Create apps and visualizations

Qlik Sense®
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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.

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.

You find the online help, additional guides and much more at help.qlik.com/sense.

2 Creating apps

Qlik Sense apps contain data, and use visualizations to explore that data. Make discoveries by applying selections to visualizations.

The foundation of an app is the data model and load script. Measures and dimensions are reusable data items used to build charts. Sheets and stories display and organize your visualizations. Bookmarks are an easy way to save a specific selection state on a sheet

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

The .qvf file format is a proprietary format.

Qlik Sense apps are purpose-built applications created with data. App users explore the data through visualizations selected and enhanced by app developers. Apps are created by three primary methods depending on skill level and how much data manipulation is required upon dataload. Options from basic to advanced include:

2.1 Foundations

Data manager and Data load editor

The Data manager lets you quickly add and transform data. You can also associate data tables. The Data load editor uses scripts to connect to a data source and retrieve the data.

Measures

Measures are calculations used in visualizations. Measures are created from an expression composed of aggregation functions, such as **Sum** or **Max**, combined with one or several fields.

Dimensions

Dimensions are fields used in visualizations. Dimensions determine how the data in a visualization is grouped. For example: total sales per country or number of products per supplier.

2.2 Structure and visuals

Sheets

Sheets contain data visualizations, such as charts and tables. You create structure in your app by grouping visualizations on sheets. For example, you could have a sheet for North American sales, and a different sheet for Europe.

Bookmarks

Bookmarks are shortcuts to a certain set of selections and chart expansions.

Stories

Stories are based on snapshots of visualizations. You present your data by creating a story that guides you to new insights by combining snapshots of data at specific times and selection states.

> *In Qlik Sense Desktop, apps are typically stored in <user>\Documents\Qlik\Sense\Apps, as <Appname>.qvf, where <Appname> is the name of the app. If you rename an app in Qlik Sense Desktop, the .qvf is not updated.*

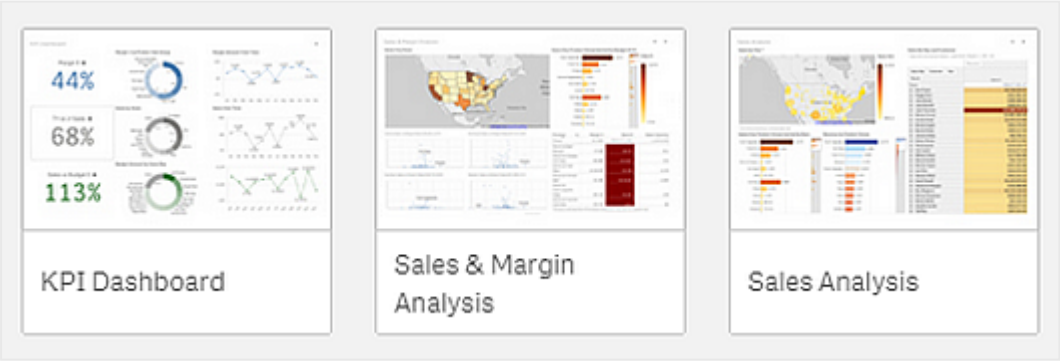
2.3 Structuring an app using sheets

Sheets structure your ideas and purpose of your app. When you create an new app, it is good practice to first build a structure of empty sheets, where each sheet represents an idea or a goal. This gives a good overview of the app.

Overview

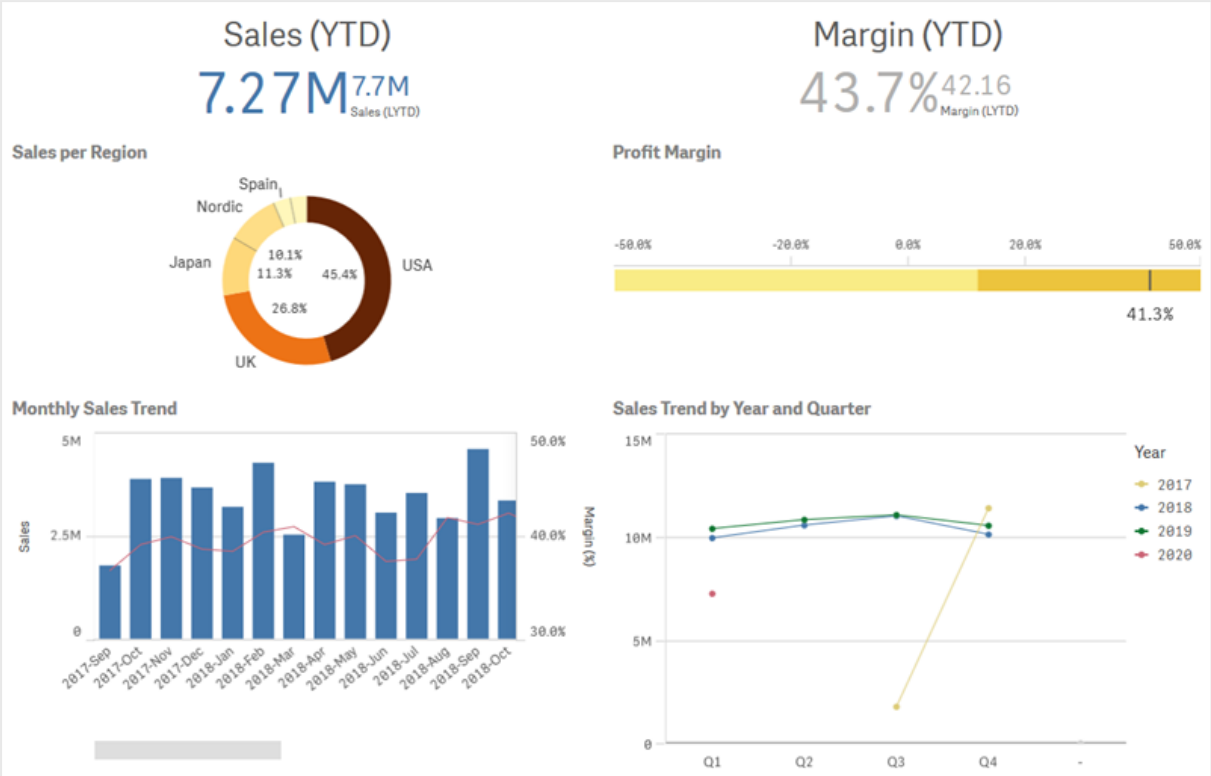
For example, you are creating an overview of your company's key metrics, sales, and margins by state, region, and product. Instead of having all this information in one place, you could structure it by having one sheet for each purpose.

Each sheet has a purpose and an idea of its own.



A sheet is where charts and tables for data visualization are placed. An app can include several sheets. The selections that you make affect visualizations regardless of which sheets they are on.

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



Creating a new sheet

You can create a new sheet from the app overview or from the assets panel.

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

Do the following:

1. From the app overview, click to view the sheets.
2. Click **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.

Changing the title and description of a sheet

You can change the title and description of your sheets. You can either use a fixed sheet title, or a dynamic sheet title based on an expression.

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 properties panel.

Using a dynamic sheet title

You can set a dynamic sheet title based on an expression in the **Title expression** property of the sheet properties panel. You can use any valid chart expression.

If you set a dynamic sheet title, the fixed title (**Title**) is not used.

Setting a show condition for a sheet

You can set a condition in **Show condition** to show or hide a sheet in an app depending on if an expression evaluates as true or false. The sheet is only shown if the expression evaluates as true. Hiding a sheet does not hide or exclude data in an app.

For example, you could create a sheet that is only available if certain values are present in your data. Typically, you should use an if function.

Changing the sheet thumbnail

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

Note the following:

- The following formats are supported: .png, .jpg, .jpeg, and .gif.
- The optimal aspect ratio of a thumbnail is 8:5 (width:height).
- You can only add or change the thumbnail of an unpublished sheet.

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.
   The **Media library** opens.
4. Click on a folder in the media library, for example **In app** or **Default**.
5. Select the image you want to use as a thumbnail for the sheet and click **Insert**.
6. Click ✔ to stop editing.

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

You can also change a sheet's thumbnail in the assets panel or in the Sheet properties panel.

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

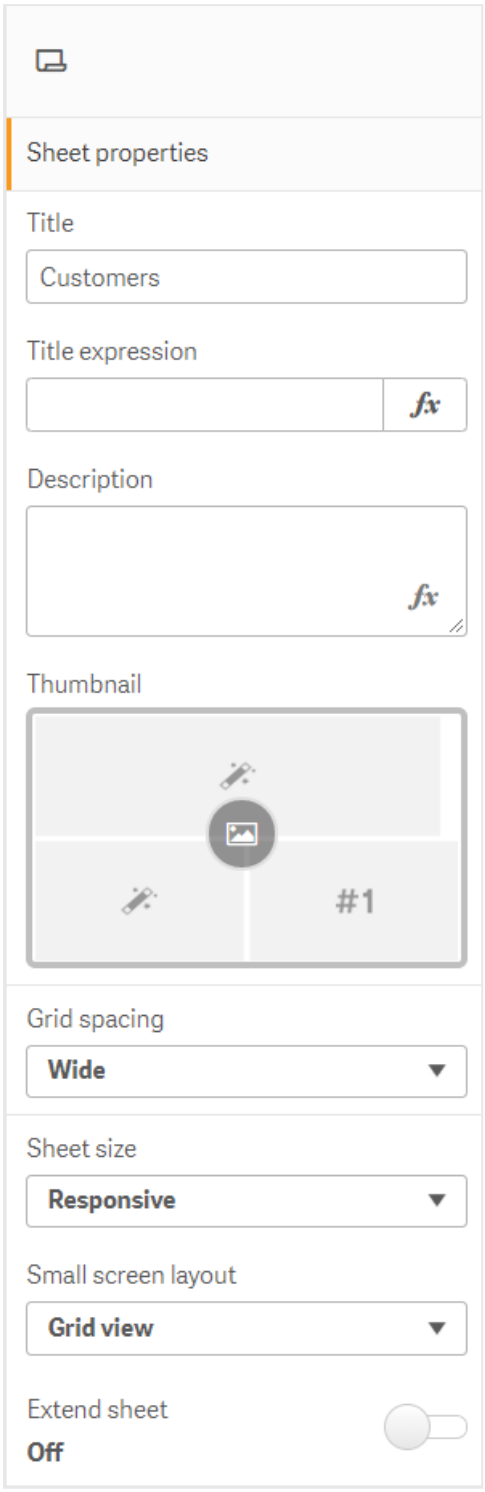
For Qlik Sense: You can upload images to the **In app** folder in the media library. You need to use the Qlik Management Console to upload images to the default folder.

For Qlik Sense Desktop: You can place images in the following folder on your computer: *C:\Users\<user>\Documents\Qlik\Sense\Content\Default*. Images will be available in the **default** folder in the media library. When moving an app between installations, the images that you use in the app are saved in the qvf file together with the app. When you open the app in a new location, the images will be in the **In app** folder in the media library for the app.

Changing the grid sizing of a sheet

You can adjust the grid sizing of the sheet to be able to fit more visualizations on a sheet, or have more control over how visualizations are positioned. The grid displays when you are adding, moving, or resizing a visualization.

Grid size can be changed in the Sheet properties pane



Do the following:

1. Go to the **Grid spacing** setting under Sheet properties.
2. Change spacing from **Wide** (the default option) to **Medium**, **Narrow**, or **Custom**.
3. If you choose Custom, a slider will appear. Use the slider to change the grid size. The higher the number, the more narrow the grid spacing is.

Customizing sheet size

By default, Qlik Sense uses a responsive layout for sheets that adjusts the sheet to the dimensions of the user's screen. You can set a custom width and height for the sheet if you want to use a non-responsive layout for your sheets. This ensures that your dashboard will be presented to users exactly as you created them, with no adjustments for responsiveness. You can set the height and width of a sheet anywhere between 300 pixels and 4,000 pixels.

If the PDF download of your sheet appears overly zoomed in, switching the **Sheet size** from **Responsive** to **Custom** is recommended.

> *Changing the **Sheet size** from **Responsive** to **Custom** may impact the interactive experience for business users. If report output formatting is particularly important, consider creating a report-specific app for better control over themes and layout.*

When a sheet is using a custom size, you can change the grid spacing, but you cannot use **Extend sheet** to change the size.

For **Responsive** sheets that are not extended, the exported PDF of the sheet will be:

- Landscape orientation: 1680 by 1120 pixels
- Portrait orientation: 1120 by 1680 pixels

If you are using a **Custom** sheet size, the PDF output of the sheet will keep the custom pixel values for width and height.

Changing the **Sheet size** from **Responsive** to **Custom** may impact the clarity of the PDF output. If you are manually exporting a custom-sized sheet as a PDF, the best practice is:

- Portrait orientation: values of 1680 by 1120 pixels, or a ratio of 1:1.5
- Landscape orientation: values of 1120 by 1680 pixels, or a ratio of 1.5:1

Extended sheets and custom-sized sheets may have a lower-resolution PDF output if the sheet is too large to clearly display on a single PDF page.

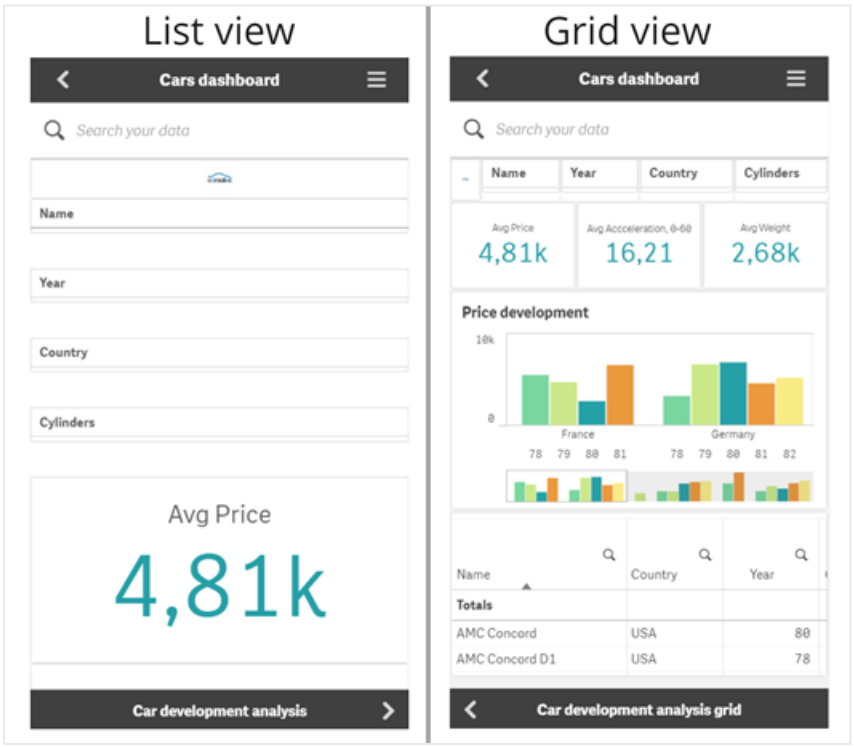
Do the following:

1. Change the **Sheet size** setting from **Responsive** to **Custom**.
2. Enter a width for the sheet in pixels.
3. Enter a height for the sheet in pixels.

Changing the small screen layout

By default, sheets are displayed in List view when viewed on small screens. You can change them to display as a grid. Sheets must be set to responsive layout to display as grid on small screens.

A sheet viewed on a small screen in List view (left) and Grid view (right)



Grid view shows a small preview of your visualizations. List view only shows the visualization titles.

Do the following:

1. Under **Sheet properties**, go to **Small screen layout**.
2. From the drop-down, select **Grid view**.

Extending the sheet area

You can extend the area of a sheet vertically if you need to add more visualizations than what can fit on a screen.

> *Downloaded extended sheets may have a lower quality PDF output if the sheet is too large to clearly display on a single PDF page.*

Note the following:

- You need to activate **Extend sheet** under Sheet properties.
- Each extension adds 50% of the original sheet height.
- If you have visualizations that scroll, this can interfere with scrolling of an extended sheet. You should leave some empty space that allows for scrolling when you design the sheet.

You can extend the sheet in two different ways:

Do the following:

- Drag an object to the bottom of the sheet and drop it on the drop zone that appears.
- Toggle **Extend sheet** under **Sheet properties**.

The sheet is now expanded by 50% of the original height. You can scroll vertically in the sheet to access all content.

Adding actions to sheets

You can add actions to sheets that trigger when users navigate to those sheets. For example, you could automatically clear selections in the app when users navigate to a particular sheet.

For more information, see *Adding actions to sheets (page 21)*.

Adding a background color or image

You can customize the background of a sheet. You can choose a specific background color, or color by expression. Any image in the media library can be set as a background. The image can be positioned and resized so it does not fill the entire background.

The following formats are supported: .png, .jpg, .jpeg, and .gif. If you use a .gif, it can be animated or static.

Do the following:

1. Open the sheet in Edit mode.
2. Under **Sheet properties**, click **Styling**.
3. Set **Background** to **Custom**. The default is **Auto**.
4. **Background color**:
    - **Single color**: Choose a color using the color picker.
    - **By expression**: Set a color using a user-defined expression. For more information, see *Examples (page 704)*.
5. **Background image**: Select **Image from media library**. The default is **None**.
6. Click on the default thumbnail.
   The **Media library** opens.
7. Click on a folder in the media library, for example **In app** or **Default**. You can also choose to **Upload media**, if the image you want is not already in the media library.
8. Select the image you want to use and click **Insert**.
   If the image you want is not already in the media library, click **New upload** and add the image.
9. Use the drop down to change the size of your image:
    - Original size
    - Always fit
    - Fit to width
    - Fit to height

- Stretch to fit
- Always fill

10. Under **Position**, you can change the alignment of the image. For example, the image can be centered on the sheet, or in the top-right corner.

The image and background color you selected is now visible on the sheet.

Sheet in Edit mode, with a background image set on the left

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).
- By right-clicking and selecting **Cut**, **Copy** and **Paste**.
- With the keyboard shortcuts Ctrl+C, Ctrl+X and Ctrl+V.

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 own** in app overview and in **Sheets** in the assets panel.

You can duplicate a sheet in the following ways:

- Click **Duplicate** in the shortcut menu of a sheet in the app overview or in the sheet navigator.
- Click **Duplicate sheet** in the global menu in the app overview or in sheet view.

Customizing sheet styling with CSS

You can customize the styling of individual sheets with CSS. This can help supplement custom themes by allowing you to customize elements not covered by themes. Customized sheet styling can also be used to override any styling from the themes applied in the application.

It is recommended that the use of CSS sheet styling be minimized as much as possible. It is recommended to use the available styling properties and styling options wherever possible instead of custom CSS.

CSS styling is best used only when there are no other options available. The CSS structure of any sheet is not static, it is not an API, and may change at any time. Keep CSS styling to a minimum, ensure it is correct, and make sure that it is easy to modify if a change happens that breaks it.

Custom CSS styling applied to sheets is not included in reports.

For more about custom themes, see *Custom themes (page 37)*.

Do the following:

1. Open the sheet in Edit mode.
2. Under **Sheet properties**, click **Styling**.
3. Set **Custom styles** to **Activated**.
4. Enter your CSS styling in the input box.

Limitations

Custom CSS styling for sheets has several limitations. Added CSS is parsed and sanitized to remove and ignore any elements that would hide or break application functionality. You will be notified if you enter unsupported CSS. The following outlines some of the limitations when using CSS to style sheets:

- `font-size` cannot be larger than 18 px.
- HTML tags are not supported.
- The following selectors are not allowed:
  - Pseudo-selectors
  - Root selectors
  - * selectors
- The following @rules are not supported:
  - `charset`
  - `color-profile`
  - `counter-style`

    - `font-face`
    - `font-feature-values`
    - `font-palette-values`
    - `import`
    - `keyframes`
    - `media`
    - `namespace`
    - `page`
    - `position-try`
    - `property`
- Injection is not allowed.
- `display:none` is only supported for custom user-defined elements or classes.
- Comments are not applied.
- Custom CSS styling is not supported by applications in Qlik Sense Mobile SaaS.
- Custom CSS styling applied to sheets is not included in reports.

Adding actions to sheets

You can set actions to sheets that trigger when users navigate to the sheet. Sheet actions are useful when you want to assist app users with predefined selection or selection controls when they navigate to a sheet. For example, a sheet could automatically apply a bookmark or clear all selections when users navigate to the sheet.

Sheet actions can be configured in the properties panel. You can add multiple actions to a sheet. The actions are performed in the order they are listed under **Actions**. You can change the order of an action by dragging it.

For a visual demo about adding actions to sheets, see Adding actions to sheets.

> *All expressions used in sheet actions are evaluated before the actions are performed. For example, you could not use an expression in an action that selects results from a previous action as the expression evaluates before the selection is made by the action.*

Sheet actions are not triggered if the sheet is an embedded sheet or in a mashup.

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. Click **Actions** in the properties panel of the sheet.
3. Click **Add action**.
4. Select the action you want to use.
   For some actions you need to provide details for the action. For example, for the **Select values in a**

field action, you need to select a field, and which value to select in the field.

5. Optionally, after **Label**, enter a name for the action.

Available sheet actions

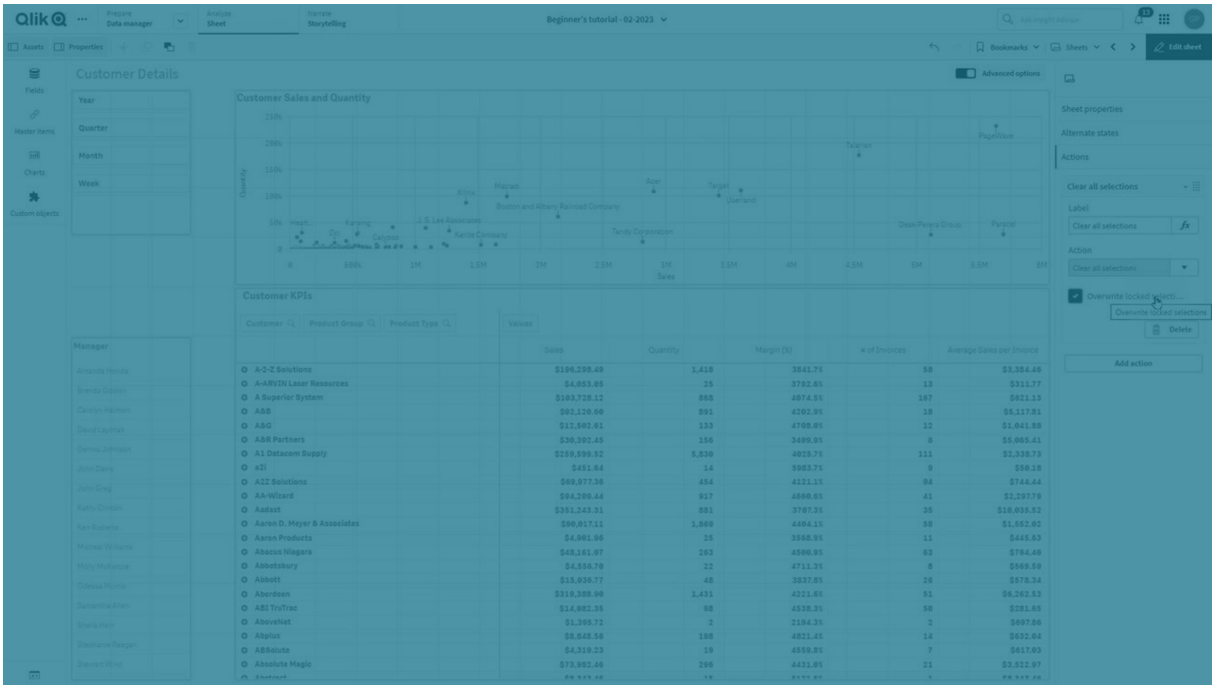
You can add one or more actions to be performed when users navigate to the sheet. For some actions, you need to provide details for the action.

Apply bookmark

You can apply the selection that is defined in a bookmark that you choose.

Clear all selections

You can clear all selections in all states in the app. You can optionally overwrite locked selections.



Clear selections in other fields

You can clear selections from all fields except the one you specify. You can optionally overwrite locked selections.

If no selections are made in the specified field, all values in this field will be selected.

Move forwards in your selections

You can move one step forwards in your selection history.

Move backwards in your selections

You can move one step backwards in your selection history.

Clear selections in field

You can clear all selections from a field that you specify.

Lock all selections

You can lock all selections in the app.

Lock a specific field

You can lock selections in a field that you specify.

Unlock all selections

You can unlock all selections in the app.

Unlock a specific field

You can unlock selections in a field that you specify.

Select all values in a field

You can select all values in a field that you specify. You can optionally overwrite locked selections.

Select values in a field

You can select a list of values in a field that you specify. Separate the values to select with a semi colon. You can optionally overwrite locked selections.

> *It is not possible to use fields with date, timestamp, or money data type.*

*This button action does not select numeric values that are stored or classified as text. For this purpose, use the **Select values matching search criteria** action instead.*

Select values matching search criteria

You can select all values that match the search results from a search criteria that you specify. You need to specify the search criteria as a string. You can optionally overwrite locked selections.

- If you want to use an expression, you need to enclose it in single quotes, for example, *='=Sum ([Sales Amount]) > 200000'*.
- If you want to search for a partial string, you need to use wild cards (*, ?,^). If you do not use wild cards, only strings that match exactly are selected.

Select alternatives

Select all alternative values in a field that you specify. You can optionally overwrite locked selections.

Select excluded

Select all excluded values in a field that you specify. You can optionally overwrite locked selections.

Select possible values in a field

Select all possible values in a field that you specify. You can optionally overwrite locked selections.

Toggle field selection

You can set the button to toggle between the current selection, and a selection that adds selections defined by a search string. You can use wild cards in the search string. If you want to define a list of values you need to use the format *(A|B)*, where A and B are values to select.

Set variable value

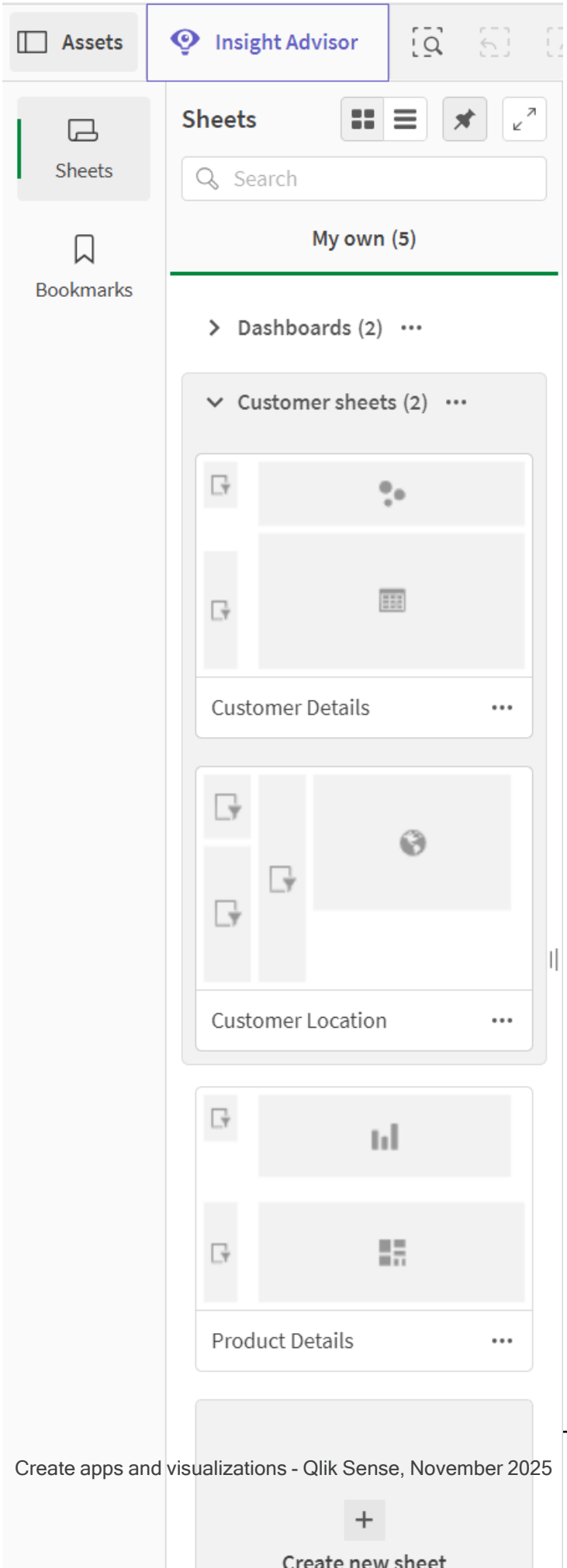
You can assign a value to a variable.

Grouping sheets

Organize sheets in the assets panel using grouping.

You can group sheets in the assets panel. Groups are collapsible, allowing you to organize large numbers of sheets into a manageable hierarchy. You can make groups public or private.

Grouped sheets in the assets panel


Assets
Insight Advisor
Sheets
Bookmarks
Sheets
Search
My own (5)
Dashboards (2)
Customer sheets (2)
Customer Details
Customer Location
Product Details
Create new sheet

Adding sheets to a group

Do the following:

1. In the assets panel, right-click a sheet in **My own** and select **Add to group**.
2. Select a group or create a new group.

Alternatively, in the app overview or assets panel, you can click and drag a sheet into a group.

Removing sheets from a group

Do the following:

1. In the assets panel, right-click a sheet and select **Remove from group**.
2. Select a group or create a new group.

Alternatively, in the app overview or assets panel, you can click and drag a sheet out from a group.

Limitations

Groups have the following limitations:

- Groups do not display in Qlik Sense Mobile. Sheets in groups will be displayed in one list instead. The order of sheets in the list in Qlik Sense Mobile may be different than the order defined in the groups.
- You cannot publish groups in published apps. You can publish sheets in the group's contents, however.

2.4 Managing apps

Once you have created and built an app with the sheets and visualizations you want it to have, you may want to fine-tune it to make it easy and efficient to use, not only for yourself but also for other people.

The following actions are available to app owners:

- Apply app styling (logo and header)
- Create reusable master items (visualizations, dimensionsand measures
- Add bookmarks to keep track of important and interesting data selections and connections
- Making apps available in Insight Advisor Chat
- Turn off Insight Advisor
- Change the app’s title and description, and also add a thumbnail to it
- Reload app data
- Manage app reload tasks
- Publish your own apps
- Move your own published apps between streams

Creating an app

The first thing you need to do when building an app is to create an empty placeholder for it. You create the app placeholder from the hub

Do the following:

1. Click **Create new app** in the hub.
2. Give your app a name.
3. Click **Create**.
   The app is created.
4. Click **Open app**.
   The app opens in the app overview.

The next step is to add data to the new app.

On-demand apps

On-demand apps enable you to load and analyze big data sources in Qlik Sense.

Trying to analyze an entire big data store at one time is highly inefficient. Nevertheless, to make representative visualizations, all the data must be discoverable. Qlik Sense on-demand apps give users aggregate views of big data stores and allow them to identify and load relevant subsets of the data for detailed analysis.

On-demand apps are made up of several building blocks or components, and some of those components are built by users with advanced scripting skills.

Generating an on-demand app

You generate an on-demand app when you have selected a manageable subset of data using an on-demand selection app. Any selection app that you are working with will contain one or more navigation links for generating on-demand apps in the **App navigation** bar.

The on-demand apps shown on the **App navigation** bar have completion indicators that start to turn green as you make selections in the selection app. Each on-demand app on the app navigation bar has a limit on the amount of data it can contain. When selections are made in the selection app, the completion indicator shows when the amount of data selected is within the bounds set for the on-demand app.

Once an on-demand app's indicator turns completely green, you can generate that app with the currently selected data. You can also choose to open a previously generated instance of that app. Every on-demand app in the app navigation bar can be generated multiple times, and those generated apps remain accessible. When the maximum number of apps has been generated, you must delete an existing app before you can generate a new on-demand app. On-demand apps also may have an expiration time after which they are automatically deleted.

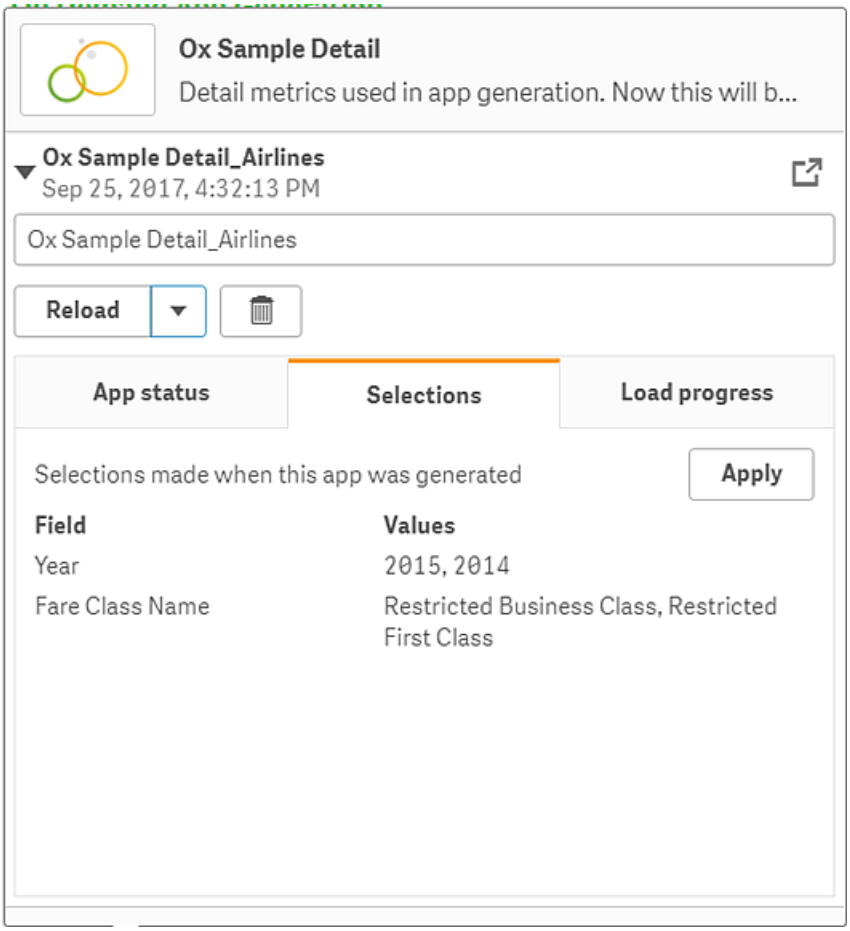
Anonymous users can only generate on-demand apps that are published automatically. Because anonymous users can only use published apps, they cannot use an on-demand app unless it is published automatically when it is generated. If an anonymous user attempts to generate an on-demand app that is not set for automatic publication, a message displays indicating that the user cannot generate an app from that particular on-demand app navigation point.

The maximum number of apps and the retention time are set on the on-demand app navigation link. The app navigation link is one of the building blocks of on-demand apps, and it is usually added by the creator of the selection app.

Do the following:

1. Open an on-demand selection app.
2. Select from the visualization objects in the selection app.
3. When the completion indicator on an on-demand app in the **App navigation** bar turns completely green, click the on-demand app.
   You can select an on-demand app in the **App navigation** bar to open its generation panel. There you can click the ⓘ to see the **Constraint** (maximum number of records allowed) and the number of records currently selected. You can also see the number of values selected for each field and any constraints on the fields. When on-demand apps are created, constraints can be placed on individual fields. For example, a field for Year might be limited so that no more than two values can be selected.
   When the number of records (**Row count**) currently selected is less than or equal to the maximum number of records allowed, the completion indicator turns completely green. An app cannot be generated, however, until all the constraints have been met. If the row count is within the constraint but one or more of the fields have not met the requirements of their constraints, the **Generate new app** button will not be enabled.

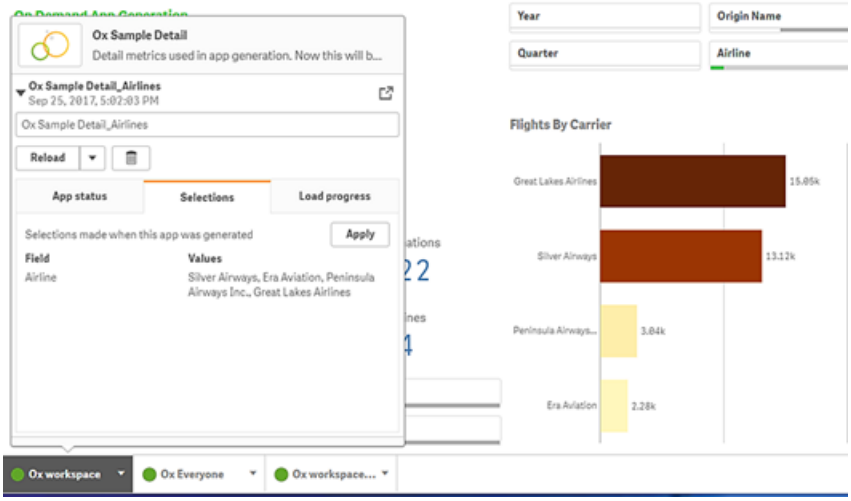
   *If you select **Generate new app** when constraints panel is open, you will not see the generated app. Click the ⓘ to close the panel, and you will see the new app listed if it generated successfully.*
4. Click the **Generate new app** button to create a new instance of the on-demand app with the data currently selected.
   The new instance of the app is generated and appears in the generation panel above the **Generate new app** button.
   To see more about the generated app, open its detail panel.



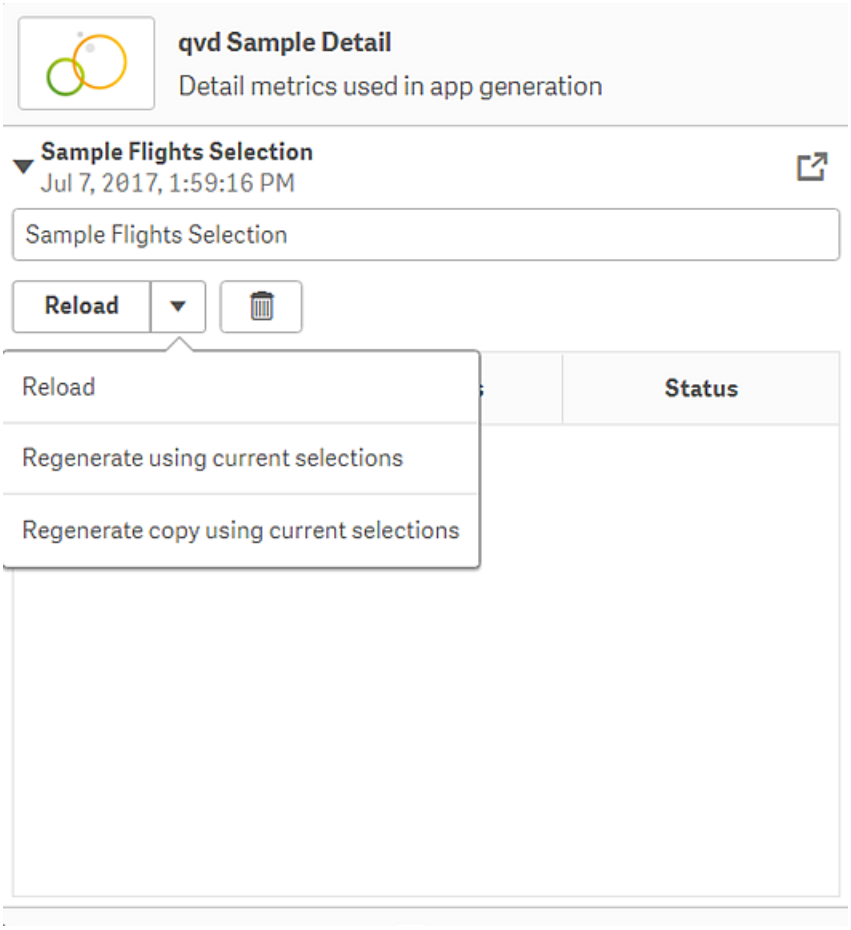
In this view, you can also rename the on-demand app. By default, on-demand apps are assigned the name of the navigation point from which they are generated, and the user's name is appended. For example, when the name of the navigation point is "Ox Sample Detail," the default name of the generated on-demand app would be "Ox Sample Detail_John-Doe" for user "John Doe." In the illustration above, the name of the on-demand app has been changed to "Ox Sample Detail_ Airlines." You can rename an on-demand app even if it has been published.

On-demand apps generated by anonymous users are given default names indicating that they were generated by an anonymous user rather than a registered user. Anonymous users can change the names of generated apps just as registered users can change the names of their apps.

The **Apply** button applies the selections listed on the generated on-demand app's **Selections** tab to the selection app.



5. Select **Open app** from the ••• > menu to open the generated app.
   You can also reload data and regenerate an on-demand app. The **Reload** menu is available when the detail panel is open:



   The selections on the **Reload** menu work as follows:

   - **Reload**: reloads the data based on the current selections that have been made within the on-demand app.

- **Regenerate using current selections**: regenerates the on-demand app using the current selections that have been made within the selection app.

  > *The **Apply** button on the **Selections** tab applies the on-demand app's selections to the selection app. The on-demand app's selections are those listed as **Selections made when this app was generated**. For more information, see the illustration above.*
  > *This is the reverse of what is done when **Regenerate using current selections** is used.*

- **Regenerate copy using the current selections**: generates a new on-demand app using the current selections that have been made within the selection app. The previously generated on-demand app remains in its current state.

Exploring a published on-demand app

Most users who use on-demand apps to explore big data sets access them as published apps. There are two points at which most users will use on-demand apps:

1. In a published on-demand selection app, where the user selects data and generates an on-demand app from the **App navigation** bar.
2. In a stream where a generated on-demand app is published.

Published on-demand apps have a preselected subset of data from a very large data source. You can explore that data through the visualization objects in the on-demand app. In that way, on-demand apps are like apps created with data from any other source.

You cannot change them after they have been published, though like other published apps, you can add private sheets and stories if you have the correct access rights. You work with published on-demand apps the same way you work in other published apps.

Styling an app

You can apply styling to customize the app based on your company standards. The selected styling will be applied to all sheets in the app. Once the app has been published, you cannot change the app styling.

Styling an app

The following styling options are available:

- Changing the direction of the characters in strings of text or numbers.
- Changing the default app theme.
- Toggling the context menu on or off for all visualizations.
- Toggling the hover menu on or off for all visualizations.
- Hiding items in visualization menus.
- Changing the sheet header styling.
- Adding and aligning an image, such as a logo.

- Toggling the toolbar and header on or off for all sheets.
- Adding a custom logo to the app.

More styling can be applied to an app by a developer through custom theme extensions.

Custom styling on individual objects override app styling.

Opening app settings

You can open app settings from anywhere in an unpublished app.

Do the following:

1. In an unpublished app, click ••• and then click **Settings**.
2. Click ✕ to close app settings.

App settings are not available on a mobile device.

As of Qlik Sense June 2018, app settings are not available on published apps even when having custom security rules defined with `Update` action on `App` resources.

Changing the reading order

Do the following:

1. In an unpublished app, click ••• and then click **Settings**.
2. In the menu, switch to the **Appearance** tab.
3. Turn **Right-to-left** on or off.

If a visualization is shared using Qlik Sense Charts, changing the reading order in the app will also affect the reading order in the shared chart. .

Changing the default app theme

You can apply one of the default Qlik themes or any custom theme that you have created and installed.

The default Qlik themes are:

- **Sense Horizon** - This is the default theme when you create a new app.
- **Sense Classic** - Provides a more compact view of objects, and limits the space between them.
- **Sense Focus** - Adjusts the padding and spacing around objects as well as provides designated

spaces for titles.

- **Sense Breeze** - Based on **Sense Focus** but with different color settings.

Do the following:

1. In an unpublished app, click ••• and then click **Settings**.
2. In the menu, switch to the **Appearance** tab.
3. Select the theme to apply from the **Application theme** drop-down menu.

You cannot change themes in published apps.

Custom themes

You can also create custom themes based on your company standards. With themes you can precisely style an app by changing the colors, adding images and backgrounds as well as specifying the fonts, font sizes, font weights and font styles on a global or granular basis throughout your app. You can also define color palettes and customize the specifications for margins, padding and spacing.

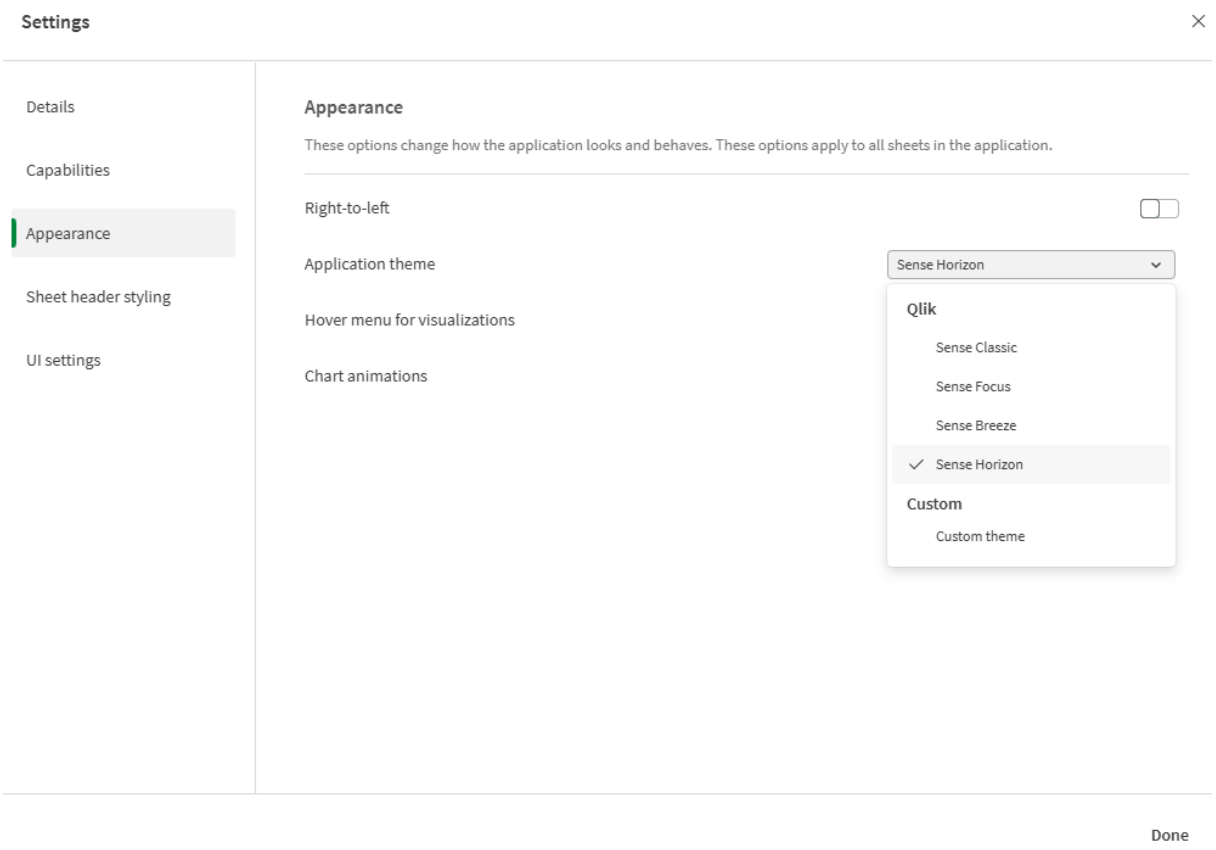
Custom themes are supported when exporting sheets and charts in PDF format. This applies to manually exported PDFs, as well as to PDFs exported automatically using subscriptions or via Qlik Reporting Service. However, a PDF generated from an app that uses a custom theme may look different than seen in the app.

Custom themes are not dependent on the app. This means that if you for example change the colors defined in a custom theme these will be updated in all apps using the theme, even if the app is published.

When you have created a custom theme, you store it in Qlik Sense as an extension. The JSON file and any additional resources, such as CSS files, are zipped and imported as an extension in the Qlik Management Console (QMC). This enables that security rules can be added in the QMC for controlling which themes specific users have access to.

You can view available custom themes from the **Appearance** section of the app settings. Custom themes appear under **Custom** in the **Application theme** drop-down menu.

App theme drop-down menu in app settings



Turning off the hover menu and context menu

The hover and context menus are interactive elements that are displayed when users interact with charts. Both menus provide access to the options menu, where the user can perform various actions related to a chart. See: Options menu

You can turn off one or both of these menus to customize the interactive experience for app users.

Turning off the hover menu

You can choose to turn off the hover menu that appears on visualizations when users place their cursor over them. This will affect all visualizations in the app.

Do the following:

1. In an unpublished app, click ••• and then click **Settings**.
2. In the menu, switch to the **Appearance** tab.
3. Turn off the **Hover menu for visualizations** setting.

You can turn off the hover menu for a single visualization in edit mode.

Do the following:

1. In edit mode, select the visualization.
2. In the properties panel, go to **Appearance** > **General**.
3. Turn off the **Show hover menu** setting.

Turning off the context menu

The context menu is shown when a user right-clicks a chart, or when a user has activated **Touch screen** mode and long touches a chart. You can turn off the context menu for all visualizations.

Do the following:

1. In an unpublished app, click ••• and then click **Settings**.
2. In the menu, switch to the **Appearance** tab.
3. Turn off the **Context menu for visualizations** setting.

Hiding items in visualization menus

In analysis mode, users interact with visualizations by right-clicking them, hovering their cursor over them, or long-touching them, and then accessing an options menu (•••). The provided options are useful for consumption of sheet content.

By default, all available options are shown to the user. You can override this functionality and instead define specific items to include. Other items outside the context menu – for example, sheet editing options and chart-specific options– will still be available.

Do the following:

1. In an unpublished app, click ••• and then click **Settings**.
2. In the menu, switch to the **UI settings** tab.
3. Turn on **Override default items in visualization menus**.
4. Turn options on and off as desired. You can configure the following options:
    - **Download**
    - **View data**
    - **Exploration menu**
    - **Full screen**
    - **Show details**

Hiding visualization menu options will create a more focused, streamlined user experience for users, but does not prevent the use of public APIs to complete tasks hidden from these menus. If you need to restrict user access to hidden functionality, limit access to that functionality through user permissions.

Limitations:

- Visualization menus can only be customized for the experience of viewing a sheet in analysis mode. Other experiences, such as Insight Advisor, do not support customization.

Changing the chart animations

Chart animations are the gradual transitions in a visualization from the old view to the new view when data has been changed, after for example a selection has been made.

Chart animations can be turned off in the app settings. They are available for the following chart types:

- Bar charts
- Bullet charts
- Combo charts
- Line charts
- Pie charts
- Scatter plots
- Funnel charts (Visualization bundle)
- Grid charts (Visualization bundle)
- Sankey charts (Visualization bundle)

Do the following:

1. In an unpublished app, click ••• and then click **Settings**.
2. In the menu, switch to the **Appearance** tab.

3. Turn **Chart animations** on or off.

Hiding toolbar, sheet header, and app navigation bar options

You can hide the toolbar and sheet header in your app. This means that these areas will not display on any sheet, for any user, regardless of permissions. Any user with **Can edit** rights in the app can toggle these elements on or off. You can also hide individual elements in your app navigation bar, toolbar, and sheet header.

Toolbar

The toolbar is the area above the sheet that contains the following buttons:

- **Assets**
- **Sheets**
- **Bookmarks**
- **Insight Advisor**
- **Smart search** ( )
- Selection buttons:
  - **Step back** selection ( )
  - **Step forward** selection ( )
  - **Clear all selections** ( )
- **Selections tool** ( )
- **Edit sheet**

You can optionally hide **Assets**, **Sheets**, and **Bookmarks** buttons to the toolbar. If you remove **Assets**, **Sheets** and **Bookmarks** will display without the assets panel.

Do the following:

1. In the app navigation bar, click ••• and then click **Settings**.
2. In the menu, switch to the **UI settings** tab.
3. Do one of the following:
   - To hide the toolbar, turn off **Toolbar**.
   - To hide **Assets**, under **Toolbar**, select **Assets**.
   - To hide **Sheets**, under **Toolbar**, select **Sheets**.
   - To hide **Bookmarks**, under **Toolbar**, select **Bookmarks**.
4. Click **Done**.

Sheet header

The sheet header is the area on the sheet that contains the sheet title, title image, and the sheet navigation arrows.

If you hide the sheet header, the navigation arrows move to the toolbar.

You can optionally hide the sheet title.

Do the following:

1. In the app navigation bar, click ••• and then click **Settings**.
2. In the menu, switch to the **UI settings** tab.
3. Do one of the following:
   - To hide the sheet header, turn off **Sheet header**.
   - To hide the sheet title, under **Sheet header**, select **Sheet title**.
4. Click **Done**.

App navigation bar

You can optionally hide the following options in the app navigation bar for your app:

- Logo
- Navigation

Do the following:

1. In the app navigation bar, click ••• and then click **Settings**.
2. In the menu, switch to the **UI settings** tab.
3. Under **App navigation bar**, select the options you want to hide in the app navigation bar.
4. Click **Done**.

When to use it

Advantages

Hiding the toolbar and sheet headers creates more space for charts, filter panes, and other objects.

Turning off sheet headers means that this area will not appear when you download or share sheets, send subscriptions, or generate Qlik Automate reports. This is helpful if you are using your sheets to create PowerPoint presentations or dashboards.

Removing the toolbar means app developers have more control over which features other users can access easily. For example, hiding the **Edit sheet** button might discourage other app developers from editing the app.

Disadvantages

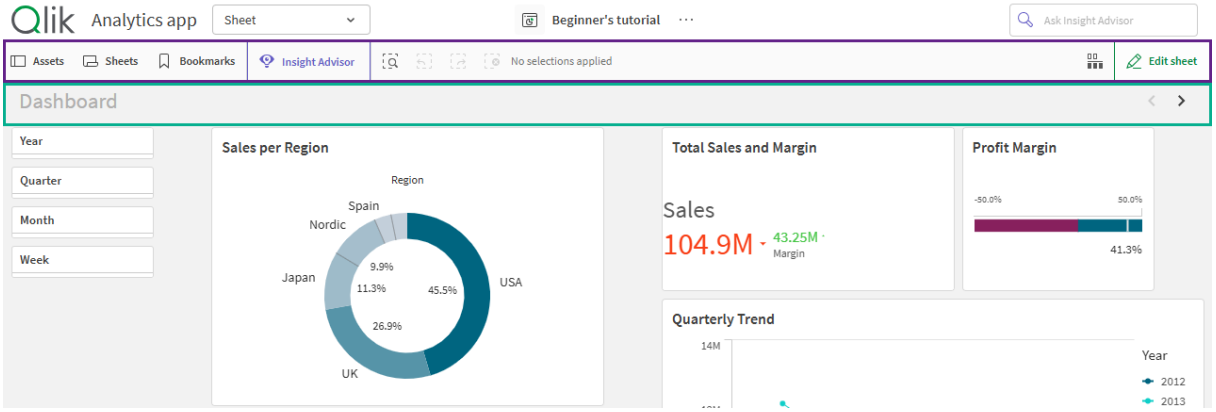
Hiding the toolbar does not completely remove capabilities such as bookmarks, notes, Insight Advisor, or sheet editing. For example, bookmarks can still be found in the app overview. However, app consumers may think that these features are no longer available.

If you hide the toolbar and sheet header, the only way to navigate between sheets is by using keyboard shortcuts or button objects.

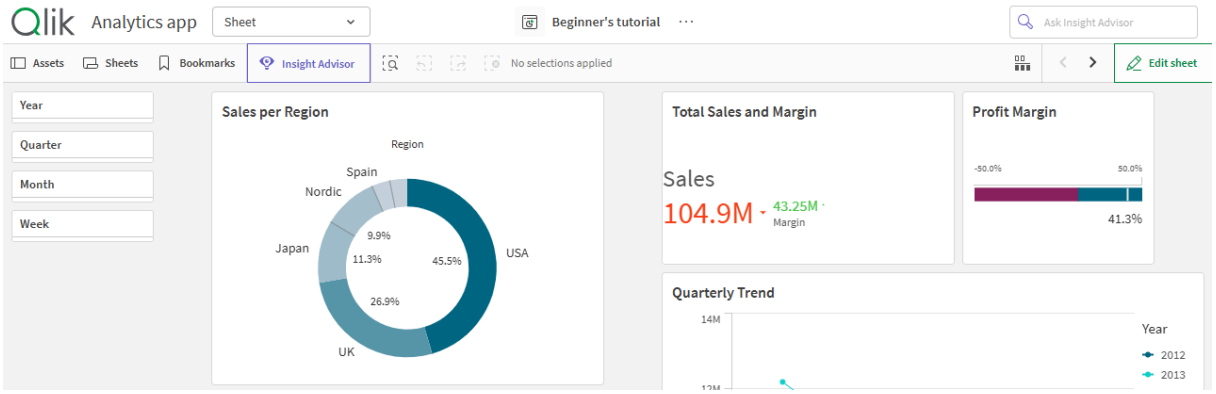
If the selections area is hidden, users may not realize that selections have been applied to the app. You may need to add filter panes to your sheets or filters to individual charts.

Examples

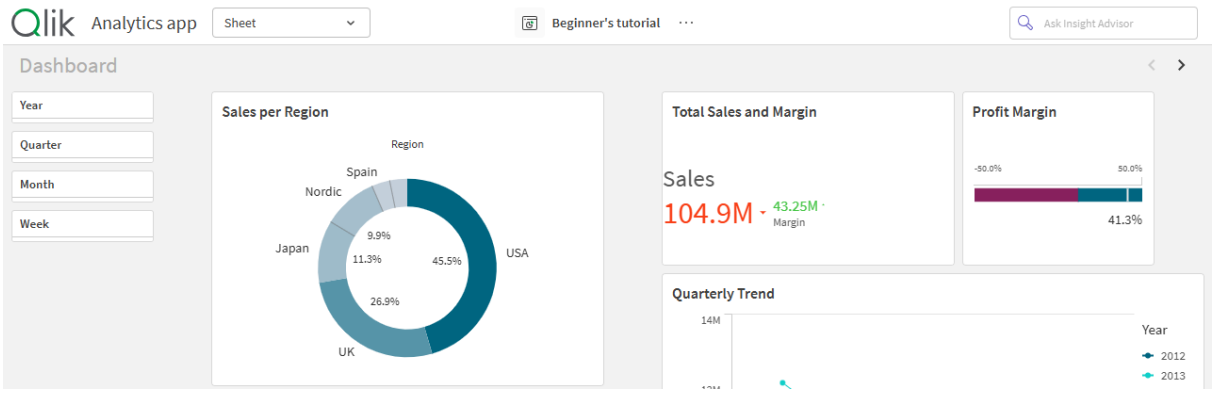
A sheet displaying the toolbar and sheet header. The toolbar shows Insight Advisor, current selections, and more. The sheet header contains the title image, sheet title, and navigation arrows.



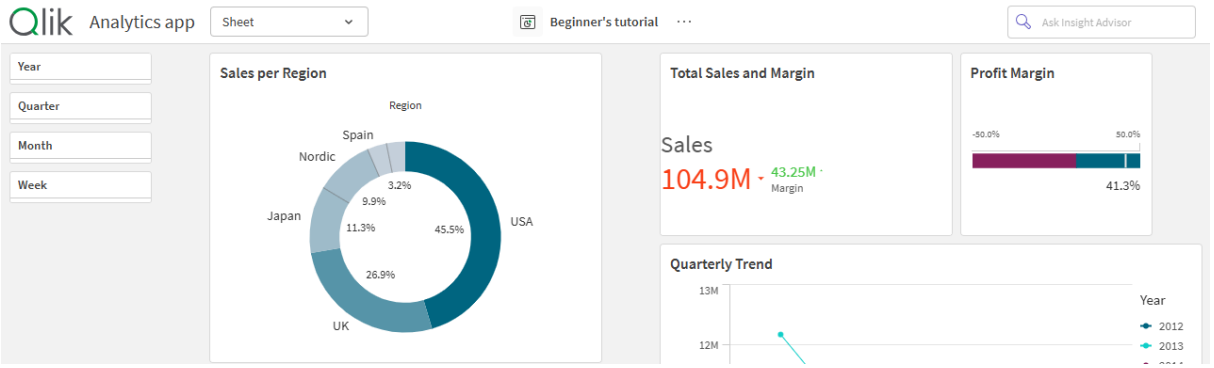
The same sheet as above, but the toolbar is visible and the sheet header is hidden. Users can no longer see the title image, sheet title, or navigation arrows.



The same sheet as above, but the sheet header is visible and the toolbar is hidden. Users cannot see which selections have been applied.



The same sheet as above, but the header and toolbar have both been hidden.



Adding custom logos

You can add custom logos to app navigation bars. These replace logos set in the navigation bar of tenants.

Do the following:

1. In the app navigation bar, click ••• and then click **Settings**.
2. In the menu, switch to the **UI settings** tab.
3. Under **App navigation bar**, click .
4. Under **Logo**, click .
5. Select an existing image or upload a new image.
6. Click **Insert**.

Changing sheet header colors

The sheet header background color can be set to a solid color or a gradient of colors by selecting two colors. The sheet header font can only be set to a solid color.

To change sheet header styling, click ••• in the app navigation bar and then click **Settings**. Sheet header options are available in the **Sheet header styling** tab.

> *If you are using a mobile device, the sheet header background is displayed as one solid color even if two colors have been set.*

When choosing colors, you have the following options:

- Choose a color from the default color palette.
- Set a Hex color by typing 6 characters in the # input field.
- Click the palette to show more color options:
  - Click the color wheel to select color.
  - Drag the slider to change the color saturation.

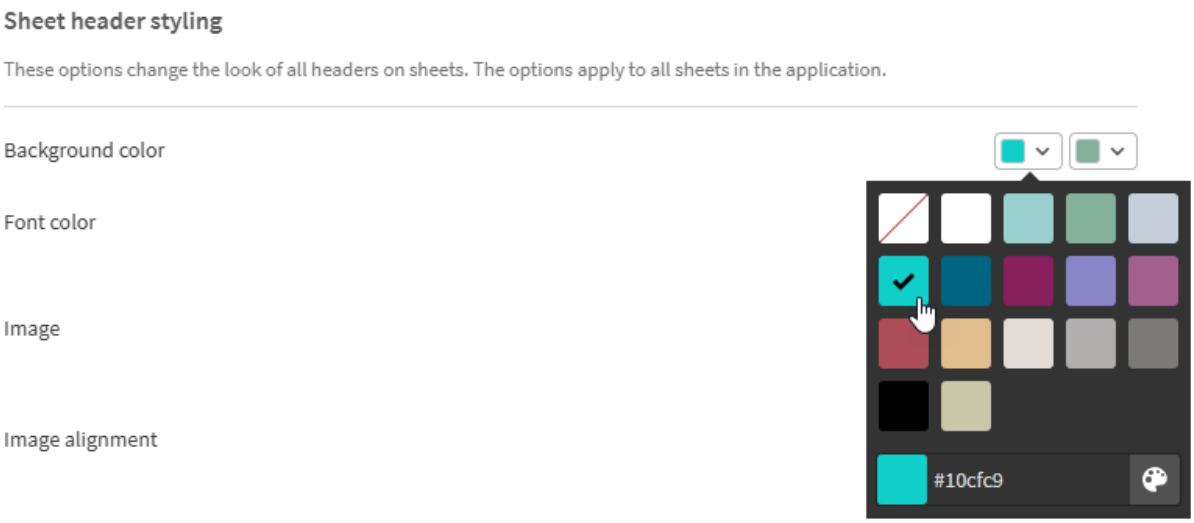
Choosing a color from the default color palette

Do the following:

1. Click ⌄ in a color drop-down.
   The dialog opens and displays the default colors.
2. Click one of the colors in the palette.
   The color is selected.
3. Click outside the dialog.
   The dialog is closed.

Now you have set a color by selecting in the default color palette.

Color dialog with the default color palette and a blue color selected.



Typing a Hex color

Do the following:

1. Click ⌄ in a color drop-down.
   The dialog opens and displays the default colors.
2. Type 6 characters in the Hex input field #.
   The color is selected in the palette.
3. Click outside the dialog.
   The dialog is closed.

Now you have set a color by typing the 6 hexadecimal digits.

Using the advanced color options

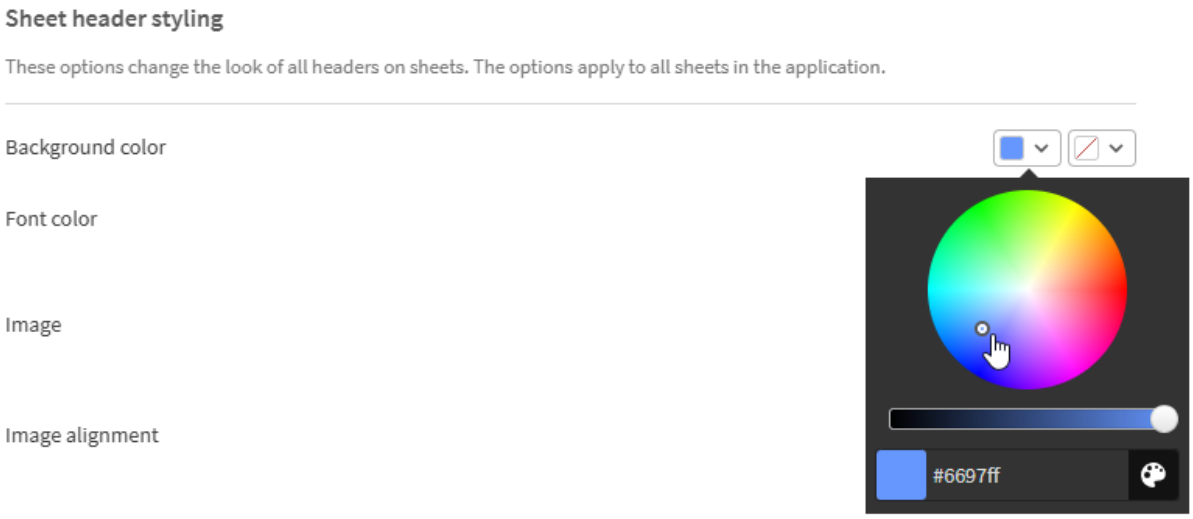
Do the following:

1. Click in a color drop-down.
   The dialog opens and displays the default colors.
2. Click at the bottom of the dialog.
   The dialog changes and displays the advanced options.
3. Do one of the following:
   - Click in the color wheel.
     The color changes and the Hex color code updates accordingly.
   - Drag the slider.
     The saturation changes and the Hex color code updates accordingly.

   Either way a color is selected.
4. Click outside the dialog.
   The dialog is closed.

Now you have set a color by using the color wheel and/or the slider.

Color dialog with the advanced options and a blue color selected.



Adding an image

You can add an image to the sheet header, such as a logo. The following formats are supported: .png, .jpg, .jpeg, and .gif.

Do the following:

1. Click the image placeholder next to **Image**.
   The **Media library** opens.
2. Click on a folder in the media library (for example, **In app** or **Default**).

3. Select the image that you want to add to the sheet title.
   A preview of the image is shown.
4. Click **Insert**.
   The image is added.

Now you have added an image to the sheet title.

Reloading app data

Apps in the hub do not automatically update when their data sources are updated. Reloading an app updates it with the latest data from the app data sources. The first time you reload an app, a reload task is automatically created with a once-only trigger.

Do the following:

- Right-click the app and select **Reload**.

*Manage the new reload task in the hub by right-clicking the app and selecting **Manage reload tasks**. For example, you can view, stop, or start the reload task. For more information about managing and scheduling reload tasks in the hub, see Managing app reload tasks (page 47). Administrators can also schedule app reloads in QMC. For more information, see Creating reload tasks.*

App reload permissions

To reload an app in the hub, you must have update access to the app and the appropriate permissions, set by an administrator in the QMC. For more information, see Configuring reload task management for the hub.

Managing app reload tasks

View and manage app reload tasks from your activity centers. Manually start reload tasks or create new reload tasks with scheduled triggers to execute the reload automatically. You can also edit and delete reload tasks.

App reload tasks that are created by an administrator in QMC also display in the hub. To view the reload tasks for an app in the hub, right-click the app and select **Manage reload tasks**.

You must have the appropriate permissions, set in the QMC, to manage app reload tasks in the hub. For more information, see Configuring reload task management for the hub.

Manage reload tasks displays the following information and options:

- **Name**: Task name.
- **Enabled**: If the reload task is enabled or disabled. Disabled tasks cannot be managed or enabled from the hub.

- **Status**: Displays the current status of the task. You can click to view a summary of the latest task execution. You can also click **Download script log** to download the script log.
- **Last execution**: Displays when the task was last executed.
- **Next execution**: Displays when the task is next scheduled to run.
- **Actions**: Management option for the task. You can click to start tasks or click to stop tasks. Click to edit a task or to delete a task.
- **Create task**: Add a new app reload task and set task properties including creating scheduled triggers.

You can click to refresh the task view.

Creating app reload tasks

Create an app reload task in the hub. When executed, the reload task fully reloads the data in an app from the source. Any old data is discarded. App reload tasks must include a scheduled trigger to execute the reload task automatically. The trigger determines the number of times the task will run (from one to infinity) and the frequency of the reload (once, daily, weekly, or monthly). For example, you can create a trigger to reload task to run 56 times, an app on a weekly basis. Create scheduled triggers for your tasks to reload app data at a specific time, date and frequency.

For information about creating app reload tasks in QMC, see Creating reload tasks.

> *You must have the appropriate permissions, set in the QMC, to create app reload tasks in the hub. For more information, see* Configuring reload task management for the hub.

Do the following:

1. In the hub, right-click the app that you want to create a reload task for, and then click **Manage reload tasks**.
2. Click **Create task**.
3. Enter a name for the task in the **Name** field.
4. Under **Execution**, review the default settings and edit any of the following properties:
    a. Select or clear **Enabled** to enable or disable the task. The task is **Enabled** by default.
    b. **Task session timeout (minutes)**: The maximum period of time before a task is aborted if the session times out. The default setting is 1440 minutes.
    c. **Max retries**: The maximum number of times the scheduler will try to rerun a failed task. The default setting is 0.
5. Click **Create**.
6. In the **Tasks** list, under **Actions**, click to open the task properties.
7. Click **Create scheduled trigger** and select the properties that you want to set for the trigger.

Scheduled triggers

Scheduled trigger properties in the hub

Property	Description
Trigger name	Name of the trigger. Mandatory.
Enabled	Status of the trigger. When selected, the trigger is active.
Time zone	The time zone of your operating system, at the time you create the trigger. When you save a trigger, the settings are kept, and if you move to a different time zone, the original values are still displayed. If you want to change the time zone and start time of a trigger, you need to do that manually. *For a trigger that was created before the introduction of the time zone setting, all times and dates are by default presented in Coordinated Universal Time (UTC).*
Daylight saving time	Way to account for daylight saving time. **Observe daylight saving time**: This option takes daylight saving time (DST) into account. If DST is in use in the selected time zone, the execution time and date are adjusted accordingly. **Permanent standard time**: This option does not take DST into account. If DST is in use in the selected time zone, the execution time and date are not adjusted. **Permanent daylight saving time**: This option takes DST into account. If a time zone uses DST, execution time and date are always according to DST, even during periods when DST is not in use. *For time zones not using DST, always select **Permanent standard time**.* **Example:** You created a trigger for an event at 10:00 AM, while you were working in Ottawa, Canada, in January. The time zone is (GMT-0500) Eastern Time (US & Canada) and DST is used between March and November. If you select **Observe daylight saving time**, a trigger set to start at 10:00 will always start at 10.00. If you select **Permanent standard time**, a trigger set to run at 10:00 will run at 10:00 in the winter but at 09:00 in the summer. If you select **Permanent daylight saving time**, a trigger set to run at 10:00 will run at 11:00 in the winter and at 10:00 in the summer.

Property	Description
Start	Start time and date: • Start time: **(hh:mm)** • Start date: **(YYYY-MM-DD)**
End	End time and date: • End time: **(hh:mm)** • End date: **(YYYY-MM-DD)** Select **Infinite** to create a trigger with no end date.

Schedule	Frequency of the trigger:
	• **Once**.
	• **Hourly**. Time period between executions of the trigger. Edit **Repeat after each** by typing the values for:
	  • **hour(s)** (default is 1)
	  • **minute(s)** (default is 0)
	• **Daily**. Time period between executions of the trigger. Type a value for **Every day(s)** (default is 1). For example, type 2 to repeat the trigger every second day.
	• **Weekly**. Time period between executions of the trigger:
	  • Type a value for **Every week(s)** (default is 1).
	  • Select one or more days under **On these weekdays** to determine which days the trigger is repeated (on the weeks you have specified). For example, type 3 and select **Mon** to repeat the trigger on Mondays every third week.
	• **Monthly**. Select one or more days under **On these days** to define the days when the trigger is repeated every month.
	 *If you have selected **Monthly** and want to be sure that a trigger is repeated every month, you need to select a day no later than the 28th.*

8. Click **Create**, and then click **Apply** to add the trigger to the reload task.

*After adding a trigger for a reload task, click **Refresh task list** in the notification message or click ↻ in the task list to see the next execution time for the reload task in task list.*

Editing app reload tasks

Edit app reload tasks in the hub. For example, create a new scheduled trigger, update the task name or execution details, or edit the properties of a scheduled trigger.

> *You must have the appropriate permissions, set in the QMC, to edit app reload tasks in the hub. For more information, see* Configuring reload task management for the hub.

Do the following:

1. In the hub, right-click the app with the reload task that you want to edit, and then click **Manage reload tasks**.
2. In the **Tasks** list, under **Actions**, click to open the task properties.
3. Edit the task properties.
    a. You can change the task name in the **Name** field.
    b. You can change the **Execution** properties.
        - Select or clear **Enabled** to enable or disable the task. The task is **Enabled** by default.
        - **Task session timeout (minutes)**: The maximum period of time before a task is aborted if the session times out. The default setting is 1440 minutes.
        - **Max retries**: The maximum number of times the scheduler will try to rerun a failed task. The default setting is 0.
    c. Create a new trigger. Select **Create scheduled trigger**, set the properties (see descriptions below) for the new trigger, and then click **Create** to add the trigger to the reload task.
    d. Edit a scheduled trigger. In the **Triggers** list, under **Actions**, click . Set the properties (see descriptions below) and click **OK** to save your changes.

Scheduled Trigger

Scheduled trigger properties in the hub

Property	Description
Trigger name	Name of the trigger. Mandatory.
Enabled	Status of the trigger. When selected, the trigger is active.

Property	Description
Time zone	The time zone of your operating system, at the time you create the trigger. When you save a trigger, the settings are kept, and if you move to a different time zone, the original values are still displayed. If you want to change the time zone and start time of a trigger, you need to do that manually. *For a trigger that was created before the introduction of the time zone setting, all times and dates are by default presented in Coordinated Universal Time (UTC).*
Daylight saving time	Way to account for daylight saving time. **Observe daylight saving time**: This option takes daylight saving time (DST) into account. If DST is in use in the selected time zone, the execution time and date are adjusted accordingly. **Permanent standard time**: This option does not take DST into account. If DST is in use in the selected time zone, the execution time and date are not adjusted. **Permanent daylight saving time**: This option takes DST into account. If a time zone uses DST, execution time and date are always according to DST, even during periods when DST is not in use. *For time zones not using DST, always select **Permanent standard time**.* **Example:** You created a trigger for an event at 10:00 AM, while you were working in Ottawa, Canada, in January. The time zone is (GMT-0500) Eastern Time (US & Canada) and DST is used between March and November. If you select **Observe daylight saving time**, a trigger set to start at 10:00 will always start at 10.00. If you select **Permanent standard time**, a trigger set to run at 10:00 will run at 10:00 in the winter but at 09:00 in the summer. If you select **Permanent daylight saving time**, a trigger set to run at 10:00 will run at 11:00 in the winter and at 10:00 in the summer.
Start	Start time and date: • Start time: **(hh:mm)** • Start date: **(YYYY-MM-DD)**

Property	Description
End	End time and date: • End time: **(hh:mm)** • End date: **(YYYY-MM-DD)** Select **Infinite** to create a trigger with no end date.

Schedule	Frequency of the trigger:
	• **Once**.
	• **Hourly**. Time period between executions of the trigger. Edit **Repeat after each** by typing the values for:
	  • **hour(s)** (default is 1)
	  • **minute(s)** (default is 0)
	• **Daily**. Time period between executions of the trigger. Type a value for **Every day(s)** (default is 1). For example, type 2 to repeat the trigger every second day.
	• **Weekly**. Time period between executions of the trigger:
	  • Type a value for **Every week(s)** (default is 1).
	  • Select one or more days under **On these weekdays** to determine which days the trigger is repeated (on the weeks you have specified). For example, type 3 and select **Mon** to repeat the trigger on Mondays every third week.
	• **Monthly**. Select one or more days under **On these days** to define the days when the trigger is repeated every month.
	*If you have selected **Monthly** and want to be sure that a trigger is repeated every month, you need to select a day no later than the 28th.*

4. Click **Apply** to save your changes.

*If you modified a task trigger, click **Refresh task list** in the notification message. You can also click to refresh the task list.*

Deleting app reload tasks

You must have the appropriate permissions to delete app reload tasks in the hub. For more information, see Configuring reload task management for the hub.

Do the following:

1. In the hub, right-click the app with the reload task that you want to delete, and then click **Manage reload tasks**.
2. In the **Tasks** list, under **Actions**, click .

Converting a QlikView document into a Qlik Sense app

If you have a QlikView document, you can reuse part of your work in Qlik Sense. The load script and data model can be used to create an app in Qlik Sense. Visualizations, dimensions and measures, however, have to be created in Qlik Sense.

After converting the document to an app, you may need to adapt the load script to be able to reload the script in Qlik Sense. In some cases, you may need to make some changes in the QlikView script before you convert the document.

Qlik Sense provides a tool to help convert a QlikView document (QVW file) to a Qlik Sense app. The tool converts visualizations, dimensions, measures, and variables. You must have access to the Dev Hub To use the QlikView to Qlik Sense converter.

Instructions for how to use the converter tool are provided on the Qlik Sense Developer site.
≤ For more information, see QlikView converter.

If you do not have access to the Dev Hub, you can convert a QlikView document manually.

We recommend that you make changes only in a duplicate of any app that you convert, so that your changes are not overwritten by a later conversion.

Manually converting a QlikView document into a Qlik Sense app

You can manually convert a QlikView document (QVW file) to a Qlik Sense app. If you have access to the Dev Hub, you can use the QlikView to Qlik Sense converter tool to simplify the process.

The QlikView to Qlik Sense converter is described on the Qlik Sense Developer site.

Prerequisites

- You need to have Qlik Sense Desktop installed to be able to convert a QlikView document into a Qlik Sense app.
- Your computer must have sufficient memory, at least 32 GB, when converting a large QlikView document.
- If the QlikView document contains hidden script or uses section access, you need to have full access to the hidden script and section access of the document.

Before converting the document

The **Always One Selected Value** property for QlikView list boxes or multi boxes must be disabled in order to clear selections in the Qlik Sense app. If your QlikView document contains hidden script or uses section access, you need to adapt the document before you convert it.

Converting hidden script tabs

When a QlikView document with hidden script is converted, the hidden script part will be disregarded and not included in the Qlik Sense script. If you want to convert the entire script, do the following before converting the document. This requires that you have access to the hidden script in the QlikView document.

Do the following:

1. Open the document in QlikView **Script Editor**.
2. Copy the code from the hidden script tabs and paste it into regular script tabs.
3. Save the document.

It is not possible to hide script code in Qlik Sense.

Removing section access code

A QlikView document with section access cannot be imported to Qlik Sense, as there are differences in format and supported functionality. You can still convert the document manually.

Do the following:

1. Remove the section access code in QlikView **Script Editor** before converting the document. This requires that you have full access to the script of the document.
2. Convert the document into an app.
3. Reapply section access in the Qlik Sense app. There are some differences that you may need to take account for:
    - User authentication is changed. The USERID field is now used to authenticate all users, and the NTNAME and PASSWORD fields are not supported anymore.
    - If you have access to the script, but not to the data, you can open the app without data and edit the script, including the section access.
    - Section access is applied using strict exclusion in Qlik Sense. This means that you can only see data that you have been specifically granted access to.

QlikView variables excluded from export

A number of variables are not exported from a QlikView document (QVW) as they are only relevant for QlikView or is handled differently in Qlik Sense.

The following variables are not exported from a QlikView document:

- All variables starting with CD
- All variables starting with FLOPPY
- QvPath
- QvRoot
- QvWorkPath
- QvWorkRoot
- WinPath
- WinRoot
- ErrorMode
- StripComments
- ScriptErrorCount
- ScriptError
- ThousandSep
- DecimalSep
- MoneyThousandSep
- MoneyDecimalSep
- MoneyFormat
- TimeFormat
- DateFormat
- TimestampFormat
- MonthNames
- DayNames
- ScriptErrorDetails
- ScriptErrorList
- OpenUrlTimeout
- HidePrefix
- FirstWeekDay
- BrokenWeeks
- ReferenceDay
- FirstMonthOfYear
- CollationLocale
- LongMonthNames
- LongDayNames

Converting the document into an app

Do the following:

1. Copy the QlikView document (qvw format) to the directory where your apps are located.
   This is usually *<user>\Documents\Qlik\Sense\Apps*, but the location of the *Apps* directory depends on where you installed Qlik Sense Desktop.

2. Start Qlik Sense Desktop.
   You now see the QlikView document as an app in the hub, with the name ending with (qvw).
3. Click on the app to open it.

The app is saved into the Qlik Sense format (qvf file) in the folder where your QlikView document (qvw file) was stored. Also, the QlikView document file (qvw) is removed from the folder and automatically converted into a backup file (qvw.backup) stored here: *<user>\Documents\Qlik\Sense\AppsBackup*.

You have now migrated a QlikView document into a Qlik Sense app. The app contains the data model, including the loaded data, and the data load script.

You can use the data model to build visualizations, copy it or import it into your server environment through the Qlik Management Console (QMC), but you need to adapt the load script before you can reload the data model.

You can also drag and drop a qvw file from a folder onto the Qlik Sense Desktop hub, to open it as a Qlik Sense app. If the Qlik Sense app (qvf file) becomes stored in another folder than <user>\Documents\Qlik\Sense\Apps, move it to the Apps folder to make it available from the hub.

Adapting the data load script in Qlik Sense

Qlik Sense and QlikView data load scripts are compatible in general, but there are some differences that you may need to take account for and adapt the script in the data load editor before you can reload data. You can adapt the script directly in Qlik Sense Desktop, or you can import the app into Qlik Sense and then adapt the script.

Change file path references to data connections

QlikView uses absolute or relative file paths which are not supported in Qlik Sense standard mode, so you need to use folder data connections to point to file locations instead.

Do the following:

1. Create folder data connections for all file paths that are used in the data load script.
   You need to check statements and functions that refer to files. **LOAD** statements are the most common ones, but there is a complete list available.
2. Replace all references to absolute or relative file paths in the script with **lib://** references to the data connections you created.

Examples

Original script in QlikView	Adapted Qlik Sense script
`LOAD * FROM [C:\data\Tutorials source\Sales rep.csv];`	`LOAD * FROM [lib://Tutorials source/Sales rep.csv];` In this case, the Tutorials source folder data connection should be pointing to *C:\data\Tutorials source*, or where the data is located if you have moved the app to another computer or a Qlik Sense server.
`FileSize('C:\data\Tutorials source\Sales rep.csv')`	`FileSize('lib://Tutorials source/Sales rep.csv')`
`for each Dir in dirlist ('C:\data\Tutorials source\*' )`	`for each Dir in dirlist ('lib://Tutorials source/*' )`

Handling features that are not supported or recommended

There are some features in QlikView that are not supported or recommended in Qlik Sense, for example:

- Input fields
- Message boxes
- **Bundle** and **Info** load
- **ALL** qualifier

We recommend that you check your script code against these lists of statements and functions that are not supported or recommended, and adapt the code according to recommendations.

Installing custom connectors

If your QlikView document uses custom connectors to access data, you should be able to use them to load data in Qlik Sense as well without changes in the script. This requires that the same connector is installed on the Qlik Sense computer.

If you want to make any changes in the data selection by the custom connector, you need to install a version of the custom connector adapted for Qlik Sense.

Changing the title and description of an app

You can change the title and description of your apps. When creating a new app the name of the app is used as its title. When you change the title, the name of the app is not changed.

Do the following:

1. Click the app name to open the app details area.
2. Click ••• > **Edit details**.
3. Edit **Title** and **Description**.

4. Click **Done**.
5. Click ✔ to stop editing.

The changes you made are saved.

Alternatively, you can change the title and description from the app settings. Click ••• in the app navigation bar, and select ⚙ **Settings**. Edit the title and description in the menu.

You can only change the title and description of an unpublished app.

Changing the thumbnail of an app

You can replace the default thumbnail of an app with another thumbnail, to make it easier to distinguish between apps in the hub. You can use one of the default images, or an image of your own.

Do the following:

1. Click the app name to open the app details area.
2. Click ••• > **Edit details**.
3. Click 🖼 on the default thumbnail.
   The **Media library** opens.
4. Select the image you want to use as a thumbnail for the app and click **Close**.

The image you selected is now used as a thumbnail for the app.

Alternatively, you can change the thumbnail from the app settings. Click ••• in the app navigation bar, and select ⚙ **Settings**. Change the thumbnail in the menu.

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

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

For Qlik Sense: You can upload images to the **In app** folder in the media library. You need to use the Qlik Management Console to upload images to the default folder.

For Qlik Sense Desktop: You can place images in the following folder on your computer: *C:\Users\<user>\Documents\Qlik\Sense\Content\Default*. Images will be available in the **default** folder in the media library. When moving an app between installations, the images that you use in the app are saved in the qvf file together with the app. When you open the app in a new location, the images will be in the **In app** folder in the media library for the app.

You can only change the thumbnail of an unpublished app.

You can open or close the app details area by clicking the app name in the navigation bar.

Duplicating an app

You can duplicate an existing app, to create a copy to develop further. You can only duplicate an app that you have created yourself unless your administrator has assign you a security role with duplication enabled.

If you have an admin role, giving you the administration rights needed, you can create duplicates of apps from the QMC.

When you duplicate a published app, only the base sheets and stories will be included in the copy.

Do the following:

- In the hub, right-click the app you want to duplicate and select **Duplicate**.
  A toast notification is displayed for a while, at the bottom of the screen, when the duplication starts. A new toast notification will be displayed when the app has been duplicated and give you the possibility to update the app list. If the duplication fails, an error message will be displayed.

A copy of the app is created under **Work**. You can click the app to open it and start adapting it according to your preferences.

Because of how the synchronization of data works in multi-node sites, apps containing images may display broken thumbnails or images inside the apps if opened right after being duplicated or imported. The broken images are restored when the synchronization is complete. To check if the images have been restored, refresh the browser window.

Making apps available in Insight Advisor Chat

You can make your apps available in Insight Advisor Chat in the hub.

When your app is available, users with access to that app can search Insight Advisor in your app with Insight Advisor Chat.

*Apps that use Section Access require additional configuration for service users to be available in Insight Advisor Chat. If you have sensitive information in app names, field names, or master item names, these may be exposed by making apps using Section Access available for Insight Advisor Chat. App suggestions for queries include apps in streams to which users have access. These may include apps to which users do not have access in an app's Section Access. Selecting these apps will do nothing, however. When clicking **Dimensions** or **Measures** to view the available items from an app using Section Access, users may see items to which they do not have access. Clicking on these items will not provide any data to the users, however.*

App content availability in Insight Advisor Chat

What users can search for and access with the **Measure** and **Dimension** buttons with Insight Advisor Chat depends on if the app is published and if there is a logical model applied to your app.

For your own unpublished apps, you can search for fields and master items from the app. For published apps, users can search for only master items. If you have business logic applied to an unpublished or published app, then users can search for available fields and master items based on the logical model.

Clicking the **Measure** or **Dimension** button (or entering show measure or show dimension) will show the corresponding master items. If the app has no master items, fields related to measures or dimensions are shown instead. Fields or master items hidden in the logical model will not appear when the button is clicked, but can be searched for in a query.

Turning on Insight Advisor Chat

Do the following:

1. In the app navigation bar, click ••• > **Settings**.
2. In the menu, switch to the **Capabilities** tab.
3. Turn on **Enable app for Insight Advisor Chat in activity centers**.

Turning on chart level scripting

By default, chart level scripting is disabled in apps. You can turn it on in app settings.

Do the following:

1. In the app navigation bar, click ••• > **Settings**.
2. In the menu, switch to the **Capabilities** tab.
3. Turn on **Allow chart scripts**.

Turning off Insight Advisor

By default, Insight Advisor Search and Insight Advisor Analysis Types are enabled in apps. You can turn off Insight Advisor to prevent users from accessing these features.

Do the following:

1. In the app navigation bar, click ••• > **Settings**.
2. In the menu, switch to the **Capabilities** tab.
3. Turn off **Insight Advisor in this application**.

Deleting an app

You can delete an app that you no longer need.

> *From the hub, you can only delete apps that you have created and that have not yet been published.*

If you have published an app, the published version is locked and can only be deleted from the Qlik Management Console. The published version is a duplicate of the original app. The original version of the app can be deleted from your personal work in the hub.

Do the following:

1. Right-click the app in the hub and select **Delete**.
   A confirmation dialog opens.
2. Click **Delete**.
   A toast notification is displayed for a while, at the bottom of the screen, when the app is being deleted. If the deletion fails, an error message will be displayed.

> *You can delete a published app from the Qlik Management Console.*

If an app is being deleted by someone else from the stream you are currently viewing, a toast notification will be displayed and give you the possibility to update the app list.

Uploading image files to media library

You can upload images to the media library. Because of limitations in the web browsers supported by Qlik Sense, it is recommended to keep the height and width as well as the file size of the images as small as possible. The maximum file size is 5 MB.

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

For Qlik Sense: You can upload images to the **In app** folder in the media library. You need to use the Qlik Management Console to upload images to the default folder.

For Qlik Sense Desktop: You can place images in the following folder on your computer: *C:\Users\<user>\Documents\Qlik\Sense\Content\Default*. Images will be available in the **default** folder in the media library. When moving an app between installations, the images that you use in the app are saved in the qvf file together with the app. When you open the app in a new location, the images will be in the **In app** folder in the media library for the app.

You can open the media library in several ways:

- From the app details area. Do the following:
  1. In an app, click the app name in the navigation bar at the top of the screen.
  2. Click ••• > **Edit details**.
  3. Click on the app thumbnail.
- When editing a sheet. For example:
  - Double-click a **Text & image** visualization on the sheet and click .
  - Click the title area on a sheet. Next, in the properties panel, click under **Thumbnail**.
  - Follow the procedure for adding a background image to a chart or sheet, then click . Example, for bar chart: *Customizing the background (page 192)*
- In **Storytelling** view, click in the toolbar.

The **Media library** dialog opens and now you can upload images.

Do the following:

1. Select **New upload**.
2. Do one of the following:
   - Drop one or more image files onto the designated area.
   - Click the designated area to open the upload dialog, browse and select images, and click **Open**.

   An upload indicator is displayed while the image file is being uploaded. You can cancel an ongoing upload by clicking on on the image.

   > *You cannot upload a file if its file name already exists in the media library.*

Now you have added images to the media library. Click the image and select to insert the image.

Deleting image files from media library

You can delete images from the media library in Qlik Sense.

You can open the media library in several ways:

- From the app details area. Do the following:
  1. In an app, click the app name in the navigation bar at the top of the screen.
  2. Click ••• > **Edit details**.
  3. Click on the app thumbnail.
- When editing a sheet. For example:
  - Double-click a **Text & image** visualization on the sheet and click .
  - Click the title area on a sheet. Next, in the properties panel, click under **Thumbnail**.
  - Follow the procedure for adding a background image to a chart or sheet, then click . Example, for bar chart: *Customizing the background (page 192)*
- In **Storytelling** view, click in the toolbar.

The **Media library** dialog opens and now you can delete images.

Delete images

Do the following:

1. Select the file you want to delete.
2. Click **Delete**.
   A confirmation dialog is displayed.
3. Click **Delete**.

Now you have deleted images from the media library.

> *For Qlik Sense: You need to use the Qlik Management Console to delete images from the default folder, or other folders that were created from the Qlik Management Console.*

Delete images using Qlik Sense Desktop

You can delete images from the default folder by removing the files from this location: *<user>\Documents\Qlik\Sense\Content\Default*.

The images in the **In app** folder are bundled images, saved in the qvf file together with the rest of the contents of the app. If a bundled image is no longer used in the app, the image will be deleted from the qvf file when saving the app.

Best practices for designing accessible apps

Analytics apps support several accessibility features. App creators can also take extra steps to improve accessibility and make sure that all users can access the information in their analytics apps.

Analytics apps support the following accessibility features:

- Default color schemes with high contrast
- Keyboard navigation and keyboard shortcuts
- Screen reader support

When designing apps for accessibility, there are design best practices you should follow. Additionally, there are specific apps settings you can use to help make your apps more accessible.

Design best practices

When designing for accessibility, follow these best practices:

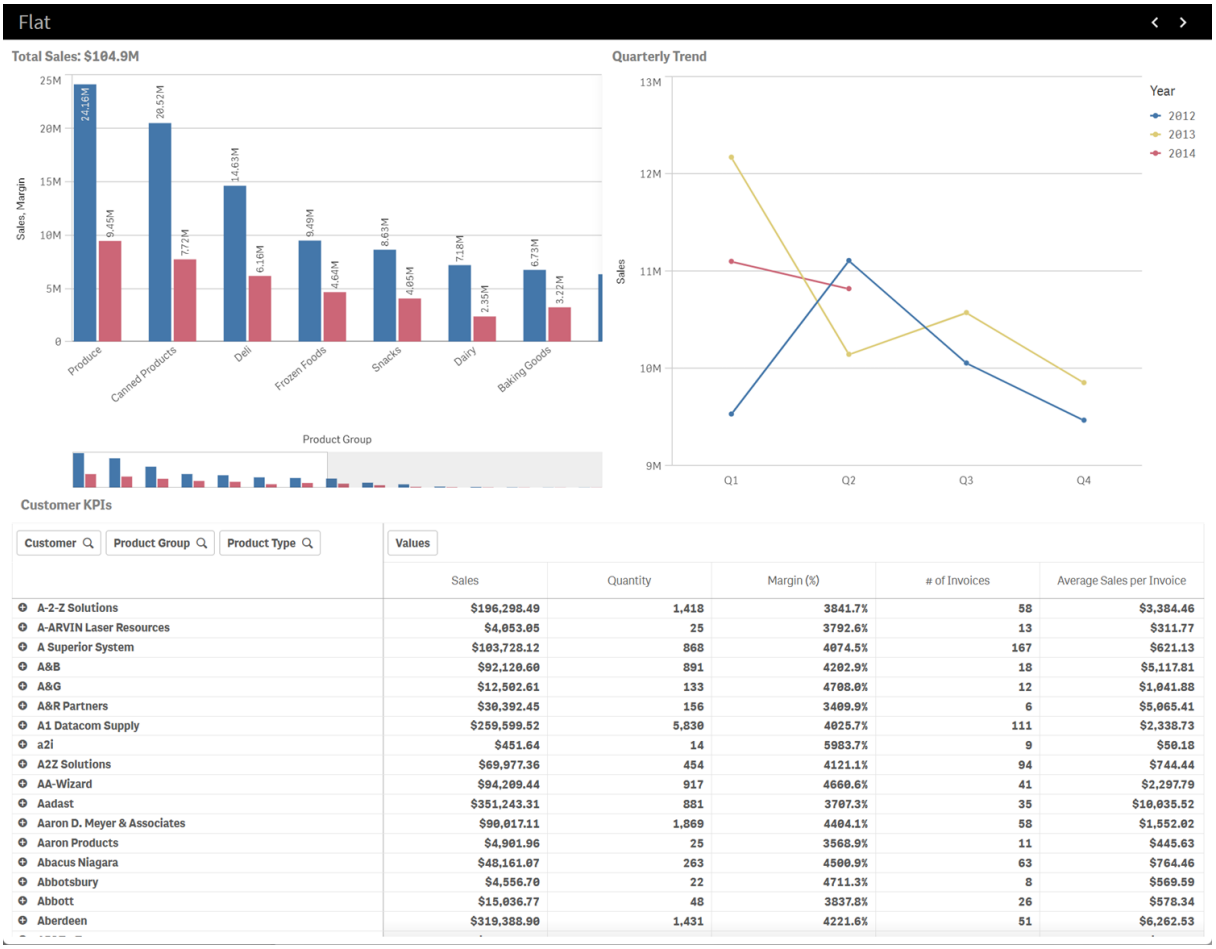
- Keep a flat sheet structure
- Provide an overview first
- Use accessible colors
- Select visualizations for accessibility
- Avoid storytelling

Keep a flat sheet structure

When adding visualizations to your sheets, use a flat structure with few columns and rows. A flat structure improves readability for your users. Additionally, it also makes keyboard navigation easier, as keyboard navigation moves from the top left to bottom right.

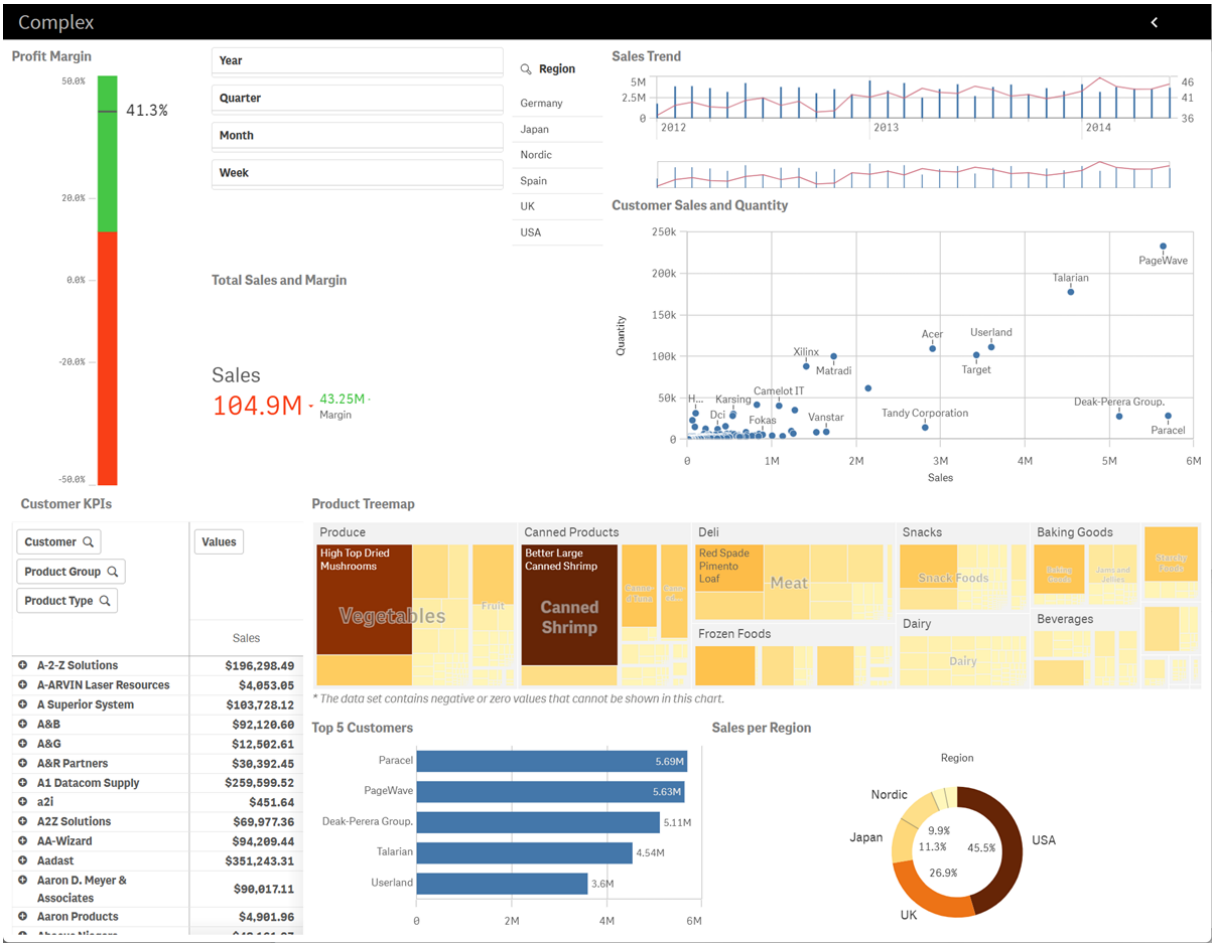
Complex sheet layouts with many columns and rows are both harder to understand and harder to navigate with a keyboard. When designing a sheet, try to navigate it with your keyboard to see how users may perceive your app.

A flat sheet layout



	Sales	Quantity	Margin (%)	# of Invoices	Average Sales per Invoice
A-2-Z Solutions	$196,298.49	1,418	3841.7%	58	$3,384.46
A-ARVIN Laser Resources	$4,053.05	25	3792.6%	13	$311.77
A Superior System	$103,728.12	868	4074.5%	167	$621.13
A&B	$92,120.60	891	4202.9%	18	$5,117.81
A&G	$12,502.61	133	4708.0%	12	$1,041.88
A&R Partners	$30,392.45	156	3409.9%	6	$5,065.41
A1 Datacom Supply	$259,599.52	5,830	4025.7%	111	$2,338.73
a2i	$451.64	14	5983.7%	9	$50.18
A2Z Solutions	$69,977.36	454	4121.1%	94	$744.44
AA-Wizard	$94,209.44	917	4660.6%	41	$2,297.79
Aadast	$351,243.31	881	3707.3%	35	$10,035.52
Aaron D. Meyer & Associates	$90,017.11	1,869	4404.1%	58	$1,552.02
Aaron Products	$4,901.96	25	3568.9%	11	$445.63
Abacus Niagara	$48,161.07	263	4500.9%	63	$764.46
Abbotsbury	$4,556.70	22	4711.3%	8	$569.59
Abbott	$15,036.77	48	3837.8%	26	$578.34
Aberdeen	$319,388.90	1,431	4221.6%	51	$6,262.53

A complex sheet layout



Provide an overview first

When creating sheets, provide an overview first and then provide details. This makes it easier for users to consume information in your sheets. For example, start by providing summaries and KPIs in your sheets, and then provide more detail-heavy tables or other visualizations. You can also place details on another sheet. Alternatively, you could resize the sheet so that it is scrollable and put additional details further down the sheet.

