can be grouped into the types:

- Aggregation functions, which use several records as input and produce a single value result.
- Scalar functions, which take a single input and produce a single output.

- Range functions, which produce a single value based on a range of input values.
- Range-producing functions, which are like range functions, but produce a range of values as output.

Many of the functions can be used in both chart expressions and scripts, but some are specific for chart expressions.



A few differences exist between script expressions and chart expressions in terms of syntax and available functions. The most important difference is the role of the aggregation functions and the use of field references. The basic rule is that any field name in a chart expression must be enclosed by exactly one aggregation function. An aggregation function can never have another expression containing an aggregation function as argument.

4.3 Set analysis and set expressions

Set analysis offers a way of defining a set (or group) of data values that is different from the normal set defined by the current selections.

Normally, when you make a selection, aggregation functions, such as **Sum**, **Max**, **Min**, **Avg**, and **Count** aggregate over the selections that you have made: the current selections. Your selections automatically define the data set to aggregate over. With set analysis you can define a group that is independent of the current selections. This can be useful if you want to show a particular value, for example, the market share of a product across all regions, irrespective of the current selections.

Set analysis is also powerful when making different sorts of comparisons, such as what are the best-selling products compared with poorly-selling products, or this year against last year.

Let us imagine an example in which you start working in an app by selecting the year 2010 in a filter pane. The aggregations are then based on that selection, and the visualizations only show values for that year. When you make new selections, the visualizations are updated accordingly. The aggregations are made over the set of possible records defined by the current selections. With set analysis, you can define a set that is of interest to you and does not depend on the selections.

Creating set expressions

Before looking at the different parts of a set analysis example, there is a distinction that should be made between a set expression and set analysis:

Defining a set of field values is referred to as defining a set expression, whereas using set expressions to analyze data is referred to as set analysis. Consequently, the rest of this section focuses on the set expression and its components.

Here is a set analysis example: `sum({$<Year={2009}>} Sales)`, in which `{$<Year={2009}>}` is a set expression.

There are two general syntax rules for a set expression:

4 Using expressions in visualizations

- A set expression must be used in an aggregation function. In this example, the aggregation function is `sum(Sales)`.
- A set expression must be enclosed by braces, `{}`. In the example, the set expression is: `{<Year={2009}>}`.

A set expression consists of a combination the following parts:

- **Identifiers.** One or more identifiers define the relationship between the set expression and what is being evaluated in the rest of the expression. A simple set expression consists of a single identifier, such as the dollar sign, `{ $ }`, which means all records in the current selection.
- **Operators.** If there is more than one identifier, an operator or operators are used to refine the set of data by specifying how the sets of data represented by the identifiers are combined to create a subset or superset, for example.
- **Modifiers.** A modifier or modifiers can be added to the set expression to change the selection. A modifier can be used on its own or to modify an identifier to filter the data set.

In our example set expression `{<Year={2009}>}` contains an identifier `$`, and the modifier `<Year={2009}>`. This example does not include an operator. The set expression is interpreted as: "All records in the current selection that belong to the year 2009".



Set expressions can only be used in expressions for visualizations, not in script expressions.

Identifiers, operators and modifiers are described in more detail with in the following subsections.

Identifiers

Identifiers define the relationship between the set expression and the field values or expression being evaluated.

In our example `sum({<Year={2009}>} Sales)`, the identifier is the dollar sign, `$`, and means that the set of records to be evaluated consists of the all the records of the current selection. This set is then further filtered by the modifier part of the set expression. In a more complex set expression, two identifiers can be combined using an operator.

This table shows some common identifiers.

Identifier	Description
1	Represents the full set of all the records in the application, irrespective of any selections made.
\$	Represents the records of the current selection. The set expression <code>{ \$ }</code> is thus the equivalent to not stating a set expression.
\$1	Represents the previous selection. <code>\$2</code> represents the previous selection-but-one, and so on.
\$_1	Represents the next (forward) selection. <code>\$_2</code> represents the next selection-but-one, and so on.
BM01	You can use any bookmark ID or bookmark name.

4 Using expressions in visualizations

This table shows some examples with different identifiers.

Example	Result
sum ({1} Sales)	Returns total sales for the app, disregarding selections but not the dimension.
sum ({\$} Sales)	Returns the sales for the current selection, that is, the same as sum(Sales).
sum ({\$1} Sales)	Returns the sales for the previous selection.
sum ({BM01} Sales)	Returns the sales for the bookmark named <i>BM01</i> .

Operators

Operators are used to include, exclude, or intersect parts of or whole data sets. All operators use sets as operands and return a set as result. Our example `sum({$<Year={2009}>} sales)`, does not contain any operator.

This table shows operators that can be used in set expressions.

Operator	Description
+	Union. This binary operation returns a set consisting of the records that belong to any of the two set operands.
-	Exclusion. This binary operation returns a set of the records that belong to the first but not the other of the two set operands. Also, when used as a unary operator, it returns the complement set.
*	Intersection. This binary operation returns a set consisting of the records that belong to both of the two set operands.
/	Symmetric difference (XOR). This binary operation returns a set consisting of the records that belong to either, but not both of the two set operands.

This table shows some examples with operators.

Examples	Results
sum({1-\$} Sales)	Returns sales for everything excluded by the selection.
sum({\$*BM01} Sales)	Returns sales for the intersection between the selection and bookmark BM01.
sum({-(\$+BM01)} Sales)	Returns sales excluded by the selection and bookmark BM01.

Modifiers

Modifiers are used to make additions or changes to a selection. Such modifications can be written in the set expression. A modifier consists of one or several field names, each followed by one or several selections that can be made in the field. Modifiers begin and end with angle brackets, `<>`.

4 Using expressions in visualizations

A set modifier can be used on a set identifier or on its own. It cannot be used on a set expression. When used on a set identifier, the modifier must be written immediately after the set identifier. In our example `sum({$<Year={2009}>} Sales)`, the modifier is `<Year={2009}>`. Modifiers are optional in set analysis.

This table shows some examples with modifiers.

Example	Result
<code>sum({\$<OrderDate = DeliveryDate>} Sales)</code>	Returns the sales for the current selection where <i>OrderDate</i> = <i>DeliveryDate</i> .
<code>sum({1<Region = {US}>} Sales)</code>	Returns the sales for region US, disregarding the current selection.
<code>sum({\$<Region = >} Sales)</code>	Returns the sales for the selection, but with the selection in <i>Region</i> removed.
<code>sum({<Region = >} Sales)</code>	Returns the same as the example above. When the set to modify is omitted, \$ is assumed.
<code>sum({\$<Year={2000}, Region={"U*"}>} Sales)</code>	Returns the sales for the current selection, but with new selections both in <i>Year</i> and in <i>Region</i> .

5 Working with master items

When you create and build your visualizations you will come to the point when you realize you have items worth saving to reuse in other visualizations and on other sheets, for your own sake as well as for others using your app. You can save these items as master items in the assets panel. When your app gets published these master items will be available to others in a library panel as ready-to-use visualizations, dimensions and measures.

One of the purposes with creating and maintaining master items is for other users to explore their own ways and directions in the data, on top of what you have provided in the app as pre-made sheets with visualizations. The users will be able to create their own visualizations with your pre-made master dimensions and master measures, for example.

5.1 Create master dimensions

When you are working with an unpublished app, you can create master dimensions so that they can be reused. Users of a published app will have access to the master dimensions in their library, but will not be able to modify them.

You can create a master dimensions in different ways.






In addition to creating master dimensions from the assets panel when working with a sheet, you can also create master dimensions from the data model viewer.

Creating a master dimension from a field

When you are working with an unpublished app, you can create master dimensions so that they can be reused. You can create a master dimension from the **Fields** section of the assets panel.

Do the following:

1. Click  **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click  to select the fields tab.
3. Click the field you want to use to create a dimension.
The preview opens.
4. Click  at the bottom of the preview.
The **Create new dimensions** dialog opens with the field you selected. The field name is also used as the name of the dimension.
5. Select if the dimension is to be single or drill-down.
6. Edit the name if you want to.
7. Type a description for the dimension (optional).
8. Add tags (optional).
9. Click **Add dimension**.

10. Click **Done** to close the dialog.

The dimension is now saved in the **Dimensions** category in the master items, and you can use it in visualizations.