Select the right visualizations

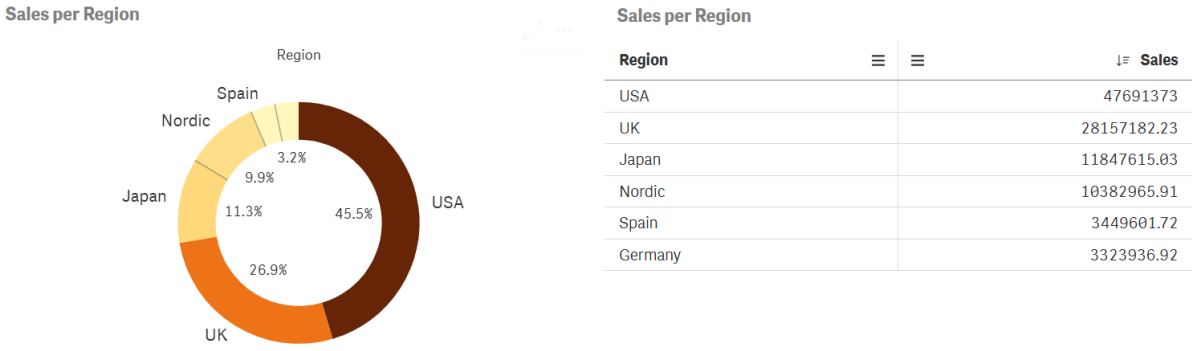
Analytic apps provide a range of visualizations for use in analytics. Some visualizations are better choices that other when designing accessible apps. Keep the following in mind when selecting visualizations:

- Use charts with data view
- Use the **Straight table** visualization
- Avoid using map charts
- Avoid using custom objects

Use charts with data view

When designing your app, use charts with data view. Data view lets users change the chart to a table, helping them to inspect and select values.

A pie chart with the same pie chart in data view



Data view is available in the following charts:

- Bar chart
- Box plot (with one or more dimensions)
- Combo chart
- Distribution plot
- Histogram
- Line chart
- Pie chart
- Pivot table
- Scatter plot
- Treemap

Use the straight table

The **Straight table** has an improved navigation experience compared to the **Table** visualization, the former default table visualization. When adding tables to an accessible app, use the straight table instead of the table.

For more information, see Straight table.

Avoid using map charts

The map chart is not navigable with keyboard navigation. When creating accessible apps, consider using alternative ways of presenting your geographic data.

Avoid using custom objects

The charts in the Dashboard or Visualization bundles may not be as accessible as other charts. They are not recommended for use in accessible apps. Additionally, if you do use extensions, test them to confirm they are accessible for your users.

Use accessible colors

The spectrum of colors is narrower for people with color-based visual impairment. They may interpret your visualizations differently than you intended. For example, some users may have difficulty with reds and greens in your visualizations. Lines, bars, and pie slices can also be difficult to distinguish when the colors do not have enough contrast.

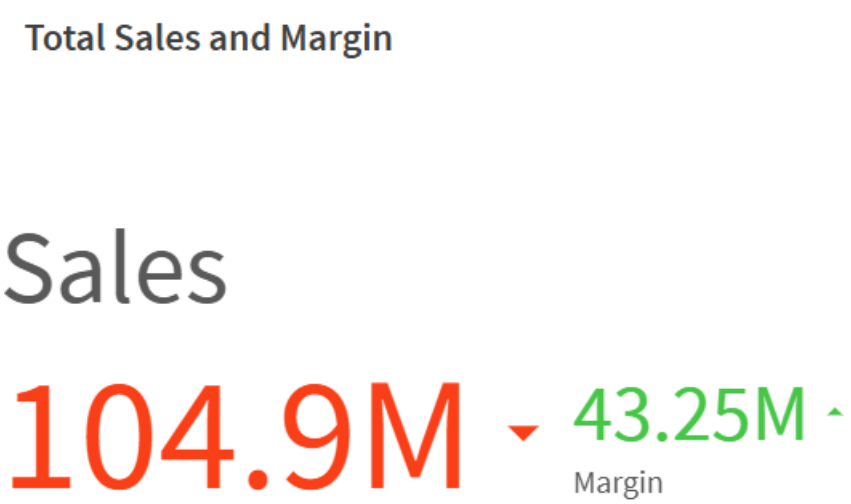
It is best to use a simple color scheme in your app. The default app color schemes each have 12 colors that contrast with each other. It is better to use three to five colors if possible, or even a color scheme based on a single color. You can create your own custom color schemes and use them in all your accessible apps. For more information, see Create custom themes.

You can also set some colors manually, separately from themes. For dimensions, you can set assign colors to values in master dimensions. For more information, see *Assigning colors to master dimension values (page 150)*. You can also color by expressions to set colors. For more information, see *Examples (page 704)*. To learn more about coloring options for visualizations, see *Coloring a visualization (page 696)*.

Adding shapes as performance indicators in KPIs

Consider adding shapes as performance indicators in your KPIs. These add context and make your KPIs more accessible. For example, you could use a red empty circle to denote bad results, a green full circle for good results, and a triangle as a warning symbol that only appears when a KPI status is at an unacceptable level. For more information, see *Adding shapes to KPIs (page 71)*.

KPI using performance indicator shapes



Avoid storytelling

While stories are useful for presenting discoveries, sheets are more accessible for keyboard navigation and screen readers. In apps designed for accessibility, it is better to use sheets to present your discoveries.

Accessible app settings

Analytics apps have a range of settings that can help improve the accessibility of your apps.

Sheet settings

There are several settings you can change in your sheets to improve accessibility:

- Improve sheet title contrast
- Turn off the hover menu

Improving sheet title contrast

You can improve the visibility of sheet titles by styling them to contrast with your sheets.

Do the following:

1. In the app navigation bar, click your app title.
2. Click to open settings.
3. Under **Sheet title styling**, adjust your color settings to improve contrast.
4. In the app navigation bar, click and then click **Settings**.
5. In the menu, switch to the **Sheet header styling** tab.
6. Adjust your color settings to improve contrast.

Turning off the hover menu

Turning off the hover menu allows for a smoother navigation experience. There is no loss of functionality as the options are also available through the context menu and keyboard shortcuts.

Do the following:

1. In the app navigation bar, click your app title.
2. Click to open settings.
3. Under **Appearance**, turn off **Show hover menu for visualizations**.
4. In the app navigation bar, click and then click **Settings**.
5. In the menu, switch to the **Appearance** tab.
6. Turn off **Hover menu for visualizations**.

Chart settings

Some charts have options that can help make them more accessible to users. You can:

- Provide text descriptions
- Limit dimension values in visualizations
- Add shapes to KPIs

Providing text descriptions

Visualizations come with fields for titles, subtitles, and footnotes. Providing accurate text descriptions can help your users navigate your visualizations and provide context to your sheets. Without context, it can take users longer to find the information that interests them in your sheets. Titles, subtitles, and footnotes are all read by screen readers as well.

In standard edit mode, when selecting a visualization, you can find titles, subtitles, and footnotes in **Properties**, under **Presentation** > **Labels**.

In advanced edit mode, you can find titles, subtitles, and footnotes in the properties panel, under **Appearance** > **General**.

Limit dimension values in visualizations

When working with nominal data in dimensions, try to find hierarchies or make aggregations if the number of categories is greater than 10. For example, displaying the top 10 values, with the rest categorized as others, makes your data easier to understand and read aloud. If you need to include full details, you can include them at the end of the sheet or other sheets.

Do the following:

1. Select a visualization.
2. In the properties panel, under **Data**, select your dimension.
3. Under **Limitation**, select one of the following:
    - **Fixed number**: Select to display the top or bottom values. Set the number of values. You can also use an expression to set the number. Click $f\times$ to open the expression editor.
    - **Exact value**: Use the operators and set the exact limit value. You can also use an expression to set the number. Click $f\times$ to open the expression editor.
    - **Relative value**: Use the operators and set the relative limit value in percent. You can also use an expression to set the number. Click $f\times$ to open the expression editor.

Abbreviate numbers

Reading, listening to, and understanding long numbers can be a challenge. Where possible, abbreviate your numbers to keep the number of digits and decimals low.

You can use functions such as **Ceil** and **Round** to round numbers. For example, if you wanted to round measure values to the millions with one decimal place, you could use `=Round(Sum(Sales)/1000000, 0.1)`.

Adding shapes to KPIs

If you are using conditional coloring for your KPIs, you can add symbols in addition to the color. Symbols can be used to provide additional performance indicators.

Do the following:

1. Select a KPI visualization, and switch to the properties panel in the advanced edit mode.
2. Select **Appearance** and expand **Color**.
3. If necessary, turn off **Library colors** and turn on **Conditional colors**.
4. Click **Add limit** to create a new limit. Multiple limits can be added to a single KPI chart.
5. Specify a value for the limit, or enter an expression using the expression editor.
6. On the **Value** color bar, click the range area of the KPI you would like to modify.
7. Under **Colors**, select a preset color or use a custom color.
8. Select **Symbols** and choose the symbol displayed when your KPI falls within the specified limit.

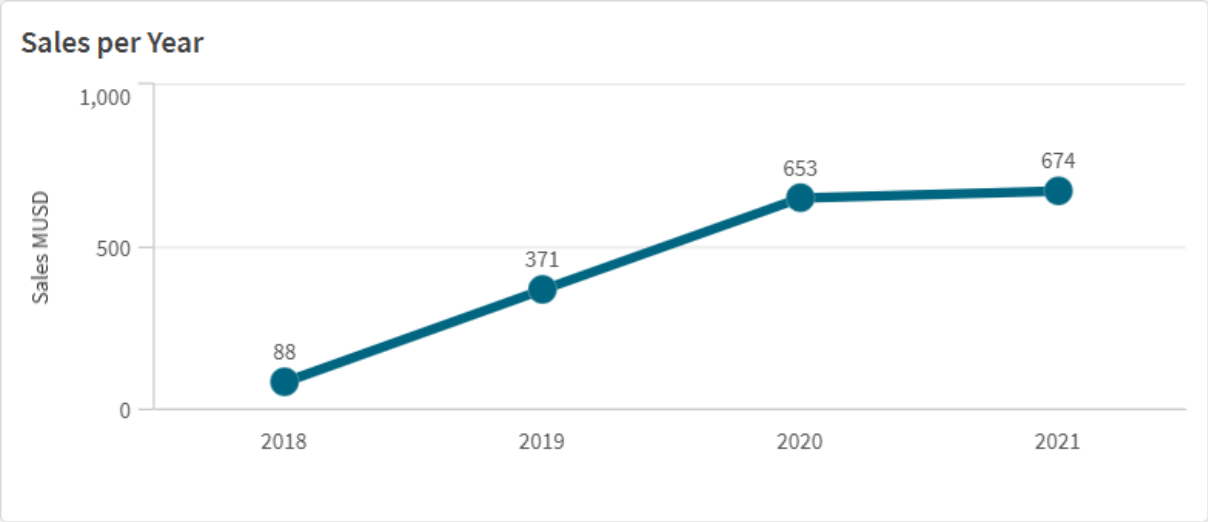
Use dynamic titles

When making visualizations, use dynamic titles to capture the essence of the chart. Rather than just a generic title, consider building an expression for the title that provides information dynamically based on user selections.

By using set analysis combined with max(), min(), rank(), and correl() to build the titles, you can present more dynamically descriptive charts.

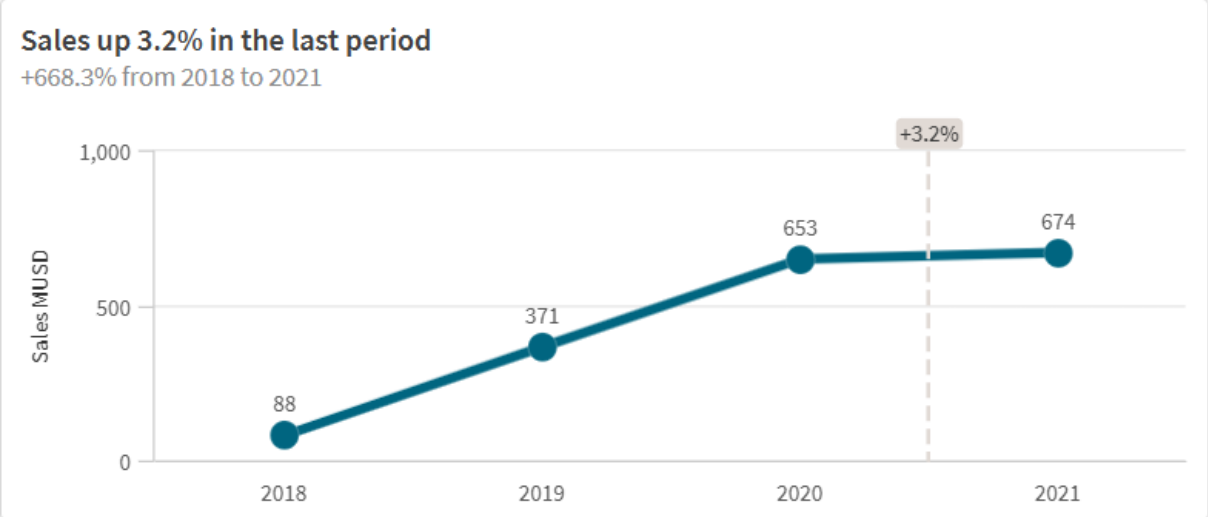
For example, this visualization has a static title.

Static title



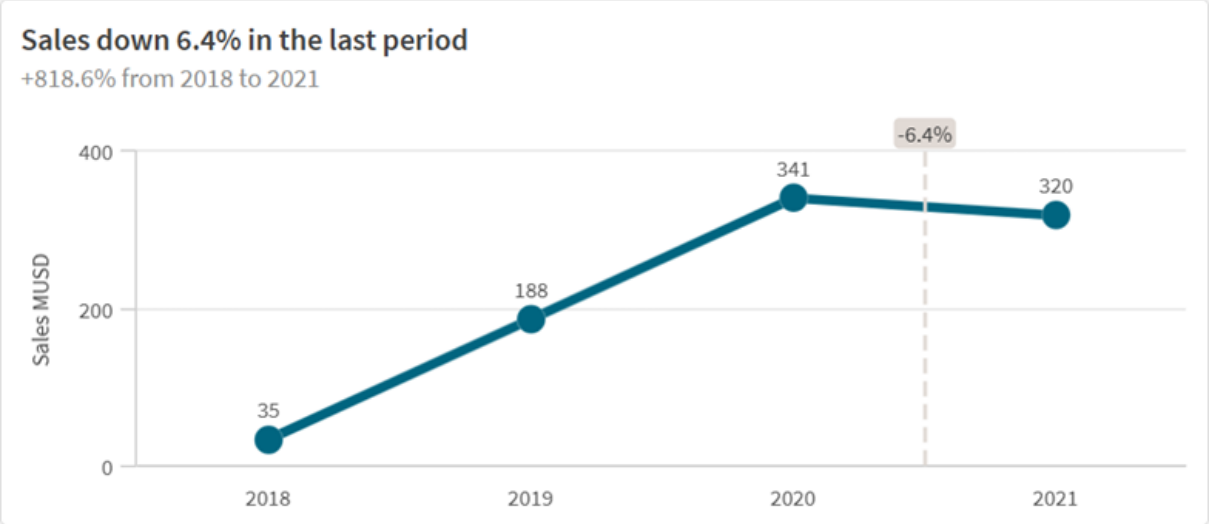
If dynamic expressions were added to the title and subtitle, the chart would express information more dynamically and provide users with more information.

Dynamic title and subtitles



The advantage of the dynamic titles is that it changes based on user selections. In the visualization below, the three top countries for sales have been selected, changing the title and subtitle of the visualization.

Dynamic title and subtitles after selections



2.5 Troubleshooting - Creating apps

This section describes problems that can occur when creating apps and visualizations in Qlik Sense.

Images are not included in an app that has been moved from one Qlik Sense environment to another

Possible cause

You have created an app in Qlik Sense and moved the app to another Qlik Sense environment.

When you move apps between Qlik Sense environments, images may not have been moved automatically. The images have to be handled manually, in different ways depending on between which environments the app has been moved.

Proposed action

Import the images from the Qlik Sense environment where the app was created to the target location using the Qlik Management Console.

Images are not included in an app that has been imported from Qlik Sense Desktop to Qlik Sense

Possible cause

You have created an app in Qlik Sense Desktop and imported the app to Qlik Sense.

When you move apps between Qlik Sense environments, images may not have been moved automatically. The images have to be handled manually, in different ways depending on between which environments the app has been moved.

Proposed action

Import the images from the images folder of the Qlik Sense Desktop app using the Qlik Management Console.

Images are included automatically only when you move an app from one Qlik Sense Desktop installation to another.

The default location of the images in Qlik Sense Desktop is *<user>\Documents\Qlik\Sense\Content\Default*.

If you have organized images in subfolders in the Content\Default folder in Qlik Sense Desktop, these have to be added manually to the app and its sheets, stories and text & image objects after importing the images.

Images are not included in an app that has been moved from one Qlik Sense Desktop installation to another

Possible cause

You have moved an app between Qlik Sense Desktop installations.

When you move apps between Qlik Sense environments, images may not have been moved automatically. The images have to be handled manually, in different ways depending on between which environments the app has been moved.

Proposed action

Do the following:

- Copy the images from the PC where the app was created and paste into the images folder of the target location.

The default location of the images in Qlik Sense Desktop is *<user>\Documents\Qlik\Sense\Content\Default*.

The image I want to use does not seem to work

Images are part of apps as thumbnails of the apps, sheets and stories, in the text & image object and in story slides.

Possible cause

You are using an image in a format that is not supported.

Proposed action

Do the following:

- Convert the image to one of the supported formats (png, jpg, jpeg or gif).

Using Insight Advisor impacts system performance

Insight Advisor uses master items as fields in recommended charts.

Possible cause

The charts generated by the Insights are choosing fields that end up with costly charts.

Proposed action

Do the following:

- Change what fields are exposed to published app users.

I cannot find **Reload** when I right-click on an app

I want to reload my app, but I do not see **Reload** when I right-click on my app.

Possible cause

You are do not have one or more of the following permissions set in QMC:

- Update access to the app.
- Read access to the HubSection_Task resource filter.
- HubAdmin role or Read and Create access to the ReloadTask resource filter.

Proposed action

Contact a QMC administrator to be assigned the HubAdmin role or to get create and read access to the ReloadTask resource filter.

I cannot manage my app reload tasks in the hub

I want to view my app reload tasks in the hub, but I do not see **Manage reload tasks** when I right-click an app.

Possible cause

The security rule HubSectionTask is disabled or you do not have read access to the HubSection_Task resource filter. Alternatively, you may not have read access to app reload tasks in the hub configured in QMC.

Proposed action

Contact a QMC administrator to get read access to HubSection_Task and either read access to app reload tasks in the hub or to be assigned the HubAdmin role. The HubAdmin role, dy default, has read access to app reload tasks in the hub.

Thumbnails are not included when copying a sheet

Possible cause

You have copied a sheet from another app. Thumbnails are stored as app resources and are not included when you copy a sheet. Copying sheets within an app works fine.

Proposed action

You can copy an entire app and use that as starting point. This will include all resources, such as images.

Right-to-left reading order works for some visualizations, but not others

Possible cause

You might notice some visualizations in Qlik Sense can display right-to-left languages such as Arabic or Hebrew without right-to-left reading order being activated in the app. However, to guarantee that the right-to-left reading order is applied correctly at all times and to all visualizations in the app, you need to activate this setting in the app.

Proposed action

Activate right-to-left reading order in the app to ensure the setting is applied to all visualizations in the app.

Do the following:

1. In an unpublished app, click ••• and then click **Settings**.
2. In the menu, switch to the **Appearance** tab.
3. Turn **Right-to-left** on or off.

If a visualization is shared using Qlik Sense Charts, changing the reading order in the app will also affect the reading order in the shared chart. .

2.6 Optimizing app performance

App performance can be improved with reduced app size, simplified data models, and strategic use of set analysis. This section will help you avoid performance issues by pointing out areas where performance can be impacted and how you can evaluate and monitor app performance.

App complexity

These are loose categories that can help diagnose issues. The most complex apps have the lowest performance.

Simple apps:

- Do not include complex set analysis or If() statements.
- Do not include large tables.
- Have a simple data model.
- Contain simple calculations.
- May have large data volumes.

Moderate apps:

- Have a data model with many tables, but follow best practices.
- Use set analysis and several If() statements.
- Have large or wide tables on sheets (15 columns or more).

Complex apps:

- Have a very complex data model.
- Connect to large data volumes.
- Contain complex calculations, charts, and tables.

App details

You need to consider your hardware environment in relation to app size, because it affects the performance of your Qlik Sense deployment. For example, if you do not optimize your apps, they may require more hardware resources.

Monitoring app size will help you:

- Understand current performance.
- Understand the performance impact of deploying a new app.
- Understand the performance impact of modifying an existing app.
- Resolve performance issues.
- Plan for future growth.

Qlik provides tools that can help you asses your apps. For more information, see: Performance and scalability in Qlik Sense Enterprise.

These are the basic app elements that can affect performance:

App details that can affect performance

Feature	Description
App disk size (MB)	You can find app size in the QMC. Go to **Apps**, and open the **Column selector** on the right hand side next to **Actions**. Click the radio button next to **File size (MB)**. If you are using Qlik Sense Desktop, you can find app size in Windows Explorer. The default folder is *%USERPROFILE%\Documents\Qlik\Sense\Apps*. The *Apps* folder lists all app names and file sizes.
App size in RAM (GB)	You can determine an app's base RAM footprint by: 1. Restarting the Qlik Sense server. 2. Noting the current RAM usage. 3. Opening up the Qlik Sense app. 4. Recording the difference in RAM. You can use the *App Metadata Analyzer* to find this metric if you are using Qlik Sense June 2018 or later.
App total rows (M)	You can use system fields to calculate total rows. Create a KPI with the measure *Sum($Rows)*.
App total fields	You can use system fields to calculate total fields. Create a KPI with the measure *Sum($Fields)*.
App total tables	You can use system fields to calculate total tables. Create a KPI with the measure *Count(DISTINCT $Table)*.

Monitoring your app

The Qlik Management Console (QMC) provides apps for monitoring system performance and usage on Qlik Sense Enterprise on Windows:

- The *Operations Monitor* app provides information about hardware utilization, such as server memory and CPU usage, active users, and reload task activity. It also provides summary and detailed information about errors, warnings, and log activities in the Qlik Sense server environment.
- The *License Monitor* app tracks license usage, and facilitates monitoring changes to license allocation.
- The *Log Monitor* app presents nearly all log data available and enables trend analysis and troubleshooting.
- The *Sessions Monitor* app shows log data about usage of apps.
- The *Reloads Monitor* app presents detailed information about reload data, both from the QMC and apps open in the hub.
- The *Sense System Performance Analyzer* app displays Qlik Sense performance across all nodes.
- The *Sense Connector Logs Analyzer* app provides insights into usage and errors of specific Qlik connectors.

- The *App Metadata Analyzer* app provides a holistic view of all your Qlik Sense apps, including granular level detail of an apps data model and its resource utilization.

Large data volumes

You can employ these architecture strategies when you are connecting to large data volumes.

Segmentation

You can segment QVDs by dimensions such as time frame, region or aggregation level. For example, you can have:

- A QVD that contains data from the two most recent years.
- A QVD that contains historical data further than two years.
- A QVD that contains all data aggregated on a higher level. For example, per month instead of date, or per country instead of individual customers.
- One large QVD with all the data, which is only used by a small subset of users.

You can segment the apps in a similar way. Smaller apps will address the analytical needs of most users. This saves memory.

You can also have multiple apps focused on different regions. This way, users will not open an app with data that they are not interested in or do not have rights to access. Data that is not accessible via section access still affects memory.

On-Demand App Generation (ODAG)

Qlik Sense on-demand apps give users aggregate views of big data stores. They can identify and load relevant subsets of the data for detailed analysis.

From a user perspective, there are two apps:

1. A shopping cart with aggregated data.
2. An empty template app used to display detail.

The user makes selections in the shopping cart app. Once a threshold has been met, a custom LOAD script is created which populates the template app with the requested details.

Application chaining

Application chaining (known as document chaining in QlikView) means that there is an aggregated app, which users consume regularly. If a user needs more detail, selections can be passed from the aggregated app to a detail app, so that they can view a lower level of granularity. This saves memory, because users are not loading unnecessary detail. Application chaining can be performed by adding button objects to a sheet. For more information, see *Button (page 458)*.

Application chaining is also supported via APIs. For example, you can use the App Integration API to create custom application chaining. For more information, see App Integration API.

Data model performance

These are indicators that can impact data model performance. Each one is a best practice that will improve app usability.

Data model performance best practices

Action	Description
Synthetic keys removed	Qlik Sense creates synthetic keys when two or more data tables have two or more fields in common. This may mean that there is an error in the script or the data model.
Circular references removed from data model	Circular references occur when two fields have more than one association. Qlik Sense will attempt to resolve these by changing the connection to one of the tables. However, all circular reference warnings should be resolved.
Appropriate granularity of data	You should only load data that is necessary. For example: a group of users only need data divided by week, month, and year. You can either load in the aggregated data or aggregate the data within the load script to save memory. If a user does need to visualize data at a lower level of granularity, you can use ODAG or document chaining.
QVDs used where possible	A QVD is a file containing a table of data exported from Qlik Sense. This file format is optimized for speed when reading data from a script, but is still very compact. Reading data from a QVD file is typically 10-100 times faster than reading from other data sources.

Action	Description
QVD files optimized on load	QVD files can be read in two modes: standard (fast) and optimized (faster). The selected mode is determined automatically by the script engine. There are some limitations regarding optimized loads. It is possible to rename fields, but any of these operations will result in a standard load: • Any transformations on the fields that are loaded. • Using a **where** clause causing Qlik Sense to unpack the records. • Using **Map** on a field that is loaded.
Incremental loads leveraged	If your app connects to a large amount of data from databases that are continuously updated, reloading the entire data set can be time consuming. Instead, you should use incremental load to retrieve new or changed records from the database.
Snowflake model consolidated	If you have a snowflake data model, you may be able to reduce the number of data tables by joining some of them using the Join prefix or other mapping. This is especially important for large fact tables. A good rule of thumb is to have only one large table.
Tables that have a small number of fields are denormalized	If you have two tables with few fields, it may improve performance to join them. .
Denormalized lookup (leaf) tables with mapping loads	You should not use the Join prefix if you only need to add one field from a table to another. You should use the ApplyMap lookup function.

Action	Description
Time stamps removed or decoupled from date field	Date fields can fill up space when the timestamp is present as the string representation is larger, and the number of distinct values is larger. If the precision is not necessary for your analysis, you can round the timestamp to e.g. the nearest hour using *Timestamp(Floor (YourTimestamp,1/24))* or remove the time component completely using *Date(Floor (YourTimestamp))*. If you want the timestamp, you can decouple it from the date itself. You can use the same Floor() function, and then create a new field with the extracted time by using something along the lines of: *Time(Frac(YourTimestamp))*.
Unnecessary fields removed from data model	You should only load necessary fields in your data model. Avoid using Load * and SELECT. Make sure you keep: • Fields that are necessary for your analysis. • Fields that are actually being used in the app.
Link tables avoided when dealing with high data volumes	You should use link tables where possible. However, if you are dealing with large data volumes, concatenated tables can out-perform link tables.
Concatenated dimensions broken to new fields	You should break apart concatenated dimensions into separate fields. This reduces the number of unique occurrences of values in your fields. This is similar to how timestamps can be optimized.
AutoNumber used where possible	You can create an optimized load by loading your data from a **QVD** file first, and then using the **AutoNumber** statement to convert values to symbol keys.
Data islands avoided	Data islands can be useful, but they usually affect performance. If you are creating islands for selection values, use variables.

Action	Description
QVDs are stored based on incremental timeframes	You should store QVD in segments, such as monthly. These smaller monthly QVD can then support many different apps that might not need all of the data.

Sheet performance

These are best practices that will improve performance of sheets and visualizations.

Sheet performance best practices

Action	Description
The If() function is avoided where possible	If the If() function is used inside an aggregation function, it will operate at the record level and be evaluated many times. For example, if you have 1000 records in an aggregation, an If() condition will be evaluated 1000 times. This could cascade rapidly if you nest statements. You should use set analysis instead. A set analysis filter is applied before the aggregation, resulting in a faster response. These responses can also be cached via set analysis, where If() cannot. You could also consider other functions and modifications to the data model.

Action	Description
Fields from different tables inside an aggregation table are avoided where possible.	When an aggregation is evaluated, the calculation runs through two steps: 1. The first step is finding the relevant combinations on which the to make the calculation. This step is single-threaded. 2. The second step is performing the calculation. This step is multi-threaded. The single-threaded part can affect performance considerably. One example is if you have multiple fields inside the aggregation, for example, Sum (Quantity*ListPrice). If Quantity is in the fact table, and ListPrice is in the master products table, the engine first needs to join the two tables to find the combinations before it can start to sum the product. The joining is the single-threaded part, and the summing is multi-threaded. If both fields are found in the same table, no join is necessary, and the aggregation is evaluated considerably faster.
Aggr() and nested Aggr() functions are used minimally	The Aggr() function greatly affects performance. Incorrect use can give inaccurate results. For example, in a table with dimensions that vary from the dimensions within the Aggr() function.
Set analysis is used where possible	You can use set analysis to define a set of data values that is different from the normal set defined by the current selections.
String comparisons avoided where possible	String comparisons are not as efficient as set analysis. For example, you should avoid Match(), MixMatch(), WildMatch(), and Pick(). Create flags in the script or use set analysis instead.

Action	Description
Calculation conditions are used on objects containing intensive calculations	You may have visualizations with many records when there are no selections. As a best practice, add calculation conditions to objects so that they only render after certain selections have been made. This stops the creation of very large hypercubes. For example: *GetSelectedCount([Country])=1 OR GetPossibleCount([Country])=1*. In this scenario, the visualization will not render unless the user selects a single country, or makes other selections where only a single country is possible.
Measures are pre-calculated in the script where possible	Any measure that is at the lowest level of granularity of the data model should be calculated in the script. For example, if in the same record in a table you have Sales and Cost, you could derive the margin by calculating *Sales - Cost AS Margin*. You can also aggregate other values in advance if you know that they will not vary based on selection, or that are bound to a different level of granularity.
Tables have less than 15 columns and have calculation conditions	A table with 15 columns could be considered wide. If your tables consist of many records, you should use calculated conditions on the table object so that it only renders after certain selections or criteria have been met. If your table is very wide, consider: • Creating multiple smaller tables that show conditionally. • Using methods to conditionally show columns. • Keeping your tables limited to only what fields are necessary for your analysis.

Action	Description
Sheets do not have an excessive number of objects	Objects are calculated when the user navigates to the sheet. Every time a user makes a selection on that sheet, each object will be recalculated if that current state does not exist in the cache. If you have a sheet with many charts, the user will have to wait for every object to calculate on nearly every selection. This puts significant load on the engine. As a best practice, follow the Dashboard/Analysis/Reporting (DAR) concept to develop a clean and minimal app.
Numeric flags are leveraged in the script for use in set analysis	Set analysis with flags can be more efficient than using string comparisons or multiplication.
Master items or variablesused for expressions	Master items enable drag and drop of governed metrics and guarantee that expressions will be cached. For example, *Sum(Sales)* is different from *SUM(Sales)*. Expressions are cached on spelling and case, and need to match verbatim in order to be reused.

3 Visualizations

Visualizations let you present data so that your apps users can interpret and explore it. For example, a bar chart that compares sales numbers for different regions, or a table with precise values for the same data. Good visualizations help you quickly and accurately interpret displayed data.

Visualizations are easy to add and customize. They can take the form of charts, such as bar charts, pie charts, tables, gauges, or treemaps. Each chart type has unique functionality. Qlik Cloud Analytics automatically highlights items associated with your selections so you can drill-down and filter.

3.1 Select visualization types that align with your purpose

Each visualization type has a specific goal. You need to think about the purpose of your visualization, and pick a visualization type that lets you explore your data for that purpose effectively.

For example: You want to show how a measure, quarterly sales, behaves over time. You should create a line chart, because one of its strengths is displaying how measure values change over time. Alternatively, you can start with the type of analysis you want to make. From the available analyses, you could select trend over time as your analysis type, which builds a line chart for you.

3.2 Which visualizations are available?

The following types of visualizations are available in the assets panel:

- Charts illustrate the data with visual elements like bars, lines, or points.
- Text-based visualizations presents data in text form, for example, tables or filters.
- Dashboard objects do not always visualize app data, but they help with navigation through collections of analytics. They can also automate the performance of certain actions.

There are analyses available in the assets panel.

The best choice of chart type depends on the purpose of the visualization.

If the predefined visualizations does not fill your purpose, you can use a visualization extension. You find them in the assets panel under **Custom objects**.

Available built-in visualizations

The built-in visualizations are those that are included regardless of your Qlik Cloud subscription. Built-in visualizations are fully supported.

These are the built-in visualizations.

Charts

- **Bar chart**: Visualize differences in measures over one or more dimensions, arranged as a series of bars with varying height. Can be displayed in vertical or horizontal format, and with grouped, stacked, or butterfly presentation.
- **Box plot**: The box plot is suitable for comparing range and distribution for groups of numerical data, illustrated by a box with whiskers, and a center line in the middle.
- **Bullet chart**: Bullet charts can be used to visualize and compare performance of a measure to a target value and to a qualitative scale, such as poor, average, and good.
- **Combo chart**: The combo chart combines bars and lines in the same chart. The bars and lines have different axes to enable comparing percentages and sums. Available as horizontal or vertical combo chart.
- **Distribution plot**: The distribution plot is suitable for comparing range and distribution for groups of numerical data. Data is plotted as value points along an axis.
- **Gauge**: The gauge is used to display the value of a single measure, lacking dimensions.
- **Histogram**: The histogram is suitable for visualizing distribution of numerical data over a continuous interval, or a certain time period. The data is divided into bins.
- **Line chart**: The line chart displays data lines between values. Line charts are often used to visualize a trend in data over intervals of time. Can also be presented as an **Area** line chart.
- **Map**: The map is used to combine geospatial data and measure values, such as the sales for a region or a store.
- **Mekko chart**: The mekko chart compares a group while comparing category items contained within these groups.
- **Pie chart**: The pie and donut charts show the relation between a single dimension and a single measure. Can also be presented as a **Donut** chart.
- **Scatter plot**: The scatter plot presents values from two measures. This is useful when you want to show data where each instance has two numbers, for example, country (population and population growth). An optional third measure can be used and is then reflected in the size of the bubbles. When showing large data sets colors will be used instead of bubble size to represent the measure size.
- **Treemap**: The treemap shows hierarchical data. A treemap can show a large number of values simultaneously within a limited space.
- **Waterfall chart**: The waterfall chart illustrates how an initial value is affected by intermediate positive and negative values.

Text-based visualizations

- **Filter pane**: The filter pane allows you to control what data that is shown in the visualizations on a sheet. A filter pane can filter the data of several dimensions at once.
- **KPI**: The KPI is used to present central performance figures. You can add a link to a sheet.

- **NL insights**: The **NL insights** visualization displays natural language insights about data in the form of a chart.
- **Pivot table**: The pivot table presents dimensions and measures as rows and columns of a table. The pivot table allows you to analyze data in multiple dimensions at a time. The data in a pivot table may be grouped based on a combination of the dimensions, and partial sums can be shown.
- **Straight table**: The straight table allows you to present tabular data for detailed analysis. You can apply pagination to simplify consumption of large data volumes. You can also allow users to add and remove columns temporarily during analysis, using an enhanced chart exploration experience.
- **Table**: The table displays values in record form, so that each row of the table contains fields calculated using measures. Typically, a table includes one dimension and multiple measures. The **Straight table** has replaced the **Table** as the default table visualization.
- **Text & image**: You can use the text & image visualization to add text, images, measures and links to a webpage.

Dashboard objects

- **Button**: You can use buttons to add quick links for easy selection and navigation in your app.
- **Tab container**: You can add visualizations in a limited space and show or hide the visualizations inside the container based on conditions.
- **Navigation menu**: The navigation menu adds a sheet navigation options into your sheet.

Available custom objects

There are a number of custom objects available to add to your sheet.

Qlik Visualization bundle

The Qlik Visualization bundle is a set of charts that can be used to enhance and increase your Qlik Sense app's charting capacity.

Visualization bundle (page 531)

- **Funnel chart**: A funnel chart is a visual representation of the connected stages of a linear process.
- **Grid chart**: A chart that displays comparative data and with the values represented as colors.
- **Multi KPI**: A chart that shows KPI for multiple dimension values to quickly understand and track performance.
- **Org chart**: Creates an organization chart with a tree structure.
- **P&L pivot**: Creates a pivot table that you can style, for example for profit and loss reporting.
- **Pivot table**: Creates a pivot table with additional styling options not available in the pivot table visualization.

- **Sankey chart**: A flow chart diagram chart visually emphasizing major transfers or flows within defined system boundaries.
- **Trellis container**: Creates a trellis chart based on a master visualization.
- **Variance Waterfall**: Shows the variance between two measures over the different values of a dimension.
- **Word cloud**: A cloud chart of words with their size based on measure value.

Qlik Dashboard bundle

The Qlik Dashboard bundle is a set of controls that you can use to enhance navigation and selection in your Qlik Sense app.

Dashboard bundle (page 481)

- **Animator**: You can animate changes in your visualizations over a period of time.
- **Container**: Add multiple visualizations to a container to save space.
- **Date picker**: You can select a single date or a range of dates from a calendar.
- **Layout container**: Add and arrange visualizations in a container.
- **Line**: Add vertical and horizontal lines to a sheet.
- **Variable input**: You can set the value of a variable.
- **Video player**: You can add a video to your sheet.

If you are unsure of what visualization types to use with your data, Qlik Sense offers two methods of creating visualizations with assistance:

- You can use Insight Advisor to let Qlik Sense analyze your data and generate visualizations based on your searches or selections. You can then choose to add these visualizations to your sheets.
- You can also create visualizations using chart suggestions by dragging a field onto the sheet from the assets panel and then dragging additional fields that you want in the visualization onto the first field. Qlik Sense then creates a suggested visualization based on the fields selected for the visualization.

3.3 Data assets in visualizations

Visualizations use data in many different ways. How your data is comprised or created impacts your visualizations. Primarily, your data assets become dimensions and measures in your visualizations, defining the categories in your visualizations and the measurements of those categories. A field can be used to group data, or it can be transformed with an aggregate function to provide a measurement in data categories.

The types of data you have in your tables and fields also impacts whether they can be used as dimensions or measures, as well as what sorting options are most effective. For example, quantitative data and qualitative data have different recommended uses when they are used as either dimensions or measures.

In addition to providing the data to display, data assets can be used to control what data is displayed and how it is presented. For example, you can color a visualization using a dimension or measure not present in the visualization. For more information, see *Changing the appearance of a visualization (page 687)*.

The assets panel contains the different data sources you can use in your visualizations.

Data assets

The following data assets are available when creating visualizations:

- Fields
- Measures
- Dimensions
- Master items

Fields

Fields hold the data loaded into Qlik Sense. Fields contain one or more values and correspond to columns in a database table. The field data can be qualitative or quantitative.

When creating visualizations, you use fields to create your dimensions and measures. You can also use fields in different ways when you add visualizations to your app. Some visualizations, such as tables, can present fields in an unmodified state.

Some fields require extra considerations, such as date or time fields.

For more information, see *Fields (page 93)*.

Measures

Measures are the data that you want to show. Measures are created from an expression composed of aggregation functions, such as **Sum** or **Max**, combined with one or several fields.

For more information, see *Measures (page 111)*.

Dimensions

Dimensions determine how the data in a visualization is grouped. For example: total sales per country or number of products per supplier. Dimensions display the distinct values from the field selected as a dimension. Dimensions can also be calculated using an expression.

For more information, see *Dimensions (page 106)*.

Master items

Master items are dimensions, measures, or visualizations that can be reused in other visualizations and sheets in your app. Updating a master item updates every instance of it. This means you could have the same measure in 5 visualizations, and they would all update whenever the master item is changed.

Master items also have more design options available. You can, for example, assign colors to a master dimension distinct values so that the distinct values are consistent across visualizations.

Master items also include special dimensions such as drill-down dimensions and calendar measures.

For more information, see *Reusing assets with master items (page 124)*.

Expressions

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.

Expressions are used primarily used to create measures. They can also be used to build calculated dimensions, or to set properties within different visualizations. For example, you can use expressions to define range limits for gauges, or reference lines for bar charts.

For more information, see *Using expressions in visualizations (page 160)*.

Data types in visualizations

Different types of data have different properties; certain data may work better as dimensions, and some as measures. Similarly, as dimensions or measures, certain kinds of data may work better as a dimension in some visualizations better than others, or as a measure with certain aggregation functions.

The data in your fields can be quantitative or qualitative. Quantitative data values are measured numerically on an ascending scale. Quantitative data can be ratios or intervals:

- Ratio: Ratios are quantitative data that you can perform arithmetic operations on, such as cost or age.
  For example, you can sum sales values for the month to get totals.
- Interval: Intervals are quantitative data that you cannot perform arithmetic operations on.
  For example, you cannot calculate a sum of temperatures during the week, but you can calculate the average temperature per day, and the high/low for each day.

Qualitative data can not be measured numerically, but can be described through language. Qualitative data can be nominal or ordinal:

- Nominal: Fields with nominal data have distinct qualitative values, but without a set order.
  For example, product names or customer names are nominal data, as they have distinct values, but do not have a required order.
- Ordinal: Fields with ordinal data have qualitative values that have a ranked or positioned value. Ordinal data should be sorted by its order as opposed to alphabetically.
  For example, low, medium, high are ordinal values. Small, medium, and large are also ordinal values.

The following table contains a general overview of recommended visualization types and aggregation functions for data types. These recommendations should not be considered absolute.

Visualization recommendations for data types as measures

Data type	Recommended aggregation functions	Non-recommended aggregation functions
Nominal	Count	Average Median Sum
Ordinal	Count Median	Average Sum
Ratio	Count Average Median	Sum
Interval	Count Average Median Sum	-

Fields

Fields hold the data that is used in Qlik Sense. Fields can be thought of as the data loaded from the load script.

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

Example of data in a load script:

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

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

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

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

Date & time fields

If you are working with fields containing date or timestamp information in your app, you can define a number of related attributes of a date, for example, year or week, and use them in your visualization.

Creating date fields in **Data manager**

Date fields are created automatically for all data fields recognized as a date or a timestamp when you use **Add data** with data profiling enabled to build your data model in **Data manager**, or when you click **Load data** in **Data manager**.

*Date fields created in **Data manager** are automatically added to autoCalendar.*

If the date or timestamp field is not recognized automatically, you can adjust the input format in the **Data manager** table editor. You can also set the display format to use in visualizations.

Which date & time fields are automatically recognized?

Date & timestamp fields will be recognized automatically based on your system locale settings. Additionally, the following formats are recognized:

- M/D/YYYY h:mm
- D/M/YYYY h:mm TT
- M/D/YYYY
- D/MM/YYYY

- YYYYMMDD
- YYYYMMDDhhmmss
- YYYYMMDDhhmmss.fff
- YYYYMMDDhhmmssK
- YYYY-MM-DD
- YYYY-MM-DDThh:mm:ss
- YYYY-MM-DD-Thh:mm:ss.fff
- YYYY-MM-DD-Thh:mm:ssK

Date & time formats

Format specifier	Description
YYYY	Year
M, MM	Month
D, DD	Day
hh	Hour
mm	Minute
ss	Second
fff	Millisecond
TT	AM or PM
K	Timezone
T	Divider between date and time. T can not be replaced with another character.

Creating date & time fields in the data load script

If you use Data load editor to build your data model, you need to create a calendar template where you define which fields to derive in the data load script. The derived date & time fields will be generated when the script is run and data is reloaded.

Using date & time fields in your app

Date & time fields in visualizations

All date or timestamp fields in the assets panel **Fields** tab are marked with , and you can expand them to use the generated date & time fields. You can use them in visualizations, just like any other data field.

Date & time fields in dimensions

You can also use date & time fields when you create a dimension. The date & time fields are listed under the field that they have been generated from.

Date & time fields in expressions

You can use date & time fields in all expressions, for example when you create a measure. The date & time fields are named according to:

[field name].autoCalendar.[date & time field].

- [field name] is the name of the data field that was used to generate date & time fields.
- [date & time field] is the date & time field you want to use, for example, Year.

Example:

```
Date.autoCalendar.Year
```

Date & time fields in calendar measures

Calendar measures use date & time fields created in autoCalendar. Each of these date & time fields is calculated by a set analysis expression that determines whether or not data falls within the time-to-date period, or if dates are within a defined relative position to the current date. These date & time fields are relative and return results based on the current date. You can use these fields independently of calendar measures.

Calendar field date & time fields are formatted as follows:

[field name].autoCalendar.[date & time field]={[value]}

- [field name] is the name of the date field used to generate date & time fields.
- [data & time field] is the name of the date & time field used, for example, InYTD.
- [value] is the value for the date & time field's set analysis expression and determines which dates are included.

Example:

```
Date.autoCalendar.YearsAgo={1}
```

The following are the available date & time fields with sample values:

InYTD

This date & time field determines whether or not dates are within the year-to-date range or outside the year-to-date range.

InYTD

Example	Result
`Date.autoCalendar.InYTD={0}`	Returns all dates that fall in the year-to-date time range. For example, if the current date was the 54th day of the year, the dates within the first 54 days of every year in the date field would be included.
`Date.autoCalendar.InYTD={1}`	Returns all dates outside the year-to-date time range. For example, if the current date was the 54th day of the year, all the dates after the first 54 days of every year in the date field would be included.

YearsAgo

This date & time field determines whether or not dates are from a specific year relative to the current date.

YearsAgo

Example	Result
`Date.autoCalendar.YearsAgo={0}`	Returns all dates from this year.
`Date.autoCalendar.YearsAgo={1}`	Returns all dates from last year.
`Date.autoCalendar.YearsAgo={8}`	Returns all dates from eight years ago.

InQTD

This date & time field determines whether or not dates are within the quarter-to-date range or outside the quarter-to-date range, relative to the current date.

InQTD

Example	Result
`Date.autoCalendar.InQTD={0}`	Returns all dates from all quarters that are within the quarter-to-date range. For example, if the current date was the 14th day of Quarter 1, the first 14 days of every quarter in the date field would be included.
`Date.autoCalendar.InQTD={1}`	Returns all dates from all quarters that are outside the current quarter-to-date range. For example, if the current date was the 14th day of Quarter 1, all dates after the first 14 days of every quarter in the date field would be included.

QuartersAgo

This date & time field determines whether or not dates are from a specific quarter relative to the current date.

QuartersAgo

Example	Result
`Date.autoCalendar.QuartersAgo={0}`	Returns all dates from the current quarter.
`Date.autoCalendar.QuartersAgo={1}`	Returns all dates from the last quarter.
`Date.autoCalendar.QuartersAgo={8}`	Returns all dates from eight quarters ago.

QuarterRelNo

This date & time field determines whether or not dates are from a specific quarter relative to the current date.

QuarterRelNo

Example	Result
`Date.autoCalendar.QuarterRelNo={0}`	Returns all dates from each instance of the current quarter. For example, if the current date was in Quarter 4, all dates from each Quarter 4 in the date field would be included.
`Date.autoCalendar.QuarterRelNo={3}`	Returns all dates from each instance of the quarter two quarters prior to the current quarter. For example, if the current date was in Quarter 4, all dates from each Quarter 1 in the date field would be included

InMTD

This date & time field determines whether or not dates are within the month-to-date range or outside the month-to-date range, relative to the current date.

InMTD

Example	Result
`Date.autoCalendar.InMTD={0}`	Returns all dates from all months that are within the current month-to-date range. For example, if the date was November 15, 2016, dates from the first 15 days of every month in the date field would be included.
`Date.autoCalendar.InMTD={1}`	Returns all dates from all months that are outside the current month-to-date range. For example, if the date was November 15, 2016, dates after the first 15 days to the end of the month of every month in the date field would be included.

MonthsAgo

This date & time field determines whether or not dates are from a specific month relative to the current date.

MonthsAgo

Example	Result
`Date.autoCalendar.MonthAgo={0}`	Returns all dates from the current month.
`Date.autoCalendar.MonthAgo={1}`	Returns all dates from the last month.
`Date.autoCalendar.MonthAgo={8}`	Returns all dates from eight months ago.

MonthRelNo

This date & time field determines whether or not dates are from a specific month relative to the current date.

MonthRelNo

Example	Result
`Date.autoCalendar.MonthRelNo={0}`	Returns all dates from each instance of the current month. For example, if the current month was June, all dates in every instance of June in the date field would be included.
`Date.autoCalendar.MonthRelNo={1}`	Returns all dates from the each instance of the previous month. For example, if the current month was June, all dates in every instance of May in the date field would be included.

InWTD

This date & time field determines whether or not dates are within the week-to-date range or outside the week-to-date range, relative to the current date.

InWTD

Example	Result
`Date.autoCalendar.InWTD={0}`	Returns all dates from all weeks that are within the current week-to-date range. For example, if the current date was the third day of a week, dates from the first three days of every week in the date field would be included.
`Date.autoCalendar.InWTD={1}`	Returns all dates from all months that are outside the current month-to-date range. For example, if the current date was the third day of a week, dates from the last four days of the every week in the date field would be included.

WeeksAgo

This date & time field determines whether or not dates are from a specific week relative to the current week.

WeeksAgo

Example	Result
`Date.autoCalendar.WeeksAgo={0}`	Returns all dates from the current week.
`Date.autoCalendar.WeeksAgo={8}`	Returns all dates from eight weeks ago.

WeekRelNo

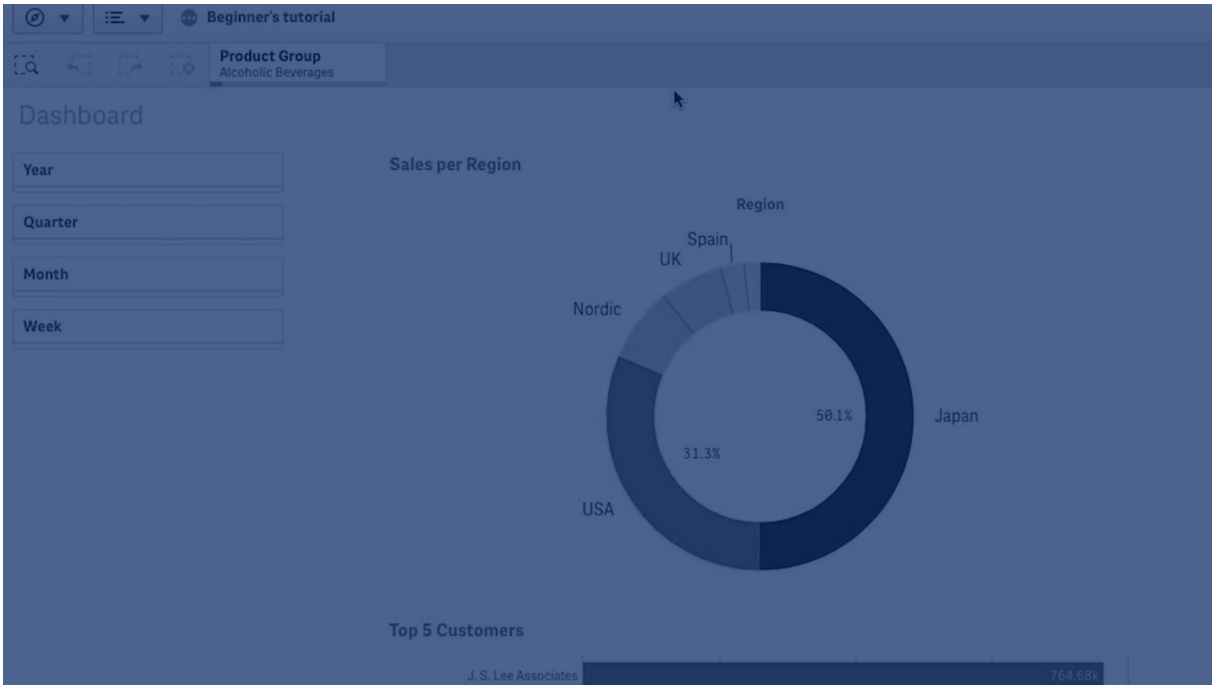
This date & time field determines whether or not dates are from a specific week relative to the current date.

WeekRelNo

Example	Result
`Date.autoCalendar.WeekRelNo={0}`	Returns all dates from each instance of the current week. For example, if the current week was the second week of the year, dates from the second week of every year in the date field would be included.
`Date.autoCalendar.WeekRelNo={1}`	Returns all dates from each instance of the previous week. For example, if the current week was the second week of the year, dates from the first week of every year in the date field would be included.

Always one selected value

You can select the **Always one selected value** for a field in an app. The value specifies that one, and only one, value is always selected for a field. You can use this value to specify, for example, that one currency is always selected for a field.



Consider the following when using the **Always one selected value**:

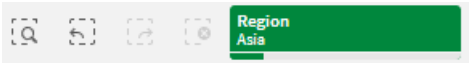
- You can use the **Always one selected value** on one or more fields.
- You cannot clear the **Always one selected value** setting when viewing a sheet. You can, however, clear the setting by editing the sheet in your workspace.
- When you publish an app with the **Always one selected value** selected, the value is applied to all sheets in the app. The app consumer cannot clear the value.
- When you duplicate an app, the **Always one selected value** is duplicated with the app.

- When you export an app without data, the **Always one selected value** is not exported with the app.
- The **Always one selected value** is not supported for derived fields.

You can use the value with a default bookmark in to highlight specific selections for your app consumer.

Set the Always one selected value

Do the following:

1. Open a sheet in an app.
2. Click **Edit sheet**.
3. Click **Fields**.
4. Right-click a field, and then click **Field settings**.
5. In the window that opens, select the **Always one selected value** check box, and then save.
6. Exit sheet edit mode. The value appears as a tab in the top toolbar. Unlike a bookmark, there is no option to clear the selection.
   The Always one selected value in the toolbar
   

   The **Always one selected value** defaults to the first entry in the field. In the example above, the value is applied to **Region**. **Asia** is the region that is selected by default. You or your app consumer can change this selection, in this case to a different region.
7. To test that the **Always one selected value** is working properly, close and then reopen the app. The value should be shown in the top toolbar.

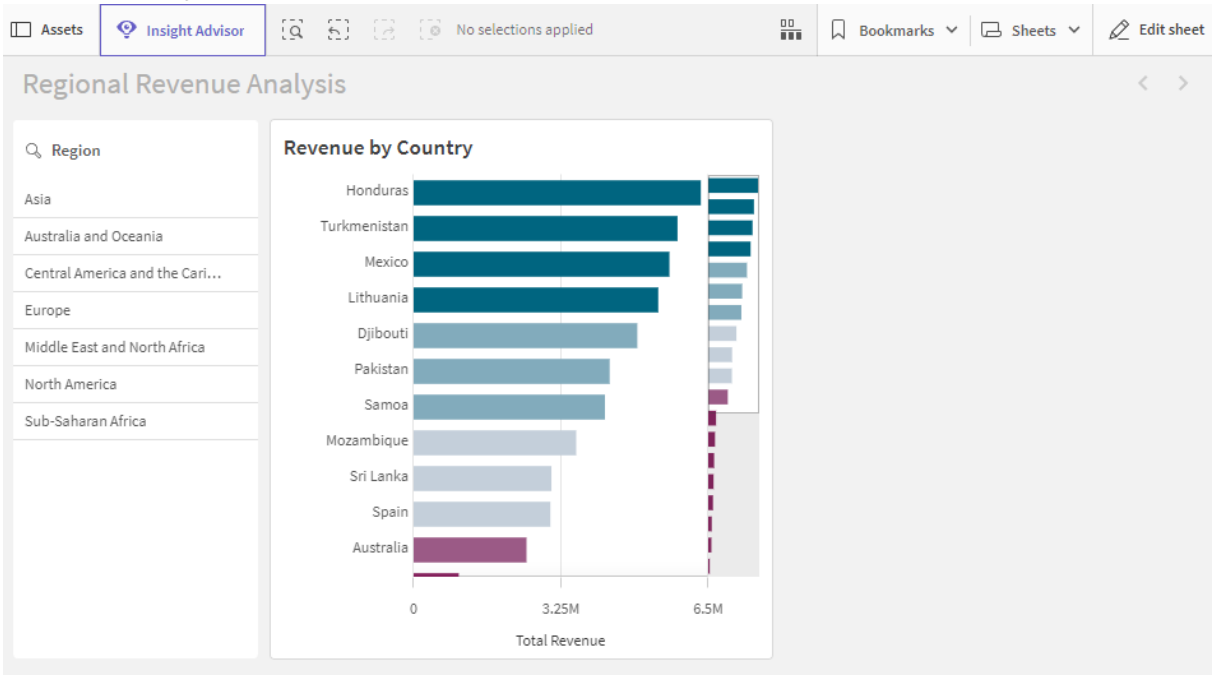
To remove the **Always one selected value** for a field, right-click the field in **Edit** mode, click **Field settings**, and deselect the **Always one selected value** check box.

Always one selected value and default bookmark example: Controlling selections to guide app consumers to insights

In this example, we set **Always one selected value** for a field. We then specify a default bookmark for the app. By specifying a default bookmark, and enabling **Always one selected value**, we control what our app consumers see when they open our published app.

1. Here is a sheet in our app before the **Always one selected value** and a default bookmark are applied. This should be the sheet that you want app consumers to see as a landing page when they open the app.

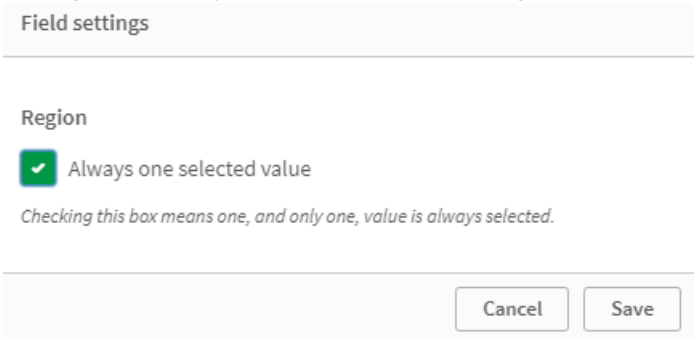
App in sheet analysis mode



The chart in the app is built using **Country** as a dimension, and **Sum([Total Revenue])** as a measure.

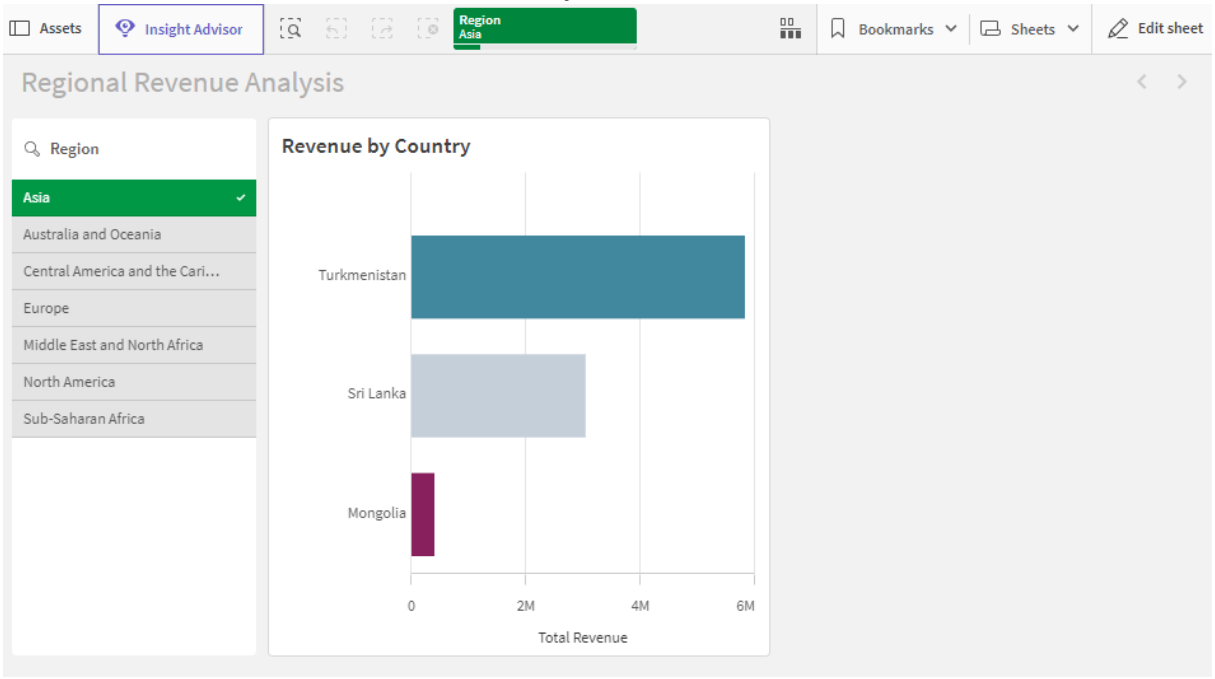
2. To ensure that one, and only one, value is always selected for the **Region** field, we edit the sheet, click **Fields**, and then right-click **Region**.
3. Click **Field settings**.
4. We then select the **Always one selected value** checkbox and save.

*Turning on the **Always one selected value** setting*



5. When we close **Edit** mode for the sheet, the **Always one selected value** value appears as a tab in the top toolbar. The value defaults to the first entry in the field. In this case, the default value is **Asia**.

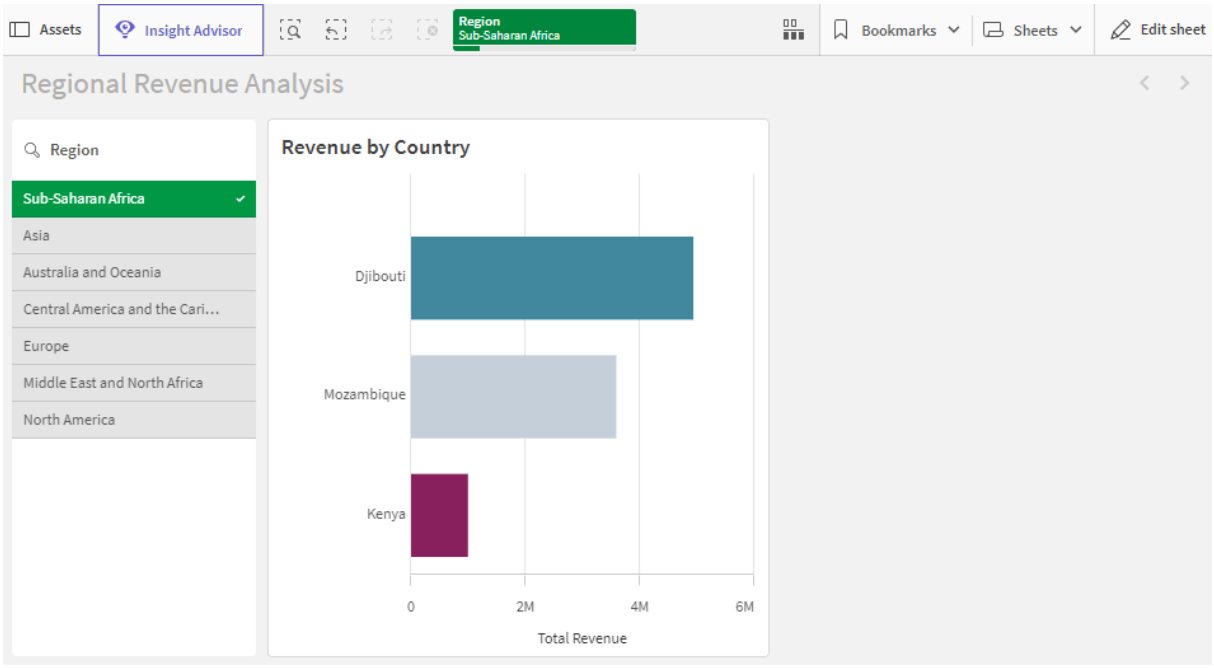
*App in sheet view with default value selected for **Always one selected value** field*



6. However, we want to show revenue for sub-Saharan Africa when the app is opened. So we select **Sub-Saharan Africa** from the **Region** field, and then click **Bookmarks** to create a new bookmark for **Region("Sub-Saharan Africa")**. We then right-click the **Region("Sub-Saharan Africa")** bookmark, and click **Set as default bookmark**.

Now, when we open the app, or publish the app for an app consumer, the app opens with one value selected, and the default bookmark is shown. The app is opened on the sheet of the bookmark instead of the app overview.

*App opened with default bookmark, using the defined selection **Sub-Saharan Africa***



Data used in example

Load script

You can add the paste the data table below into your load script to try this example out in your own app.

```
Sales:
LOAD * INLINE [
Region,Country,Item Type,Sales Channel,Order Priority,Order Date,Order ID,Ship Date,Units
Sold,Unit Price,Unit Cost,Total Revenue,Total Cost,Total Profit
Central America and the
Caribbean,Honduras,Household,Offline,H,2/8/2017,522840487,2/13/2017,8974,668.27,502.54,5997054
.98,4509793.96,1487261.02
Asia,Mongolia,Personal
Care,Offline,C,2/19/2014,832401311,2/23/2014,4901,81.73,56.67,400558.73,277739.67,122819.06
Asia,Sri
Lanka,Cosmetics,Offline,M,11/19/2016,419123971,12/18/2016,6952,437.20,263.33,3039414.40,183067
0.16,1208744.24

Asia,Turkmenistan,Household,Offline,L,12/30/2010,441619336,1/20/2011,3830,668.27,502.54,255947
4.10,1924728.20,634745.90
Central America and the
Caribbean,Honduras,Snacks,Online,L,6/30/2016,795490682,7/26/2016,2225,152.58,97.44,339490.50,2
16804.00,122686.50
Australia and Oceania,Australia,Office
Supplies,Online,C,10/27/2015,158535134,11/25/2015,2924,651.21,524.96,1904138.04,1534983.04,369
155.00
Europe,United
Kingdom,Household,Online,L,1/5/2012,955357205,2/14/2012,282,668.27,502.54,188452.14,141716.28,
46735.86
Sub-Saharan
```

```
Africa,Djibouti,Cosmetics,Offline,H,4/7/2014,259353148,4/19/2014,7215,437.20,263.33,3154398.00
,1899925.95,1254472.05
Australia and
Oceania,Australia,Cereal,Offline,H,6/9/2013,450563752,7/2/2013,682,205.70,117.11,140287.40,798
69.02,60418.38
Middle East and North
Africa,Libya,Clothes,Offline,H,10/30/2010,705784308,11/17/2010,6116,109.28,35.84,668356.48,219
197.44,449159.04
Central America and the
Caribbean,Haiti,Cosmetics,Offline,H,10/13/2013,505716836,11/16/2013,1705,437.20,263.33,745426.
00,448977.65,296448.35
Central America and the
Caribbean,Belize,Clothes,Offline,M,7/25/2016,807025039,9/7/2016,5498,109.28,35.84,600821.44,19
7048.32,403773.12
Europe,Lithuania,Office
Supplies,Offline,H,10/24/2010,166460740,11/17/2010,8287,651.21,524.96,5396577.27,4350343.52,10
46233.75
Asia,Turkmenistan,Office
Supplies,Online,M,4/23/2013,462405812,5/20/2013,5010,651.21,524.96,3262562.10,2630049.60,63251
2.50
Middle East and North
Africa,Libya,Fruits,Online,L,8/14/2015,816200339,9/30/2015,673,9.33,6.92,6279.09,4657.16,1621.
93
Sub-Saharan
Africa,Djibouti,Cereal,Online,H,5/20/2017,555990016,6/17/2017,8656,205.70,117.11,1780539.20,10
13704.16,766835.04
Middle East and North
Africa,Pakistan,Cosmetics,Offline,L,7/5/2013,231145322,8/16/2013,9892,437.20,263.33,4324782.40
,2604860.36,1719922.04
North
America,Mexico,Household,Offline,C,11/6/2014,986435210,12/12/2014,6954,668.27,502.54,4647149.5
8,3494663.16,1152486.42
Australia and Oceania,Federated States of
Micronesia,Beverages,Online,C,10/28/2014,217221009,11/15/2014,9379,47.45,31.79,445033.55,29815
8.41,146875.14
Australia and
Oceania,Samoa,Cosmetics,Online,H,7/20/2013,670854651,8/7/2013,9654,437.20,263.33,4220728.80,25
42187.82,1678540.98

Europe,Spain,Household,Offline,L,10/21/2012,213487374,11/30/2012,4513,668.27,502.54,3015902.51
,2267963.02,747939.49
Middle East and North
Africa,Lebanon,Clothes,Online,L,9/18/2012,663110148,10/8/2012,7884,109.28,35.84,861563.52,2825
62.56,579000.96
Sub-Saharan
Africa,Kenya,Vegetables,Online,L,3/18/2012,827844560,4/7/2012,6457,154.06,90.93,994765.42,5871
35.01,407630.41
North America,Mexico,Personal
Care,Offline,L,2/17/2012,430915820,3/20/2012,6422,81.73,56.67,524870.06,363934.74,160935.32
Australia and
Oceania,Australia,Beverages,Offline,H,7/7/2014,240470397,7/11/2014,9389,47.45,31.79,445508.05,
298476.31,147031.74
North America,Mexico,Personal
Care,Offline,M,7/30/2015,559427106,8/8/2015,5767,81.73,56.67,471336.91,326815.89,144521.02
Sub-Saharan
```

```
Africa,Mozambique,Household,Offline,L,2/10/2012,665095412,2/15/2012,5367,668.27,502.54,3586605
.09,2697132.18,889472.91
];
```

Dimensions

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

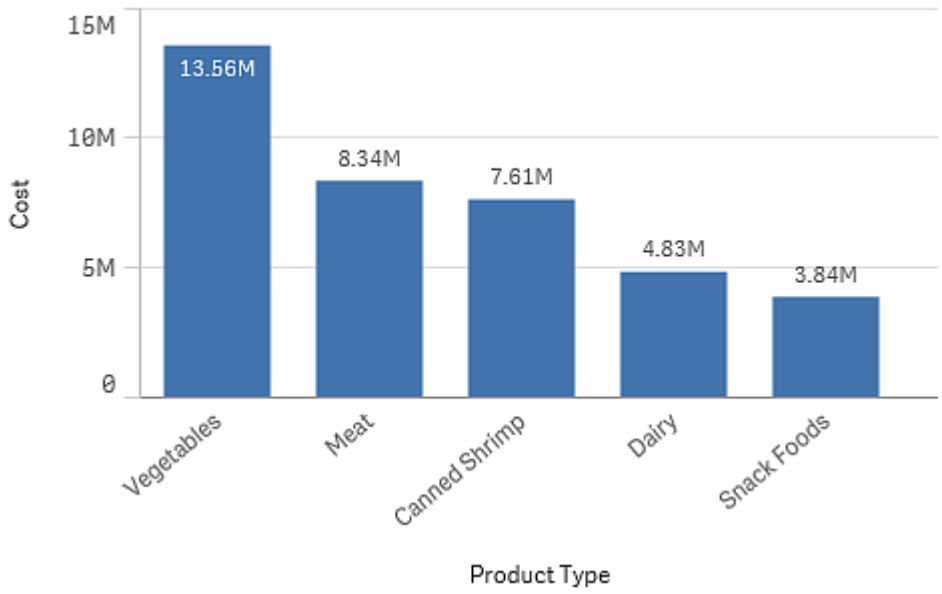
Dimensions are created from fields in the data model tables.

Example:

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

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

Bar chart with the dimension Product Type and measure Cost.



You can also create different types of master dimensions:

- *Drill-down groups (page 107)*
- *Cyclic dimensions (page 108)*

Creating dimensions

When you load data into an app, all data is loaded as fields. At the same time, Qlik Sense identifies the fields from the data model that can be used as dimensions. These are shown to you as you populate visualizations with data or create master items.

The process of creating a dimension depends on whether you want to customize how data is grouped. Follow these guidelines:

- To simply use a certain field to group data in your visualization, add the field as a dimension when you create the visualization. No additional configuration is needed.
- Create a master dimension in the app if you want to:
  - Create a standalone entity in the app that is easily recognized as a useful way to group data.
  - Enhance and expand how the dimension fields group data. For example, you can create a drill-down or cyclic dimension for specific behavior, or set a specific color for the dimension.
  - Allow re-use of the dimension across the app, including by others.

  After creating the master dimension, it can be added to any applicable charts as you configure them.
  Reusing dimensions with master dimensions (page 126)

Field groups as dimensions

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

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

Any fields or calculated dimensions can be grouped together.

Drill-down groups

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

Example 1:

Organization: Company, Department, Employee

Example 2:

Geography: Continent, Country, State, City

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

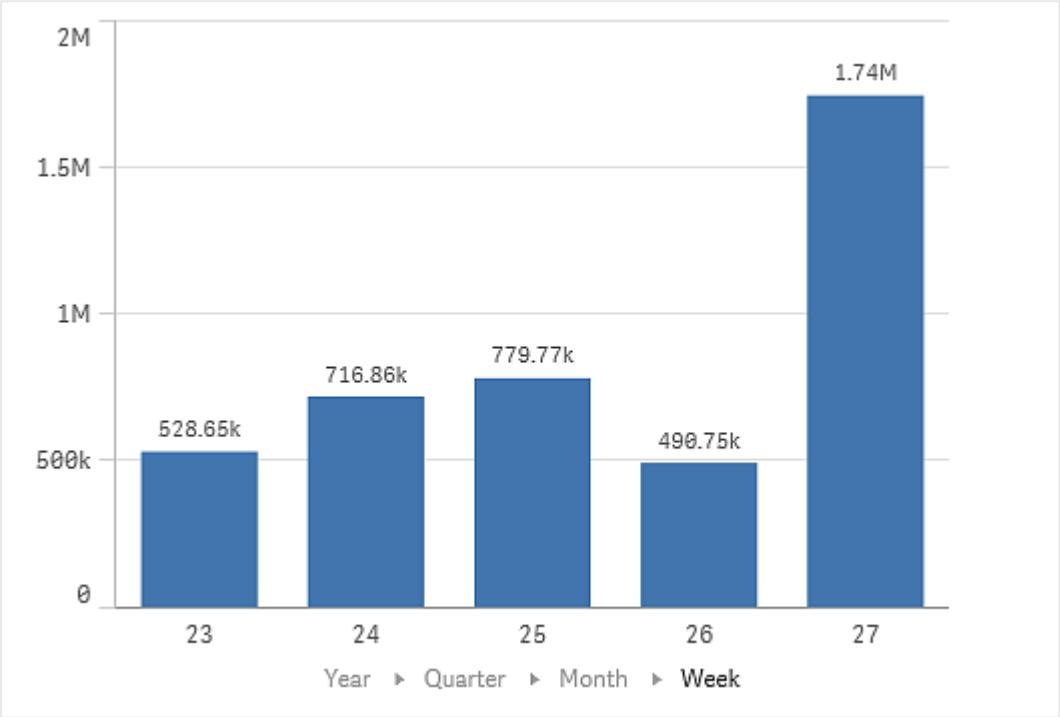
In the first example above, *Company* will be used as chart dimension until a single company is selected. The chart will then show *Department*. If a single department is selected, the chart will switch to *Employee*.

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

Drill-up

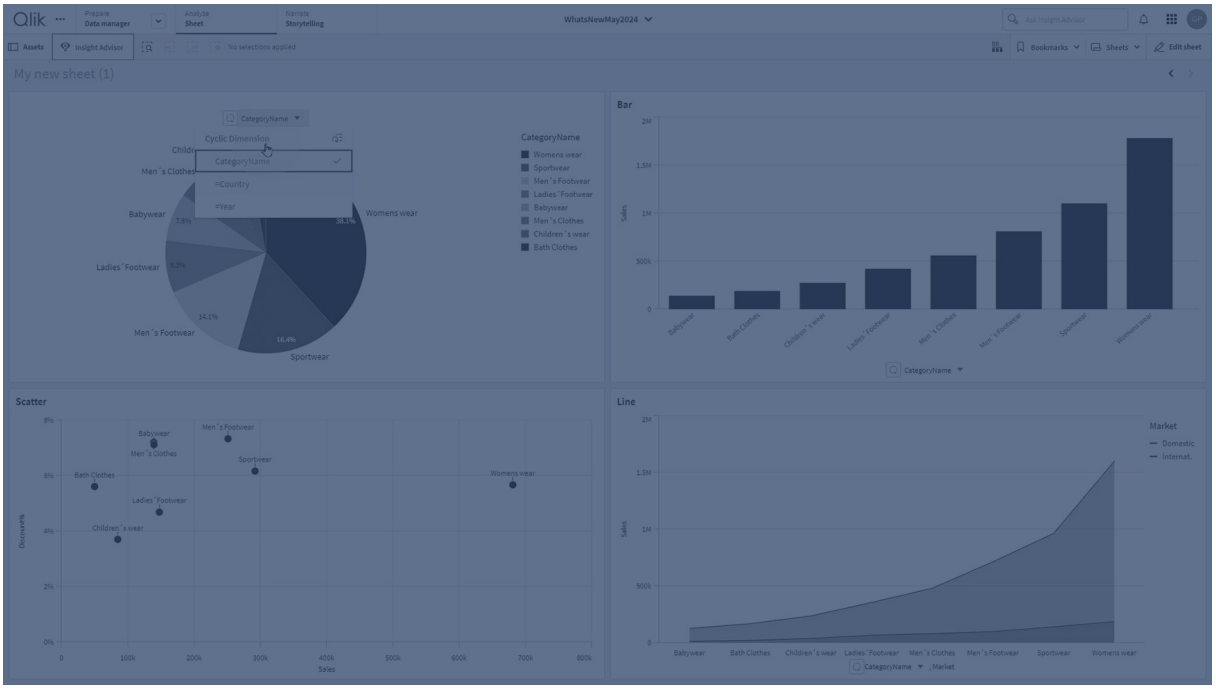
The drill-up function is available in bar charts, pie charts, and line charts. Other visualizations reflect the changes made in the charts, but cannot themselves be used to drill up through the different dimensions. When you drill down in a dimension group, breadcrumbs provide links back to the previous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

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



Cyclic dimensions

Group non-hierarchical fields together as a master dimension so they can be cycled through in a visualization.



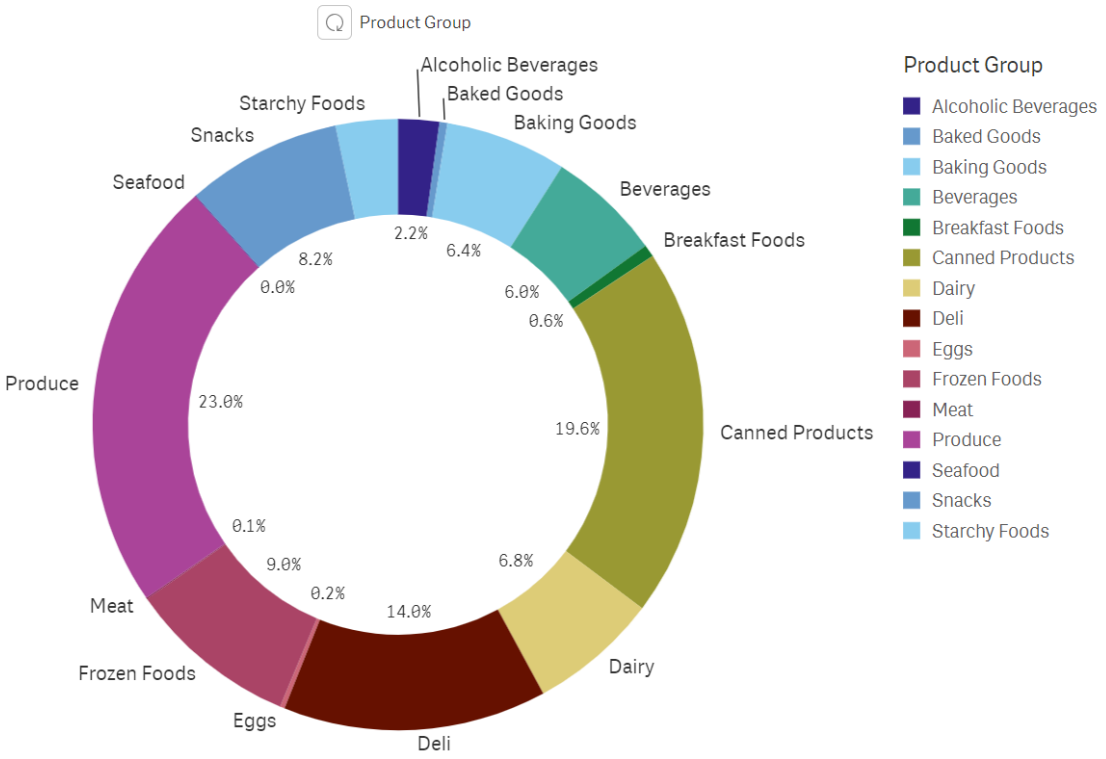
Cyclic dimensions allow users to quickly change between fields displayed as dimensions in visualizations. Users can cycle through the fields in the cyclic dimension using a button. Unlike drill-down dimensions, fields grouped in a cyclic dimension do not need a hierarchical relationship. Their only relationship is that they are all of interest with similar measures in a chart.

When a cyclic dimension is used as a visualization dimension, the visualization will use the first dimension in the list. Users can switch to the next dimension in the order they appear in the cyclic dimension's list. If you are using a cyclic dimension in multiple visualizations, all the fields in each visualization using the cyclic dimension will change when you switch to the next field.

You can switch dimension by:

- Clicking ↻ in the visualization.
  You can also select a specific field from the cyclic dimension by clicking on the field name label in the axis.
- Clicking a button with the action **Step cyclic dimension**.
  For more information, see *Button (page 458)*.

Chart using a cyclic dimension



Limitations

Cyclic dimensions have the following limitations:

- The cycle button ( ) is only available in the following visualizations:
  - Bar charts
  - Bullet charts
  - Combo charts
  - Grid charts
  - Line charts
  - Pie charts
- Qlik Sense Mobile has the following limitations with cyclic dimensions:
  - Buttons with the action **Step cyclic dimension** will only cycle dimension if the button is in a container.
  - In offline mode, buttons with the action **Step cyclic dimension** do not cycle the dimension.
  - In offline mode, any visualization with a cyclic dimension will only display the first dimension in the cycle. The cyclic dimension cannot be cycled.
- Custom objects may not work with cyclic dimensions.
- Cyclic dimensions are not supported with the following Qlik Dashboard bundle objects:

    - Date picker
    - Line
    - Text
    - Variable input
    - Video player
- Cyclic dimensions are not supported with the following Qlik Visualization bundle objects:
    - Trellis container
- Cyclic dimensions do not support assigning colors to dimension values
- In the storytelling view, while snapshots display correctly, clicking **Go to source** will not apply the cyclic dimension state from the snapshot.
- If a field is removed from the data model but not from a cyclic dimension, the cyclic dimension will continue to work until it steps to the removed field.

Calculated dimensions

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

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

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

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

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

Example:

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

Syntax:

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

Measures

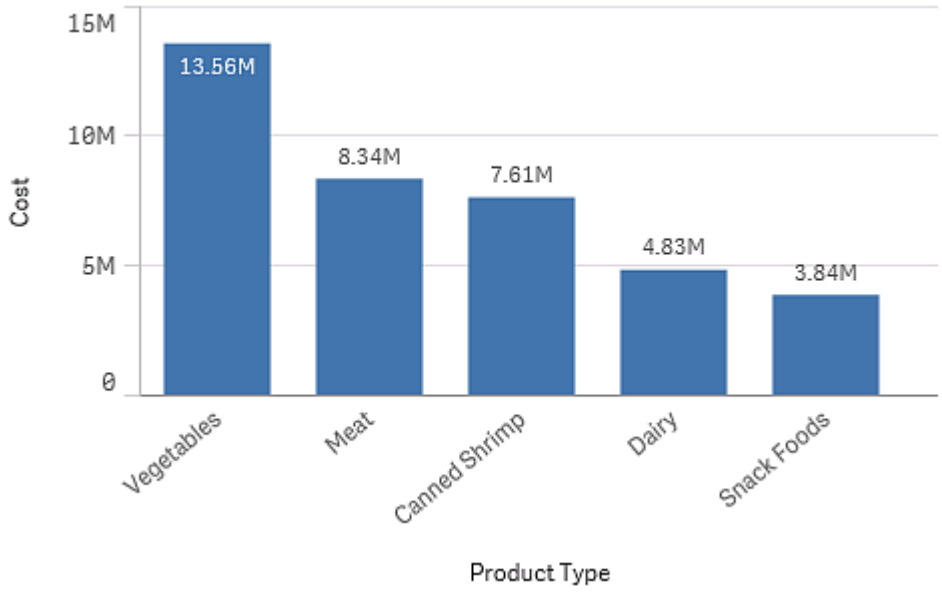
Measures are calculations used in visualizations, typically represented on the y-axis of a bar chart or a column in a table. Measures are created from an expression composed of aggregation functions, such as **Sum** or **Max**, combined with one or several fields.

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

Example:

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

Bar chart with the dimension Product Type and the measure Cost.



Creating measures

When you load data into an app, all data is loaded as fields. When you add a measure to a chart or create a master measure, these fields can be used in aggregations to perform specific calculations.

The process of creating a measure depends on whether you want to customize or standardize a particular calculation. Follow these guidelines:

- To simply add a calculation to a chart, enter the measure expression when configuring the chart. No additional configuration is needed.
- Create a master measure in the app if you want to:
  - Create a standalone entity in the app that is easily recognized as a useful calculation.
  - Enhance and expand the definitions of a calculation. For example, you can define colors and label expressions so they are added whenever the measure is used, rather than configuring these properties separately in each instance.
  - Allow a centralized definition of a measure, so a change in the central definition will propagate through the app to all objects where the measure is referenced.
  - Allow re-use of the measure across the app, including by others.

After creating the master measure, it can be added to any applicable charts as you configure them.
Reusing measures with master measures (page 133)

Modifiers

Measures are calculations based on fields, for example **Sum(Cost)**. You can use modifiers to change how the measure is calculated over the available dimensions.

For example, you can have the values of a measure accumulate over one or two dimensions, or you can calculate the average of your measure over a specific number of steps.

For information about how to apply a modifier to measure, see *Applying a measure modifier (page 686)*.

Which visualizations have modifiers

Visualizations comparison

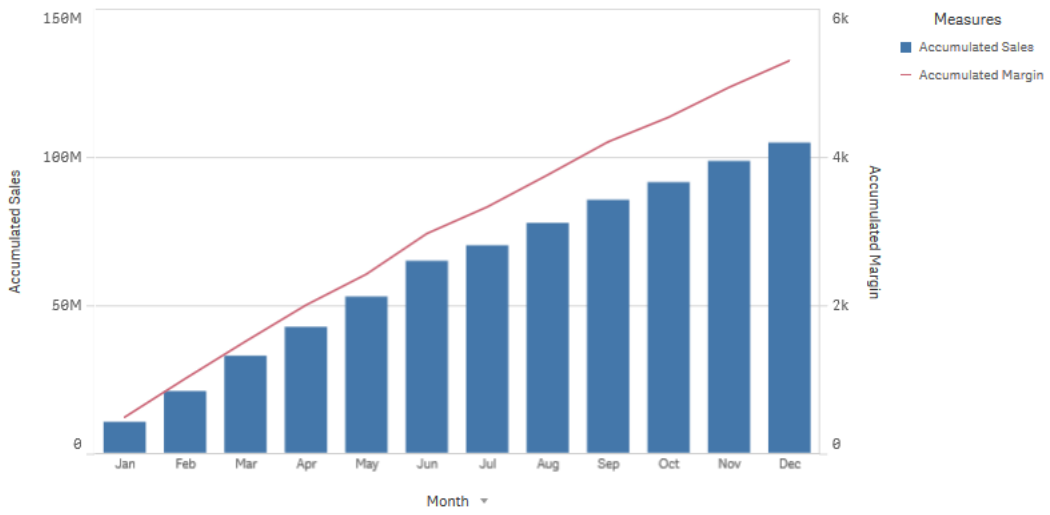
Visualization	Accumulation	Difference	Moving average	Relative numbers
Bar chart	Yes	Yes	Yes	Yes
Combo chart	Yes	Yes	Yes	Yes
Line chart	Yes	Yes	Yes	Yes
Table	Yes	Yes	Yes	Yes
Straight table (Visualization bundle)	Yes	Yes	Yes	Yes

Accumulation

The accumulation modifier allows you to accumulate the values of a measure over one or two dimensions. Accumulating values makes it easy to visualize how the effect of the measure builds up over a dimension.

In the following combo chart, the bars and lines accumulate over time.

A combo chart where the line shows the accumulated profit margin and the bars show the accumulated sales figures.



Syntax:

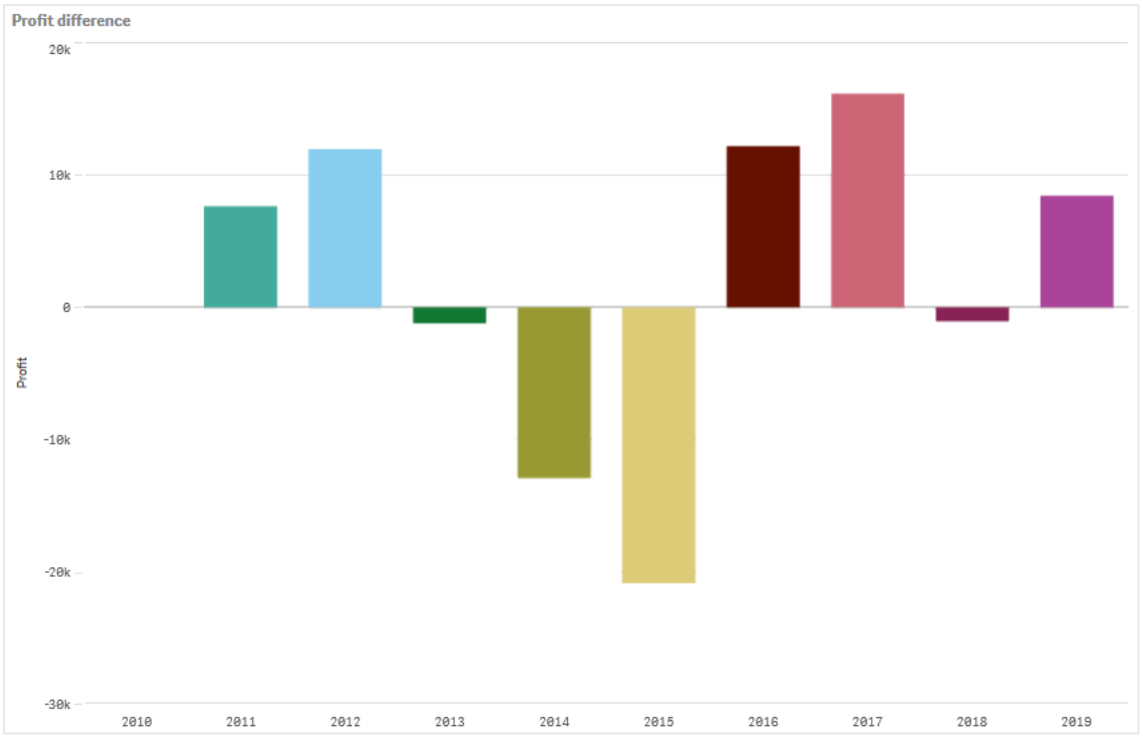
```
RangeSum(Above {$M,0,Steps})
```

Difference

The difference modifier allows you to visualize the difference between consecutive values of a measure over one or two dimensions. The difference modifier is useful when you want to visualize the change in direction of grouped data.

In the following bar chart, any drops in yearly profits over a 10 year period appear as negative bars.

A bar chart showing the profit differences from one year to the next.



Syntax:

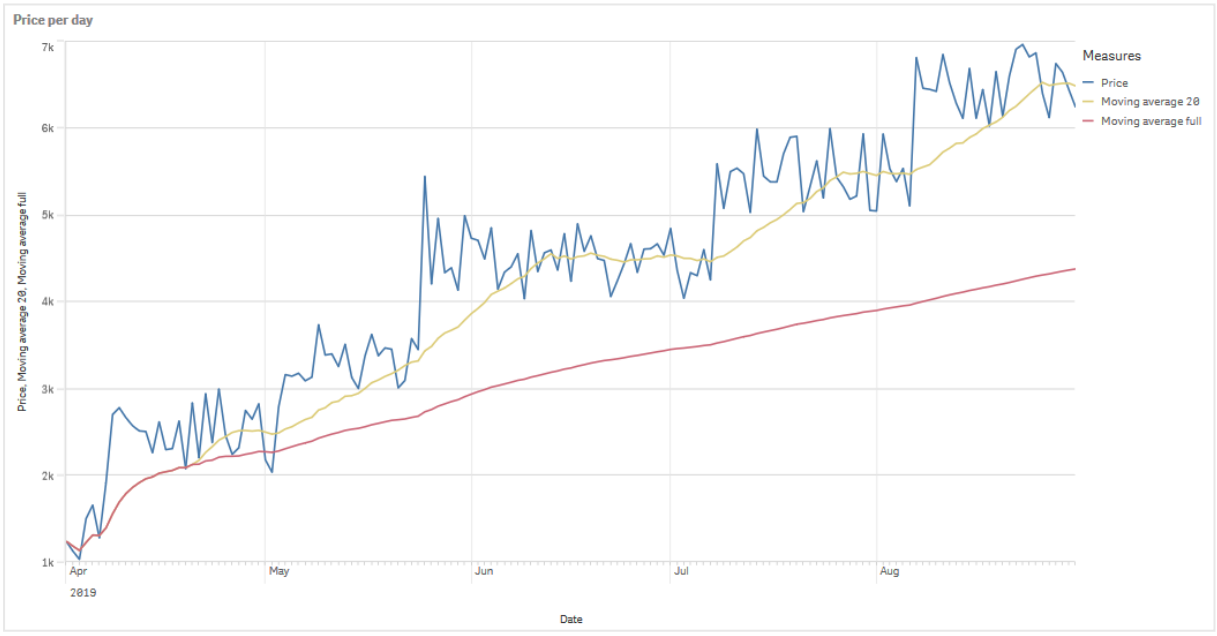
```
$M - Above($M)
```

Moving average

The moving average modifier allows you to see the average values of a measure over a specific period. You can use it to filter out the action from short-term value fluctuations. You can change the number of steps over which the averaging takes place, depending on how strongly you want your modifier to follow the changes in your data. A moving average is commonly used with time series data to highlight longer-term trends or cycles.

In the following line chart moving averages with two difference ranges are shown, one with a 20 step range, and one with a full range.

A line chart showing the price of a product over a five month period.



Syntax:

```
RangeAvg(Above ($M,0,Steps))
```

Relative numbers

The relative numbers modifier allows you to see relative percentages. You can use it to see the impact of specific selections, relative to the selection, relative to the total, or relative to other fields. You can change the basis upon which the relative number is calculated.

In the following table a column with sales of each year of a specific selection, and three columns with relative numbers are shown, one relative to current selection, one relative to total sales for all years, and one relative to the sales of each year.

A table showing different sales percentages relative to current selection, relative to total sales, and relative to each year's sales.

Sales comparison table

Year	Sales	Percentage of this selection	Compared to total sales from all years	Compared to other products in the same year
Totals	**$ 20,520,054**	**100%**	**20%**	**20%**
2012	$ 8,296,002	40%	8%	21%
2013	$ 7,602,738	37%	7%	18%
2014	$ 4,621,314	23%	4%	21%

The following is an example of the syntax of the modifier relative to the total selection.

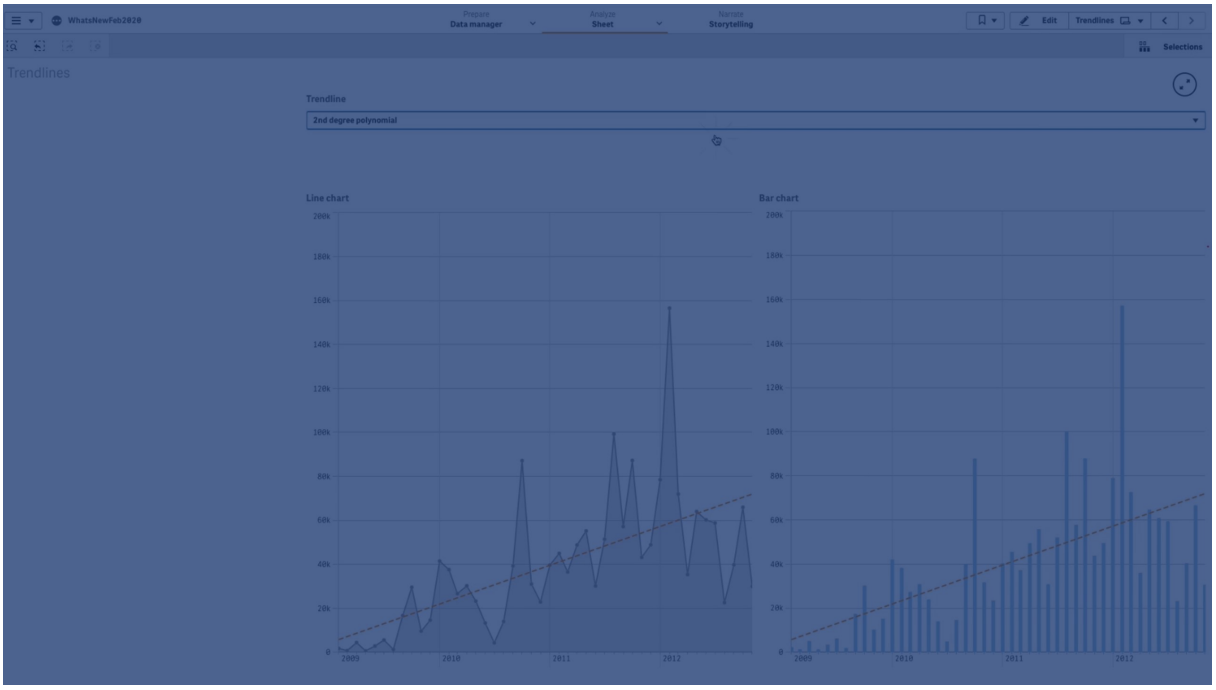
Syntax:

```
$M / Sum( total Aggr( $M, dim ) )
```

Trend lines

A trend line is a visual representation of the direction of values over a period of time. Trend lines show trends over time, by visualizing the direction of values and how fast the values change.

For information about how to create trend lines, see *Adding trend lines to visualizations (page 680)*.



Which visualizations have trend lines

Visualization	Trend lines
Bar chart	Yes
Line chart	Yes

When to use trend lines

A single trend line can be added to a chart to smooth out fluctuations in data, and to show any trends more clearly.

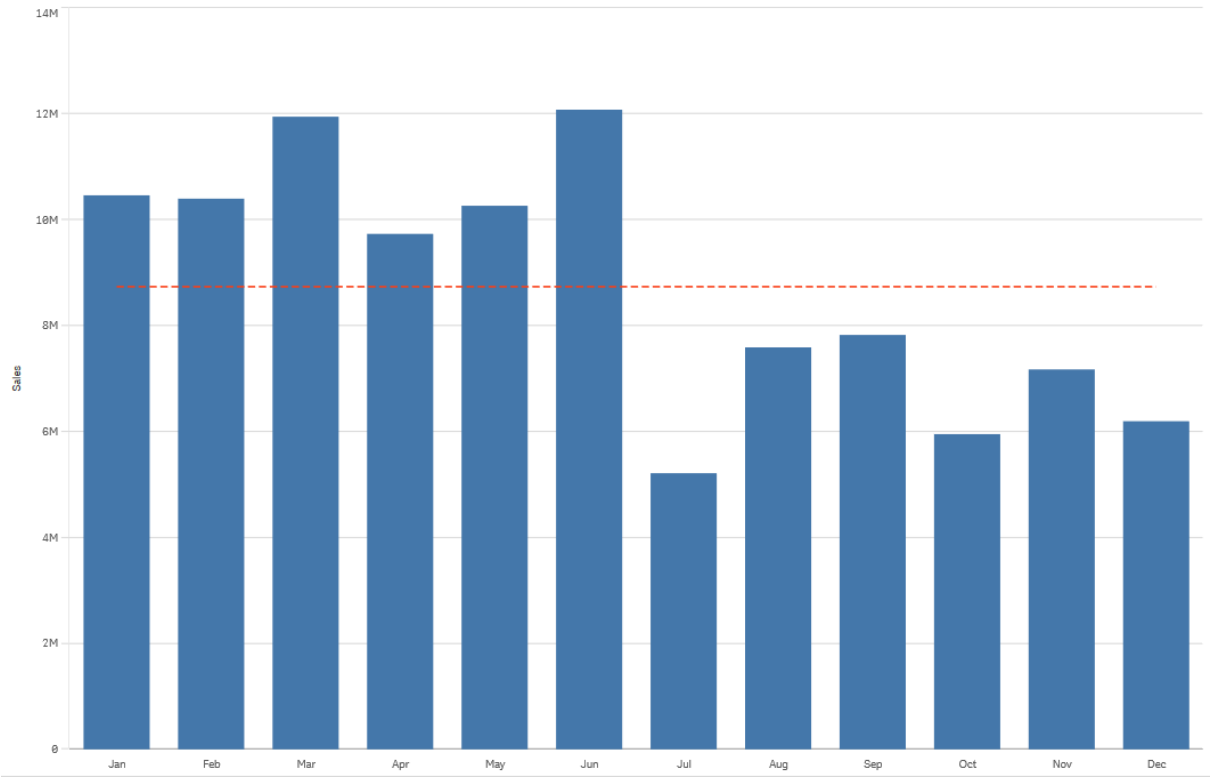
More than one trend line can be added to a chart, showing different types of trends or different values.

Types of trend lines

Average

An average trend line shows the average value of the data, for the time period being analyzed.