*You can quickly add several dimensions as master items by clicking **Add dimension** after adding each dimension. Click **Done** when you have finished.*



*Direct Discovery fields are indicated by  in the **Fields** section of the assets panel.*



Creating a master dimension from the assets panel

When you are working with an unpublished app, you can create master dimensions so that they can be reused. Users of a published app will have access to the master dimensions in their library, but will not be able to modify them.



You can only create master dimensions when you are working with an unpublished app.

Do the following:

1. Click  **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click  to select the master items tab.
3. Click the **Dimensions** heading to expand the category.
4. Click **Create new**.
The **Create new dimensions** dialog opens.
5. Select if the dimension is to be single or drill-down.
6. Click a field on the left-hand side to select it.
The name of the field is automatically added as the name of the dimension.
7. Change the name if you want to.
8. Type a description for the dimension (optional).
9. Add tags (optional).
10. Click **Add dimension**.
11. Click **Done** to close the dialog.

The dimension is now saved in the **Dimensions** category in the master items, and you can use it in visualizations.



*You can quickly add several dimensions as master items by clicking **Add dimension** after adding each dimension. Click **Done** when you have finished.*

Creating a drill-down dimension

When adding a dimension, you can select between creating a single or a drill-down dimension. The following description explains how to create a drill-down group from the **Create new dimensions** dialog.

Create new dimensions

☐ Single ☒ Drill-down

Show fields from table: **All**

Search

- Sales Rep Name
- Sales Rep Name1
- Sales Rep Name2
- Sales Rep Name3
- Sales Rep Number
- Week**
- WeekDay
- WeekYear
- Year

Field:

- Year
- Quarter
- Month

Name:

Description:

Tags:

Add dimension

Done

Do the following:

1. Select **Drill-down** as dimension type.
2. Click at least two fields from the fields list on the left-hand side to insert them as the referenced fields.



You can filter which table to select fields from in the drop-down list.

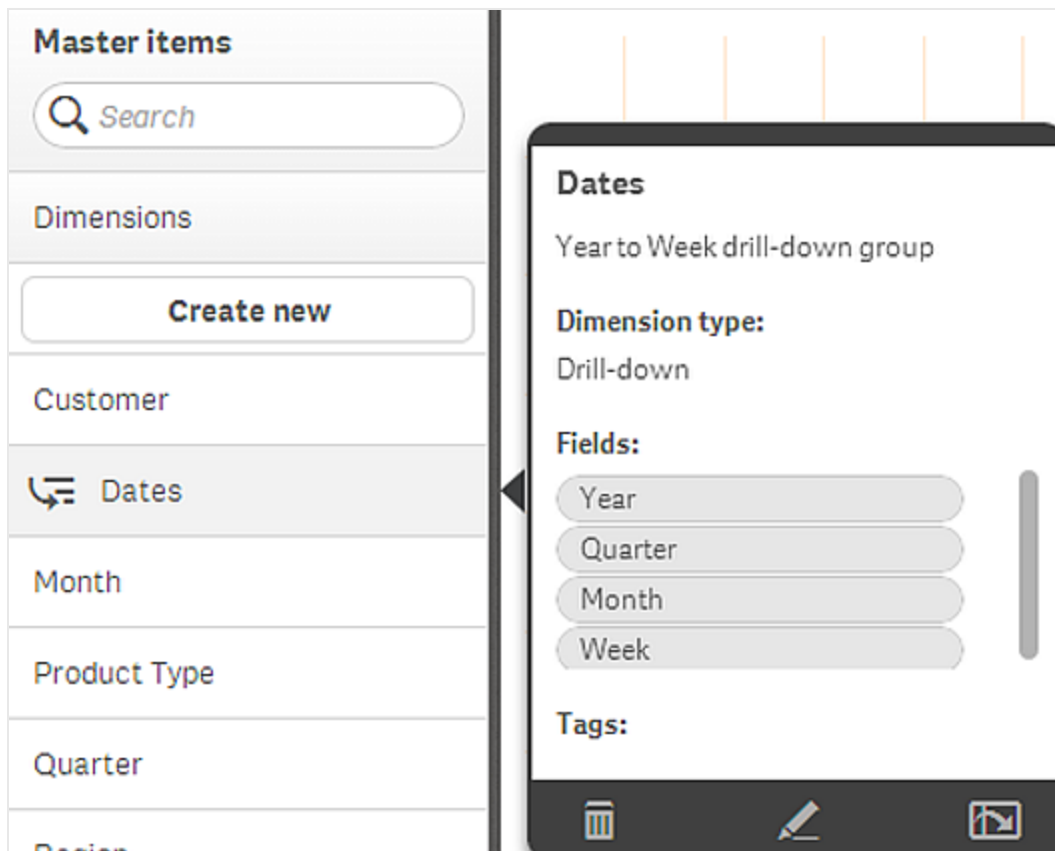


You can rearrange the order of the fields you have selected by dragging them to new positions in the list of selected fields.