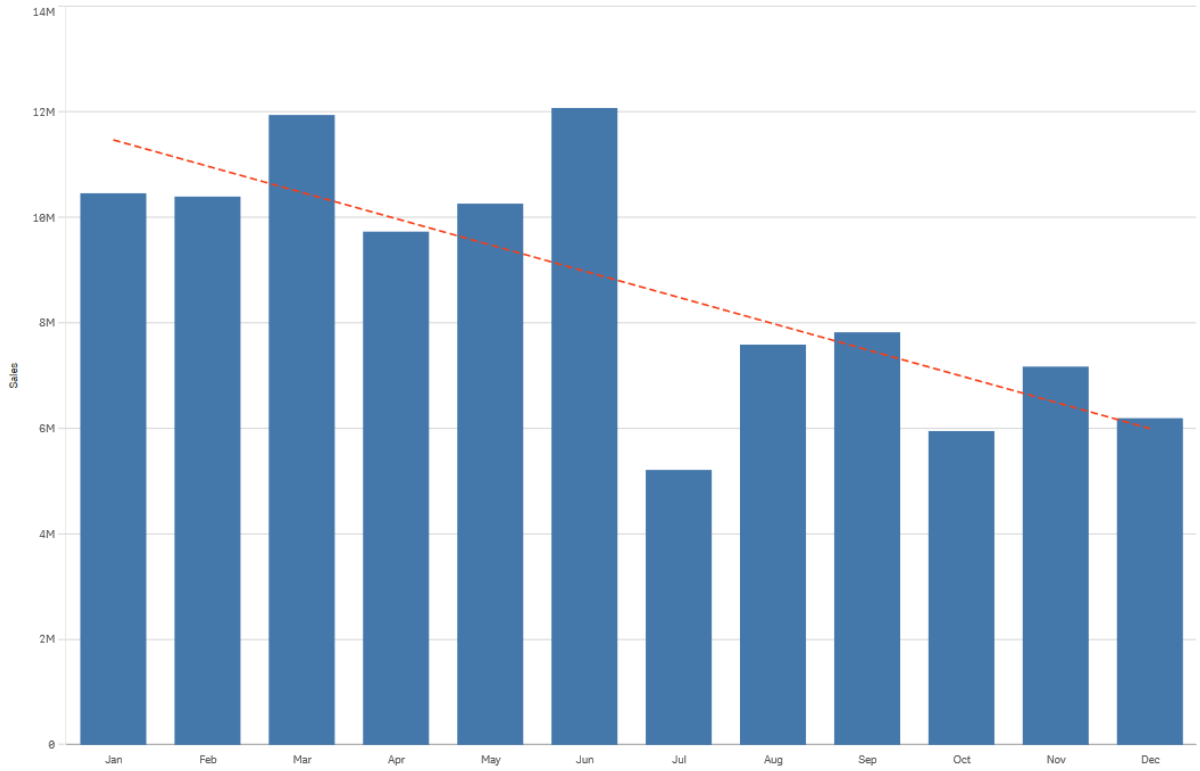
A bar chart showing sales per month. An average trend line is shown with a dashed red line.



Linear

A linear trend line shows increase or decrease of values at a steady rate. Linear trend lines are usually used with simple linear data sets.

A bar chart showing sales per month. An linear trend line is shown with a dashed red line.

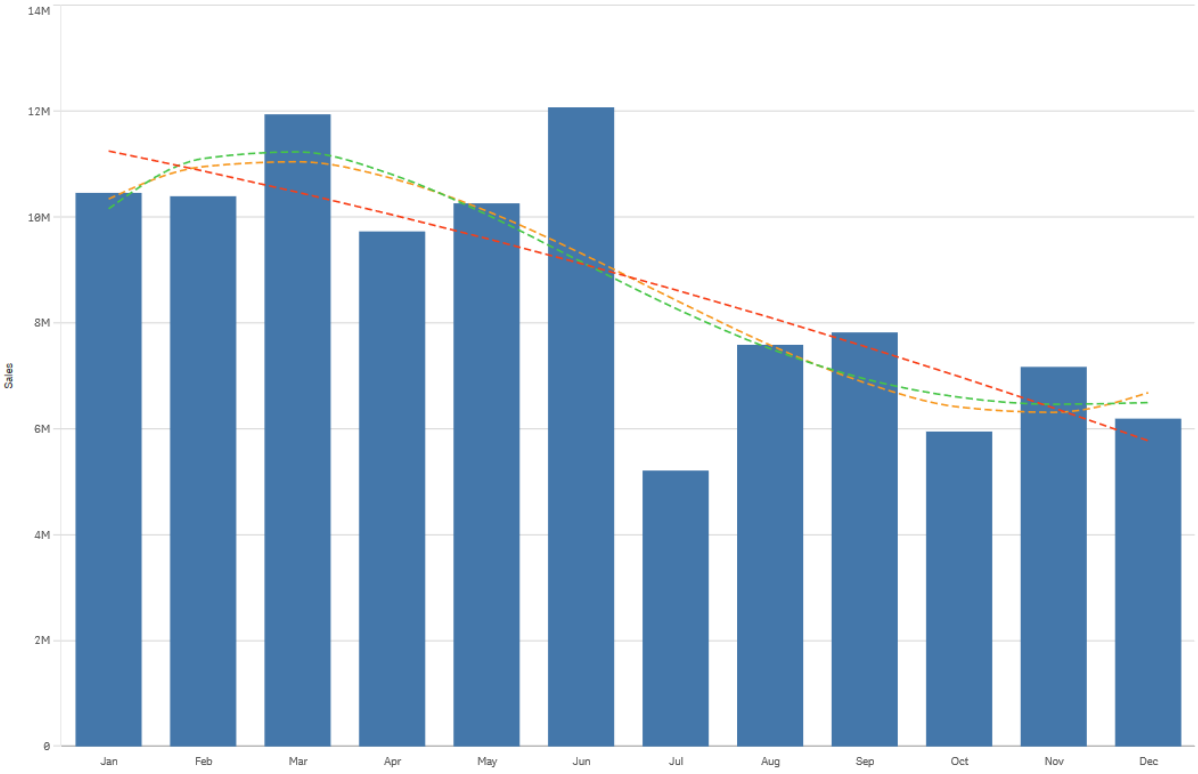


Polynomial (second, third, fourth degree)

A polynomial trend line is a curved line used on fluctuating data.

The number of data fluctuations can determine the order of the polynomial. A second degree polynomial trend line has one hill or valley, a third degree polynomial trend line has up to two hills or valleys, and a fourth degree polynomial has up to three hills or valleys.

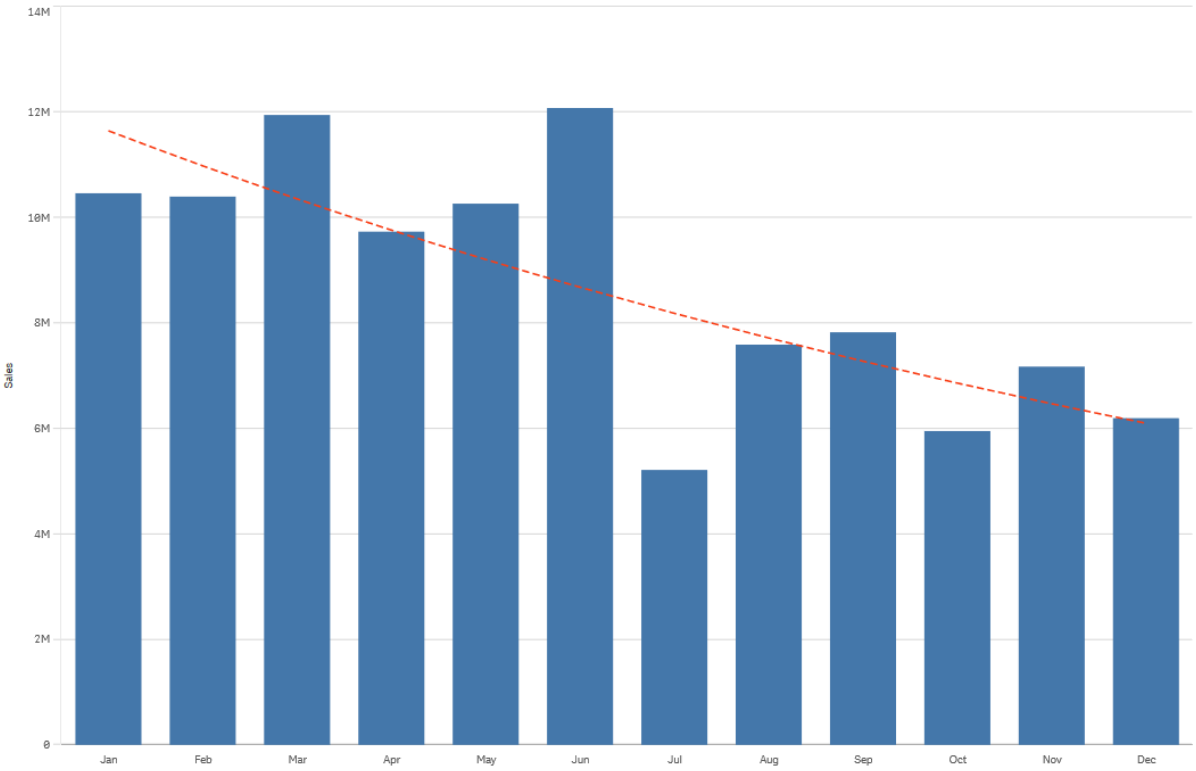
A bar chart showing sales per month. Polynomial trend lines of second, third, and fourth degree are shown with dashed red, yellow, and green lines respectively.



Exponential

An exponential trend line is a curved line used when data values rise or fall at increasingly higher rates.

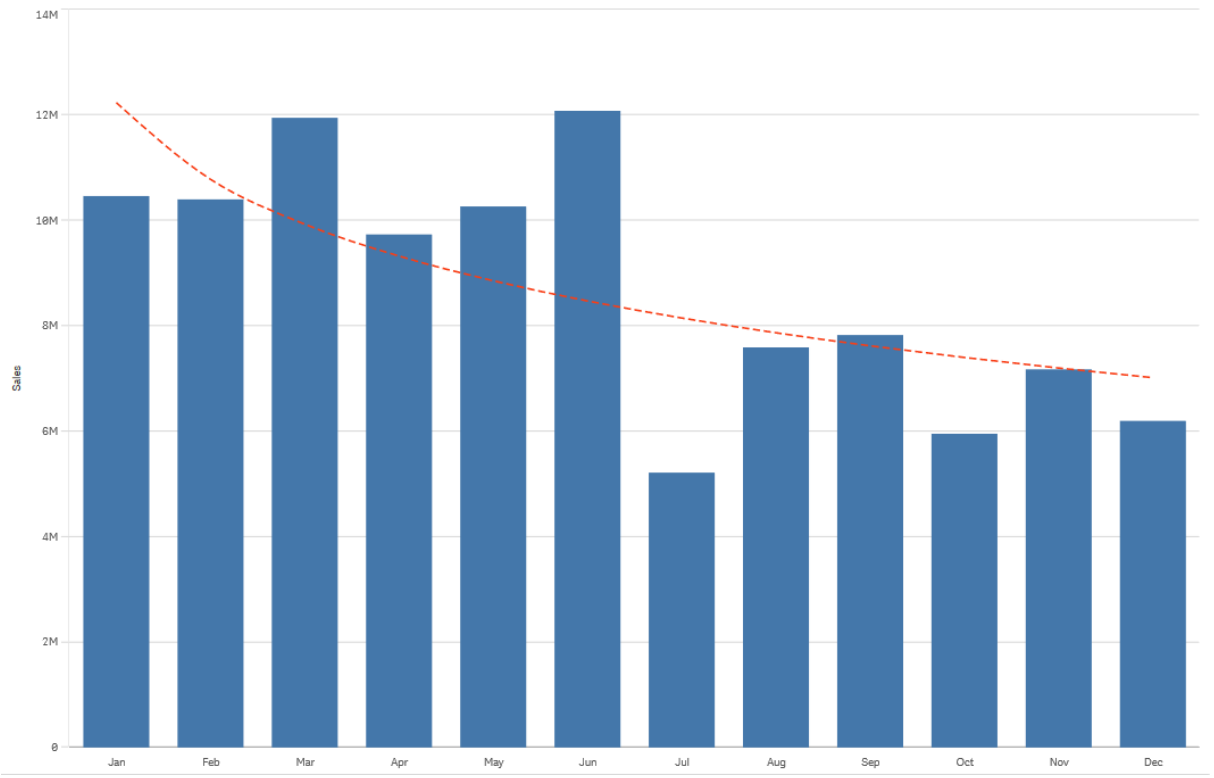
A bar chart showing sales per month. An exponential trend line is shown with a dashed red line.



Logarithmic

A logarithmic trend line is a curved line used when the rate of change in data increases or decreases quickly, before leveling out.

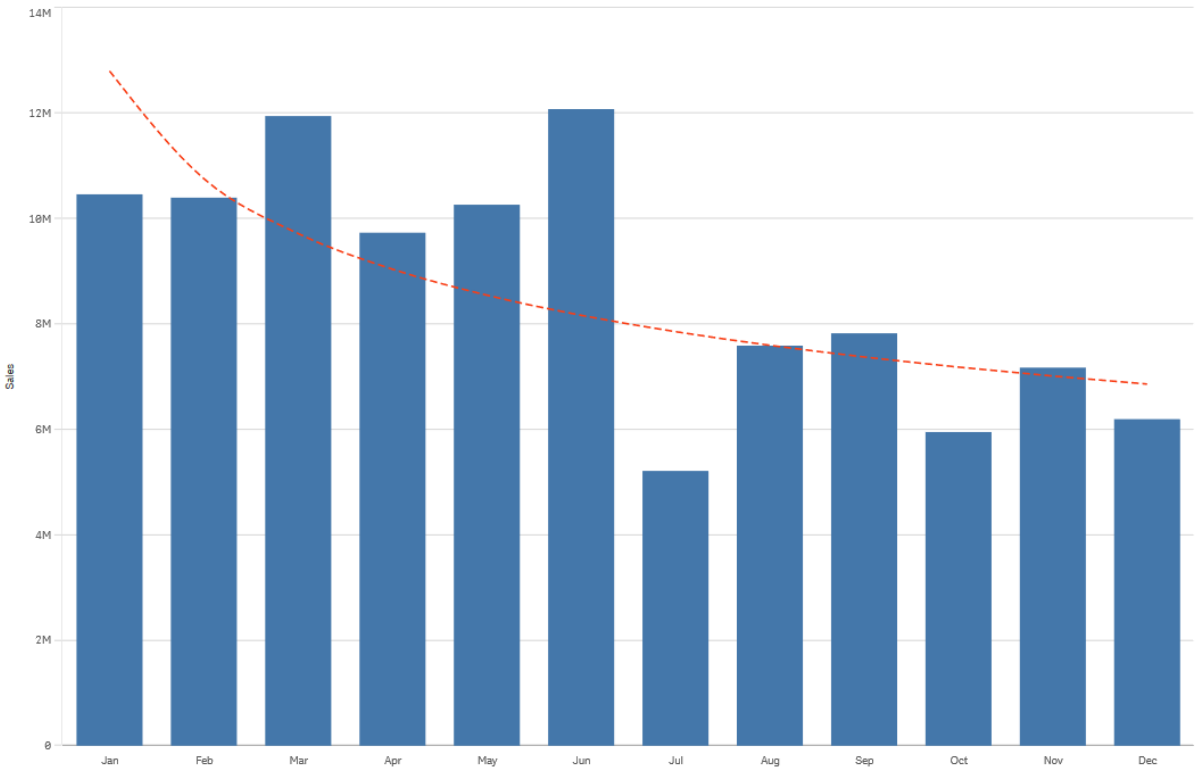
A bar chart showing sales per month. A logarithmic trend line is shown with a dashed red line.



Power

A power trend line is a curved line used with data sets that compare measurements that increase at specific rates.

A bar chart showing sales per month. A power trend line is shown with a dotted red line.



Reusing assets with master items

When you create and build your visualizations, you can save assets to reuse in other visualizations and on other sheets. You can save visualizations, dimensions, and measures as master items in the assets panel. When your app gets published these master items will be available to others as ready-to-use visualizations, dimensions, and measures.

Any updates you make to the master item are applied everywhere the master item is used. For example, you could use a master measure in as many of your visualizations as you like while only having to update it in a single instance to update all instances of the measure in your visualizations.

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.

Reusing dimensions with master dimensions (page 126)

Reusing measures with master measures (page 133)

Reusing visualizations with a master visualization (page 125)

Reusing visualizations with 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 visualization but will not be able to modify them.

> *You can only create master visualizations when you are working with an unpublished app. Visualizations with **Chart suggestions** enabled cannot be made into a master visualization.*

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 right-clicking it on the sheet, and selecting **Add to master items**.*

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 sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Master items** in the assets panel.
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.

> *You can also right-click the master item, and then click **Edit**.*

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 visualization by selecting a linked visualization on a sheet, and clicking **Edit** in the properties panel. You must be in sheet edit mode.*

Reusing dimensions with 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, but will not be able to modify them.

You can create a master dimension in different ways.

You can also create drill-down groups and cyclic dimensions:

- *Creating a drill-down dimension (page 128)*
- *Creating a cyclic dimension (page 129)*

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 sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Fields** in the assets panel.
3. Right-click the field you want to use as a dimension and click **Create dimension**.
   The **Create new dimensions** dialog opens with the field you selected. The field name is also used as the name of the dimension.
4. Select if the dimension is to be single, cyclic, or drill-down.
5. Edit the name if you want to.
6. Type a description for the dimension (optional).
7. If you want to specify a color, click ▼ in the color drop down and select a color through one of the following methods:

- Click one of the colors in the palette.
- Type a 6 character color code in the Hex input field: **#**.
- Click at the bottom of the dialog, select a color in the color wheel, and optionally adjust the saturation slider.

8. Add tags (optional).
9. Click **Create**.
10. Click **Close**.

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

Do the following:

1. Click **Edit sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Master items** in the assets panel.
3. Next to **Dimensions**, click **+**.
   The **Create new dimensions** dialog opens.
4. Select if the dimension is to be single, cyclic, or drill-down.
5. 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.
6. Change the name if you want to.
7. Type a description for the dimension (optional).
8. If you want to specify a color, click in the color drop down and select a color through one of the following methods:
   - Click one of the colors in the palette.
   - Type a 6 character color code in the Hex input field: **#**.
   - Click at the bottom of the dialog, select a color in the color wheel, and optionally adjust the saturation slider.
9. Add tags (optional).
10. Click **Create**.
11. Click **Close**.

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.

> *If selections cause the current drill-down dimension field to have only one possible value, the next field in the list is used instead.*

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.

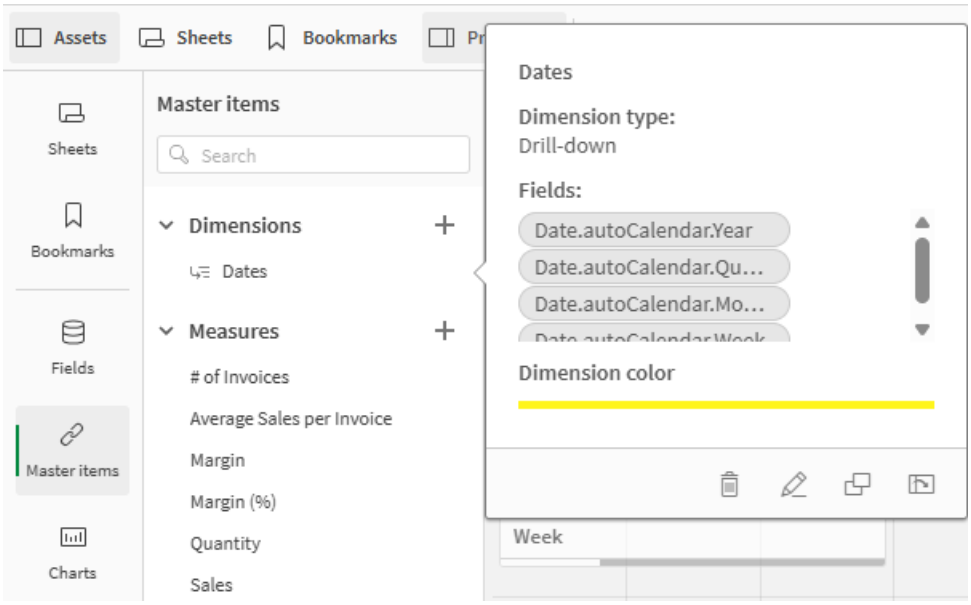
   > *You can filter which table to select fields from in the drop-down list.*

   > *You can rearrange the order of the fields you have selected by dragging them to new positions in the list of selected fields.*
3. Optionally, add labels for the fields added to your drill-down dimension.
   Click f_x in **Label** to add an expression for the label. The expression must start with =.
4. Type a name for the dimension.
5. Type a description for the dimension (optional).
6. If you want to specify a color, click ▼ in the color drop down and select a color through one of the following methods:
   - Click one of the colors in the palette.
   - Type a 6 character color code in the Hex input field: **#**.
   - Click at the bottom of the dialog, select a color in the color wheel, and optionally adjust the saturation slider.
7. Add tags (optional).
8. Click **Create**.
9. Click **Close**.

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.

The preview displays the dimension type and which fields are included in the drill-down dimension.



Creating a cyclic dimension

When adding a dimension, you can select between creating a single, drill-down, or cyclic dimension.

The following description explains how to create a cyclic dimension from the **Create new dimensions** dialog.

Do the following:

1. Select **Cyclic** 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. Optionally, add labels for the fields added to your cyclic dimension.
   Click f_x in **Label** to add an expression for the label. The expression must start with =.
4. Type a name for the dimension.

5. Type a description for the dimension (optional).
6. If you want to specify a color, click ▼ in the color drop down and select a color through one of the following methods:
    - Click one of the colors in the palette.
    - Type a 6 character color code in the Hex input field: **#**.
    - Click at the bottom of the dialog, select a color in the color wheel, and optionally adjust the saturation slider.
7. Add tags (optional).
8. Click **Create**.
9. Click **Close.**

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 **Edit sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Master items** in the assets panel.
3. Next to **Measures**, click **+**.
   The **Create new dimensions** dialog opens.
4. Click in the **Field** text box to open the **Add expression** dialog.

You will now be able to add expressions in different ways, depending on you 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. Select a field from the drop-down list.
2. Click the aggregation function you want to use.
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.
   Continue by adding the descriptive data for the dimension.

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 sheet** to open the properties panel (If it is hidden, click **Properties**).
3. Click the visualization that you want to edit.
   The properties panel for that visualization is displayed on the right-hand side.
4. Under **Data**, click **Add data** and select **Dimension**.
   A dimension text box is displayed.
5. 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. Optionally, click ▼ in the color drop down and select a color through one of the following methods:
   - Click one of the colors in the palette.
   - Type a 6 character color code in the Hex input field: **#**.
   - Click at the bottom of the dialog, select a color in the color wheel, and optionally adjust the saturation slider.
4. Add tags (optional).

5. Click **Create**.
6. Click **Close**.

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

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.

Edit a master dimension from the assets panel or while editing visualization properties.

Editing a master dimension from the assets panel

Use the assets panel to edit a master dimension when you want to preview the dimension or edit several master dimensions

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Master items** in the assets panel.
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 master dimension is now updated.

*You can also right-click the master item, and then click **Edit**.*

Editing a master dimension from visualization properties

When a dimension in a visualization is linked to a master dimension, you can edit the master dimension from the properties panel. All visualizations in the app that use the master dimension will be updated. To edit a linked dimension only in this visualization, without affecting the master item, you must first unlink it from the master. See *Unlinking from a master item (page 157)*.

Do the following:

1. In edit mode, select the visualization.
2. In the properties panel, click the **Data** tab.
   If it is hidden, click **Properties** from the toolbar.

3. Under **Dimensions**, click the linked dimension to edit.
4. Under **Master item**, click **Edit**.
   A dialog is displayed to inform you that any changes to the master dimension will be applied to all visualization that use the dimension.
5. Make your changes to the master dimension, and then click **Save**.

Reusing measures with 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, but will not be able to modify them.

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

You can also create a master measure based on a measure created in a visualization. Under the measure in the properties panel of a visualization, click **Add new** under **Master items**.

Master measure formatting

Number formatting, color, and label can be configured for a master measure. These properties are not applied to a visualization if you reference the master measure using an expression. To apply these properties in a visualization, create a direct link to the master measure when configuring the visualization.

Do the following:

1. Expand **Data** > **Measures** in the properties panel.
2. Click **Add**.
3. In the drop down menu, under **Measures**, select the master measure.

A direct link is now created to the master measure.

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.

When naming an entity, avoid assigning the same name to more than one field, variable, or measure. There is a strict order of precedence for resolving conflicts between entities with identical names. This order is reflected in any objects or contexts in which these entities are used. This order of precedence is as follows:

- Inside an aggregation, a field has precedence over a variable. Measure labels are not relevant in aggregations and are not prioritized.
- Outside an aggregation, a measure label has precedence over a variable, which in turn has precedence over a field name.

- Additionally, outside an aggregation, a measure can be re-used by referencing its label, unless the label is in fact a calculated one. In that situation, the measure drops in significance in order to reduce risk of self-reference, and in this case the name will always be interpreted first as a measure label, second as a field name, and third as a variable name.

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Fields** in the assets panel.
3. Right-click the field you want to use as a measure and click **Create measure**.
   The **Create new measure** dialog opens with the field you selected. The field name is also used as the name of the measure.
4. Click f_x in the **Expression** field to open the **Edit expression** dialog.
5. 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.*

6. Click **Apply** to close the **Add expression** dialog.
   Now you need to add some descriptive data for the measure.
7. Edit the name if you want to.
8. Type a description for the measure (optional).
9. If you want to specify a color, click ▼ in the color drop down and select a color through one of the following methods:
   - Click one of the colors in the palette.
   - Type a 6 character color code in the Hex input field.
   - Click at the bottom of the dialog, select a color in the color wheel, and optionally adjust the saturation slider.
10. Add tags (optional).
11. Under **Number formatting**, you can choose:

- Auto
- Number
- Money
- Date
- Duration
- Custom
- Measure expression

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.

When naming an entity, avoid assigning the same name to more than one field, variable, or measure. There is a strict order of precedence for resolving conflicts between entities with identical names. This order is reflected in any objects or contexts in which these entities are used. This order of precedence is as follows:

- Inside an aggregation, a field has precedence over a variable. Measure labels are not relevant in aggregations and are not prioritized.
- Outside an aggregation, a measure label has precedence over a variable, which in turn has precedence over a field name.
- Additionally, outside an aggregation, a measure can be re-used by referencing its label, unless the label is in fact a calculated one. In that situation, the measure drops in significance in order to reduce risk of self-reference, and in this case the name will always be interpreted first as a measure label, second as a field name, and third as a variable name.

Do the following:

1. Click **Edit sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Master items** in the assets panel.
3. Next to **Measures**, click +.
4. Click f_x 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.

5. If you want to show fields from a particular table, select this table in the top drop-down list (optional).
6. Select a field from the **Field** drop-down list.
7. Select a function from the bottom drop-down list.

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

8. 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.

9. Click **Apply** to close the **Add expression** dialog.
   Now you need to add some descriptive data for the measure.
10. Type a name for the measure.
11. Type a description for the measure (optional).
12. If you want to specify a color, click ▼ in the color drop down and select a color through one of the following methods:
    - Click one of the colors in the palette.
    - Type a 6 character color code in the Hex input field.
    - Click at the bottom of the dialog, select a color in the color wheel, and optionally adjust the saturation slider.
13. Add tags (optional).
14. Under **Number formatting**, you can choose:
    - Auto
    - Number
    - Money
    - Date
    - Duration
    - Custom
    - Measure expression
15. 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 sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Master items** in the assets panel.
3. Next to **Measures**, click +.
4. Click fx in the **Expression** field to open the **Add expression** dialog.
5. 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.*

6. Click **Apply** to close the **Add expression** dialog.
   Now you need to add some descriptive data for the measure.
7. Type a name for the measure.
8. Type a description for the measure (optional).
9. If you want to specify a color, click ▼ in the color drop down and select a color through one of the following methods:
   - Click one of the colors in the palette.
   - Type a 6 character color code in the Hex input field.
   - Click at the bottom of the dialog, select a color in the color wheel, and optionally adjust the saturation slider.
10. Add tags (optional).
11. Under **Number formatting**, you can choose:
    - Auto
    - Number
    - Money
    - Date
    - Duration
    - Custom
    - Measure expression
12. Click **Create**.

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

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.

Edit a master measure from the assets panel or while editing visualization properties.

Editing a master measure from the assets panel

Use the assets panel to edit a master measure when you want to preview the measure or edit several master measures.

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Master items** in the assets panel.
3. Under **Measures**, click the measure that you want to edit.
   The preview opens.
4. Click at the bottom of the preview.

   *You can also right-click the master item, and then click **Edit**.*

   A dialog is displayed to inform you that any changes to the master measure will be applied to all visualizations that use the measure.
5. Click **OK**.
   The **Edit measure** dialog opens, where you update the expression, name, description, color, and tags.
6. Click **Save**.

The measure is now updated.

Editing a master measure from visualization properties

When a measure in a visualization is linked to a master measure, you can edit the master measure from the properties panel. All visualizations in the app that use the master measure will be updated. To edit a linked measure only in this visualization, without affecting the master item, you must first unlink it from the master. See *Unlinking from a master item (page 157)*.

Do the following:

1. In edit mode, select the visualization.
2. In the properties panel, click the **Data** tab.
   If it is hidden, click **Properties** from the toolbar.
3. Under **Measures**, click the linked measure to edit.
4. Under **Master item**, click **Edit**.

A dialog is displayed to inform you that any changes to the master measure will be applied to all visualizations that use the measure.

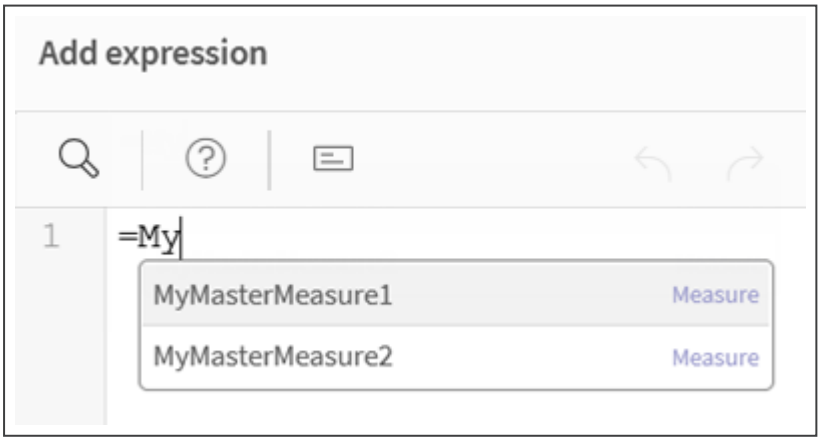
5. Make your changes to the master measure, and then click **Save**.

Using master measures in expressions

You can use master measures in expressions. You can use the master measure by itself, or use it to build a more complex expression.

When you type in the **Expression editor**, an auto-complete list of matching master measures opens.

Master measure in Expression editor



Considerations

When working with master measures, consider the following:

- If the master measure is renamed or deleted, references in expressions are not automatically updated. The old reference will return NULL in the expression as there is no measure by that name.

Master measure formatting

Number formatting, color, and label can be configured for a master measure. These properties are not applied to a visualization if you reference the master measure using an expression. To apply these properties in a visualization, create a direct link to the master measure when configuring the visualization.

Do the following:

1. Expand **Data** > **Measures** in the properties panel.
2. Click **Add**.
3. In the drop down menu, under **Measures**, select the master measure.

A direct link is now created to the master measure.

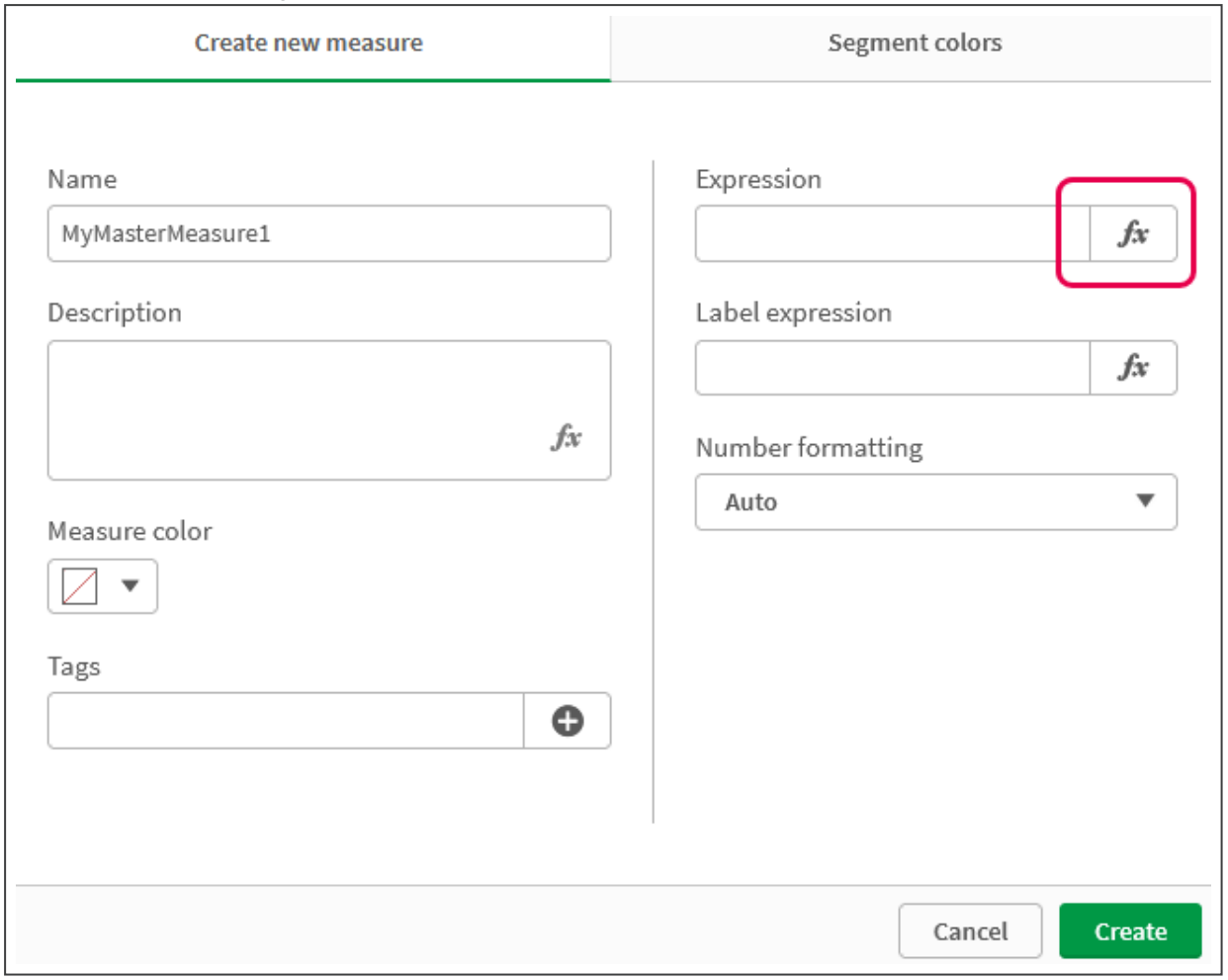
Example: Using a master measure in an expression

This example creates a master measure, and then uses the master measure in a chart expression.

1. Create the master measure.
    i. Click **Master items** in the assets panel.
    ii. Beside **Measures**, click **Create new**.
    Create new measure button

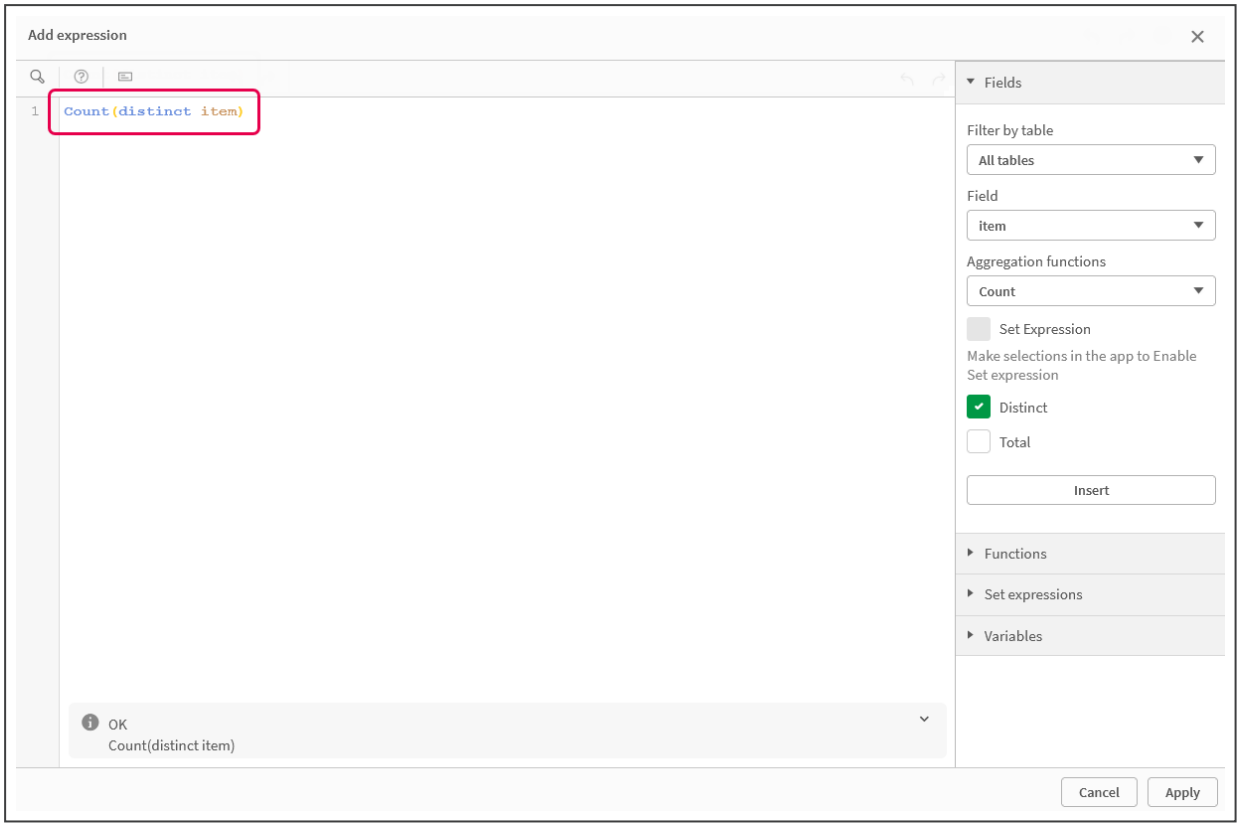
    iii. In the **Create new measure** dialog box, enter a **Name** for the master measure, and then click f_x to open the Expression editor.

Create new measure dialog box



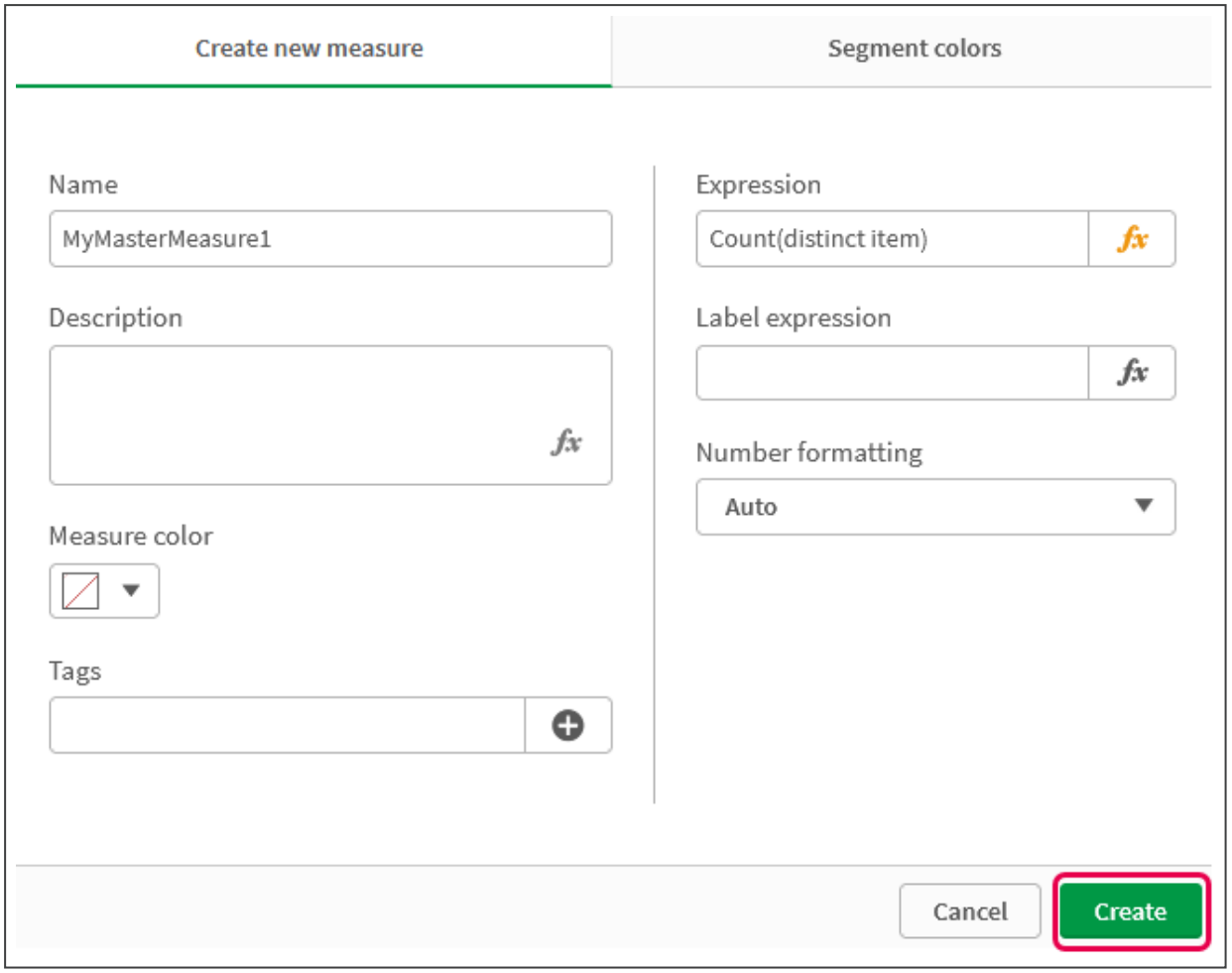
iv. In the Expression editor, create the expression.
You can type the expression, or use the options available in the expression builder panel.
Insert the expression using the expression builder *Count(distinct item)*, and then click **Apply**.

Add expression in Expression editor



v. In the **Create new measure** dialog box, click **Create**.

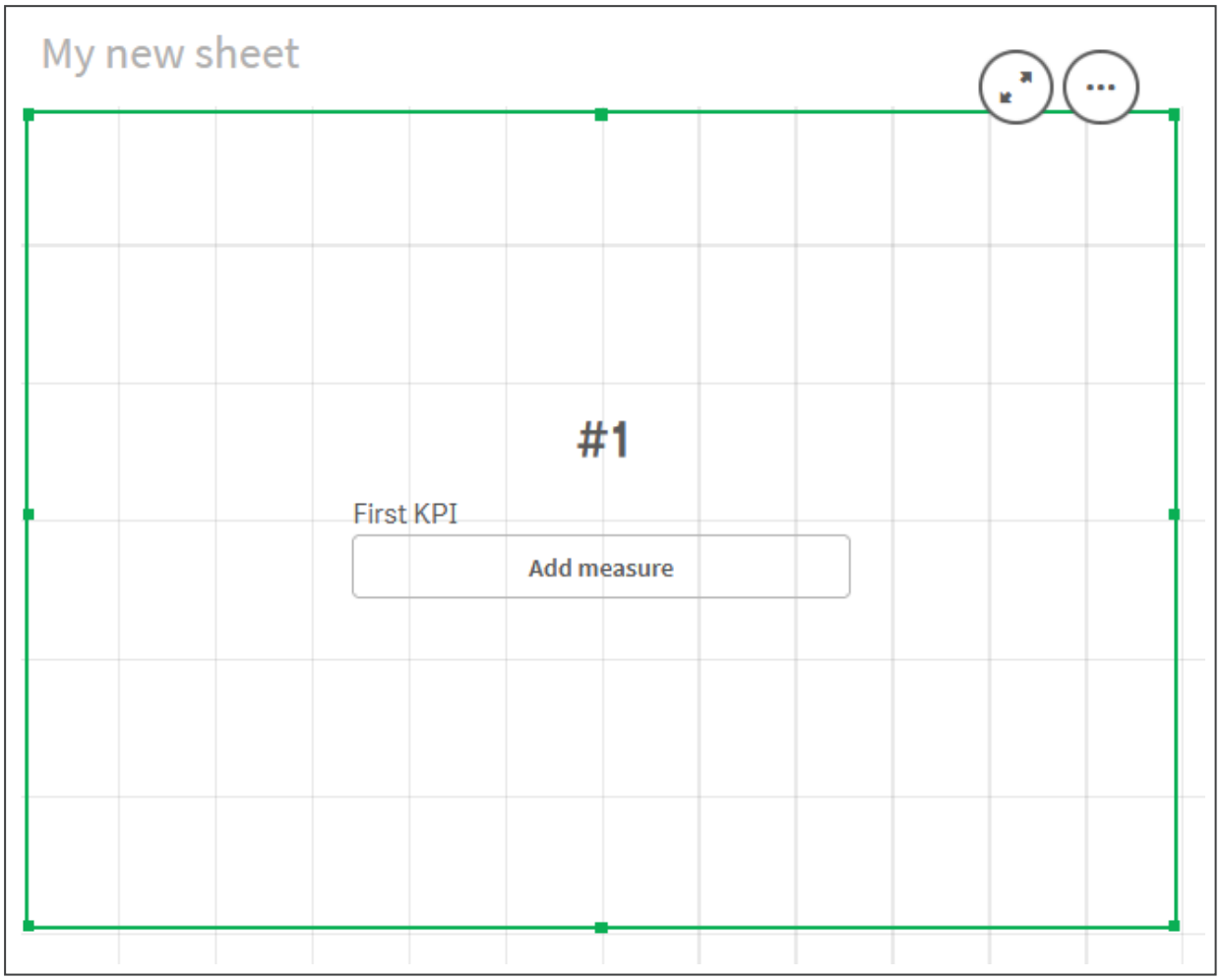
Create measure



The new master measure is created.

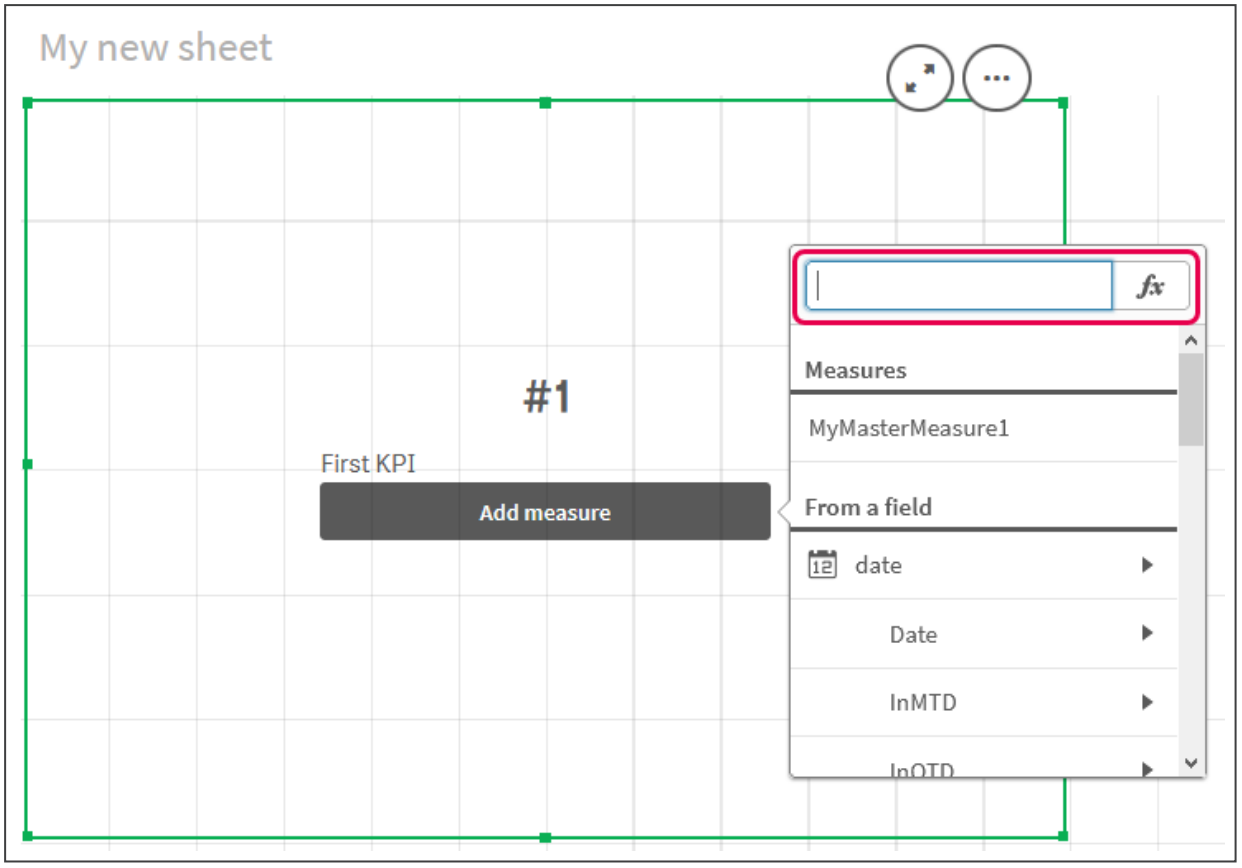
New master measure

2. Use the master measure in a chart expression.
    i. Add a **KPI** chart to a sheet in an app.
    New KPI



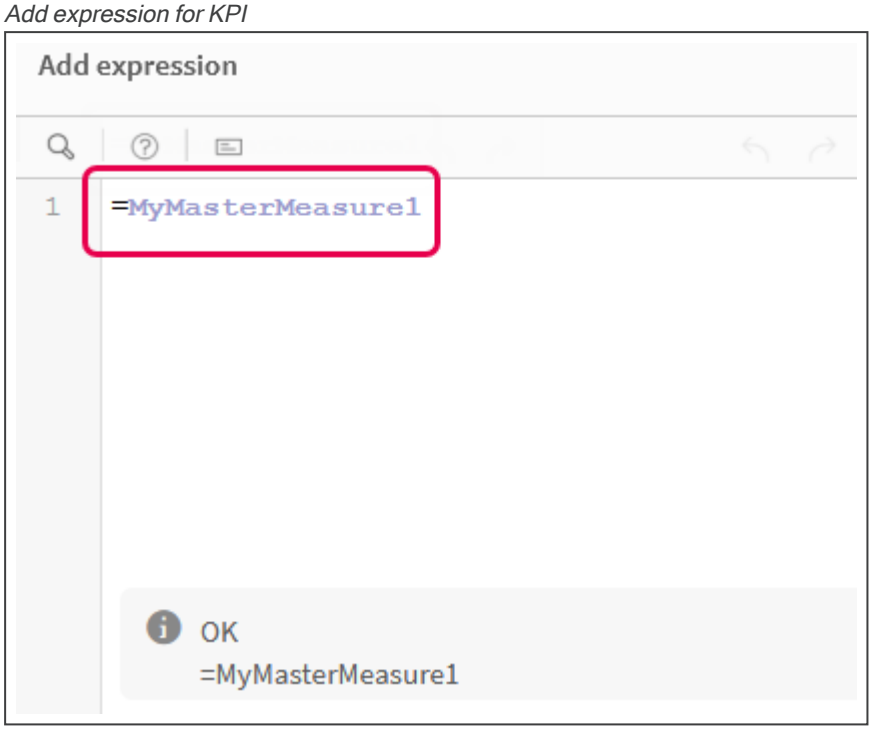
    ii. Click **Add measure**, and then click f_x to open the Expression editor for the **KPI**.

Open Expression editor



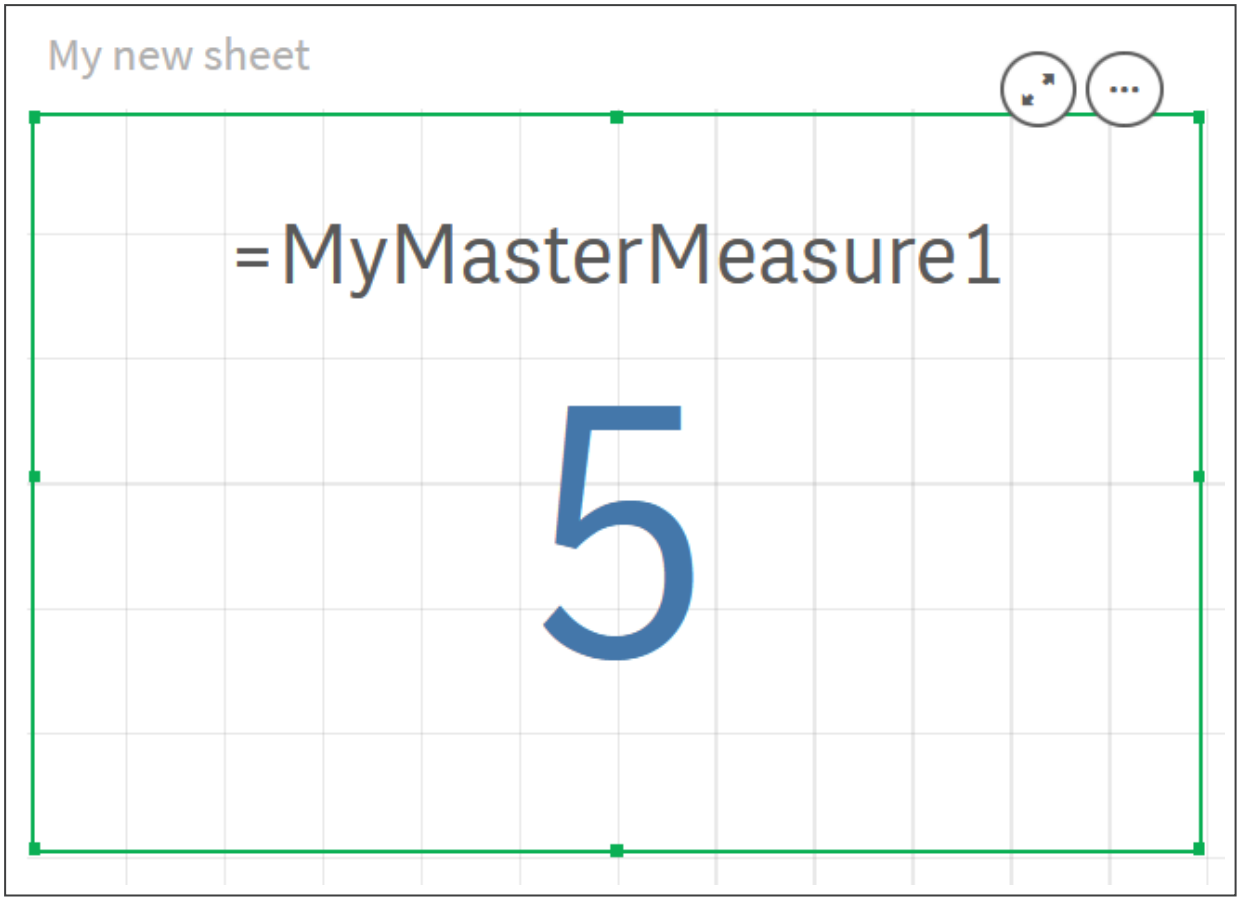
iii. Type the master measure into the expression. As you type, you will get an auto-complete list of any available master measures. If required, the master measure can be used to build more complex expressions in the Expression editor.

Add expression for KPI



iv. Close the Expression editor to view the **KPI**. You can change properties for the KPI, including the label, in the properties panel.

Master measure in KPI



Assigning colors to master items

You can assign colors to your master items. Colors assigned to master dimensions and master measures persist across all instances of those master items in all visualizations.

If you change the color used for the master item, the color will be updated across all instances of that master item. Optionally, master item colors can be disabled for individual visualizations.

Visualizations use master dimension colors when **Single color** is selected in the **Colors and legend** section of the visualization properties panel. Master measure colors are used when **Single color** or **Multicolored** are selected in the **Colors and legend** section of the visualization properties panel.

By default, if a visualization's default **Auto** settings use the **Single** or **Multicolored**, master item colors will be applied automatically. If they do not, you must switch to **Custom** and select a supported setting. Master item colors can be disabled in individual visualizations.

In a visualization with colors specified for both master dimension and master measure, Qlik Sense defaults to the master dimension color. Master measure colors can be applied using the **Use library colors** drop-down and selecting **Measure** in the **Colors and legend** section of the visualization properties panel. In visualization with a mix of master measures with assigned colors and measures without assigned colors, the other measures will use the default palette colors.

Master dimensions can have colors assigned to their distinct values.

Master measures can have custom color gradients applied to their values in visualizations. .

When assigning colors to your master items, you have the following options:

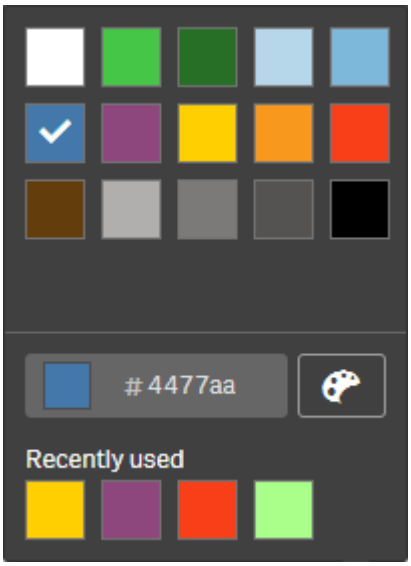
- Choose a color from the default palette
- Type a hexadecimal color code
- Choose a color using advanced color options

Assigning a color from the default color palette

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. Click to display the master items.
3. Select a master item from your library.
4. Click .
5. Click in the color drop-down.
6. Select one of the colors in the palette.
7. Click outside the dialog.
8. Click **Save**.

The color dialog with the default color palette and a blue color selected.



Assigning a color using a hexadecimal color code

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. Click to display the master items.
3. Select a master item from your library.

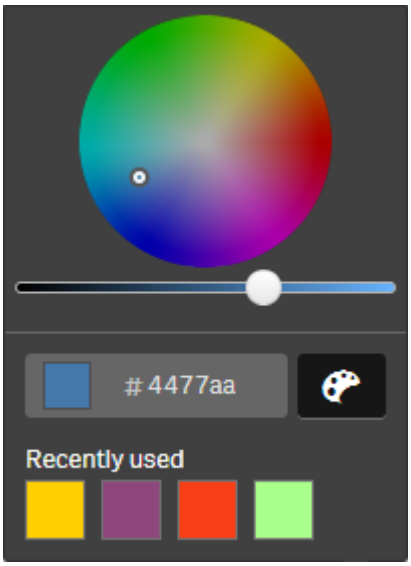
4. Click .
5. Click ▼ in the color drop-down.
6. Type a 6 character color code in the input field: **#**.
7. Click outside the dialog or press Enter.
8. Click **Save**.

Assigning a color using advanced color options

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. Click to display the master items.
3. Select a master item from your library.
4. Click .
5. Click ▼ in the color drop-down.
6. Click at the bottom of the dialog.
   The dialog displays the advanced options.
7. Select a color in the color wheel.
   The selected color changes and the Hex color code updates accordingly.
8. Optionally, adjust the color saturation using the slider.
   The saturation changes and the Hex color code updates accordingly.
9. Click outside the dialog.
10. Click **Save**.

The color dialog with the color wheel in the advanced options and a blue color selected.



Assigning colors to master dimension values

You can assign colors to the distinct values contained in a master dimension. This ensures that the distinct values of your dimensions use the same colors in all visualizations.

Colors assigned to values are used when you choose to color **By dimension** and have **Library colors** enabled. If you choose to color by Single color, the master dimension's color is used instead.

Assigning colors to master dimension values has the following limitations:

- A maximum of 100 colors can be assigned to a dimension's values.
- Dimension values cannot be longer than 1024 characters. Longer values are disabled in the list of values.
- Drill-down and cyclic dimensions do not support assigning colors to dimension values

> *Do not assign colors to master dimension values if you use section access or work with sensitive data, because the values might be exposed by the color configuration.*

The **Value colors** section of **Edit dimensions** contains the options for assigning colors to a dimension's distinct values. You can search the list of values with .

Qlik Sense automatically applies an auto fill to your values to provide a default color. The auto fill is either a single color or a color scheme. Changing your auto-fill settings will not change colors you have assigned to values.

In addition to distinct values, you can set colors for the values classified as others in a visualization, that is, the collection of distinct values that fall outside the displayable values in a dimension. You can also set colors for null values.

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. Click to display the master items.
3. Select a master dimension from your library.
4. Click .
5. Click **Value colors**.
6. If you want to change the auto fill settings, set **Auto fill** to **Custom** , select the auto fill method, and either select a single color or color scheme.
7. Select a value and do one of the following:
   - Select a color in the color wheel, and optionally adjust the saturation slider.
   - Type a 6 character color code in the Hex input field: #.

   Values assigned colors display the icon.
8. If you want to remove an assigned color, select the value and click .

9. Optionally, to assign a color to **Others** or **Null values**, click ▼ and do one of the following:
    - Click one of the colors in the palette.
    - Type a 6 character color code in the Hex input field: #.
    - Click at the bottom of the dialog, select a color in the color wheel, and optionally adjust the saturation slider.
10. Click **Save**.

Assigning colors to master measure values

You can assign a color gradient or segment scheme to a master measure, enabling you to color visualizations by measure, using colors other than the default color schemes.

If you choose to color by single color, the master measure's color is used instead of the color scheme.

To assign custom segment or gradient colors to the values in a master measure, do the following:

1. Access and enable segment colors.
2. Select the template scheme.
3. Select the segment format.
4. Optionally, add or remove limits.
5. Optionally, edit your segment limits.
6. Assign colors to your segments.
7. Save.

Accessing and enabling segment colors

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. Click to display the master items.
3. Select a master measure from your library.
4. Click .
5. Click on the **Segment colors** tab.
6. Set the **Segment colors** button to **Custom** coloring.

Selecting the template scheme

The template scheme provides a default template to edit. You can choose from the default classes and gradients.

Do the following:

- Under **Select a template scheme**, select a template scheme.

Selecting the segment format

The segment format determines how colors will be applied. **Percentage** adds value classes based on where values fit into the percentile of their value. **Fixed value** uses defined values to set the limits of each segment.

Do the following:

- Set **Segment format** to **Fixed value** or **Percentage**.

Adding, editing and removing limits

By default, the number of segments depends on the scheme selected. You can create additional segments by adding limits. When a new segment is created a pointer marks the value of its limit.

Do the following:

- Click on the **Add limit** button to add a limit to the gauge.
- Use the slider to change the value of a limit. You can also type a value for the selected limit.
- Click on the **Remove limit** button to remove the selected limit.

Editing segments

By default, segment colors depend on the scheme selected. You can change the color of a segment and its ending.

Do the following:

- Click the segment to change colors.
- Select **Gradient** to use different shades of colors in the transition between segments for the selected limit.

Create calendar measures

To analyze data over relative time ranges, use calendar measures. For example, you might want to compare current year-to-date sales figures with figures from the same period the previous year.

Calendar measures aggregate data from a field over a time range, and are saved in the **Measures** category in the master items. Calendar measures comprise a field to be aggregated, an aggregation, a date field, and a time range for that date field that sets which data is included in the aggregation. You create calendar measures under **Fields** in the **Assets** panel, using the **Create calendar measures** dialog.

You can aggregate fields from tables loaded in **Data manager** or from a script in **Data load editor**, as long as the field is in the same table as the date field, or is in an associated table.

However, the date field must be from a table that has been loaded using **Data manager**, because calendar measures use expressions tagged as date & time fields that are declared in autoCalendar, and date fields are only mapped to autoCalendar when loaded in **Data manager**. Calendar measures support the following aggregations with the aggregated field: Sum, Count, Avg, Min, and Max.

*Calendar measures do not support calendars created using the **Data load editor**. If you use calendars created using **Data load editor** and want to create calendar measures, you must load a table containing a date field using **Data manager** for use with your tables loaded using **Data load editor**.*

If your date field is subject to more than one calendar and both calendars are qualified for use with calendar measures, then the first calendar loaded in the data load script is used in the calendar measures.

A calendar measure can use one of the following time ranges are available for use with calendar measures: weekly, monthly, quarterly, and yearly. Within each time range, different measures exist for periods such as current month, year-to-date, and current week last year. The following time ranges and measures are available for creating calendar measures:

Calendar measures for time range Yearly

Measure	Description
YTD	The year to date for all years.
YTD Current Year	The year to date for the current year.
YTD Last Year	The year to date for last year.

Calendar measures for time range Monthly

Measure	Description
MTD	The month to date for all months and years.
MTD Current Month	The month to date for the current month.
MTD Last Month	The month to date for last month.
Current Month	All dates this month.
Current Month Last Year	All dates this month last year.
Last Month	All dates last month.

Calendar measures for time range Quarterly

Measure	Description
QTD	The quarter to date for all years.
QTD Current Quarter	The quarter to date for the current quarter.
QTD Last Quarter	The quarter to date for the last quarter.
Current Quarter	All dates in the current quarter.
Current Quarter Last Year	All dates in the current quarter last year.
Last Quarter	All days for the last quarter.

Calendar measures for time range Weekly

Measure	Description
WTD	The week to date for all weeks across all years.
WTD Current Week	This week to date for the current week.
WTD Last Week	The week to date for the last week.
Current Week	All dates this week.
Current Week Last Year	All dates this week last year.
Last Week	All dates last week.

Once created, calendar measures are treated identically to master measures. That is, calendar measures are reusable and editable while an app is unpublished. Users of a published app will have access to the calendar measures, but will not be able to modify them.

Creating a calendar measure from a field

On a sheet in edit mode with the **Fields** tab open, do the following:

1. Right-click a field and select **Create calendar measures**.
   By default, the field you right-clicked will be included as the **Aggregated field**.
2. Select a date field from the **Date field** drop-down list.

3. Select a field from the **Aggregated field** drop-down list.
4. Select an aggregation from the **Aggregation** drop-down list.
5. Select a time range from the **Time range** drop-down list.
   A list of the available measures displays under **Preview of measures**.
   You can toggle the display of the measures' expressions by selecting the **Preview of measures** switch.
6. Select the calendar measures to add to your master items.
   By default, all measures are selected.
7. Click **Save to master items**.
8. Click **Close**.

Tagging master items

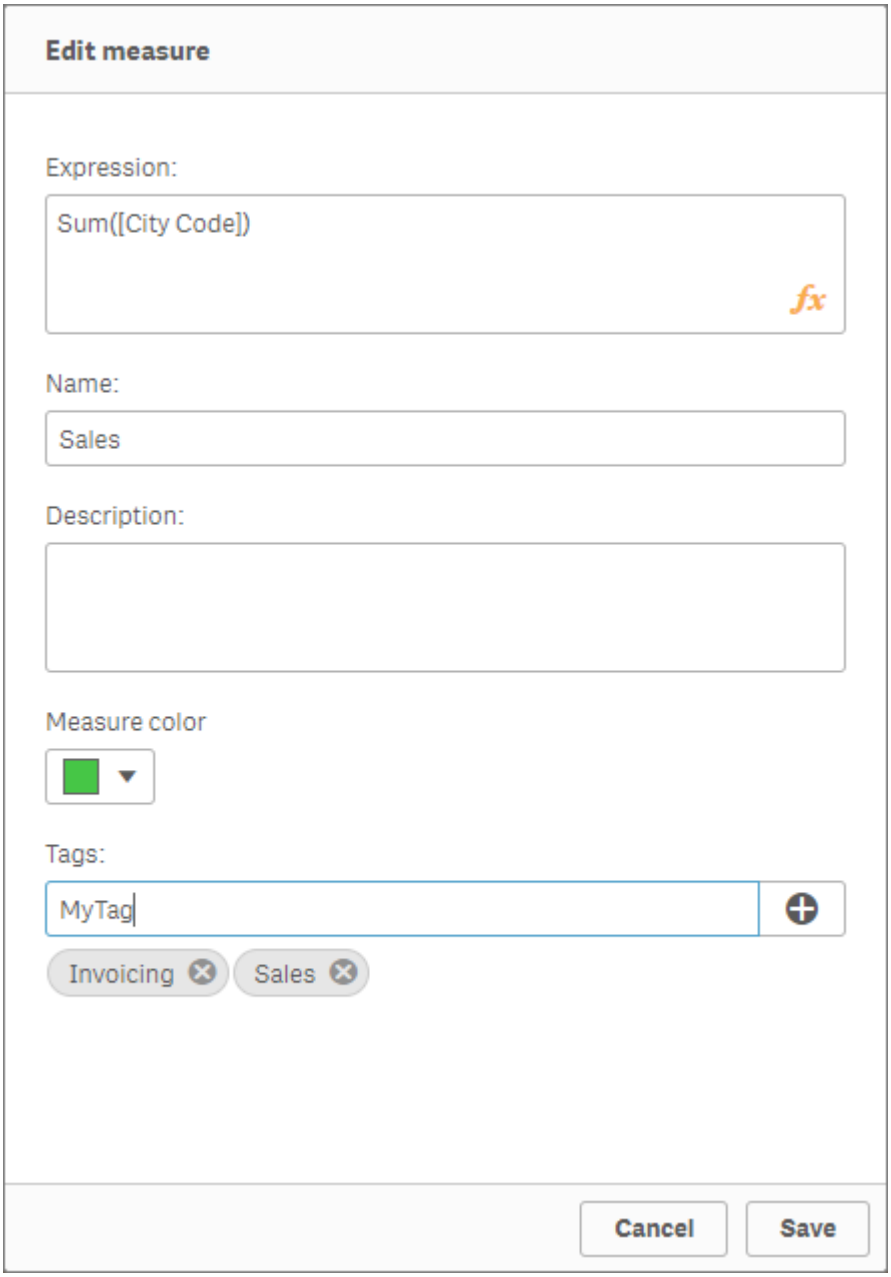
You can use tags to organize master items. You will find matches in tags when searching in the assets panel. You can also tag master items with synonyms for Insight Advisor. Use the format *alt:<term>* in synonym tags. For example, *alt:cities*.

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.

Adding tags while creating a new measure

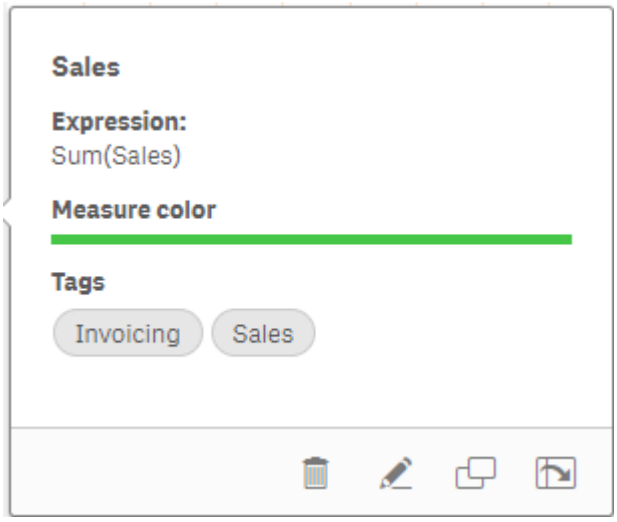


You can add tags by clicking ⊕ or by pressing Enter.

Previewing tags

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

The preview displays the dimension type, which fields are included in the drill-down dimension and tags.



Unlinking from a master item

Unlink a dimension or measure in a visualization from its master item to edit only the current instance of the dimension or measure. Unlinking removes the connection to the master item, and the dimension or measure becomes independent. If you want to update all instances of a linked dimension or linked measure, you must edit the master item. For more information, see *Editing a master dimension (page 132)* or *Editing a master measure (page 138)*.

Unlinking from the properties panel

Unlink from a master dimension or master measure in a visualization using the properties panel.

Do the following:

1. Click **Edit sheet**.
   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. Under **Data**, locate and click the dimension or measure.
   A linked dimension or measure is indicated by the symbol .
4. Click .
   A dialog is displayed that you are about to unlink from a master item
5. Click **OK**.

You can now edit the dimension or measure in the visualization without affecting any visualization that use the master items.

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

Unlinking from a master visualization

Unlink a visualization from its master visualization to edit only the current instance. Unlinking removes the connection between the visualization on your sheet and the master item. The current visualization becomes independent. To edit all visualizations that are linked to a master visualization, see *Editing a master visualization (page 125)*.

Do the following:

1. Click **Edit sheet**.
2. Click ••• in the top right corner of a linked visualization, and then click **Unlink visualization**.
   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.

> *You can also right-click the linked visualization, and then click **Unlink visualization** from the shortcut menu.*

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.

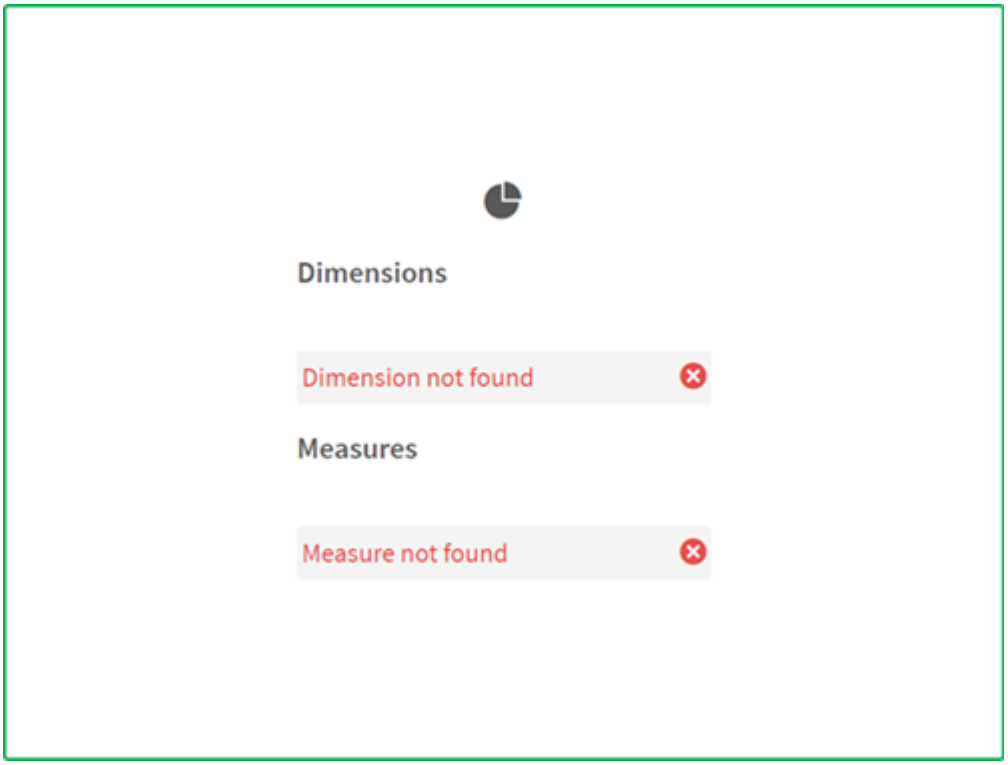
> *If you delete a master dimension or master measure the visualizations that use the deleted master items will not work unless you replace it with a new dimension or measure.*

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Master items** in the assets panel.
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.

A visualization that 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 sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. Click **Master items** in the assets panel.
3. Drag a dimension or measure from the **Dimensions** or **Measures** sections to the visualization on the sheet.
   The shortcut menu opens.
4. Select **Replace invalid dimension** or **Replace invalid measure**.

The visualization is complete and works again.

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 sheet** 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 sheet** 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 sheet** in the toolbar.
2. Right-click on the invalid visualization and select **Delete** in the shortcut menu.

The invalid visualization is deleted.

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 aggregations based on fields. Specifically, the measures are calculations that span multiple records. For example **Sum(Cost)** means all the values of the field **Cost** are aggregated using the function **Sum**. In other words, **Sum(Cost)** is an expression.

What is an expression?

An expression is a combination of functions, fields, and mathematical operators (+ * / =), and other measures. 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.

Where can I use expressions?

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.

Expressions are used both in scripts and in chart visualizations. They can be simple, involving only basic calculations, or complex, involving functions fields and operators. Expressions can be used in several different situations. The difference between measures and expressions is that expressions have no name or descriptive data.

In a script, an expression is evaluated as the script execution passes it by. In visualizations (including charts and tables), expressions are evaluated automatically whenever any of the fields, variables or functions that the expression contains change value or logical status. A few differences exist between script expressions and chart expressions in terms of syntax and available functions.

For detailed reference regarding script functions and chart functions, see the Script syntax and chart functions.

Working with the expression editor

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

You can add expressions in two ways. Expressions can be created using the **Fields**, **Functions**, **Variables**, and **Set expressions** sections by making selections and inserting them into the expression field. You can edit the inserted expressions and add more complex expressions by typing directly into the expression field. You can undo an action by clicking the **Undo button** ↶.

Inserting an expression using Fields

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

Do the following:

1. If you want to limit the available fields to those from a particular table in your data model, select a table from the **Filter by table** drop-down list.
2. Select a field from the **Field** drop-down list.
3. Select the aggregation function you want to use. The functions available are from the group of basic aggregation functions.
4. If you want to insert the current selection as a set expression in your aggregation, use the **Set expression** check box. The current selection is always based on the default state.
5. If you want to insert a **Distinct** or a **Total** clause together with the aggregation function, use the check boxes for each clause. Each clause can be used separately.
6. Click **Insert** to insert the field and the function into the expression field.

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

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

Inserting a function using Functions

You can insert more than the basic aggregation functions by making selections from the **Functions** section at the right-hand side of the expression editor dialog.

1. If you want to filter the list of available functions, select a function category from the **Function category** drop-down list.
2. Select a function from the **Function name** drop-down list.
   You see a preview of the function.
3. Click **Insert** to insert the function and the first parenthesis into the expression field.
4. Type the rest of the expression in the expression editor according to the syntax.
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.

Inserting a variable using Variables

You can insert a variable by making selections from the **Variables** section at the right-hand side of the expression editor dialog.

1. If you want system variables to appear in the list of available variables use the **Show system variables** check-box.
2. Select a variable from the **Variable** drop-down list.
   You see a **Definition** and **Value** of the variable, if available.

3. Click **Insert** to insert the variable into the expression field.
4. Click **Apply** to close the **Add expression** dialog.
   For a dimension or measure, you continue by adding descriptive data for the dimension or measure.

Inserting a set expression using Set expressions

You can insert a set expression by making selections from the **Set expressions** section at the right-hand side of the expression editor dialog.

1. Select whether to **Use current selections** or **Use bookmark**, as a set expression.
   You can only **Use current selections** if a selection has been made in the app. You can only **Use bookmark** if a bookmark is available. Use the **Bookmark** drop-down menu to choose between bookmarks.
2. If you have defined alternate states, you can change the alternate state which the set expression is based on. Select the alternate state from **Alternate state** drop-down menu.
3. Click **Insert** to insert the set expression into the expression field.
4. 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 field.
   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.

Autocomplete, evaluation and color coding

When typing in the expression editor, you get an autocomplete list of matching fields, variables and functions to select from. The list is narrowed down as you continue to type. The color coding helps you to see where fields, variables and functions are used in the expression.

The color coding applies both in the autocomplete list and in the expression itself.

You can verify that any dollar-sign expansions added in your expression give the correct result, by checking the expression evaluation, in the dollar-sign expansion preview.

Search and replace

When using the expression editor, you can open the search and replace toolbar by clicking . Type in the string you want to look for in the **Search for** field, using the **Match case** option if necessary. All the matching occurrences in the expression will be highlighted and you can navigate between all of them using the **Previous** and **Next** arrows. You can then optionally replace one or all of the occurrences with the string you enter in the **Replace with** field.

Detailed syntax help

You can activate help mode by clicking the **Help button** . When active, all functions in the expression editor act like hyperlinks. Clicking on a function opens a browser tab to the online help section with the full description of how to use the specific function. When a function is clicked, help mode is exited.

References to fields, measures, and variables

An expression can contain references to fields, variables, and measures.

In most cases, expressions are aggregations, that is calculations that potentially can span multiple records. This means that all field references in an expression must be wrapped in an aggregation function. If no aggregation function is used, the Only() function is used.

When the name of a measure is used inside an expression, it is interpreted as an alias for the measure. This allows you to re-use an already defined entity. You can use the labels of master measures and chart measures in this way. However, the chart measure must be in the same chart. You cannot use labels of measures in other charts.

You can define a measure recursively. In other words, the measure can contain a reference to itself. However, you should only do this in charts with few rows. Performance degrades if the chart has many rows. If there are hundreds of rows, the recursive definition will stop working altogether.

A variable can be used in two different ways: in a direct reference or in a dollar-sign expansion. If you use a direct reference, the variable value will be used in the calculation. If you use a dollar-sign expansion, the entire dollar-sign expansion will be replaced by the variable value before the expression is parsed. Therefore, the two different methods may return different results.

How names are interpreted

A name inside an expression can be a reference to a field, a variable, a function, or a measure. Depending on situation, the name is interpreted differently.

Example:

The string XXX represents a field, a variable, a function, or a measure. XXX will be interpreted as one of these depending on how you create the expression.

Examples of how names are interpreted

Expression	XXX interpreted as
`XXX`	measure, variable, or field
`$(XXX)`	variable
`Count(XXX)`	field or variable
`XXX()`	function

You should not use the same name for a field and a variable (or a measure). But if you do and there is ambiguity, the following order of precedence is used:

- If the name is found inside an aggregation function, a field has precedence over a variable.
- If the name is found outside an aggregation function, a measure label has precedence over a variable name, which in turn has precedence over a field name.

Rules for expressions

The following rules apply for chart expressions:

- If a field reference isn't wrapped in an aggregation function, the Only() function is used by the engine.
- 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.

Using functions in charts

A function is a type of procedure or routine that performs a specific task on data in apps. 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.

The following list shows some examples of functions:

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

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.

For detailed reference regarding script functions and chart functions, see the Script syntax and chart functions.

Using variables in expressions

A variable in Qlik Sense is a container storing a static value or a calculation, for example a numeric or alphanumeric value. When you use the variable in the app, any change made to the variable is applied everywhere the variable is used. You can define variables in the variables overview, or in the script using the Data load editor. You set the value of a variable using **Let** or **Set** statements in the data load script.

When using variables in expressions, you can change the expression used in a range of charts simultaneously simply by editing the variable.

You open the **Variables** overview by clicking in the edit bar when editing a sheet.

*The **Variables** overview is not available in published apps. If you need to add or change variables in an published app, use the variable input control available with the Dashboard bundle.*

The following actions are available in the variables overview:

- Create a new variable.
- Edit the selected variable.
- Delete the selected variable.

To edit or delete a variable that is defined in the script, you must edit the script.

Getting an overview of all variables in an app

You can get an overview of all variables in an unpublished app.

Do the following:

- When editing a sheet, click in the edit bar on the sheet to open the variables dialog.
  The variables dialog opens and displays a list of all variables in the app and their definitions (if any).

Examples

For examples of how to use variables in expressions, see *Example: Using a variable with dollar-sign expansion (page 170)*.

See also:

Working with the expression editor (page 161)

Creating a variable

A variable in Qlik Sense is a named entity, containing a data value. When a variable is used in an expression, it is substituted by its value or the variable's definition. Variables are defined using the variables dialog or in the script using the data load editor.

You can create a new variable from the variables dialog, when editing a sheet in an unpublished app.

You can duplicate an existing variable by clicking ••• and selecting **Duplicate**.

For a visual demo about creating variables, see Creating a variable.

Do the following:

1. When editing a sheet, click in the edit bar on the sheet to open the variables dialog.
   The variables overview opens.
2. Click **Create new**.
   The following input fields for the variable are displayed:
   - **Name** (mandatory)
   - **Definition**
   - **Description**
   - **Tags**

   Press Esc or click **Cancel** if you want to cancel creating the new variable.
3. Type a name for the variable (mandatory). Use the following guidelines when choosing a name:
   - You cannot change the name once you have created the variable.
   - Use a letter as the first character, do not use a number or a symbol.
   - It is not recommended to name a variable identically to a field or a function in Qlik Sense. For more information, see *How names are interpreted (page 172)*.

- Do not use the following characters when naming a variable: `$ ( ) [ ] "`
- The name must be unique. You cannot name a variable using a name used for a reserved variable or a system variable. These variables are not listed in the variables dialog, but if you are not allowed to use a certain name, even though you cannot find a duplicate in the variables dialog, a reserved variable or a system variable already has this name.
- A long name is not recommended. If a variable's name is too long, the name cannot be fully displayed in the variables overview.

4. Optionally, type a description for the variable.
5. Create a definition for the variable. You can enter the expression editor by clicking f_x.
   For more information, see *Working with the expression editor (page 161)*.

   Example:

   Set the variable's value to today's date, presented as a number:
   Num(Today())
6. Optionally, enter tags for the variable.
7. Optionally, select **Include current value of variable when creating bookmarks** if you want the current variable value to be included when a user creates a bookmark.
   For more information on variables and bookmarks, see *Including variable states in bookmarks and reports (page 169)*.
8. Click **Create** to save the variable.

Editing a variable

You can edit variables from the variables dialog.

Do the following:

1. When editing a sheet, click $x=$ in the edit bar on the sheet to open the variables dialog.
   The variables dialog opens.
2. In the row of the variable you want to edit, click ••• and select **Edit**.
3. Edit the variable as desired.
4. Click **Save**.

Editing script variables

If you update a script variable during a user session–that is, in the app interface, without reloading the app–the updated variable definition is temporary and unique to you. After your session expires, the variable definition returns to its original value as per the last reload. Also, if you reload the app, your changes will be undone.

The only exception to this behavior is Qlik Sense Desktop. In Qlik Sense Desktop, a script variable updated during a user session will not return to its original script value. To undo the variable definition changes from the session activity, you need to reload the app.

Deleting a variable

You can delete variables, from an unpublished app, by deleting them from the variables dialog.

Do the following:

1. When editing a sheet, click in the edit bar on the sheet to open the variables dialog.
   The variables dialog opens.
2. Select the variables you want to delete and click **Delete**. You can select up to 20 variables.
   You can also click ••• in the row of the variable you want to delete and select **Delete**.

   > *If you remove a variable from the script and reload the data, the variable stays in the app. If you want to fully remove the variable from the app, you must also delete the variable from the variables dialog.*

   > *Deleting a variable cannot be undone.*
3. Click **Delete**.

Including variable states in bookmarks and reports

You can configure variables to have their states included in bookmarks and reports.

By default, variable states are not included when users create bookmarks or reports. App creators and app users have different options for including variable states in bookmarks and reports.

You can configure your app's variables to have their current state included when users create a bookmark or report. By selecting **Include current value of variable when creating bookmarks**, app creators can have variable states automatically included in bookmarks and reports.

You can also choose to include variable states in bookmarks and reports. When creating bookmarks, you can use **Save variable state in bookmarks**. When creating subscriptions to reports, you can select the option **Use variable state** to include variable states in the report.

Advantages of setting Include in bookmarks on variables

There are two advantages to setting **Include current value of variable when creating bookmarks** on variables over the other options. You can choose which variables to have their states included in bookmarks and reports on an individual basis. This gives you more control over what variable states are included. Script variable states are not included when you use **Save variable state in bookmarks** in a bookmark.

Interactions between the variable setting and bookmark setting

If **Include current value of variable when creating bookmarks** is selected, it will overrule the option selected for **Save all variable states** in bookmarks.

The table below summarizes the behavior of bookmarks and reports for including variable states when **Include current value of variable when creating bookmarks** and **Save all variable states/Use variable state** are used.

Interaction summary

Include current value of variable when creating bookmarks	Save all variable states	Result
Yes	Yes	Variable states of all variables included.
Yes	No	Variable states of variables with **Include current value of variable when creating bookmarks** selected included.
No	Yes	Variable states of all variables included.
No	No	Variable states not included.

Saving variable states in bookmarks

Do the following:

1. When editing a sheet, click in the edit bar on the sheet to open the variables dialog.
   The variables dialog opens.
2. In the row of the variable you want to delete, click ••• and select **Edit**.
3. Select **Include current value of variable when creating bookmarks**.
4. Click **Save**.

Limitations

Include current value of variable when creating bookmarks is not available for script variables.

Examples of using a variable in an expression

A variable in Qlik Sense is a named entity, containing a data value. When a variable is used in an expression, it is substituted by its value or the variable's definition.

Ways to use variables in an expression

A variable can be used in two different ways: in a direct reference or in a dollar-sign expansion. If you use a direct reference, the variable value will be used in the calculation. If you use a dollar-sign expansion, the entire dollar-sign expansion will be replaced by the variable value before the expression is parsed. Therefore, the two different methods may return different results.

Example: Using a variable with dollar-sign expansion

The variable *x* contains the text string *Sum(Sales)*.

In a chart, you define the expression *$(x)/12*. The effect is exactly the same as having the chart expression *Sum(Sales)/12*.

However, if you change the value of the variable *x* to for example *Sum(Budget)*, the data in the chart are immediately recalculated with the expression interpreted as *Sum(Budget)/12*.

When using variables in expressions, you can change the expression used in a range of charts simultaneously simply by editing the variable.

Example: Variable with dollar-sign expansion in pivot table

Suppose you have a **Pivot table** or **Pivot** object that contains the following:

- Dimensions are *Product Type* and *Product Name*.
- Measures are *Sum(Sales)* and *Count (distinct InvoiceNumber)*.
- The items under **Columns** are **Values** (default) and the field *Quarter*.

You can use variables to encourage interactive analysis. Suppose you also create a variable *vUserInteraction* with a blank definition. Then, you create two **Button** charts on your sheet, configured with the **Set variable value** action:

- **Show more detail**: Clicking this button sets *vUserInteraction* to a value of `='Yes'`.
- **Show less detail**: Clicking this button sets *vUserInteraction* to a value of `='No'`.

In your pivot table, you could add a number of additional measures to the chart, such as *Count(Quantity)* and *Sum(Cost)*. Then, configure each measure column to have the following value for **Show column if**:

```
'$(Reference)'='Yes'
```

This allows the chart to adapt to whether or not the user wants additional information. If the user clicks the **Show more detail** button, additional measures are added to the table. If not, or if they click **Show less detail**, the additional measures are removed.

More examples: Using variables in dollar-sign expansions

Dollar-sign expansions are a versatile and powerful tool in Qlik Sense, with many possible uses. For more examples, see Dollar-sign expansions.

Example: Directly referencing a variable in an expression

Using a variable as a direct reference is less common, but still useful. For example:

Suppose you have a field *TransactionSummary* in your data model that contains free text summaries of transactions. This field could contain supplemental information about transactions. For example, a transaction could have a summary to document that the customer purchased an item with a store credit, or to document any issues that came up during the sale.

In your app, you might want to use *TransactionSummary* but you want to put the data into context without affecting the data model or load script, and without storing it elsewhere in the chart.

You could do the following:

1. Create a variable named *vIntroStatement* in the variables dialog with the following definition:
   `='The following summary was provided by the vendor: '`
2. Add the following measure to a **Text & image** chart:
   `vIntroStatement & TransactionSummary`

Storing the introductory statement as a variable allows you to centrally control the use of a value. For example, the variable *vIntroStatement* could be used in multiple charts, and within a number of different measures (for example, there could be a separate chart that sometimes contains text describing how many units were sold during the transaction). By using a variable, you can simplify the process of updating expressions in the app. To make a change to the wording, simply update the variable and the changes are reflected across the app.

How names are interpreted

It is not recommended to name a variable identically to a field or a function in Qlik Sense. But if you do, you must know how to use them in an expression.

Example:

The string XXX represents a field, a variable, a function, or a measure. XXX will be interpreted as one of these depending on how you create the expression.

Examples of how names are interpreted

Expression	XXX interpreted as
`XXX`	measure, variable, or field
`$(XXX)`	variable
`Count(XXX)`	field or variable
`XXX()`	function

When naming an entity, avoid assigning the same name to more than one field, variable, or measure. There is a strict order of precedence for resolving conflicts between entities with identical names. This order is reflected in any objects or contexts in which these entities are used. This order of precedence is as follows:

- Inside an aggregation, a field has precedence over a variable. Measure labels are not relevant in aggregations and are not prioritized.
- Outside an aggregation, a measure label has precedence over a variable, which in turn has precedence over a field name.
- Additionally, outside an aggregation, a measure can be re-used by referencing its label, unless the label is in fact a calculated one. In that situation, the measure drops in significance in order to reduce risk of self-reference, and in this case the name will always be interpreted first as a measure label, second as a field name, and third as a variable name.

As a best practice, consider using a standardized naming convention for the variables you create in an app. For example, you could make sure all of your variable names start with *v*. For example: *vUserText*. This helps to ensure variables are recognized quickly as variables and differentiated from measures, fields, and functions.

Variable calculation

There are several ways to use variables with calculated values in Qlik Sense, and the result depends on how you define it and how you call it in an expression.

This example requires the following data is loaded in the data load editor:

```
LOAD * INLINE [
    Dim, Sales
    A, 150
    A, 200
    B, 240
    B, 230
    C, 410
    C, 330
];
```

Let's define two variables, from the variables dialog:

- **Name** *vSales* **Definition** *'Sum(Sales)'*
- **Name** *vSales2* **Definition** *'=Sum(Sales)'*

In the second variable, we add an equal sign before the expression. This will cause the variable to be calculated before it is expanded and the expression is evaluated.

If you use the vSales variable as it is, for example in a measure, the result will be the string Sum(Sales), that is, no calculation is performed.

If you add a dollar-sign expansion and call $(vSales) in the expression, the variable is expanded, and the sum of Sales is displayed.

Finally, if you call $(vSales2), the variable will be calculated before it is expanded. This means that the result displayed is the total sum of Sales. The difference between using =$(vSales) and =$(vSales2) as measure expressions is seen in this chart showing the results:

Results

Dim	$(vSales)	$(vSales2)
A	350	1560
B	470	1560
C	740	1560

As you can see, $(vSales) results in the partial sum for a dimension value, while $(vSales2) results in the total sum.

See also:

Working with the expression editor (page 161)

Using chart level scripting in visualizations

With chart level scripting, you can add script-like functionality to the results of a visualization. It complements chart expressions, as chart level scripting include control statements, such as loops and recursive actions, for more complex mathematical calculations. You can also modify multiple columns, as long as a placeholder exists in the chart, and add new rows to a result.

You can use chart level scripting on most visualization types and you access it from the properties panel. Some visualizations or specific configurations, do not support chart level scripting. In those cases, you cannot access chart level scripting from the properties panel, or you will receive an error message.

When modifying chart data, you use a sub-set of the Qlik Sense script which consists of a number of statements. See Chart level scripting.

You enable chart level scripting in the app settings. When enabled, a **Scripts** control is available on the **Data** section of the properties panel for a visualization. See Turning on chart level scripting.

Even when disabled, existing chart scripts will be processed. Disabling once authored content has been developed is a useful way of preventing new chart scripts being created by other users.

Adding a chart script to a visualization

You can add chart scripts to existing visualizations, or when you create new visualizations.

Chart level scripting must be enabled in the app before you can add a chart script to a visualization, see Turning on chart level scripting.

Adding chart scripts to a new visualization

Do the following:

1. Drag the visualization from the assets panel onto the sheet, or double-click the visualization.
2. On the **Data** tab, add dimensions and measures to the visualization.
3. Also on the **Data** tab, add a chart script in the **Scripts** section.
   You can add maximum five chart scripts per visualization.

Adding chart scripts to an existing visualization

Do the following:

1. When in **Edit sheet** mode, select the visualization.
2. On the **Data** tab, add a chart script in the **Scripts** section.
   You can add maximum five chart scripts per visualization.

Example

This example assumes that you have created a visualization, for example a bar chart, and that you have added a dimension and a measure.

This example takes the values of the first dimension and puts them in the first measure in reverse order.

```
Let P = HCNoRows();
For J = 1 to P
Put #hc1.measure.1(J) = HCValue(#hc1.dimension.1, P - J + 1);
Next
```

Limitations of chart level scripting

Chart level scripting cannot be used in the standard edit mode.

Chart level scripting does not work for visualizations with **Chart suggestions** enabled.

You can add maximum five chart scripts per visualization.

Chart level scripting is not available for the following visualizations:

- Bar charts in stacked mode
  If you have created a chart script in grouped mode and switch to stacked mode, an invalid hypercube error will be shown.
- Box plot
- Button
- Distribution plot
- Filter pane
- Line charts with two dimensions
- Pivot table
- Text & image
- Treemap
- Grid Chart (Visualization bundle)
- Trellis Container (Visualization bundle)

Searching in the assets panel

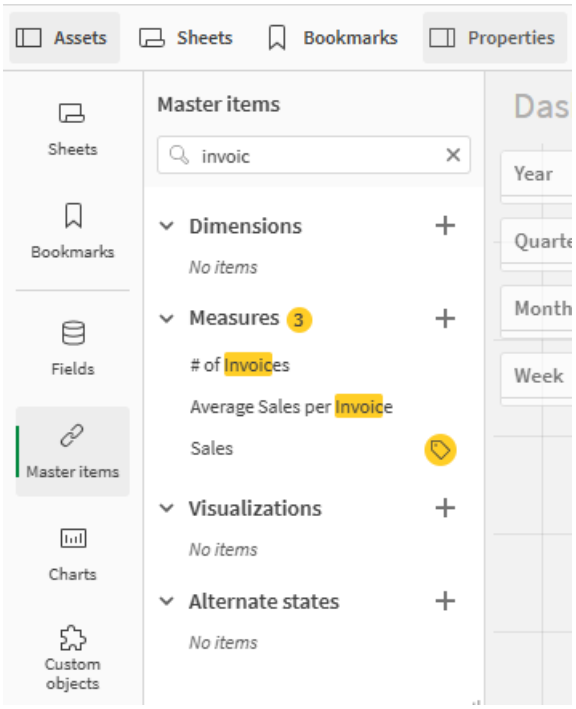
Find assets using the search field. As you type in the search field, items that have a name or a tag that contain the search string are presented.

The search function is not case sensitive.

When editing a sheet, use the assets panel to search for items you can use for building the app.

When a matching string is found in a tag, it is indicated by a tag icon in the search result. Click an item in the list of results to preview it.

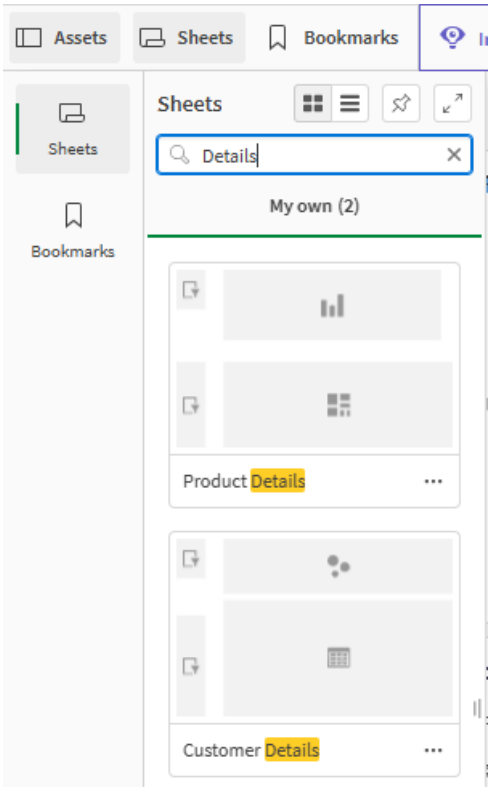
Searching for "inv" among the measures presents any measure that contains that string in its name or a tag.



Searching in sheet analysis mode

Search for exploration-related assets when you are viewing a sheet in analysis mode. For example, you search for sheets, bookmarks, notes, or key driver analyses.

Searching for sheets in the assets panel



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.

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.

This functionality is not available in all editions of Qlik Sense.

3.4 Best practices for choosing visualization types

A good visualization clearly presents relationships among many values, and lets you analyze data at a glance. Qlik Cloud Analytics offers a range of Qlik Sense visualizations, charts, and analyses. Each chart and analysis excels at visualizing data in different ways for different purposes. You should select your charts and analyses by deciding what you want to see from the data in your charts.

If you are unsure of what visualizations to use, Qlik Sense can offer recommendations. Insight Advisor can also help you create visualizations. For more information, see *Creating visualizations with Insight Advisor (page 642)* and *Creating visualizations using Insight Advisor chart suggestions (page 666)*.

The following lists the purposes for viewing data and the chart and analysis type recommended to achieve that purpose:

Viewing comparisons

Comparison charts are used to compare values against each other. They show the differences in values, such as the difference between categories, or how values are changing over time.

Questions that might be answered by comparison charts include:

- What product has the highest total sales this year?
- How have product sales risen or fallen over the last 24 months?

Chart types for viewing comparisons

Chart type	Common purpose
Bar chart (page 185)	Comparing categories against the same measure or measures.
Combo chart (page 220)	Comparing measures that are different in scale.
Line chart (page 272)	Comparing trends over time.

If you want to compare different values of the same dimension, you can use alternate states.

Viewing relationships

Relationship charts are used to explore how values relate to each other. A relationship chart allows you to find correlations, outliers, and clusters of data.

Questions that might be answered by relationship charts include:

- Is there a correlation between advertising spending and sales for our products?
- How do expenses and income vary per region?

Chart types for viewing relationships

Chart type	Common purpose
Scatter plot (page 380)	Viewing the relationship between two or three measures for a dimension.

Viewing compositions

Composition charts take a total value and discover what component values make up that total. Composition charts can be static, showing the current composition of a total value, or they can show how the composition of a total value changes over time. Composition charts can display compositions either by percentage of the total value or the fixed values in the total value.

Questions that might be answered by composition charts include:

- What percentages of our total sales come from which regions?
- What is each department's allotment of our total quarterly budget over the past year?

Chart types for viewing compositions

Chart type	Common purpose
Bar chart (page 185)	Viewing the changing composition of a value over a short period of time.
Line chart (page 272)	Viewing the changing composition of a value over a long period of time.
Pie chart (page 361)	Viewing the static composition of a value.
Treemap (page 445)	Viewing the static composition of a value's accumulation to the total.
Waterfall chart (page 452)	Viewing the static composition of a value with accumulation or subtraction to the total.

Viewing distributions

Distribution charts are used to explore how the values within data are grouped. Distribution charts show you the shape of your data, the range of its values, and possible outliers.

Questions that might be answered by distribution charts include:

- What is the number of customers per age group?
- What cities have the highest use of our services?

Chart types for viewing distributions

Chart type	Common purpose
Histogram (page 263)	Viewing the how data is distributed over intervals.
Scatter plot (page 380)	Viewing the distribution of two measures.
Distribution plot (page 232)	Viewing the distribution of measure values in a dimension.
Box plot (page 210)	Viewing the range and distribution of numerical data.