3. Type a name for the dimension.
4. Type a description for the dimension (optional).
5. Add tags (optional).
6. Click **Add dimension**.
7. Click **Done** to close the dialog.

The drill-down dimension is now saved in the **Dimensions** category among the master items.

When you click the dimension in the panel on the left-hand side, the preview displays the dimension type and which fields are included in the drill-down dimension.



Creating a calculated dimension

You can create a calculated dimension from the **Master items** tab in the assets panel. The expression editor opens from the **Create new dimensions** dialog.

Do the following:

1. Click the **Dimensions** heading on the **Master items** tab to expand the category.
2. Click **Create new**.
The **Create new dimensions** dialog opens.
3. Click **fx** in the **Field** text box to open the **Add expression** dialog.

You will now be able to add expressions in different ways, depending on your preferences and of different levels of complexity.



*You can also add an expression by typing directly into the **Field** text box, but you will then not be provided with syntax highlighting and syntax check.*

Using a common function

1. Click the function you want to use.
2. Select a field from the drop-down list.
3. Click **Insert** to insert the function and the field into the expression editor.



You can insert just a function or just a field by selecting only one of them.

4. Click **Apply** to close the **Add expression** dialog.
For a measure, you continue by adding the descriptive data for the measure.

Adding an expression by typing

1. Type the expression directly in the expression editor.
The field names you use in the expression are checked, and the syntax of the expression is validated.





As you type in the expression editor, the expression is validated continuously. If there is an error, you see a hint about what is incorrect. Additional error information may be available by clicking the icon next to the hint.

Each line in the expression editor is numbered and syntax highlighting is used.

2. Click **Apply** to close the **Add expression** dialog.
For a measure, you continue by adding the descriptive data for the measure.

Adding an expression through the properties panel

You can add an expression to a visualization through the properties panel.

1. Open the sheet with the visualization that you want to edit.
2. Click  **Edit** to open the properties panel. (If it is hidden, click  in the lower right-hand corner to open it.)
3. Click the visualization that you want to edit.
4. Click **Dimensions**.
5. Click **Add dimensions**.
A dimension text box is displayed.
6. Type your expression. The expression must begin with an equals sign (=), otherwise the string will be interpreted as text.

Detailed syntax help

You can open the online help with the full description of how to use the current function by double-clicking the function name in the expression editor and pressing Ctrl+H on the keyboard. This feature becomes available after having entered the first parenthesis of the expression after the function name.



This feature is supported only when using a computer with a keyboard.

Adding the descriptive data for the dimension

After having entered the expression, you need to add some descriptive information.

1. Type a name for the dimension.
2. Type a description for the dimension (optional).
3. Add tags (optional).
4. Click **Add dimension**.
5. Click **Done** to close the dialog.

The calculated dimension is now saved in the **Dimensions** category of the **Master items**, and you can use it in visualizations.

5.2 Create master measures

When you are working with an unpublished app, you can create master measures so that they can be reused. Users of a published app will have access to the master measures in their library, but will not be able to modify them.




A measure is a combination of an expression and descriptive data, such as name, description and tags. You can add the expression for the measure in different ways.



In addition to creating master measures from the assets panel when working with a sheet, you can also create master measures from the data model viewer.

Creating a master measure from a field

When you are working with an unpublished app, you can create master measures so that they can be reused. You can create a master measure from the **Fields** section of the assets panel.

1. Click  **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click  to select the fields tab.
3. Click the field you want to use to create a measure.
The preview opens.
4. Click  at the bottom of the preview.
5. The **Create new measure** dialog opens with the field you selected as a the name of the measure and

as a part of the expression.

6. Click **fx** in the **Expression** field to open the **Edit expression** dialog.
7. Type the expression directly in the expression editor (the main window).
The field names you use in the expression are checked, and the syntax of the expression is validated.