Viewing performances

Performance charts provide a quick view of a performance measure. Looking at a performance chart, a user can quickly identify the measure value and whether the results are as expected or not.

Questions that might be answered by performance charts include:

- What are the current total sales for this quarter?
- Are current total sales for this quarter meeting the projected sales for the quarter?
- How is performance for this product line compared with other product lines?

Chart types for viewing performances

Chart type	Common purpose
Bullet chart (page 215)	Comparing performance of a measure for several dimensions.
Gauge (page 259)	Viewing a performance value to understand performance immediately.
KPI (page 267)	Viewing one or two performance measures.
Text & image (page 441)	Viewing text or several measures with an image.

Viewing data

Data charts present detailed data rather than a visualization of the data. Data charts are useful when you need to view precise values, and when you want to compare individual values.

Questions that might be answered by data charts include:

- What are the records for each transaction for this month?
- What are the quantity and sales for each item in each product group for each of our customers?

Chart types for viewing data

Chart type	Common purpose
Pivot table (page 367)	Viewing precise value for several dimensions and measures.
Table (page 421)	Viewing precise values from your data without trends or patterns.

Viewing geography

Geographical charts let you visualize your data by geography, displaying your data on a map either as points or areas.

Common questions that might be answered by geographical charts include:

- What cities have the highest use of our services?
- Which countries have the most customers?

Chart types for viewing geography

Chart type	Common purpose
Map chart (page 281)	Viewing data represented geographically by point or area.

What if no standard chart suits my purpose?

You can use controls or objects from a bundle supplied by Qlik:

- *Dashboard bundle (page 481)*
- *Visualization bundle (page 531)*

You can also create custom visualization objects if none of the standard charts provided fit your requirements for visualizing your data.

For more information, see *Creating a visualization using a custom object (page 678)*.

3.5 Visualizations

You can use visualizations to present the data that is loaded into the app. For example, you can use a bar chart to compare sales numbers for different regions, or use a table to show precise values for the same data.

The selections you make in a visualization are reflected in all associated visualizations on all sheets.

Creating a visualization

You create visualizations from predefined charts or custom objects. You must be in **Edit** mode to be able to add a visualization to the sheet.

1. Drag the visualization from the assets panel onto the sheet, or double-click the visualization.
2. Add dimensions and measures to the visualization. The number of dimensions and measures that are required depends on which visualization you selected.
   Dimensions determine how the data in a visualization is grouped. For example: total sales per country or number of products per supplier. For more information, see *Dimensions (page 106)*.

Measures are calculations used in visualizations, typically represented on the y-axis of a bar chart or a column in a table. Measures are created from an expression composed of aggregation functions, such as **Sum** or **Max**, combined with one or several fields. For more information, see *Measures (page 111)*.

3. Adjust the presentation, for example sorting, coloring, or labeling.

You can convert from one visualization type to another by dragging a new chart to a visualization on a sheet.

For other methods of creating a visualization, see *Creating and editing visualizations (page 629)*.

Reusing a visualization

If you have created a visualization that you want to reuse in other sheets of the app, you can save it as a master visualization. You can only create master visualizations in an unpublished app. When the app is published, all users can add the visualization to their own sheets, but not modify it.

Right-click on a visualization and select ***Add to master items*** *to save it as a master visualization.*

You can find master visualizations under in the assets panel.

Which visualizations are available?

The following types of visualizations are available in the assets panel:

- Charts illustrate the data with visual elements like bars, lines, or points.
- Text-based visualizations presents data in text form, for example, tables or filters.
- Dashboard objects do not always visualize app data, but they help with navigation through collections of analytics. They can also automate the performance of certain actions.

There are analyses available in the assets panel.

The best choice of chart type depends on the purpose of the visualization.

If the predefined visualizations does not fill your purpose, you can use a visualization extension. You find them in the assets panel under **Custom objects**.

Available built-in visualizations

The built-in visualizations are those that are included regardless of your Qlik Cloud subscription. Built-in visualizations are fully supported.

These are the built-in visualizations.

Charts

- **Bar chart**: Visualize differences in measures over one or more dimensions, arranged as a series of bars with varying height. Can be displayed in vertical or horizontal format, and with grouped, stacked, or butterfly presentation.
- **Box plot**: The box plot is suitable for comparing range and distribution for groups of numerical data, illustrated by a box with whiskers, and a center line in the middle.
- **Bullet chart**: Bullet charts can be used to visualize and compare performance of a measure to a target value and to a qualitative scale, such as poor, average, and good.
- **Combo chart**: The combo chart combines bars and lines in the same chart. The bars and lines have different axes to enable comparing percentages and sums. Available as horizontal or vertical combo chart.
- **Distribution plot**: The distribution plot is suitable for comparing range and distribution for groups of numerical data. Data is plotted as value points along an axis.
- **Gauge**: The gauge is used to display the value of a single measure, lacking dimensions.
- **Histogram**: The histogram is suitable for visualizing distribution of numerical data over a continuous interval, or a certain time period. The data is divided into bins.
- **Line chart**: The line chart displays data lines between values. Line charts are often used to visualize a trend in data over intervals of time. Can also be presented as an **Area** line chart.
- **Map**: The map is used to combine geospatial data and measure values, such as the sales for a region or a store.
- **Mekko chart**: The mekko chart compares a group while comparing category items contained within these groups.
- **Pie chart**: The pie and donut charts show the relation between a single dimension and a single measure. Can also be presented as a **Donut** chart.
- **Scatter plot**: The scatter plot presents values from two measures. This is useful when you want to show data where each instance has two numbers, for example, country (population and population growth). An optional third measure can be used and is then reflected in the size of the bubbles. When showing large data sets colors will be used instead of bubble size to represent the measure size.
- **Treemap**: The treemap shows hierarchical data. A treemap can show a large number of values simultaneously within a limited space.
- **Waterfall chart**: The waterfall chart illustrates how an initial value is affected by intermediate positive and negative values.

Text-based visualizations

- **Filter pane**: The filter pane allows you to control what data that is shown in the visualizations on a sheet. A filter pane can filter the data of several dimensions at once.
- **KPI**: The KPI is used to present central performance figures. You can add a link to a sheet.

- **NL insights**: The **NL insights** visualization displays natural language insights about data in the form of a chart.
- **Pivot table**: The pivot table presents dimensions and measures as rows and columns of a table. The pivot table allows you to analyze data in multiple dimensions at a time. The data in a pivot table may be grouped based on a combination of the dimensions, and partial sums can be shown.
- **Straight table**: The straight table allows you to present tabular data for detailed analysis. You can apply pagination to simplify consumption of large data volumes. You can also allow users to add and remove columns temporarily during analysis, using an enhanced chart exploration experience.
- **Table**: The table displays values in record form, so that each row of the table contains fields calculated using measures. Typically, a table includes one dimension and multiple measures. The **Straight table** has replaced the **Table** as the default table visualization.
- **Text & image**: You can use the text & image visualization to add text, images, measures and links to a webpage.

Dashboard objects

- **Button**: You can use buttons to add quick links for easy selection and navigation in your app.
- **Tab container**: You can add visualizations in a limited space and show or hide the visualizations inside the container based on conditions.
- **Navigation menu**: The navigation menu adds a sheet navigation options into your sheet.

Available custom objects

There are a number of custom objects available to add to your sheet.

Qlik Visualization bundle

The Qlik Visualization bundle is a set of charts that can be used to enhance and increase your Qlik Sense app's charting capacity.

Visualization bundle (page 531)

- **Funnel chart**: A funnel chart is a visual representation of the connected stages of a linear process.
- **Grid chart**: A chart that displays comparative data and with the values represented as colors.
- **Multi KPI**: A chart that shows KPI for multiple dimension values to quickly understand and track performance.
- **Org chart**: Creates an organization chart with a tree structure.
- **P&L pivot**: Creates a pivot table that you can style, for example for profit and loss reporting.
- **Pivot table**: Creates a pivot table with additional styling options not available in the pivot table visualization.

- **Sankey chart**: A flow chart diagram chart visually emphasizing major transfers or flows within defined system boundaries.
- **Trellis container**: Creates a trellis chart based on a master visualization.
- **Variance Waterfall**: Shows the variance between two measures over the different values of a dimension.
- **Word cloud**: A cloud chart of words with their size based on measure value.

Qlik Dashboard bundle

The Qlik Dashboard bundle is a set of controls that you can use to enhance navigation and selection in your Qlik Sense app.

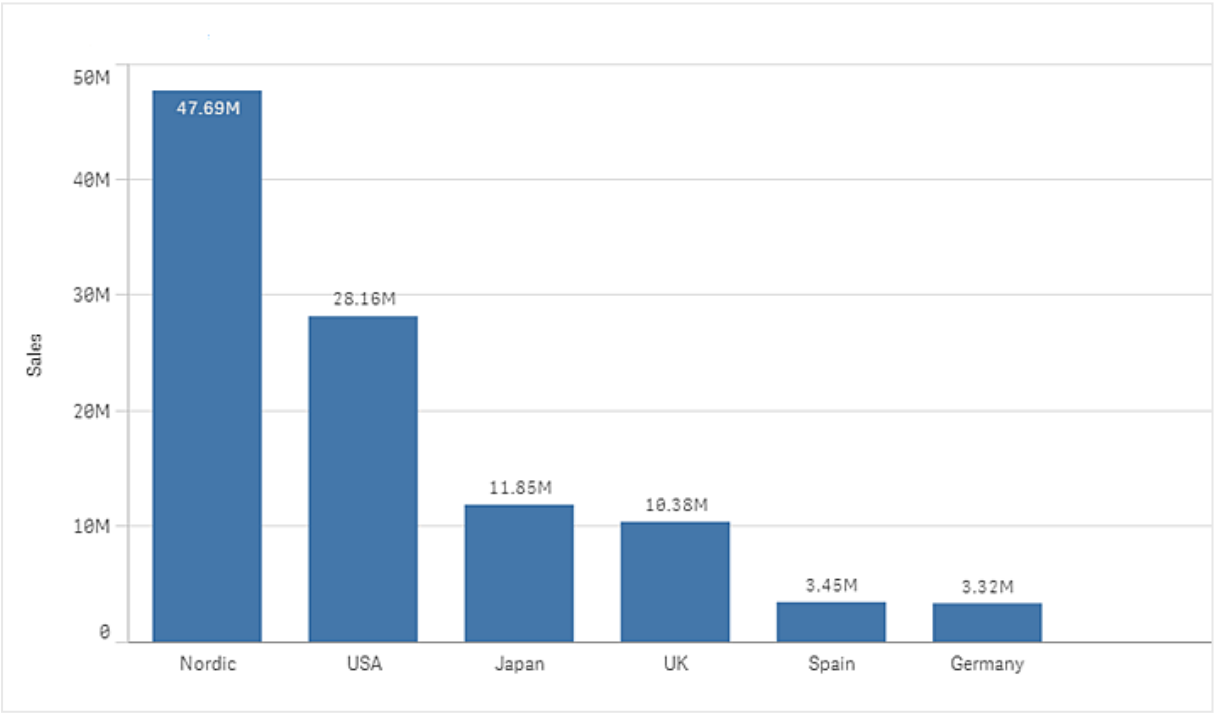
Dashboard bundle (page 481)

- **Animator**: You can animate changes in your visualizations over a period of time.
- **Container**: Add multiple visualizations to a container to save space.
- **Date picker**: You can select a single date or a range of dates from a calendar.
- **Layout container**: Add and arrange visualizations in a container.
- **Line**: Add vertical and horizontal lines to a sheet.
- **Variable input**: You can set the value of a variable.
- **Video player**: You can add a video to your sheet.

Bar chart

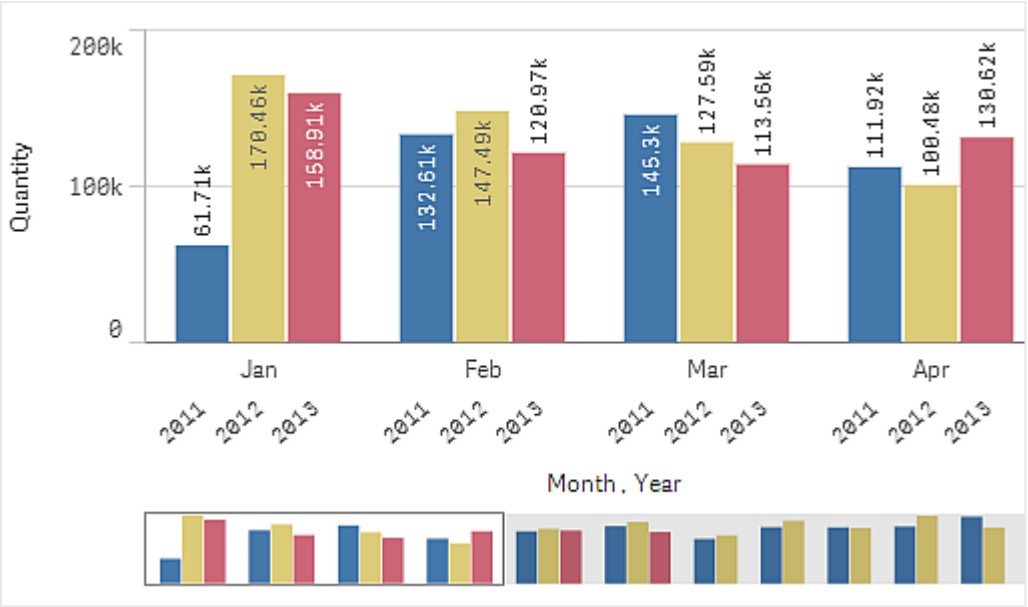
The bar chart is suitable for comparing multiple values. The dimension axis shows the category items that are compared, and the measure axis shows the value for each category item.

In the image, the dimension values are different regions: Nordic, USA, Japan, UK, Spain, and Germany. Each region represents a dimension value, and has a corresponding bar. The bar height corresponds to the measure value (sales) for the different regions.

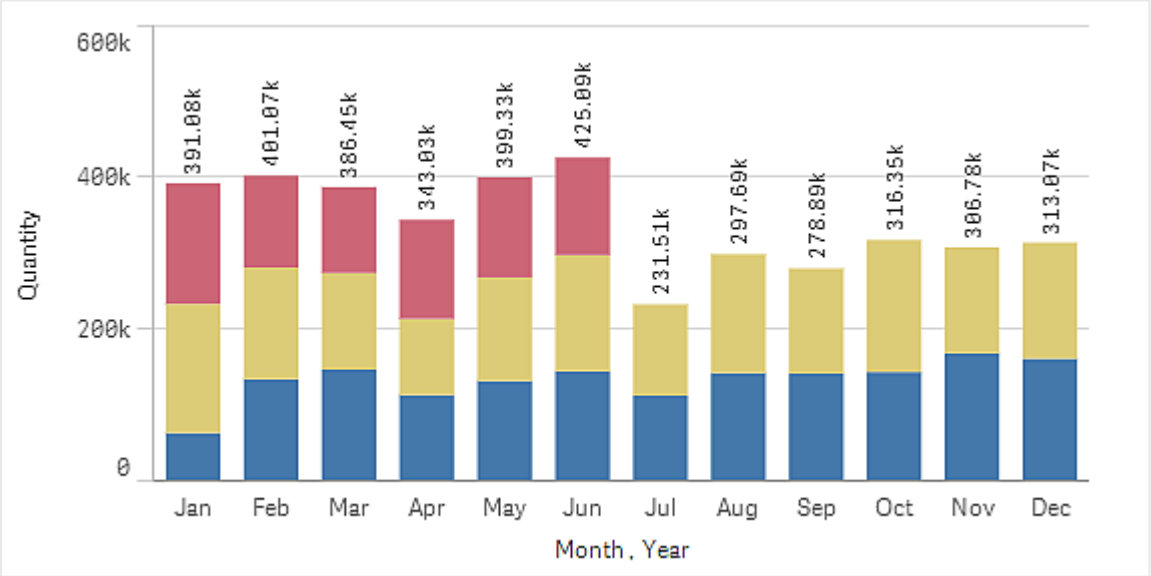


You can make more complex comparisons of data by using grouped or stacked bars. This requires using two dimensions and one measure. The two example charts use the same two dimensions and the same measure:

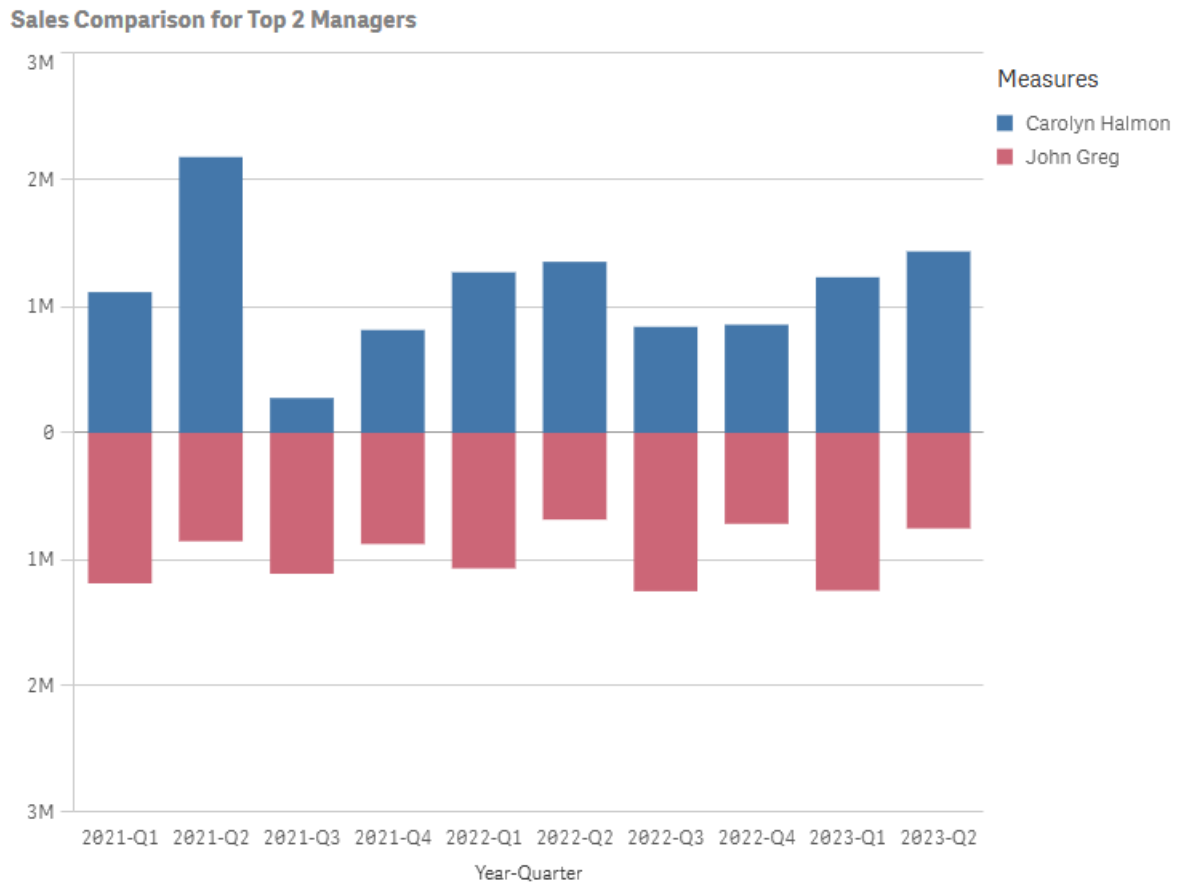
Grouped bars: With grouped bars, you can easily compare two or more items in the same categorical group.



Stacked bars: With stacked bars it is easier to compare the total quantity between different months. Stacked bars combine bars of different groups on top of each other and the total height of the resulting bar represents the combined result.



Using the butterfly chart configuration, you can compare two subsets of data in separate, mirrored views. The butterfly chart requires using one dimension and two measures. Data is shown along the same axis.



The bar chart can be displayed horizontally or vertically, as in the example below:

When to use it

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

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

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

Creating a bar chart

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

Do the following:

1. From the assets panel, 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.

In a bar chart you need at least one measure.

You can include up to two dimensions and one measure, or one dimension and up to 15 measures in a bar chart. Each bar corresponds to a dimension, and the values of the measures determine the height or length of the bars.

You can also create a bar chart with no dimension and up to 15 measures. In this case, one bar is displayed for every measure. The value of the measure determines the height or length of a bar.

Creating a bar chart

Dimensions	Measures	Result
1 dimension	1 measure	A simple bar chart with one bar for each dimension value.
2 dimensions	1 measure	A grouped or a stacked bar chart with one bar for each value of the two dimensions.
No dimension	up to 15 measures	A simple bar chart with one bar for each measure.
1 dimension	up to 15 measures	A grouped or a stacked bar chart with one bar for each value of each measure. With 1 dimension and 2 measures, you can switch to the butterfly chart configuration. You need to switch to advanced edit mode. See *Changing the presentation format of the bar chart (page 189)*.

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

Changing the presentation format of the bar chart

You have the following format options for your bar chart:

- Simple chart
- **Grouped**
- **Stacked**
- **Butterfly**

The simple chart and **Grouped** options are used by default, depending on the data you add to the chart. Additional options are available as applicable.

Each of the above formats can be presented in **Horizontal** or **Vertical** arrangement.

Presentation formats for bar chart

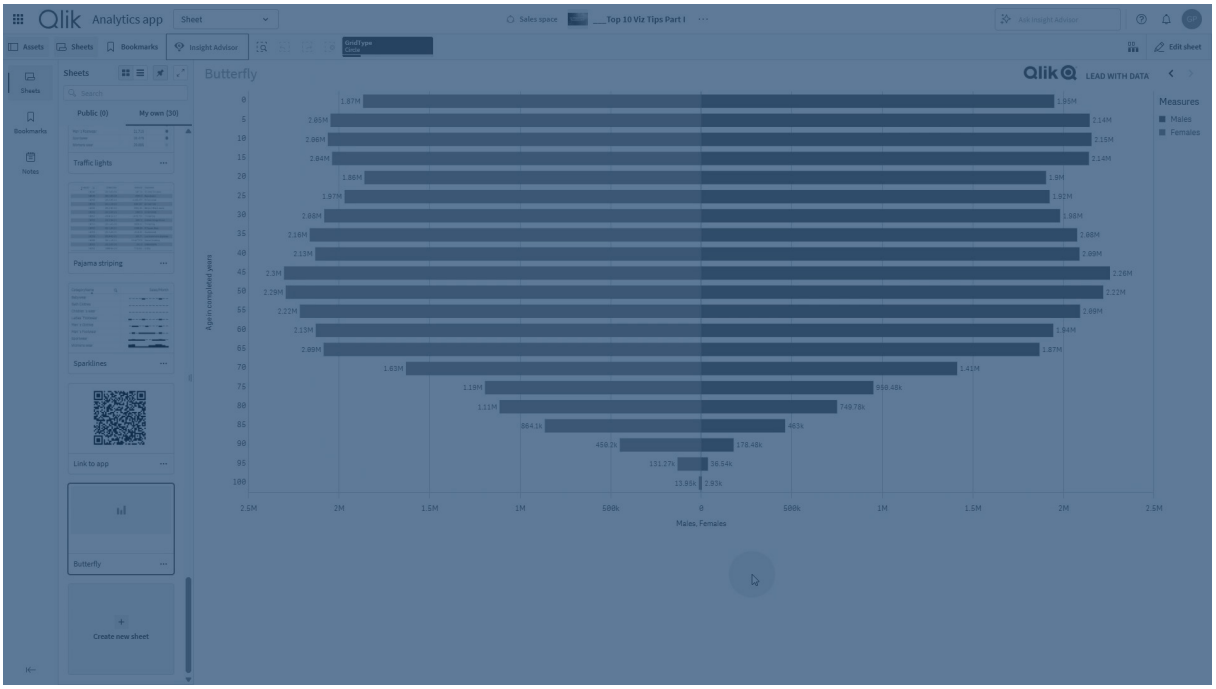
Presentation format	Data required	Result
Simple chart	Either of the following: • 1 dimensions and 1 measure • 0 dimension and 1-15 measures	Data is presented in side-by-side fashion. As applicable, measures are differentiated by color.
Grouped	Either of the following: • 2 dimensions and 1 measure • 1 dimension and 2-15 measures	Data is presented in groups in side-by-side fashion. Groups are differentiated by color.
Stacked	Either of the following: • 2 dimensions and 1 measure • 1 dimension and 2-15 measures	Data is stacked together and differentiated by color.
Butterfly	1 dimension and 2 measures	Data is presented in two separate, mirrored views along the same axis.

Do the following:

1. Create a bar chart with one of the data requirements shown in the above table.
2. Open the properties panel and expand **Appearance** > **Presentation**.
3. Select the desired option (**Grouped**, **Stacked**, or **Butterfly**).
4. Select whether to display chart in a **Horizontal** or **Vertical** arrangement.

Video - configuring a butterfly chart

This video shows an example of how you can create a butterfly chart.



Considerations for **Butterfly** format

- Only for charts with one dimension and two measures.
- Only non-negative values are shown.
- If all values are negative, a disclaimer is shown in the center of the chart. If any value is negative, a disclaimer is shown in the footnote of the chart.
- The measure axis of the second measure is also used to show the negative part of a trend line for the first measure, or a reference line with a negative value.
- When defining a custom range for the X-axis, you can only set a maximum value. It is not possible to set a minimum value. This setting is configured under **Appearance** > **X-axis**.

Styling the bar chart

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Axis title**: Style the titles on the axes.
    - **Axis label**: Style the labels on the axes.
    - **Value labels**: Style the labels which display the measure value for each dimension value. When using the **Stacked** presentation option, this setting controls **Segment labels** (measure values for each dimension value) and **Total labels** (combines the measure values for each dimension value).
    - **Legend title**: Style the title of the legend.
    - **Legend labels**: Style the labels of the individual legend items.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
When using a background color, use the slider to adjust the opacity of the background.
When using a background image, you can adjust image sizing and position.

Customizing the bar segment outline and bar width

You can adjust the outline surrounding each bar segment in the chart, as well as the width of the bars.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, under **Outline**, set the thickness and color of the outlines.
4. Adjust the slider for **Bar width** to set the width of the bars.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Adding trend lines

You can add trend lines to the chart. Use trend lines to visualize how data changes over time.

For more information about trend lines, see *Trend lines (page 117)*.

Do the following:

1. In the properties panel, expand the **Data** section.
2. Under **Measures**, expand the measure for which you are adding trend lines.
3. Under **Trend lines**, click **Add trend line**.
4. Define the **Label** and **Type** for the trend line.
5. Use the **Colors** slider to define **Custom** or **Auto** coloring.
6. Use the checkbox to toggle a **Dashed** appearance on or off.

Showing or hiding dimensions and measures depending on a condition

You can show or hide a dimension or measure depending on if a condition is true or false. This is known as a show condition, and is entered as an expression. The dimension or measure is only shown if the expression is evaluated as true. If this field is empty, the dimension or measure is always shown. Expand the dimension or measure in the **Data** section of the properties panel and enter an expression under **Show dimension if** or **Show measure if**.

Custom tooltips are disabled for a bar chart if any of the dimensions in the chart are using a show condition.

Let's say you have a dataset with the fields `City`, `Manager`, and `Sales`, among others. You could configure your bar chart so that aggregated sales are displayed along a dimension called `City`. You can add a second dimension, `Manager`, but only organize the data by this dimension if there are more than three manager names associated with your sales data.

Do the following:

1. Drag a bar chart from the assets panel onto the sheet.
2. Add `City` as a dimension.
3. Add `Manager` as a second dimension from the properties panel.
4. Add `Sum(Sales)` as a measure.
5. In the properties panel, expand the dimension `Manager`. Under **Show dimension if**, add the following expression:
   ```
   Count(distinct Manager)>3
   ```

If your data only contains two manager names, the bar chart will not organize sales by manager, since the expression is evaluated as false. If the data contains three or more unique `Manager` values, sales will be organized by both `City` and `Manager`.

Working with shapes

With shapes, you can add points and lines as separate items in the chart. Shapes allow you to enhance your dimension and measure data with special information that helps with analysis. For example, you could add a point to highlight a specific dimension value, or draw a line between the highest and lowest points for a key performance indicator.

Adding a point

Do the following:

1. In the properties panel, expand **Add-ons** > **Shapes**.
2. Click **Add shape**, and select **Point**.
3. Optionally, define a **Label** for the point using text or an expression.
4. Under **Dimension value**, type the dimension value for which to add the point. You can also define the value with an expression.
5. In the **Measure input** drop down menu, select one of the following and define the value below the menu:
   - **Measure value**: Define the measure value for which to add the point, either as a simple value or an expression. For example, you could use a set analysis expression.

- **Measure index**: Define the measure from which the measure value is extracted. This can be provided as a simple value or an expression. For example, use 0 for the first measure in the chart, 1 for the second measure in the chart, and so on.

6. Set the **Symbol** to use for the point. The default is **Circle**.
7. Adjust the **Label position** if needed. The label can be displayed above or below the point.
8. Set color and opacity using the following settings. You can also configure these elements to have no color.
    - **Point color**
    - **Outline color**
    - **Label color**
9. Use the **Colored background** check box to add a background for the label, if defined. When this option is turned on, the defined **Label color** is used for the background, and the label text switches to a color that best contrasts the background.
10. Use the sliders to adjust the **Outline width** and **Data point size**.

Adding a line

You can add a line as a series of points. The line connects each point that you define for it.

Do the following:

1. In the properties panel, expand **Add-ons** > **Shapes**.
2. Click **Add shape**, and select **Line**.
3. Optionally, define a **Label** for the line using text or an expression. This does not appear in the chart but helps with identification when you have multiple lines and points.
4. By default, data points are not highlighted on the line. To highlight them, turn on **Show data points** at the bottom of the settings for the line. With this option turned on, more point settings are shown.
5. To add a point, click **Add point**.
6. Under **Dimension value**, type the dimension value for which to add the point. You can also define the value with an expression.
7. In the **Measure input** drop down menu, select one of the following and define the value below the menu:
    - **Measure value**: Define the measure value for which to add the point, either as a simple value or an expression. For example, you could use a set analysis expression.
    - **Measure index**: Define the measure from which the measure value is extracted. This can be provided as a simple value or an expression. For example, use 0 for the first measure in the chart, 1 for the second measure in the chart, and so on.
8. Adjust the point's appearance using the following settings. These settings become visible when **Show data points** is turned on.
    - **Label**: Set a textual label for the point.
    - **Symbol**: Set the shape of the point. The default is **Circle**.
    - **Label position**: Choose whether to show the label above or below the point.
    - **Point color**: Set the color of the point.

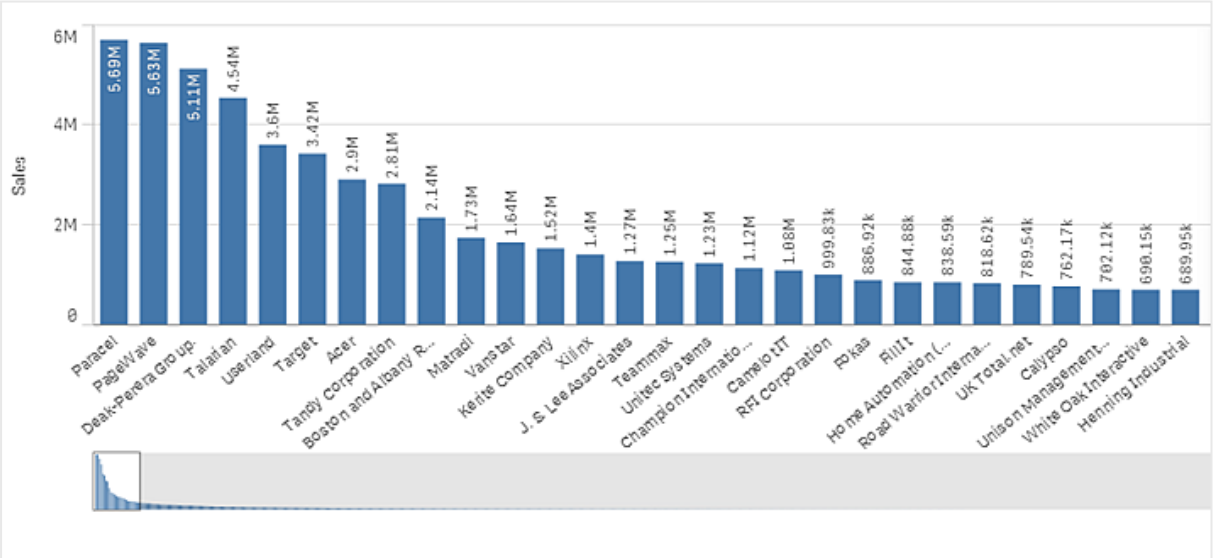
- **Outline color**: Set the color of the point outline.
- **Label color**: Set the color of the label text. If **Colored background** is turned on, this setting instead controls the background behind the label.
- **Outline width**: Set the width of the point outline.
- **Data point size**: Set the overall size of the point.
- **Colored background**: Add a background for the label, if label text has been defined. When this option is turned on, the defined **Label color** is used for the background, and the label text switches to a color that best contrasts the background.

9. Add one or more points as needed, using the above steps.
10. Set the **Line color**, including opacity.
11. Use the slider to adjust the **Line thickness**.
12. Select the **Line type**, choosing between **Solid** or **Dashed**.
13. Use the **Line curve** drop down menu to select one of the following:
    - **Linear**: Each point is connected with straight lines.
    - **Monotone**: Each point is connected with curved lines.

Display limitations

Displaying large numbers of dimension values

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



*You can exchange the mini chart with a regular scrollbar, or hide it, with the **Scrollbar** property.*

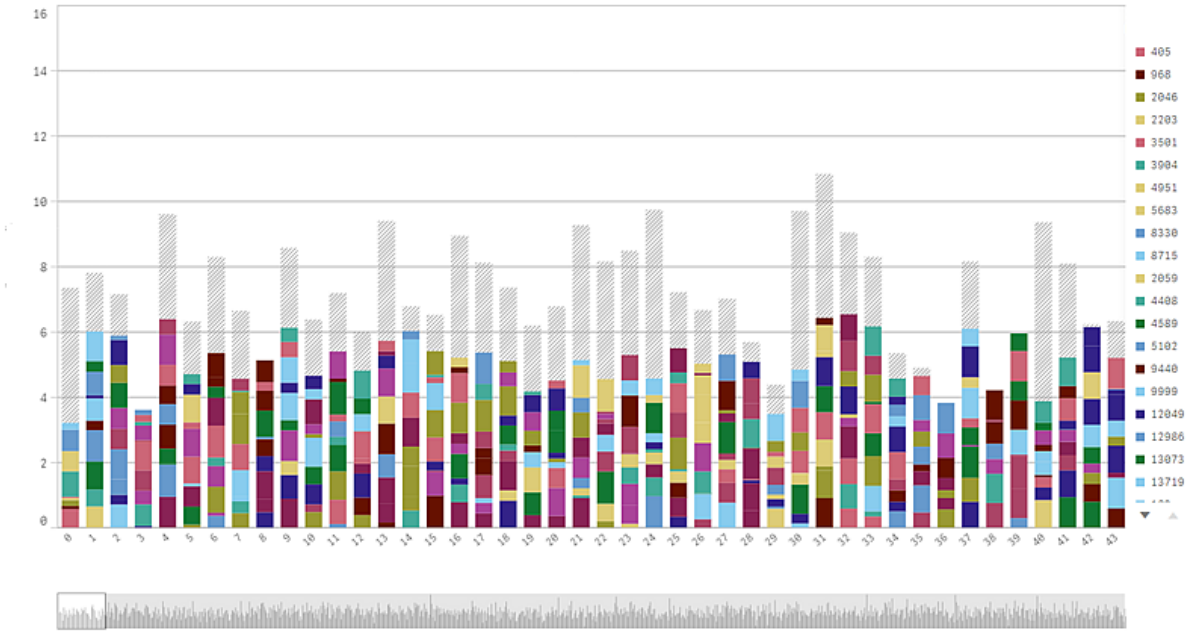
Displaying out of range values

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

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

Displaying large amounts of data in a stacked bar chart

When displaying large amounts of data in a stacked bar chart, there may be cases when not each dimension value within a bar is displayed with correct color and size. These remaining values will instead be displayed as a gray, striped area. The size and total value of the bar will still be correct, but not all dimension values in the bar will be explicit.



To remove the gray areas, you can either make a selection or use dimension limits in the properties panel.

The approximate limit for how many stacked bars that can be displayed without gray areas is 5000 bars, assuming that each bar consists of 10 inner dimension values and one dimension value and one measure value for the whole bar.

The initial data load is 500 dimension values or dimension stacks. (The value 500 refers to the outer dimension values, not each dimension value in a stack.) When you have scrolled past those 500 values, an incremental load is performed, where values are instead loaded based on the current view or scroll position.

Displaying large amounts of data in a bar chart with continuous scale

If the chart uses a continuous scale, a maximum of 2000 data points can be displayed. The actual maximum number of data points in the chart is affected by the distribution of the data. Above that number, data points are neither displayed, nor included in selections made in the chart. Additionally, only twelve dimension values are displayed for the second dimension in a chart with two dimensions and continuous scale.

To avoid displaying limited data sets, you can either make a selection or use dimension limits in the properties panel.

Colors and legend

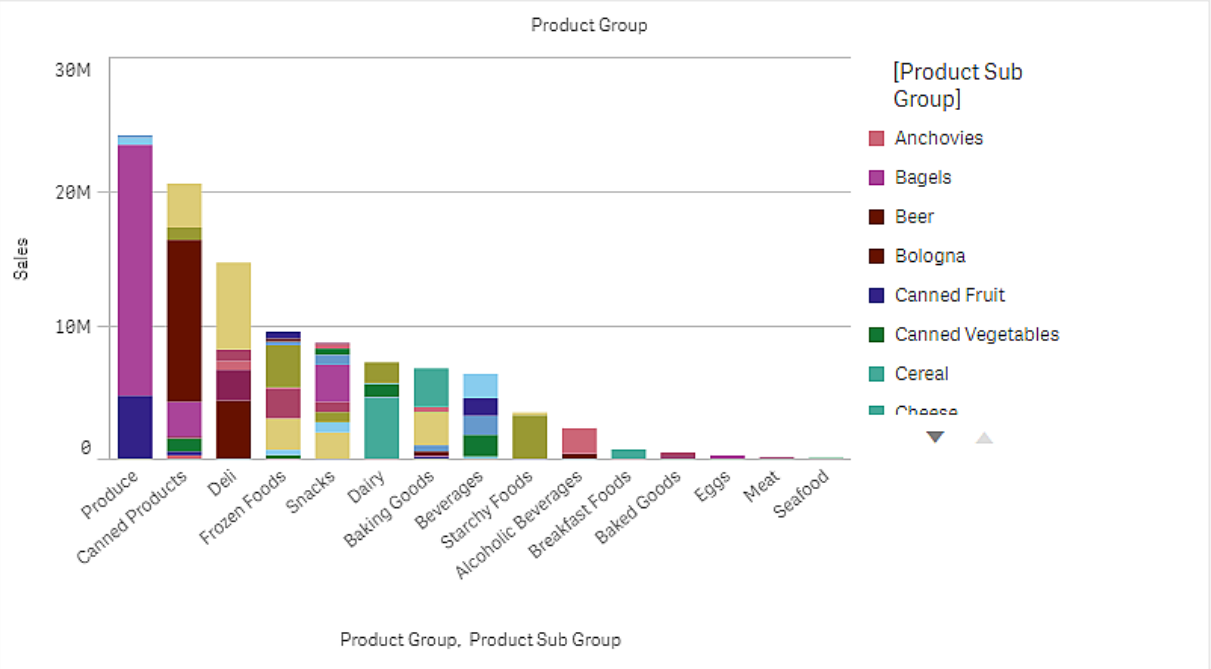
When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Stacked bar charts and number formatting by measure expression

Stacked bar charts ignore number formatting by measure expression and instead will always us the default formatting to make it consistent with the formatting of totals.

Comparing categories against a measure with a bar chart

This example shows how to make a bar chart to visualize sales data and how to compare different product groups against the same measure.



Dataset

In this example, we'll use two data files available in the Qlik Sense Tutorial - Building an App. Download and expand the tutorial, and the files are available in the *Tutorials source* folder:

- *Sales.xls*
- *Item master.xls*

To download the files, go to Tutorial - Building an App.

Add the two data files to an empty app and make sure that they are associated by *Item Number*.

The dataset that is loaded contains sales data. The *Item master* table holds the information about the items ordered, such as product groups.

Measure

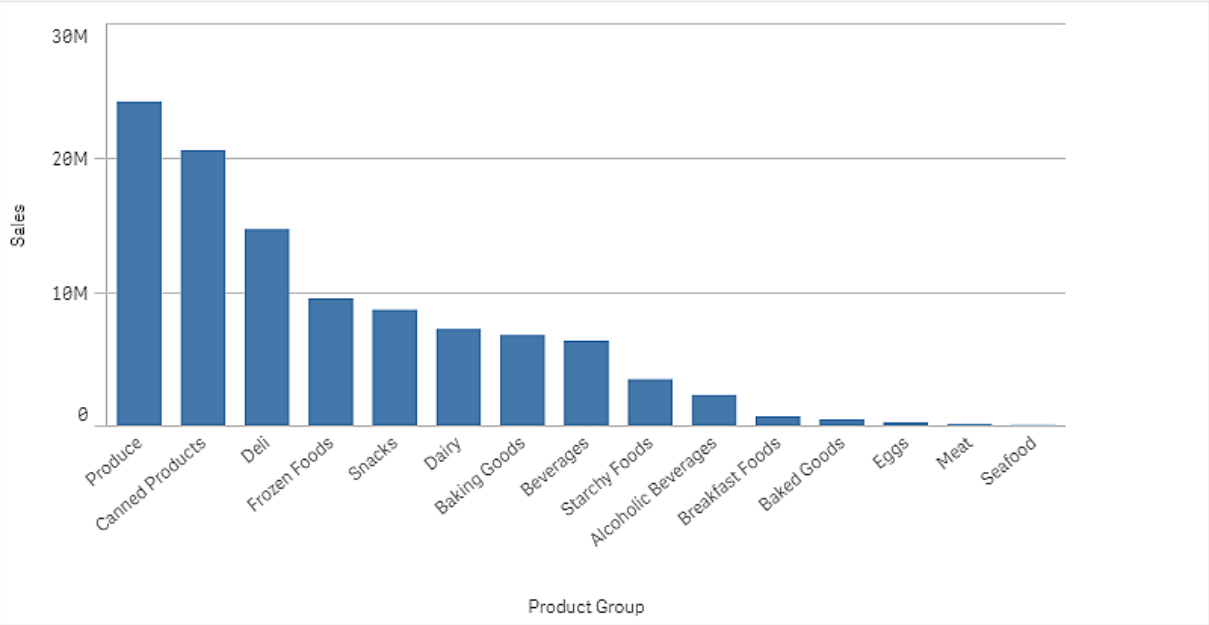
We use the sales volume as the measure, by creating a measure in Master items with the name *Sales*, and the expression `Sum(Sales)`.

Visualization

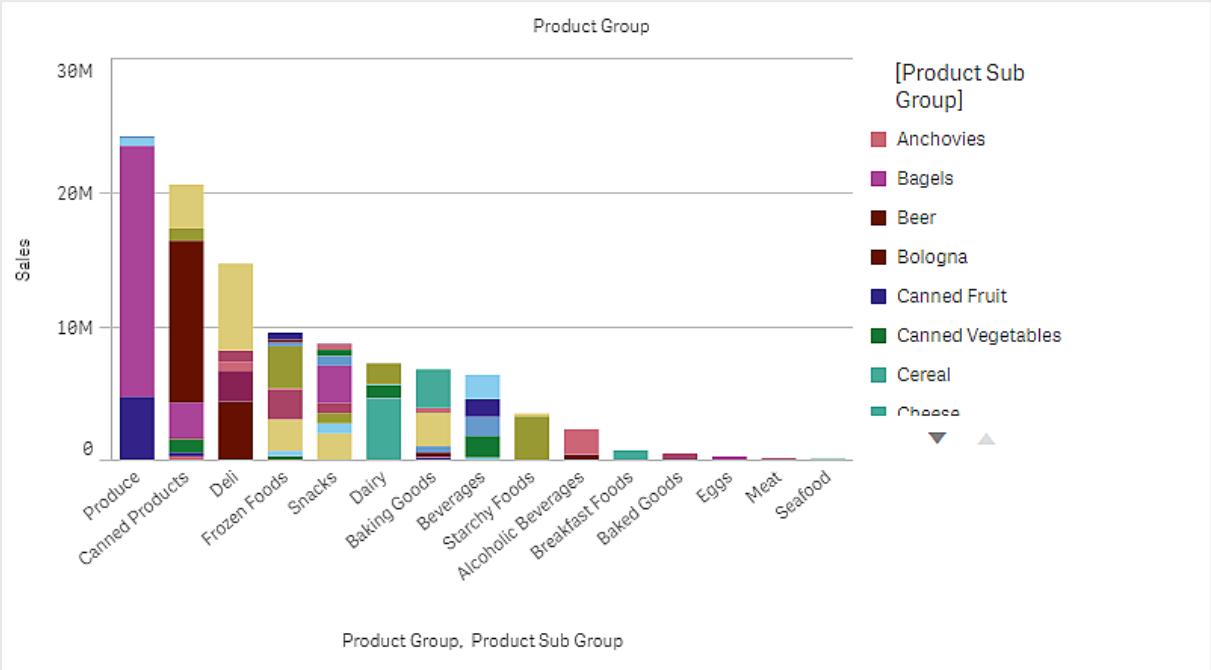
We add a bar chart to the sheet and set the following data properties:

- **Dimension**: Product Group (product group).
- **Measure**: *Sales*; the measure that was created as a master item.

The following bar chart is created, with a bar showing the sales for each product group:



But we want to have some more detailed information about the product sales, by adding the Product Sub Group as a dimension. The Product Sub Group field divides the product groups into sub groups. By default, a grouped chart is selected when adding the second dimension. We want to display a stacked chart instead, that is changed under **Appearances** in the properties panel.



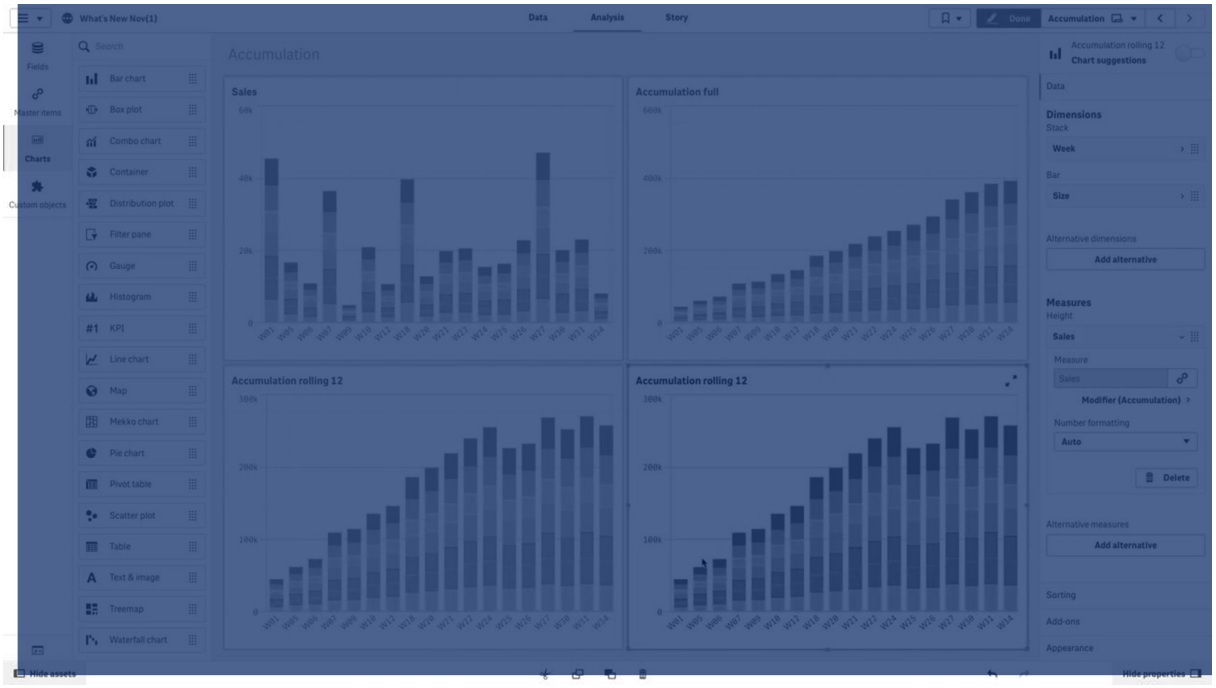
Discovery

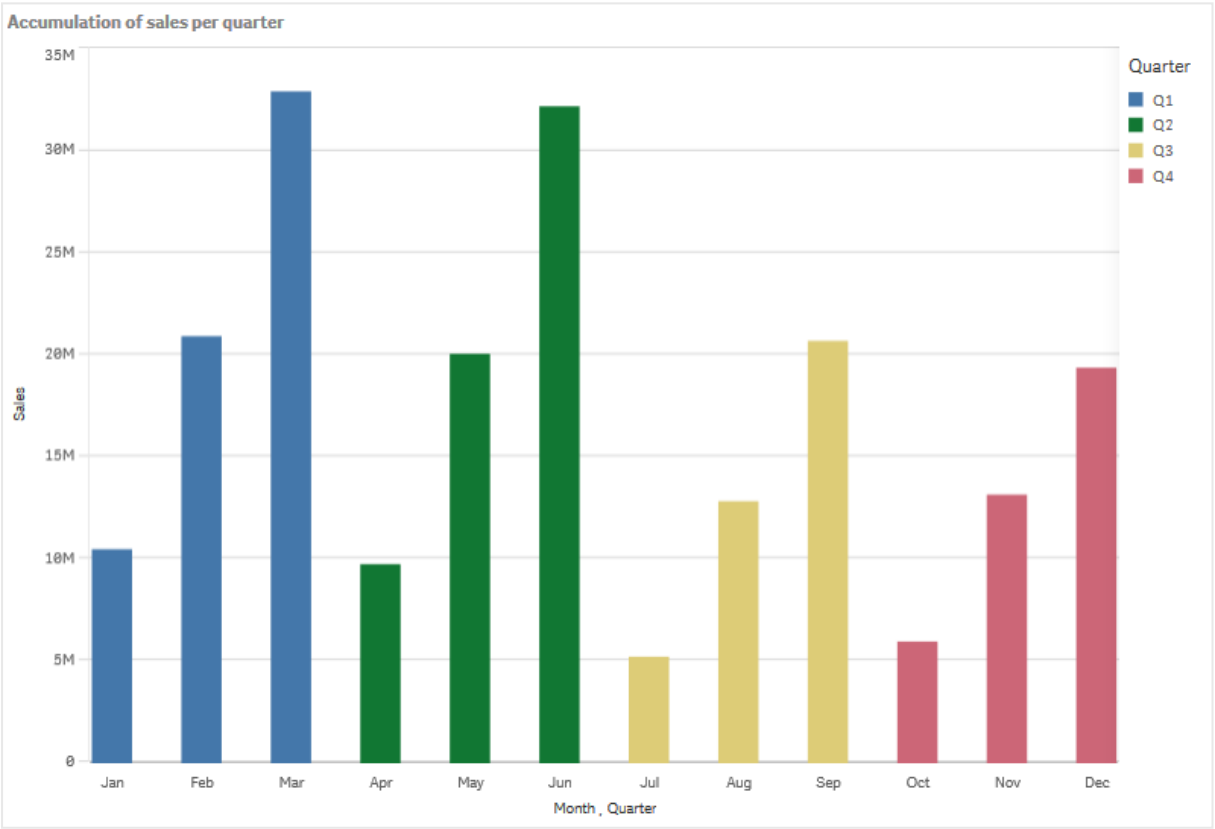
The bar chart visualizes the sales volume of different product groups, divided into product sub groups. The visualization is sorted in order of sales volume per product. You can hover the mouse pointer over a product sub group and view the details.

In the bar chart we can see that Produce has the highest sales volume. One of the sub products contribute to most of the Produce sales, if we hover over that part of the bar we can see it is Fresh Vegetables.

Accumulating values over a dimension in a bar chart

This example shows how to use a bar chart to visualize sales data which accumulate over a dimension.





Dataset

In this example, we will use a data file available in the Qlik Sense Tutorial - Building an App. Download and expand the tutorial. The file is available in the *Tutorials source* folder: *Sales.xls*

To download the file, go to Tutorial - Building an App.

Add the data file to an empty app. The dataset that is loaded contains sales data.

Measure

We use the sales volume as the measure that we create in Master items:

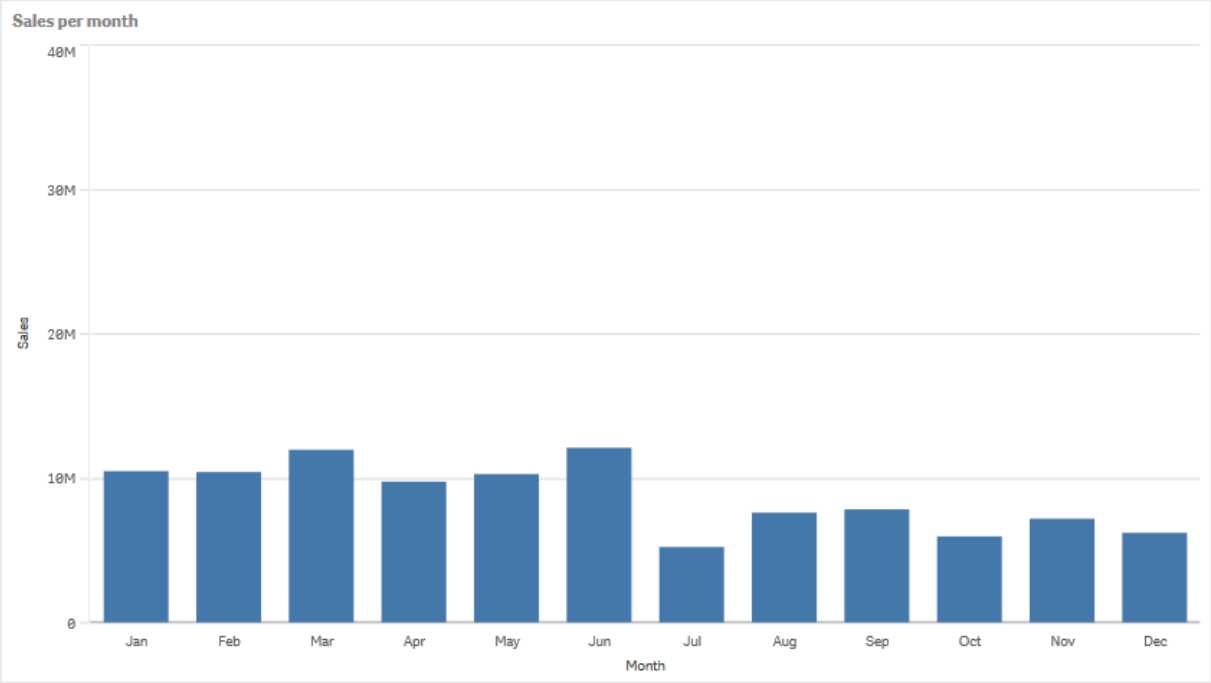
- *Sales* with the expression `Sum(Sales)`. This is the sum of the sales volume.

Visualization

We add a bar chart to the sheet and set the following data properties:

- **Dimension**: Month (Date.Month).
- **Measure**: *Sales*; the measure that was previously created.

The following bar chart is created, with a bar showing the sum of sales for each month.



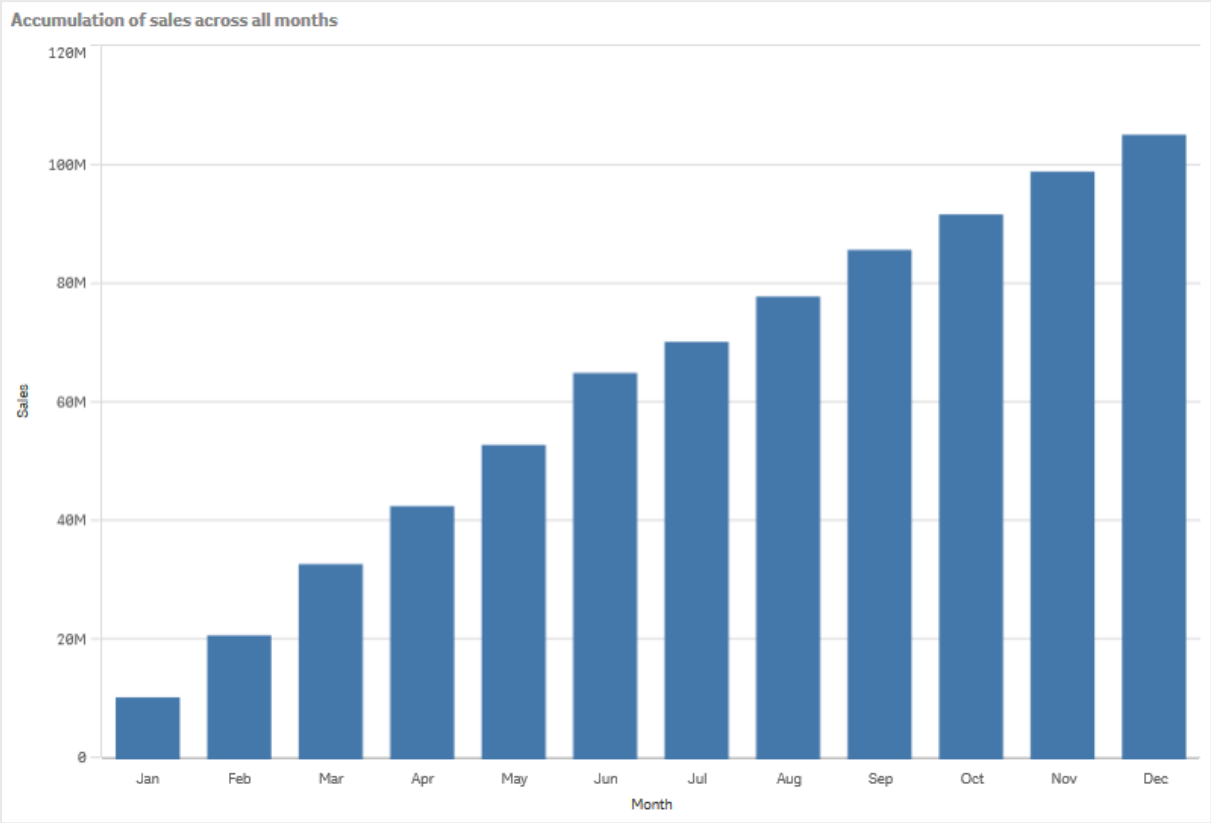
Accumulation

To have our sales data accumulate over one dimension, we need to apply a modifier to our *Sales* measure.

Do the following:

- Under **Measure**: *Sales* set the **Modifier** to Accumulation. This will set the measure to accumulate over one dimension.

Our bar chart becomes as follows, with the sales accumulating from one month to the next.

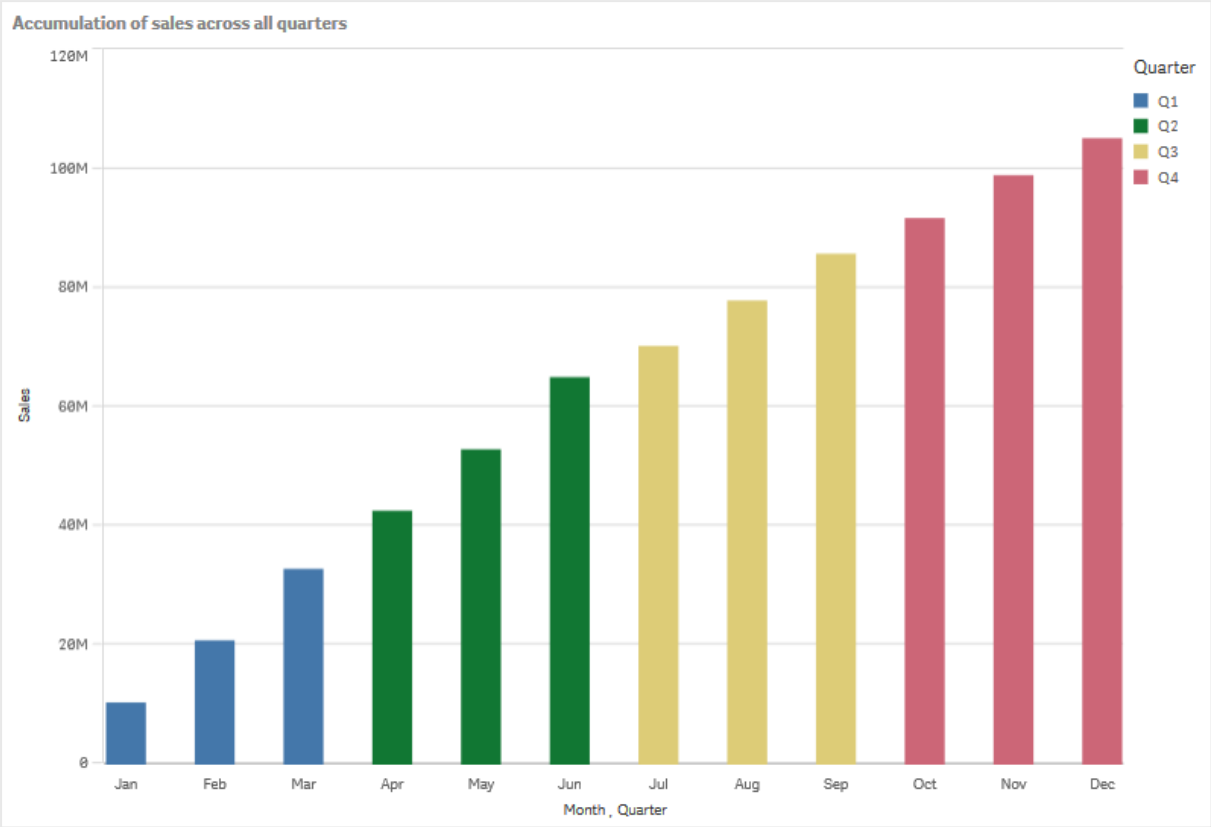


We want to achieve a visual separation of the periods of time, by adding the Quarter as a second dimension. The Quarter fieldgroups the month bars into larger groups. By default, a grouped chart is selected when adding a second dimension.

Do the following:

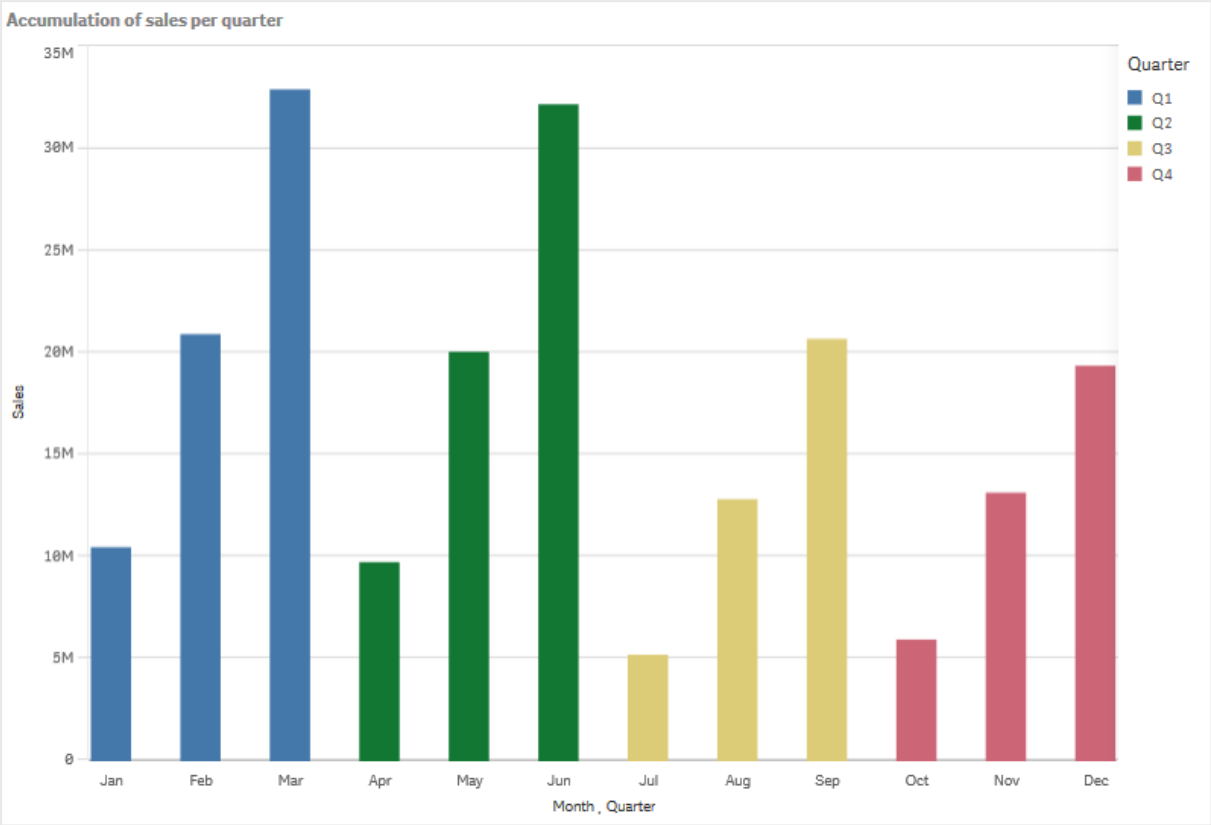
1. Add **Dimension**: Quarter (Date.Quarter).
2. Under **Measure**: *Sales* set the **Modifier>Dimension** to *Month*. This sets the dimension over which the accumulation will take place.

If **Across all dimensions** is turned on, the accumulation continues across all quarters.



Notice how the bars of the previous two bar charts are the same.

If **Across all dimensions** is turned off, the accumulation starts again at the beginning of each quarter. Our bar chart becomes as follows, with the sales accumulating from one month to the next, inside each quarter.



It is good practice to have the title of your charts represent their content. So consider changing the title of your new bar chart to reflect that the bars are now an accumulation of sales.

Discovery

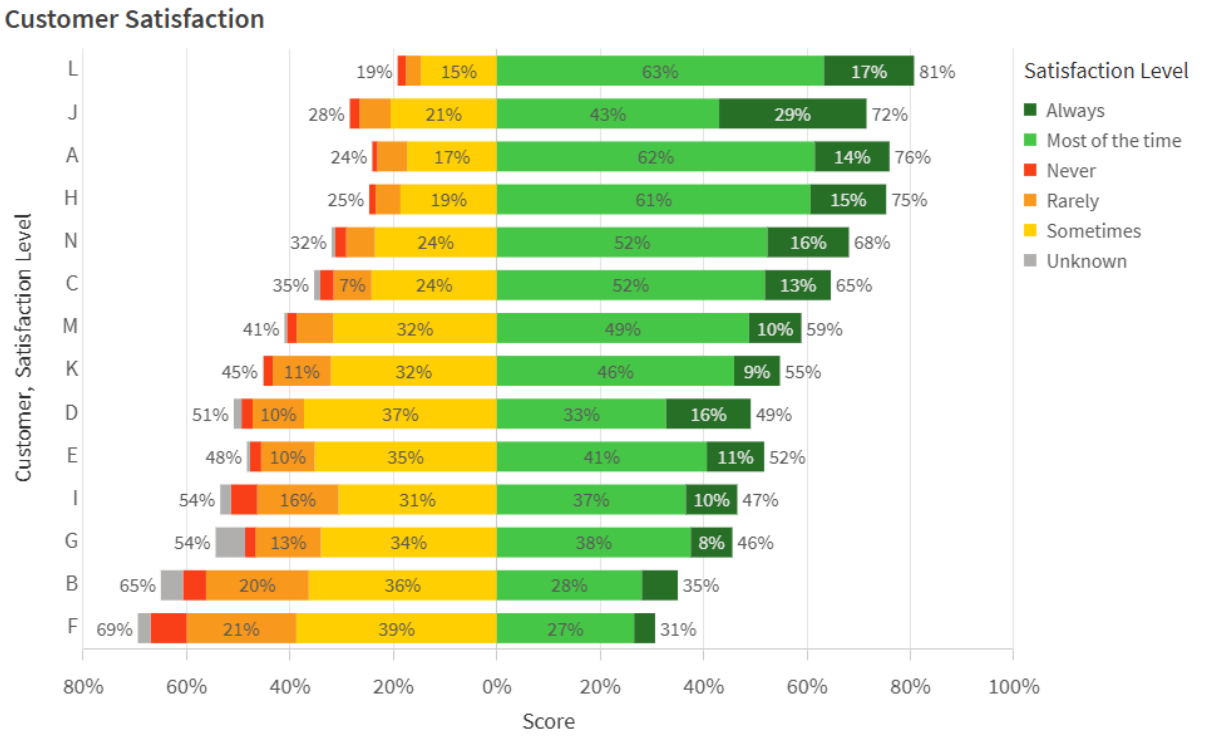
The bar chart visualizes the sales volume of each month, grouped into quarters. By having the sales accumulate inside each quarter, we get a better understanding of the volume of sales for each quarter. You can hover the mouse pointer over a month and view the details.

In the bar chart we can see that Q1 has the highest sales volume. We can also see that even though Q4 had the lowest sales volume, the first two months of the quarter were better than the ones from Q3.

Visualizing variations from a reference point in a bar chart

In this example, you will create a horizontal stacked bar chart to present results from a customer satisfaction survey. The goal is to visualize data as positive or negative variations from 0, the fixed reference point.

Completed bar chart displaying survey results



What you will do

In this example, you will use survey data in a bar chart to rank overall satisfaction by customer. The data shows the satisfaction levels of each customer with an organization's products and services. Data is organized by survey batch and outlines what percentage of each customer's representatives fall into each of the predefined satisfaction levels grouped by the survey:

- Always
- Most of the time
- Sometimes
- Rarely
- Never
- Unknown

In the data, the fixed reference point 0 is the most neutral satisfaction score. Positive and negative variations from this reference point indicate higher and lower customer satisfaction, respectively.

Preparations

Create a new app and paste the *Example load script (page 207)* into a new section in the Data load editor. Then, load the data.

After loading the data, switch to sheet view.

Example load script

Data for example

```
[Customer Satisfaction]:
CrossTable (Satisfaction_Level,Satisfaction_Value,2)
LOAD RowNo() as Batch_ID, * INLINE [
Customer,Always,Most of the time,Sometimes,Rarely,Never,Unknown
B,6.7,28.7,36.6,19.2,4.2,4.5
L,20.8,60.5,14.4,2.2,2.0,0
I,10.1,36.8,30.3,15.3,5.3,2.2
J,30.5,43.6,18.8,5.4,1.6,0.0
N,17.4,53.1,22.3,5.0,1.7,0.6
D,16.1,34.3,37.2,9.0,1.9,1.5
K,9.7,46.4,31.0,11.1,1.6,0.2
F,3.8,26.2,38.6,21.2,7.5,2.7
G,7.8,38.1,34.6,11.1,2.0,6.4
A,15.4,61.1,17.0,5.5,1.0,0.0
M,11.1,47.3,32.2,6.7,2.2,0.5
C,13.9,51.4,24.1,6.9,2.7,0.8
H,16.4,58.8,18.5,4.7,1.6,0.0
E,10.7,41.2,36.1,9.7,1.8,0.6
B,7.2,27.4,36.2,20.5,4.7,4.1
L,14.1,66.0,15.0,3.6,1.2,0
I,9.8,36.3,31.0,16.1,4.8,2.0
J,26.5,42.4,22.3,6.7,2.1,0.0
N,14.1,51.6,24.9,6.1,2.5,0.8
D,16.6,31.2,37.4,10.9,2.4,1.5
K,8.0,45.4,33.2,11.4,1.9,0.1
F,4.3,26.9,39.0,21.2,6.5,2.2
G,8.3,36.9,33.5,14.1,2.1,5.0
A,13.5,61.9,17.7,6.1,0.9,0.0
M,9.2,50.2,31.1,7.4,1.6,0.5
C,11.6,52.3,24.4,7.8,2.4,1.6
H,12.9,62.5,18.8,4.9,0.9,0.0
E,11.5,40.0,34.4,11.0,2.5,0.6
];

[Satisfaction Levels]:
load * inline [
Satisfaction_Level,Satisfaction_Score,Satisfaction_Order,Satisfaction_Sign
Always,5,3,1
Most of the time,4,2,1
Sometimes,3,1,-1
Rarely,2,1,-1
Never,1,2,-1
Unknown,0,3,-1
];
```

Part 1: Create a master dimension

Before creating the bar chart, add a master dimension to set the specific colors needed in the chart. The colors can range from red to green as customer satisfaction scores increase.

Do the following:

1. Click **Master items** in the assets panel.
2. Click + next to **Dimensions** to add a master dimension.
3. Select *Satisfaction_Level* in the left side panel.
4. Under **Name**, enter *Satisfaction Level*.
5. Click **Create**.
6. Select the master dimension in the **Dimensions** list and click . Click **Continue**.
7. In the dialog, switch to the **Value colors** tab.
8. In the list of field values, assign the following hex codes for each respective value:
    - *Always*: 276e27
    - *Most of the time*: 46c646
    - *Never*: f93f17
    - *Rarely*: f8981d
    - *Sometimes*: ffcf02
    - *Unknown*: b0afae

Part 2: Configure chart data

Do the following:

1. Drag a bar chart onto the sheet.
2. Add *Customer* as the first dimension.
3. Add the *Satisfaction Level* master dimension as the second dimension.
4. Add the following measure:
   `avg(Satisfaction_Value)*Satisfaction_Sign/100`
5. For the measure you just added, enter *Score* as the **Label**.

Part 3: Configure sorting

Sort the data in the chart to reflect the balance between survey results and the meanings of the satisfaction ranks. Additionally, use the *Satisfaction_Order* field, which presents each of the satisfaction ranks in numeric order, to sort how the dimension values are stacked.

Do the following:

1. In the properties panel, expand **Sorting**.
2. Expand *Customer*.
3. Set **Sorting** to **Custom**, and check the **Sort by expression** checkbox.
4. Use the following **Expression**:
   `avg(Satisfaction_Value*Satisfaction_Score)`
5. Change the sorting to **Descending**.
6. Uncheck the **Sort numerically** and **Sort alphabetically** checkboxes.

7. Expand *Satisfaction Level*.
8. Set **Sorting** to **Custom**, and check the **Sort by expression** checkbox.
9. Use the following **Expression**:
   `sum(Satisfaction_Order)`
10. Uncheck the **Sort numerically** and **Sort alphabetically** checkboxes.
11. Expand *Score*.
12. Set **Sorting** to **Custom**.
13. Uncheck the **Sort numerically** and **Sort alphabetically** checkboxes.

Part 4: Configure presentation

Now that the data and sorting have been defined, adjust the presentation of the chart.

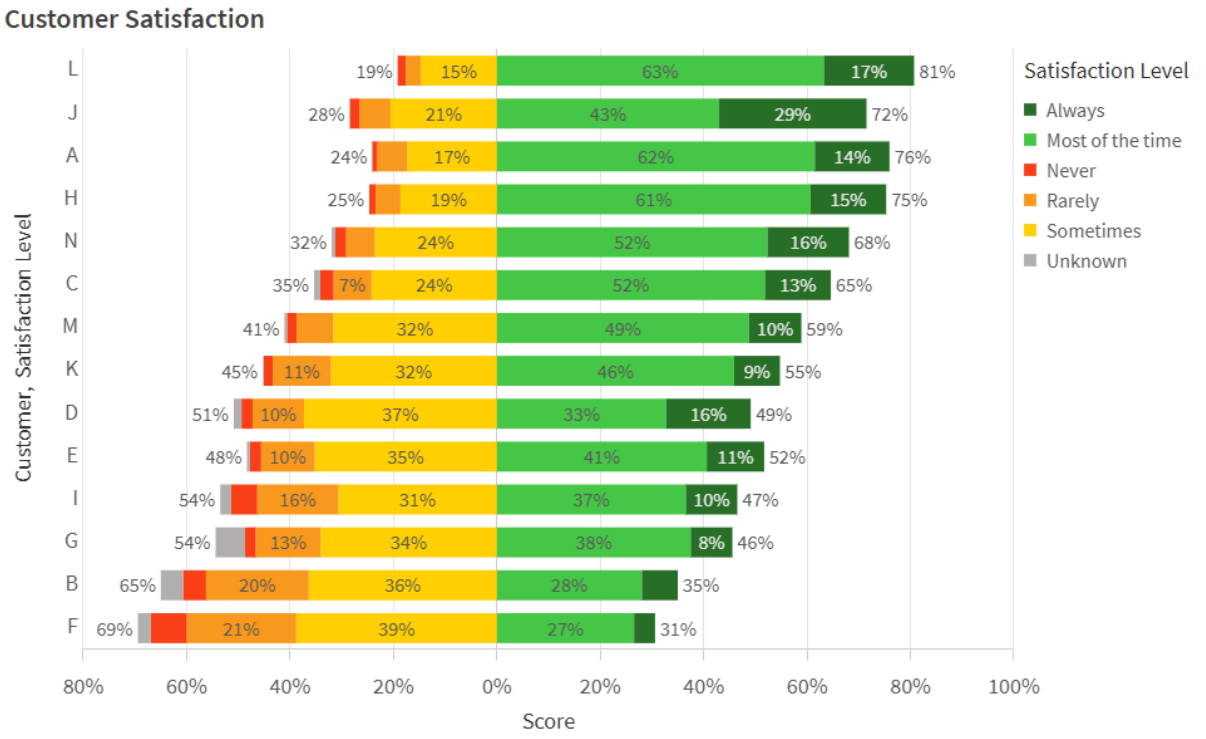
Do the following:

1. In the properties panel, expand **Appearance** > **General**.
2. Add the **Title** *Customer Satisfaction*.
3. Expand **Appearance** > **Presentation**.
4. Switch from **Grouped** to **Stacked** presentation.
5. Switch from **Vertical** to **Horizontal** orientation.
6. Turn **Value labels** on.
7. Turn **Segment labels** on.
8. Turn **Total labels** on.
9. Click **Styling**.
10. Under **General**, set the **Title** font size to 22px.
11. Under **Chart**, set the following properties:
    - For **Axis title**, set the font size to 18px.
    - For **Axis label**, set the font size to 18px.
    - For **Value labels**, set the font size to 16px.
    - For **Legend title**, set the font size to 18px.
    - For **Legend labels**, set the font size to 16px.
12. Expand **Appearance** > **Colors and legend**.
13. Set **Colors** to **Custom**.
14. In the drop down menu, select **By dimension** and ensure the *Satisfaction Level* dimension is selected.

Results

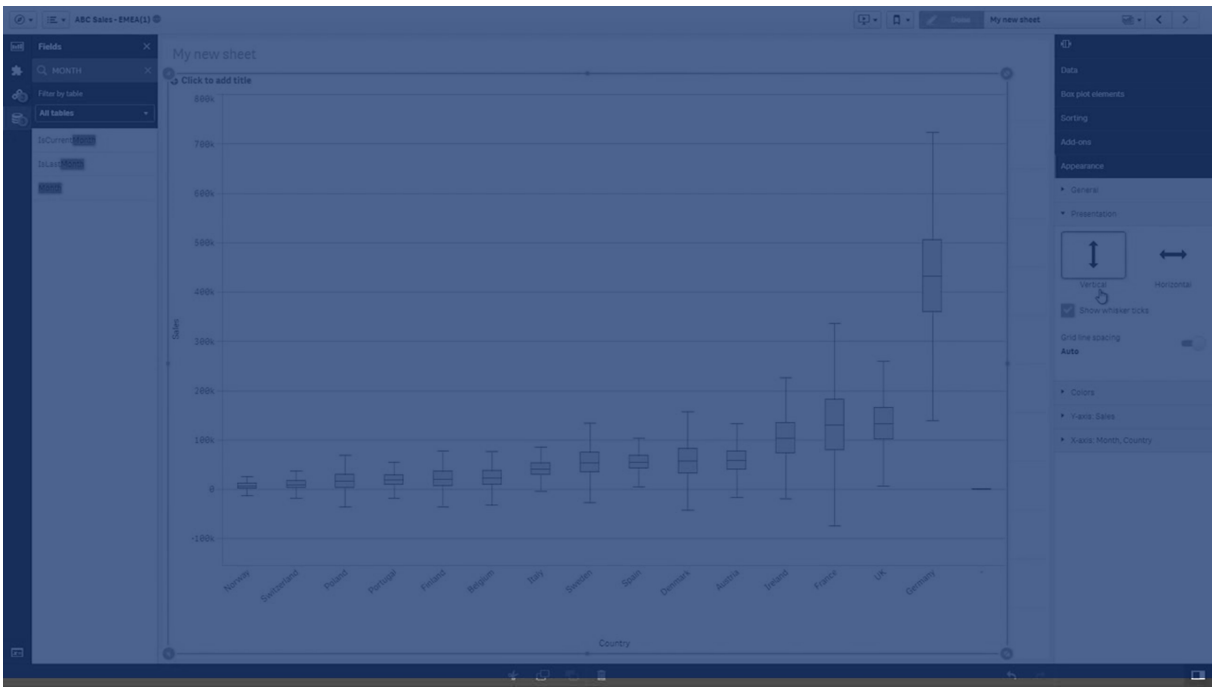
The completed bar chart should look like the following.

Completed bar chart displaying survey results

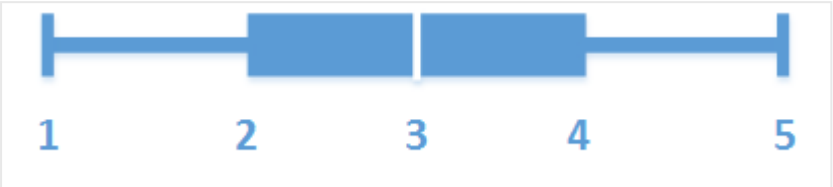


Box plot

The box plot is suitable for comparing range and distribution for groups of numerical data, illustrated by a box with whiskers, and a center line in the middle. The whiskers represent high and low reference values for excluding outlier values.



You can define the box start and end points, and whiskers ranges with a few different presets, or define your own settings using expressions.



1. First whisker
2. Box start
3. Center line
4. Box end
5. Last whisker

You can hover over a box to display a popup showing the respective values of the box plot elements.

When to use it

The box plot is suitable for comparing range and distribution for groups of numerical data.

Advantages: The box plot organizes large amounts of data, and visualizes outlier values.

Disadvantages: The box plot is not relevant for detailed analysis of the data as it deals with a summary of the data distribution.

Creating a box plot

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

In a box plot you need to use one or two dimensions, and one measure. If you use a single dimension you will receive a single box visualization. If you use two dimensions, you will get one box for each value of the second, or outer, dimension.

By default, the **Standard (Tukey)** preset is used.

You cannot use calculated dimensions in a box plot.

Do the following:

1. From the assets panel, drag an empty box plot to the sheet.
2. Add the first dimension.
   This is the inner dimension, which defines a box.
3. Add a second dimension.
   This is the outer dimension, which defines the boxes shown on the dimension axis.

4. Click **Add measure** and create a measure from a field. The measure does not have to contain an aggregation.

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

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

Styling the box plot

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Axis title**: Style the titles on the axes.
    - **Axis label**: Style the labels on the axes.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Changing the definition of the box plot

You can use one of the three presets, found under **Box plot elements** in the properties panel, to define your box plot.

- **Standard (Tukey)**
  This preset is based on the original box plot definition by J. Tukey. The center line represents the median (second quartile), and the box start and end points represent the first and third quartiles. Whisker length can be set to 1, 1.5 or 2 inter-quartile ranges. An inter-quartile range represents the difference between the first and third quartiles.
- **Percentile-based**
  This preset is also defined with the box start and end points representing the first and third quartiles, and the center line representing the median, but the whisker length is adjusted by setting a percentile based whisker position.
- **Standard deviation**
  This preset is based on standard deviations, with the center line representing the average value, and the box start and end points representing one standard deviation variance. You can set the whisker length to a multiple of standard deviations.

You can also define a custom box plot where you set the value of each box plot element using an expression.

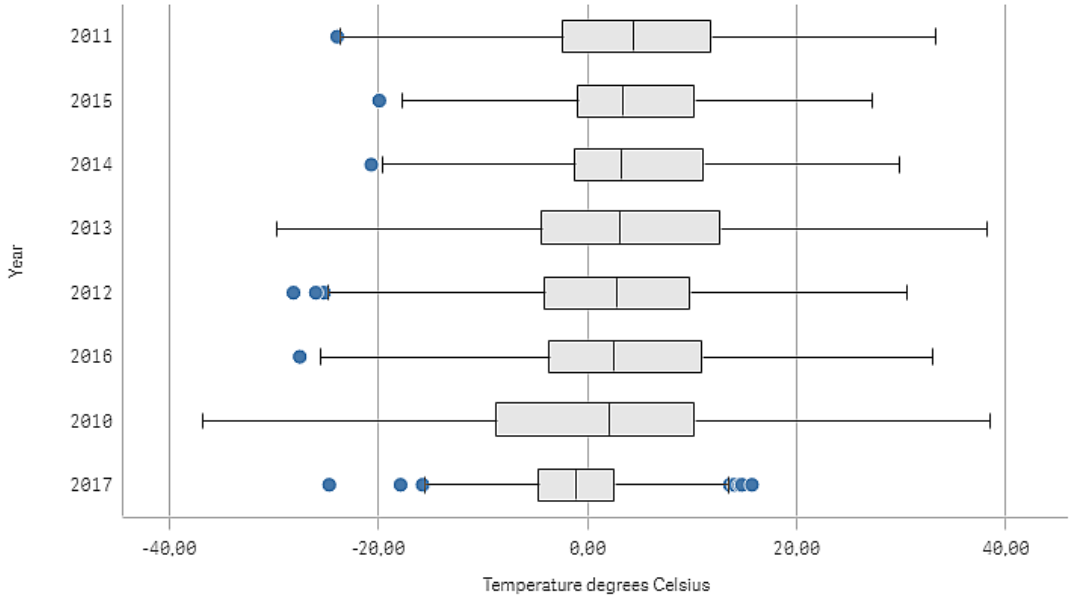
Limitations

Calculated fields are only supported as dimensions in box plots if they match the following criteria:

- The expression must be based on:
  - A single field.
  - Multiple non-key fields from the same table in the data model.
- The expression cannot depend on the selection state. For example, it could not use the **GetSelectedCount()** function.
- The expression cannot contain an **Aggr()** function.

Visualizing range and distribution of numerical data with a box plot

This example shows how to make a box plot to visualize range and distribution of numerical data using daily temperature measurements.



Dataset

In this example, we'll use the following weather data.

- Location: Sweden > Gällivare Airport
- Date range: all data from 2010 to 2017
- Measurement: Average of the 24 hourly temperature observations in degrees Celsius

The dataset that is loaded contains a daily average temperature measurement from a weather station in the north of Sweden during the time period of 2010 to 2017.

Measure

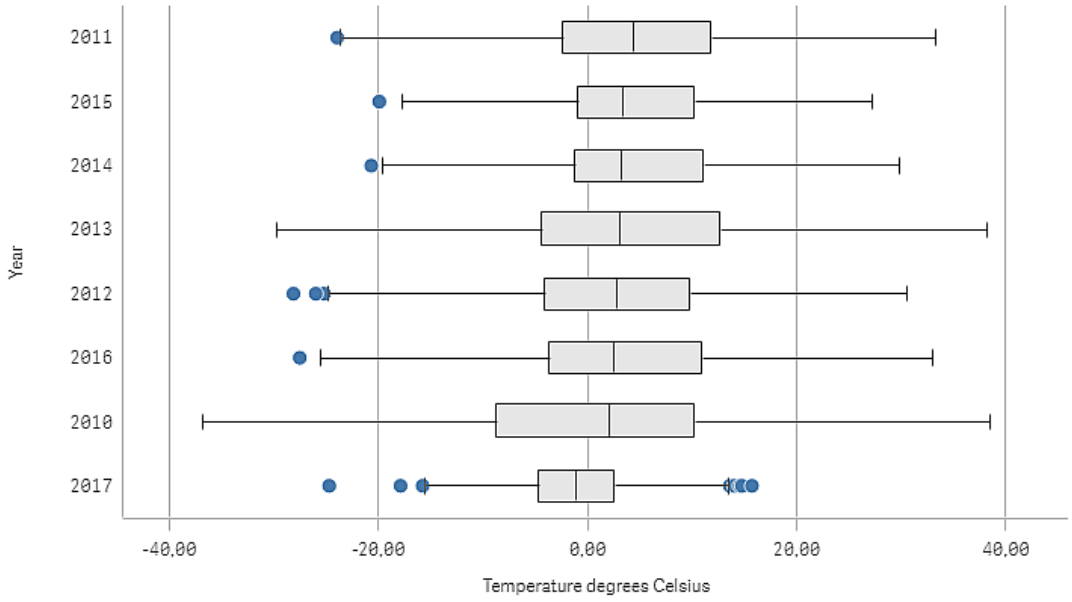
We use the average temperature measurement in the dataset as the measure, by creating a .measure in Master items with the name *Temperature degrees Celsius*, and the expression `Avg([Average of the 24 hourly temperature observations in degrees Celsius])`.

Visualization

We add a box plot to the sheet and set the following data properties:

- **Dimension**: Date (date) and Year (year). The order is important; Date needs to be the first dimension.
- **Measure**: *Temperature degrees Celsius*; the measure that was created as a master item.

In this example we use the default box plot preset, **Standard (Tukey)** with the whisker length **1.5 interquartile range**.



Discovery

The box plot visualizes the distribution of the daily temperature measurements. The visualization is sorted in mean temperature order. The mean temperature for each year is illustrated by the middle line in each box. The box stretches from the first quartile to the third quartile, and the whiskers stretch 1.5 inter-quartile ranges. There are also a number of outlier values, the points that are placed outside the whiskers. You can hover the mouse pointer over an outlier point and view the details.

In the box plot we can see that the year 2010 has the longest box and whiskers. That shows that the year 2010 has the largest distribution of temperatures measured. It also seems to be the coldest year in average.

The range of 2017 is small, as the dataset only contains measurements from the first months of the year.

Bullet chart

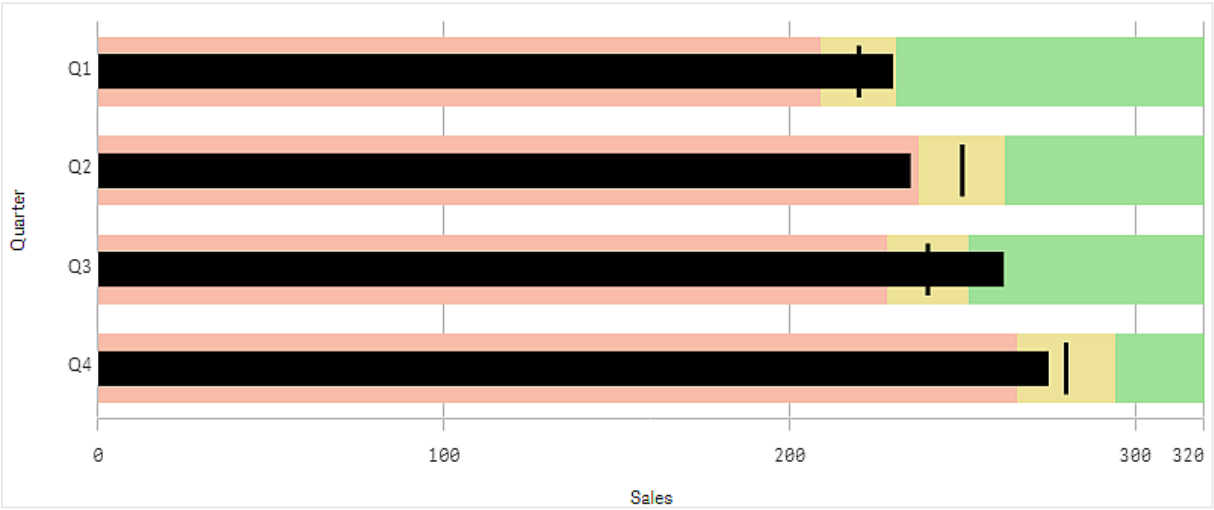
The bullet chart displays a gauge with extended options. Bullet charts can be used to visualize and compare performance of a measure to a target value and to a qualitative scale, such as poor, average, and good.

In a bullet chart you need one measure, which determines the length of the bar.

You can also add a dimension. This will show one gauge for every dimension value. If you do not define a dimension, the chart will show a single gauge.

Example:

A bullet chart showing sales performance for each value of the dimension (quarter)



The example shows a bullet chart with sales performance for each quarter. It also shows the performance relative to target and performance range, which are different for each quarter.

When to use it

Bullet charts let you compare and measure performance with more enriched information than a common gauge. This is helpful when comparing performance according to a target and a simple performance rating. For example: you can show how sales relate to a target value, and in context of poor, good, and stretched performance.

Creating a bullet chart

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

Do the following:

1. From the assets panel, drag an empty bullet chart to the sheet.
2. Click **Add dimension** to select the dimension that define how many gauges are shown.
3. Click the **Add measure** button to select the value measure of the chart that defines the length of the bar.
   Once the measure is selected the bullet chart is displayed with default settings. Each gauge is displayed with an individual range. If you want to use a common range, you can set it with **Appearance**>**Y-axis**>**Common range**.
4. To add a target value, click **Target** under the measure. You can define a fixed value or use a measure with target values.
5. To add performance ranges, set **Use segments** under the measure to **On**.

Click **Add limit** to set a range limit for the segments. You can adjust the color of each segment by clicking on it.
You can define a fixed limit value or an expression.

The bullet chart is now displayed with the dimension and measure you selected.

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

Styling the bullet chart

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Axis title**: Style the titles on the axes.
    - **Axis label**: Style the labels on the axes.
    - **Value labels**: Style the labels which display the measure value for each dimension value. Click the checkbox for **Auto contrast color** to automatically override the selected color with the default color for the app's theme. This only applies to value labels inside the bars or inside white rectangles outside the bars.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Setting a target value

You can add a target value which is displayed as a marker line. If the measure contains sales numbers, this could be budgeted sales for example.

You can define a fixed value or use a measure with target values.

Setting performance ranges

To add performance ranges, set **Use segments** under the measure to **On**.

You need to add the limits for the ranges you want to use for showing indicators with **Add limit**. You can set a limit value in three ways.

- Use the slider.
- Type a value in the text box.
- Set an expression that returns the limit value.

Changing the color scheme

You can change color scheme of the value bar and the target by setting **Appearance > Colors > Colors** to **Custom**. You can set single colors or use an expression.

It's a good idea to use a bar color that is visually dominant to the range colors.

When you have added the limits, you can select the color and the symbol of the indicator for each defined range.

Adding a custom tooltip

You can add measures, charts, and images as tooltips. To add custom tooltips, select **Appearance**>**Tooltip**>**Custom**.

- If you want to add a measure as a tooltip, you can add it from a field using **From a field**. You can also use an expression to add a measure. Click f_x to open the expression editor. The existing expression is displayed by default. You can add a title and description to the tooltip. You can change the label of the tooltip using **Label** as well as its formatting using **Number formatting**.
- If you want to add a chart as a tooltip, select a master visualization from the list of **Master items**.
  - Set the size of the tooltip container. Qlik Sense fits the chart into the container.
    - **Small**. Sets the width and height of the container to 140 pixels.
    - **Medium**. Sets the width and height of the container to 200 pixels.
    - **Large**. Sets the width and height of the container to 340 pixels.

    *After you add the chart, you can edit it by clicking **Edit master item**. See Editing a master visualization (page 125).*
- If you want to add an image as a tooltip, choose whether to add an image from your **Media library** or from a **URL**.
  - Set the size of the tooltip container. Qlik Sense fits the image into the container.
    - **Small**. Sets the width and height of the container to 50 pixels.
    - **Medium**. Sets the width and height of the container to 200 pixels.
    - **Large**. Sets the width and height of the container to 340 pixels.
    - **Original**. Qlik Sense fits the image into the container. If the image is larger than 340 pixels, it is scaled down.
  - **Media library**: Appears when you choose **Media library** for **Type**. Click to select an image from your media library.
  - **URL**: Appears when you choose **URL** for **Type**. Enter a **URL**.

Setting the scale of the axis

If you use a dimension to show several gauges, you can select how to show the scale of the axis with **Appearance**>**Y-axis**>**Common range**.

- If you want each dimension gauge to use the same scale, enable **Common range**. If the range measure depends on the dimension value, the range bars will have different lengths.
  This is useful when you want to be able to compare the actual values.
  You can also set a common axis for all gauges with **Appearance**>**Y-axis**>**Common range**.
- If you want each range bar to be equally long, disable **Common range**.
  This is useful when you want to be able to compare the relative performance of each dimension value.

Changing the orientation of the labels

To change the orientation of the chart's labels, the chart's presentation must be vertical. This can be set with **Appearance** > **Presentation** > **Vertical**. Label orientation can then be selected with **Appearance** > **X-axis** > **Label orientation**. The following orientations are available:

- **Auto**: Automatically selects one of the other options depending on the space available on the chart.
- **Horizontal**: Labels are arranged in a single horizontal line.
- **Tilted**: Labels are stacked horizontally at an angle.
- **Layered**: Labels are staggered across two horizontal lines.

To view examples of label orientation, see *X-axis and Y-axis (page 692)*.

Limitations

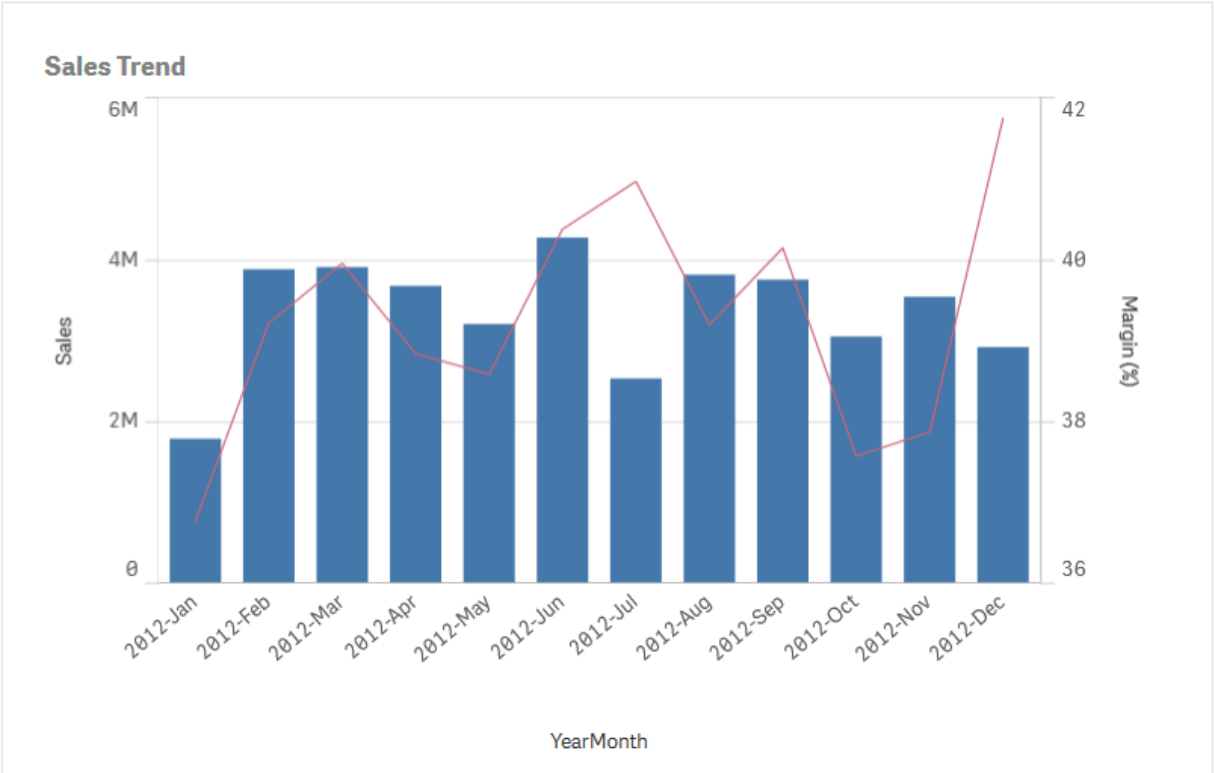
When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Combo chart

The combo chart is suitable for comparing two sets of measure values that are usually hard to compare because of the differences in scale. It is basically a bar chart combined with a line chart.

A typical example is when you have a bar chart with sales figures and want to combine these figures with the margin values (in percent). In a regular bar chart, the bars for sales would be displayed as usual, but the margin values would be almost invisible because of the very large difference between the numeric values for sales and margin.

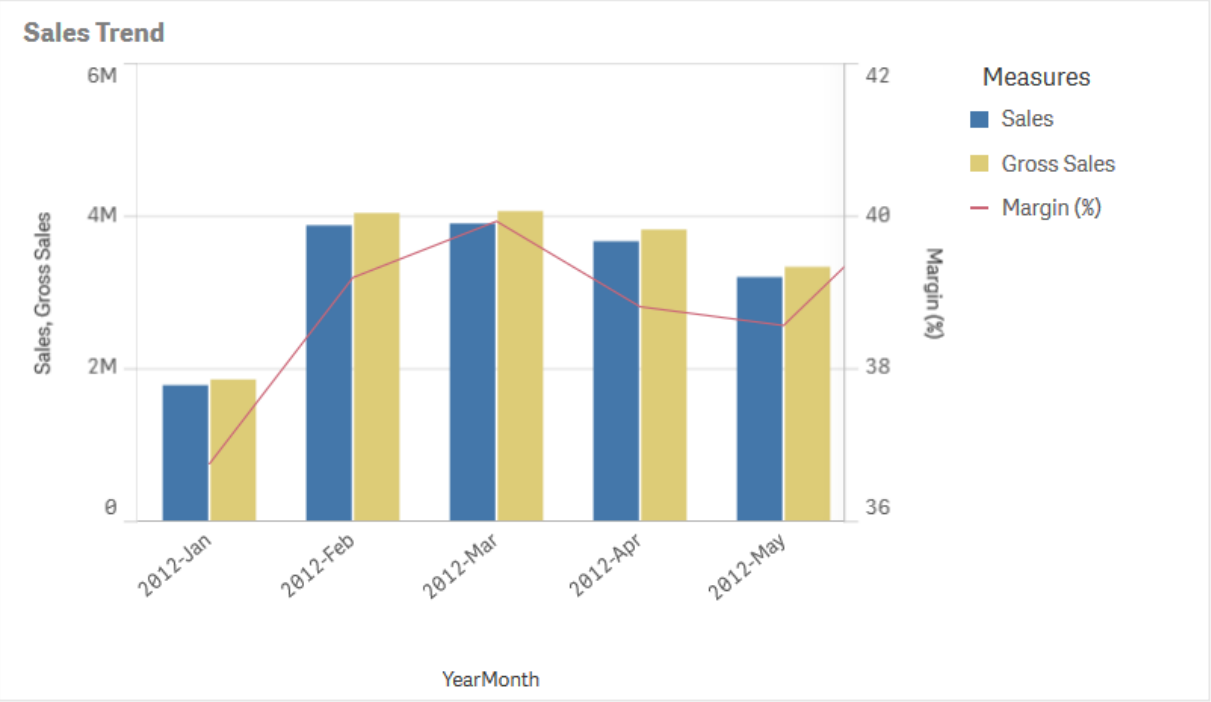
A combo chart with the margin values (in percent) and bars with sales figures.



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

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

A combo chart with three measures; the margin values (in percent), bars with sales figures and the measure Gross sales grouped with the sales values.



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

The combo chart can only be displayed vertically.

When to use it

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

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

Advantages

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

Disadvantages

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

Creating a combo chart

You can create a combo chart on the sheet you are editing. In a combo chart, you need at least one dimension and one measure.

Do the following:

1. From the assets panel, 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. Select to show the measure as a bar.
4. Add another measure by selecting **Add** under **Height of line**. Enter an expression, or master measure item, or a field with an aggregation function applied. By default a line will appear as the measure.
5. When you are done adding measures, configure each measure to display as bars, lines, or markers. For more information, see *Configuring the presentation of measures (page 226)*.

You can only have one dimension, but you can continue adding up to 15 measures. You can only have two measure axes though. This means, if you add three or more measures with a large difference in value range it can be hard to display all measures with a good distribution of values.

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

Styling the combo chart

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the labels shown on the chart depends on how you configure the measure values to be displayed, as well as other chart-specific settings and label display options. Configure a measure to be shown as **Bars**, **Line**, or **Marker** by expanding the measure under **Data** > **Measures**, and clicking **More properties**. Configure additional chart and label options under **Appearance** > **Presentation**.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, expand the **Bars** section. This section appears if any of the measures are being displayed as bars.
5. Under **Bar labels**, style the labels for measure values configured as **Bars**. You can select the font, font size, and color.
   When using the **Stacked** presentation option, this setting controls **Segment labels** (measure values for each dimension value) and **Total labels** (combines the measure values for each dimension value).
6. Expand the **Lines** section of the **Chart** tab. This section appears if any of the measures are being displayed as lines.
7. Under **Point labels**, style the labels for measure values configured as **Line**. You can select the font, font size, and color.
8. On the **Chart** tab, expand the **Markers** section. This section appears if any of the measures are being displayed as markers.
9. Under **Marker labels**, style the labels for measure values configured as **Marker**. You can select the font, font size, and color.
10. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Axis title**: Style the titles on the axes.
    - **Axis label**: Style the labels on the axes.
    - **Legend title**: Style the title of the legend.
    - **Legend labels**: Style the labels of the individual legend items.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the bar segment outline and bar width

If your combo chart contains measure data represented as bars, you can adjust the outline surrounding each bar segment in the chart, as well as the width of the bars.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab, expand the **Bars** section.
4. Under **Outline**, set the thickness and color of the outlines.
5. Adjust the slider for **Bar width** to set the width of the bars.

Customizing the lines and data points

If your combo chart contains measure data represented as lines, you can customize the appearance of the lines and data points in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab, expand the **Lines** section.
4. Under **Data point size**, adjust the slider to change the size of the data points in the chart.
5. Under **Line options**, adjust the line thickness, line type (solid or dashed), and line curve (linear or monotone).

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.

4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Configuring grid line spacing

You can change the placement of grid lines on the chart. Select whether to show grid lines based on the primary or secondary axis, and adjust the spacing. You can also turn off grid lines if desired.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Expand **Appearance** > **Presentation**.
3. Toggle **Grid line spacing** from **Auto** to **Custom**.
4. Use the drop down menu to select whether the grid lines are placed along the **Primary axis** or **Secondary axis**.
   Depending on the scale used by each axis, you might not notice any difference between these settings.
5. Use the second drop down menu to select the spacing, or choose **No lines** to remove grid lines.

Configuring the presentation of measures

Optionally, you can change the presentation of measures between bars, lines, or markers. Additional options are also available.

Do the following:

1. In the properties panel, under **Measures**, select **More Properties** in a measure.
2. Choose the **Presentation** of the measure. You can:
   - Change the presentation of measures between bars, lines, or markers. For markers you can choose between several different shapes.
   - Select drop-down options to switch between the **Primary axis** or the **Secondary axis**.

   > *The primary axis is on the left side of the chart, and the secondary axis in on the right side. Right and left axes are reversed if **Right-to-left** is turned on in app settings.*

Adding bar and marker labels

If any measures in the chart are configured as bars or markers, you can show or hide their value labels. Bar and marker labels can be configured separately from one another.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Presentation**, do one or both of the following:

- Set **Bar labels** to **Auto**.
- Set **Marker labels** to **Auto**.

Adding segment and total labels

For combo charts with a specific configuration, you can add segment and total labels. Segment labels show values for each measure segment in a chart. Total labels show values for an entire set of measures arranged along a single axis.

You can add segment and total labels if all of the following apply:

- Two or more measures on the same axis are configured as bars.
- The combo chart uses the **Stacked** presentation option. This setting is located under **Appearance** > **Presentation**.

  *The **Stacked** presentation option becomes available when two or more measures have the following settings under **Data** > **More properties**:*

  - *The measures are configured as **Bars**.*
  - *The measures appear on the same axis.*

  For more information, see Configuring the presentation of measures (page 226).
- **Bar labels** are set to **Auto**.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Presentation**, set **Bar Labels** to **Auto**.
3. Do one or both of the following:
   - Set **Segment labels** to **Auto**.
   - Set **Total labels** to **Auto**.

Working with shapes

With shapes, you can add points and lines as separate items in the chart. Shapes allow you to enhance your dimension and measure data with special information that helps with analysis. For example, you could add a point to highlight a specific dimension value, or draw a line between the highest and lowest points for a key performance indicator.

Adding a point

Do the following:

1. In the properties panel, expand **Add-ons** > **Shapes**.
2. Click **Add shape**, and select **Point**.
3. Optionally, define a **Label** for the point using text or an expression.

4. Under **Dimension value**, type the dimension value for which to add the point. You can also define the value with an expression.
5. In the **Measure input** drop down menu, select one of the following and define the value below the menu:
    - **Measure value**: Define the measure value for which to add the point, either as a simple value or an expression. For example, you could use a set analysis expression.
    - **Measure index**: Define the measure from which the measure value is extracted. This can be provided as a simple value or an expression. For example, use 0 for the first measure in the chart, 1 for the second measure in the chart, and so on.
6. Set the **Symbol** to use for the point. The default is **Circle**.
7. Adjust the **Label position** if needed. The label can be displayed above or below the point.
8. Set color and opacity using the following settings. You can also configure these elements to have no color.
    - **Point color**
    - **Outline color**
    - **Label color**
9. Use the **Colored background** check box to add a background for the label, if defined. When this option is turned on, the defined **Label color** is used for the background, and the label text switches to a color that best contrasts the background.
10. Use the sliders to adjust the **Outline width** and **Data point size**.

Adding a line

You can add a line as a series of points. The line connects each point that you define for it.

Do the following:

1. In the properties panel, expand **Add-ons** > **Shapes**.
2. Click **Add shape**, and select **Line**.
3. Optionally, define a **Label** for the line using text or an expression. This does not appear in the chart but helps with identification when you have multiple lines and points.
4. By default, data points are not highlighted on the line. To highlight them, turn on **Show data points** at the bottom of the settings for the line. With this option turned on, more point settings are shown.
5. To add a point, click **Add point**.
6. Under **Dimension value**, type the dimension value for which to add the point. You can also define the value with an expression.
7. In the **Measure input** drop down menu, select one of the following and define the value below the menu:
    - **Measure value**: Define the measure value for which to add the point, either as a simple value or an expression. For example, you could use a set analysis expression.
    - **Measure index**: Define the measure from which the measure value is extracted. This can be provided as a simple value or an expression. For example, use 0 for the first measure in the chart, 1 for the second measure in the chart, and so on.

8. Adjust the point's appearance using the following settings. These settings become visible when **Show data points** is turned on.
    - **Label**: Set a textual label for the point.
    - **Symbol**: Set the shape of the point. The default is **Circle**.
    - **Label position**: Choose whether to show the label above or below the point.
    - **Point color**: Set the color of the point.
    - **Outline color**: Set the color of the point outline.
    - **Label color**: Set the color of the label text. If **Colored background** is turned on, this setting instead controls the background behind the label.
    - **Outline width**: Set the width of the point outline.
    - **Data point size**: Set the overall size of the point.
    - **Colored background**: Add a background for the label, if label text has been defined. When this option is turned on, the defined **Label color** is used for the background, and the label text switches to a color that best contrasts the background.
9. Add one or more points as needed, using the above steps.
10. Set the **Line color**, including opacity.
11. Use the slider to adjust the **Line thickness**.
12. Select the **Line type**, choosing between **Solid** or **Dashed**.
13. Use the **Line curve** drop down menu to select one of the following:
    - **Linear**: Each point is connected with straight lines.
    - **Monotone**: Each point is connected with curved lines.

Display limitations

Displaying out of range values

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

Displaying large amounts of data in a combo chart

If the chart uses a continuous scale, a maximum of 2000 data points can be displayed. The actual maximum number of data points in the chart is affected by the distribution of the data. Above this actual maximum number of data points, data points are neither displayed, nor included in selections made in the chart.

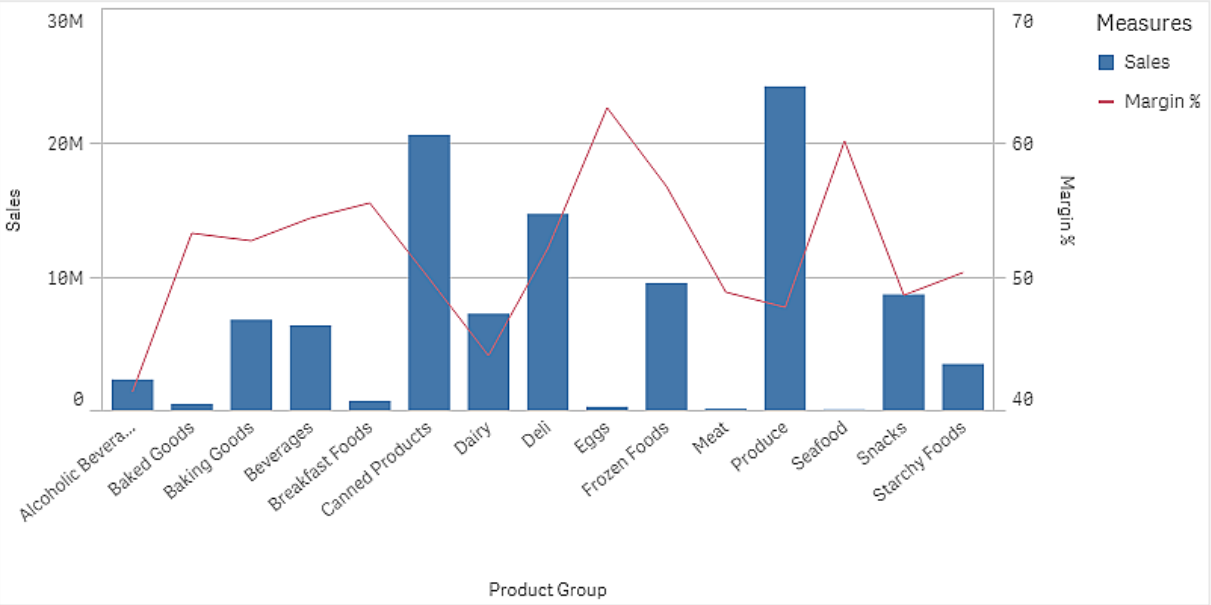
To avoid displaying limited data sets, you can either make a selection or use dimension limits in the properties panel.

Colors and legend

When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Comparing measures with a different scale using a combo chart

This example shows how to make a combo chart that visualizes sales data. You will also compare different product groups against two measures with a different scale.



Dataset

In this example, we will use two data files from the Qlik Sense Tutorial - Building an App. To download the files, go to Tutorial - Building an App. Download and unzip the tutorial, and find the files in the *Tutorials source* folder:

- *Sales.xls*
- *Item master.xls*

Create a new app and add the two data files. Make sure that they are associated by *Item Number*.

The dataset that is loaded contains sales data. The *Item master* table holds the information about the items ordered, such as product groups.

Measures

We need to create two measures in Master items:

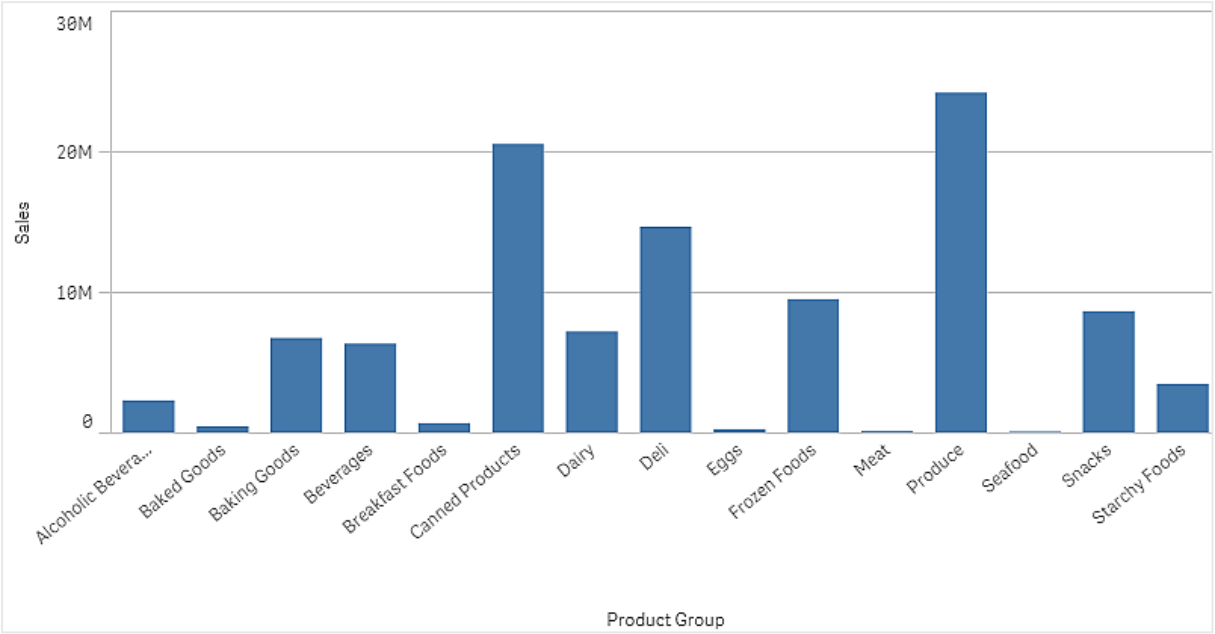
- Sales volume: with the name *Sales*, and the expression `Sum(Sales)`.
- Sales margin in percent: with the name *Margin %*, and the expression `Avg(Margin/Sales)*100`.

Visualization

We add a combo chart to the sheet and set the following data properties:

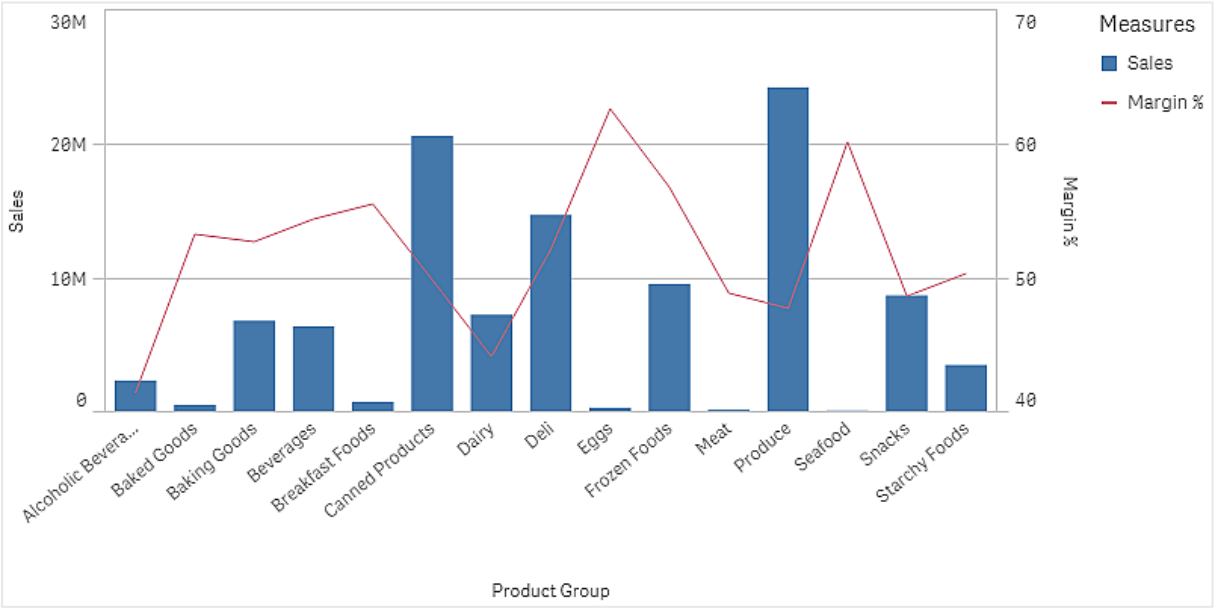
- **Dimension**: Product Group (product group).
- **Measure**: *Sales* (the master measure you created).

The following chart is created, with a bar showing the sales for each product group. It is a bar chart at this stage.



But we also want to show the sales margin, which has a different scale than the sales volume. Sales volume is in the scale of millions, while the margin is a percentage between 0 and 100. If we add margin as a bar next to sales volume, it would be too small to distinguish.

In the properties pane, go to **Measures** > **Height of line**. Use the drop down to add *Margin %* as a measure.



Discovery

The combo chart visualizes the sales volume and margin of different product groups. You can hover the mouse pointer over a product group and view the details. The bars show the sales volume with the scale to the left, and the line shows the margin with the scale to the right.

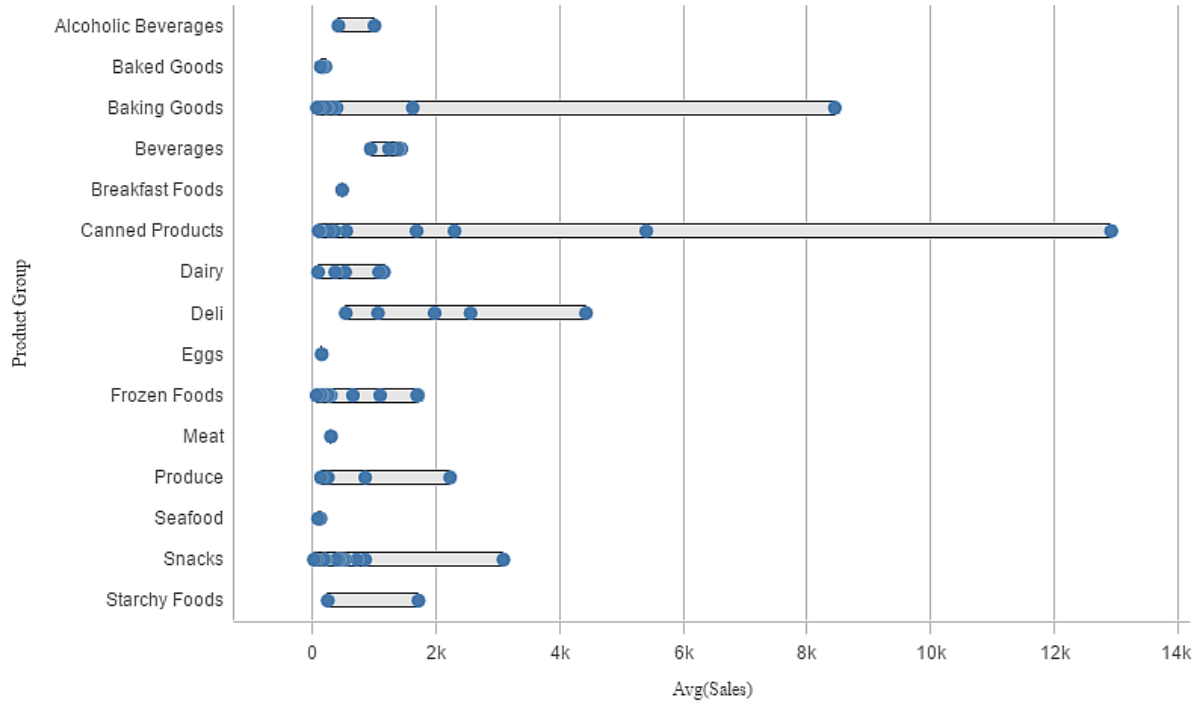
In the chart we can see that Produce and Canned Products have the highest sales volumes. Both groups have a lower margin than most other product groups.

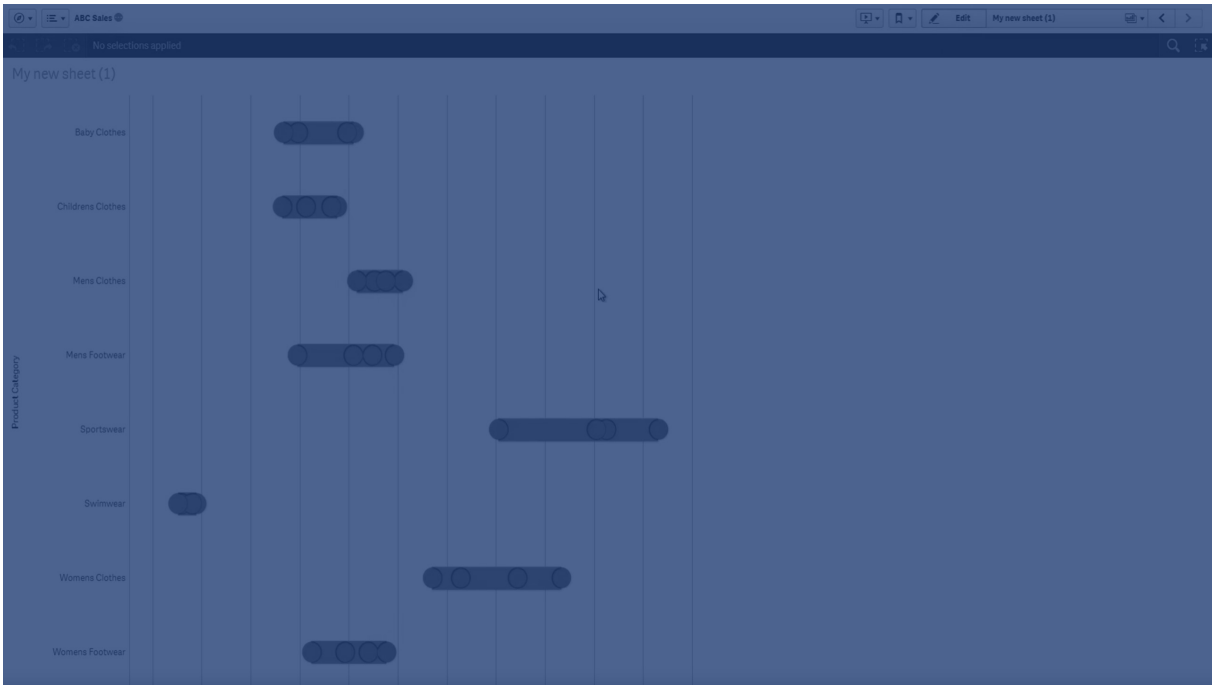
Some product groups with low sales volume, like Eggs and Seafood, have a significantly higher margin.

Distribution plot

The distribution plot is suitable for comparing range and distribution for groups of numerical data. Data is plotted as value points along an axis.

You can choose to display only the value points to see the distribution of values, a bounding box to see the range of values, or a combination of both as shown here:





When to use it

The distribution plot is suitable for comparing range and distribution for groups of numerical data.

Advantages

The distribution plot visualizes the distribution of data.

Disadvantages

The distribution plot is not relevant for detailed analysis of the data as it deals with a summary of the data distribution.

Creating a distribution plot

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

In a distribution plot you need to use one or two dimensions, and one measure. If you use a single dimension you will receive a single line visualization. If you use two dimensions, you will get one line for each value of the second, or outer, dimension.

Do the following:

1. From the assets panel, drag an empty distribution plot to the sheet.
2. Add the first dimension.
   This is the inner dimension, which defines the value points.
3. Add a second dimension.
   This is the outer dimension, which defines the groups of value points shown on the dimension axis.
4. Click **Add measure** and create a measure from a field.

p *Viewing the distribution of measure values in a dimension with a distribution plot (page 235)*

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

Styling the distribution plot

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Axis title**: Style the titles on the axes.
    - **Axis label**: Style the labels on the axes.
    - **Legend title**: Style the title of the legend.
    - **Legend labels**: Style the labels of the individual legend items.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.

3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Display limitations

Displaying large amounts of data in a distribution plot

When displaying large amounts of data in a distribution plot, the message "**Currently showing a limited data set.**" is shown to indicate that not all data is displayed.

- If the chart uses more than one dimension, 3000 data points are displayed.

Colors and legend

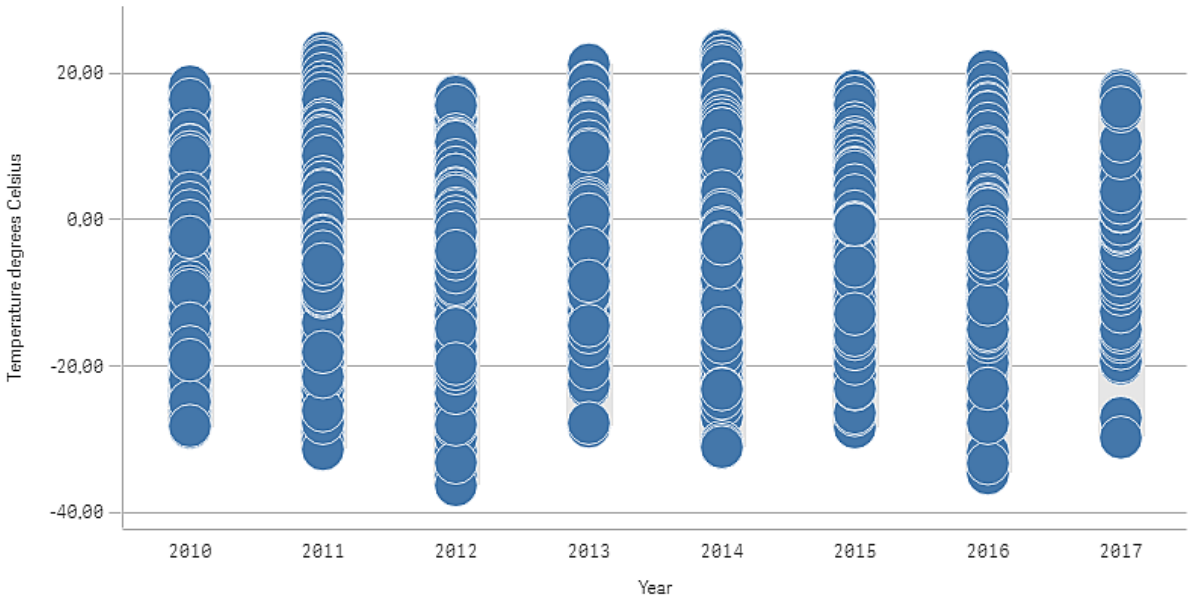
When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Other limitations

It is not possible to use calculated dimensions.

Viewing the distribution of measure values in a dimension with a distribution plot

This example shows how to make a distribution plot to view the distribution of measure values in a dimension using weather data as an example.



Dataset

In this example, we'll use the following weather data.

- Location: Sweden > Gällivare Airport
- Date range: all data from 2010 to 2017
- Measurement: Average of the 24 hourly temperature observations in degrees Celsius

The dataset that is loaded contains a daily average temperature measurement from a weather station in the north of Sweden during the time period of 2010 to 2017.

Measure

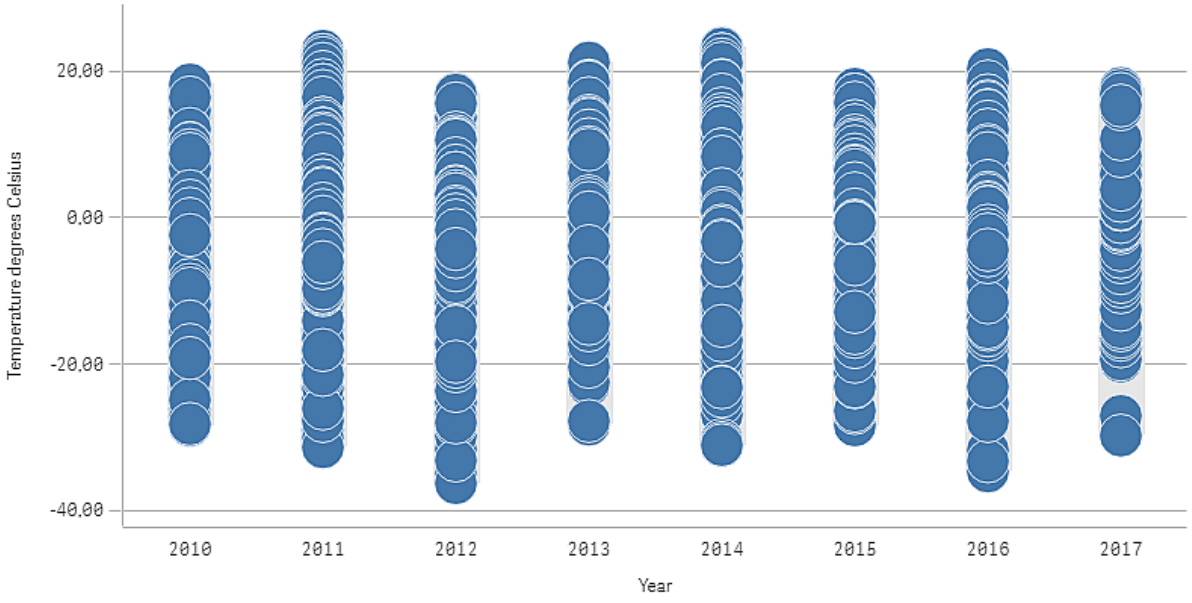
We use the average temperature measurement in the dataset as the measure, by creating a .measure in Master items with the name *Temperature degrees Celsius*, and the expression `Avg([Average of the 24 hourly temperature observations in degrees Celsius])`.

Visualization

We add a distribution plot to the sheet and set the following data properties.

- **Dimension**: Date (date) and Year (year). The order is important, Date needs to be the first dimension.
- **Measure**: *Temperature degrees Celsius*, the measure that was created as a master item.

Distribution plot with the dimensions Date (date) and Year (year) and the measure Temperature degrees Celsius.



Discovery

The distribution plot visualizes the distribution of the daily temperature measurements. The visualization is sorted by year, and each point represents a temperature measurement.

In the visualization we can see that the year 2012 has the lowest extreme temperature measurement, close -40 degrees Celsius. We can also see that the year 2016 seems to have the largest distribution of temperature measurements. With this many points in the distribution plot, it can be hard to spot clusters and outliers, but the year 2017 has two low temperature measurements that stand out. You can hover the mouse pointer over a point and view the details.

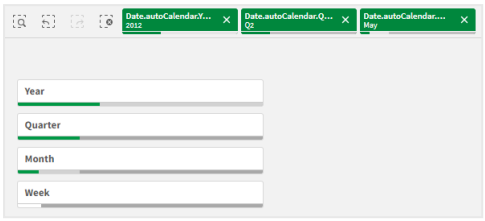
Filter pane

You can add a filter pane to control what data that is shown in the visualizations on a sheet. A filter pane can filter the data of several dimensions at once.

For example, if you have a chart of sales over time, you can use a filter pane to limit the data in the chart to only show sales from a selected time period, from certain product categories, and from a certain region.

When a dimension is added, it is placed to the right of the previous dimensions, or below, depending on the available space. As long as there is enough space, the dimensions are displayed as expanded lists. If there is not enough space, the dimensions that were added first are turned into filter panes.

Selections have been made in the dimensions Year, Quarter, and Month.



When to use it

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

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

Advantages

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

Disadvantages

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

Creating a filter pane

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

In a filter pane you can use up to 1000 dimensions.

Do the following:

1. From the assets panel, drag an empty filter pane to the sheet.
2. Click **Add dimension** and select a dimension or a field.
3. If you want to add more dimensions, click **Add dimension** again.

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

- *Styling the filter pane (page 239)*
- *Customizing individual listboxes in a filter pane (page 242)*

If you double-click or drag a field or a dimension from the assets panel, 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.

Styling the filter pane

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **Filter pane** and **Listboxes** tabs. Settings on the **Filter pane** tab applies styling for the filter pane and settings on the **Listboxes** tab applies styling for all listboxes inside the filter pane.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles in both **Filter pane** and **Listboxes**.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Filter pane** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Listboxes** tab, set the font, emphasis style, font size and color for the following text elements:
    - **Header**: Style the text of the headers for the listboxes.
    - **Content**: Style the text of the listbox values.
      Click the checkbox for **Auto contrast color** to automatically override the selected color with colors that have higher contrast with the selection state of the listbox value.

Customizing the background

You can customize the filter pane background, the background of the header area, as well as the background of the listboxes. The filter pane and the listbox background can be set by color and image, while the background of the header area can be set to a single color.

In the styling panel, you can configure background options.

Setting the filter pane background

The filter pane background of the chart includes the title area, as well as the filter pane itself, which is partially covered by the listboxes.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.

3. On the **Filter pane** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Setting the listbox background

You can style the background of the listboxes. This styling applies to all listboxes in the filter pane.

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Listboxes** tab of the styling panel, you can select a background color (single color or expression), and also set the background to an image from your media library.
   When using a background image, you can adjust image sizing and position.

Coloring the selection states

Each selection state of a listbox value can be assigned a specific color. This coloring is applied to the background of the listbox value.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Listboxes** tab of the styling panel, under **Selection state**, set colors for each of the selection states:
   - **Selected**
   - **Alternative**
   - **Excluded**
   - **Selected excluded**
   - **Possible**

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Filter pane** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **Filter pane** tab, select a shadow size and color. Select **None** to remove the shadow.

Customizing individual listboxes in a filter pane

A filter pane can contain one or more listboxes to filter dimension values over specified fields. Add fields to the filter pane, then re-arrange them in the properties panel in an order that meets your preferences.

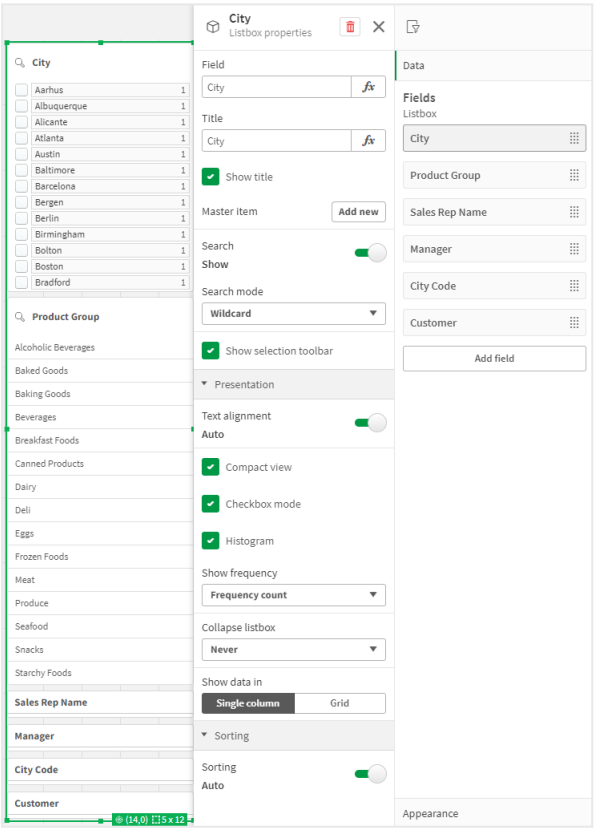
Each field in the filter pane has its own listbox, which shows the individual field values. Each listbox in a filter pane can be customized with its own unique properties.

Do the following:

1. Create a filter pane on a sheet.
2. Add a field to the filter pane to create a new listbox for that field.
3. In the properties panel, under **Data**, click the field you just added.

This expands the **Listbox properties** panel, where you can customize the design of the listbox.

Listbox properties *panel for a single listbox in a filter pane.*



Configuring search options

In **Listbox properties**, you can choose whether or not users can search for individual field values in each listbox within the filter pane. You can also switch the default **Search mode** from **Normal** to **Wildcard**. **Wildcard** adds default wildcard symbols (*) to the search field.

Condensing information in the filter pane

There are multiple settings available in **Listbox properties** to help you customize how much space each listbox occupies in the filter pane.

Enabling compact view

To remove space between each dimension value, select the **Compact view** checkbox under **Presentation**.

Adjusting the collapse behavior

You can adjust whether the listbox is shown as expanded or collapsed in the filter pane. When a listbox is collapsed, you can click to expand it temporarily to view and apply selections.

Regardless of the collapse behavior selected, the exact behavior of each listbox within a filter pane depends on a number of factors. These include its configuration in relation to other listboxes in the filter pane, and available space. For more information, see *Display limitations (page 245)*.

To adjust the collapse behavior, select an option in the **Collapse listbox** drop down menu. This is located under **Presentation**.The following options are available:

- **Auto**: The listbox automatically adjusts to be expanded or collapsed, based on available space and configuration in relation to other listboxes in the filter pane. The listbox defaults to this option.
- **Always**: The listbox always collapses. It might be placed inside the drop down menu for additional dimensions.
- **Never**: The listbox never collapses. It might still be placed inside the drop down menu for additional dimensions.

Changing selection behavior

You can adjust several different settings in **Listbox properties** to customize how selections are made in the listbox.

Enabling checkbox mode

If you select **Checkbox mode** under **Presentation** in **Listbox properties**, the listbox switches to a view where each dimension value is represented by a checkbox. In this mode, selections are made by clicking the checkbox next to each item, rather than the default behavior allowing clicking and dragging to select multiple values at once.

If you have applied **Always one selected value** for the field within the assets panel, radio buttons are used instead of checkboxes. The functionality is the same.

Toggling selection toolbar

By default, a selection toolbar appears when you make selections in a listbox. This toolbar allows you to explore other options for selections, as well as clear, cancel, or confirm the selections.

In **Listbox properties**, the **Show selection toolbar** checkbox is checked by default. Clear this checkbox if you want the toolbar not to appear above the listbox when you make selections.

If you toggle this setting off, selections are confirmed when you press Enter or click outside the listbox.

Displaying dimension value frequencies

Under **Presentation** in **Listbox properties**, click the checkbox next to **Histogram** to display bars underneath each dimension value to represent how frequently each value appears in the data.

Switching to grid layout

By default, a listbox for a field in a filter pane is set to show data in a single column. Alternatively, you can show data in a grid layout. Under **Presentation**, in **Listbox properties**, switch the parameter for **Show data in** from **Single column** to **Grid**.

In the grid layout, you can also configure how the data is ordered (by **Row** or **Column**), and customize the maximum visible rows or columns in the grid.

Showing the frequency of values

You can show the frequency next to each value, either as an absolute number or as a percentage. You select this by opening **Listbox properties**, expanding the **Presentation** section, and selecting an option in **Show frequency**.

> *In some cases the frequency cannot be calculated and is displayed as -. One example of this is for key fields.*

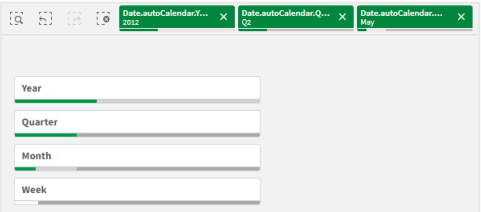
Selections in filter panes

During analysis, you make selections in a filter pane listbox. Click a collapsed filter pane dimension to open a selection listbox.

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

You can customize the selection behavior for each individual listbox in a filter pane. For more information, see *Changing selection behavior (page 243)*.

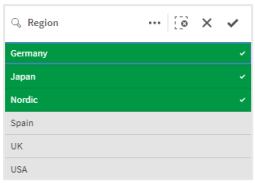
Fields are filtered out from each dimension to be shown in the visualizations on the sheet.



Making selections in filter pane lists

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

Germany, Japan, and Nordic selected in the Region filter pane.



The selections tool

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

During analysis, click to open selections view.

Selection locking and unlocking

In a filter pane, locked selections are indicated by a lock icon. You can lock and unlock selections in the selections bar above the sheet.

Display limitations

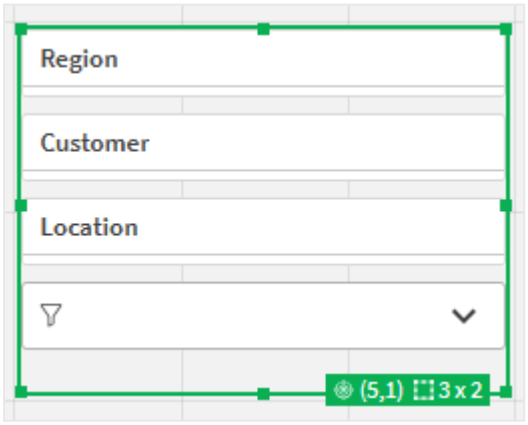
Responsive design

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

Example:

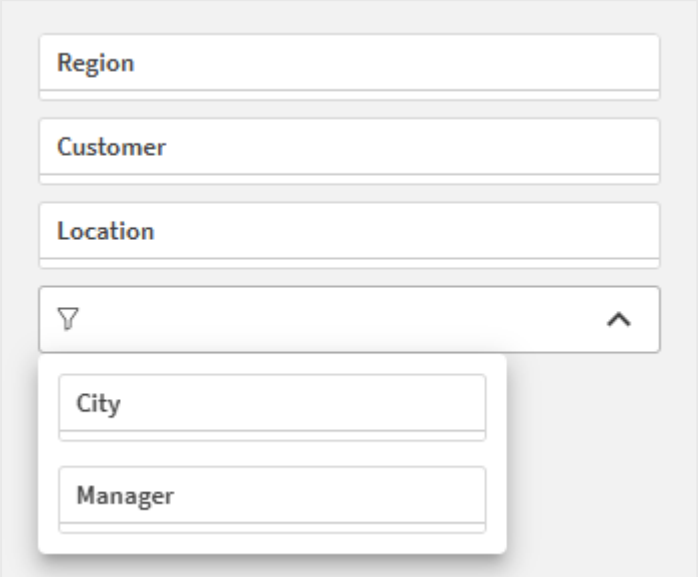
The following image shows a filter pane while it is being edited. Only three out of five dimensions are displayed. There is an additional item below the displayed dimensions. When this is clicked, the remaining dimensions are listed.

Filter pane in edit mode.



When you have finished editing the filter pane and enter analysis mode, you will see the filter pane with all the dimensions displayed. If all items cannot be shown due to lack of space, click below the displayed dimensions to view the remaining dimensions.

Filter pane in analysis mode, with expanded drop down list showing additional dimensions.



Full screen view

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

Keyboard navigation

You can use your keyboard to navigate a filter pane. Use the arrow keys or the Tab key to alternate between the different objects on the sheet. Once you have moved the focus to the filter pane, use the Enter, Space and Esc keys to move the focus between the following levels:

- Entire filter pane
- Listboxes inside the filter pane
- Values inside each listbox

Keyboard controls in filter panes

Keyboard navigation	Description
Space or Enter	Moves focus to the first listbox in the filter pane. Another key press brings the focus to the first value inside that listbox. If the focus is on a collapsed listbox, press Enter to open the listbox in a pop-over.
Esc	Moves focus back one level (from the values to the listbox to the filter pane object).

Keyboard navigation	Description
Right arrow	If the focus is on an individual listbox within the filter pane, the right arrow key moves the focus to the next listbox on the right. If the focus is on a value inside a listbox, the right arrow key moves to the next value in the listbox.
Left arrow	If the focus is on an individual listbox within the filter pane, the left arrow key moves the focus to the next listbox on the left. If the focus is on a value inside a listbox, the left arrow keymoves to the previous value in the listbox.
Up arrow	If the focus is on an individual listbox within the filter pane, the up arrow key moves the focus to the previous listbox (to the left, or above, the current listbox). If the focus is on a value inside a listbox, the up arrow key moves to the previous value in the listbox.
Down arrow	If the focus is on an individual listbox within the filter pane, the down arrow key moves the focus to the next listbox (to the right, or below, the current listbox). If the focus is on a value inside a listbox, the down arrow key moves to the next value in the listbox.

Filter pane examples

This help topic provides several examples showing how you can customize styling and other properties in filter panes to achieve a number of functional purposes.

Example 1 – Condensed design

You can add many listboxes to a filter pane, allowing refinement of data across many different dimensions.

To save space and prioritize other visualizations on your sheet, you can give your filter pane a condensed design where content is expanded and collapsed as needed.

Do the following:

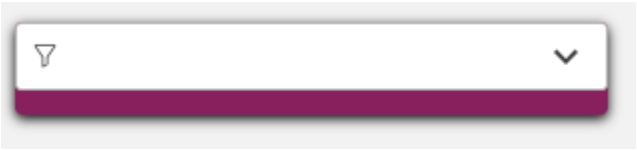
1. Create a new app and paste the *Example load script (page 258)* into a new section in the Data load editor. Then, load the data.
2. Switch to sheet view. In the sheet properties, set **Grid spacing** to 42.
3. Drag a **Filter pane** onto the sheet.
4. Click **Add dimension**. Select *Country*.
5. In the properties panel, click **Add field**. Select *Item Type*.
6. Using the **Add field** button, add four other dimensions as listboxes:

- *Order Year*
- *Order Priority*
- *Region*
- *Sales Channel*

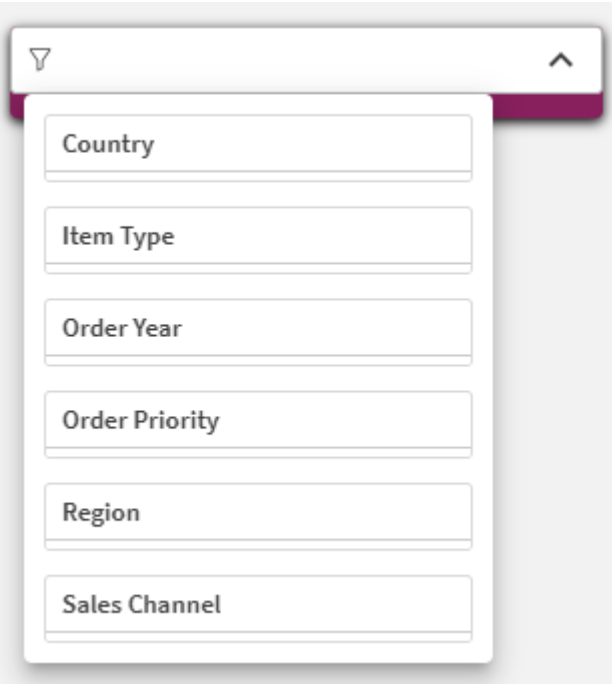
7. One by one, expand each listbox you just added and set **Presentation** > **Collapse listbox** to **Always**.
8. In the properties panel, expand **Appearance** > **Presentation**.
9. Click **Styling**.
10. In the **Filter pane** tab, set the following properties:
    - Font size for **Title**: 18px
    - Font color for **Title**: Hex code #ffffff
    - **Background color**: Hex code #87205d
    - **Shadow**: Small, Hex code #000000
11. In the **Listboxes** tab, set the following properties:
    - Font size for **Header**: 14px
12. Resize the filter pane to a two-by-ten space on the sheet grid.

Switch to analysis mode. You can expand listboxes as needed to make selections.

Drawer-style filter pane in collapsed state



Drawer-style filter pane with dimensions list expanded



Example 2 – Rich design

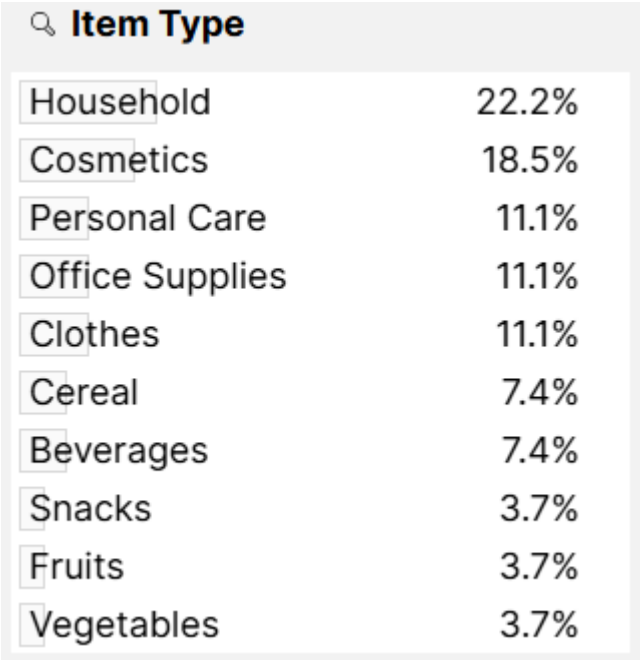
Although a filter pane is mainly used to filter data, it can also be used to visualize data. Incorporating a rich design allows analyzers to gain insights as they make different selections.

Do the following:

1. Create a new app and paste the *Example load script (page 258)* into a new section in the Data load editor. Then, load the data.
2. Switch to sheet view and drag a **Filter pane** onto the sheet.
3. Click **Add dimension**. Select *Item Type*.
4. Click the *Item Type* listbox to expand its properties.
5. Expand **Presentation**.
6. Turn on the **Histogram** setting.
7. Use the **Show frequency** drop down menu to select **Relative frequency (%)**.
8. Set **Collapse listbox** to **Never**.
9. Expand **Sorting**.
10. Set the **Sorting** to **Custom**.
11. Clear all options and turn on **Sort by expression**.
12. Select **Descending**.
13. Under **Expression**, enter the following expression:
    ```
    Count([Item Type])
    ```
14. In the properties panel, expand **Appearance** > **General**.
15. Turn off **Show titles**.

16. Expand **Appearance** > **Presentation**.
17. Click **Styling**.
18. In the **Listboxes** tab, set the following properties:
    - **Header**:
        - Font: **Inter, sans-serif**
        - Font size: 18px
    - **Content**:
        - Font: **Inter, sans-serif**
19. Resize the filter pane to a small rectangular shape, for example, three by four squares.

Filter pane with rich design. The items in the filter pane are shown with value distribution histograms and relative percentages, and are sorted in descending order from highest to lowest occurrence.



Example 3 – Focused design

How you design your filter pane can depend on how you want users to make selections. For example, you might want to restrict users from certain features to encourage more narrow, focused interaction with data.

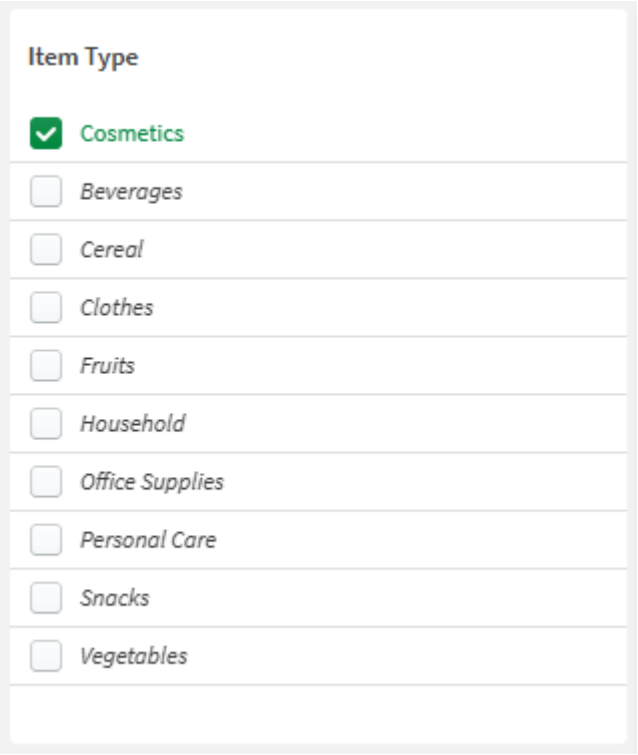
Scenarios include:

- Filtering on your particular dimension brings most insight when values are selected one at a time, or selecting multiple values does not provide any meaningful insight. To guide analysis in this way, you can turn off range selection by using checkbox mode.
- Searching for values in the field either provides no insight, or is not desirable.
- You want to minimize distractions when filtering data–for example, the selections toolbar.

Do the following:

1. Create a new app and paste the *Example load script (page 258)* into a new section in the Data load editor. Then, load the data.
2. Switch to sheet view and drag a **Filter pane** onto the sheet.
3. Click **Add dimension**. Select *Item Type*.
4. Click the *Item Type* listbox to expand its properties.
5. Set **Search** to **Hide**.
6. Turn off **Show Selection toolbar**.
7. Expand **Presentation**.
8. Turn on **Checkbox mode**.
9. In the properties panel, expand **Appearance** > **General**.
10. Turn off **Show titles**.
11. Resize the filter pane to a small rectangular shape, for example, three by four squares.

Filter pane with focused design



Example 4 – Grid design

You can use grid mode for filter panes that use small, defined sets of data. A good example is organizing time-based dimensions in grids.

Do the following:

1. Create a new app and paste the *Example load script (page 258)* into a new section in the Data load editor. Then, load the data.
2. Switch to sheet view and drag a **Filter pane** onto the sheet.
3. Click **Add dimension**. Select *Order Year*.
4. Click the *Order Year* listbox to expand its properties.
5. Turn off **Show titles**.
6. Expand **Presentation**.
7. Set **Collapse listbox** to **Never**.
8. For **Show data in**, select **Grid**.
9. Set **Max visible columns** to **Custom**.
10. Set **Max columns** to 3.
11. Add *Order Quarter* as a listbox in the filter pane.
12. Click the *Order Quarter* listbox to expand its properties.
13. Turn off **Show titles**.
14. Expand **Presentation**.
15. Set **Collapse listbox** to **Never**.
16. For **Show data in**, select **Grid**.
17. Set **Order by** to **Columns**.
18. Set **Max visible rows** to **Custom**.
19. Set **Max columns** to 1.
20. Add *Order Month* as a listbox in the filter pane.
21. Click the *Order Month* listbox to expand its properties.
22. Turn off **Show titles**.
23. Expand **Presentation**.
24. Set **Collapse listbox** to **Never**.
25. For **Show data in**, select **Grid**.
26. Set **Max visible columns** to **Custom**.
27. Set **Max columns** to 4.
28. In the properties panel, expand **Appearance** > **General**.
29. Turn off **Show titles**.
30. In the properties panel, expand **Appearance** > **Presentation**.
31. Click **Styling**.
32. In the **Filter pane** tab, set the following properties:
    - **Background color**: #83af9b
33. In the **Listboxes** tab, set the following properties:

- **Content**:
  - Font: Fredoka One, fantasy
  - Text size: 15px
  - Text size: Bold
  - Text color: #000000
- **Selection state** > **Possible**: #000000
- **Background color**: #83af9b

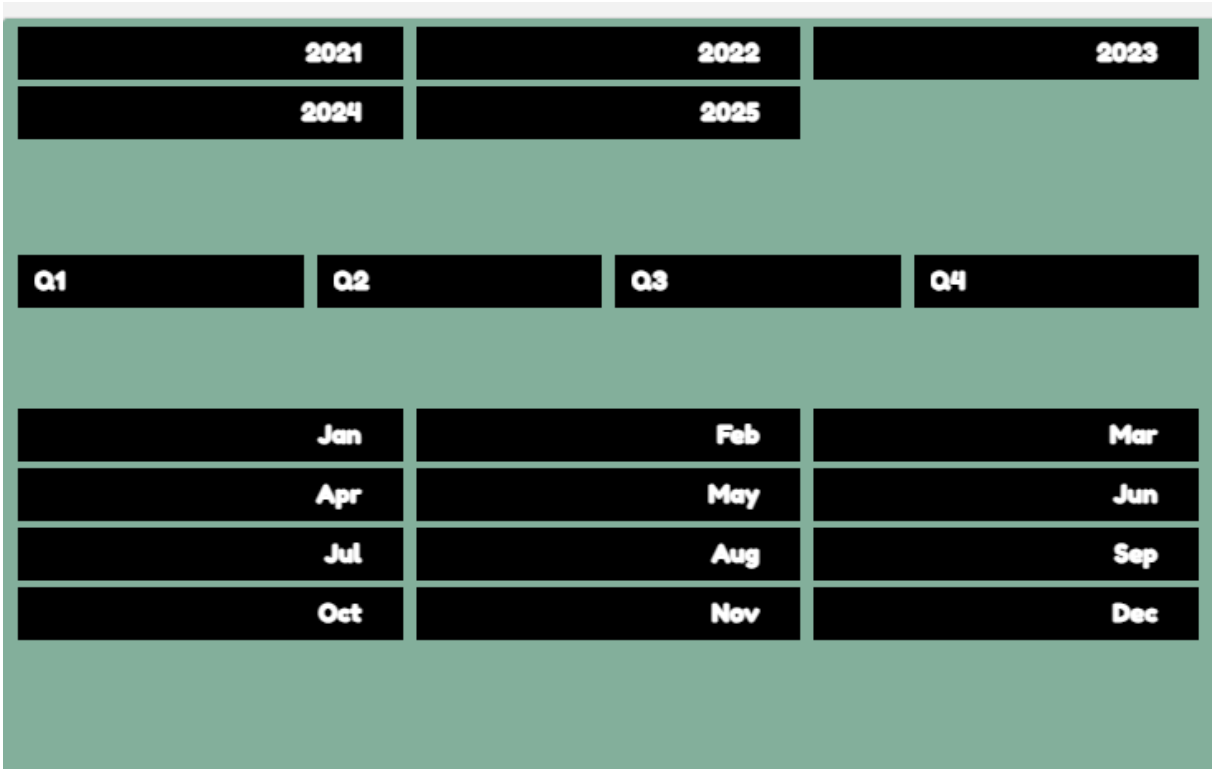
34. Resize the filter pane to a size that works well for the display–for example, three by three.

Filter pane with grid design

Further enhancements: composite filter pane with the layout container

For further responsiveness and control, you could create the above filter pane as a series of three filter panes embedded within a layout container. The image below shows an example of what this might look like.

Grid-style filter panes embedded in a layout container



Example 5 – Aligning with organization's color palette

Filter panes can be styled in accordance with your organization's color palette. In addition to defining background and text color, you can set color schemes for the selection states in your filter pane. You might want selections to appear in your company's main brand colors rather than the default green color.

With custom themes, you can further apply your organization's color scheme by setting a color for selections across all visualizations and the selection toolbar. For more information, see Custom themes.

In this example, we create a filter pane reflecting the following brand colors:

- Main color: Hex code #3100ff
- Secondary color: Hex code #9ba7ff

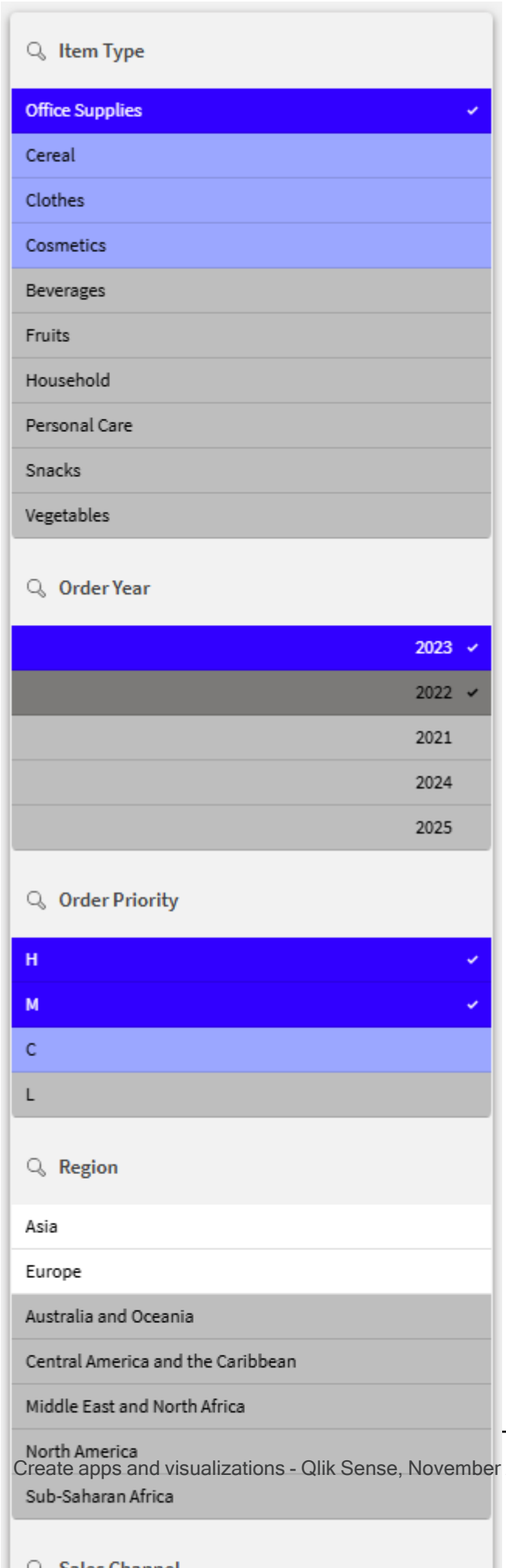
Do the following:

1. Create a new app and paste the example data into a new section in the Data load editor. Then, load the data.
2. Switch to sheet view and drag a **Filter pane** onto the sheet.
3. Click **Add dimension**. Select *Item Type*.
4. In the properties panel, click **Add field**. Select *Order Year*.
5. Using the **Add field** button, add three other dimensions as listboxes:
    - *Order Priority*
    - *Region*

    - *Sales Channel*
6. In the properties panel, expand **Appearance** > **General**.
7. Turn off **Show titles**.
8. Expand **Appearance** > **Presentation**.
9. Click **Styling**.
10. In the **Filter pane** tab, set the following properties:
    - **Shadow**: Small, Hex code #000000
11. In the **Listboxes** tab, set the following properties:
    - Font size for **Header**: 14px
    - **Selection state**:
        - **Selected**: Hex code #3100ff
        - **Alternative**: Hex code #9ba7ff
        - **Excluded**: #bebebe
        - **Selected excluded**: #7b7a78
        - **Possible**: #ffffff
12. Resize the filter pane to a long rectangular shape on one side of the sheet–for example, three by twelve squares.

Switch to analysis mode. Make selections in the filter pane to view the color scheme.

Filter pane with selection states reflecting brand colors


Item Type
Office Supplies
Cereal
Clothes
Cosmetics
Beverages
Fruits
Household
Personal Care
Snacks
Vegetables
Order Year
2023
2022
2021
2024
2025
Order Priority
H
M
C
L
Region
Asia
Europe
Australia and Oceania
Central America and the Caribbean
Middle East and North Africa
North America
Sub-Saharan Africa

Example load script

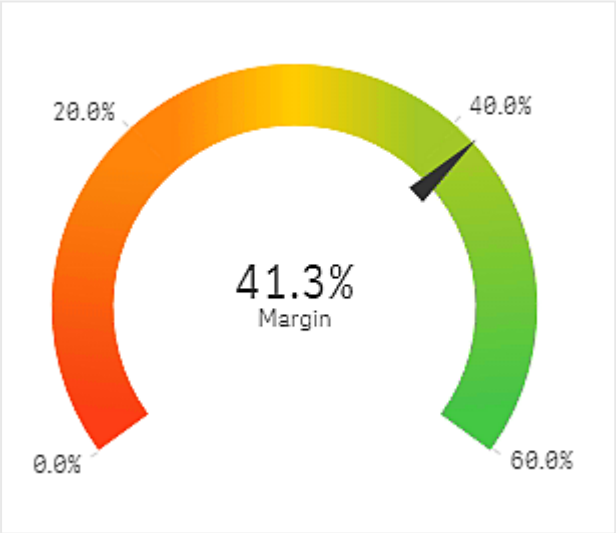
Data for examples

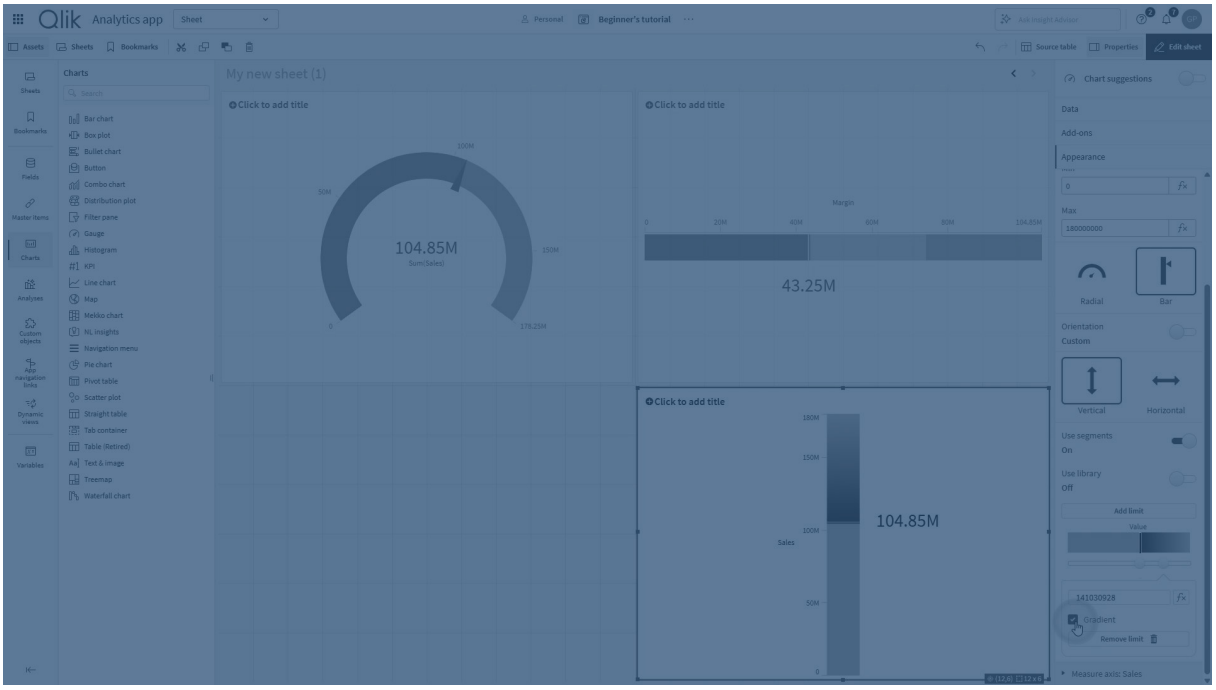
```
Sales:
LOAD
Dual([Order Month Text], [Order Month Num]) as [Order Month],

* INLINE [
Order ID,Order Date,Order Year,Order Quarter,Order Month Text,Order Month
Num,Region,Country,Item Type,Sales Channel,Order Priority,Ship Date,Units Sold,Unit Price,Unit
Cost,Total Revenue,Total Cost,Total Profit
522840487,2/8/2021,2021,Q1,Feb,2,Central America and the
Caribbean,Honduras,Household,Offline,H,2/13/2017,8974,668.27,502.54,5997054.98,4509793.96,1487
261.02
832401311,2/19/2021,2021,Q1,Feb,2,Asia,Mongolia,Personal
Care,Offline,C,2/23/2014,4901,81.73,56.67,400558.73,277739.67,122819.06
419123971,11/19/2021,2021,Q4,Nov,11,Asia,Sri
Lanka,Cosmetics,Offline,M,12/18/2016,6952,437.2,263.33,3039414.4,1830670.16,1208744.24

441619336,12/30/2021,2021,Q4,Dec,12,Asia,Turkmenistan,Household,Offline,L,1/20/2011,3830,668.2
7,502.54,2559474.1,1924728.2,634745.9
795490682,6/30/2022,2022,Q2,Jun,6,Central America and the
Caribbean,Honduras,Snacks,Online,L,7/26/2016,2225,152.58,97.44,339490.5,216804,122686.5
158535134,10/27/2022,2022,Q4,Oct,10,Australia and Oceania,Australia,Office
Supplies,Online,C,11/25/2015,2924,651.21,524.96,1904138.04,1534983.04,369155
955357205,1/5/2022,2022,Q1,Jan,1,Europe,United
Kingdom,Household,Online,L,2/14/2012,282,668.27,502.54,188452.14,141716.28,46735.86
259353148,4/7/2022,2022,Q2,Apr,4,Sub-Saharan
Africa,Djibouti,Cosmetics,Offline,H,4/19/2014,7215,437.2,263.33,3154398,1899925.95,1254472.05
450563752,6/9/2022,2022,Q2,Jun,6,Australia and
Oceania,Australia,Cereal,Offline,H,7/2/2013,682,205.7,117.11,140287.4,79869.02,60418.38
705784308,10/30/2022,2022,Q4,Oct,10,Middle East and North
Africa,Libya,Clothes,Offline,H,11/17/2010,6116,109.28,35.84,668356.48,219197.44,449159.04
505716836,10/13/2022,2022,Q4,Oct,10,Central America and the
Caribbean,Haiti,Cosmetics,Offline,H,11/16/2013,1705,437.2,263.33,745426,448977.65,296448.35
807025039,7/25/2023,2023,Q3,Jul,7,Central America and the
Caribbean,Belize,Clothes,Offline,M,9/7/2016,5498,109.28,35.84,600821.44,197048.32,403773.12
166460740,10/24/2023,2023,Q4,Oct,10,Europe,Lithuania,Office
Supplies,Offline,H,11/17/2010,8287,651.21,524.96,5396577.27,4350343.52,1046233.75
462405812,4/23/2023,2023,Q2,Apr,4,Asia,Turkmenistan,Office
Supplies,Online,M,5/20/2013,5010,651.21,524.96,3262562.1,2630049.6,632512.5
816200339,8/14/2023,2023,Q3,Aug,8,Middle East and North
Africa,Libya,Fruits,Online,L,9/30/2015,673,9.33,6.92,6279.09,4657.16,1621.93
555990016,5/20/2023,2023,Q2,May,5,Sub-Saharan
Africa,Djibouti,Cereal,Online,H,6/17/2017,8656,205.7,117.11,1780539.2,1013704.16,766835.04
231145322,7/5/2023,2023,Q3,Jul,7,Middle East and North
Africa,Pakistan,Cosmetics,Offline,L,8/16/2013,9892,437.2,263.33,4324782.4,2604860.36,1719922.0
4
986435210,11/6/2023,2023,Q4,Nov,11,North
America,Mexico,Household,Offline,C,12/12/2014,6954,668.27,502.54,4647149.58,3494663.16,1152486
.42
217221009,10/28/2023,2023,Q4,Oct,10,Australia and Oceania,Federated States of
Micronesia,Beverages,Online,C,11/15/2014,9379,47.45,31.79,445033.55,298158.41,146875.14
670854651,7/20/2024,2024,Q3,Jul,7,Australia and
```

```
Oceania,Samoa,Cosmetics,Online,H,8/7/2013,9654,437.2,263.33,4220728.8,2542187.82,1678540.98

213487374,10/21/2024,2024,Q4,Oct,10,Europe,Spain,Household,Offline,L,11/30/2012,4513,668.27,50
2.54,3015902.51,2267963.02,747939.49
663110148,9/18/2024,2024,Q3,Sep,9,Middle East and North
Africa,Lebanon,Clothes,Online,L,10/8/2012,7884,109.28,35.84,861563.52,282562.56,579000.96
827844560,3/18/2024,2024,Q1,Mar,3,Sub-Saharan
Africa,Kenya,Vegetables,Online,L,4/7/2012,6457,154.06,90.93,994765.42,587135.01,407630.41
430915820,2/17/2024,2024,Q1,Feb,2,North America,Mexico,Personal
Care,Offline,L,3/20/2012,6422,81.73,56.67,524870.06,363934.74,160935.32
240470397,7/7/2024,2024,Q3,Jul,7,Australia and
Oceania,Australia,Beverages,Offline,H,7/11/2014,9389,47.45,31.79,445508.05,298476.31,147031.74
559427106,7/30/2024,2024,Q3,Jul,7,North America,Mexico,Personal
Care,Offline,M,8/8/2015,5767,81.73,56.67,471336.91,326815.89,144521.02
665095412,2/10/2025,2025,Q1,Feb,2,Sub-Saharan
Africa,Mozambique,Household,Offline,L,2/15/2012,5367,668.27,502.54,3586605.09,2697132.18,88947
2.91
];

drop fields [Order Month Text], [Order Month Num];
```

Gauge

The gauge shows a single measure value and visualizes how to interpret that value.





When to use it

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

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

Advantages

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

Disadvantages

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

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

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

Creating a gauge

You can create a gauge on the sheet you are editing. In a gauge you can only have one measure and no dimensions.

Do the following:

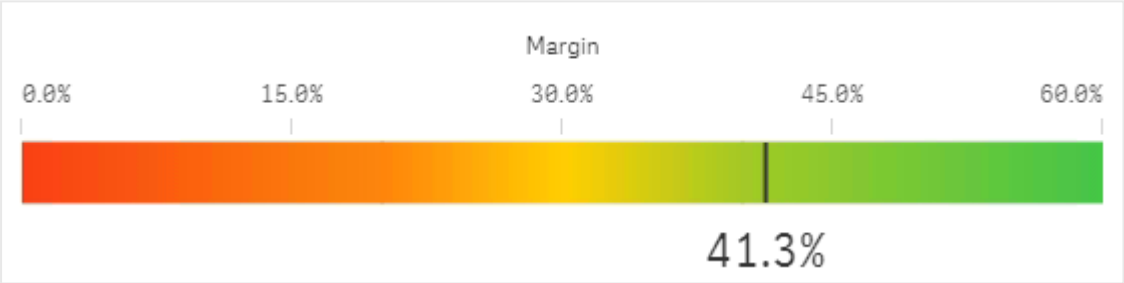
1. From the assets panel, drag an empty gauge to the sheet.
2. Click **Add measure** and select a measure or create a measure from a field.

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

The following settings are used by default in a gauge:

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

For example, you can change the radial gauge to a bar, and use a color gradient.



Styling the gauge

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the labels and other titles on the chart depends on how it has been configured outside of the styling panel. For a gauge, these display options can be configured in other areas the **Appearance** section.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font and font color for the following text elements:
    - **Axis title**: Style the title for measure displayed in the gauge.
    - **Axis label**: Style the labels for gauge's range limits.
    - **Value label**: Style the label displaying the measure value.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

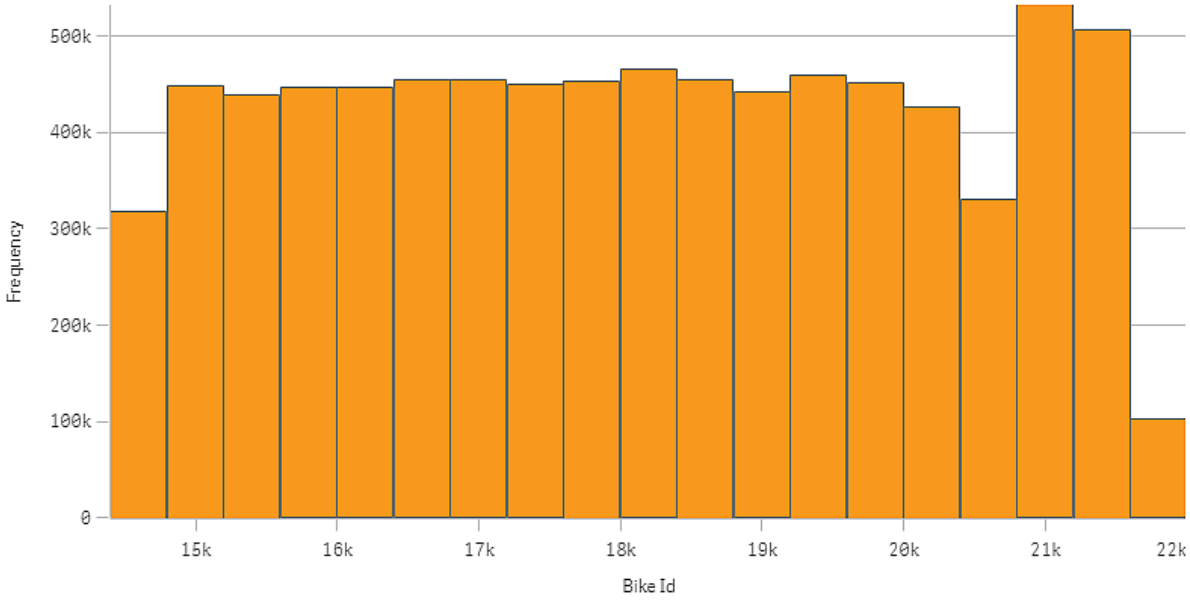
1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

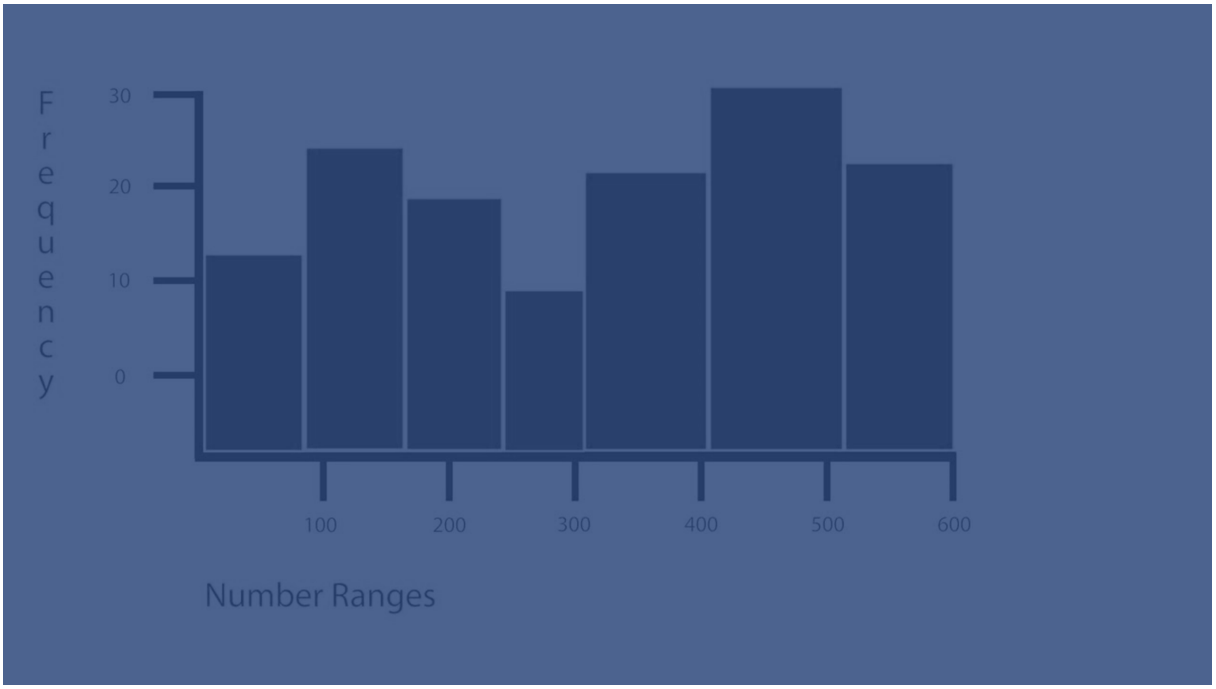
Display limitations

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

Histogram

The histogram is suitable for visualizing distribution of numerical data over a continuous interval, or a certain time period. The data is divided into bins, and each bar in a histogram represents the tabulated frequency at each bin.





When to use it

The histogram is suitable for visualizing distribution of numerical data over a continuous interval, or a certain time period.

Advantages

The histogram organizes large amounts of data, and produces a visualization quickly, using a single dimension.

Disadvantages

The histogram is not relevant for detailed analysis of the data as it deals with a summary of the data distribution.

Creating a histogram

You can create a histogram on the sheet you are editing. You can only apply a single dimension to a histogram. Histograms do not need a measure, as the frequency of the binned data is automatically calculated.

Do the following:

1. From the assets panel, drag an empty histogram to the sheet.
2. Add the dimension to calculate the frequency on.

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

Dimension limitations

There are some limitations to the dimension used in a histogram.

- The dimension must be a numerical field.
- You cannot use a master dimension that was created using the expression editor, even if the resulting field is numeric.
- The dimension cannot be based on an aggregation function.

Styling the histogram

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Axis title**: Style the titles on the axes.
    - **Axis label**: Style the labels on the axes.
    - **Value label**: Style the labels displaying the frequency value of each dimension value bin.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

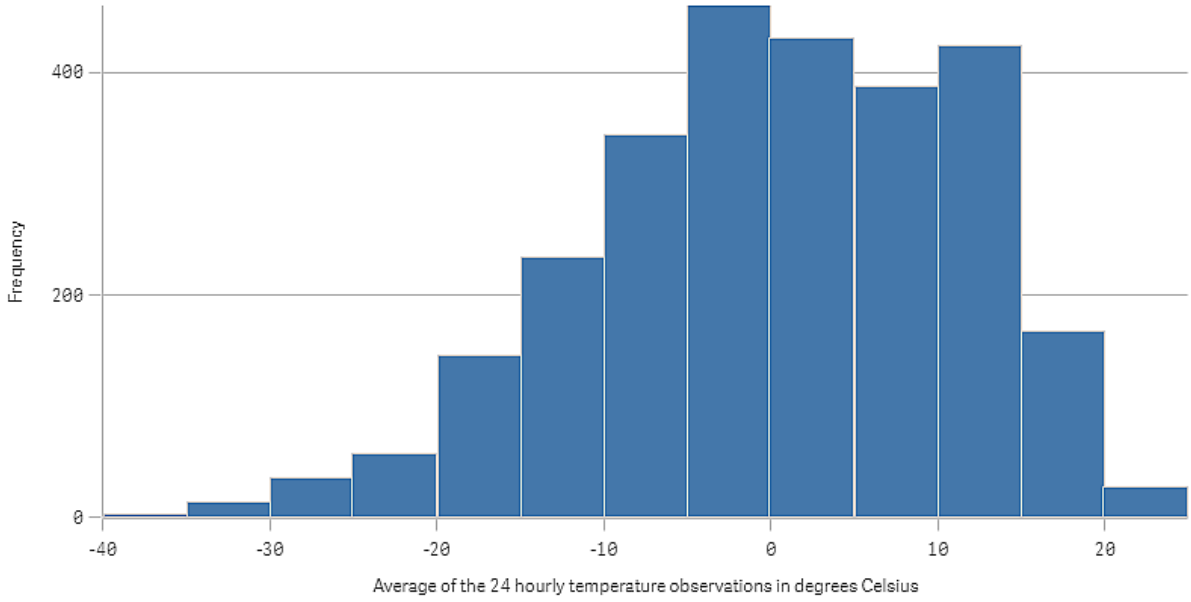
Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.

5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Viewing the distribution of data over intervals with a histogram

This example shows how to make a histogram to the distribution of data over intervals, using weather data.



Dataset

In this example, we'll use the following weather data.

- Location: Sweden > Gällivare Airport
- Date range: all data from 2010 to 2017
- Measurement: Average of the 24 hourly temperature observations in degrees Celsius

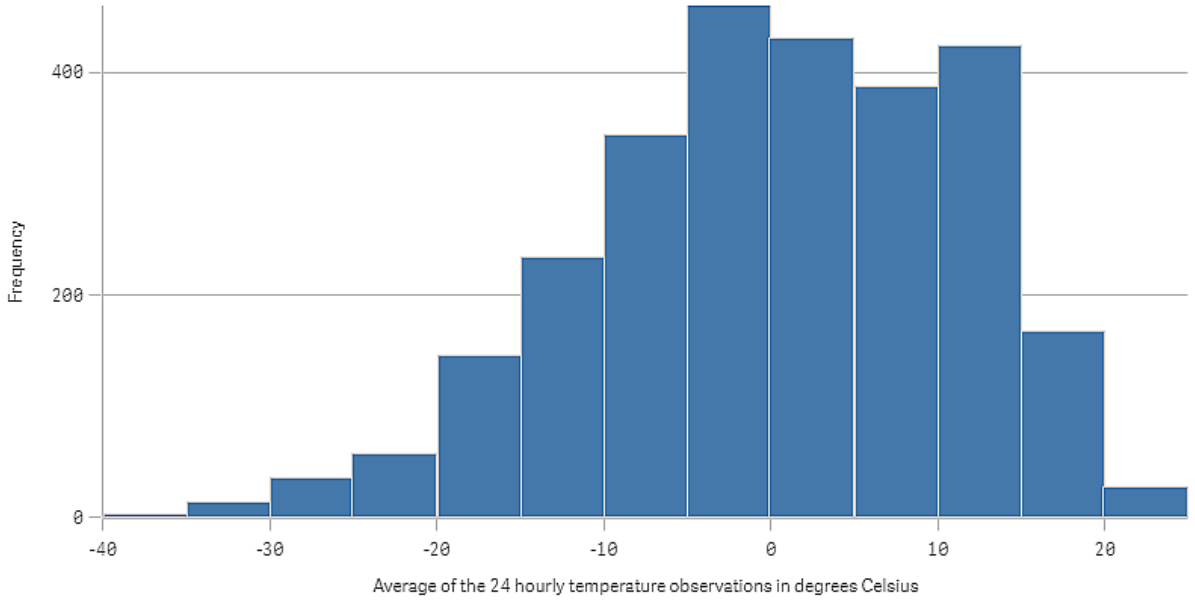
The dataset that is loaded contains a daily average temperature measurement from a weather station in the north of Sweden during the time period of 2010 to 2017.

Visualization

We add a histogram to the sheet and add the field *Average of the 24 hourly temperature observations in degrees Celsius* as dimension.

The visualization creates a frequency measure automatically, and sorts the temperature measurements into a number of bars according to frequency distribution.

We can adjust the size of the bars to get even intervals, by setting **Bars** to **Custom** and **Bar width (x-axis)** with a width of *5*. This adjusts the bars to be intervals of 5 degrees Celsius as shown below:



Discovery

The histogram visualizes the frequency distribution of the temperature measurements. You can hover the mouse over a bar to see more details of the frequency.

We can see that most days, the temperature is between -5 and 15 degrees Celsius. There are days below -30, but they are not many.

KPI

The KPI visualization can show one or two measure values, and is used to track performance.

A KPI visualization with two measure values, using conditional colors and symbols.

When to use it

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

Advantages

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

Disadvantages

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

Creating a KPI

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

Do the following:

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

In a KPI visualization, you can have one or two measures and no dimensions. With two measures, the second value automatically becomes a complementary value and is shown with a smaller font size. You can easily switch their order by dragging the measures in the properties panel under **Measures**.

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

The following settings are used by default in a KPI visualization:

- Centered alignment.
- Black text color.
- No background color.
- Fluid layout behavior.
- Medium font size.
- No titles.
- Measure label displayed.
- Conditional colors and symbols are turned off.
- No link to sheet.

If you double-click or drag a measure from the assets panel, a KPI visualization is added on the sheet using the measure.

Styling the KPI

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

In a KPI, you can style the text in the following components of the chart:

- Title area: Includes the chart title, subtitle, and footnote.
- Chart area: Includes measure titles and measure values.

Styling the title, subtitle, and footnote

You can customize the text displayed in the title area of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**

- **Subtitle**
- **Footnote**

Styling the chart text

The data displayed in a KPI chart consists of text. The appearance of this text can be customized separately from the title area.

You can set the text alignment for the chart. Choose between left-aligned, centered, or right-aligned text.

You can also select between several layout behavior options. The layout behavior defines how the size of the text adapts given the configured font size, chart size, and text length. The following options are available:

- **Responsive**: You can adjust the font size, with additional text size adjustments applied based on chart size and text length. Adjustments are made to fit all text content into the KPI.
- **Fluid** (default): You can adjust the font size, with additional text size adjustments applied based on chart size only. This re-scaling of the text is independent of text length. If the text is too long, an ellipsis is inserted at the end.
- **Fixed**: You can adjust the font size, but it does not automatically adapt to chart size or text length. It remains at the same size regardless of changes to these components.

Additionally, you can show or hide each of the measure titles in the KPI, and set the font size for the chart text.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. Navigate to the **Chart** tab.
4. Under **Alignment**, set the text alignment. Choose between left, centered, or right alignment.
5. Under **Layout behavior**, adjust how text size adapts to chart size and text length. The appearance of each setting depends on the **Font size** you set for the chart.
6. Under **Show**, select whether to show or hide each KPI title in the chart.
7. Under **Font size**, adjust the size of the text that displays the measure titles and values.

For further customization settings, you can set the **Styling mode** to **Advanced options** to style each measure title and measure value individually.

Do the following:

1. In the **Chart** tab of the styling panel, under **Styling mode**, turn on **Advanced options**.
2. Under **First measure title**, configure the following settings:
    - Set **Show title** on or off to display or hide the measure title.
    - Style the text. Choose the font, emphasis style, font size, and color.
3. Under **First measure value**, set the font, emphasis style, and font size.
4. Repeat the steps above to customize the **Second measure title** and **Second measure value**.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Using conditional colors and symbols

You can set your KPI visualization to display in different colors, and with different symbols, depending on the value of the selected measure. Conditional colors and symbols can be configured in the properties panel.

You can do this by adding multiple range limits to the KPI, creating subsections that indicate performance. For example, you can set your KPI so that it displays in:

- Green with a check mark symbol when performance is strong.
- Yellow with a caution symbol when performance falls below expectations.
- Red with an X symbol when performance is low.

You can also set range limits with expressions, rather than defining a single value.

Do the following:

1. In the properties panel for a KPI visualization, select **Appearance** and expand **Color**.
2. If necessary, turn off **Library colors** and turn on **Conditional colors**.
3. Click **Add limit** to create a new limit. Multiple limits can be added to a single KPI chart.

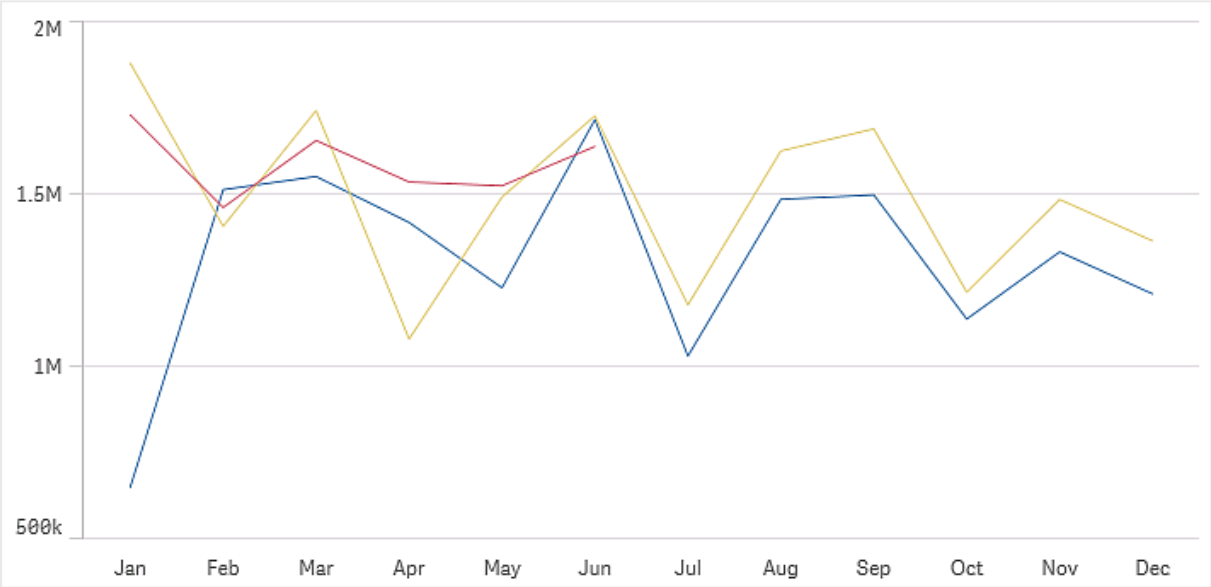
4. Specify a value for the limit, or enter an expression using the expression editor.
5. On the **Value** color bar, click the range area of the KPI you would like to modify.
6. Under **Colors**, select a preset color or use a custom color. Toggle, if needed, to **Symbols** to choose the symbol displayed when your KPI falls within the specified limit.

Linking to another sheet

You can link from the KPI visualization to a sheet in the app. When making data analysis and clicking the visualization, you can click a second time to go to a predefined sheet. The sheet is opened in a new tab. When hovering over ℹ, the name of the sheet is displayed. The icon is only displayed when **Show title** is selected, under **Presentation**.

Line chart

The line chart is used to show trends over time. The dimension is always on the x-axis, and the measures are always on the y-axis.



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

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

- As gaps
- As connections
- As zeros

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

When to use it

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

Advantages

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

Disadvantages

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

Creating a line chart

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

Do the following:

1. From the assets panel, 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.

In a line chart you need at least one dimension and one measure.

You can include up to two dimensions and one measure, or one dimension and up to 15 measures in a line chart.

Creating a line chart

Dimensions	Measures	Result
1 dimension	1 measure	A simple line chart with a single line.
2 dimensions	1 measure	A line chart with the first dimension on the X-axis, and a line for each value of the second dimension.
1 dimension	up to 15 measures	A line chart with one line for each measure.

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

Styling the line chart

You have a number of styling options available in the properties panel. Click **Styling** under **Appearance** > **Presentation** to style the text, background, data point size, and lines at the chart level (for the entire chart). The styling panel contains various sections under the **General** and **Chart** tabs. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel. Any customization you apply here overrides the styling set in the app theme.

You can also set line styling options individually for each measure in the chart. These options are available for each measure in the **Data** section of the properties panel. When you style an individual measure, the settings you choose override both the chart-level settings and the app theme for that specific measure only.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:

- **Axis title**: Style the titles on the axes.
- **Axis label**: Style the labels on the axes.
- **Value label**: Style the labels for the measure values that are configured as **Lines**.
- **Legend title**: Style the title of the legend.
- **Legend labels**: Style the labels of the individual legend items.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the data points at the chart level

You can set the size of the data points. The settings defined here apply to all measures in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, under **Data point size**, adjust the slider to change the size of the data points in the chart.

Customizing the measure lines at the chart level

You can customize the appearance of the lines in the chart. The settings defined here apply to all measures in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. Switch to the **Chart** tab of the styling panel.
4. In the **Line options** section, adjust the line thickness, line type (solid or dashed), and line curve (linear or monotone).

Styling each measure individually

Each measure line in the chart can be styled with separate settings. For each measure, you can customize the data point size, line thickness, line type, and line curve.

Do the following:

1. In the properties panel, expand the **Data** section.
2. Click the measure you want to customize.
3. Under **Styling**, click **Add**.
4. Adjust the data point size, line thickness, line type (solid or dashed), and line curve (linear or monotone).

Repeat these steps for each individual measure you need to customize separately from the app theme or chart-level style settings.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Showing or hiding dimensions and measures depending on a condition

You can show or hide a dimension or measure depending on if a condition is true or false. This is known as a show condition, and is entered as an expression. The dimension or measure is only shown if the expression is evaluated as true. If this field is empty, the dimension or measure is always shown. Expand the dimension or measure in the **Data** section of the properties panel and enter an expression under **Show dimension if** or **Show measure if**.

Custom tooltips are disabled for a line chart if any of the dimensions in the chart are using a show condition.

Let's say you have a dataset with the fields `Sales`, `Quarter`, `Year`, and `Order Number`, among others. You could configure your chart so that sales are displayed along a time-based dimension for yearly aggregations. You can add a second dimension for quarterly aggregations but only organize the data by this dimension if the total number of orders received by your company has reached a target goal of 100,000.

Do the following:

1. Drag a line chart from the assets panel onto the sheet.
2. Add `Quarter` as a dimension.
3. Add `Year` as a second dimension from the properties panel.
   Each distinct year in the data model becomes a separate line in the chart.
4. Add `Sum(Sales)` as a measure.
5. In the properties panel, expand the dimension `Manager`. Under **Show dimension if**, add the following expression:
   `Count([Order Number])>100000`

If your data contains 50,000 order records, the chart will not organize sales by quarter, since the expression is evaluated as false. If the data contains 100,000 or more order records, sales will be organized by both `Year` and `Quarter`.

Adding trend lines

You can add trend lines to the chart. Use trend lines to visualize how data changes over time.

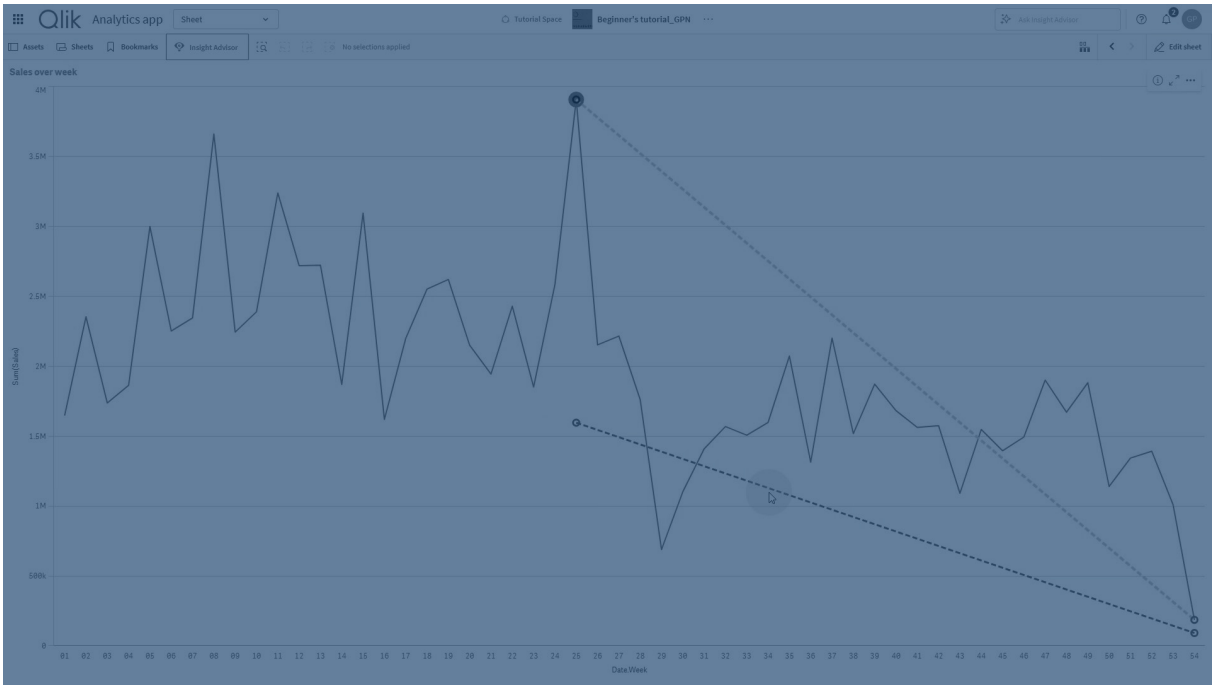
For more information about trend lines, see *Trend lines (page 117)*.

Do the following:

1. In the properties panel, expand the **Data** section.
2. Under **Measures**, expand the measure for which you are adding trend lines.
3. Under **Trend lines**, click **Add trend line**.
4. Define the **Label** and **Type** for the trend line.
5. Use the **Colors** slider to define **Custom** or **Auto** coloring.
6. Use the checkbox to toggle a **Dashed** appearance on or off.

Working with shapes

With shapes, you can add points and lines as separate items in the chart. Shapes allow you to enhance your dimension and measure data with special information that helps with analysis. For example, you could add a point to highlight a specific dimension value, or draw a line between the highest and lowest points for a key performance indicator.



Adding a point

Do the following:

1. In the properties panel, expand **Add-ons** > **Shapes**.
2. Click **Add shape**, and select **Point**.
3. Optionally, define a **Label** for the point using text or an expression.
4. Under **Dimension value**, type the dimension value for which to add the point. You can also define the value with an expression.
5. In the **Measure input** drop down menu, select one of the following and define the value below the menu:
    - **Measure value**: Define the measure value for which to add the point, either as a simple value or an expression. For example, you could use a set analysis expression.
    - **Measure index**: Define the measure from which the measure value is extracted. This can be provided as a simple value or an expression. For example, use 0 for the first measure in the chart, 1 for the second measure in the chart, and so on.
6. Set the **Symbol** to use for the point. The default is **Circle**.
7. Adjust the **Label position** if needed. The label can be displayed above or below the point.
8. Set color and opacity using the following settings. You can also configure these elements to have no color.
    - **Point color**
    - **Outline color**
    - **Label color**

9. Use the **Colored background** check box to add a background for the label, if defined. When this option is turned on, the defined **Label color** is used for the background, and the label text switches to a color that best contrasts the background.
10. Use the sliders to adjust the **Outline width** and **Data point size**.

Adding a line

You can add a line as a series of points. The line connects each point that you define for it.