As you type in the expression editor, the expression is validated continuously. If there is an error, you see a hint about what is incorrect in the lower left-hand corner. Additional error information may be available by clicking the icon next to the hint.

Each line in the expression editor is numbered and syntax highlighting is used.



You can open the online help with the full description of how to use the current function by double-clicking the function name in the expression editor and pressing Ctrl+H on the keyboard. This feature becomes available after having entered the first parenthesis of the expression after the function name, and only when using a computer with a keyboard.

8. Click **Apply** to close the **Add expression** dialog.
Now you need to add some descriptive data for the measure.
9. Edit the name if you want to.
10. Type a description for the measure (optional).
11. Add tags (optional).
12. Click **Create**.

The measure is now saved in the **Measures** category in the master items, and you can use it in visualizations.





*Direct Discovery fields are indicated by  in the **Fields** section of the assets panel.*

Creating a master measure with a common aggregation function

When you are working with an unpublished app, you can create master measures so that they can be reused. You can easily create a measure using one of the most common aggregation functions by selecting the function and the field from drop-down lists.

Do the following:

1. Click  **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click  to select the master items tab.
3. Click the **Measures** heading to expand that category.
4. Click **Create new**.
The **Create new measure** dialog opens.

5. Click **fx** in the **Expression** field to open the **Add expression** dialog.
You find drop-down lists for selecting a field and a common function on the right-hand side.
6. If you want to show fields from a particular table, select this table in the top drop-down list (optional).
7. Select a field from the **Field** drop-down list.
8. Select a function from the bottom drop-down list.



You can insert just a field by not selecting a function.

9. Click **Insert** to insert the field and the function into the expression editor.





*You can open the online help with the full description of how to use the current function by double-clicking the function name in the expression editor and pressing **Ctrl+H** on the keyboard. This feature becomes available after having entered the first parenthesis of the expression after the function name, and only when using a computer with a keyboard.*

10. Click **Apply** to close the **Add expression** dialog.
Now you need to add some descriptive data for the measure.
11. Type a name for the measure.
12. Type a description for the measure (optional).
13. Add tags (optional).
14. Click **Create**.

The measure is now saved in the **Measures** category in the master items, and you can use it in visualizations.

Creating a master measure by typing the expression

When you are working with an unpublished app, you can create master measures so that they can be reused. You can add complex expressions by typing the expression into the expression editor.

1. Click  **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click  to select the master items tab.
3. Click the **Measures** heading to expand that category.
4. Click **Create new**.
The **Create new measure** dialog opens.
5. Click **fx** in the **Expression** field to open the **Add expression** dialog.
6. Type the expression directly in the expression editor (the main window).
The field names you use in the expression are checked, and the syntax of the expression is validated.



As you type in the expression editor, the expression is validated continuously. If there is an error, you see a hint about what is incorrect in the lower left-hand corner. Additional error information may be available by clicking the icon next to the hint.

Each line in the expression editor is numbered and syntax highlighting is used.



You can open the online help with the full description of how to use the current function by double-clicking the function name in the expression editor and pressing Ctrl+H on the keyboard. This feature becomes available after having entered the first parenthesis of the expression after the function name, and only when using a computer with a keyboard.

7. Click **Apply** to close the **Add expression** dialog.
Now you need to add some descriptive data for the measure.
8. Type a name for the measure.
9. Type a description for the measure (optional).
10. Add tags (optional).
11. Click **Create**.

The measure is now saved in the **Measures** category in the master items, and you can use it in visualizations.

5.3 Creating a master visualization

You can create a master visualization to be able to reuse it. Users of a published app will have access to the master visualizations in their library, but will not be able to modify them.




You can only create master visualizations when you are working with an unpublished app.

Do the following:

1. While editing a sheet, drag a visualization from the sheet to the master items.
If you have given the visualization a title, this is automatically added as the name of the master visualization.
2. Add a name, or change the name if you want to.
3. Type a description for the visualization (optional).
4. Add tags (optional).
5. Click **Add**.

The visualization is now saved to the master items tab.






*You can also add a visualization to the master items by long-touching/right-clicking it on the sheet, and selecting  **Add to master items**.*

5.4 Editing a master dimension

When you update a master dimension, the changes will be reflected in all its instances, including all visualizations that use it.

Do the following:

1. In sheet view, click  **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click  to display the master items.
3. Click the dimension that you want to edit.
The preview opens.
4. Click  at the bottom of the preview.
If the dimension is used on a sheet, a dialog is displayed to inform you that any changes to the master dimension will be applied to all its instances on the sheets.
5. Click **OK**.
The **Edit dimension** dialog opens, where you update the field or expression, name, description and tags.
6. Click **Save**.

The dimension is now updated.






You can also edit a master item from its preview. You open the preview by clicking an item in the master items.

5.5 Editing a master measure

When you update a master measure, the changes will be reflected in all its instances, including all visualizations that use it.

Do the following:

1. In sheet view, click  **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click  to display the master items.
3. Click the measure that you want to edit.
The preview opens.
4. Click  at the bottom of the preview.
If the measure is used on a sheet, a dialog is displayed to inform you that any changes to the master measure will be applied to all its instances on the sheets.

5. Click **OK**.

The **Edit measure** dialog opens, where you update the expression, name, description and tags.

6. Click **Save**.

The measure is now updated.






You can also edit a master item from its preview. You open the preview by clicking an item in the master items.

5.6 Editing a master visualization

When you update a visualization in the master items, the changes will be reflected in all instances of the master visualization.

Do the following:

1. In sheet view, click  **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click  to display the master items.
3. Click the visualization that you want to edit.
The preview opens.
4. Click  at the bottom of the preview.
If the visualization is used on a sheet, a dialog is displayed to inform you that any changes to the master visualization will be applied to all its instances on the sheets.
5. Click **OK**.
The visualization opens for editing.
6. Make the changes you want, and click **Done** in the upper right corner of the visualization to finish editing.

The visualization is updated and reflected in all its instances.



You can also edit a master item from its preview. You open the preview by clicking an item in the master items.

5.7 Tagging master items

You can use tags to organize master items. You will find matches in tags when searching in the library or assets panel.

Each tag can contain a maximum of 31 characters, and each master item can have up to 30 tags.

Adding tags to a master item

You can add tags when creating or editing a master item.

Create new measure

Expression:

Sum(Sales)

fx

Name:

Sales

Description:

Tags:

MyTag

+

Invoicing

Sales

Cancel

Create

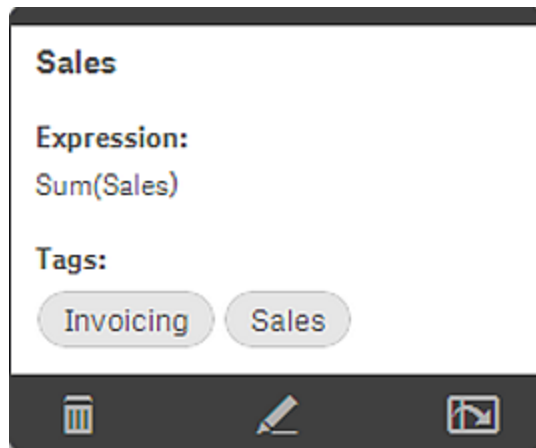
Adding tags while creating a new measure



You can add tags by clicking **+** or by pressing Enter.

Previewing tags

In the library and assets panel, tags are displayed when previewing dimensions, measures and visualizations.






5.8 Deleting a master dimension or master measure

You can delete dimensions and measures from the master items as long as the app is not published.