Do the following:

1. In the properties panel, expand **Add-ons** > **Shapes**.
2. Click **Add shape**, and select **Line**.
3. Optionally, define a **Label** for the line using text or an expression. This does not appear in the chart but helps with identification when you have multiple lines and points.
4. By default, data points are not highlighted on the line. To highlight them, turn on **Show data points** at the bottom of the settings for the line. With this option turned on, more point settings are shown.
5. To add a point, click **Add point**.
6. Under **Dimension value**, type the dimension value for which to add the point. You can also define the value with an expression.
7. In the **Measure input** drop down menu, select one of the following and define the value below the menu:
    - **Measure value**: Define the measure value for which to add the point, either as a simple value or an expression. For example, you could use a set analysis expression.
    - **Measure index**: Define the measure from which the measure value is extracted. This can be provided as a simple value or an expression. For example, use 0 for the first measure in the chart, 1 for the second measure in the chart, and so on.
8. Adjust the point's appearance using the following settings. These settings become visible when **Show data points** is turned on.
    - **Label**: Set a textual label for the point.
    - **Symbol**: Set the shape of the point. The default is **Circle**.
    - **Label position**: Choose whether to show the label above or below the point.
    - **Point color**: Set the color of the point.
    - **Outline color**: Set the color of the point outline.
    - **Label color**: Set the color of the label text. If **Colored background** is turned on, this setting instead controls the background behind the label.
    - **Outline width**: Set the width of the point outline.
    - **Data point size**: Set the overall size of the point.
    - **Colored background**: Add a background for the label, if label text has been defined. When this option is turned on, the defined **Label color** is used for the background, and the label text switches to a color that best contrasts the background.
9. Add one or more points as needed, using the above steps.
10. Set the **Line color**, including opacity.

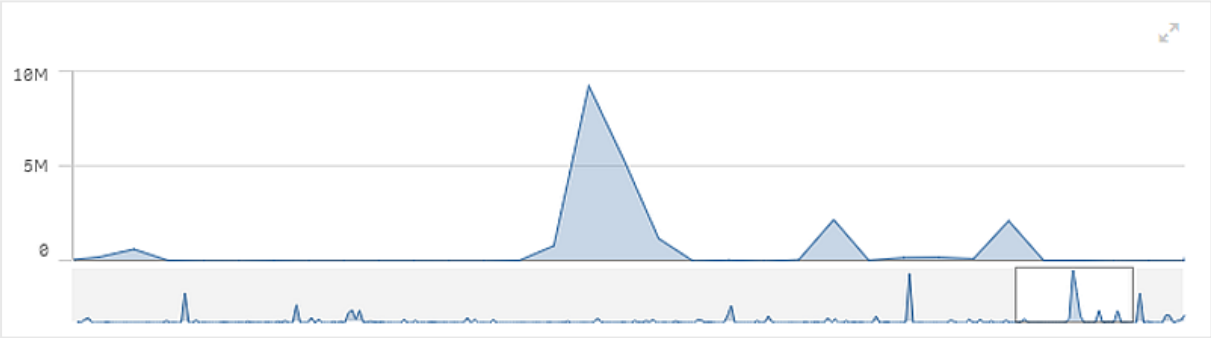
11. Use the slider to adjust the **Line thickness**.
12. Select the **Line type**, choosing between **Solid** or **Dashed**.
13. Use the **Line curve** drop down menu to select one of the following:
    - **Linear**: Each point is connected with straight lines.
    - **Monotone**: Each point is connected with curved lines.

Display limitations

Displaying large numbers of dimension values

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

Line chart with a mini chart, since the dimension values exceeds the width of the visualization.



Displaying out of range values

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

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

Displaying large amounts of data in a line chart

If the chart uses a continuous scale, you can set the maximum number of visible points and lines. In the properties panel, go to **Presentation**. Then adjust the following:

- **Max visible points**: Set the maximum number of points that will be displayed. The default is 2,000. The maximum is 50,000. If you set a number less than 1,000, the line chart will behave as if the maximum is 1,000 visible points. The actual maximum number of data points in the chart is affected by the distribution of the data, and could be lower than the value you configure with this setting. When there are more data points than the value you have set, data points are neither displayed, nor

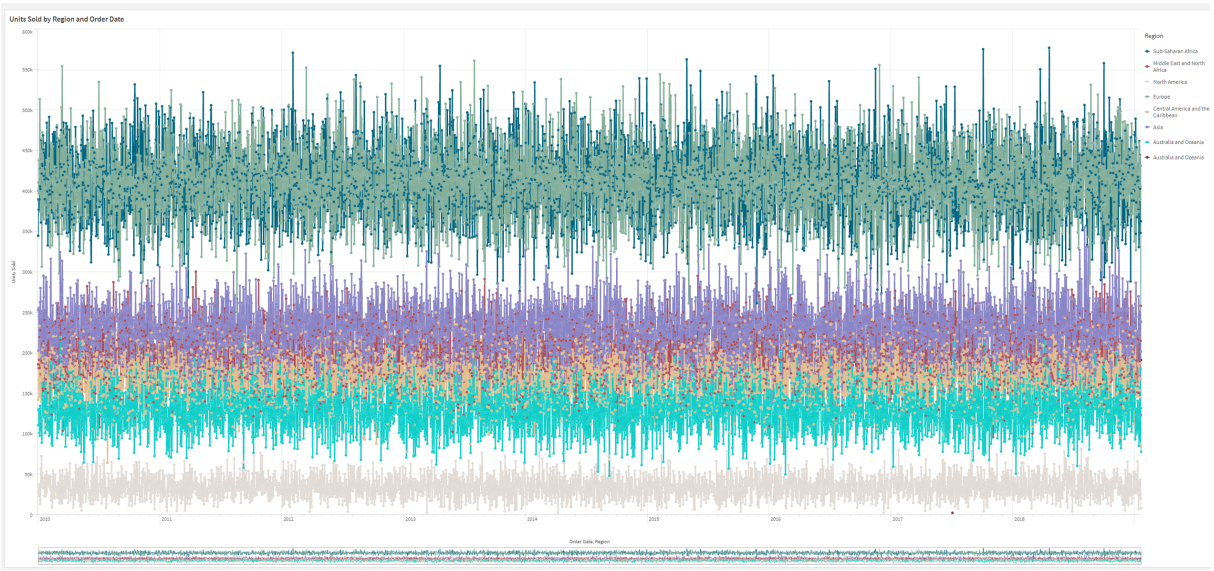
included in selections made in the chart.

- **Max visible lines**: Set the maximum number of lines that will be displayed. The default is 12. The maximum is 1,000.

If there are more data points than the number set in **Max visible points**, you will not see any points, only lines. If there are more than 5,000 visible points, then labels will not be shown. If you have a large number of lines, not all lines will be displayed, or lines may overlap.

If you have a large number of points or lines, it may take your chart longer to render when you zoom or pan. You cannot make selections when the line chart is rendering.

A line chart with a large data set. This chart is set to display 50 lines, and 20,000 data points.



To avoid displaying limited data sets, you can either make a selection or use dimension limits in the properties panel.

Colors and legend

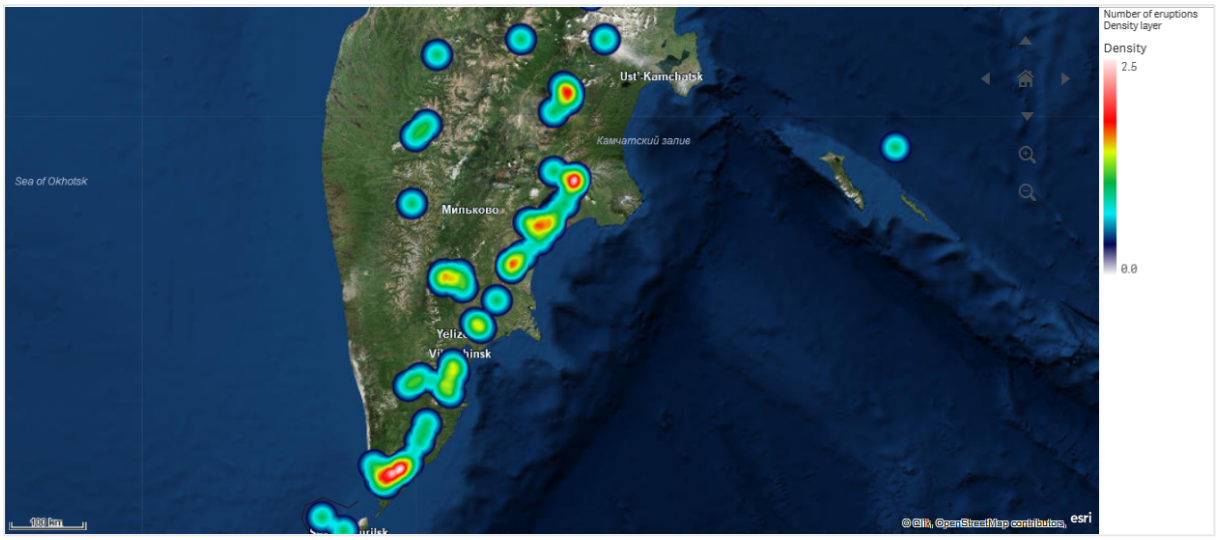
When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Map chart

Maps enable you to view your data geographically.

Maps have many ways to present your data. You can add multiple layers to your map to display different types of information on the same map. You can set a custom scope for locations so that if two locations have the same name, you display the locations and their data correctly. You can use drill-down dimensions to create a hierarchy of geographic areas for selection. You can limit the pan of a map to a specific view and scope of the map, such as a region of interest, out of which users cannot pan or zoom out. You can add custom base maps to your map and use non-WGS-84 coordinates.

Map with density layer displaying number of global volcanic eruptions.



When to use maps

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

Advantages

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

Disadvantages

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

Server connection requirements

In order for a Qlik Sense map chart to be able to perform location lookup and show a background map (base map and layers), your web browser needs to be able to establish a connection with both of the following servers on port 443 (HTTPS):

- maps.qlikcloud.com (required for location lookups and background map)
- ibasemaps-api.arcgis.com (required for Satellite base map)

For more information, refer to the Map service connection requirements on Ports used by user web browser.

If you are instead using an on-premise GeoAnalytics server, your map chart will not need access to maps.qlikcloud.com and can function without an internet connection. However, in this setup, the Satellite base map will not be displayed as it requires a connection with ibasemaps-api.arcgis.com. For more information, see Using GeoAnalytics with Qlik Sense map.

Base map

The base map provides the background for the data contained in your layers. You can select your base map in **Map settings**. Qlik Sense has four default base maps:

- **Default**: An OpenStreetMap-based map.
- **Pale**: A paler version of **Default**.
- **Dark**: A darker version of **Default**.
- **Satellite**: A satellite image map.
- **None**: No base map.

As of December 7, 2021 the map tile service used by Qlik Sense for satellite base maps changed from services.arcgisonline.com to ibasemaps-api.arcgis.com. If your maps are not functioning as expected, contact your Qlik administrator. They might need to allow this new service.

Additionally, custom base maps can be added using background layers to add your own custom base maps. For example, you could add the floor plan of an airport or office as a custom base map.

Layers

Layers contain visualized dimension and measure data that is displayed over your map. You can stack layers on top of each other. You can also control at what zoom levels different layers appear in or have layers that appear only if other values in a drill-down dimension are selected. This enables you to create different levels of detail as you make selections and zoom in and out of areas of interest on your map. The following layers are available:

- **Point layer**: A point layer overlays individual locations on a map, representing them with shapes.
  Point layers (page 288)
- **Area layer**: An area layer presents areas on your map, such as countries or states. With polygon geometry loaded into a field, it can present any custom area.
  Area layers (page 290)
- **Line layer**: A line layer enables you to display lines between points on your map.
  Line layers (page 291)
- **Density layer**: A density layer enables you to visualize the density of points in an area using a color ramp.
  Density layers (page 294)
- **Chart layer**: A chart layer enables you to display small pie charts or bar charts over locations in your map.
  Chart layers (page 296)
- **Background layer**: Background layers enable you to display a custom base map for your map visualization.
  Background layers (page 298)

Layers that use drill-down dimensions can be used to create drill-down layers. Drill-down layers enable you to drill-down different hierarchical dimensions in a single layer or in multiple layers. You could, for example, switch between area and point layers as selections are made. For more information, see *Drill-down layers (page 301)*. For an example map that uses drill-down dimensions and layers, see *Controlling visible map data with drill-down layers (page 302)*.

Location data for map layers

Maps support several ways for determining locations in a layer. You can use the dimension added to the layer. You can alternatively specify fields containing location data for the layer, if the layer dimension does not contain geographic data. In the **Location** properties, you can specify additional parameters for the location field, such as adding additional fields that include country or administrative area information. For example, if you have a field containing custom area geometries and a field containing the names of the custom areas, you can set the name field as the dimension and then set the area geometry field as the location field in **Location** in the map properties.

Locations can be either geometries or names of locations such as names of countries, regions, cities, postal codes etc. Layer locations can be defined using fields that contain names and codes. Qlik Sense can identify the following types of locations:

- Continent names
- Country names
- ISO alpha 2 country codes
- ISO alpha 3 country codes
- First-order administrative area names, such as a state or province names
- Second-order administrative area names
- Third-order administrative area names
- Fourth-order administrative area names
- Postal codes or ZIP Codes
- City, village, or other populated place names
- IATA airport codes
- ICAO airport codes

Availability of locations may vary by country. If the named location is not available, use coordinate or area data for the location.

Qlik Sense uses map and location data obtained from recognized field leaders who use accepted methodologies and best practices in marking borders and naming countries within their mappings. Qlik Sense provides flexibility to enable users to integrate their own, separate background maps. If the standard maps do not fit, Qlik Sense offers the option to load customer provided background maps, borders, and areas.

Geometries can either be added at load time by the data preparation service or loaded from geographic sources such as KML. Point layers also support latitudes and longitudes in separate fields. For area layers, areas can be defined using geometries from a geographic data source such as KML files. Line layers support the same point data as point layers. Line layers also support strings with line geometries in GeoJSONLineString or MultiLineString formats.

If you are using a custom map in a background layer that uses non-WGS-84 coordinates, you can use a field with locations defined in the coordinate system the map uses (either degrees or meters). For more information, see *Using non-WGS-84 coordinate systems (page 288)*.

Creating maps

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

You can create several map visualizations based on different point data or area data, which use the same dimension data.

Do the following:

1. From the assets panel, drag an empty map to the sheet.
2. From **Map settings**, select the **Base map**.
3. From **Layers** in the properties panel, add layers to your map.
   Layers are placed above layers of the same type. You can set the order of layers by dragging layers up and down in the list. The layer at the top of your list is also overlaid on top of the other layers on your map.
   For information on configuring layers, see:
   - *Point layers (page 288)*
   - *Area layers (page 290)*
   - *Line layers (page 291)*
   - *Density layers (page 294)*
   - *Chart layers (page 296)*
   - *Background layers (page 298)*

Once the map is created, you can adjust its appearance and other settings for the map and its layers in the properties panel.

will appear in the top-left corner of your map if there is an issue with the added layer. Click the icon to see the error message.

Styling the map

There are options available in the properties panel for styling the text in the map chart.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text in the title area

Click **Styling** under **Appearance** > **Presentation** to customize the styling of the chart's title area (title, subtitle, and footnote). You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

You can style the text of the title information for the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the text in the map layer labels

The font, font size, and text color for the layers of individual layers can be customized. You can style the text for the following types of map layers:

- Area layers
- Point layers
- Line layers
- Chart layers

Do the following:

1. Under **Layers** in the properties panel, click the layer for which you want to style the text.
2. Under **Options** > **General**, toggle on the **Show label** setting.
3. Use the options under **Label font family** to change the font for the layer labels.
4. Use the options under **Label font size** to adjust the text size of the layer labels.
5. Select a color for the label text under **Label font color**.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.

3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Customizing the selection color

You can customize the color for selections made in your map.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, after **Selection color**, select a color.

Limiting location scope in map layers

By default, Qlik Sense searches a broad scope of locations for the location field when names are used. In cases where there are multiple possible matches, you may need to limit the scope of locations searched to ensure Qlik Sense displays the desired location.

Do the following:

1. From **Layers** in the properties panel, click **Location**.
2. Set **Scope for location** to **Custom**.
3. After **Location type**, select the type of data contained in the field or expression selected as **Location field**.
4. Optionally, after **Country**, enter a field, expression, or text indicating the country the locations in the **Location field** are located.
5. Optionally, after **Administrative area (Level 1)**, enter a field, expression, or text indicating the first-level administrative area the locations in the **Location field** are located.
6. Optionally, after **Administrative area (Level 2)**, enter a field, expression, or text indicating the second-level administrative area the locations in the **Location field** are located.

Limiting panning in your map

You can limit the panning settings in your map to keep the view in your map limited to a set area, such as a specific region of interest. When you limit the panning in a map, you lock the map to the current view. The map will not zoom out further than the current view. You cannot pan the map beyond the limits of the current view. If you zoom in, you can pan, but you are limited by the boundaries of the pan limit.

Do the following:

1. From the properties panel, click **Appearance**.
2. In **Presentation**, set **Limit pan navigation** to **Custom**.

3. Set your map to the view you want to which you want to limit the pan.
4. Click **Set pan limit**.

You can toggle the set pan limit on and off with **Limit pan navigation**. You can clear the saved pan limit by clicking **Clear pan limit**.

Using non-WGS-84 coordinate systems

If you have data and a background map in a projection other than WGS-84, you should set the base map to **None**, add your background map as a background layer, and then set your projection to use undefined degrees or meters depending on the unit of length used in your base map.

When using non-WGS-84 coordinates, you must use geometries loaded into a field. Location names cannot be used.

Do the following:

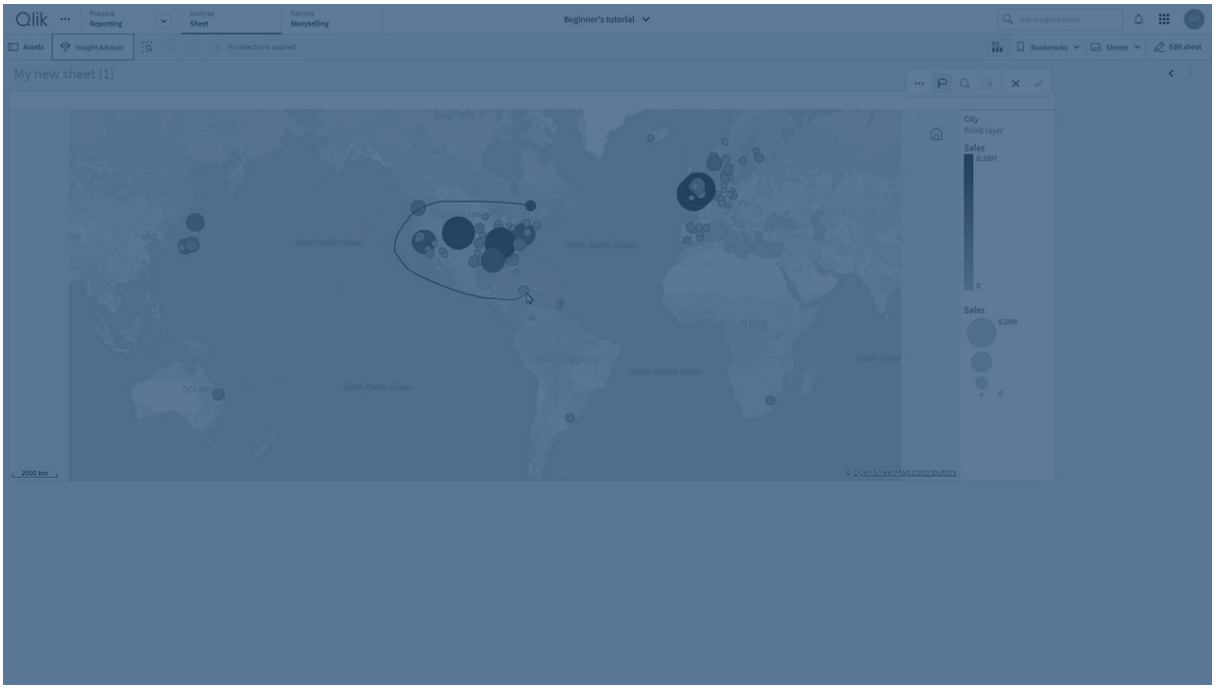
1. From the properties panel, click **Map settings**.
2. In **Base map**, select **Empty (undefined degrees)** or **Empty (undefined meters)**.
3. Select **Background layer**.
4. After **URL**, enter the URL to a slippy map server.
   For example, *http://a.tile.opencyclemap.org/cycle/${z}/${x}/${y}.png* .
5. After **Attribution**, enter the attribution string for the map.
   For example, *© OpenCycleMap. Map data © OpenStreetMap contributors*.
6. From **Layers**, click **Add layer**.
7. Select your layer type.
8. In **Dimensions**, click **Add** and select a field containing data in your map's coordinate system.

Limitations

The map chart is not navigable with keyboard navigation. When creating accessible apps, consider using alternative ways of presenting your geographic data.

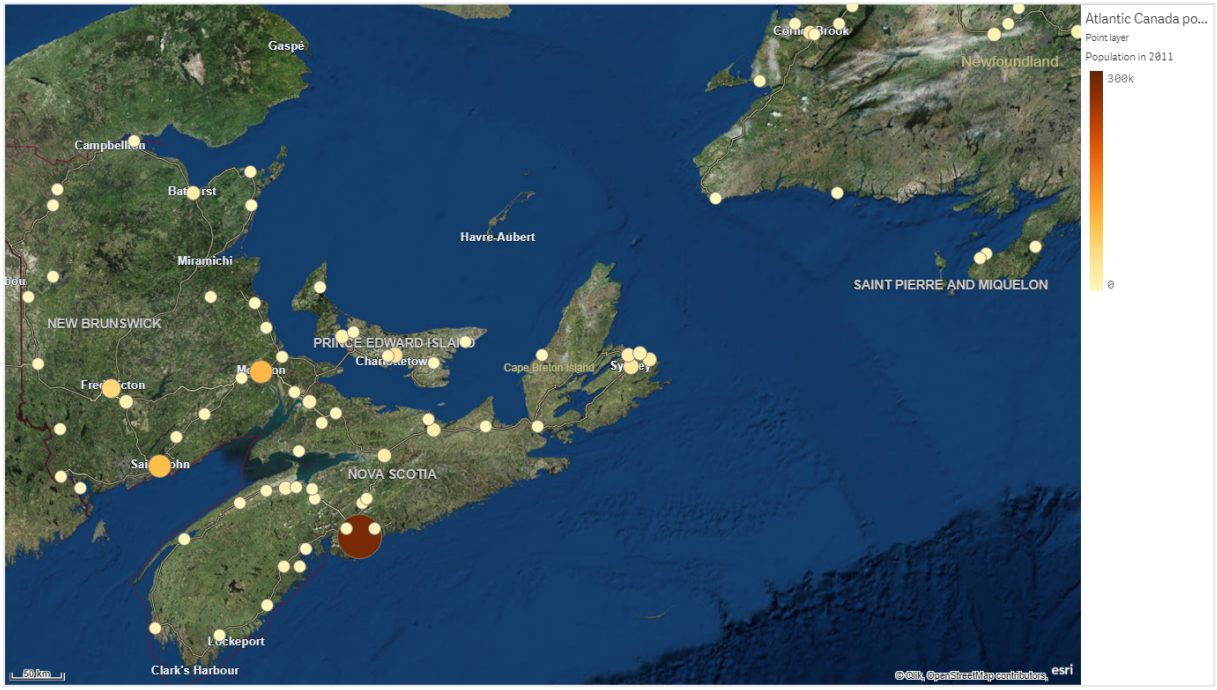
Point layers

A point layer overlays individual locations on a map, representing them with shapes.



By default, point layers use circular bubbles, but you can also use several other shapes. You can also use custom images as the points in a point layer. The size of the points in your layer can be fixed or you can specify a measure or expression to set the sizes of the different points. You can highlight these differences in values further by coloring by measure.

Map with point layer displaying cities in Atlantic Canada colored and sized by population.



Adding a point layer

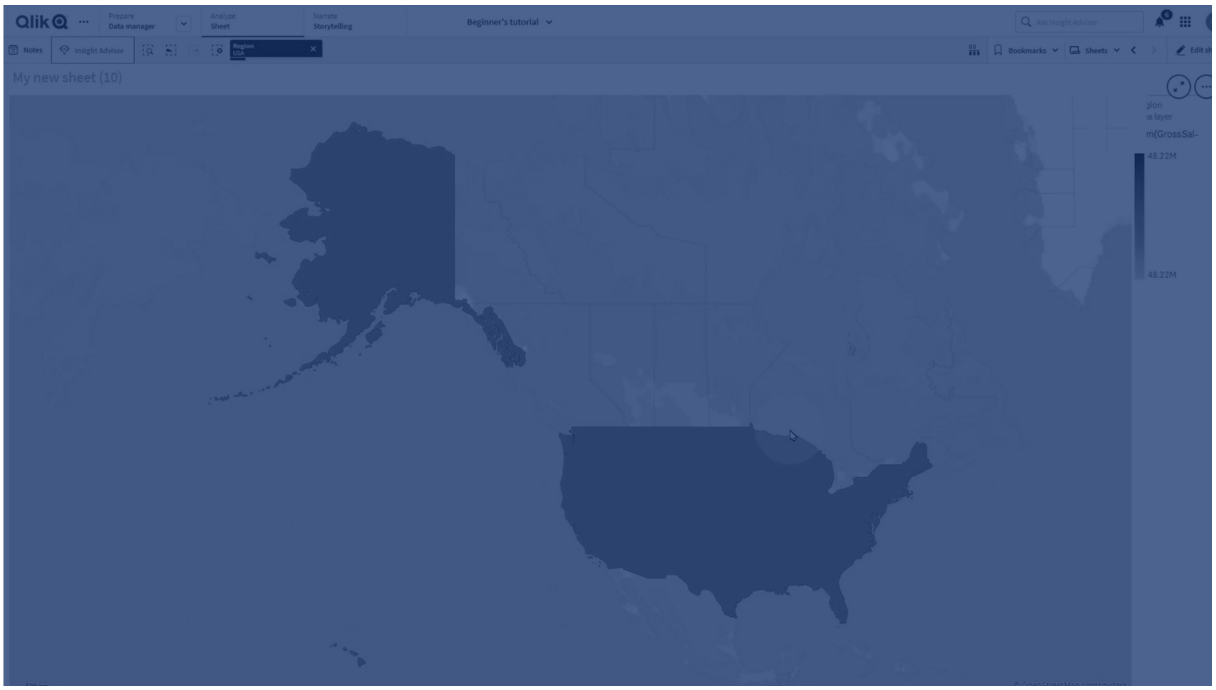
Do the following:

1. Drag and drop a field onto the map, select **Add as new layer**, and select **Add as point layer**.
2. From **Layers** in the properties panel, click **Add layer** and select **Point layer**. In **Dimensions**, click **Add** and select a field containing point data to use as the dimension.
3. If there are issues with the point locations, adjust the location settings in **Locations** in the properties panel.
   For more information, see *Limiting location scope in map layers (page 287)*.

Once the layer is added, you can adjust settings for the layer in the properties panel.

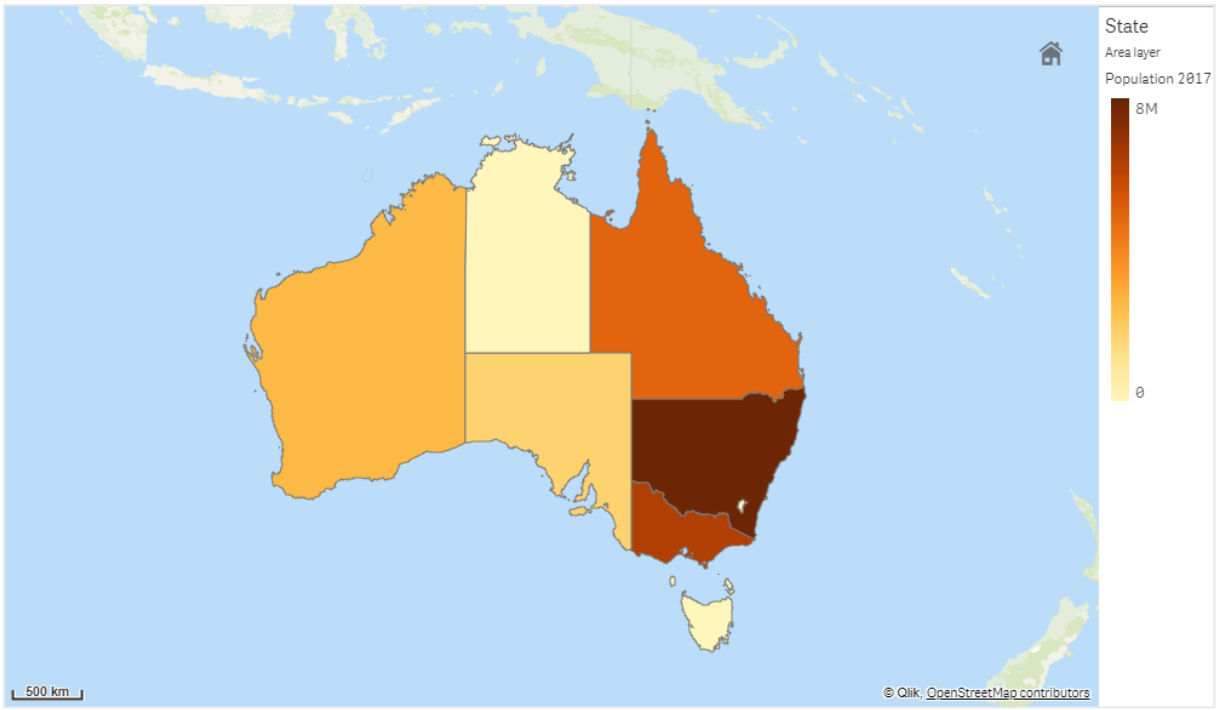
Area layers

An area layer presents areas on your map, such as countries or states. With polygon geometry loaded into a field, it can present any custom area.



With an area layer, each dimension value corresponds to a presented area. By using colors with your area layer, you can present different measure values for the areas. In the properties panel, under **Appearance** > **Colors and legend**, switch **Colors** to **Custom** where the options **By measure** and **By expression** are available.

Map with area layer displaying Australian states and territories colored by population.



Adding an area layer

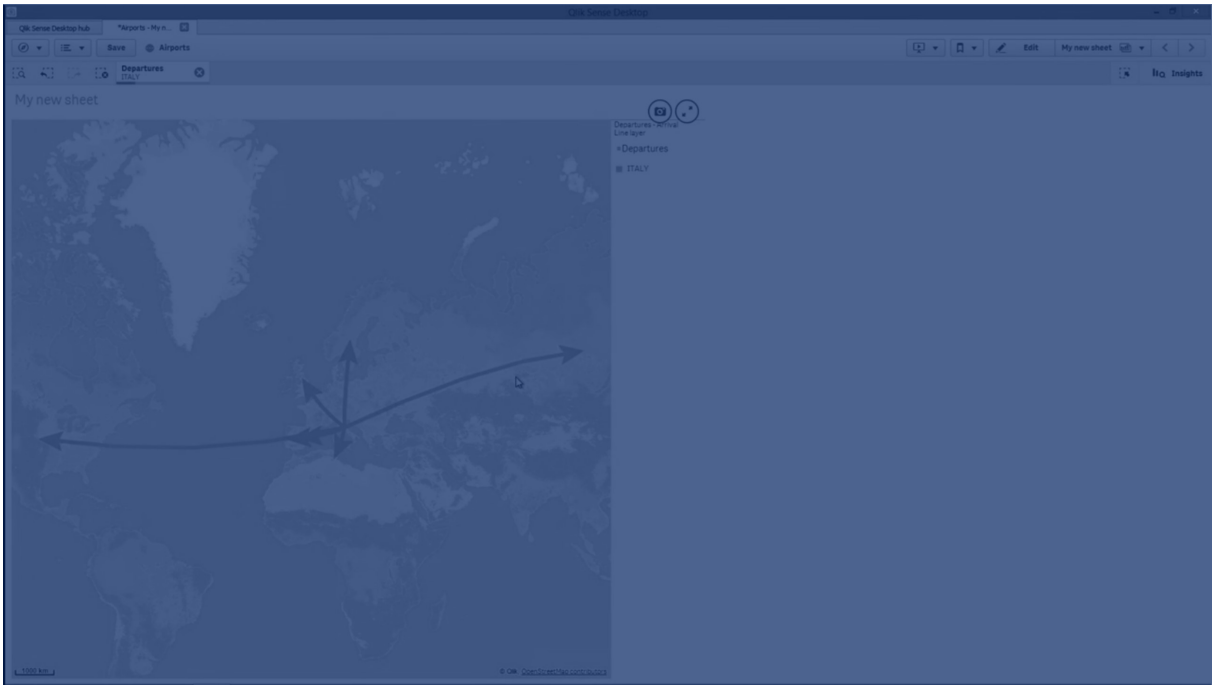
Do the following:

1. Do one of the following:
   - Drag and drop a field onto the map, select **Add as new layer**, and select **Add as area layer**.
   - From **Layers** in the properties panel, click **Add layer** and select **Area layer**. In **Dimensions**, click **Add** and select a field containing area data to use as the dimension.
2. If there are issues with the point locations, adjust the location settings in **Locations** in the properties panel.
   Limiting location scope in map layers (page 287)

Once the layer is added, you can adjust settings for the layer in the properties panel.

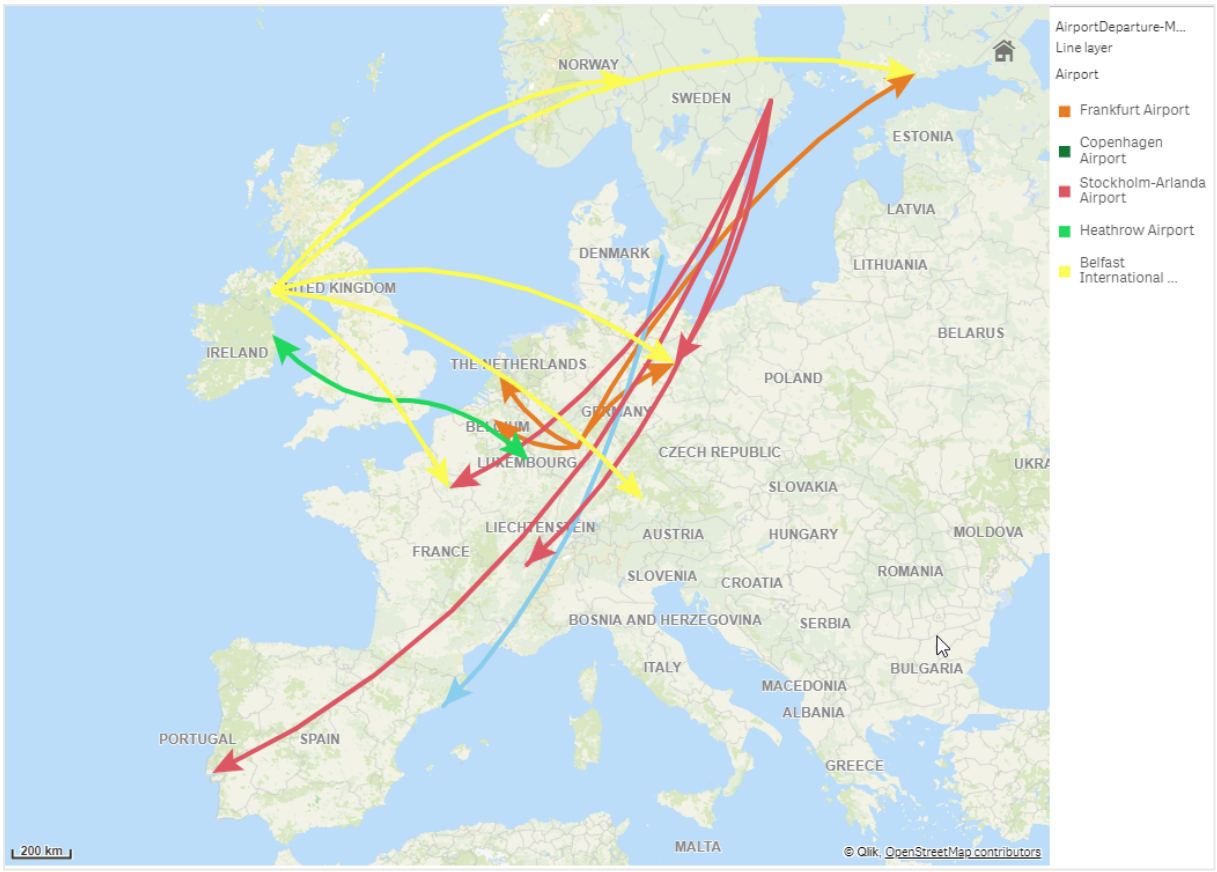
Line layers

A line layer enables you to display lines between points on your map.



For example, you can use a line layer to show aircraft flights between cities. With a line layer, you can use two fields containing point data to define the start points and end points for lines in the layer. Alternatively, you can use a field containing line geometry in either GeoJSON LineString or MultiLineString format. You can customize the width and curvature of lines in the line layer and add directional arrows to your lines.

Map with line layer displaying departing flights between airports in Europe.



Adding a line layer

Line layers display lines using either start and end points, where two fields are used to determine where lines start and end, or using line geometries in GeoJSONLineString or MultiLineString format.

If you are using a start and end point line layer, the dimension you select for your line layer should represent the fields selected as the start and end points in your **Location** settings. For example, if you wanted to visualize where your shipments are being sent, you could set *Shipments* as the dimension and then use *Distribution Center Location* and *Shipping Destination* as the start point and end point in **Location**.

Alternatively, you can add two dimensions to the line layer and use these as the start and end points. This is useful if you want to display lines between all locations in the first dimensions to all locations in the second dimension, which has an association to the first dimension.

Adding a line layer with start and end points

Do the following:

1. Do one of the following:
    - Drag and drop a field containing start point data onto the map, select **Add as new layer**, and select **Add as line layer**.

- From **Layers** in the properties panel, click **Add layer** and select **Line layer**. In **Dimensions**, click **Add** and select a field to use as the dimension.

2. If your dimension contains start point data, add a field containing end point data. Do one of the following:
   - Drag and drop a field containing end point data onto the map, select **Use in <*layer name*>**, and select **Add <*field name*> as a second dimension**.
   - In **Data**, click **Add** and select a field containing end point data.
3. If your dimension does not contain start or end point data, in **Location**, add the fields containing the start point data and end point data as location fields.
4. If there are issues with the start and end point locations, adjust the location settings in **Location** in the properties panel.
   Line layers using start point field and end point fields each have separate location settings in **Location**.
   For more information, see *Limiting location scope in map layers (page 287)*.

Once the layer is added, you can adjust settings for the layer in the properties panel.

Adding a line layer with line geometries

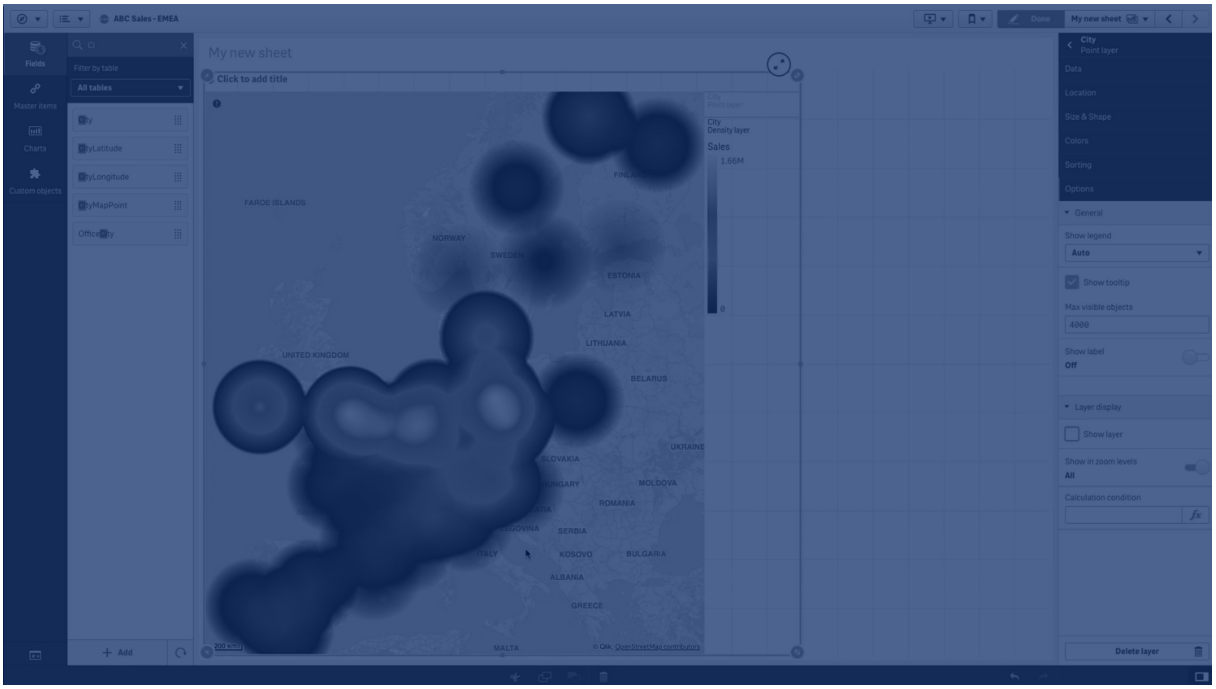
Do the following:

1. Do one of the following:
   - Drag and drop a field containing line geometries onto the map, select **Add as new layer**, and select **Add as line layer**.
   - From **Layers** in the properties panel, click **Add layer** and select **Line layer**. In **Dimensions**, click **Add** and select a field to use as the dimension.
2. In **Location**, select **Line geometry** and then select a field in **Line geometry field**.
   By default, your dimension is selected as the **Line geometry field**.

Once the layer is added, you can adjust settings for the layer in the properties panel.

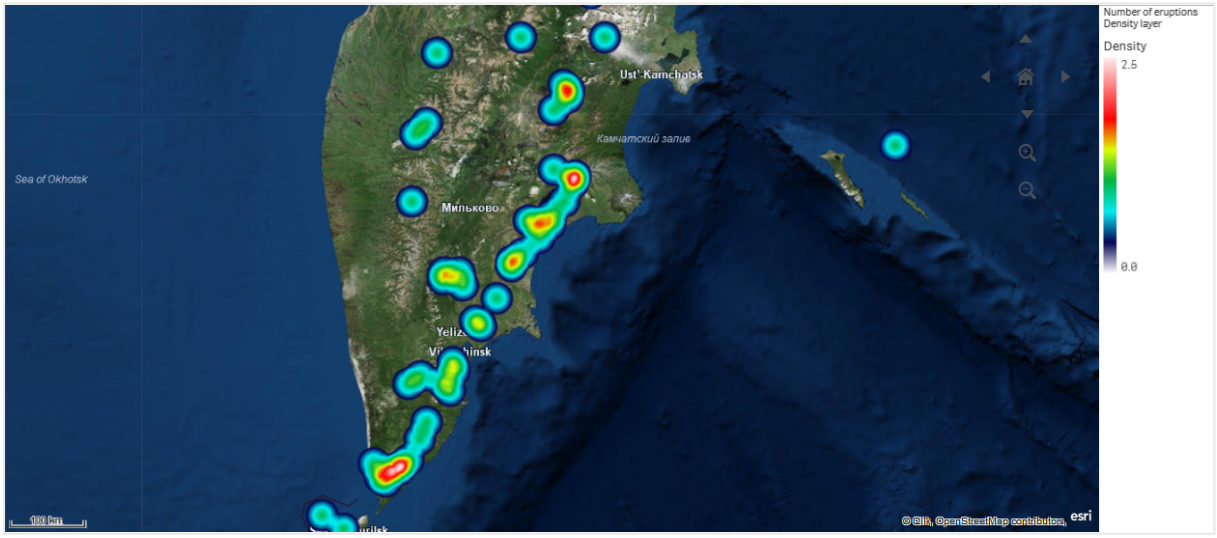
Density layers

A density layer enables you to visualize the density of points in an area using a color ramp.



Each point influences a circular area, with the highest influence at the center and declining towards its outer perimeter. You can specify the influence radius of the points, change its color and scale it to suit your visualization. Density layers can be used to show hotspots of activity, population densities and more.

Map with density layer displaying number of global volcanic eruptions.



Adding a density layer

Do the following:

1. Do one of the following:
   - Drag and drop a field containing point data onto the map, select **Add as new layer**, and select **Add as density layer**.
   - From **Layers** in the properties panel, click **Add layer** and select **Density layer**. In **Dimensions**, click **Add** and select a field containing point data to use as the dimension.
2. If there are issues with the point locations, adjust the location settings in **Locations** in the properties panel.
   For more information, see *Limiting location scope in map layers (page 287)*.

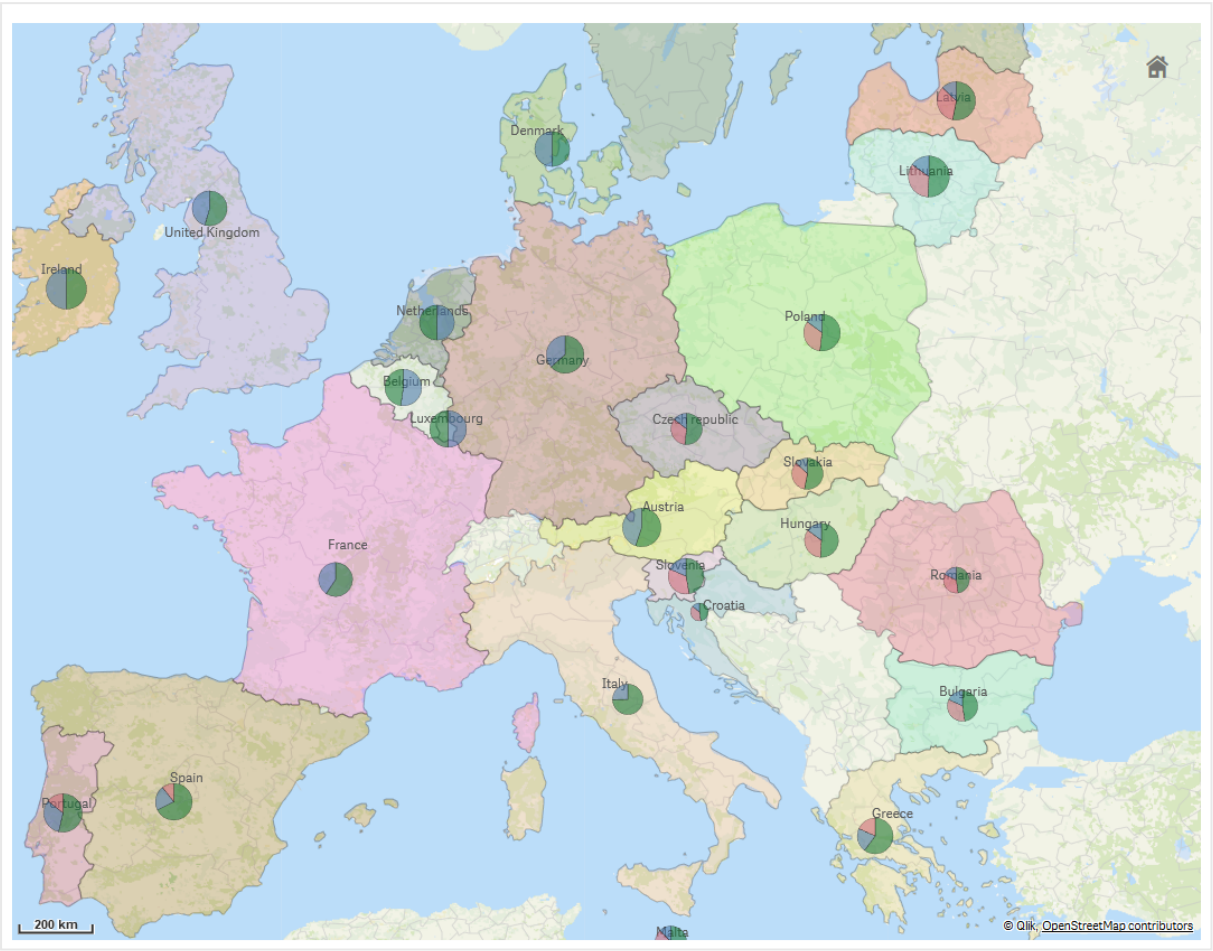
Once the layer is added, you can adjust settings for the layer in the properties panel. .

Chart layers

A chart layer enables you to display small pie charts or bar charts over locations in your map. It uses one dimension to identify the locations and a second dimension to create the pie or bar charts.

You can label the charts and use an expression to control their size. The info bubble displays useful information about the contents of the selected chart.

Map with chart layer displaying source of funds in European Union countries as pie charts. The size of each pie chart shows average absorption rate of funds.



Adding a chart layer

Do the following:

1. Do one of the following:
   - Drag and drop a field containing point data onto the map, select **Add as new layer**, and select **Add as chart layer**.
   - From **Layers** in the properties panel, click **Add layer** and select **Chart layer**.
2. In **Dimensions**, under **Location**, click **Add** and select a field containing point data to use as the locations on your map. Click **Add** and select a field containing data to use as the dimension on your charts.
3. In **Measures**, click **Add** and select a field containing data to use as the measure on your charts.
4. If there are issues with the point locations, adjust the location settings in **Location** in the properties panel.
   Limiting location scope in map layers (page 287)

Once the layer is added, you can adjust settings for the layer in the properties panel.

Background layers

Background layers enable you to display a custom base map for your map visualization.

A background layer could, for example, be a map of an airport that then has a point layer with WIFI hotspot locations overlaid on it. If the custom base map format supports transparency, you can overlay it on top of another map. Qlik Sense supports the following custom maps formats as background layers:

- Slippy or tile map services (TMS)
- Web Map Service (WMS)
- Image URL (Image)

Maps services must be located on their own server. Unlike other layers, the background layer uses no dimensions or measures and only displays an external base map.

If your WMS contains areas with no data, you can set the areas with no data to be transparent. This enables the WMS background layer to be overlaid on another base map or background layer. You can also choose which WMS layers to include in the background layer.

You can insert an image as a background layer. This can be used as a custom base map. You could add an image of a floor plan and use it as a custom base map. An image background layer can also be overlaid on top of another background layer. For example, you could insert an image of a detailed local map as a background layer over top another map. Background layers support the following image types:

- .png
- .jpg
- .jpeg
- .gif

Map with background layer displaying a TMS OpenStreetMap map.

Adding a background layer

Background layer configuration varies depending on the type of background map.

Adding a TMS background layer

Do the following:

1. From **Layers** in the properties panel, click **Add layer**.
2. Select **Background layer**.
3. After **Format**, select **TMS**.
4. After **URL**, enter the URL to a tile or slippy map server.
   For example, *http://a.tile.opencyclemap.org/cycle/${z}/${x}/${y}.png*.
5. After **Attribution**, enter the attribution string for the map.
   For example, *© OpenCycleMap. Map data © OpenStreetMap contributors*.

Once the layer is added, you can adjust settings for the layer in the properties panel.

Adding a WMS background layer

You can optionally use HTTP header authentication when adding a WMS background layer, including the username and password in the URL passed to the WMS server. You can enter the username and password manually or use expressions to define them.

> *If you use basic authentication, any user with access to the app can potentially extract the credentials used.*

Do the following:

1. From **Layers** in the properties panel, click **Add layer**.
2. Select **Background layer.**
3. Under **Format**, select **WMS**.
4. Click **WMS setup**.
5. Under **WMS server URL**, enter the **URL**.
6. If you are using basic authentication, select **Use basic authentication**.
   a. After **User**, enter the username.
   To use an expression, click f_x to open the expression editor.
   b. After **Password**, enter the password.
   To use an expression, click f_x to open the expression editor.
7. Under **Version**, select the WMS version.
8. Click **Load WMS**.
9. After **CRS**, enter the coordinate reference system used by the WMS map.
10. Select **Transparent** to generate map images that are transparent where there is not data.

    This is not supported by all WMS.

11. Under **Image format**, select the WMS image format.
12. Under **Layers**, select the map layers that your WMS server supports.
13. Click **Save**.
14. After **Attribution**, enter the attribution string for the map.
    For example, *© OpenCycleMap. Map data © OpenStreetMap contributors*.

Once the layer is added, you can adjust settings for the layer in the properties panel.

Adding an image background layer

Images can be used as a custom base map, such as for floor plans. When using an image background layer as a custom base map, set **Base map** in **Map settings** to **None**. Select **Undefined meters** or **Undefined degrees** as the projection. The location data for your other layers must use same coordinate system as this background layer.

When you add an image background layer for a smaller geographic area as a custom base map, add a layer containing data, such as a point layer, at the same time. This lets the map automatically zoom in to the position of your image background layer.

*The lowest unit in the scale bar is 10 meters. If this measurement is too large for your image, you can disable the scale bar in **Presentation** and then proportionally adjust up your image in the background layer to the scale you want. Scale the location data you want to use in other layers as well.*

Do the following:

1. From **Layers** in the properties panel, click **Add layer**.
2. Select **Background layer**.
3. Under **Format**, select **Image**.
4. After **URL**, enter the URL of the image.
5. Position your image by entering the coordinates for the top left and bottom right corners of the image.
   Coordinates must be in the same coordinate type as was selected in **Projection**.

   *If you are unsure of the coordinates in your image background layer, enable **Show debug info**. This will display the coordinates for the current center of your map.*
6. After **Attribution**, enter the attribution string for the image.
   For example, *© OpenCycleMap. Map data © OpenStreetMap contributors*.

Once the layer is added, you can adjust settings for the layer in the properties panel. For image background layers being used as custom base maps, it is recommended that you change the **Limit zoom levels** and **Limit pan navigation settings** to set the focus on your custom map.

Drill-down layers

When creating a map that has multiple points of data located in a wide geographical area, you can use drill-down dimensions to display your layers in a selection hierarchy.

This enables you to use different layers at different levels within your map, ensuring only the most relevant information is being displayed.

As you make selections in a drill-down layer, the dimension used for locations changes to the next dimension in the drill-down dimension. The drill-down happens across layers that use the same drill-down dimension. If you have an area and point layer that use the same drill-down dimension, you can set which layer displays with which dimension from the drill-down dimension.

If selections cause the current drill-down dimension field to have only one possible value, the next field in the list is used instead.

Drill-down dimensions used for drill-down layers should have the fields in order of highest geographical area to smallest geographical area.

For information on creating drill-down dimensions, see *Creating a drill-down dimension (page 128)*.

Do the following:

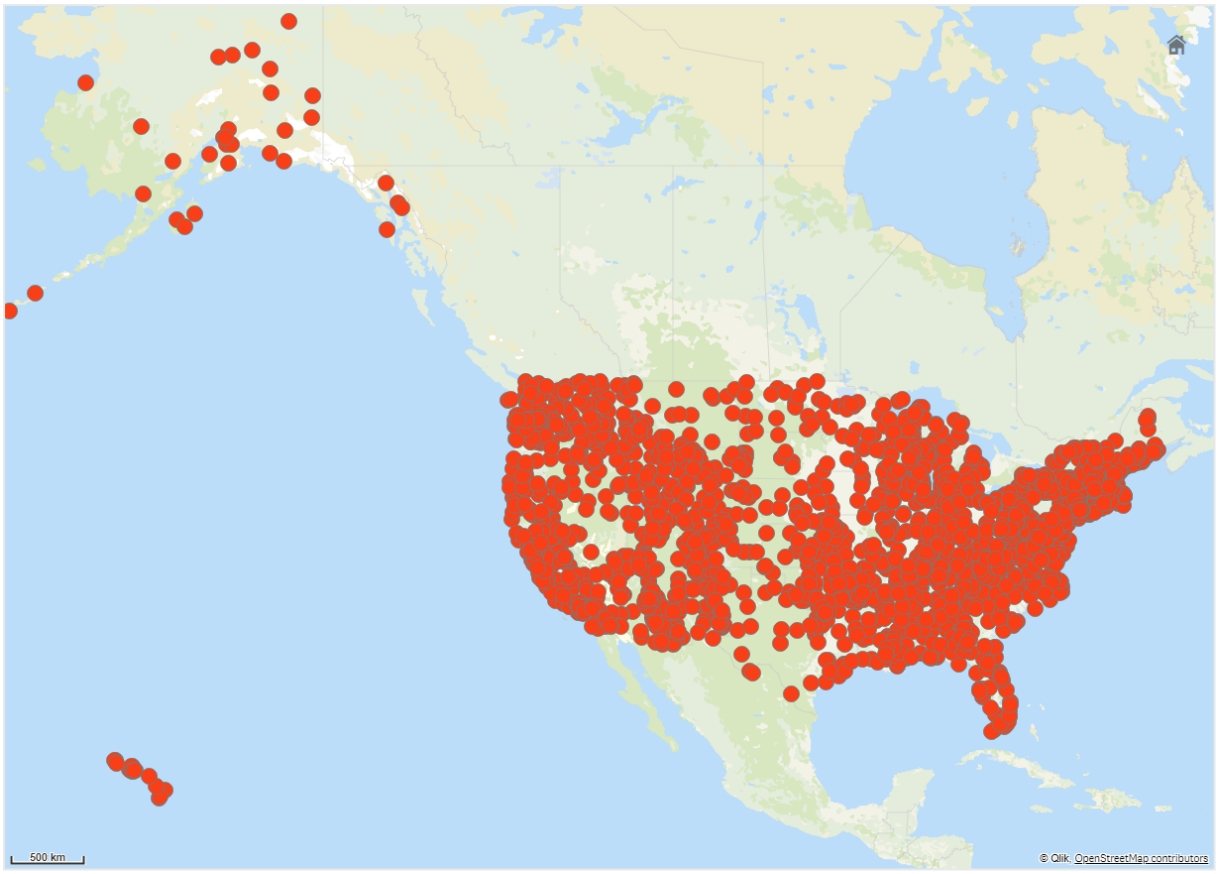
1. From **Layers** in the properties panel, click **Add layer**.
2. Select **Point layer**, **Area layer**, **Line layer**, **Density layer**, or **Chart layer**.
3. Click **Dimensions**, click **Add** and select your drill-down dimension.
4. In your layer, click **Options**.
5. Click **Layer display**.
6. After **Visible drill-down levels**, select which dimensions to display in the layer.

Controlling visible map data with drill-down layers

This example will show you how to build a map with a top-level area layer that drills down into with two point layers.

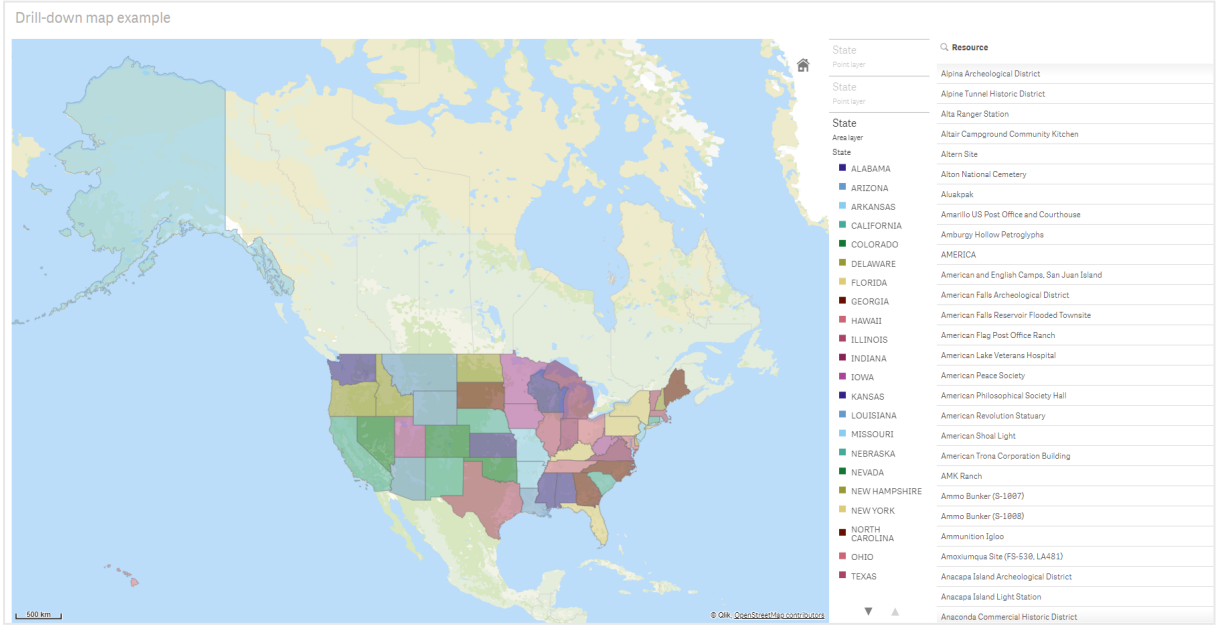
When creating a map that has multiple points of data located in a wide geographical area, you can use drill-down dimensions to display your layers in a hierarchy. As users make selections in a layer, the dimension displayed in the layer changes to the next dimension in the drill-down dimension. This enables you to use display data at different selection levels within your map, ensuring only the most relevant information is being displayed.

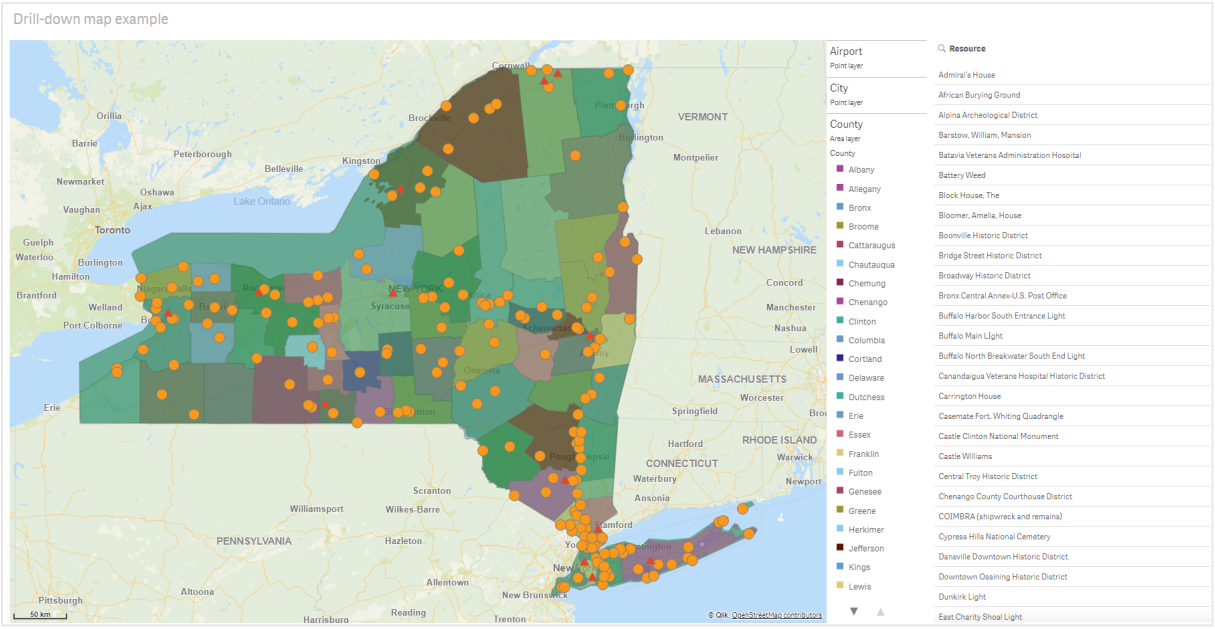
We have a list of all historical sites in the United States National Park Service's National Register of Historic places. When we add the cities that historical sites are located in to a map as a point layer, we get accurate locations for our bubbles. It could be made more understandable with better organization, however.



How then can we organize this information better, especially if we also want to add in another point layer containing airports to help plan how to get to the different sites?

To solve this problem, we will create a map of the United States of America with a layer of states that drills down to the county level. Drilling down to the county level will also show the cities that contain the historical sites as data points, as well as all airports for that state and the surrounding states.





Dataset

This example uses two sets of data:

- Federal listings: National Register of Historic Places listed properties from federal agencies (federal_listed_20190404.xlsx)
  This data set is available from the National Park Service National Register of Historic Places. It contains data about all registered history places, their location, and the federal agencies associated to them.
  ≤ federal_listed_20190404.xlsx.
- Airport data
  This table contains data for airports in the United States. It consists of each airport's International Air Transport Association (IATA) code, city, and state or territory.
  You must import this data into Qlik Sense either by adding to a spreadsheet that you then import into Qlik Sense or by importing the table from this help page as a web file.
  Airport data

Airport data

Airport	AirportCity	AirportState
ABE	Allentown/Bethlehem/Easton, PA	PA
ABI	Abilene, TX	TX
ABQ	Albuquerque, NM	NM
ABR	Aberdeen, SD	SD
ABY	Albany, GA	GA
ACT	Waco, TX	TX
ACV	Arcata/Eureka, CA	CA

Airport	AirportCity	AirportState
ADK	Adak Island, AK	AK
ADQ	Kodiak, AK	AK
AEX	Alexandria, LA	LA
AGS	Augusta, GA	GA
ALB	Albany, NY	NY
ALO	Waterloo, IA	IA
AMA	Amarillo, TX	TX
ANC	Anchorage, AK	AK
APN	Alpena, MI	MI
ART	Watertown, NY	NY
ASE	Aspen, CO	CO
ATL	Atlanta, GA	GA
ATW	Appleton, WI	WI
AUS	Austin, TX	TX
AVL	Asheville, NC	NC
AVP	Scranton/Wilkes-Barre, PA	PA
AZO	Kalamazoo, MI	MI
BDL	Hartford, CT	CT
BET	Bethel, AK	AK
BFL	Bakersfield, CA	CA
BGR	Bangor, ME	ME
BHM	Birmingham, AL	AL
BIL	Billings, MT	MT
BIS	Bismarck/Mandan, ND	ND
BJI	Bemidji, MN	MN
BKG	Branson, MO	MO
BLI	Bellingham, WA	WA
BMI	Bloomington/Normal, IL	IL
BNA	Nashville, TN	TN
BOI	Boise, ID	ID

Airport	AirportCity	AirportState
BOS	Boston, MA	MA
BPT	Beaumont/Port Arthur, TX	TX
BQK	Brunswick, GA	GA
BQN	Aguadilla, PR	PR
BRD	Brainerd, MN	MN
BRO	Brownsville, TX	TX
BRW	Barrow, AK	AK
BTM	Butte, MT	MT
BTR	Baton Rouge, LA	LA
BTV	Burlington, VT	VT
BUF	Buffalo, NY	NY
BUR	Burbank, CA	CA
BWI	Baltimore, MD	MD
BZN	Bozeman, MT	MT
CAE	Columbia, SC	SC
CAK	Akron, OH	OH
CDC	Cedar City, UT	UT
CDV	Cordova, AK	AK
CEC	Crescent City, CA	CA
CHA	Chattanooga, TN	TN
CHO	Charlottesville, VA	VA
CHS	Charleston, SC	SC
CIC	Chico, CA	CA
CID	Cedar Rapids/Iowa City, IA	IA
CLD	Carlsbad, CA	CA
CLE	Cleveland, OH	OH
CLL	College Station/Bryan, TX	TX
CLT	Charlotte, NC	NC
CMH	Columbus, OH	OH
CMI	Champaign/Urbana, IL	IL

Airport	AirportCity	AirportState
CMX	Hancock/Houghton, MI	MI
COD	Cody, WY	WY
COS	Colorado Springs, CO	CO
COU	Columbia, MO	MO
CPR	Casper, WY	WY
CRP	Corpus Christi, TX	TX
CRW	Charleston/Dunbar, WV	WV
CSG	Columbus, GA	GA
CWA	Mosinee, WI	WI
CVG	Cincinnati, OH	KY
DAB	Daytona Beach, FL	FL
DAL	Dallas, TX	TX
DAY	Dayton, OH	OH
DBQ	Dubuque, IA	IA
DCA	Washington, DC	VA
DEN	Denver, CO	CO
DFW	Dallas/Fort Worth, TX	TX
DHN	Dothan, AL	AL
DIK	Dickinson, ND	ND
DLH	Duluth, MN	MN
DRO	Durango, CO	CO
DSM	Des Moines, IA	IA
DTW	Detroit, MI	MI
EAU	Eau Claire, WI	WI
ECP	Panama City, FL	FL
EGE	Eagle, CO	CO
EKO	Elko, NV	NV
ELM	Elmira/Corning, NY	NY
ELP	El Paso, TX	TX
EUG	Eugene, OR	OR

Airport	AirportCity	AirportState
EWN	New Bern/Morehead/Beaufort, NC	NC
EWR	Newark, NJ	NJ
EVV	Evansville, IN	IN
EYW	Key West, FL	FL
FAI	Fairbanks, AK	AK
FAR	Fargo, ND	ND
FAT	Fresno, CA	CA
FAY	Fayetteville, NC	NC
FCA	Kalispell, MT	MT
FLG	Flagstaff, AZ	AZ
FLL	Fort Lauderdale, FL	FL
FNT	Flint, MI	MI
FOE	Topeka, KS	KS
FSD	Sioux Falls, SD	SD
FSM	Fort Smith, AR	AR
FWA	Fort Wayne, IN	IN
GCC	Gillette, WY	WY
GCK	Garden City, KS	KS
GEG	Spokane, WA	WA
GFK	Grand Forks, ND	ND
GGG	Longview, TX	TX
GJT	Grand Junction, CO	CO
GNV	Gainesville, FL	FL
GPT	Gulfport/Biloxi, MS	MS
GRB	Green Bay, WI	WI
GRI	Grand Island, NE	NE
GRK	Killeen, TX	TX
GRR	Grand Rapids, MI	MI
GSO	Greensboro/High Point, NC	NC
GSP	Greer, SC	SC

Airport	AirportCity	AirportState
GTF	Great Falls, MT	MT
GTR	Columbus, MS	MS
GUC	Gunnison, CO	CO
GUM	Guam, TT	TT
HDN	Hayden, CO	CO
HIB	Hibbing, MN	MN
HLN	Helena, MT	MT
HNL	Honolulu, HI	HI
HOB	Hobbs, NM	NM
HOU	Houston, TX	TX
HPN	White Plains, NY	NY
HRL	Harlingen/San Benito, TX	TX
HSV	Huntsville, AL	AL
IAD	Washington, DC	VA
IAH	Houston, TX	TX
ICT	Wichita, KS	KS
IDA	Idaho Falls, ID	ID
ILG	Wilmington, DE	DE
ILM	Wilmington, NC	NC
IMT	Iron Mountain/Kingsfd, MI	MI
IND	Indianapolis, IN	IN
INL	International Falls, MN	MN
ISN	Williston, ND	ND
ISP	Islip, NY	NY
ITO	Hilo, HI	HI
JAC	Jackson, WY	WY
JAN	Jackson/Vicksburg, MS	MS
JAX	Jacksonville, FL	FL
JFK	New York, NY	NY
JLN	Joplin, MO	MO

Airport	AirportCity	AirportState
JNU	Juneau, AK	AK
KOA	Kona, HI	HI
KTN	Ketchikan, AK	AK
LAN	Lansing, MI	MI
LAR	Laramie, WY	WY
LAS	Las Vegas, NV	NV
LAW	Lawton/Fort Sill, OK	OK
LAX	Los Angeles, CA	CA
LBB	Lubbock, TX	TX
LCH	Lake Charles, LA	LA
LEX	Lexington, KY	KY
LFT	Lafayette, LA	LA
LGA	New York, NY	NY
LGB	Long Beach, CA	CA
LIH	Lihue, HI	HI
LIT	Little Rock, AR	AR
LMT	Klamath Falls, OR	OR
LNK	Lincoln, NE	NE
LRD	Laredo, TX	TX
LSE	La Crosse, WI	WI
LWS	Lewiston, ID	ID
MAF	Midland/Odessa, TX	TX
MBS	Saginaw/Bay City/Midland, MI	MI
MCI	Kansas City, MO	MO
MCO	Orlando, FL	FL
MDT	Harrisburg, PA	PA
MDW	Chicago, IL	IL
MEM	Memphis, TN	TN
MFE	Mission/McAllen/Edinburg, TX	TX
MFR	Medford, OR	OR

Airport	AirportCity	AirportState
MGM	Montgomery, AL	AL
MHK	Manhattan/Ft. Riley, KS	KS
MHT	Manchester, NH	NH
MIA	Miami, FL	FL
MKE	Milwaukee, WI	WI
MKG	Muskegon, MI	MI
MLB	Melbourne, FL	FL
MLI	Moline, IL	IL
MLU	Monroe, LA	LA
MMH	Mammoth Lakes, CA	CA
MOB	Mobile, AL	AL
MOD	Modesto, CA	CA
MOT	Minot, ND	ND
MQT	Marquette, MI	MI
MRY	Monterey, CA	CA
MSN	Madison, WI	WI
MSO	Missoula, MT	MT
MSP	Minneapolis, MN	MN
MSY	New Orleans, LA	LA
MTJ	Montrose/Delta, CO	CO
MYR	Myrtle Beach, SC	SC
OAJ	Jacksonville/Camp Lejeune, NC	NC
OAK	Oakland, CA	CA
OGG	Kahului, HI	HI
OKC	Oklahoma City, OK	OK
OMA	Omaha, NE	NE
OME	Nome, AK	AK
ONT	Ontario, CA	CA
ORD	Chicago, IL	IL
ORF	Norfolk, VA	VA

Airport	AirportCity	AirportState
ORH	Worcester, MA	MA
OTH	North Bend/Coos Bay, OR	OR
OTZ	Kotzebue, AK	AK
PAH	Paducah, KY	KY
PBI	West Palm Beach/Palm Beach, FL	FL
PDX	Portland, OR	OR
PHF	Newport News/Williamsburg, VA	VA
PHL	Philadelphia, PA	PA
PHX	Phoenix, AZ	AZ
PIA	Peoria, IL	IL
PIH	Pocatello, ID	ID
PIT	Pittsburgh, PA	PA
PNS	Pensacola, FL	FL
PPG	Pago Pago, TT	TT
PSC	Pasco/Kennewick/Richland, WA	WA
PSE	Ponce, PR	PR
PSG	Petersburg, AK	AK
PSP	Palm Springs, CA	CA
PVD	Providence, RI	RI
PWM	Portland, ME	ME
RAP	Rapid City, SD	SD
RDD	Redding, CA	CA
RDM	Bend/Redmond, OR	OR
RDU	Raleigh/Durham, NC	NC
RHI	Rhinelander, WI	WI
RIC	Richmond, VA	VA
RKS	Rock Springs, WY	WY
RNO	Reno, NV	NV
ROA	Roanoke, VA	VA
ROC	Rochester, NY	NY

Airport	AirportCity	AirportState
ROW	Roswell, NM	NM
RST	Rochester, MN	MN
RSW	Fort Myers, FL	FL
SAF	Santa Fe, NM	NM
SAN	San Diego, CA	CA
SAT	San Antonio, TX	TX
SAV	Savannah, GA	GA
SBA	Santa Barbara, CA	CA
SBN	South Bend, IN	IN
SBP	San Luis Obispo, CA	CA
SCC	Deadhorse, AK	AK
SCE	State College, PA	PA
SDF	Louisville, KY	KY
SEA	Seattle, WA	WA
SFO	San Francisco, CA	CA
SGF	Springfield, MO	MO
SGU	St. George, UT	UT
SHV	Shreveport, LA	LA
SIT	Sitka, AK	AK
SJC	San Jose, CA	CA
SJT	San Angelo, TX	TX
SJU	San Juan, PR	PR
SLC	Salt Lake City, UT	UT
SMF	Sacramento, CA	CA
SMX	Santa Maria, CA	CA
SNA	Santa Ana, CA	CA
SPI	Springfield, IL	IL
SPS	Wichita Falls, TX	TX
SRQ	Sarasota/Bradenton, FL	FL
STL	St. Louis, MO	MO

Airport	AirportCity	AirportState
STT	Charlotte Amalie, VI	VI
STX	Christiansted, VI	VI
SUN	Sun Valley/Hailey/Ketchum, ID	ID
SUX	Sioux City, IA	IA
SWF	Newburgh/Poughkeepsie, NY	NY
SYR	Syracuse, NY	NY
TLH	Tallahassee, FL	FL
TOL	Toledo, OH	OH
TPA	Tampa, FL	FL
TRI	Bristol/Johnson City/Kingsport, TN	TN
TTN	Trenton, NJ	NJ
TUL	Tulsa, OK	OK
TUS	Tucson, AZ	AZ
TVC	Traverse City, MI	MI
TWF	Twin Falls, ID	ID
TXK	Texarkana, AR	AR
TYR	Tyler, TX	TX
TYS	Knoxville, TN	TN
VLD	Valdosta, GA	GA
VPS	Valparaiso, FL	FL
WRG	Wrangell, AK	AK
XNA	Fayetteville, AR	AR
YAK	Yakutat, AK	AK
YUM	Yuma, AZ	AZ

Instructions

Once you have loaded the data sets into a new app in Qlik Sense, you can begin building your map. To make the example map, you must complete the following tasks:

1. Create the drill-down dimensions.
2. Add the map to our sheet.
3. Add the *State-County* area layer.
4. Add the *State-City* point layer.

5. Add the *State-Airport* point layer.
6. Add the *Resource* filter pane.

Creating the drill-down dimensions

First, you need to create three drill-down dimensions. This will create the relationships between *State* and the fields *County*, *City*, and *Airport*, enabling the *County*, *City*, and *Airport* layers to become visible after a state from the *State* layer has been selected.

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. Click to display the master items.
3. Click **Dimensions**.
4. Click **Create new**.
5. Select **Drill-down**.
6. Add the field *State* to the dimension.
7. Add the field *County* to the dimension.
8. After **Name**, type *State-County*.
9. Click **Create**.
10. Add the field *State* to the dimension.
11. Add the field *City* to the dimension.
12. After **Name**, type *State-City*.
13. Click **Create**.
14. Add the field *State* to the dimension.
15. Add the field *Airport* to the dimension.
16. After **Name**, type *State-Airport*.
17. Click **Create**.
18. Click **Close**.

Adding the map to the sheet

The next step is to add a map to your sheet.

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. From the assets panel, drag an empty map to the sheet.

Adding the *State-County* area layer

The first layer you add is an area layer to which you add the dimension *State-County*. In addition, you set the country as *'USA'* to ensure we map to the state of Georgia rather than the nation of Georgia.

Do the following:

1. From **Layers** in the properties panel, click **Add layer**.
2. Select **Area layer**.
3. In **Dimensions**, click **Add** and select *State-County*.
4. Click **Location**.
5. Set **Scope for locations** to **Custom**.
6. After **Country**, enter *'USA'*.
7. After **Administrative area (Level 1)**, select *State*.
8. Click **Colors**.
9. Set **Colors** to **Custom**, select **By dimension**, and select **100 colors**.
10. Select **Persistent colors**.
11. Adjust the **Opacity**slider to half opacity.
12. Click ❮ at the top of the properties panel.

Adding the *State-City* point layer

The next layer you add is a point layer. You add *State-City* as the dimension and then set the country as *'USA'* and then set *State* as the first-level administrative area, as some counties cities in different states have the same names.

Do the following:

1. From **Layers** in the properties panel, click **Add layer**.
2. Select **Area layer**.
3. In **Dimensions**, click **Add** and select *State-City*.
4. Click **Location**.
5. Set **Scope for locations** to **Custom**.
6. After **Country**, enter *'USA'*.
7. After **Administrative area (Level 1)**, select *State*.
8. Click **Colors**.
9. Set **Colors** to **Custom**, select **Single color**, and select a color.
10. Click **Options**.
11. In **Layer** display, set **Visible drill-down levels** to **Custom**.
12. Clear **State**.
13. Click ❮ at the top of the properties panel.

Adding the *State-Airport* point layer

The final layer you add to the map is a point layer to which you add the *State-Airport* field as the dimension. Qlik Sense recognizes IATA codes for placement, ensuring the airports are located in their actual position rather than just in their city.

Do the following:

1. From **Layers** in the properties panel, click **Add layer**.
2. Select **Area layer**.
3. In **Dimensions**, click **Add** and select *State-Airport*.
4. Click **Location**.
5. Set **Scope for locations** to **Custom**.
6. After **Country**, enter *'USA'*.
7. After **Administrative area (Level 1)**, select *State*.
8. Click **Size & Shape**.
9. From **Shape**, select **Triangle**.
10. Click **Colors**.
11. Set **Colors** to **Custom**, select **Single color**, and select a color.
12. Click **Options**.
13. In **Layer** display, set **Visible drill-down levels** to **Custom**.
14. Clear **State**.
15. Click ❮ at the top of the properties panel.

Add the *Resource* filter pane

Finally, you can optionally add a filter pane containing the field *Resource*. This provides you with a list of the available historical sites as you make selections within your map.

Do the following:

1. In the assets panel, drag and drop a filter pane into the sheet.
2. Click **Add dimension**.
3. Add a filter pane containing the field *Resource*.

Creating a map with multiple background layers

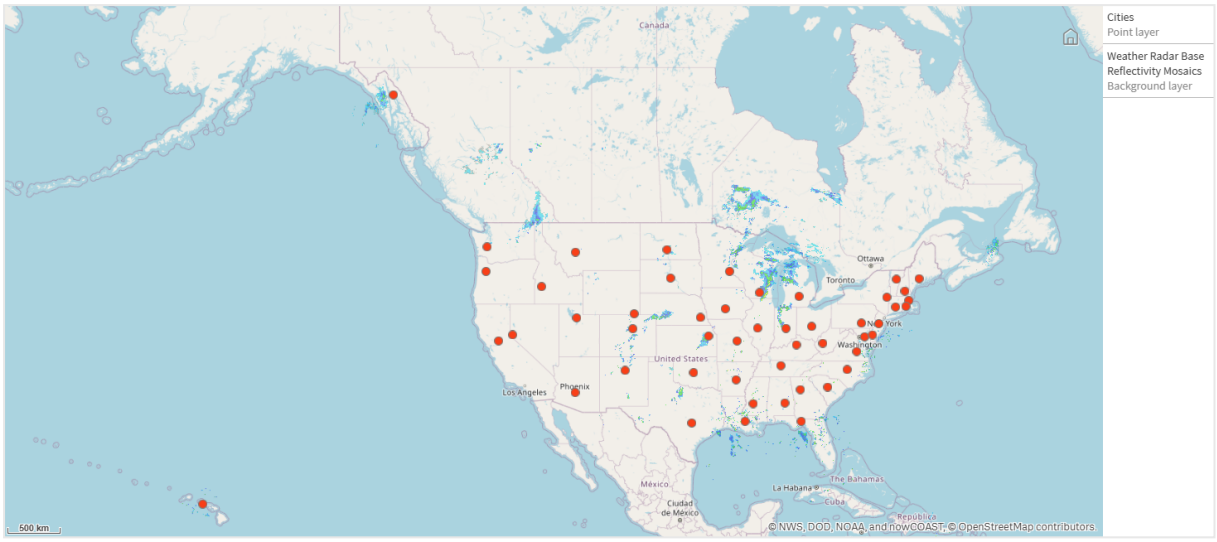
You can use multiple background layers in a map chart. This enables you to create layered base maps for your map chart data.

Some WMS sources include layers with transparency. With these sources, you can overlay the WMS background layer on top of a base map or other layers. Images can also be placed over other background layers. This enables you to create more complex base maps for your data.

> *Whether or not an WMS transparency layer supports transparency is dependent on the WMS source.*

In this map example, a custom TMS is used in a background layer. A WMS background layer is placed on top, using a WMS endpoint from the National Ocean and Atmospheric Administration. The WMS layer shows weather radar data.

Map chart with a point layer overlaid on TMS and WMS background layers



Dataset

This example uses a single table for data, *Cities*, with an external TMS and WMS data from external sources. You can import the two tables into your app using the web file connector.

Cities

Cities

Cities
Albany, New York
Annapolis, Maryland
Atlanta, Georgia
Augusta, Maine
Austin, Texas
Baton Rouge, Louisiana
Bismarck, North Dakota
Boise, Idaho
Boston, Massachusetts
Carson City, Nevada
Charleston, West Virginia
Cheyenne, Wyoming
Columbia, South Carolina
Columbus, Ohio

Cities
Concord, New Hampshire
Denver, Colorado
Des Moines, Iowa
Dover, Delaware
Frankfort, Kentucky
Harrisburg, Pennsylvania
Hartford, Connecticut
Helena, Montana
Honolulu, Hawaii
Indianapolis, Indiana
Jackson, Mississippi
Jefferson City, Missouri
Juneau, Alaska
Lansing, Michigan
Lincoln, Nebraska
Little Rock, Arkansas
Madison, Wisconsin
Montgomery, Alabama
Montpelier, Vermont
Nashville, Tennessee
Oklahoma City, Oklahoma
Olympia, Washington
Phoenix, Arizona
Pierre, South Dakota
Providence, Rhode Island
Raleigh, North Carolina
Richmond, Virginia
Sacramento, California
Saint Paul, Minnesota
Salem, Oregon

Cities
Salt Lake City, Utah
Santa Fe, New Mexico
Springfield, Illinois
Tallahassee, Florida
Topeka, Kansas
Trenton, New Jersey

How I built this

*This example adds layers so that they are layered on top of each other in the final order. If you add these layers in a different order, you click and drag layers into the correct order you want in **Layers**.*

Do the following:

1. Add the table *Cities* to your app. You can copy and paste the table using manual entry or you can import the table into your app using the web file connector.
2. In a sheet, add a map chart.
3. In **Map settings**, set **Base map** to **None**.
4. Add a background layer and do the following:
    - In **Data**, do the following:
        - For **Format**, select **TMS**.
        - For **URL**, enter *https://a.tile.openstreetmap.org/${z}/${x}/${y}.png*.
        - For **Attribution**, enter *© OpenStreetMap contributors*.
    - In **Options** > **General**, do the following:
        - Set **Show legend** to **None**.
    - In **Options** > **Presentation**, do the following:
        - Set **Opacity** to 0.5.
5. Add a background layer and do the following:
    - For **Label**, enter *Weather Radar Base Reflectivity Mosaics*.
    - For **Format**, select **WMS** and click **WMS setup**. Do the following:
        - For **WMS server URL**, enter *https://nowcoast.noaa.gov/geoserver/observations/weather_radar/ows*.
        - For **Version**, select **1.3.0**.
        - Click **Load WMS**.
        - In **Step 2 (Settings)**, set the following settings:
            - Set **CRS** to **EPSG:3857**.
            - Turn on the **Transparent** setting.

- Select all options under **Weather Radar Base Reflectivity Mosaics**.
- Click **Save**.

- For **Attribution**, enter *NWS, DOD, NOAA, and nowCOAST*.

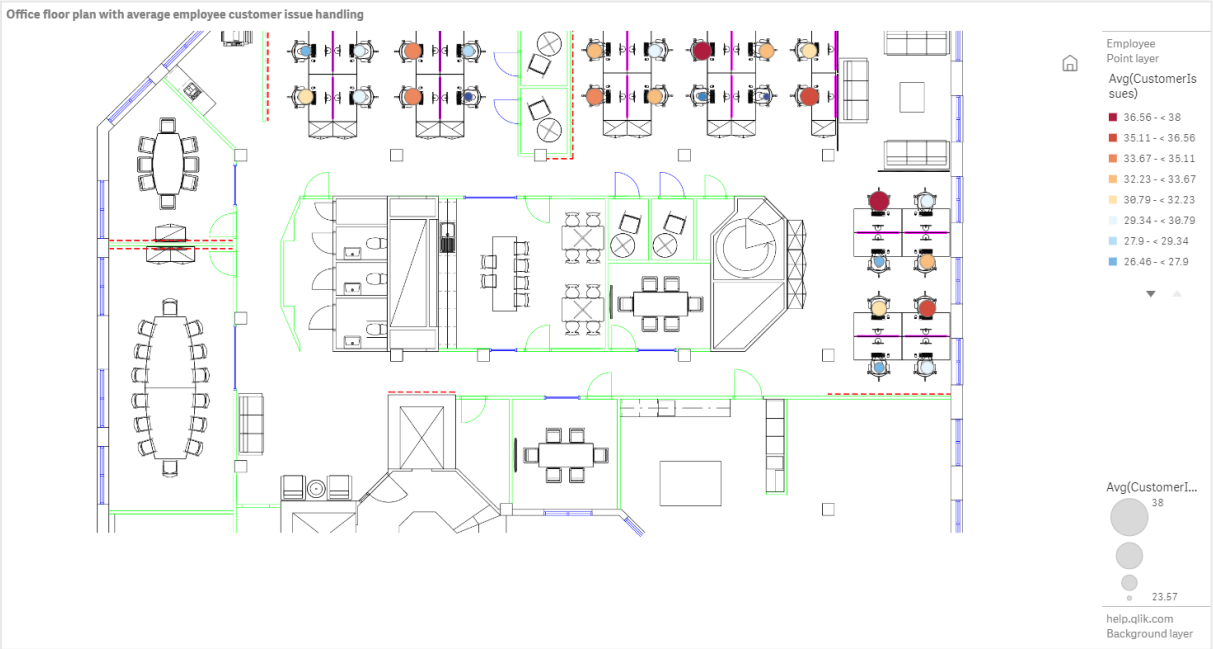
6. Add a point layer and do the following:
   - In **Data**, add *Cities* as the dimension.
   - In **Location**, do the following:
     - Set **Scope for locations** to **Custom**.
     - Set **Country** to *'USA'*.
   - In **Colors**, set **Colors** to **Custom** and set **Color** to *f93f17*.
   - In **Size & Shape**, set **Bubble size** to 9.

Creating a map with an image background layer

You can use images as custom base maps in map visualizations. You may want to display data over a floor plan.

This example map chart displays an office floor plan with a point layer. Each bubble is positioned over an employee's desk. The weekly average of customer issues handled per day by the employee determines the size and color of each bubble.

Map example with floor plan image background with a point layer showing employees sized by the number of customer issues they have resolved



This example hides the default scale. Images do not have a consistent size scale. Image size in a map background layer is also dependent on what coordinates the user sets for the corners of the image.

Dataset

This example uses two tables and a background image. You can import the two tables into your app using the web file connector.

CustomerIssues

CustomerIssues

Date	EmployeeNumber	CustomerIssues
8/1/2019	1	24
8/1/2019	2	31
8/1/2019	3	21
8/1/2019	4	42
8/1/2019	5	24
8/1/2019	6	40
8/1/2019	7	40
8/1/2019	8	19
8/1/2019	9	23
8/1/2019	10	47
8/1/2019	11	38
8/1/2019	12	21
8/1/2019	13	22
8/1/2019	14	15
8/1/2019	15	30
8/1/2019	16	46
8/1/2019	17	41
8/1/2019	18	31
8/1/2019	19	50
8/1/2019	20	27
8/1/2019	21	35
8/1/2019	22	38
8/1/2019	23	37
8/1/2019	24	31
8/1/2019	25	13
8/1/2019	26	11
8/2/2019	1	35

Date	EmployeeNumber	CustomerIssues
8/2/2019	2	31
8/2/2019	3	33
8/2/2019	4	14
8/2/2019	5	24
8/2/2019	6	33
8/2/2019	7	40
8/2/2019	8	14
8/2/2019	9	44
8/2/2019	10	24
8/2/2019	11	37
8/2/2019	12	39
8/2/2019	13	49
8/2/2019	14	16
8/2/2019	15	42
8/2/2019	16	13
8/2/2019	17	45
8/2/2019	18	48
8/2/2019	19	46
8/2/2019	20	18
8/2/2019	21	18
8/2/2019	22	45
8/2/2019	23	47
8/2/2019	24	31
8/2/2019	25	10
8/2/2019	26	21
8/3/2019	1	16
8/3/2019	2	34
8/3/2019	3	15
8/3/2019	4	44
8/3/2019	5	49
8/3/2019	6	18

Date	EmployeeNumber	CustomerIssues
8/3/2019	7	16
8/3/2019	8	41
8/3/2019	9	27
8/3/2019	10	46
8/3/2019	11	21
8/3/2019	12	49
8/3/2019	13	38
8/3/2019	14	30
8/3/2019	15	48
8/3/2019	16	17
8/3/2019	17	42
8/3/2019	18	48
8/3/2019	19	44
8/3/2019	20	44
8/3/2019	21	12
8/3/2019	22	44
8/3/2019	23	17
8/3/2019	24	24
8/3/2019	25	25
8/3/2019	26	33
8/4/2019	1	20
8/4/2019	2	45
8/4/2019	3	32
8/4/2019	4	37
8/4/2019	5	32
8/4/2019	6	50
8/4/2019	7	41
8/4/2019	8	14
8/4/2019	9	37
8/4/2019	10	39
8/4/2019	11	28

Date	EmployeeNumber	CustomerIssues
8/4/2019	12	35
8/4/2019	13	24
8/4/2019	14	19
8/4/2019	15	25
8/4/2019	16	26
8/4/2019	17	23
8/4/2019	18	45
8/4/2019	19	48
8/4/2019	20	36
8/4/2019	21	40
8/4/2019	22	21
8/4/2019	23	10
8/4/2019	24	42
8/4/2019	25	35
8/4/2019	26	26
8/5/2019	1	24
8/5/2019	2	28
8/5/2019	3	44
8/5/2019	4	19
8/5/2019	5	34
8/5/2019	6	37
8/5/2019	7	14
8/5/2019	8	26
8/5/2019	9	38
8/5/2019	10	25
8/5/2019	11	41
8/5/2019	12	35
8/5/2019	13	48
8/5/2019	14	36
8/5/2019	15	36
8/5/2019	16	37

Date	EmployeeNumber	CustomerIssues
8/5/2019	17	31
8/5/2019	18	44
8/5/2019	19	21
8/5/2019	20	28
8/5/2019	21	13
8/5/2019	22	10
8/5/2019	23	50
8/5/2019	24	35
8/5/2019	25	11
8/5/2019	26	39
8/6/2019	1	26
8/6/2019	2	14
8/6/2019	3	45
8/6/2019	4	27
8/6/2019	5	33
8/6/2019	6	21
8/6/2019	7	14
8/6/2019	8	45
8/6/2019	9	41
8/6/2019	10	35
8/6/2019	11	35
8/6/2019	12	13
8/6/2019	13	35
8/6/2019	14	26
8/6/2019	15	40
8/6/2019	16	14
8/6/2019	17	20
8/6/2019	18	23
8/6/2019	19	11
8/6/2019	20	23
8/6/2019	21	31

Date	EmployeeNumber	CustomerIssues
8/6/2019	22	48
8/6/2019	23	39
8/6/2019	24	50
8/6/2019	25	47
8/6/2019	26	40
8/7/2019	1	49
8/7/2019	2	39
8/7/2019	3	16
8/7/2019	4	28
8/7/2019	5	46
8/7/2019	6	37
8/7/2019	7	36
8/7/2019	8	15
8/7/2019	9	18
8/7/2019	10	25
8/7/2019	11	12
8/7/2019	12	37
8/7/2019	13	40
8/7/2019	14	35
8/7/2019	15	11
8/7/2019	16	12
8/7/2019	17	22
8/7/2019	18	16
8/7/2019	19	46
8/7/2019	20	39
8/7/2019	21	41
8/7/2019	22	26
8/7/2019	23	25
8/7/2019	24	34
8/7/2019	25	50
8/7/2019	26	41

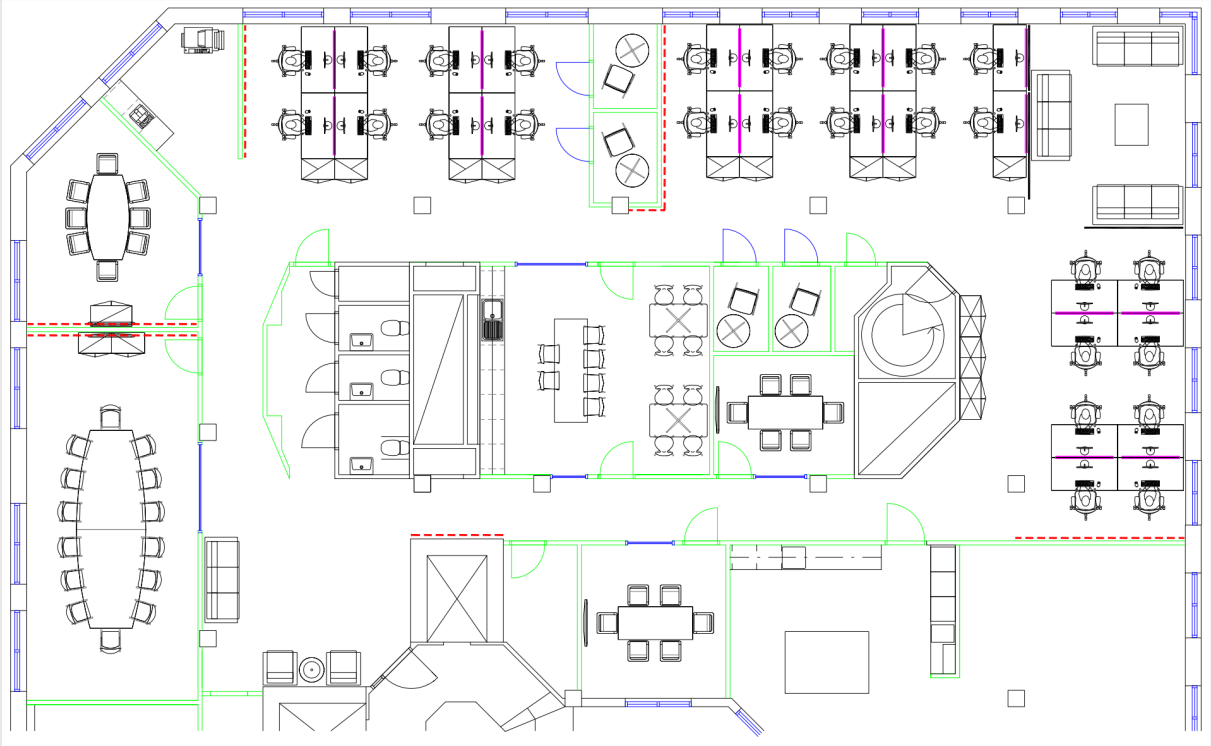
EmployeeData

EmployeeData

Employee	EmployeeNumber	Latitude	Longitude
Nehru Pollard	1	2.1	-2.1
Duncan Bell	2	1.675	-2.1
Arthur Miller	3	2.1	-1.6
Latifah Randall	4	1.675	-1.6
Glenna Giles	5	2.1	-1.1
Chaim Gates	6	1.675	-1.1
Elijah Mcgowan	7	2.1	-0.585
Serina Richards	8	1.675	-0.585
Nora Odonnell	9	2.1	0.595
Fiona Craig	10	1.675	0.595
Kirestin Mcguire	11	2.1	1.155
Francesca Wilkerson	12	1.675	1.155
Virginia Sanford	13	2.1	1.6
Beau Weeks	14	1.675	1.6
Justin Cook	15	2.1	2.2
Lisandra Sloan	16	1.675	2.2
Brody Ball	17	2.1	2.6
Kirk Welch	18	1.675	2.6
Julian Mcgee	19	0.7	3.25
Geoffrey Wheeler	20	0.7	3.7
Carter Leonard	21	0.14	3.25
Noel Watson	22	0.14	3.7
Damian Everett	23	-0.3	3.25
Justina Frazier	24	-0.3	3.7
MacKenzie Garcia	25	-0.85	3.25
Germane Carey	26	-0.85	3.7

Background image

Example background image



How I built this

Do the following:

1. Add the data sources to your app and associate the tables using the *EmployeeNumber* fields in each table.
2. In a sheet, add a map chart.
3. In **Map settings**, do the following:
    - Change **Base map** to **None**.
    - Change **Projection** to **User defined (degrees)**.
4. In **Appearance** > **Presentation**, do the following:
    - Toggle the **Scale bar** to **Off**.
    - Set **Limit zoom levels** to **Custom** and set the zoom to *7x zoom - 8x zoom*.
5. Add a background layer to the map chart and in **Data**, do the following:
    - In **Format**, select **Image**.
    - Set the **URL** to *https://help.qlik.com/en-US/sense/Subsystems/Hub/Content/Resources/Images/ui_map-image-background-example.png*.
    - Set the **Top left corner** to 2.5 for **Top (latitude)** and -4.1 for **Left (longitude)**.
    - Set the **Bottom right corner** to -2.5 for **Bottom (latitude)** and 4.1 for **Right (longitude)**.

> *At this point in the example, the image does not appear yet. After you add a point layer with the next step, the map updates with the correct scale and image position.*

6. Add a point layer to the map chart and do the following:
    - In **Data**, add *Employee* as the field.
    - In **Location**, select **Latitude and longitude fields**. Set *Latitude* as the **Latitude field** and *Longitude* as the **Longitude field**.
    - In **Size & Shape**, set **Size by** *Avg(CustomerIssues)*.
    - In **Colors**, do the following:
        - Set **Colors** to **Custom** and color **By measure**.
        - Select *Avg(CustomerIssues)* as the measure.
        - Select **Diverging classes** as the color scheme.

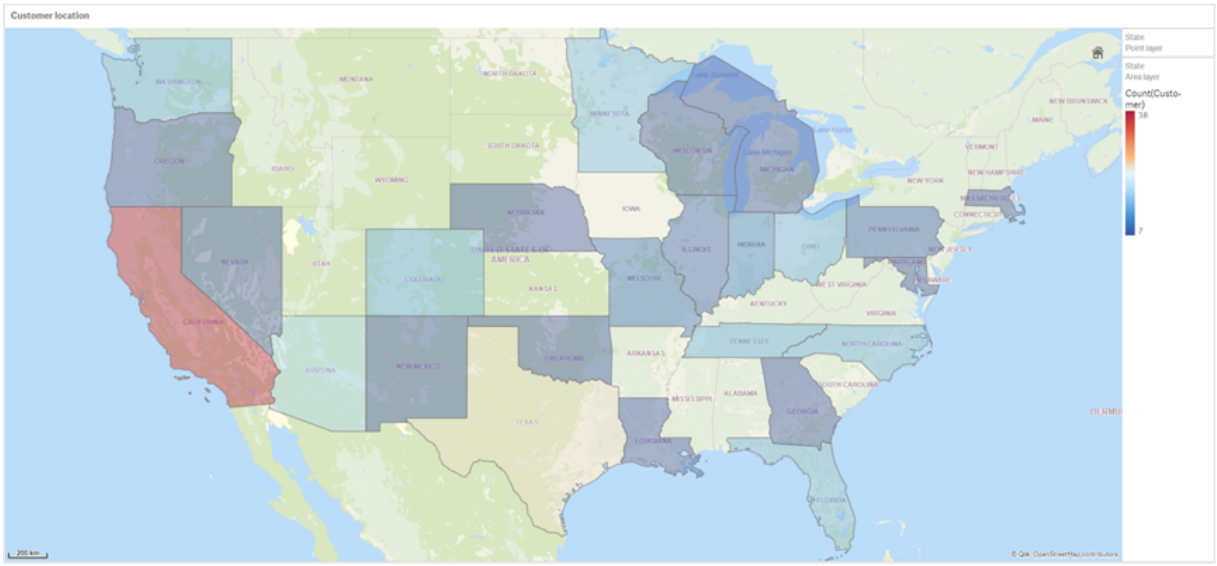
To get the same look and feel as the image at the top of the page, set the app theme to **Sense Classic**.