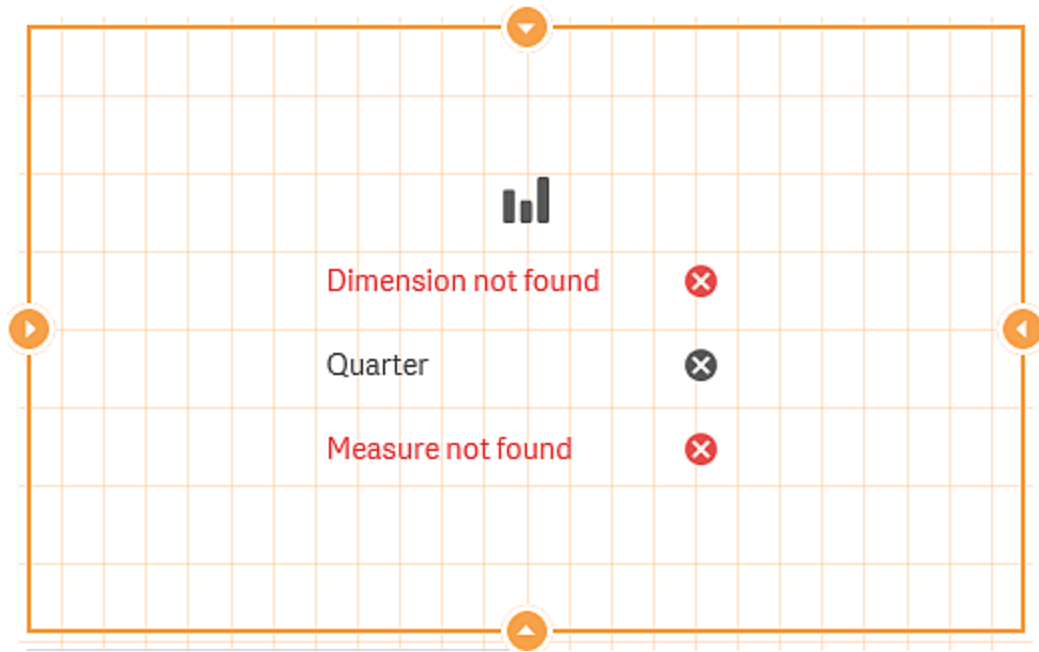


If you delete a master dimension or master measure, the visualizations that use the deleted master item will not work unless you replace it with a new dimension or measure.

Do the following:

1. In sheet view, click  **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click  to display the master items.
3. Click the dimension or measure that you want to delete.
The preview opens.
4. Click  at the bottom of the preview.
A dialog is displayed stating that all visualizations that use the dimension or measure will stop working.
5. Click **OK**.

The dimension or measure is deleted from the master items, and all visualizations on the sheets that used the deleted item do not work anymore. You see the text **Dimension not found** or **Measure not found** on those visualizations.



This visualization is lacking both a dimension and a measure, both which have been deleted from the master items

Replacing an invalid dimension or measure

When a dimension or measure has been deleted from the master items, all visualizations that reference to the deleted master item will not work anymore, until the missing dimension or measure is replaced.

Do the following:

1. In sheet view, click **Edit** in the toolbar.
The assets panel opens on the left-hand side. Click to display the master items.
2. Drag a dimension or measure from the **Dimensions** or **Measures** sections to the visualization on the sheet.
The shortcut menu opens.
3. Select **Replace invalid dimension** or **Replace invalid measure**.

The visualization is complete and works again.


5.9 Deleting a master visualization

You can delete visualizations from the master items as long as the app is not published.

Do the following:

1. In sheet view, click **Edit** in the toolbar.
The assets panel opens on the left-hand side.
2. Click to display the master items.
3. Click the visualization that you want to delete.

The preview opens.

4. Click  at the bottom of the preview.
A dialog is displayed stating that wherever this visualization is used on sheets, there will be invalid instances of it.
5. Click **OK**.

The visualization is deleted from the master items, and on all sheets where this visualization was used, you see invalid visualizations. You now need to replace the invalid visualization with other ones, or delete the instances.





You can also delete visualizations from the preview that is displayed when clicking the visualization in the master items.

Replacing an invalid visualization on a sheet


The representation of the invalid visualization is there to tell you that there used to be a visualization at a certain location on the sheet, but the invalid visualization serves no purpose.

Do the following:

1. In sheet view, click  **Edit** in the toolbar.
The assets panel opens on the left-hand side. Click  to display the master items.
2. Drag a visualization from the master items to the location of the invalid visualization on the sheet.

The invalid visualization is replaced.

Deleting an invalid visualization

1. In sheet view, click  **Edit** in the toolbar.
2. Long-touch/right-click on the invalid visualization and select **Delete** in the shortcut menu.

The invalid visualization is deleted.