Creating a map focused on a region

You can configure your map charts to stay focused on a region of interest, such as a country. You can also set the minimum and maximum zoom levels of your map. This controls how far the Qlik Sense zooms into the map when you make selections.

The following example explains how to make a map with the focus locked on a single region and with a custom maximum zoom level.

The map chart with panning limited to just the region of interest

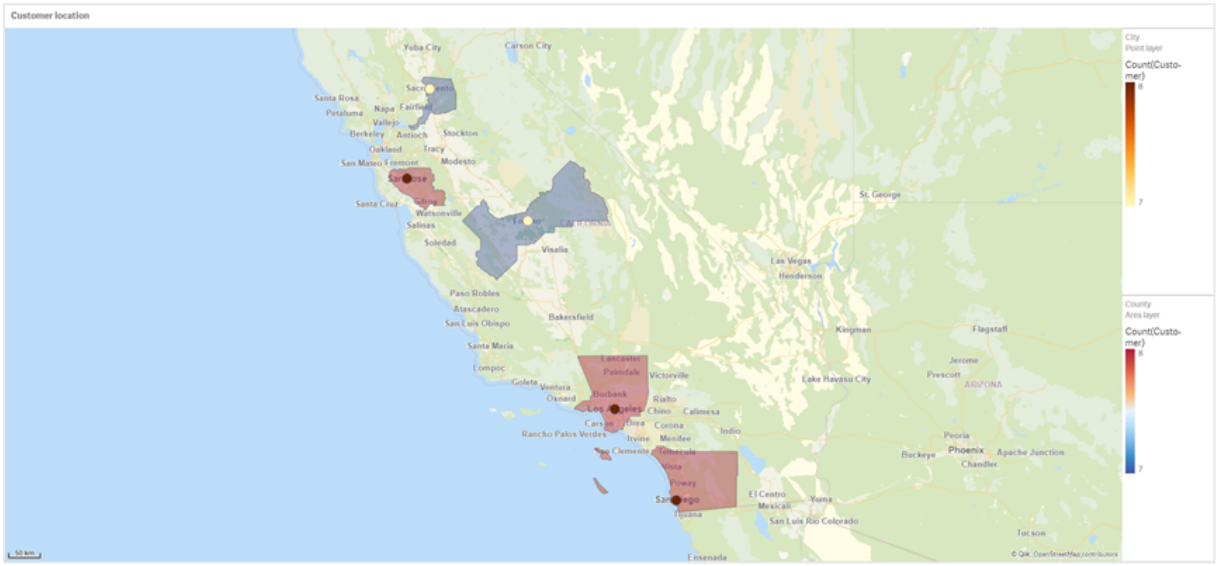


This map has set a pan limit so users cannot pan the focus of the map visualization away from the region of interest. Users can drill down between separate map layers, but they cannot scroll outside of the initial view.

This map visualization uses a point layer and an area layer with two drill-down dimensions. One drill-down dimension enables the area layer to display counties after states are selected. The other drill-down dimension enables the point layer to display cities as a points after a state is selected in the area layer.

A zoom limit is applied to the map chart. When a state is selected in the area layer, the map drills down to display the counties in the area layer and the cities in a separate point layer. The map remains zoomed a level appropriate for a general regional overview.

A map chart with a state selection applied



Dataset

This example uses two sets of data. You must import this data into Qlik Sense. You can add the data to a spreadsheet and import it into Qlik Sense. You can also import the table from this help page as a web file.

City data

Sample city data

City	City Code	County	State	Latitude	Longitude
New York	1	New York County	US	40.730599	-73.986581
Los Angeles	2	Los Angeles County	CA	34.053678	-118.242702
Chicago	3	Cook County	IL	41.875555	-87.624421
Philadelphia	5	Philadelphia County	PA	39.952335	-75.163789
Phoenix	6	Maricopa County	AZ	33.446768	-112.075672
San Antonio	7	Bexar County	TX	29.4246	-98.49514
San Diego	8	San Diego County	CA	32.717421	-117.162771
Dallas	9	Dallas County	TX	32.776196	-96.796899

City	City Code	County	State	Latitude	Longitude
San Jose	10	Santa Clara County	CA	37.34385	-121.883135
Austin	11	Travis County	TX	30.271129	-97.7437
Indianapolis	12	Marion County	IN	39.76838	-86.158045
Jacksonville	13	Duval County	FL	30.332184	-81.655651
Columbus	15	Franklin County	OH	39.96226	-83.000706
Charlotte	16	Mecklenburg County	NC	35.227087	-80.843127
Detroit	17	Wayne County	MI	42.348664	-83.056738
Memphis	18	Shelby County	TN	35.149022	-90.051628
Seattle	19	King County	WA	47.603832	-122.330062
Denver	20	Denver County	CO	39.739154	-104.984703
Boston	22	Suffolk County	MA	42.360482	-71.059568
Nashville	23	Davidson County	TN	36.162226	-86.774342
Baltimore	24	Baltimore City County	MD	39.290861	-76.610807
Portland	25	Multnomah County	OR	45.520247	-122.674195
Las Vegas	26	Clark County	NV	36.166286	-115.149225
Milwaukee	27	Milwaukee County	WI	43.034993	-87.922497
Albuquerque	28	Bernalillo County	NM	35.084103	-106.650985
Tucson	29	Pima County	AZ	32.221742	-110.926476
Fresno	30	Fresno County	CA	36.73082	-119.699202
Sacramento	31	Sacramento County	CA	38.581572	-121.4944
Kansas City	32	Jackson County	MO	39.084469	-94.56303
Colorado Springs	33	El Paso County	CO	38.833958	-104.825348
Atlanta	34	Fulton County	GA	33.749099	-84.390185
Omaha	35	Douglas County	NE	41.258732	-95.937873
Raleigh	36	Wake County	NC	35.780402	-78.639078
Miami	37	Miami-Dade County	FL	25.774266	-80.193659
Minneapolis	38	Hennepin County	MN	44.9773	-93.265469
Tulsa	39	Tulsa County	OK	36.152436	-95.990409
Cleveland	40	Cuyahoga County	OH	41.505161	-81.693445
New Orleans	41	Orleans Parish	LA	29.949932	-90.070116

Customer

Sample customer data

Customer	Customer Number	City Code
A Superior System	10000453	1
Beech Aircraft Corporation	10003882	1
Deere and Company	10009863	1
Gailey Enterprises	10012851	1
J.A. Bauer Pottery Company	10017852	1
Old Towne Creations	10020715	1
Real World	10022755	1
ValueClick	10025878	1
A&G	10000457	2
Bell Canada Enterprises	10004207	2
Échange CAC Exchange	10010832	2
Gainunion	10012885	2
J.M. Haggar	10018129	2
OnDeck Systems	10020849	2
Reflex Presentations	10022962	2
Wasabi	10026294	2
Aadast	10000471	3
Bendix Corporation	10004255	3
ECI com	10010855	3
Galaxy Marketing Associates	10012907	3
Johnson and Higgins	10018352	3
One Planet Solutions	10020864	3
Relcom	10022978	3
Wayne'sWorld	10026334	3
ABI TruTrac	10000488	5
Best Way! Imaging	10004602	5
Ed Stefanov	10010881	5
Gamacles	10013011	5
Joy Line	10018371	5

Customer	Customer Number	City Code
Onebox	10020907	5
SageGroup	10023511	5
VEI	10026023	5
AboveNet	10000496	6
Bezeq	10005043	6
EDA Today	10010882	6
Gamma One Conversions	10013039	6
K	10018518	6
Keystroke Quality	10019420	6
Outsource Documents	10020982	6
PAGE	10021240	6
Sarcom	10023703	6
Systems of Missouri	10024915	6
Velos Medical Informatics	10026038	6
Abplus	10000497	7
BF Datacom	10005099	7
Edmark	10010923	7
GammaGraphX (GGX)	10013052	7
K&K Enterprises	10018603	7
Overdreams	10021006	7
SAS Institute	10023757	7
Ventana s Group	10026081	7
ABSolute	10000499	8
BH Feldman Consulting	10005236	8
Elbit Oy	10010990	8
Gammel Group	10013061	8
Karickal Exports	10018868	8
Owl's Eye Productions	10021015	8
SAT-SAGEM (usa)	10023780	8
White Oak Interactive	10026365	8

Customer	Customer Number	City Code
Absolute Magic	10000501	9
Bibb Manufacturing Company	10005376	9
Eloi Companies	10011018	9
Gandalf Systems	10013079	9
KAT Micro Distributing	10018877	9
P.C'S	10021111	9
Science Applications International (SAIC)	10023964	9
Xcert	10026521	9
Abstract	10000502	10
BidCast	10005620	10
Elucidex	10011052	10
Ganymede	10013080	10
Kendrick Jansen	10018950	10
P.C.G. Associates	10021107	10
Screen Digest	10024016	10
Xyratex	10026868	10
AC Exchange	10001103	11
Bien Logic	10005688	11
Embedded Support Tools (EST)	10011089	11
Garbee and Garbee	10013127	11
Kennecott Copper Corporation	10018957	11
Pacific Bell	10021160	11
Smith Manufacturing Company	10024477	11
Yurie Systems	10027119	11
AC&E	10001263	12
Acara	10001786	12
Big	10005810	12
Big Picture Technologies	10005919	12
EMC	10011093	12
Garlin Imports	10013137	12

Customer	Customer Number	City Code
KENROB and Associates	10019066	12
Packet Design	10021232	12
Sterling Armament Company	10024704	12
Zero G	10027370	12
Acacia	10001784	13
Big Mountain Multi	10005861	13
Emergency	10011286	13
Gate9th	10013312	13
Kerite Company	10019194	13
PADL	10021239	13
Sun Microsystems	10024880	13
Acc Tonec	10001818	15
Big Planet	10005922	15
Enterprises	10011355	15
Gatierf Publications	10013341	15
kGS	10019469	15
Page Marketing	10021242	15
T & S	10024916	15
Accel Partners	10002114	16
Biz-comm	10006836	16
Equitable Life Assurance Society	10011360	16
GCC Technologies	10013376	16
KillerGraffix	10019502	16
Page Research	10021270	16
T.F.C.	10024918	16
Accent Interactive	10002115	17
Boott Cotton Mills Corporation	10006916	17
Farmland Industries	10011499	17
GDC	10013426	17
Kim Tom Co	10019512	17

Customer	Customer Number	City Code
PageBoy	10021283	17
T.J.T. International	10024919	17
Accent Systems	10002117	18
Borden Company	10006917	18
Farrell Lines Company	10011546	18
GEAR	10013538	18
Kimball (W.W.) Company	10019514	18
PagePoint	10021286	18
T.M. Denton Consultants	10024924	18
Access Point	10002128	19
Accidental	10002137	19
Boston and Albany Railroad Company	10006919	19
Bre-X	10007117	19
FCS	10011600	19
Federated Co-Operatives Limited	10011732	19
GearSource	10013572	19
Gehlken Enterprises	10013670	19
Levi Strauss and Company	10019783	19
Lobster Productions	10019952	19
PageSites	10021297	19
PageWeavers	10021302	19
T3West	10024930	19
Tag Systems	10024942	19
AccessWare	10002136	20
Brazilian Traction, Light and Power Company	10006977	20
Federal Express Corporation	10011623	20
Gebbie Press	10013574	20
Lewis Grocer Company	10019812	20
PageWave	10021300	20
Tadpole	10024940	20

Customer	Customer Number	City Code
ACCPAC International	10002138	22
Brentano's	10006983	22
FenP Innovators	10011821	22
Greymac Trust Company	10013870	22
Lucky	10020080	22
Pallister Management	10021305	22
Take 3	10025022	22
Accrue	10002139	23
C&C	10007134	23
Fentek Industries	10011842	23
Grove Farm Co., Inc.	10013871	23
Market	10020181	23
Palo Alto	10021331	23
Talarian	10025024	23
Accton	10002140	24
C. Hoelzle Associates	10007163	24
Fenwick & West	10011870	24
Grumman Corporation	10013899	24
Maui Island(MIC)	10020193	24
Panasonic	10021350	24
Target	10025052	24
AccuCom	10002142	25
C.O.F.	10007183	25
Ferrari	10011918	25
Guarantee Mutual Life Company	10014043	25
MaxBan	10020227	25
Pangaea Systems	10021380	25
Taroch	10025063	25
ACCUCOMP	10002144	26
C3 Development	10007253	26

Customer	Customer Number	City Code
FiberPlex	10011979	26
GURUs	10014059	26
MaXpeed	10020239	26
Panix	10021411	26
Tartanchase	10025086	26
AccuLAN	10002149	27
C3I	10007258	27
FICOM	10012023	27
H.H. Robertson Company	10014064	27
MAXSTRAT	10020247	27
Paraclipse	10021494	27
Taskers of Andover, Ltd.	10025158	27
Accumedic Systems	10002150	28
Cabco West	10007268	28
Fifth Generation	10012128	28
HarborGroup	10014238	28
Maxtor	10020256	28
Parian Development Group	10021575	28
Tatters	10025213	28
Ace Equipment	10002153	29
Cadtex	10007309	29
Fifth Moon	10012157	29
HarveyOpolis	10014540	29
Maxwell Laboratories	10020266	29
Password Busters	10021641	29
Teamaker	10025239	29
Acer	10002154	30
Cajun	10007448	30
Filene's	10012158	30
HBS	10014802	30

Customer	Customer Number	City Code
Mb digital marketing	10020281	30
Patrick Townsend & Associates	10021677	30
Teammax	10025241	30
ACES Research	10002155	31
CalComp	10007457	31
Filetron	10012161	31
Hederman Brothers	10015011	31
McGraw-Hill Publishing Company	10020306	31
Patton Enterprises	10021736	31
Teamsolve	10025242	31
ACI	10002159	32
Caleidoscopio S.r.l.	10007468	32
Emergent	10011345	32
FIND/SVP	10012305	32
GateMaster	10013332	32
Hekimian Laboratories	10015253	32
Mead Corporation	10020323	32
Paul Budde	10021750	32
Todd Shipyards Corporation	10025267	32
ACME Laboratories	10002161	33
Calypso	10007536	33
Finder	10012328	33
Helfand Enterprises	10015267	33
Medics	10020332	33
PayMaxx	10021794	33
Transylvania Company	10025288	33
Acsior	10002412	34
Camelot IT	10007591	34
Finest Host	10012369	34
Helius	10015325	34

Customer	Customer Number	City Code
Melville Shoe Corporation	10020340	34
Payton Group International	10021800	34
UBF	10025304	34
Action Systems	10002501	35
Camros	10007866	35
Finisar	10012399	35
Hercules Incorporated	10015686	35
Mersey Docks	10020364	35
Pick Professionals	10021802	35
UK Total.net	10025353	35
ActivCard	10002520	36
Champion International	10009606	36
Firehole	10012514	36
hesketh.com	10015789	36
Nancy Leffingwell Enterprises	10020449	36
Picka	10021804	36
UKnames.net	10025359	36
Active	10002526	37
Dan River Mills, Inc.	10009633	37
FireTrans	10012600	37
Hewlett Packard	10015886	37
Nbase	10020491	37
PLAINFIELD ROOFING AND SHEET METAL	10026438	37
Ultimate Group	10025392	37
Aberdeen	10000486	38
Ad-vantage	10003687	38
Besicorp	10004516	38
Data General Corporation	10009639	38
ECS Associates	10010865	38
Galaxy Systems	10012927	38

Customer	Customer Number	City Code
G-Com International	10013397	38
Hidden Oak	10015956	38
Jones and Laughlin Steel Corporation	10018363	38
NBTel	10020492	38
One World	10020868	38
QualityLogic	10022166	38
Safe	10023495	38
Ultra-Image	10025418	38
Vectrix	10026009	38
Ad Agency	10003554	39
Day and Zimmermann, Inc.	10009645	39
G.R. Barron	10012761	39
Hill and Knowlton, Inc.	10016113	39
NBX	10020515	39
Quallaby	10022167	39
Underwriters Laboratories	10025467	39
Associates	10003749	40
Dayton Rubber Company	10009650	40
Gadzoox Microsystems	10012792	40
iBEAM	10016780	40
Nematron	10020662	40
Quantum	10022201	40
Universal Access	10025608	40
Beckman Instruments, Inc.	10003857	41
De Postel	10009669	41
Gaecom	10012799	41
Id	10017290	41
Oki	10020672	41
Rdlabs	10022746	41
Userland	10025737	41

How I built this

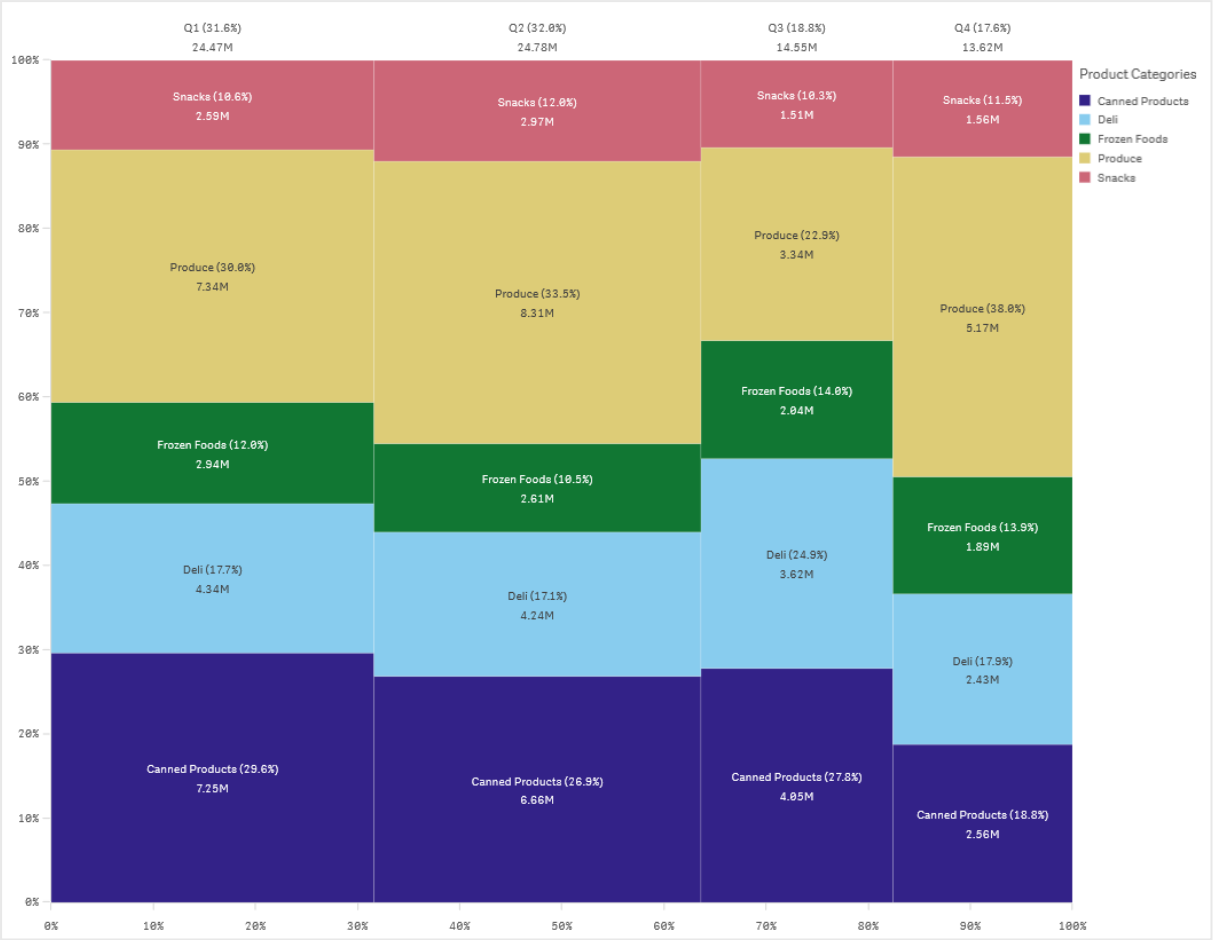
Do the following:

1. Import the data into **Data manager**.
2. Make the recommended associations between the two tables in **Data manager**.
3. Create two drill-down dimensions, one of *State* and *County* and one of *State* and *City*.
4. Add a map and in **Presentation**, set a **Custom** zoom level with a maximum zoom of **7x zoom**.
5. Add a point layer with *State -City* as the dimension. Set the following properties:
    - In **Location**, set the scope to **Custom** and enter *'USA'* in **Country**.
    - In **Size & Shape**, set **Size by** to *Count(Distinct(Customer))*.
    - In **Colors**, color by measure using *Count(Distinct(Customer))*.
    - In **Options**>**Layer display**, set **Visible drill-down levels** to **Custom** and select *City*.
6. Add an area layer with *State-County* as the dimension. Set the following properties:
    - In **Location**, set the scope to **Custom**, enter *'USA'* in Country, and *State* in **Administrative area (Level 1)**.
    - In **Colors**, color by measure using *Count(Distinct(Customer))* and set the **Opacity** slider to 40%.
7. Center the region in the map and then set **Limit pan navigation** to **Custom** and click **Set pan limit**.

Mekko chart

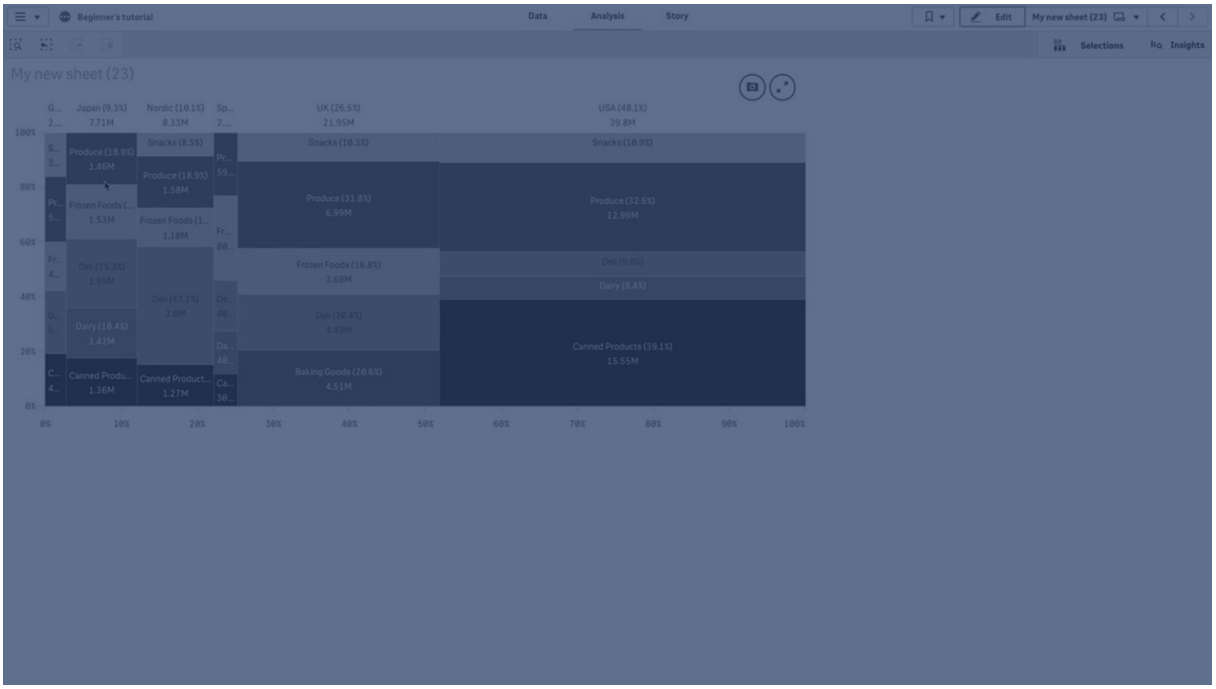
The mekko chart is suitable for comparing groups, while being able to compare category items contained within these groups. Mekko charts are also known as mosaic plots, Marimekko charts, and Mondrian diagrams. The dimension axis shows the groups, while the measure axis shows the normalized percentage value for each category item. The size of each group shows its value.

In this image, the dimensional groups represent different yearly quarters. The width of each quarter shows the normalized percentage value of the sum of sales, for that quarter. Each quarter is divided in several product categories, such as Produce, Canned Products, and Frozen Foods. The height of each product category corresponds to the normalized percentage value of the sum of sales of that product category, within that quarter. This allows you to easily compare between product categories inside a specific quarter, and between different quarters.



Sorting is automatic according to size. By default, the coloring is by dimension, with 12 colors, but that can be changed in the properties panel. You can decide which dimension to color by. In this example, the coloring is by product category to clearly distinguish the different categories and how their contribution to the sales change in each quarter.

If the data set contains negative values, a text message is shown stating that the negative values cannot be displayed.



When to use it

Use a mekko chart when you need to visualize normalized percentage values of grouped data. Mekko charts should primarily be used with values that can be aggregated.

Advantages

The mekko chart is easy to read and understand. You get a good comparison between groups, and a comparison of the impact of categories within each group.

Disadvantages

The mekko chart does not work so well with many dimension values due to the limitation of the axis length.

Mekko charts are not good when there is a big difference in the magnitude of the measure values. Nor is a mekko chart the right choice when mixing absolute and relative values.

Negative values cannot be displayed in mekko charts.

Creating a mekko chart

You can create a simple mekko chart on the sheet you are editing.

Do the following:

1. From the assets panel, drag an empty mekko chart to the sheet.
2. Click **Add dimension** and select a dimension or a field. This dimension defines the grouping.
3. Add a second dimension in the order of hierarchy level. The second dimension you add defines the categories.
4. Click **Add measure** and select a measure or create a measure from a field.

In a mekko chart you need two dimensions and one measure.

Each bar corresponds to the first dimension, divided into smaller categories based on the second dimension. The values of the measures determine the relevant height of the categories inside each bar, as well as the size of the bars.

When you have created the chart, you might want to adjust its appearance in the properties panel.

Styling the mekko chart

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Axis label**: Style the labels on the axes.
    - **Value label**: Style the labels for the dimension and measure values, including the percentage contributed by each value towards the total of the grouping above it in the hierarchy.
    - **Legend title**: Style the title of the legend.
    - **Legend labels**: Style the labels of the individual legend items.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

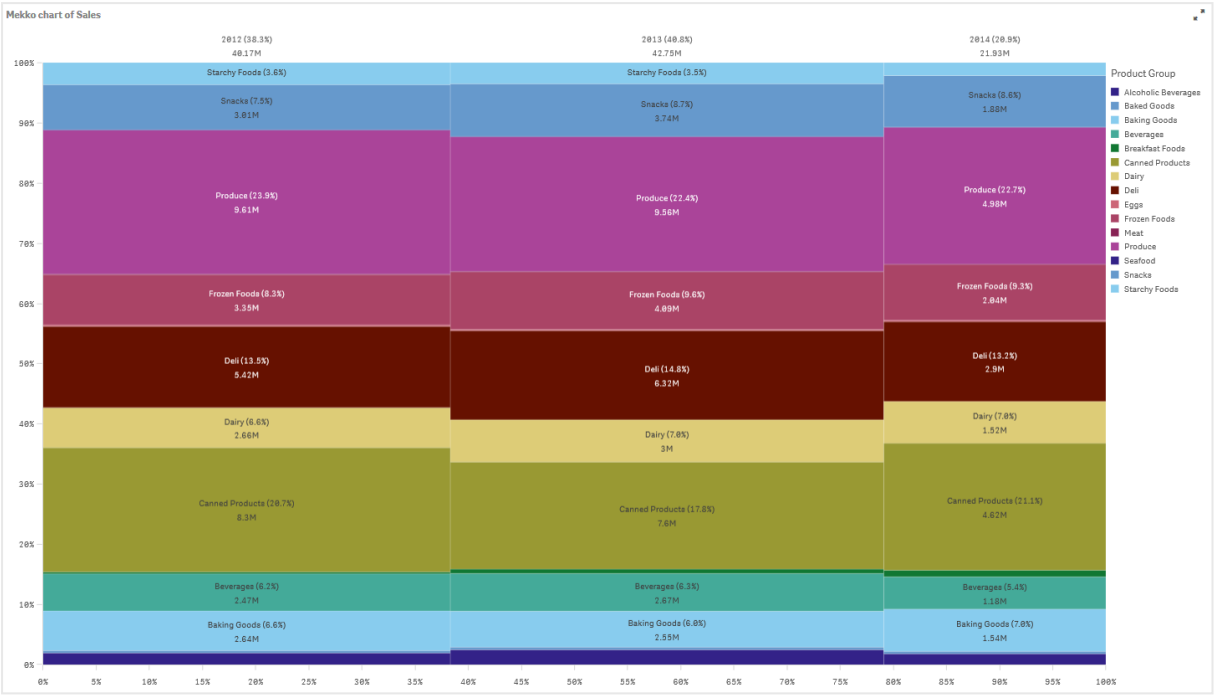
1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Comparing groups and group categories against a measure with a mekko chart

This example shows how to make a mekko chart to compare the sales between different years as well as the impact specific product groups have on a year's sales, and how that compares to other years.



Dataset

In this example, we will use two data files available in the Qlik Sense Tutorial - Building an App. Download and expand the tutorial, and the files are available in the *Tutorials source* folder:

- *Sales.xls*
- *Item master.xls*

To download the files, go to Tutorial - Building an App.

Add the two data files to an empty app and make sure that they are associated by *Item Number*.

The dataset that is loaded contains sales data. The *Item master* table holds the information about the items ordered, such as product groups.

Measure

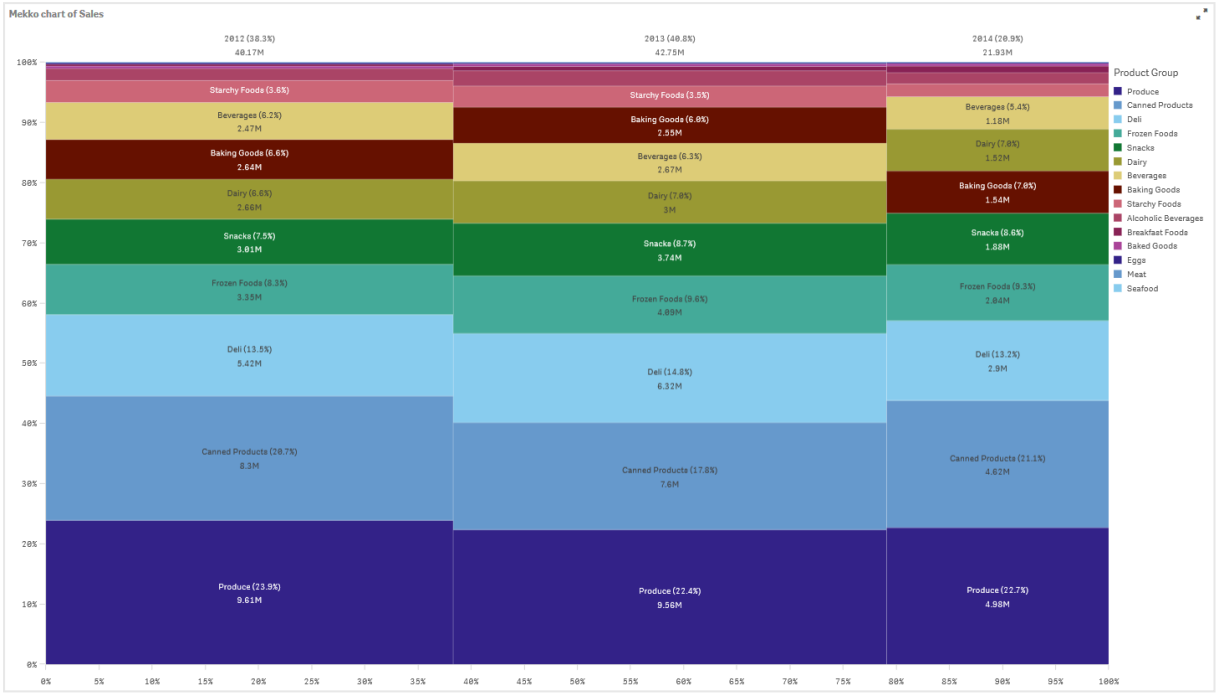
We use the sales volume as the measure by creating a measure in Master items with the name *Sales*, and the expression `Sum(Sales)`.

Visualization

We add a mekko chart to the sheet and set the following data properties.

- **Dimension**: Date.autoCalendar.Quarter (year).
- **Dimension**: Product Group (product group)
- **Measure**: *Sales*; the measure that was created as a master item.

The following mekko chart is created:



The size of each column represents the volume of sales for each year. The size of the different sections inside each column represent the volume of sales for each specific product group during that year.

Notice how the sum of all three yearly percentages adds up to 100%. The same applies to the percentages of the product groups section of each year. This is because the percentages are normalized, so the size of each section is relevant to the total.

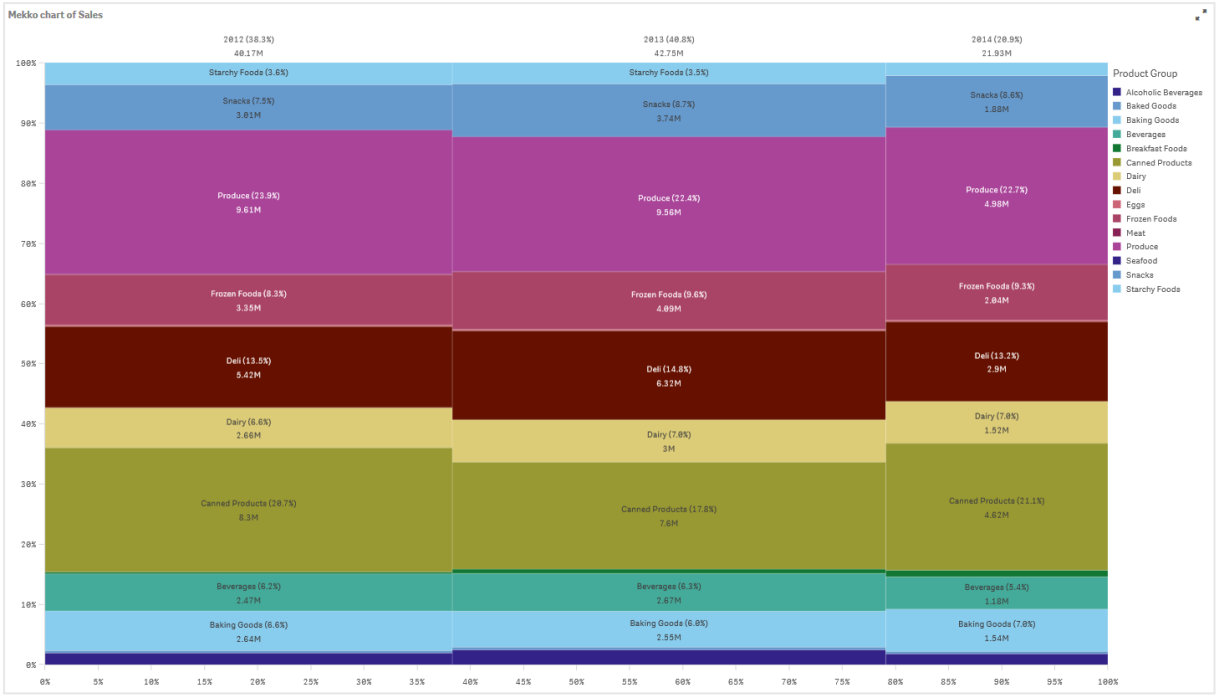
We want to have a better overview of how each product group's sales change from one year to the next. This is not obvious for product groups such as Baking Goods, Dairy, or Beverages which do not sit side by side from one column to the next. We want to display a different sorting, one based on the product groups.

This can be changed under **Sorting** in the properties panel.

Set the sorting order to the following:

1. Date.Year
2. Product Group
3. Sum(Sales)

The chart becomes as follows:



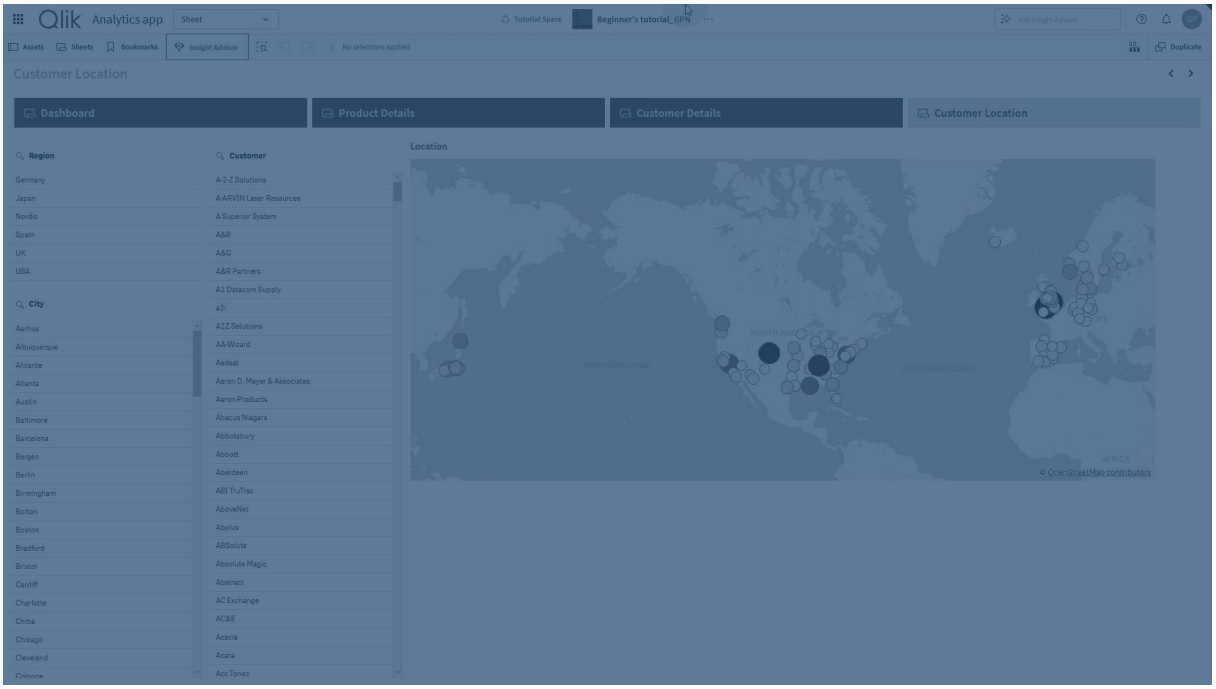
Discovery

The mekko chart visualizes the normalized percentage of sales per year for different product groups, as well as the normalized percentage of sales of each year. The visualization is sorted in order of product group, per year. You can hover the mouse pointer over a product group and view the details.

In the mekko chart we can see that Produce has the highest sales volume throughout the three years.

Navigation menu

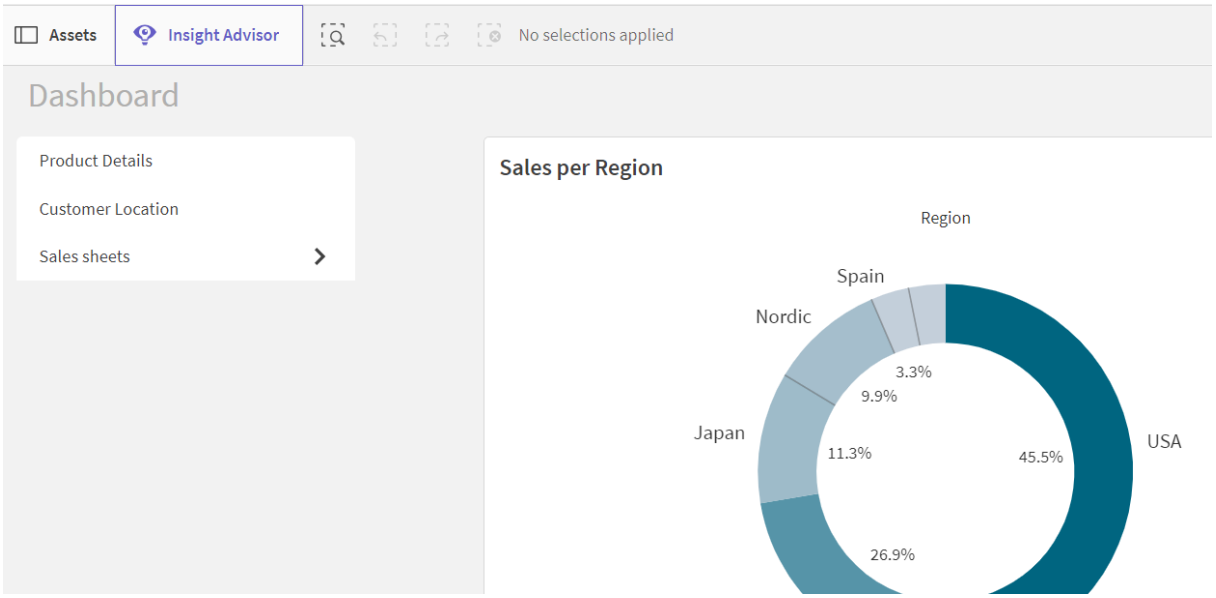
The navigation menu adds sheet navigation options into your sheet.



Users can navigate between sheets from the assets panel. You can also add a sheet navigation menu to allow users to navigate directly in the sheets, without needing to open the assets panel.

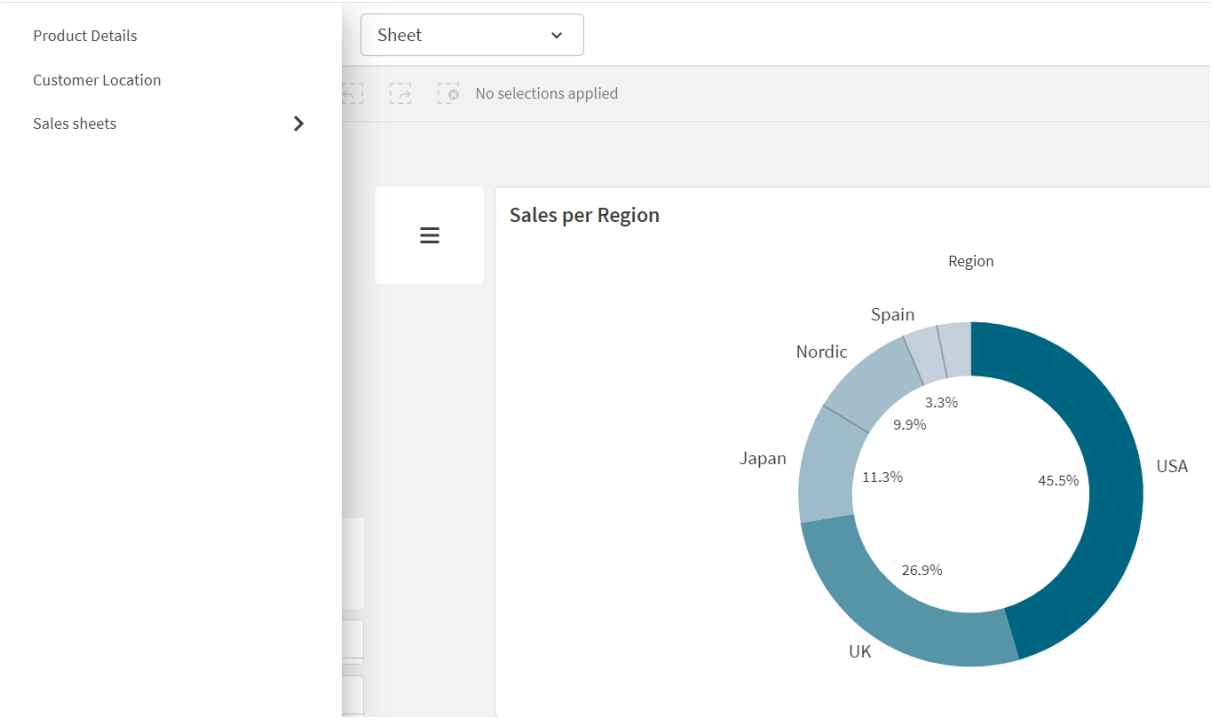
By default, the navigation menu displays all public sheets and groups in an app.

Navigation menu



You can choose to have the navigation menu open a drawer menu over the app. When this is selected, the navigation menu become an icon (☰).

Drawer navigation menu



When to use it

The navigation menu is useful when you want to provide an alternative method of navigating sheets in an app.

Creating navigation menus

You can format and color the text in the menu. The background image has sizing and positioning options.

Do the following:

- From the assets panel, drag a navigation menu on to the sheet.

Styling the navigation menu

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Menu** tab, set the font, font size, and color for the following text elements:
    - **Labels**: Style the labels of the individual items (and their icons, if used).

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.
4. On the **Menu** tab of the styling panel, select a default color for the menu items, a highlight color, and a hover color.

Customizing the border and shadow

You can customize the border and shadow of the chart.

*If the **Separate items** setting is turned on, the border and shadow are applied to each menu item rather than the entire chart. For information about **Separate items**, see Separating items in navigation menus (page 355).*

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.
7. On the **Menu** tab, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
8. Select a color for the border.
9. Adjust the **Corner radius** to control the roundness of the border.
10. Under **Shadow** in the **Menu** tab, select a shadow size and color. Select **None** to remove the shadow.

Setting navigation menus as drawer menus

You can make your navigation menu a drawer menu. When set as a drawer menu, the navigation menu acts as a button that opens a menu over the whole app listing sheets. You can optionally add a menu icon (☰) to the navigation menu.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, turn on **Drawer menu**.
3. Optionally select **Show drawer icon**.
4. Adjust **Drawer panel position** to configure whether the panel opens on the left or right side of the page.

Styling drawer menus

You can style your drawer button and panel.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. Click **Menu**.
4. Under **Drawer button**, optionally customize the colors and add a background image.
5. Under **Drawer panel**, optionally customer the color and background image used by the panel.

Setting orientation and layout

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, under **Orientation**, select **Vertical** or **Horizontal**.
3. Under **Layout**, select **Fill** or **Minimal**.
4. Under **Position**, select the position of the menu items in the navigation menu.
5. If you selected **Horizontal** or **Minimal**, optionally select **Same item width** to make all tabs have the same size.

Separating items in navigation menus

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, turn on **Separate items**.

With the **Separate items** setting turned off, choose whether to show a divider between items with **Use divider**. When using a divider, you can set its color.

Showing large items

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, select **Show large items**.

Showing item icons

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, select **Show item icons**.

Turning on the hover menu

The hover menu is turned off by default in navigation menus. You can turn it on in the properties panel.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **General**, select **Show hover menu**.

Working with sheet title expressions

The navigation menu can display sheet names entered using a sheet title expression. The order of priority is as follows:

- If a **Title expression** is applied to the sheet, the navigation menu displays the output of this expression.
- If there is no **Title expression** applied to the sheet, the navigation menu displays the **Title** of the sheet.

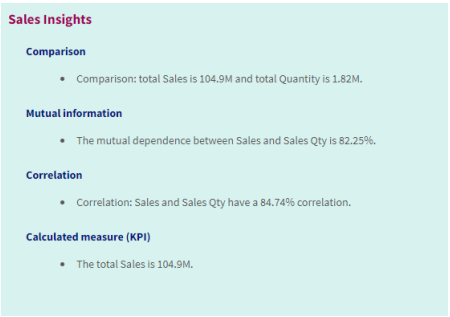
For more information about sheet titles and title expressions, see Structuring an app using sheets.

NL insights

The **NL insights** visualization displays natural language insights and information about selected dimensions and measures.

NL insights uses Insight Advisor to generate natural language information about the dimensions and measure added to the chart. The chart updates the insights as selections are made in the app.

*Native **NL insights** object displaying natural language insights with full verbosity*



NL insights is a native chart type replacing the deprecated **NL Insights** control from the Dashboard bundle.

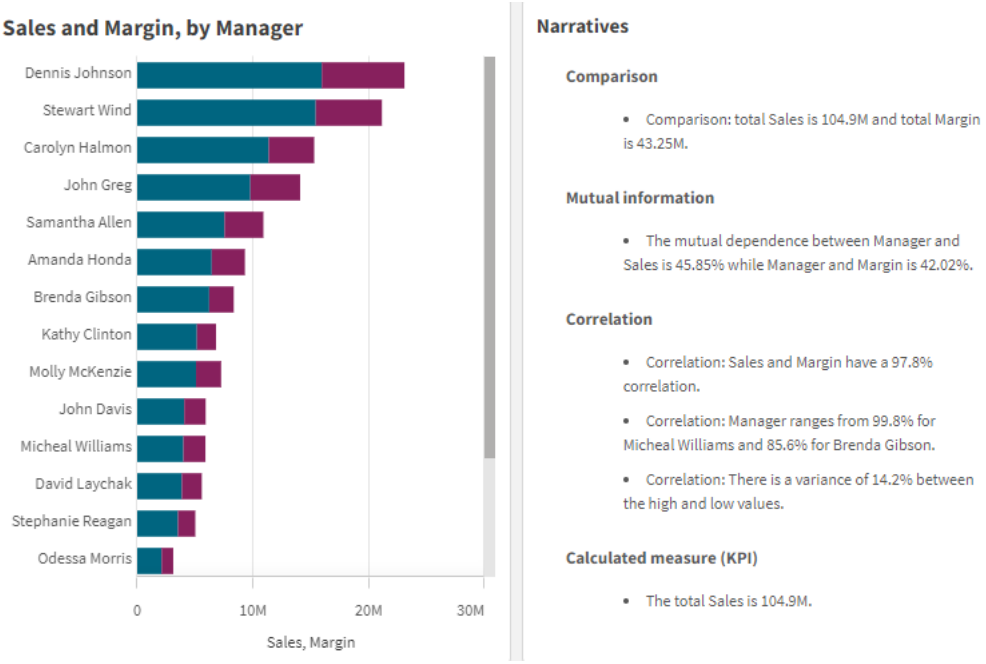
By default, **NL insights** generates insights for all analysis types supported for the selected fields. The classification of fields in your app logical model determines which fields are available as dimensions or measures.

When to use it

Use **NL insights** when you want to include a narrative or analytical summary of your data. For example, on a sheet focused on sales, you might want narratives summarizing key ranking, correlation, and comparison analyses for sales to complement your other visualizations.

It is also helpful to pair **NL insights** with another chart containing the same dimensions and measures. This provides additional context and information for the chart. To do this, configure the **NL insights** object to use an input chart that has already been created on the current sheet. The dimensions and measures from that input chart are used to generate the natural language insights, and the **NL insights** will update based on changes you make in the input chart.

***NL insights** with natural language insights generated directly from input bar chart*



Migrating from the Dashboard bundle to native object

NL Insights extension objects from the Dashboard bundle must be migrated to native charts if they appear on a public (base) sheet or published (community) sheet. To do this, follow the applicable steps to make the sheet private, then publish and/or make it public again.

> *An alternative to the following instructions is to duplicate the app in the stream, open the sheet in the duplicated app to ensure proper chart migration, and then re-publish the app to the stream.*

Public sheets

Do the following:

1. Open the app overview, or open **Sheets** from sheet view.
2. Right-click the public sheet and select **Unapprove**.
3. Right-click the community sheet and select **Unpublish**.
4. Open the private sheet and ensure the chart has been migrated.
5. Right-click the sheet and then select **Publish**.
6. Right-click the community sheet and select **Approve**.

Published sheets

Do the following:

1. Open the app overview, or open **Sheets** from sheet view.
2. Right-click the community sheet and select **Unpublish**.
3. Open the private sheet and ensure the chart has been migrated.
4. Right-click the sheet and then select **Publish**.
5. Right-click the community sheet and select **Approve**.

Creating NL insights

You need at least one dimension or one measure to create the chart. Combine dimensions and measures as needed. If you use an existing chart to generate the content of your NL Insights, the dimensions and measures from that input chart are used and will be dynamically updated if you change the input chart.

Do the following:

1. From the assets panel, drag an empty **NL insights** chart to the sheet.
2. Click **Add chart** to use natural language insights from an existing chart in the NL **insights** visualization. Choose from any of the supported charts in the current sheet.
   Alternatively, click **Add dimension** or **Add measure** to add natural language insights from a dimension or measure into the chart.
3. In the properties panel, add or remove dimensions and measures from the chart.

   You cannot add or remove dimensions and measures if you have chosen to use insights from an existing chart.

When you have created the **NL insights** visualization, you might want to adjust its appearance and other settings in the properties panel.

Styling NL insights

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, style the following text elements:
    - **Analysis type**: Set the font, font size, and color of the headers displaying the analysis types of the insights.
    - **Style**: Set the font, font size, and color of the narrative insights.
    - **Structure**: Set how the narrative insights in the chart should be presented. Choose bullet points or sentences.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.

3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Adjusting the verbosity

You can control the verbosity of the natural language insights. Verbosity can be full or brief. Full verbosity groups natural language insights by analysis type. Brief verbosity displays all natural language insights as a list.

Verbosity can be configured under **Appearance** > **Presentation** in the properties panel.

Removing analysis types

You can remove unwanted analysis types from NL Insights under **Appearance** > **Presentation** in the properties panel.

Changing the language of the natural language insights

You can change the language of the generated natural language insights under **Appearance** > **Presentation** in the properties panel.

NL insights *has the same language supports as natural language insights in Qlik Sense within Qlik Cloud Analytics. For information, see* Supported languages.

Considerations

The analysis types and number of narrative insights generated in the **NL insights** chart depend on the volume and variety of data that belongs to the fields selected. A limited number of analysis types and insights might be displayed in the following scenarios:

- The selected items use the same underlying field with aggregations or selections.
- The selected items include only measures and no dimensions.
- The selected items are mostly unrelated.

Limitations

The **NL insights** object has the following the limitations:

- You cannot use the following chart types for direct input into the **NL insights** chart:
  - Animator
  - Button
  - Container
  - Date picker
  - Filter pane

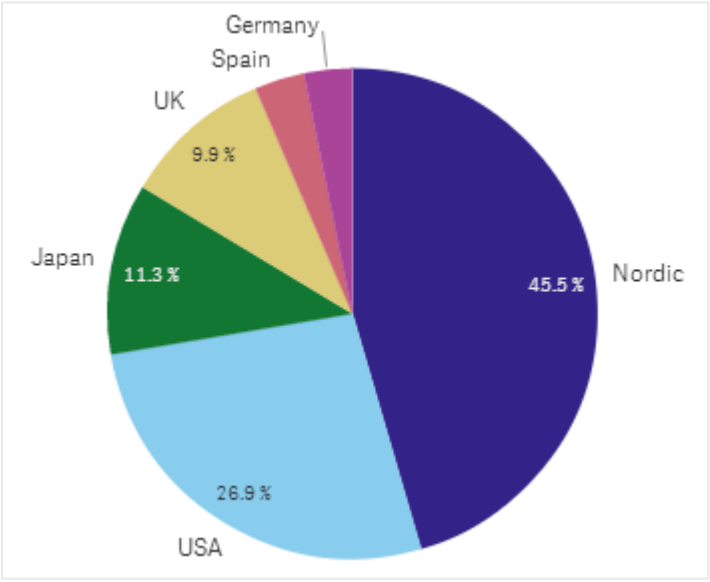
    - Text & image
    - Video player
- The **NL insights** chart does not provide natural language insights for the following analysis types (even if it uses an input chart generated from these analysis types):
    - Clustering (k-means)
    - Overview
    - Period changes
    - Process control (rolling mean)
    - Year to date
- Expressions with modifiers, either applied directly to the chart or via an input chart, might not provide correct values in natural language insights.
- The number format accompanying an expression is only applied to narrative statements generated using that expression. Additional narratives that are generated might not adhere to the expression's number format.
- When using an existing chart as the input for an **NL insights** object, certain actions taken on the input chart will not result in the natural language insights being updated automatically. Specifically, switching to alternative measures or dimensions, or customizations made through chart exploration in analysis mode, do not update natural language insights unless those changes are applied and made available for all users.
- Changing the number format of a measure might not always result in this formatting being changed in all available insights.

Pie chart

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

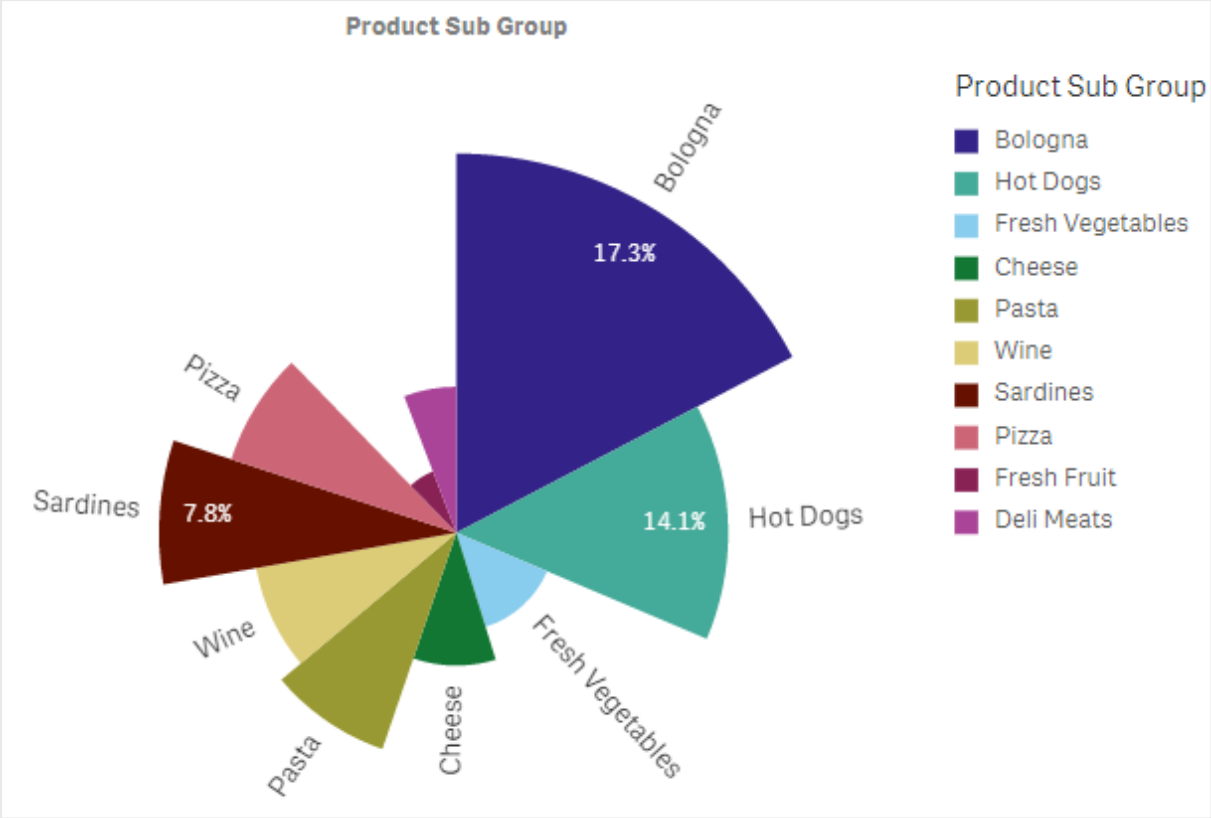
In the pie chart, the dimensions form sectors of the measure values. A pie chart can have one dimension and up to two measures. The first measure is used to determine the angle of each slice in the chart.

Sales per region in a pie chart.



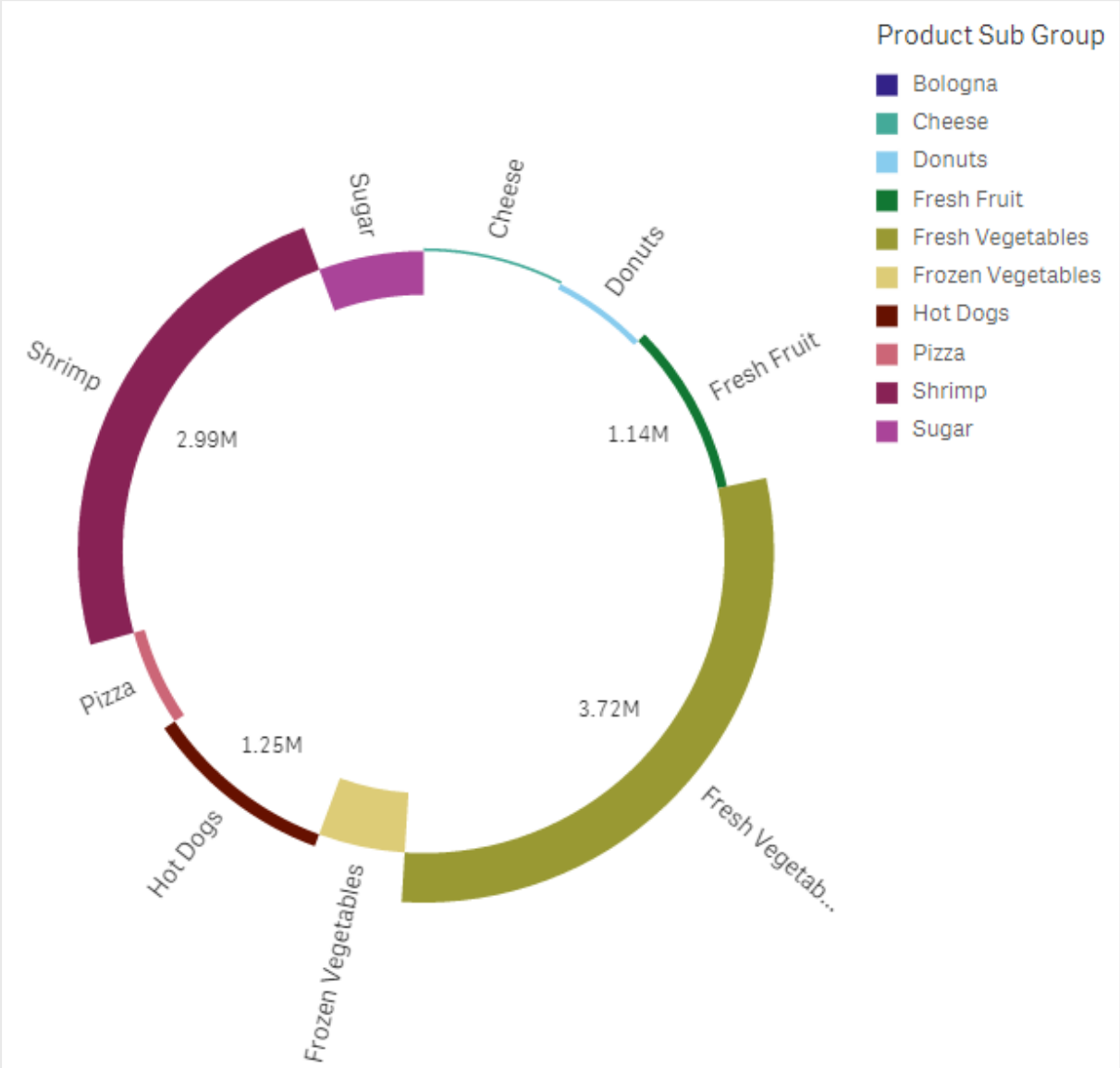
Optionally, a second measure can be used to determine the radius of each pie slice. This style of pie chart is also known as a rose chart.

Sales by product sub group in a pie chart with the average sales per invoice sales determining slice radius



In the pie presentation of the pie chart, negative values in the radius measure are not supported and will be excluded. Negative values in the radius measure are supported in the donut presentation and will point in towards the center of the pie chart.

Sales by product sub group in a pie chart with radius measure containing a comparison of sales from the previous year



When to use it

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

We do not recommend that you compare the results of two pie charts with each other.

Advantages

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

Disadvantages

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

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

Creating a pie chart

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

Do the following:

1. From the assets panel, 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.

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

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

After you have created the pie chart, you may want to add a radius measure or adjust its appearance and other settings in the properties panel.

Styling the pie chart

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:

- **Title**
- **Subtitle**
- **Footnote**

4. On the **Chart** tab, set the font, font size, and color for the following text elements:
   - **Dimension label**: Style the label for the dimension shown in the chart.
   - **Dimension value label**: Style the individual dimension values.
   - **Value label**: Style the labels which display the measure value (displayed as a value or relative percentage) for each dimension value.
   - **Legend title**: Style the title of the legend.
   - **Legend labels**: Style the labels of the individual legend items.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the outline and shape

You can customize the outline surrounding the chart, as well as the shape and thickness of the slices.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, under **Outline**, set the thickness and color of the outlines of the slices.
4. Under **Corner radius**, set the roundness of the corners of the slices.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.

4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Pivot table

The pivot table presents dimensions and measures as rows and columns in a table. In a pivot table you can analyze data by multiple measures and in multiple dimensions at the same time.

You can rearrange measures and dimensions by pivoting rows and columns.

When to use it

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

Advantages

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

Disadvantages

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

Creating a pivot table

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

Do the following:

1. From the assets panel, 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 adjust appearance and other settings in the properties panel.

Column width is automatically set to keep columns together for improved readability. You can adjust the width of the dimension column by dragging the header divider. The width of individual measure columns will still be automatically set. Double-click the header divider to reset to automatic column width.

Styling the pivot table

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**

- **Footnote**

4. On the **Chart** tab, set the font size and color for the following text elements:
    - **Header**: Style the text of the headers for each column to the right of the first column.
    - **Content**: Style the text of the first column, as well as each cell in the table itself.

Additionally, you can customize how the text appears when a user hovers over a row. See *Customizing the hover behavior and scrollbar (page 369)*.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

If a cell in the pivot table has a null value, it is colored separately from the background settings applied in the styling panel (it appears in a white color).

Customizing the hover behavior and scrollbar

You can set display options for when a user hovers over a row in the table. You can also set the scrollbar size.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, under **Row hover**, adjust the following settings:
    - To highlight rows in the table when a user hovers over them, set the switch to **On**. Switch the behavior off according to preference.
    - **Row hover color**: Set the color to highlight the row when a user hovers over it.
    - **Row hover font color**: Set the color of the text in the highlighted row when a user hovers over it.
4. Under **Scrollbar size**, set the size of the scrollbar in the chart (you can select Small, Medium, or Large).

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Pivoting your data in the table

When you want to rearrange your data, drag the items to a new column or row.

In the following pivot table, the dimension *Customer* has been dragged to the position after *Product Group*. The dimension *Item Desc* has been moved to the position before *Product Group*. As a consequence, the dimensions are now sorted by *Item*, primarily. Focus has shifted from *Customer* to *Item Desc*. You can find out the quantities and sales for each customer by clicking . This will expand a dimension.

Item Desc	Product Group	Customer	Values	
			Quantity	Sales
American Beef Bologna			166	4346.12
American Chicken Hot Dogs			173	15115.88
American Cole Slaw			156	3979.37
American Corned Beef			1771	211676.74
American Foot-Long Hot Dogs			52	2267.24
American Low Fat Cole Slaw			16	-37.75

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

Item Desc	Product Group	Customer	Values				
		A-2-Z Solutions		A-ARVIN Laser Resources		A Superior System	
		Quantity	Sales	Quantity	Sales	Quantity	
Even Better Large Curd Cottage Cheese		-	-	-	-	-	
Even Better Low Fat Cottage Cheese		2	240.82	-	-	1	
Even Better Low Fat Sour Cream		-	-	-	-	-	
Even Better Low Fat String Cheese		-	-	3	20.22	-	
Even Better Mild Cheddar Cheese		2	1105.01	4	2560.05	-	
Even Better Muenster Cheese		-	-	-	-	-	
Even Better Sharp Cheddar Cheese		-	-	1	640.01	-	

Measure grouping

As you may have noticed, *Quantity* and *Sales* are not presented as separate measures in the top column row. Next to the dimension *Customer*, you find an item called *Values*. When you use more than one measure, they are automatically grouped together forming a measure group, *Values*. This group can be

added to the rows section or the columns section. The measure group cannot be edited or selected in the table. You cannot split up the measure item and use one measure as a row and another as a column.

Pivoting your data in the properties panel

In the properties panel, you can add measures and dimensions to the pivot table, and also pivot rows or columns.

Data

In the data pane, you can add dimensions and measures. You can move items between rows and columns. You can also change item order inside rows or columns. When you use more than one measure, they are grouped and a *Values* item is created.

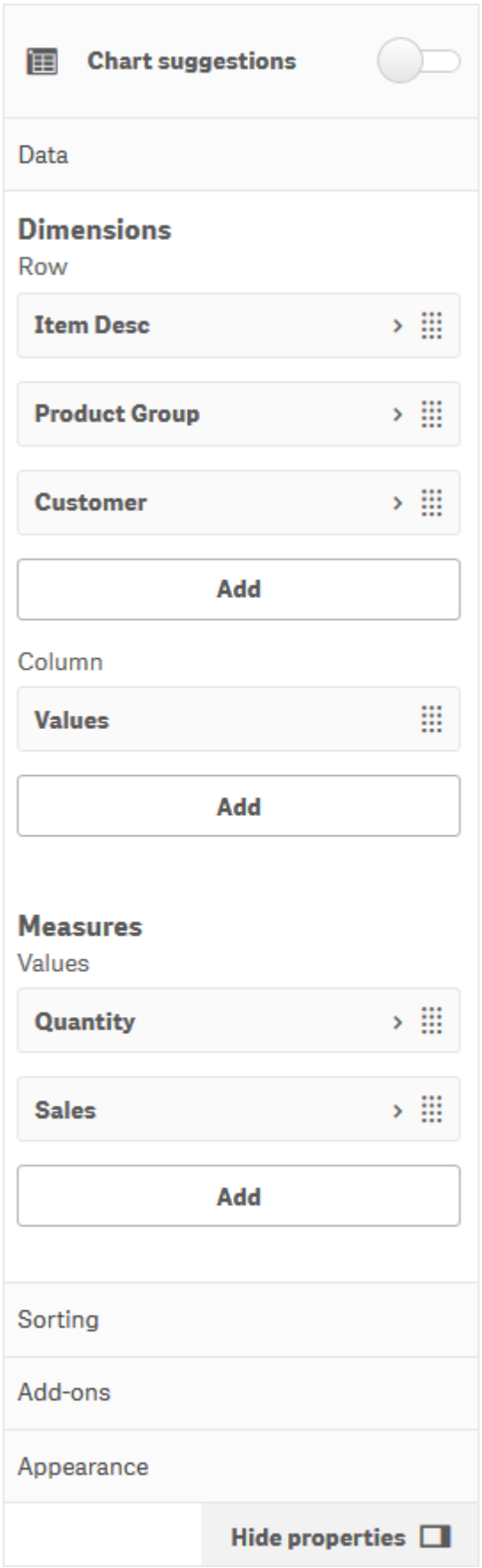
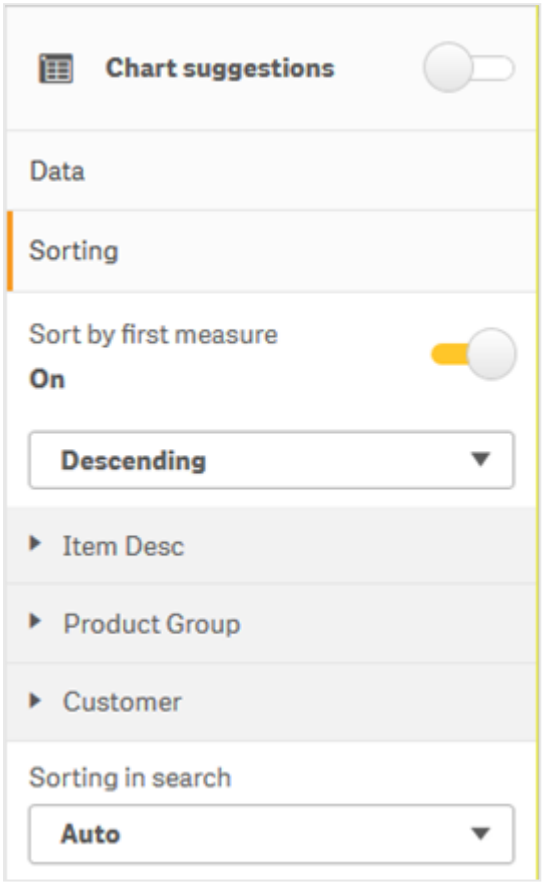


Chart suggestions
Data
Dimensions
Row
Item Desc
Product Group
Customer
Add
Column
Values
Add
Measures
Values
Quantity
Sales
Add
Sorting
Add-ons
Appearance
Hide properties

Sorting

On the sorting pane, you can change the internal order of dimensions and measures.



When sorting pivot tables, NULL values are always displayed first.

Sort by first measure

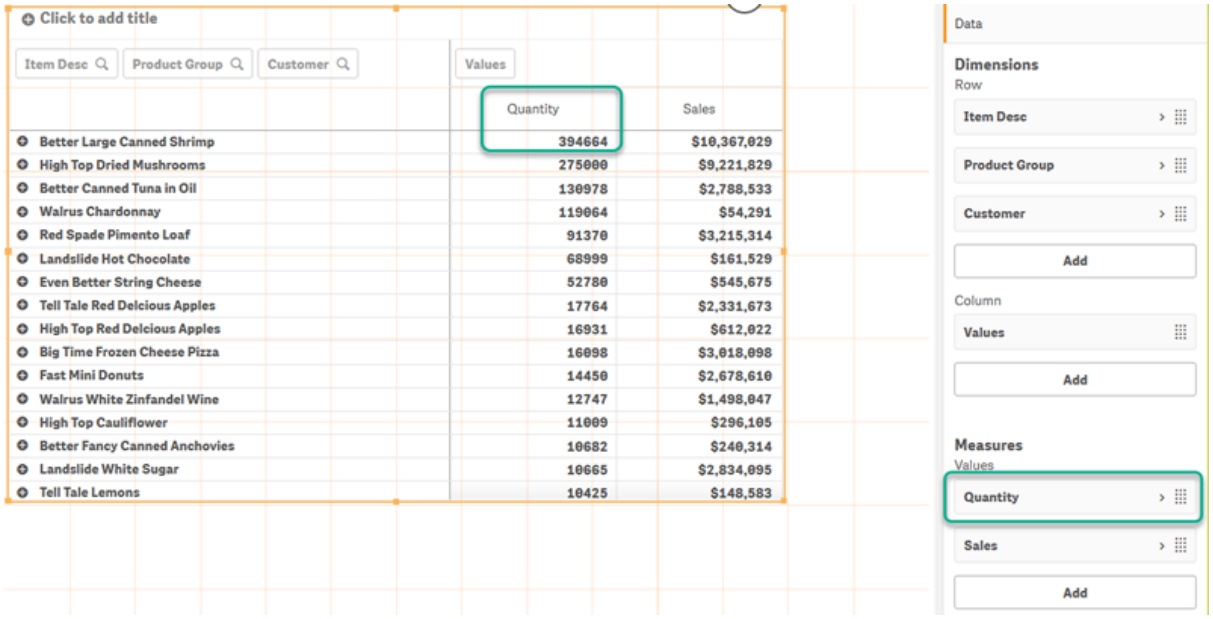
If you have more than one measure, a measure group is created. Turn on **Sort by first measure** to sort dimension values by the numeric value of the first measure. You can choose between **Ascending** and **Descending** sort order.

This sort order will affect all dimensions, and take precedence before any other sort order defined under the dimensions.

For example, you have two measures: *Quantity* and *Sales*. In the properties pane, under **Data**> **Measures**, *Quantity* is listed first. If you **Sort by first measure** in descending order, your table is sorted starting with the dimension with the highest *Quantity*.

If **Sort by first measure** is turned off, the table uses the sort order configured for the dimensions.

*Pivot table in edit mode. **Sort by first measure** has been toggled on.*



Limitations:

- This option is only supported if subtotals are calculated. You can calculate subtotals by doing one of the following:
    - In the properties pane, go to **Data**, and click on a dimension. Toggle on **Show totals**.
    - In the properties pane, go to **Appearance** > **Presentation**. Toggle on **Indent rows**.
- This option is not supported for calculated dimensions.
- This option is only supported if all dimensions are in the Row section and all measures are in the Column section.

Dimension sorting

With **Sort by first measure** turned off, the table can be sorted by dimension values. Each dimension can have **Auto** or **Custom** sorting. With **Auto** sorting, field values are sorted alphabetically and numerically in ascending order. With **Custom** sorting, you can turn each of the following settings on or off:

- **Sort by expression**: Sorts by custom expression. **Sort by expression** overrides the **Sort numerically** and **Sort alphabetically** settings. This option should only be used with the first (outermost) dimension in the table.
- **Sort numerically**: Sorts field values starting with a number.
- **Sort alphabetically**: Sorts field values starting with a letter.

Ascending and **Descending** options are available for all three settings.

Sorting in search

The user can click a dimension name in the table to expand a listbox. In the listbox, the user can search and select individual dimension values. The **Sorting in search** setting controls the sort order of the values in a dimension listbox.

You have the following options for the listbox sort order:

- **Auto**: Uses the default sort order. Numbers are sorted numerically in ascending order. Text is sorted alphabetically in ascending order.
- **Inherit from dimension**: Uses the sort order defined for the individual dimension.

Global grouping

Global grouping lets you create a limited data set, and within that data set, single out values that you want to focus on. For example: the best quarters, the top sales people, or the worst selling products.

Example:

In the following pivot table, no limitation is applied. The values are sorted on *Sales*, descending. The list is long and the values for 2013 are not shown.

Year / Sales Rep Name	sum(Sales)
2014	**$41,006,958.72**
Judy Thurman	$6,037,992.86
Stewart Wind	$4,717,671.77
Lee Chin	$3,535,768.74
Cheryle Sincock	$1,791,498.68
Brenda Gibson	$1,750,292.96
John Greg	$1,443,128.30
Martha Richard	$1,388,402.75
Amalia Craig	$1,200,853.57
David Laychak	$1,170,791.14
Karl Anderson	$957,467.35
Max Blagburn	$940,446.81
David Howard	$850,575.53
Angelen Carter	$810,618.88
Amanda Honda	$704,245.66
Amelia Fields	$635,124.63
Donna Brown	$603,055.39
Peggie Hurt	$525,843.84
Craig Amundson	$495,495.93
Micheal Williams	$469,046.29

In the following pivot table, a limitation has been applied to the (inner) dimension *Sales Rep Name*, so that only the top five sales representatives for the years 2013 and 2014 are shown.

Year / Sales Rep Name	Sum(Sales)
2014	**$41,006,959.00**
Judy Thurman	$6,037,993.00
Stewart Wind	$4,717,672.00
Lee Chin	$3,535,769.00
Cheryle Sincock	$1,791,499.00
Brenda Gibson	$1,750,293.00
2013	**$38,657,267.00**
Stewart Wind	$5,669,097.00
Judy Thurman	$4,951,304.00
Lee Chin	$3,685,579.00
John Greg	$2,104,622.00
Cheryle Sincock	$1,353,069.00

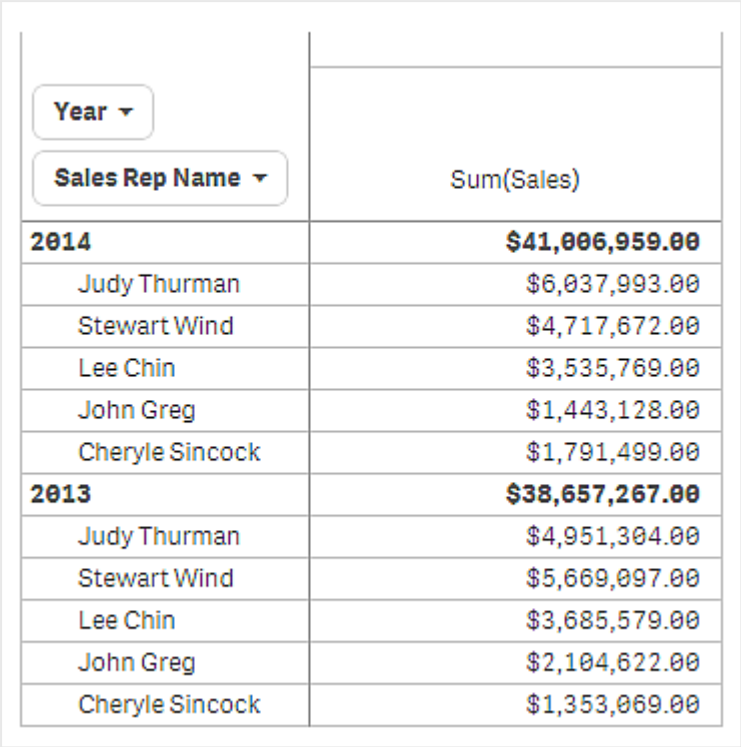
The next step is to select global grouping in the properties panel. The option **Global grouping** is only available after you have applied a limitation on the dimension.

When global grouping is selected, the limitation on the top five sales representatives is applied again, but this time the dimension *Year* is ignored. The five sales representatives with the highest sales (either in 2013 or 2014) are the only ones that will be presented in the final pivot table.

The following image shows the six highest results for 2014 and 2013. The top four results are from 2014, but the fifth (John Greg) is from 2013. Because five other sales representatives have higher sales than Brenda Gibson (who was number five in 2014), she is removed.

Judy Thurman	$6,037,993.00
Stewart Wind	$4,717,672.00
Lee Chin	$3,535,769.00
John Greg	$2,104,622.00
Cheryle Sincock	$1,791,499.00
Brenda Gibson	$1,750,293.00

The following image shows the pivot table with global grouping applied. The pivot table only contains the sales results for the top five sales representatives. Even though *Brenda Gibson* had a better result in 2014 than John Greg, his result for 2013 qualified him for the top five list.



Year / Sales Rep Name	Sum(Sales)
2014	**$41,006,959.00**
Judy Thurman	$6,037,993.00
Stewart Wind	$4,717,672.00
Lee Chin	$3,535,769.00
John Greg	$1,443,128.00
Cheryle Sincock	$1,791,499.00
2013	**$38,657,267.00**
Judy Thurman	$4,951,304.00
Stewart Wind	$5,669,097.00
Lee Chin	$3,685,579.00
John Greg	$2,104,622.00
Cheryle Sincock	$1,353,069.00

Creating a bookmark with an expanded pivot table

By default, if you create a bookmark that contains a pivot table, the pivot table will be shown collapsed. If you expanded any rows using ⊕, they will not be shown. However, you can choose to show the pivot table as expanded.

Do the following:

1. Click 🔖 in the toolbar.
2. Click **Create new bookmark**.
   Change the name and description, if desired.
3. Toggle on **Save layout**.
4. Click **Save**.

Configuring totals

You can choose to show numeric totals for dimensions in the pivot table. Consider the following:

- With **Indent rows** turned on in **Appearance** > **Presentation**, you can show totals for any dimension other than the automatically created **Values** dimension.
- With **Indent rows** turned off in **Appearance** > **Presentation**, you can show totals for the first **Row** dimension, and any **Column** dimension other than the automatically created **Values** dimension.

Do the following:

1. In the properties panel, expand the **Data** section.
2. Expand the dimension.
3. Set **Show totals** to **On**.

Comparing straight tables and pivot tables

You can see the efficiency of a pivot table if you compare it to a regular table that has the same data.

Straight table

In the following table, you have:

- Three dimensions: Customer, Product Group, and Item Desc
- Two measures: Quantity and Sales

The table shows food product sales. If you want to rearrange the data to simplify analysis, your options are limited. You can change the order of the columns, but that does not improve the overview. You can also set the sorting order, either in the sorting section in the properties panel, or by clicking the dimension columns. However, the problem persists. The customers, product groups, and items are all displayed more than once. It is not possible to get a good summary of the data.

Customer	Product Group	Item	Quantity	Sales
Totals			**1,818,294**	**$104,852,674.81**
A-2-Z Solutions	Alcoholic Beverages	Good Light Wine	2	$337.58
A-2-Z Solutions	Alcoholic Beverages	Pearl Chardonnay	8	$513.89
A-2-Z Solutions	Alcoholic Beverages	Pearl Light Beer	1	$60.10
A-2-Z Solutions	Alcoholic Beverages	Walrus Light Wine	7	$34.69
A-2-Z Solutions	Baked Goods	Colony Pumpernickel Bread	2	$9.54
A-2-Z Solutions	Baked Goods	Colony Wheat Bread	1	$74.73
A-2-Z Solutions	Baked Goods	Great Blueberry Muffins	3	$149.02
A-2-Z Solutions	Baking Goods	BBB Best Apple Butter	6	$211.35
A-2-Z Solutions	Baking Goods	BBB Best Apple Preserves	2	$276.20
A-2-Z Solutions	Baking Goods	BBB Best Extra Chunky Peanut Butter	1	$617.40
A-2-Z Solutions	Baking Goods	BBB Best Grape Jam	1	$33.75
A-2-Z Solutions	Baking Goods	BBB Best Pepper	4	$328.97

Pivot table

We add a pivot table to the sheet and use the same info:

- Three dimensions: Customer, Product Group, and Item Desc
- Two measures: Quantity and Sales

Customer	Product Group	Item Desc	Values	
			Quantity	Sales
A-2-Z Solutions			1418	$196,298
A-ARVIN Laser Resources			25	$4,053
A Superior System			868	$103,728
A&B			891	$92,121
A&G			133	$12,503
A&R Partners			156	$30,392
A1 Datacom Supply			5830	$259,600
a2i			14	$452
A2Z Solutions			454	$69,977
AA-Wizard			917	$94,209
Aadast			881	$351,243

Discovery

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

One of the advantages of a pivot table is the interchangeability: the ability to move row items to columns and column items to rows. You can rearrange the data and have several different views of the same data set. You can move dimensions and measures to bring forward data of interest and hide data that is either too detailed, or irrelevant to the analysis.

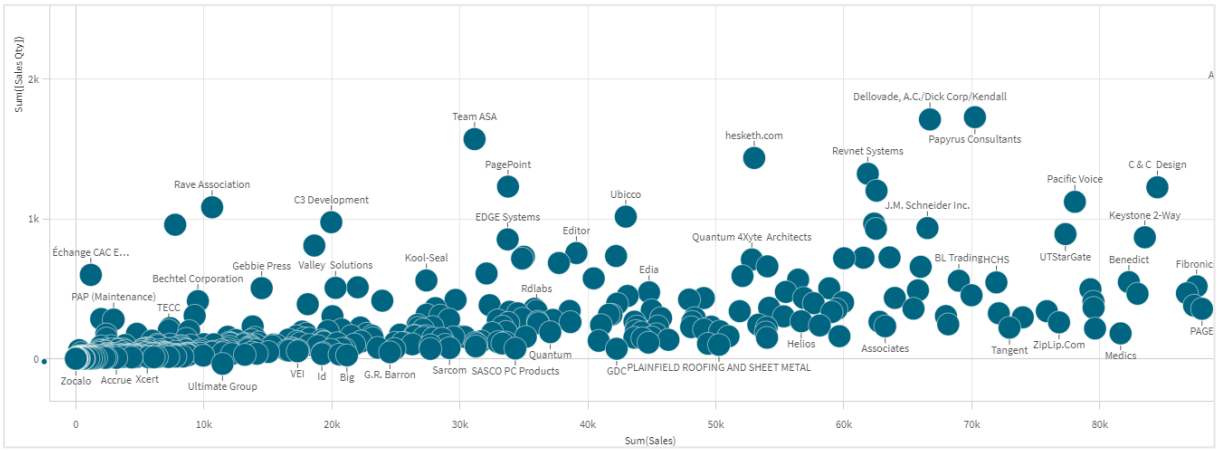
The pivot table shows the dimensions *Customer*, *Product Group*, and *Item Desc*, and the measures *Quantity* and *Sales*. In this view, you have a summary of quantity and sales for each customer. If you want to know which items and product groups that the customers bought, you can expand the customer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

Scatter plot

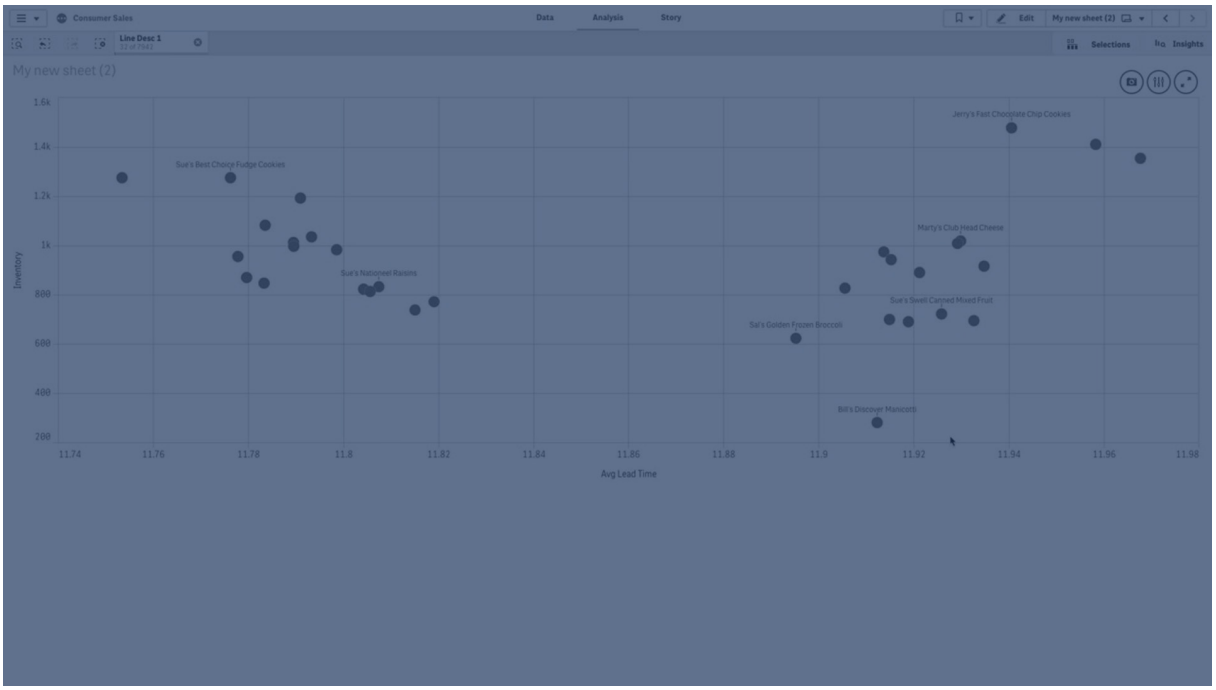
The scatter plot presents pairs of values from two or three measures.

This is useful when you want to show data where each instance has two numbers, for example, the relationship between Sales and Quantity per Customer. In the scatter plot below, a third measure (Cost) is used to generate the bubble size.

Scatter plot displaying the relationship between Sales and Quantity per Customer.



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



When to use it

The scatter plot helps you find potential relationships between values, and to find outliers in data sets. The scatter plot is useful when you want to show data where each instance has at least two metrics, for example, average life expectancy and average gross domestic product per capita in different countries.

Advantages

The scatter plot is a great way to visualize the correlation of two or more measures at the same time. The third measure is an efficient way of differentiating between values and simplifying the identification of, for example, large countries, large customers, large quantities, and so on.

Disadvantages

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

Values may be placed on top of each other and are then not visible until you zoom in.

Creating a scatter plot

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

In a scatter plot you need one dimension and at least two measures. You can have maximum one dimension and three measures, where the third measure is visualized as bubble size.

Do the following:

1. From the assets panel, 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.
5. Optionally, if you want bubble size to be set according to a third measure:
   Click **Add measure** and select a measure or create a measure from a field.

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

Styling the scatter plot

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Axis title**: Style the titles on the axes.
    - **Axis label**: Style the labels on the axes.
    - **Value label**: Style the labels for the bubbles representing each dimension value.
    - **Legend title**: Style the title of the legend.
    - **Legend labels**: Style the labels of the individual legend items.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.

6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Styling bubble outlines

The outlines of the bubbles in the scatter plot can be styled. You can change the size, color, and opacity of the outlines.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab, adjust the settings for **Bubble outline**. You can set the size, color, and opacity.

Adding reference lines

You can add reference lines to the scatter plot. Reference lines can be added on the X-axis and Y-axis.

Adding an X-axis reference line

Do the following:

1. In the properties panel, expand the **Add-ons** section.
2. Expand **X-axis reference lines**, and then click **Add reference line**.
3. Under **Reference line expression**, enter a static value or expression to define the position of the line.
4. Further customize the reference line with the following: additional settings:
    - **Show condition**: Set whether to show or hide the line depending on a condition.
    - **Label** and **Show label**: Add a label for the line that will be shown in the chart and/or the properties panel.
    - **Show value**: Set whether to show the value of the expression defining the line.
    - **Color**: Change the color of the line.
    - **Line type**: Select between a solid or dashed line.
    - **Colored background**: Set whether the label and value bar above the chart data area is styled with a colored background.

Adding a Y-axis reference line

Do the following:

1. In the properties panel, expand the **Add-ons** section.
2. Expand **Y-axis reference lines**, and then click **Add reference line**.
3. The position of the line is defined with the equation format $y=kx+m$, where k is the slope and m is the y-intercept. You can define these parameters with the following settings for the newly created reference line:

- **Reference line expression**: Enter a static value or expression to define the y-intercept.
- **Slope**: Enter a static value or expression to define the slope.

4. Further customize the reference line with the following: additional settings:
   - **Show condition**: Set whether to show or hide the line depending on a condition.
   - **Label** and **Show label**: Add a label for the line that will be shown in the chart and/or the properties panel.
   - **Show value**: Set whether to show the value of the expression defining the line.
   - **Color**: Change the color of the line.
   - **Line type**: Select between a solid or dashed line.
   - **Colored background**: Set whether the label and value bar inside the chart data area is styled with a colored background.

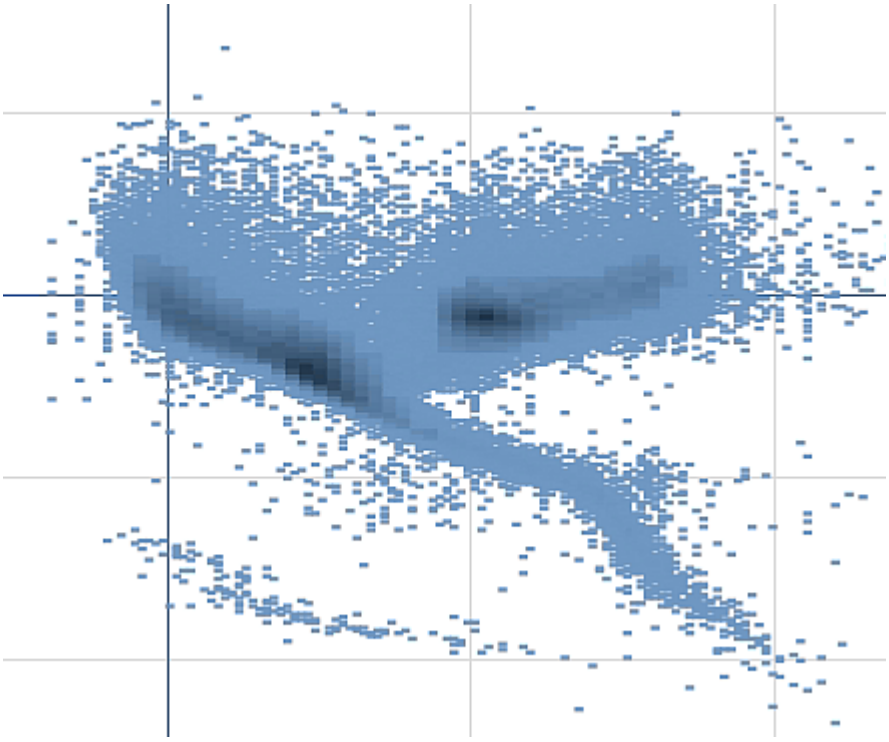
Display limitations

Large data sets in scatter plots

You can set the maximum number of visible bubbles in a scatter plot if you are using advanced edit mode. Go to **Presentation** > **Max visible bubbles**. The default is 2,500. The maximum is 50,000. If you set a number less than 1,000, the scatter plot will behave as if the maximum is 1,000 visible bubbles.

If the number of displayed data points is less than **Max visible bubbles**, the data will be shown as individual bubbles. If there are more data points than the number set in **Max visible bubbles**, you will see an overview of your dataset as a table with colored boxes. This switch between compressed view and bubble view is done automatically. If there are more than 5,000 visible bubbles, then bubble labels and out of bound bubbles will not be shown.

Scatter plot with compressed data in a bubble view.



Zooming and panning

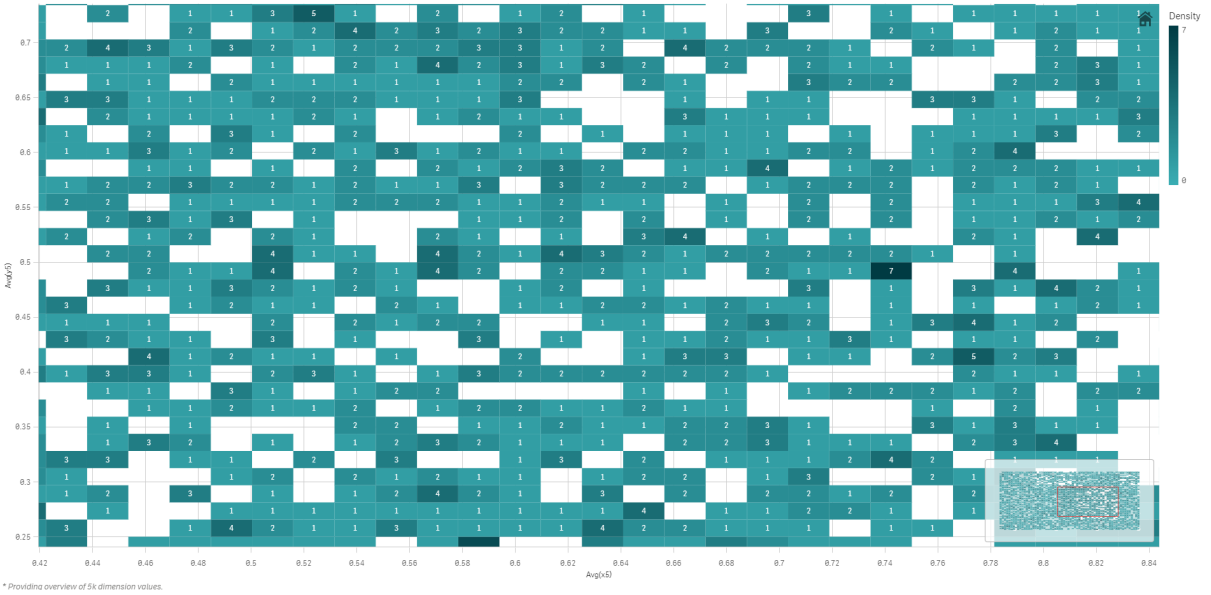
In a scatter plot, you can zoom and pan around in your data. The interaction differs depending on what device you are using. If you are zooming in you can see where in the data set you are located by looking at the mini chart in the bottom right corner. If you zoom in on large data sets you will be able to see the data shown as boxes with values inside. The values represent the number of points in each box.

You cannot make selections when the scatter plot is rendering during a pan or zoom.

Zooming and panning is not possible when you have made a selection in the compressed data view.

You can change the compression resolution in the visual exploration menu or in the properties panel.

Scatter plot with compressed data in a compressed view.



Colors and legends

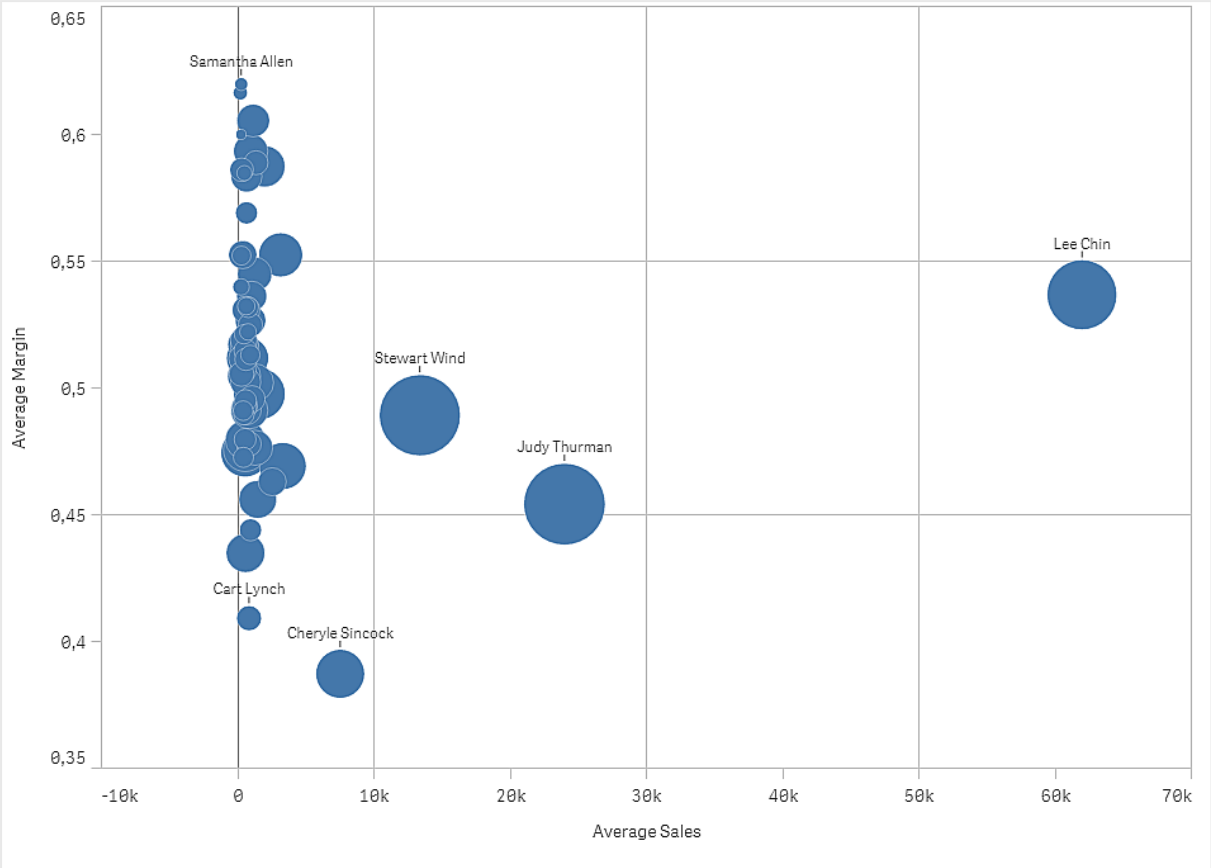
Compressed scatter plots are always auto-colored by the primary data color. That means that any custom color definition made will not affect compressed data. The density of the data points is reflected by color. More dense data will be displayed in a darker color.