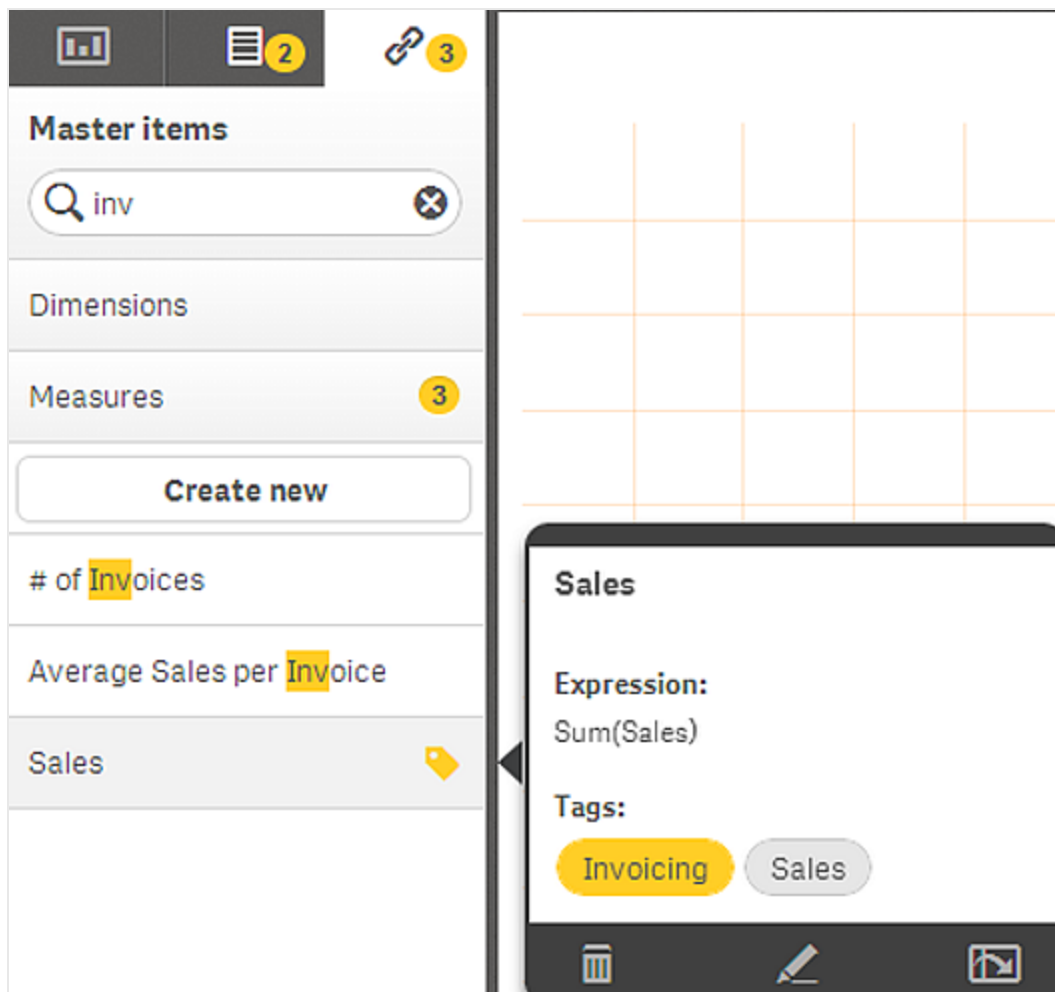
6 Searching in the assets

The search field at the top of the assets panel helps you find assets on the different tabs. As you start to type in the search field, all items that have a name or a tag that contains the search string, are presented.



The search function is not case sensitive.

When a matching string is found in a tag, it is indicated by a tag icon in the search result. Clicking the item in the list of results, brings up a preview of it.



Searching for "inv" among the measures presents any measure that contains that string in its name or a tag.

7 Designing visualizations with Direct Discovery

Designing visualizations from Direct Discovery fields requires some background knowledge about the nature of the field types that can be used.

7.1 Direct Discovery fields in visualizations

DIMENSION

- The Direct Discovery `DIMENSION` field type can be used in the same way as any other dimension.

MEASURE

- A Direct Discovery `MEASURE` must be aggregated with one of the common functions before it can be used in a visualization.
- A regular field that is dropped onto a sheet becomes a filter pane, but not a Direct Discovery `MEASURE` as it must be aggregated first.

DETAIL

The Direct Discovery `DETAIL` field type can only be used in tables, and not in combination with a measure.



When creating a table using a Direct Discovery `DETAIL` field, and the number of rows being retrieved exceeds a value defined in the load script (by default, 1000 rows), you may see a warning message and the table may appear to be invalid. To make the table work normally, try making selections in the app to reduce the data set.