However, if you zoom or make selections so that the number of displayed data points is reduced to less than **Max visible bubbles**, the data will be colored as defined.

When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Correlating two measures with a scatter plot to find outliers

This example shows how to make a scatter plot to correlate two measures. We want to compare how the average sales volume correlates with the average margin for a group of sales persons, and find the outliers.



Dataset

In this example, we'll use two data files available in the Qlik Sense Tutorial - Building an App. Download and expand the tutorial, and the files are available in the *Tutorials source* folder:

- *Sales.xls*
- *Sales rep.csv*

To download the files, go to Tutorial - Building an App.

Add the two data files to an empty app and make sure that they are associated by *Sales Rep ID - Sales Rep Number*.

The dataset that is loaded contains sales data. The *Sales rep* table holds the information about the sales persons.

Measures

We need two measures that we create in Master items:

- *AverageSales* with the expression `Avg(Sales)`. This is the average of the sales value for all orders.
- *AverageMargin* with the expression `Avg(Margin/Sales)`. This is the average of the sales margin for all orders.

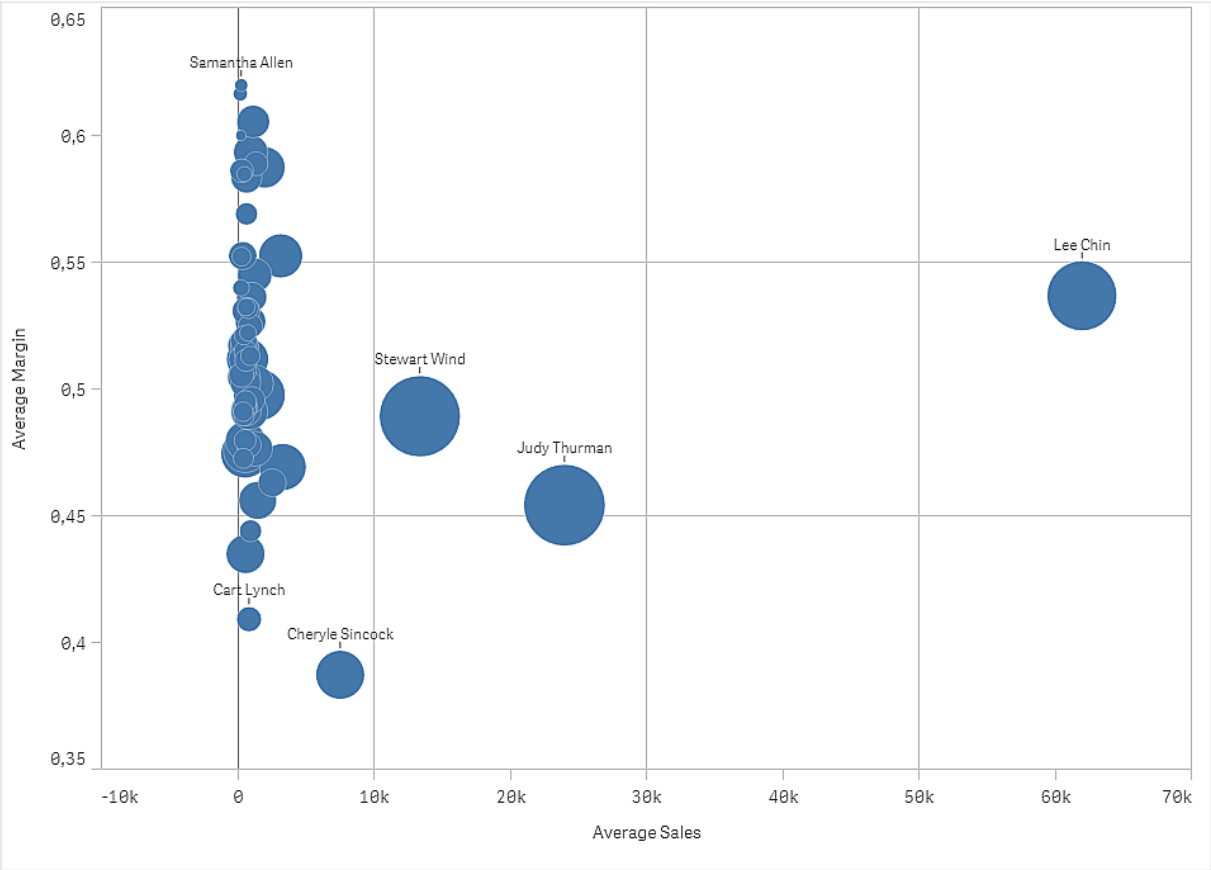
Visualization

We add a scatter plot to the sheet and set the following data properties.

- **Dimensions > Bubble**: Sales Rep Name (sales person)
- **Measures > X-axis**: *AverageSales*
- **Measures > Y-axis**: *AverageMargin*

A scatter plot is created, with a bubble for each sales person.

But we also want to have information about the total sales for each sales person, by adding the third measure `Avg(Sales)`. The size of each bubble reflects the total sales for each sales person.



Discovery

The scatter plot visualizes the average sales versus average margin for each sales person, and we can see which sales persons distinguish themselves in performance. You can hover the mouse pointer over a sales person and view the details.

In the chart, we can see that Lee Chin has the highest average sale value. Stewart Wind has the largest total sales volume, followed by Judy Thurman. Cheryle Sincock has a significantly smaller average margin than other sales persons, while outperforming most of them in average sales volume.

Straight table

The **Straight table** shows several fields simultaneously, where the content of each row is logically connected. A table can consist of as many dimensions and measures as needed.

App creators can add many fields simultaneously, customize the table at the column-level, add alternative dimensions and measures, set column width, apply pagination and turn on chart exploration.

Chart exploration allows users that do not have edit rights to customize the original straight table when they are in analysis mode. These users can add or remove columns, change sort order, re-arrange columns, and make selections. They can then share, download, subscribe, or bookmark the new table layout. The changes made in chart exploration mode by a user are not seen by other users analyzing the sheet.

The straight table replaces the table as the default table visualization. For help with configuring existing instances of the table visualization, see Table (page 421).

When to use it

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

Advantages

You can filter and sort the table in different ways. Many values can be included in a table, and when you drill down in a table, you make good use of the limited space on the sheet. A table is excellent when you want to see exact values rather than trends or patterns. Tables are an easy way to export data into other programs.

Disadvantages

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

Best practices for optimizing tables

If a table has too many dimensions and measures, it may load slowly. As a best practice, add the majority of your fields and expressions as Alternative columns. This encourages users to add only the fields they need using chart exploration.

You can also increase performance by ensuring a table has 10 columns or less.

Tables that extract fields from a single data source will perform better than tables that contain fields from multiple data sources.

Creating a straight table

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

Do the following:

1. In the **Assets** panel under **Charts**, drag a **Straight table** to the sheet.
2. Click **Add columns** to add items to the table. A dropdown will open:

- **Fields & master items**: Opens a searchable dialog box displaying every field and master item. You can choose to add any item as a dimension or measure.
- **Custom expression**: Opens a dialog box where you can type in an expression, or open the expression editor *fx*.

3. In the properties panel, under **Data**, click + to add more dimensions or measures to the table.
4. As needed, further manage the table data in the **Data** tab of the properties panel. You can:
   - Under **Alternative columns**, add alternative columns that users can add to the table when using chart exploration.
   - Click the checkbox next to any item. Click ••• to perform actions such as cut, paste, and delete. Click the checkbox next to **Columns** or **Alternative columns** to select all items in the list. Use the arrow icons to move items between each section.
   - Change the column order by clicking ⣿ next to a field or expression and dragging the item.

After you have created the table, customize it by modifying its properties in the properties panel. See:

- *Formatting links (page 395)*
- *Configuring sorting in a straight table (page 400)*
- *Showing details (page 403)*
- *Chart-level text styling (page 404)*
- *Activating chart exploration in a straight table (page 408)*

Selecting active fields from cyclic dimensions in straight tables

If a straight table uses a cyclic dimension, analyzers can select the active field from the cyclic dimension.

Do the following:

1. Click ☰ on a cyclic dimension column.
2. Click ↻ **<Dimension name>** and select a dimension from the cyclic dimension.

Using chart exploration

Chart exploration mode is a great way to quickly remove or add data, and then share it, download it, or bookmark the new table state. It is available in the ••• menu under ⚙ **Chart exploration**. Your app creator needs to turn this setting on for you to use it.

You use chart exploration in analysis mode. Add or remove columns from a table, re-sort columns, change column width, and apply selections. You cannot change the size or layout of the entire table on the sheet in chart exploration mode.

If you customize a table using chart exploration mode, other users cannot see your changes, unless you save them as a public bookmark. This means that several users can alter the same table, at the same time. Your changes will remain visible to you until your session ends. When this occurs, the table will return to its default state, as set by the person who created the straight table. If you want to save your table layout, create a bookmark.

The chart exploration panel is not shown in the resulting table that you have shared or downloaded.

For information about configuring chart exploration as an app creator, see *Activating chart exploration in a straight table (page 408)*.

Chart exploration of a straight table. The table has three columns: Customer, Region, City.

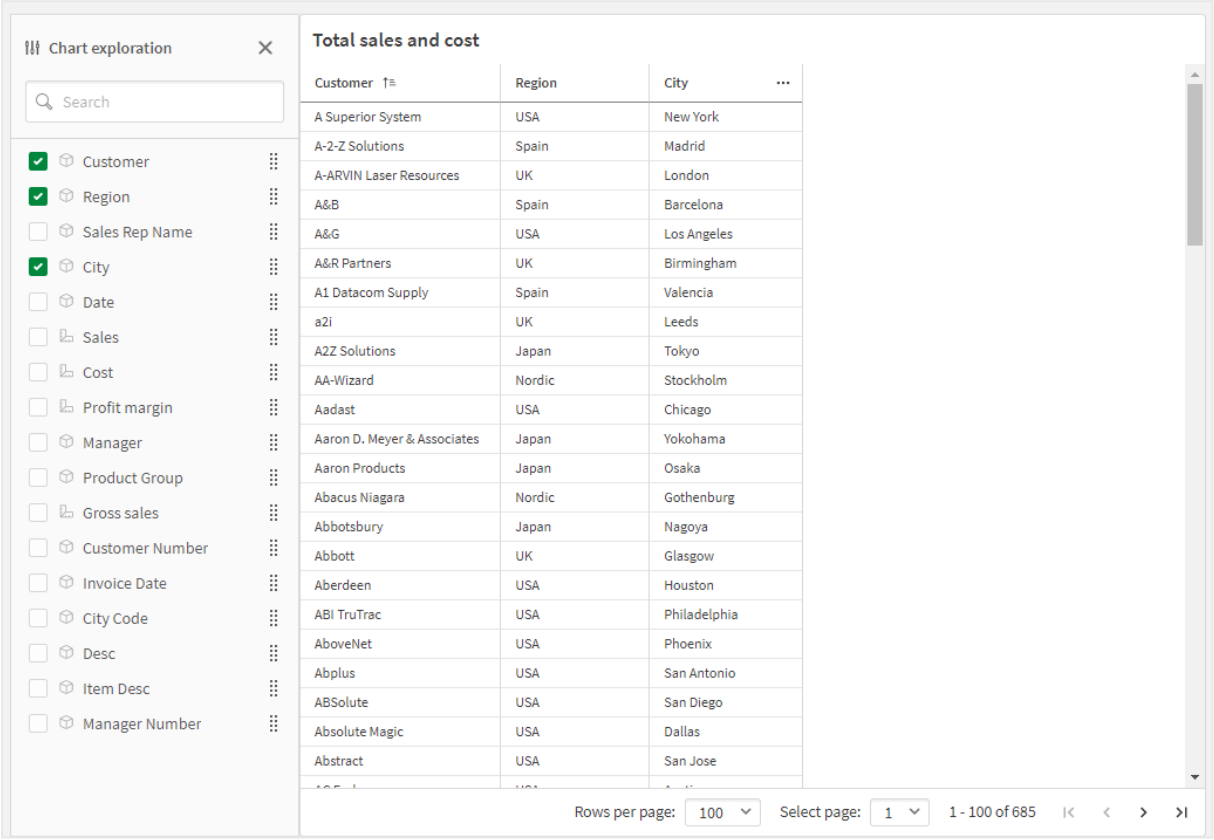


Chart exploration of the same table as above, but with two measures added to the table: Sales and Cost. The background colors are the result of an expression.

Limitations

Chart exploration limitations

Chart exploration for straight tables added to containers

Chart exploration is not available if the table is embedded inside any of the following objects:

- An existing container object that has not been replaced with a tab container. The tab container became the native container object in the November 2024 releases of Qlik Sense Enterprise on Windows and Qlik Sense Desktop.
  Chart exploration is also not available in existing instances of the deprecated **ShowHide container** and **Tabbed container** objects. However, converting these objects to tab containers is not recommended. Instead, create a new tab container from scratch in order to access chart exploration in straight tables.
  For information about the tab container, see *Tab container (page 466)*.
- Trellis container
  Trellis container (page 604)

Chart exploration for straight tables embedded in web pages

Chart exploration is not available for straight tables that are embedded in web pages.

Number of rows displayed

If pagination is turned on, you can only display 100 rows at a time. If pagination is turned off, you can display up to 250 000 rows at a time. If your table has more than 250 000 rows, pagination will be applied.

Because huge tables are impractical and hard to manage, the limit for what is practical is far less than the theoretical maximum. In most cases, it is desirable to see all the columns without scrolling horizontally.

Accessibility

The straight table is only fully accessible if pagination is turned on.

Configuring straight table properties

Adjust the properties of your straight table in the properties panel. The available properties allow you to customize data, sorting, appearance, and interactivity.

For information about using the available properties, see:

- *Formatting links (page 395)*
- *Configuring sorting in a straight table (page 400)*
- *Showing details (page 403)*
- *Chart-level text styling (page 404)*
- *Activating chart exploration in a straight table (page 408)*

Customizing data representation in a straight table

A number of settings are available for formatting and representing data in your **Straight table**.

Setting a limitation

You can define whether or not to limit the number of display values. When you set a limitation, the only dimensions displayed are those where the measure value meets the limitation criterion.

Do the following:

1. Under **Data**, click on a dimension to expand its properties.
2. Under **Field** in the properties, select an option in the **Limitation** drop down. The options are:
    - **No limitation**: The default value.
    - **Fixed number**: Select to display the top or bottom values. Set the number of values. You can also use an expression to set the number.
    - **Exact value**: Use the operators and set the exact limit value. You can also use an expression to set the number.
    - **Relative value**: Use the operators and set the relative limit value in percent. You can also use an expression to set the number.

Applying a show condition

Do the following:

1. Under **Data**, select a dimension and open **Presentation** in the properties.
2. Under **Show column if**, type an expression to define when the column is shown during analysis.

Formatting dimension representation

You can format dimension columns to show values, links, or images using **Representation** in the properties panel. You can select the following representations:

- **Text**: Displays the dimension values as text. This is the default value.
- **Link**: Displays values as clickable links. Either the dimension value is used or the URL or you can add other URLs to the displayed dimension values.
- **Image**: Displays values as images.

Formatting links

The character ; is not supported as a query parameter separator in a URL.

Do the following:

1. Under **Data**, select a dimension and open **Presentation** in the properties.
2. Under **Representation**, select **Link**.
3. Under **Link setting**, select one of the following:
    - **Add label**: The dimension contains the destination URL in either the dimension expression or the data table. The links are displayed and ordered by destination URL expression. Under **Link label**, enter a descriptive text label for the destination URL. Click $f\times$ to open the expression editor.
    - **Add URL**: The dimension values become selectable text links that are labels for the URLs. Under **Link URL**, enter the destination URL expression. Click $f\times$ to open the expression editor.

Formatting images

*Images in straight tables are only accessible from servers and domains that have been safe-listed. Administrators make these resources available in **Administration** by adding **Content-Security-Policies (CSP)** for each server or domain. CSP helps to prevent cross-site scripting attacks by controlling what resources a browser can request from a server.*

The character ; is not supported as a query parameter separator in a URL.

Do the following:

1. Under **Data**, select a dimension and open **Presentation** in the properties.
2. Under **Representation**, select **Image**.
3. Under **Image setting**, select one of the following:
    - **Add label**: The dimension contains the absolute URL to the image in either the dimension expression or the data table. The links are displayed and ordered by the URL expression. Under **Image label**, enter a descriptive text label for the image that displays as alternative text when the image is hovered over. Click f_x to open the expression editor.
    - **Add URL**: The dimension values become labels for the alternative text that displays when the image is hovered over.
      Under **Image URL**, enter the destination URL expression. Click f_x to open the expression editor.
4. Under **Sizing**, select one of the following sizing options:
    - **Always fit**
    - **Fit to width**
    - **Fit to height**
    - **Stretch to fit**
    - **Original size**
5. Under **Position**, select the image position within the cell.

Formatting measure representation

You can format measure columns using **Representation** in the properties panel. You can select the following representations:

- **Text**: Displays measure values as text. This is the default value.
- **Image**: Displays measure values as images.
- **Indicator**: Displays customizable indicator symbols in measure cells. Text representations for each value can be shown or hidden alongside these indicators, depending on preference.
- **Mini chart**: Displays a small chart for each measure value. Each mini chart shows the changes for the measure along a specific dimension, which is configured separately from the other dimensions in the table.

More information about the representation options is outlined below.

Formatting images

*Images in straight tables are only accessible from servers and domains that have been safe-listed. Administrators make these resources available in **Administration** by adding **Content-Security-Policies (CSP)** for each server or domain. CSP helps to prevent cross-site scripting attacks by controlling what resources a browser can request from a server.*

The character ; is not supported as a query parameter separator in a URL.

Do the following:

1. Under **Data**, select a measure and open **Presentation** in the properties.
2. Under **Representation**, select **Image**.
3. Under **Image setting**, select one of the following:
   - **Add label**: The measure value contains the absolute URL to the image in either the measure expression or the data table. The links are displayed and ordered by the URL expression.
     Under **Image label**, enter a descriptive text label for the image that displays as alternative text when the image is hovered over. Click f_x to open the expression editor.
   - **Add URL**: The measure values become labels for the alternative text that displays when the image is hovered over.
     Under **Image URL**, enter the destination URL expression. Click f_x to open the expression editor.
4. Under **Sizing**, select one of the following sizing options:
   - **Always fit**
   - **Fit to width**
   - **Fit to height**
   - **Stretch to fit**
   - **Original size**
5. Under **Position**, select the image position within the cell.

Adding a trend indicator to a measure

You can add a trend indicator to a measure column. This will show a symbol next to the measure value. You can define the ranges that determine which symbol is displayed and in which color it is displayed. You enable the indicator by setting **Representation** to **Indicator** in the measure properties.

Do the following:

1. In the properties panel, expand **Data** and click a measure.
   The measure properties open.
2. Under **Presentation**, set **Representation** to **Indicator**.
3. Click the rectangle below the **Add limit** button, containing a color and symbol. You can set the color and symbol for the indicator.
   If you add one or more limits, you can adjust the color and symbol for each range by clicking the range in this rectangle.
4. Set additional properties for the indicators, which are detailed in the sections below.

Setting the indicator limits

You need to add the limits for the ranges you want to use for showing indicators with **Add limit**. You can set a limit value in three ways.

- Use the slider.
- Type a value in the text box.
- Set an expression that returns the limit value.

When you have added the limits, you can select the color and the symbol of the indicator for each defined range.

Styling the indicators

You can style the way the indicators are displayed.

- You can show both the indicator and the measure value by selecting **Show values**.
- You can set the value color to the same as the indicator color with **Apply color to value**.

  With this setting on, the indicator color overrides the current cell value color if it is defined in other properties for the chart.

- You can display the indicator to the right or to the left of the value with **Indicator position**.
- When you have one or more limits, toggle on **Gradient** to color the indicators with gradients between the colors.

Example:

In this example, we added a trend indicator to the *Sales* measure to indicate which values are below the target value. The indicator limits are:

- For values below $1,000,000.00, a red flag is displayed.
- For values in the range of $1,000,000.01 and $4,999,999.99, a yellow flag is displayed.
- For values above $5,000,000.00, a green check-mark is displayed.

Table with trend indicators

Region	Year	Sales
Totals		**$104,852,674.81**
Germany	2012	$1,048,040.29
Germany	2013	$1,558,921.54
Germany	2014	$716,975.09
Japan	2012	$3,153,576.36
Japan	2013	$5,665,402.19
Japan	2014	$3,028,636.48
Nordic	2012	$3,144,808.01
Nordic	2013	$5,444,724.09
Nordic	2014	$1,793,433.81
Spain	2012	$1,114,059.67
Spain	2013	$1,600,079.11
Spain	2014	$735,462.94
UK	2012	$11,761,653.12
UK	2013	$11,418,197.99
UK	2014	$4,977,331.12
USA	2012	$19,951,164.83
USA	2013	$17,066,665.68
USA	2014	$10,673,542.49

Formatting measure values as mini charts

You can represent a measure as a series of mini charts, rather than a series of text values. The mini charts visualize the measure values within the context of the data in the table, as well as an additional dimension that you select.

Using mini charts allows you to provide more context about prominent or related dimensions. For example, in table containing a dimension *Product* and a measure *Sum(Sales)*, you could represent the measure as a series of mini charts breaking down each product's sales by month.

Do the following:

1. In the properties panel, expand **Data** and click a measure.
   The measure properties open.
2. Under **Presentation**, set **Representation** to **Mini chart**.

3. Under **Select dimension**, select the dimension that will be used to visualize the data in each mini chart.
4. Under **Type**, pick a chart type. **Bars**, **Dots**, **Sparkline**, and **Positive/negative** are available.
5. Set additional properties for the mini charts, which are detailed in the sections below.

Configuring mini chart appearance

You can set the colors to use, and whether or not to show points on the mini charts.

Expand **Colors** to access all options for the mini chart colors. Each type of mini chart has different settings.

Check or uncheck the **Show dots** setting to show or hide data points on the mini charts.

Configuring mini chart data

You can further customize the data used in the mini charts with these settings:

- Select whether or not to include null values in mini charts by toggling the **Include null values** setting.
- Mini charts can show data for up to 100 unique values for the mini chart dimension you select. By default, additional dimension values are not shown. Turn on **Show others** to represent all additional dimension values by combining them into a single dimension value at the end of each mini chart.
- Under **Y-axis**, you can adjust what values are used for the Y-axis. Use the **Local** setting to set Y-axis values in comparison to the data shown in the mini charts. Use the **Global** setting to set Y-axis values in comparison to all data. You can also configure how positive and negative values are represented by selecting between the **Auto**, **Zero as baseline**, or **Zero as center** settings.

Working with add-ons

Straight tables have the following options under **Add-ons** in the properties panel:

Data handling:

- **Include zero values**: When unselected, measures that have the value '0' are not included in the presentation. If there is more than one measure value, all the measure values must have the value '0' to be excluded from the presentation.
- **Calculation condition**: Specify an expression in this text field to set a condition that needs to be fulfilled (true) for the object to be displayed. The value may be entered as a calculated formula. For example: *count(distinct Team)<3*. If the condition is not fulfilled, the message or expression entered in **Displayed message** is displayed.
  A calculation condition is useful when a chart or table is slow to respond due to a large amount of data. You can use the calculation condition to hide an object until the user has filtered the data to a more manageable level by applying selections. Use the **Displayed message** property to guide the user to filter the data.
  Using Calculation Conditions

Configuring sorting in a straight table

You can adjust the sorting of a **Straight table** in several ways:

Column sorting: Adjust the order of the dimensions and measures from left to right.

Row sorting: Adjust the sorting priority order of the rows.

Internal sorting: Use the internal sorting order of dimensions and measures.

Interactive sorting: During analysis, you can click on a column header to sort the table.

Column sorting

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

Row sorting

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

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

Example:

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

Customer	Month	Product Type	Sales
Totals			$104,852,674.81
A-2-Z Solutions	Jan	Baking Goods	$248.83
A-2-Z Solutions	Jan	Beer and Wine	$129.25
A-2-Z Solutions	Jan	Breakfast Foods	$68.29
A-2-Z Solutions	Jan	Canned Soup	$45.24
A-2-Z Solutions	Jan	Carbonated Beverages	$187.42
A-2-Z Solutions	Jan	Dairy	$8,262.54
A-2-Z Solutions	Jan	Specialty	$686.59
A-2-Z Solutions	Feb	Beer and Wine	$24.60
A-2-Z Solutions	Feb	Breakfast Foods	$270.72
A-2-Z Solutions	Feb	Canned Soup	$91.80

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

Customer	Month	Product Type	Sales
Totals			$104,852,674.81
A-2-Z Solutions	Jan	Baking Goods	$248.83
A-2-Z Solutions	Jul	Baking Goods	$1,318.04
A-2-Z Solutions	Nov	Baking Goods	$396.00
A-2-Z Solutions	Jan	Beer and Wine	$129.25
A-2-Z Solutions	Feb	Beer and Wine	$24.60
A-2-Z Solutions	Apr	Beer and Wine	$129.25
A-2-Z Solutions	Jun	Beer and Wine	$60.10
A-2-Z Solutions	Jul	Beer and Wine	$129.25
A-2-Z Solutions	Oct	Beer and Wine	$400.65
A-2-Z Solutions	Nov	Beer and Wine	$10.09
A-2-Z Solutions	Dec	Beer and Wine	$63.07
A-2-Z Solutions	Jul	Bread	$158.56
A-2-Z Solutions	Oct	Bread	$74.73

Internal sorting

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

Interactive sorting

During analysis, you can set which column to sort on by clicking the column header. Clicking the column header opens a menu in which sorting can be changed. You can select **Sort ascending** or **Sort descending**.

Interactive sorting is session-based and is not saved. If you want your changes to the sorting to be persistent, you need to make the changes in the properties panel.

Users with the ability to edit the sheet can sort interactively using chart exploration, click **Edit sheet**, and save those changes to the original table.

Customizing the appearance of a straight table

Under **Appearance** in the properties panel, you can change the functional appearance of a straight table. For example, you can add a hover menu, turn on pagination, and apply text wrapping.

Other aspects of the straight table's appearance can be customized with styling. For more information, see *Chart-level text styling (page 404)*.

Turning on the hover menu

Under **Appearance** > **General**, use the toggle for **Show hover menu** to choose whether you want the hover menu to display in the visualization.

Showing details

Under **Appearance** > **General**, set **Show details** to **Show** if you want to allow users to be able to choose to view details, such as descriptions, measures, and dimensions.

Allowing users to view expressions in the chart

Under **Appearance** > **General**, set **Show expressions** to **Show** if you want to allow users to be able to choose to view expressions.

Using pagination

Under **Appearance** > **Presentation**, turn on the **Use pagination** setting to change how many rows are displayed in the chart. With pagination, instead of displaying all rows at once, only a certain amount of rows are displayed. Users can use the arrow buttons at the bottom of the table to navigate.

Using text wrapping

When text in the straight table is too long to be displayed given the provided space, some text is not shown and instead represented with an ellipsis. Under **Appearance** > **Presentation**, you can use the settings under **Multiline text wrapping** to wrap the text over multiple lines in the table. This setting can be controlled individually at the header and cell levels:

- **Wrap text in headers** (table headers only)
- **Wrap text in cells** (table cells only)

*Up to three lines of text can be wrapped using these settings. For longer text, set a higher **Row height** limit in the **Styling** panel. See Customizing the grid (page 407).*

Customizing representation of null values

You can change how null values are represented for measures in the straight table. Enter static text to be used to replace null values. When you use numeric values, these values are interpreted as numbers rather than text. This allows you to fill in missing calculations with actual values, such as 0.

Do the following:

1. Click **Appearance** > **Presentation** in the properties panel.
2. Under **Null value text**, enter the text that will replace null measure values.

Hiding the column header

You can hide the header at the top of the straight table that displays column titles and allows user to change the sorting. Under **Appearance** > **Presentation**, activate the **Hide header** setting.

Styling a straight table

A number of styling properties are available for customizing the look and feel of your straight table. Styling can help reflect your organization's color palette, assist analysis, and improve readability.

For information about adjusting other aspects of the straight table's appearance, see *Showing details (page 403)*.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Styling the text

The straight table is a text-based visualization, so text can be styled in many different ways:

- *Chart-level text styling (page 404)*
- *Column- and cell-level text styling (page 404)*
- *Row-level text styling (page 406)*

Chart-level text styling

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Header**: Style the text of the headers for the dimensions and measures.
    - **Dimension values**: Style the text of the dimension values.
    - **Measure values**: Style the text of the measure values.
    - **Totals**: Style the text of the totals, if you have selected to show a **Totals** row under **Appearance** > **Presentation**.
    - **Null values**: Style the text of the null values. You can change emphasis style and color.
    - **Zebra stripes**: With this setting turned on, you can set alternating text color for rows. See *Applying zebra stripes (page 408)*.

Column- and cell-level text styling

Text emphasis

You can use an expression to define how the text in each column is styled. If you style a column's text with an expression, this expression overrides the app theme, and any custom styling applied to the visualization, for that column.

You can use the following syntax in your expression to define the styling (the letter in the tag is not case sensitive):

- <B>: Bold
- <I>: Italics
- <U>: Underlined
- <S>: Strikethrough

More than one of the options above can be applied at a time.

Examples:

if(avg(Sales) > 300, '<B>')
if(count(OrderID) = 0, '<S>')
if(sum(Sales) > 100000, '<B><U>', '<I>')

Do the following:

1. Under **Data**, select a column and open **Presentation** in the properties.
2. Under **Text style expression**, enter the expression. Click f_x to open the expression editor.

Text color

You can change the text color for individual columns.

Do the following:

1. Under **Data**, select a column and open **Presentation** in the properties.
2. Under **Text color expression**, enter the expression. Click f_x to open the expression editor.

Text alignment and column width

Do the following:

1. Under **Data**, select a column and open **Presentation** in the properties.
2. Use the slider to select an option for **Text alignment**. With **Custom** text alignment, you can select left, center, or right alignment.

   > *If **Text alignment** is set to **Auto**, column data is aligned according to data type: text values are left-aligned and number values, including date related values, are right-aligned. If you set it to **Custom**, you can align the data to the left, center, or right.*

3. Make a selection for **Column width**. You can select one of the following:

- **Auto**
- **Fit to content**
- **Pixels**
- **Percentage**

Row-level text styling

Row-level settings are available for styling text:

- *Applying zebra stripes (page 408)*
- *Customizing the hover behavior (page 407)*

Customizing the background

Background can be styled at various levels:

- *Chart-level background styling (page 406)*
- *Column- and cell-level background styling (page 406)*
- *Row-level background styling (page 407)*

Chart-level background styling

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL. When using a background color, use the slider to adjust the opacity of the background. The chart header always displays with 100% opacity.
   When using a background image, you can adjust image sizing and position.
4. On the **Chart** tab, customize the background color for the following elements:
   - **Header** (100% opacity is used)
   - **Dimension values**
   - **Measure values**
   - **Measure labels**
   - **Totals** (100% opacity is used)
   - **Null values**
   - **Zebra stripes** (see *Applying zebra stripes (page 408)*)

Column- and cell-level background styling

You can use an expression to define the background color of each column. If you style a column's background with an expression, this expression overrides the app theme, and any custom styling applied to the visualization, for that column.

Do the following:

1. Under **Data**, select a column and open **Presentation** in the properties.
2. Under **Background style expression**, enter the expression. Click f_x to open the expression editor.

Row-level background styling

Row-level settings are available for defining the background color:

- *Applying zebra stripes (page 408)*
- *Customizing the hover behavior (page 407)*

Customizing the grid

You can customize the table grid.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab, customize the grid with the following elements:
    - **Row height**: Set the height of rows in lines.
    - **Border**: Set the color of the cell borders.
    - **Divider**: Set the color of the divider between that divides the header and body of the table.

Customizing the hover behavior

You can set display options for when a user hovers over a row in the table.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, under **Row hover**, adjust the following settings:
    - To highlight rows in the table when a user hovers over them, set the switch to **On**. Switch the behavior off according to preference.
    - **Row hover color**: Set the color to highlight the row when a user hovers over it.
    - **Row hover font color**: Set the color of the text in the highlighted row when a user hovers over it.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.

6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Applying zebra stripes

With zebra stripes, you can add alternating rows of color to the straight table. Zebra stripes improve readability by increasing contrast between odd and even rows.

You can set the text and background color for odd and even rows.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, set **Zebra stripes** to **On**.
4. Adjust the following settings:
    - **Color (odd row)**: Set the text color of the odd rows.
    - **Background (odd row)**: Set the background color of the odd rows.
    - **Color (even row)**: Set the text color of the even rows.
    - **Background (even row)**: Set the background color of the even rows.

Activating chart exploration in a straight table

Chart exploration allows app consumers and other users that do not have edit rights to customize the original straight table when they are in analysis mode.

Chart exploration mode is a great way to quickly remove or add data, and then share it, download it, or bookmark the new table state. It is very helpful in apps that have many viewers with different needs.

Users with the ability to edit the sheet can make changes to the table using chart exploration, click **Edit sheet**, and save those changes to the original table.

Turning on chart exploration

App developers can turn on **Chart exploration** in the properties panel.

Do the following:

1. In the properties panel, expand the **Chart exploration** section.
2. Toggle on **Enable chart exploration**.
3. Choose between the following under **Visibility option**:
    - **Auto**: Chart exploration panel is visible when users open the sheet.
    - **Minimized**: Chart exploration is turned on, but not visible when users open the sheet. Users can open it in the hover menu by clicking ••• and then **Chart exploration**.

Preparing the table for chart exploration

For a table item to be available in chart exploration mode, the table creator (or a user who can edit the sheet) must have added those fields, master items, or expressions to the table as columns or alternative columns. For more information, see *Creating a straight table (page 390)*.

Using chart exploration as a consumer

When analyzing a sheet, chart exploration is either visible by default, or it can be activated in the ••• menu under **Chart exploration**.

For more information, see *Using chart exploration (page 391)*.

Searching in straight tables

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

Do the following:

1. Click the column header for a dimension that you want to search in.
2. Click **Search**.
   A selection popup is displayed with a list of all values of the field. This includes values that are excluded by selections. Excluded values are dark gray.
3. Type your search string. You can use any of the available search types. See Searching within selections or visualizations.
   While you type, the list is filtered to only display matching items.
4. Make a selection by clicking or drawing.
5. Confirm your selection.

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

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

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

Selections in straight tables

You can make selections in a straight table by clicking or drawing in the dimension columns.

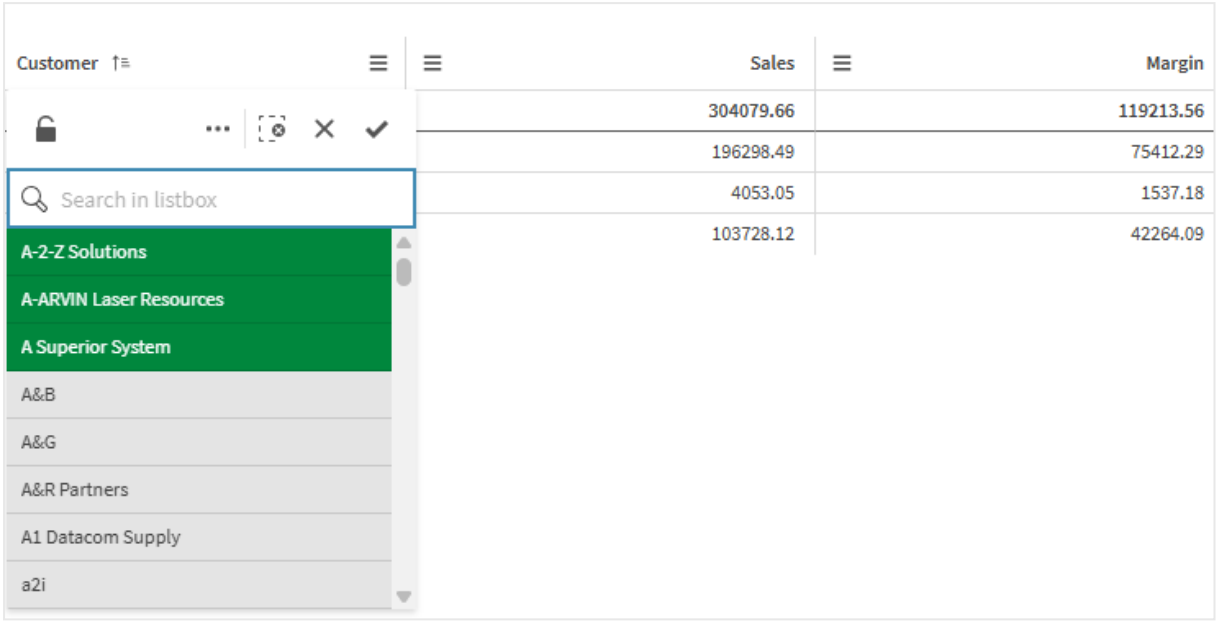
Measure values cannot be selected. When you make a selection, it is always the dimension values that you select. You can only make selections in one column at a time.

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

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

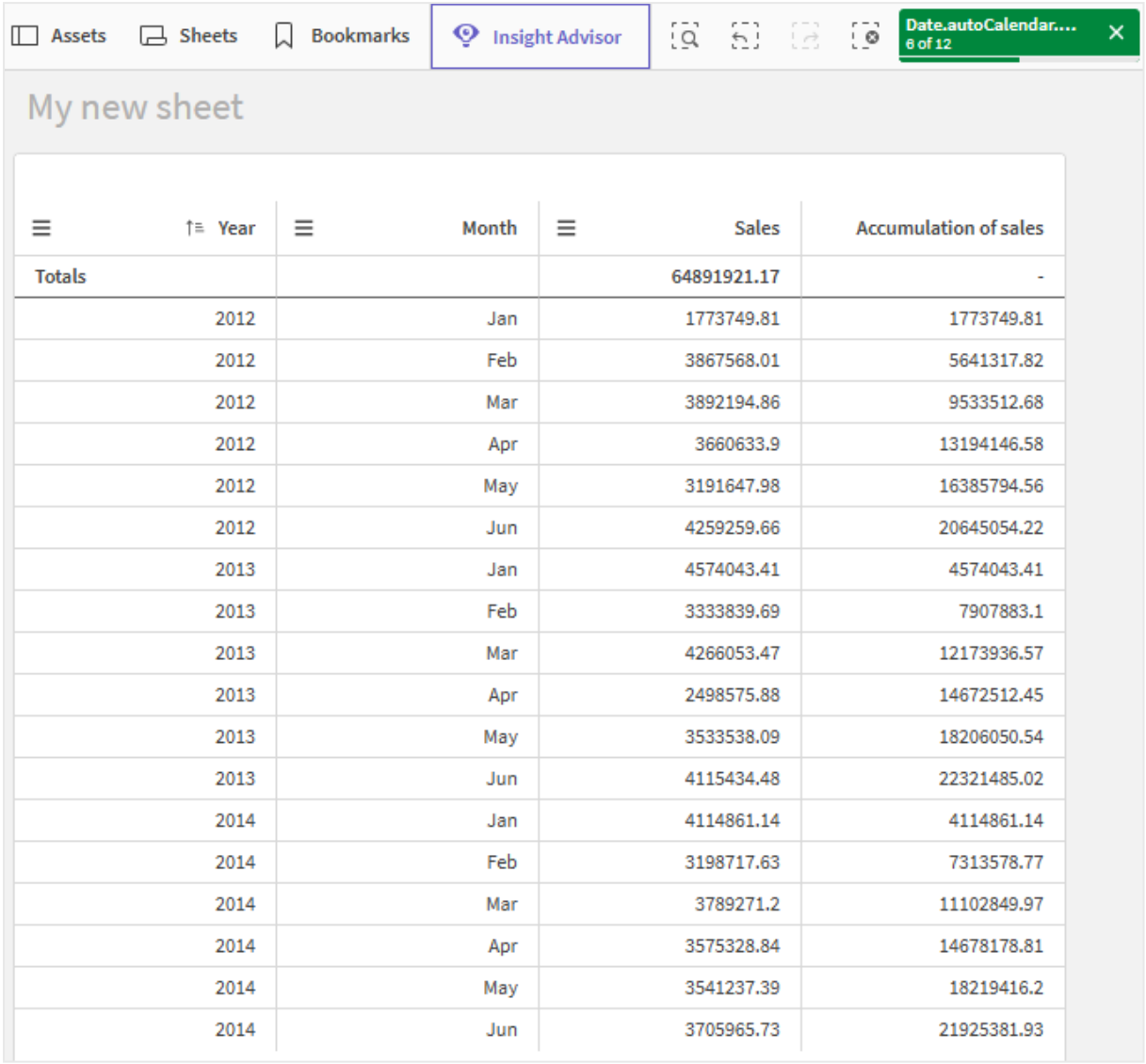
To view the selections applied to column, click the column header and select **Search**.

Straight table with three selected fields in the dimension Customer.



Accumulating values over a dimension in a straight table

This example shows how to use a straight table to compare data which accumulate over a dimension.



Year	Month	Sales	Accumulation of sales
Totals		64891921.17	-
2012	Jan	1773749.81	1773749.81
2012	Feb	3867568.01	5641317.82
2012	Mar	3892194.86	9533512.68
2012	Apr	3660633.9	13194146.58
2012	May	3191647.98	16385794.56
2012	Jun	4259259.66	20645054.22
2013	Jan	4574043.41	4574043.41
2013	Feb	3333839.69	7907883.1
2013	Mar	4266053.47	12173936.57
2013	Apr	2498575.88	14672512.45
2013	May	3533538.09	18206050.54
2013	Jun	4115434.48	22321485.02
2014	Jan	4114861.14	4114861.14
2014	Feb	3198717.63	7313578.77
2014	Mar	3789271.2	11102849.97
2014	Apr	3575328.84	14678178.81
2014	May	3541237.39	18219416.2
2014	Jun	3705965.73	21925381.93

Dataset

In this example, we will use a data file available in the Qlik Sense Tutorial - Building an App. Download and expand the tutorial. The file is available in the *Tutorials source* folder: *Sales.xls*

To download the file, go to Tutorial - Building an App.

Add the data file to an empty app. The dataset that is loaded contains sales data.

Measure

We use the sales volume as the measure that we create in Master items:

- *Sales* with the expression `Sum(Sales)`. This is the sum of the sales volume.

Visualization

We add a **Straight table** to the sheet and set the following data properties:

- **Dimension**: Year (Date.Year).
- **Dimension**: Month (Date.Month).
- **Measure**: *Sales*; the measure that was previously created.

The following table is created, with columns showing the year, the month, and the sum of sales for each month.

Year	Month	Sales
Totals		104852674.81
2012	Jan	1773749.81
2012	Feb	3867568.01
2012	Mar	3892194.86
2012	Apr	3660633.9
2012	May	3191647.98
2012	Jun	4259259.66
2012	Jul	2519872.65
2012	Aug	3799274.06
2012	Sep	3739097.87
2012	Oct	3036455.81
2012	Nov	3528099.04
2012	Dec	2905448.63
2013	Jan	4574043.41
2013	Feb	3333839.69
2013	Mar	4266053.47
2013	Apr	2498575.88
2013	May	3533538.09
2013	Jun	4115434.48
2013	Jul	2696221.99
2013	Aug	3792981.81
2013	Sep	4087106.08
2013	Oct	2917027.48
2013	Nov	3647345.62
2013	Dec	3291822.6
2014	Jan	4114861.14
2014	Feb	3198717.63
2014	Mar	3789271.2
2014	Apr	3575328.84
2014	May	3541237.39
2014	Jun	3705965.73

Make sure to set the **Sorting** with *Year* > *Month* > *Sales*.

Accumulation

To have our sales data accumulate over one dimension, we need to set an additional data property:

- **Measure**: *Sales*; the measure that was previously created.

We add this measure twice to reuse it for accumulation. To do this we need to apply a modifier to our *Sales* measure.

Do the following:

1. In the properties panel, under **Data**, expand the properties for the second *Sales* measure.
2. Set the **Modifier>Dimension** to *Month*. This sets the dimension over which the accumulation will take place.
3. Make sure **Across all dimensions** is turned off. We want the accumulation to restart at the beginning of each year.
4. Under **Totals function**, select **None**.

*In Accumulation there is the option to select **Show excluded values**. When turned on, your visualization includes any dimensional values that do not have data. This ensures that all values, including months with no sales data, are counted in the accumulation.*

Our table becomes as follows, with the last column showing sales accumulating from one month to the next, for each year.

Year	Month	Sales	Accumulation of sales
Totals		104852674.81	-
2012	Jan	1773749.81	1773749.81
2012	Feb	3867568.01	5641317.82
2012	Mar	3892194.86	9533512.68
2012	Apr	3660633.9	13194146.58
2012	May	3191647.98	16385794.56
2012	Jun	4259259.66	20645054.22
2012	Jul	2519872.65	21391177.06
2012	Aug	3799274.06	21322883.11
2012	Sep	3739097.87	21169786.12
2012	Oct	3036455.81	20545608.03
2012	Nov	3528099.04	20882059.09
2012	Dec	2905448.63	19528248.06
2013	Jan	4574043.41	4574043.41
2013	Feb	3333839.69	7907883.1
2013	Mar	4266053.47	12173936.57
2013	Apr	2498575.88	14672512.45
2013	May	3533538.09	18206050.54
2013	Jun	4115434.48	22321485.02
2013	Jul	2696221.99	20443663.6
2013	Aug	3792981.81	20902805.72
2013	Sep	4087106.08	20723858.33
2013	Oct	2917027.48	21142309.93
2013	Nov	3647345.62	21256117.46
2013	Dec	3291822.6	20432505.58
2014	Jan	4114861.14	4114861.14
2014	Feb	3198717.63	7313578.77
2014	Mar	3789271.2	11102849.97
2014	Apr	3575328.84	14678178.81
2014	May	3541237.39	18219416.2
2014	Jun	3705965.73	21925381.93

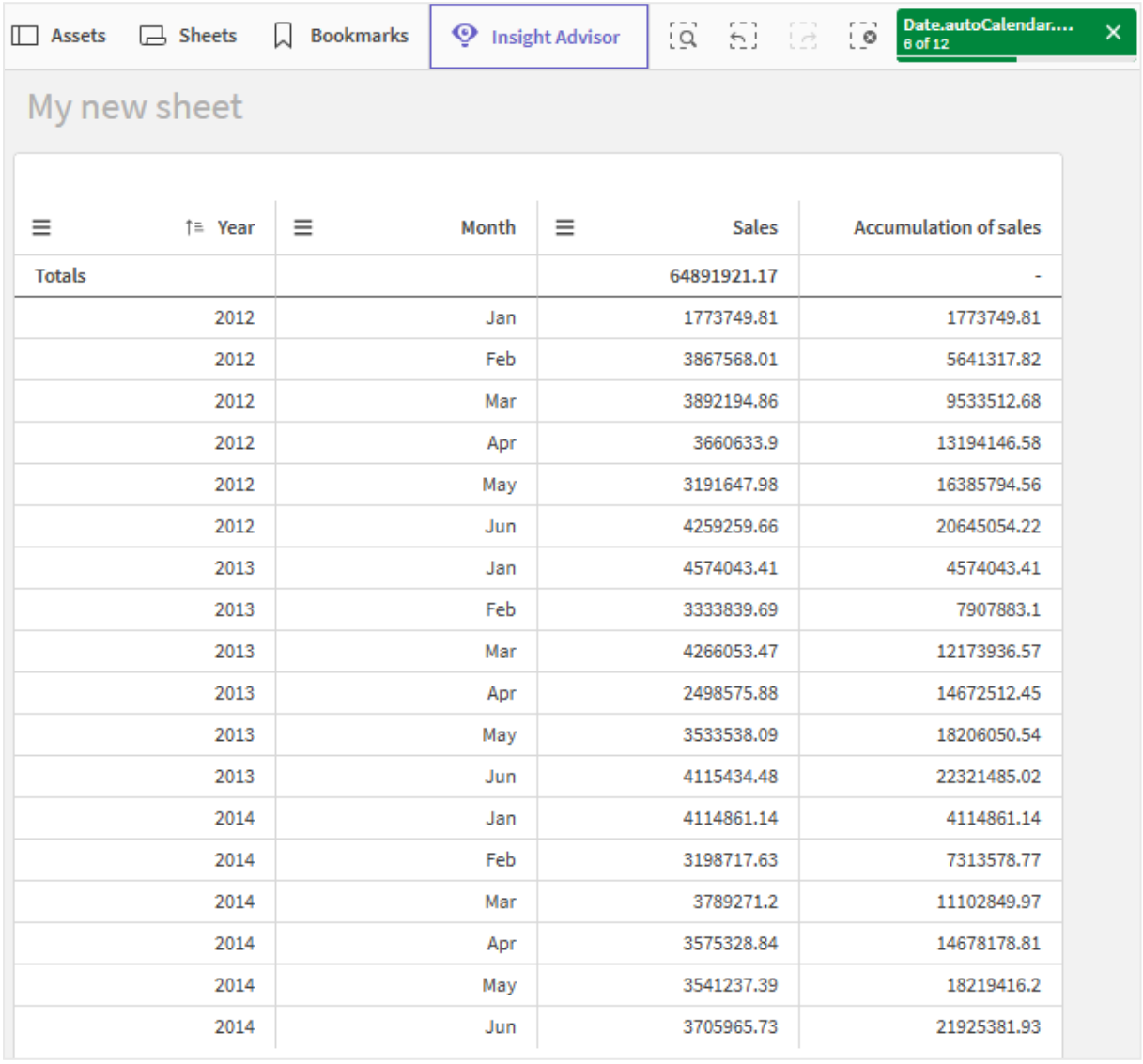
It is good practice to have the title of your charts represent their content. So consider changing the titles of the columns of your table to reflect that the last column contains an accumulation of sales.

Our data for the year 2014 is insufficient as it stops at *June*. In order to achieve a better comparison between the accumulated sales of all three years we will choose a more appropriate range of months, from *January* to *June*.

Do the following:

1. Click **Edit sheet** to exit edit mode.
2. Select all months from *January* to *June* and confirm your selection.

Our table becomes as follows, with the sales accumulating from *January* to *June*, inside each year.



Year	Month	Sales	Accumulation of sales
Totals		64891921.17	-
2012	Jan	1773749.81	1773749.81
2012	Feb	3867568.01	5641317.82
2012	Mar	3892194.86	9533512.68
2012	Apr	3660633.9	13194146.58
2012	May	3191647.98	16385794.56
2012	Jun	4259259.66	20645054.22
2013	Jan	4574043.41	4574043.41
2013	Feb	3333839.69	7907883.1
2013	Mar	4266053.47	12173936.57
2013	Apr	2498575.88	14672512.45
2013	May	3533538.09	18206050.54
2013	Jun	4115434.48	22321485.02
2014	Jan	4114861.14	4114861.14
2014	Feb	3198717.63	7313578.77
2014	Mar	3789271.2	11102849.97
2014	Apr	3575328.84	14678178.81
2014	May	3541237.39	18219416.2
2014	Jun	3705965.73	21925381.93

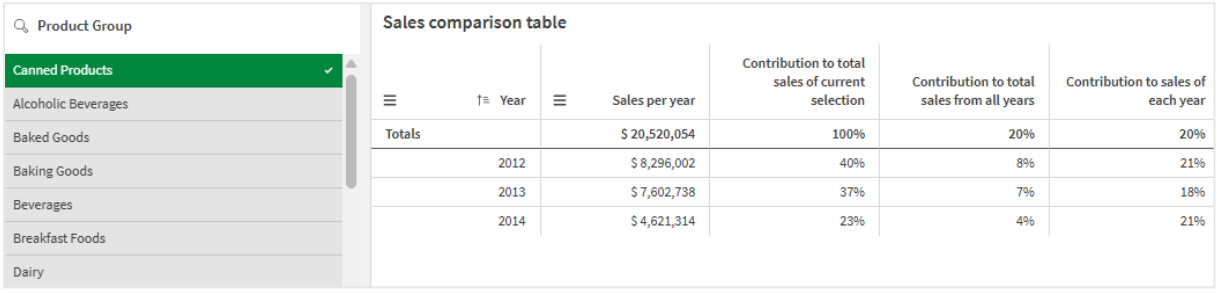
Discovery

The table shows the sales volume of each month, grouped into years. By having the sales accumulate inside each year, we get a better understanding of the volume of sales for each year. We have made a

selection of the months from *January* to *June*, to compare the same range of months between the three years. In the last column of the table we can see that the accumulated sales for 2014 so far have been higher than the accumulated sales for 2012, but not as high as the ones for 2013.

Using relative numbers in a straight table to calculate contribution

This example shows how to use the relative numbers modifier to calculate contribution in a one-dimensional **Straight table**.



Dataset

In this example, we will use a data file available in the Qlik Sense Tutorial - Building an App. Download and expand the tutorial. The file is available in the *Tutorials source* folder: *Sales.xls*

To download the file, go to Tutorial - Building an App.

Add the data file to an empty app. The dataset that is loaded contains sales data.

Measure

We use the sales volume as the measure that we create in Master items:

- *Sales* with the expression `Sum(Sales)`. This is the sum of the sales volume.

Visualization

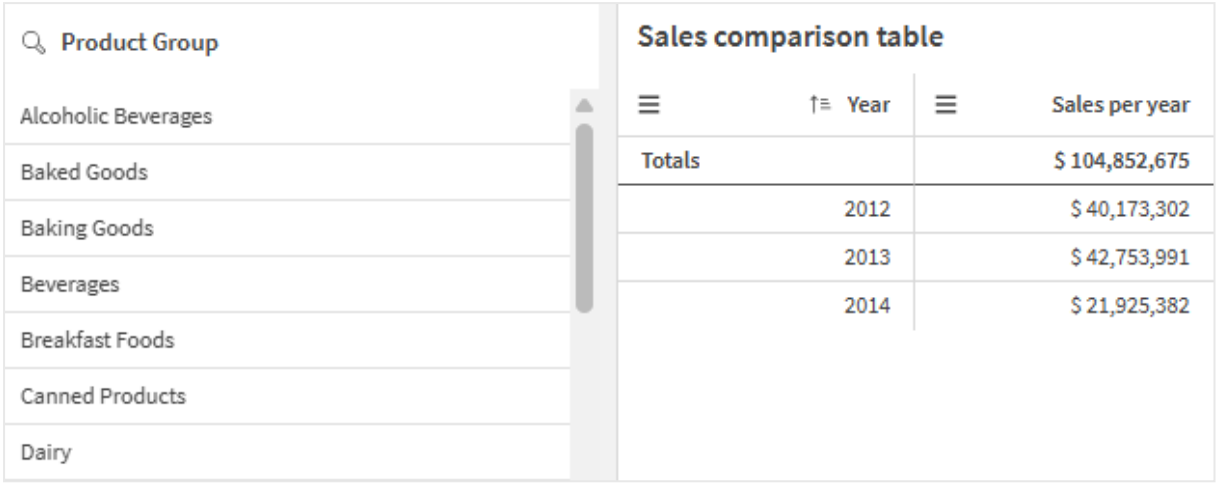
We start by adding a filter pane to the sheet and set the following data properties:

- **Dimension**: Product Group.

We also add a **Straight table** to the sheet and set the following data properties:

- **Dimension**: Year (Date.Year).
- **Measure**: *Sales*; the measure that was previously created.

The following table is created, with columns showing the year, and the sum of sales for each year.



Make sure to set the **Number formatting** to **Money**, and the **Format pattern** to *$ #,##0;-$ #,##0*.

It is good practice to have the title of your charts represent their content. Additionally, consider changing the title of each column to reflect what it represents. The first column that we added is the *Year*, and the second column contains the *Sales per year*.

Relative numbers

We could use the filter pane to select specific product groups and see their yearly sales and their total sales. That would not provide a good comparison to their contribution. Instead we will use relative numbers to get percentages as an indication of the product group contribution. By changing the parameters upon which the relative numbers calculation is based, we will get different contributions and gain more insight.

Contribution of a year to the sales of product group

To see how much each year has contributed to the total sales of a specific product group when we make a selection, we need to add a third column:

Do the following:

1. In the properties panel, expand the **Data** section.
2. Click the checkbox for *Sales per year*.
3. Click •••, and then select **Duplicate**.

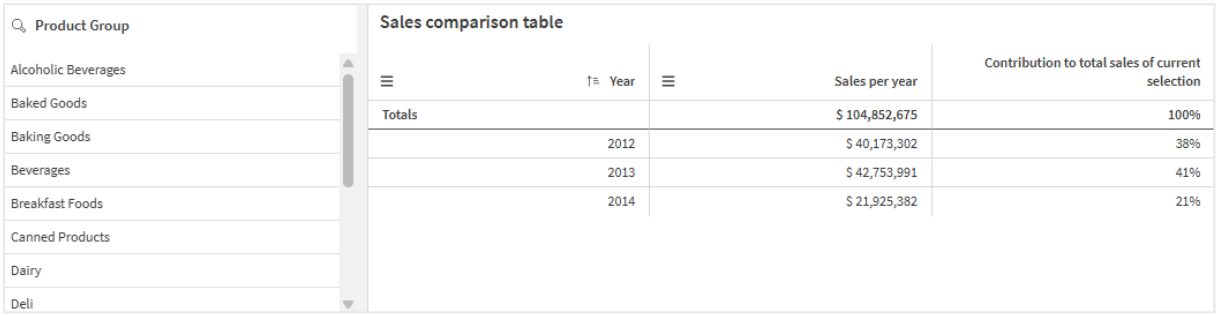
To use this duplicate measure as a relative number we will apply a modifier.

Do the following:

1. Under **Measure**: *Sales per year* set the **Modifier** to Relative numbers. This will set the measure to act as a relative number.
2. Set the **Modifier>Selection scope** to *Current selection*. This sets the modifier to be calculated relative to any selection made.
3. The **Modifier>Dimensional scope** is set to *Disregard dimension* by default. This sets the modifier to be calculated relative to the total.

4. Set the **Number formatting** to **Custom**, and the **Format pattern** to *#,##0%*.
5. Change the **Label** to something meaningful such as *Contribution to total sales of current selection*.

Our table becomes as follows, with the last column showing the contribution of each year to the total sales of the selected product group.



Contribution of a product group to total sales

To see how much each year's sales of a specific product group have contributed to the total sales of all product groups, we need to add a fourth column:

Do the following:

1. In the properties panel, expand the **Data** section.
2. Click the checkbox for *Contribution to total sales of current selection*.
3. Click •••, and then select **Duplicate**.

We will apply the Relative numbers modifier again, but with different properties this time.

Do the following:

1. Set the **Modifier>Selection scope** to *Disregard selection*. This sets the modifier to be calculated disregarding any selection made.
2. The **Modifier>Dimensional scope** is already set to *Disregard dimension*. This sets the modifier to be calculated relative to the total.
3. Change the **Label** to something meaningful such as *Contribution to total sales from all years*.

The **Number formatting** and the **Format pattern** are already set, since we duplicated the previous measure.

Our table becomes as follows, with the last column showing the contribution of the selected product group to the total sales from all three years.

Since we have not made any selections yet, the last two columns have the same values.

Contribution of a product group to yearly sales

To see how much the sales of a specific product group have contributed to that year's sales compared to all the other product groups, we need to add a fifth column:

Do the following:

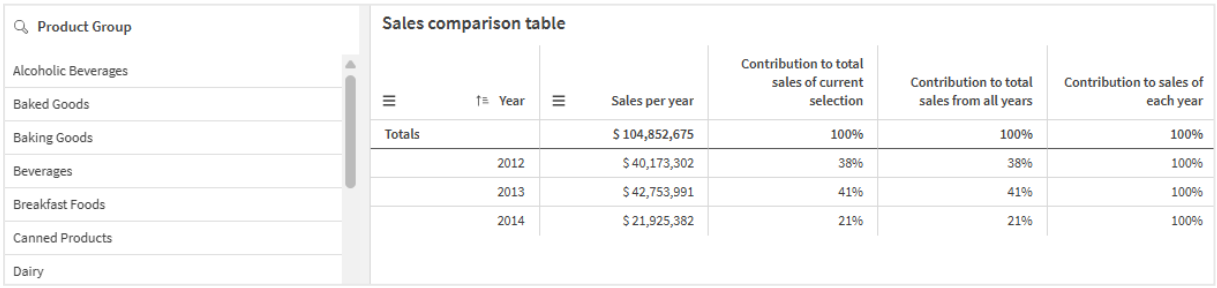
1. In the properties panel, expand the **Data** section.
2. Click the checkbox for *Contribution to total sales from all years*.
3. Click •••, and then select **Duplicate**.

We will apply the Relative numbers modifier again, but with different properties this time.

Do the following:

1. The **Modifier>Selection scope** is already set to *Disregard selection*. This sets the modifier to be calculated disregarding any selection made.
2. Set the **Modifier>Dimensional scope** to *Respect dimension*. This sets the modifier to be calculated relative to each dimensional value.
3. Change the **Label** to something meaningful such as *Contribution to sales of each year*.

Our table becomes as follows, with the last column showing the contribution of the selected product group to the total sales from all three years.



Since we have not made any selections yet, the last column shows the yearly contribution of all product groups for each year.

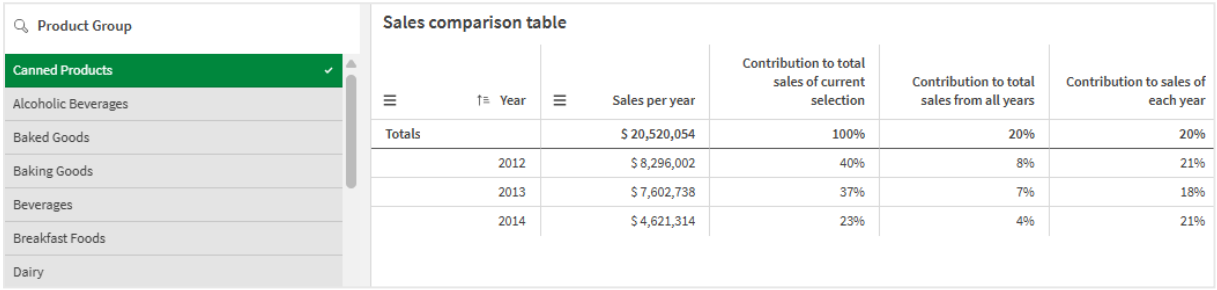
Making a selection

We can now start making selections to change our relative numbers to something that provides more insight.

Do the following:

1. Click **Edit sheet** to exit edit mode.
2. Select *Canned Products* from the product group filter pane.

Our table becomes as follows.



Year	Sales per year	Contribution to total sales of current selection	Contribution to total sales from all years	Contribution to sales of each year
Totals	$ 20,520,054	100%	20%	20%
2012	$ 8,296,002	40%	8%	21%
2013	$ 7,602,738	37%	7%	18%
2014	$ 4,621,314	23%	4%	21%

Discovery

The table shows the relative sales for each year. By having the different contribution columns, using the relative numbers as a measure modifier, we get a better understanding of the contribution of each product group to the total sales. From the *Contribution to total sales of current selection* column we can see that 40% of the *Canned Product* sales happened in 2012, with a dramatic drop in 2014. The *Contribution to total sales from all years* column shows that 8% of the total sales from all three years came from the 2012 sales of *Canned Product*. The *Contribution to sales of each year* column also tells us that for 2012 the *Canned Product* sales contributed 21% of the sales of that year, and the same applies to the sales of 2014.

Table

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

> *The **Straight table** has replaced the **Table** as the default table visualization. Consider upgrading existing tables to straight tables for improved functionality and performance. For information about the straight table, see Straight table (page 389).*

Customer	Sales	Quantity	Margin (%)	# of Invoices	Average Sales per Invoice
Totals	**$104,852,674.81**	**1,816,372**	**4127.8%**	**38,314**	**$2,736.67**
A-2-Z Solutions	$196,298.49	1,418	3841.7%	58	$3,384.46
A-ARVIN Laser Resources	$4,053.05	25	3792.6%	13	$311.77
A Superior System	$103,728.12	868	4074.5%	167	$621.13
A&B	$92,120.60	891	4202.9%	18	$5,117.81
A&G	$12,502.61	133	4708.0%	12	$1,041.88
A&R Partners	$30,392.45	156	3409.9%	6	$5,065.41
A1 Datacom Supply	$259,599.52	5,830	4025.7%	111	$2,338.73
a2i	$451.64	14	5983.7%	9	$50.18
A2Z Solutions	$69,977.36	454	4121.1%	94	$744.44
AA-Wizard	$94,209.44	917	4660.6%	41	$2,297.79

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

When to use it

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

Advantages

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

Disadvantages

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

Creating a table

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

Do the following:

1. From the assets panel, drag a **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.

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

Column width is automatically set to keep columns together for improved readability. You can adjust the width of a column by dragging the header divider. Double-click the header divider to reset to the default width.

Styling the table

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font size and color for the following text elements:
    - **Header**: Style the text of the column headers.
    - **Content**: Style the text of the table content. If you have selected to show a Totals row, it will be styled using these settings, in addition to its text being bold.

Additionally, you can customize how the text appears when a user hovers over a row. See *Customizing the hover behavior and scrollbar (page 424)*.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Setting the row height

You can adjust the height of the rows in the table.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab, under **Row height (in lines)**, enter a positive integer value representing how many originally sized rows should fit into one newly sized row, height-wise.

Customizing the hover behavior and scrollbar

You can set display options for when a user hovers over a row in the table. You can also set the scrollbar size.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, under **Row hover**, adjust the following settings:
   - To highlight rows in the table when a user hovers over them, set the switch to **On**. Switch the behavior off according to preference.
   - **Row hover color**: Set the color to highlight the row when a user hovers over it.
   - **Row hover font color**: Set the color of the text in the highlighted row when a user hovers over it.
4. Under **Scrollbar size**, set the size of the scrollbar in the chart (you can select Small, Medium, or Large).

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.

3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Aligning data

If **Text alignment** is set to **Auto**, column data is aligned according to data type: text values are left-aligned and number values, including date related values, are right-aligned. If you set it to **Custom**, you can align the data to the left, center, or right.

Sorting the table

You can adjust the sorting of the table in several ways:

- Column sorting: adjust the order of the dimensions and measures from left to right
- Row sorting: adjust the sorting priority order of the rows
- Internal sorting: use the internal sorting order of dimensions and measures
- Interactive sorting: during analysis you can click on a column header to sort the table

Column sorting

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

Row sorting

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

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

Example:

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

Customer	Month	Product Type	Sales
Totals			**$104,852,674.81**
A-2-Z Solutions	Jan	Baking Goods	$248.83
A-2-Z Solutions	Jan	Beer and Wine	$129.25
A-2-Z Solutions	Jan	Breakfast Foods	$68.29
A-2-Z Solutions	Jan	Canned Soup	$45.24
A-2-Z Solutions	Jan	Carbonated Beverages	$187.42
A-2-Z Solutions	Jan	Dairy	$8,262.54
A-2-Z Solutions	Jan	Specialty	$686.59
A-2-Z Solutions	Feb	Beer and Wine	$24.60
A-2-Z Solutions	Feb	Breakfast Foods	$270.72
A-2-Z Solutions	Feb	Canned Soup	$91.80

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

Customer	Product Type	Month	Sales
Totals			**$104,852,674.81**
A-2-Z Solutions	Baking Goods	Jan	$248.83
A-2-Z Solutions	Baking Goods	Jul	$1,318.04
A-2-Z Solutions	Baking Goods	Nov	$396.00
A-2-Z Solutions	Beer and Wine	Jan	$129.25
A-2-Z Solutions	Beer and Wine	Feb	$24.60
A-2-Z Solutions	Beer and Wine	Apr	$129.25
A-2-Z Solutions	Beer and Wine	Jun	$60.10
A-2-Z Solutions	Beer and Wine	Jul	$129.25
A-2-Z Solutions	Beer and Wine	Oct	$400.65
A-2-Z Solutions	Beer and Wine	Nov	$10.09
A-2-Z Solutions	Beer and Wine	Dec	$63.07
A-2-Z Solutions	Bread	Jul	$158.56
A-2-Z Solutions	Bread	Oct	$74.73

Internal sorting

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

Interactive sorting

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

Displaying totals

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

Displaying more data

The chart can be configured to display more data, or to show it in different ways. Under **Appearance** > **Presentation** in the properties panel, you can:Under **Appearance** > **Presentation** in the properties panel, you can:

- Freeze the first column from scrolling.
  For app consumers who have **Touch screen mode** activated in the navigation menu, you need to turn on **Enable on touchscreen** to support the freezing of the first column for these consumers.
- Select to wrap multiline text in headers and cells separately.

  *Up to three lines of text can be wrapped using these settings. For longer text, set a higher **Row height** limit in the **Styling** panel. See* Setting the row height.
- Turn off horizontal scrolling and turn on the column picker feature. This lets app consumers change table column order.

Adding a trend indicator to a measure

You can add a trend indicator to a measure column. This will show a symbol next to the measure value. You can define the ranges that determine which symbol is displayed and in which color it is displayed. You enable the indicator by setting **Representation** to **Indicator** in the measure properties.

Setting the indicator limits

You need to add the limits for the ranges you want to use for showing indicators with **Add limit**. You can set a limit value in three ways.

- Use the slider.
- Type a value in the text box.
- Set an expression that returns the limit value.

When you have added the limits, you can select the color and the symbol of the indicator for each defined range.

Styling the indicator

You can style the way the indicator is displayed.

- You can show both the indicator and the measure value by selecting **Show values**.
- You can set the value color to the same as the indicator color with **Apply color to value**.
- You can display the indicator to the right or to the left of the value with **Indicator position**.

Example

In this example, we added a trend indicator to the Sales measure to indicate which values are below the target value. The indicator limits are:

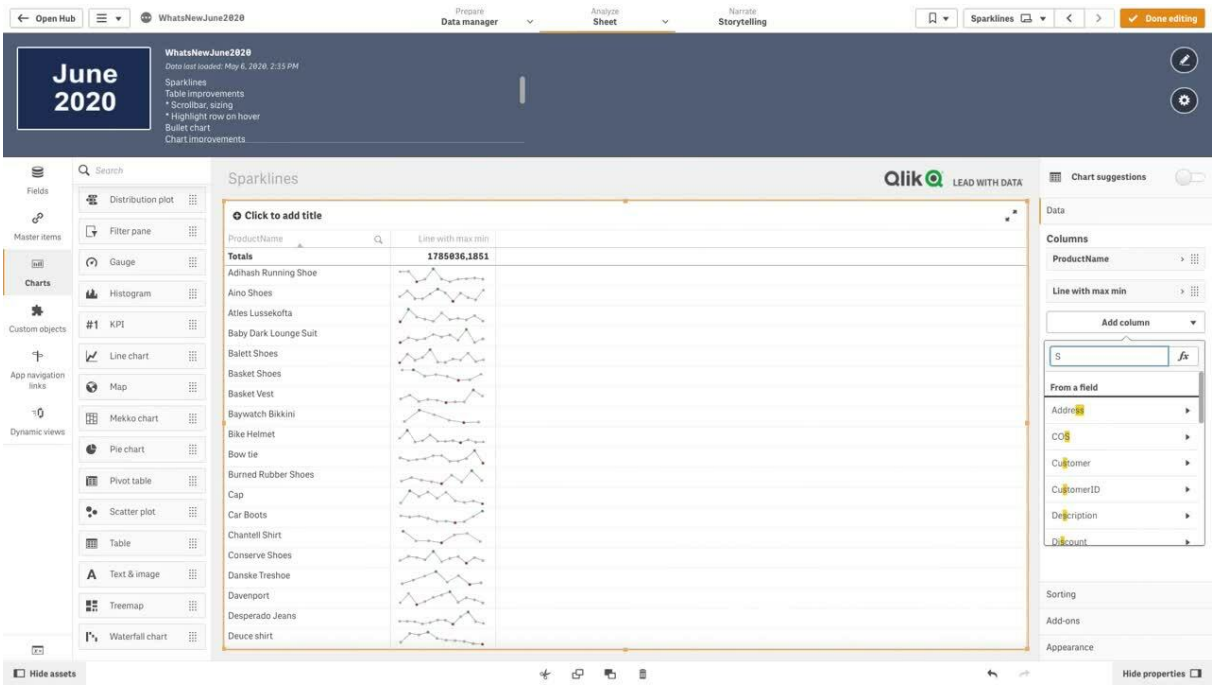
- For values below 3000000 a red flag is displayed.
- For values in the range of 3000000 to 3500000 a yellow flag is displayed.
- For values above 3500000 a green check-mark is displayed.

Year	Month	Sales
2012	jan.	1773749,81
2012	feb.	3867568,01
2012	mars	3892194,86
2012	apr.	3660633,9
2012	maj	3191647,98
2012	juni	4259259,66
2012	juli	2519872,65
2012	aug.	3799274,06
2012	sep.	3739097,87
2012	okt.	3036455,81
2012	nov.	3528099,04
2012	dec.	2905448,63

Adding a mini chart to a measure

You can add a mini chart to a measure column. This will show a small chart visualization instead of the measure value. You can define the dimension that determines what data is displayed and in which color it is displayed. You enable the indicator by setting **Representation** to **Mini chart** in the measure properties.

The mini chart popup only shows the value of the measure, and is not broken down by individual dimension point values.



Setting the mini chart type

After specifying which dimension the mini chart will be based on, you must select a **Mode**.

- **Bars** creates a bar chart.
- **Dots** creates a dot chart.
- **Sparkline** creates a sparkline chart. You can show dots at each data point along the sparkline chart by selecting **Show dots**.
- **Positive/negative** creates a chart with each value represented by a dot above or below the zero.

When you have selected the mode, you can specify the **Y-axis** of the Mini chart at the bottom of the mini chart options.

Styling the mini chart

You can set the color of bars or lines for **Bars**, **Dots**, and **Sparkline**.

- You can optionally set the **Max value color** and **Min value color**, which will highlight the highest and lowest visible chart values.
- You can optionally set the **Highlight first** and **Highlight last** colors, which will highlight the first and last visible chart values.

You can set the positive and negative color for a **Positive/negative** mini chart.

Display limitations

Number of rows and columns

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

Tables with content of mixed sizes

In a table you can have both columns where the content fits on one row within the cell, and columns containing wrapped multiline text. In some cases you will see a shift in alignment and number of rows when the multiline column is scrolled in and out of view. When the view only contains content that fits on one row, the table will adjust and show all content on single line rows, which means more rows are displayed.

We recommend that you disable multiline text wrapping in these cases to avoid confusion for the user.

Searching in tables

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

*The **Straight table** has replaced the **Table** as the default table visualization. Consider upgrading existing tables to straight tables for improved functionality and performance. For information about the straight table, see Straight table (page 389).*

Do the following:

1. Click in the dimension column that you want to search in.
   A selection popup is displayed with a list of all values of the field. This includes values that are excluded by selections. Excluded values are dark gray.
2. Type your search string. You can use any of the available search types. See Searching within selections or visualizations.
   While you type, the list is filtered to only display matching items.
3. Make a selection by clicking or drawing.
4. Confirm your selection.

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

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

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

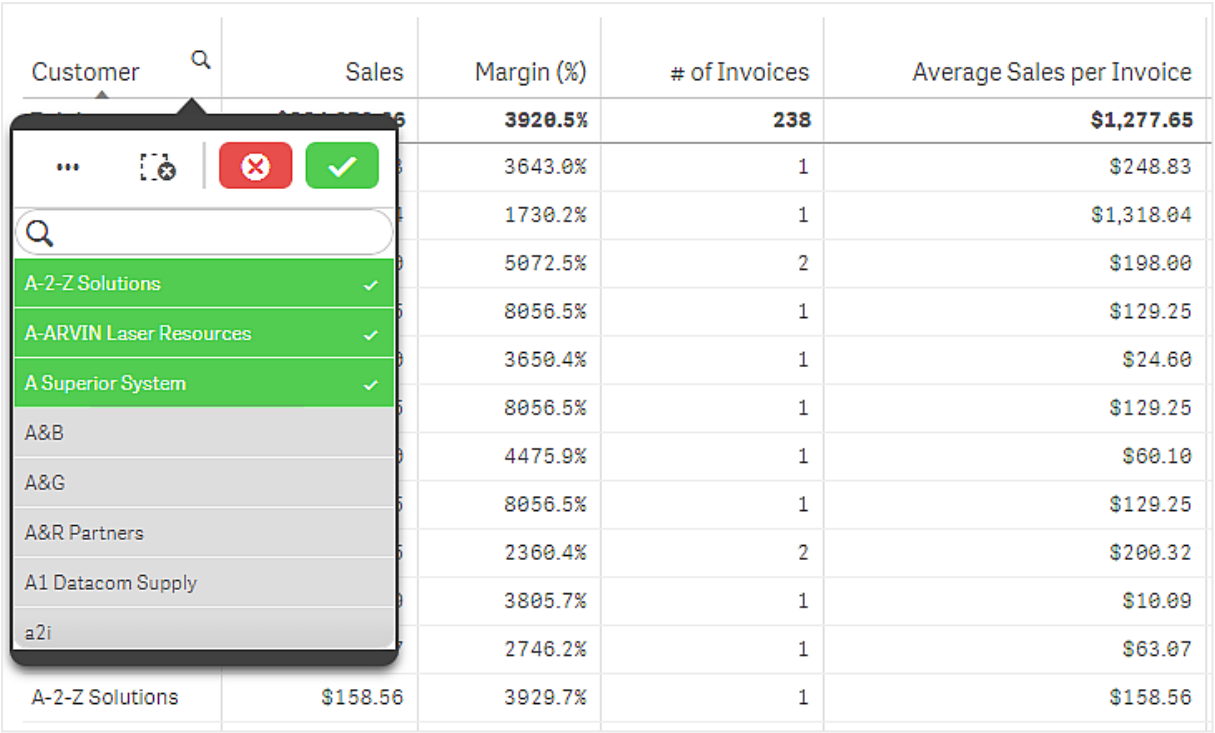
Selections in tables

You can make selections in a table by clicking or drawing in the dimension columns.

*The **Straight table** has replaced the **Table** as the default table visualization. Consider upgrading existing tables to straight tables for improved functionality and performance. For information about the straight table, see Straight table (page 389).*

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

Table with three selected fields in the dimension Customer.



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

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

Accumulating values over a dimension in a table

This example shows how to use a table to compare data which accumulate over a dimension.

> *The **Straight table** has replaced the **Table** as the default table visualization. Consider upgrading existing tables to straight tables for improved functionality and performance. For information about creating straight tables, see* Creating straight tables.

Year	Month	Sales	Accumulation of sales
Totals		**64891921.17**	-
2012	Jan	1773749.81	1773749.81
2012	Feb	3867568.01	5641317.82
2012	Mar	3892194.86	9533512.68
2012	Apr	3660633.9	13194146.58
2012	May	3191647.98	16385794.56
2012	Jun	4259259.66	20645054.22
2012	Jul	0	20645054.22
2012	Aug	0	20645054.22
2012	Sep	0	20645054.22
2012	Oct	0	20645054.22
2012	Nov	0	20645054.22
2012	Dec	0	20645054.22
2013	Jan	4574043.41	4574043.41
2013	Feb	3333839.69	7907883.1
2013	Mar	4266053.47	12173936.57
2013	Apr	2498575.88	14672512.45
2013	May	3533538.09	18206050.54
2013	Jun	4115434.48	22321485.02
2013	Jul	0	22321485.02
2013	Aug	0	22321485.02
2013	Sep	0	22321485.02
2013	Oct	0	22321485.02
2013	Nov	0	22321485.02
2013	Dec	0	22321485.02
2014	Jan	4114861.14	4114861.14
2014	Feb	3198717.63	7313578.77
2014	Mar	3789271.2	11102849.97
2014	Apr	3575328.84	14678178.81
2014	May	3541237.39	18219416.2
2014	Jun	3705965.73	21925381.93

Dataset

In this example, we will use a data file available in the Qlik Sense Tutorial - Building an App. Download and expand the tutorial. The file is available in the *Tutorials source* folder: *Sales.xls*

To download the file, go to Tutorial - Building an App.

Add the data file to an empty app. The dataset that is loaded contains sales data.

Measure

We use the sales volume as the measure that we create in Master items:

- *Sales* with the expression `Sum(Sales)`. This is the sum of the sales volume.

Visualization

We add a table to the sheet and set the following data properties:

- **Dimension**: Year (Date.Year).
- **Dimension**: Month (Date.Month).
- **Measure**: *Sales*; the measure that was previously created.

The following table is created, with columns showing the year, the month, and the sum of sales for each month.

Year	Month	Sales
Totals		**104852674.81**
2012	Jan	1773749.81
2012	Feb	3867568.01
2012	Mar	3892194.86
2012	Apr	3660633.9
2012	May	3191647.98
2012	Jun	4259259.66
2012	Jul	2519872.65
2012	Aug	3799274.06
2012	Sep	3739097.87
2012	Oct	3036455.81
2012	Nov	3528099.04
2012	Dec	2905448.63
2013	Jan	4574043.41
2013	Feb	3333839.69
2013	Mar	4266053.47
2013	Apr	2498575.88
2013	May	3533538.09
2013	Jun	4115434.48
2013	Jul	2696221.99
2013	Aug	3792981.81
2013	Sep	4087106.08
2013	Oct	2917027.48
2013	Nov	3647345.62
2013	Dec	3291822.6
2014	Jan	4114861.14
2014	Feb	3198717.63
2014	Mar	3789271.2
2014	Apr	3575328.84
2014	May	3541237.39
2014	Jun	3705965.73

Make sure to set the **Sorting** with *Year* > *Month* > *Sales*.

Accumulation

To have our sales data accumulate over one dimension, we need to set an additional data property:

- **Measure**: *Sales*; the measure that was previously created.

We add this measure twice to reuse it for accumulation. To do this we need to apply a modifier to our *Sales* measure.

Do the following:

1. Under **Measure**: *Sales* set the **Modifier** to Accumulation. This will set the measure to accumulate over one dimension.
2. Set the **Modifier>Dimension** to *Month*. This sets the dimension over which the accumulation will take place.
3. Make sure **Across all dimensions** is turned off. We want the accumulation to restart at the beginning of each year.

*In Accumulation there is the option to select **Show excluded values**. When turned on, your visualization includes any dimensional values that do not have data. This ensures that all values, including months with no sales data, are counted in the accumulation.*

Our table becomes as follows, with the last column showing sales accumulating from one month to the next, for each year.

Year	Month	Sales	Accumulation of sales
Totals		**104852674.81**	-
2012	Jan	1773749.81	1773749.81
2012	Feb	3867568.01	5641317.82
2012	Mar	3892194.86	9533512.68
2012	Apr	3660633.9	13194146.58
2012	May	3191647.98	16385794.56
2012	Jun	4259259.66	20645054.22
2012	Jul	2519872.65	23164926.87
2012	Aug	3799274.06	26964200.93
2012	Sep	3739097.87	30703298.8
2012	Oct	3036455.81	33739754.61
2012	Nov	3528099.04	37267853.65
2012	Dec	2905448.63	40173302.28
2013	Jan	4574043.41	4574043.41
2013	Feb	3333839.69	7907883.1
2013	Mar	4266053.47	12173936.57
2013	Apr	2498575.88	14672512.45
2013	May	3533538.09	18206050.54
2013	Jun	4115434.48	22321485.02
2013	Jul	2696221.99	25017707.01
2013	Aug	3792981.81	28810688.82
2013	Sep	4087106.08	32897794.9
2013	Oct	2917027.48	35814822.38
2013	Nov	3647345.62	39462168
2013	Dec	3291822.6	42753990.6
2014	Jan	4114861.14	4114861.14
2014	Feb	3198717.63	7313578.77
2014	Mar	3789271.2	11102849.97
2014	Apr	3575328.84	14678178.81
2014	May	3541237.39	18219416.2
2014	Jun	3705965.73	21925381.93

It is good practice to have the title of your charts represent their content. So consider changing the titles of the columns of your table to reflect that the last column contains an accumulation of sales.

Our data for the year 2014 is insufficient as it stops at *June*. In order to achieve a better comparison between the accumulated sales of all three years we will choose a more appropriate range of months, from *January* to *June*.

Do the following:

1. Click **Done**.
2. Select all months from *January* to *June* and confirm your selection.

Our table becomes as follows, with the sales accumulating from *January* to *June*, inside each year.

Year	Month	Sales	Accumulation of sales
Totals		**64891921.17**	-
2012	Jan	1773749.81	1773749.81
2012	Feb	3867568.01	5641317.82
2012	Mar	3892194.86	9533512.68
2012	Apr	3660633.9	13194146.58
2012	May	3191647.98	16385794.56
2012	Jun	4259259.66	20645054.22
2012	Jul	0	20645054.22
2012	Aug	0	20645054.22
2012	Sep	0	20645054.22
2012	Oct	0	20645054.22
2012	Nov	0	20645054.22
2012	Dec	0	20645054.22
2013	Jan	4574043.41	4574043.41
2013	Feb	3333839.69	7907883.1
2013	Mar	4266053.47	12173936.57
2013	Apr	2498575.88	14672512.45
2013	May	3533538.09	18206050.54
2013	Jun	4115434.48	22321485.02
2013	Jul	0	22321485.02
2013	Aug	0	22321485.02
2013	Sep	0	22321485.02
2013	Oct	0	22321485.02
2013	Nov	0	22321485.02
2013	Dec	0	22321485.02
2014	Jan	4114861.14	4114861.14
2014	Feb	3198717.63	7313578.77
2014	Mar	3789271.2	11102849.97
2014	Apr	3575328.84	14678178.81
2014	May	3541237.39	18219416.2
2014	Jun	3705965.73	21925381.93

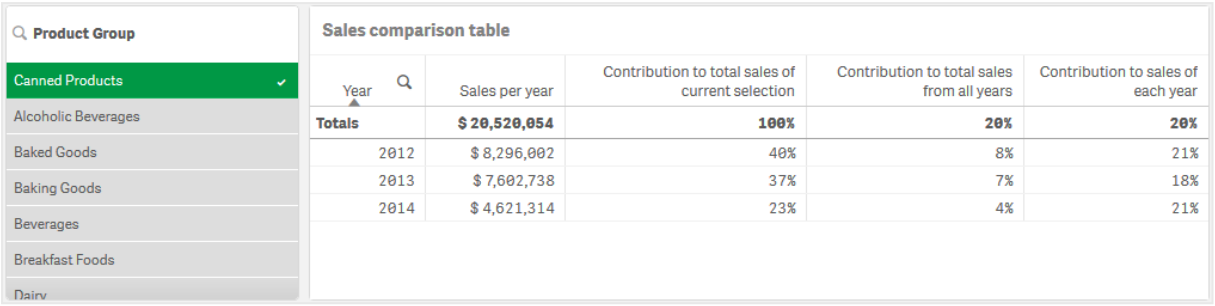
Discovery

The table shows the sales volume of each month, grouped into years. By having the sales accumulate inside each year, we get a better understanding of the volume of sales for each year. We have made a selection of the months from *January* to *June*, to compare the same range of months between the three years. In the last column of the table we can see that the accumulated sales for 2014 so far have been higher than the accumulated sales for 2012, but not as high as the ones for 2013.

Using relative numbers in a table to calculate contribution

This example shows how to use the relative numbers modifier to calculate contribution in a one dimensional table.

*The **Straight table** has replaced the **Table** as the default table visualization. Consider upgrading existing tables to straight tables for improved functionality and performance. For information about creating straight tables, see* Creating straight tables.



Dataset

In this example, we will use a data file available in the Qlik Sense Tutorial - Building an App. Download and expand the tutorial. The file is available in the *Tutorials source* folder: *Sales.xls*

To download the file, go to Tutorial - Building an App.

Add the data file to an empty app. The dataset that is loaded contains sales data.

Measure

We use the sales volume as the measure that we create in Master items:

- *Sales* with the expression `Sum(Sales)`. This is the sum of the sales volume.

Visualization

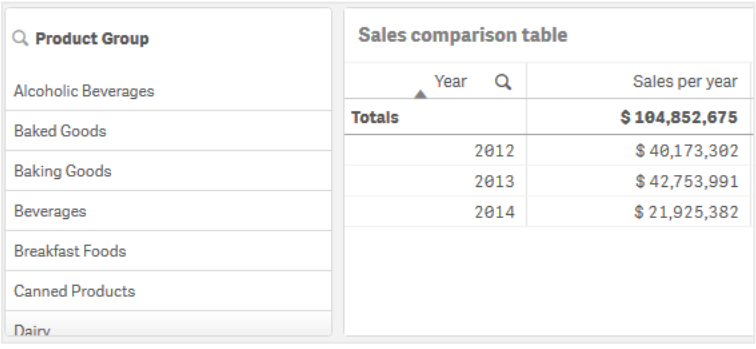
We start by adding a filter pane to the sheet and set the following data properties:

- **Dimension**: Product Group.

We also add a table to the sheet and set the following data properties:

- **Dimension**: Year (Date.Year).
- **Measure**: *Sales*; the measure that was previously created.

The following table is created, with columns showing the year, and the sum of sales for each year.



Make sure to set the **Number formatting** to **Money**, and the **Format pattern** to *$ #,##0;-$ #,##0*.

It is good practice to have the title of your charts represent their content. Additionally, consider changing with the title of each column to reflect what it represents. The first column that we added is the *Year*, and the second column contains the *Sales per year*.

Relative numbers

We could use the filter pane to select specific product groups and see their yearly sales and their total sales. That would not provide a good comparison to their contribution. Instead we will use relative numbers to get percentages as an indication of the product group contribution. By changing the parameters upon which the relative numbers calculation is based, we will get different contributions and gain more insight.

Contribution of a year to the sales of product group

To see how much each year has contributed to the total sales of a specific product group when we make a selection, we need to add a third column:

Do the following:

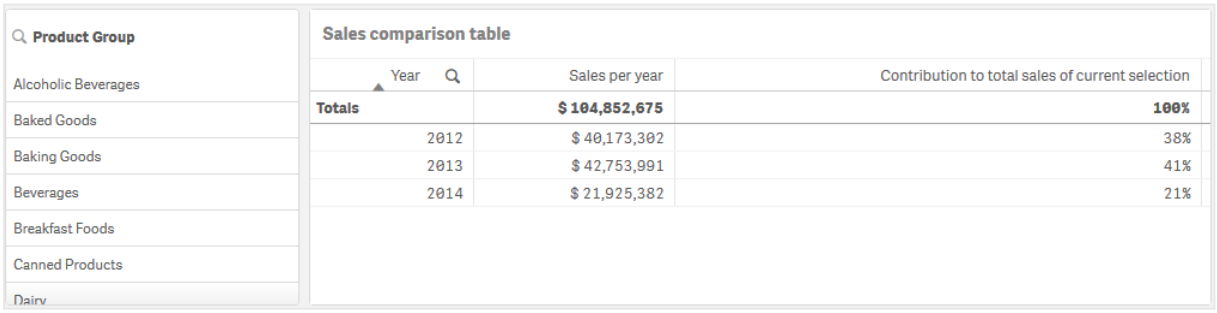
- In the properties panel, right-click on *Sales per year* and select **Duplicate**.

To use this duplicate measure as a relative number we will apply a modifier.

Do the following:

1. Under **Measure**: *Sales per year* set the **Modifier** to Relative numbers. This will set the measure to act as a relative number.
2. Set the **Modifier>Selection scope** to *Current selection*. This sets the modifier to be calculated relative to any selection made.
3. The **Modifier>Dimensional scope** is set to *Disregard dimension* by default. This sets the modifier to be calculated relative to the total.
4. Set the **Number formatting** to **Custom**, and the **Format pattern** to *#,##0%*.
5. Change the **Label** to something meaningful such as *Contribution to total sales of current selection*.

Our table becomes as follows, with the last column showing the contribution of each year to the total sales of the selected product group.



Contribution of a product group to total sales

To see how much each year's sales of a specific product group have contributed to the total sales of all product groups, we need to add a fourth column:

Do the following:

- In the properties panel right-click on *Contribution to total sales of current selection* and select **Duplicate**.

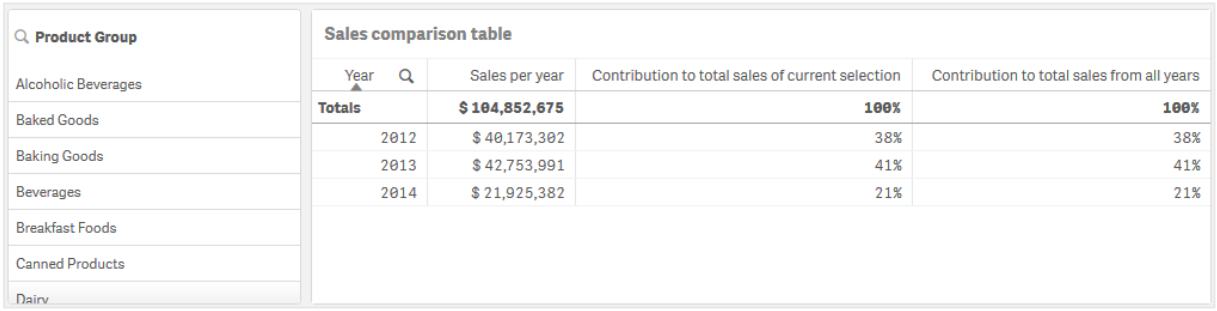
We will apply the Relative numbers modifier again, but with different properties this time.

Do the following:

1. Set the **Modifier>Selection scope** to *Disregard selection*. This sets the modifier to be calculated disregarding any selection made.
2. The **Modifier>Dimensional scope** is already set to *Disregard dimension*. This sets the modifier to be calculated relative to the total.
3. Change the **Label** to something meaningful such as *Contribution to total sales from all years*.

The **Number formatting** and the **Format pattern** are already set, since we duplicated the previous measure.

Our table becomes as follows, with the last column showing the contribution of the selected product group to the total sales from all three years.



Year	Sales per year	Contribution to total sales of current selection	Contribution to total sales from all years
Totals	**$ 104,852,675**	**100%**	**100%**
2012	$ 40,173,302	38%	38%
2013	$ 42,753,991	41%	41%
2014	$ 21,925,382	21%	21%

Since we have not made any selections yet, the last two columns have the same values.

Contribution of a product group to yearly sales

To see how much the sales of a specific product group have contributed to that year's sales compared to all the other product groups, we need to add a fifth column:

Do the following:

- In the properties panel right-click on *Contribution to total sales from all years* and select **Duplicate**.

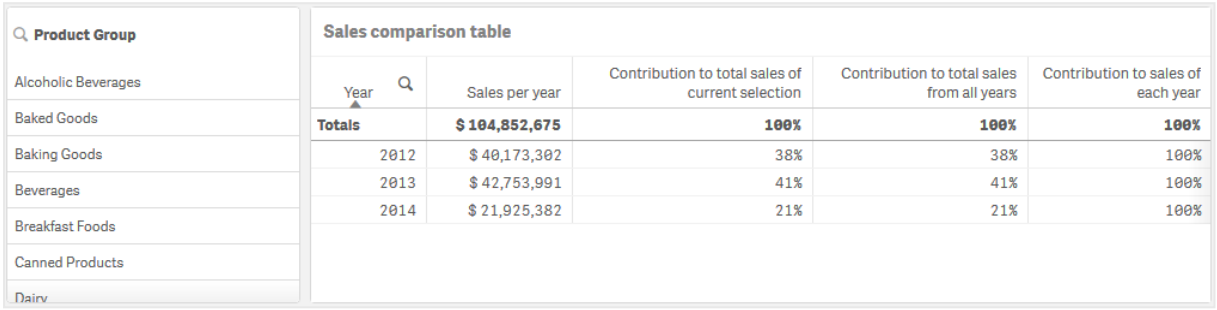
We will apply the Relative numbers modifier again, but with different properties this time.

Do the following:

1. Set the **Modifier>Selection scope** to *Disregard selection*. This sets the modifier to be calculated disregarding any selection made.

2. The **Modifier>Dimensional scope** is already set to *Respect dimension*. This sets the modifier to be calculated relative to each dimensional value.
3. Change the **Label** to something meaningful such as *Contribution to sales of each year*.

Our table becomes as follows, with the last column showing the contribution of the selected product group to the total sales from all three years.



Year	Sales per year	Contribution to total sales of current selection	Contribution to total sales from all years	Contribution to sales of each year
Totals	**$ 104,852,675**	**100%**	**100%**	**100%**
2012	$ 40,173,302	38%	38%	100%
2013	$ 42,753,991	41%	41%	100%
2014	$ 21,925,382	21%	21%	100%

Since we have not made any selections yet, the last column shows the yearly contribution of all product groups for each year.

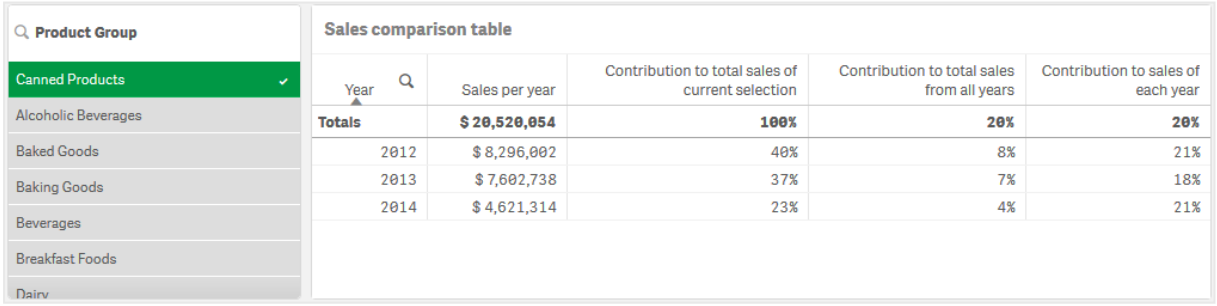
Making a selection

We can now start making selections to change our relative numbers to something that provides more insight.

Do the following:

1. Click ✔ **Done editing** in the toolbar.
2. Select *Canned Products* from the product group filter pane.

Our table becomes as follows.



Year	Sales per year	Contribution to total sales of current selection	Contribution to total sales from all years	Contribution to sales of each year
Totals	**$ 20,520,054**	**100%**	**20%**	**20%**
2012	$ 8,296,002	40%	8%	21%
2013	$ 7,602,738	37%	7%	18%
2014	$ 4,621,314	23%	4%	21%

Discovery

The table shows the relative sales for each year. By having the different contribution columns, using the relative numbers as a measure modifier, we get a better understanding of the contribution of each product group to the total sales. From the *Contribution to total sales of current selection* column we can see that 40% of the *Canned Product* sales happened in 2012, with a dramatic drop in 2014. The *Contribution to total sales from all years* column shows that 8% of the total sales from all three years came from the 2012 sales of *Canned Product*. The *Contribution to sales of each year* column also tells us that for 2012 the *Canned Product* sales contributed 21% of the sales of that year, and the same applies to the sales of 2014.

Text & image

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

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

When to use it

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

- Use it on the first sheet of an app for essential information.
- Display a company image, or use a background image together with formatted text and measure values to present figures in a compelling way.
- Link to sites with additional information.
- Use the responsive behavior to ensure that the visualization renders well on all devices.

Advantages

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

Disadvantages

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

Creating a text & image

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

Do the following:

1. From the assets panel, 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 assets panel, it is added to the sheet immediately.

Styling the text & image

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

In a text & image object, you can also set a background image outside of the styling panel. Setting a background image in this way will not exclude or negate any background modifications you have made in the above procedure.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Background image**, toggle on **Use background image**.
3. Add an image from your media library. You can select from a number of size and position options.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

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.

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 .

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 .

The link is removed, but not the text.

Adding an image

You can add an image through the editing toolbar. You can use one of the default images, or an image of your own.

Do the following:

1. Click in the editing toolbar.
   The **Media library** opens.
   The following formats are supported: .png, .jpg, .jpeg, and .gif.
   For Qlik Sense: You can upload images to the **In app** folder in the media library. You need to use the Qlik Management Console to upload images to the default folder.
   For Qlik Sense Desktop: You can place images in the following folder on your computer: *C:\Users\<user>\Documents\Qlik\Sense\Content\Default*. Images will be available in the **default** folder in the media library. When moving an app between installations, the images that you use in the app are saved in the qvf file together with the app. When you open the app in a new location, the images will be in the **In app** folder in the media library for the app.
2. Click on a folder in the media library, for example **In app** or **Default**.
3. Select the image that you want to add.
4. Click **Insert**.

   *Alternatively, right-click the image file you want to add and select **Insert**.*

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

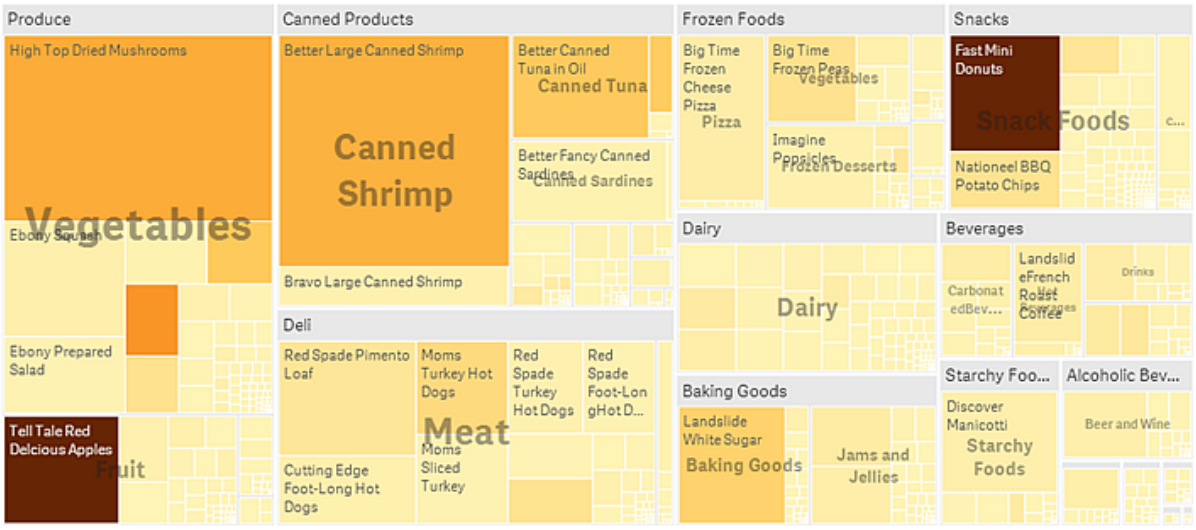
You can delete a measure in the following ways:

- Place the cursor before the token and press Delete.
- Place the cursor after the token and press Backspace.

- In the properties panel, right-click the measure and select **Delete** in the dialog.
- In the properties panel, click the measure and click **Delete**.

Treemap

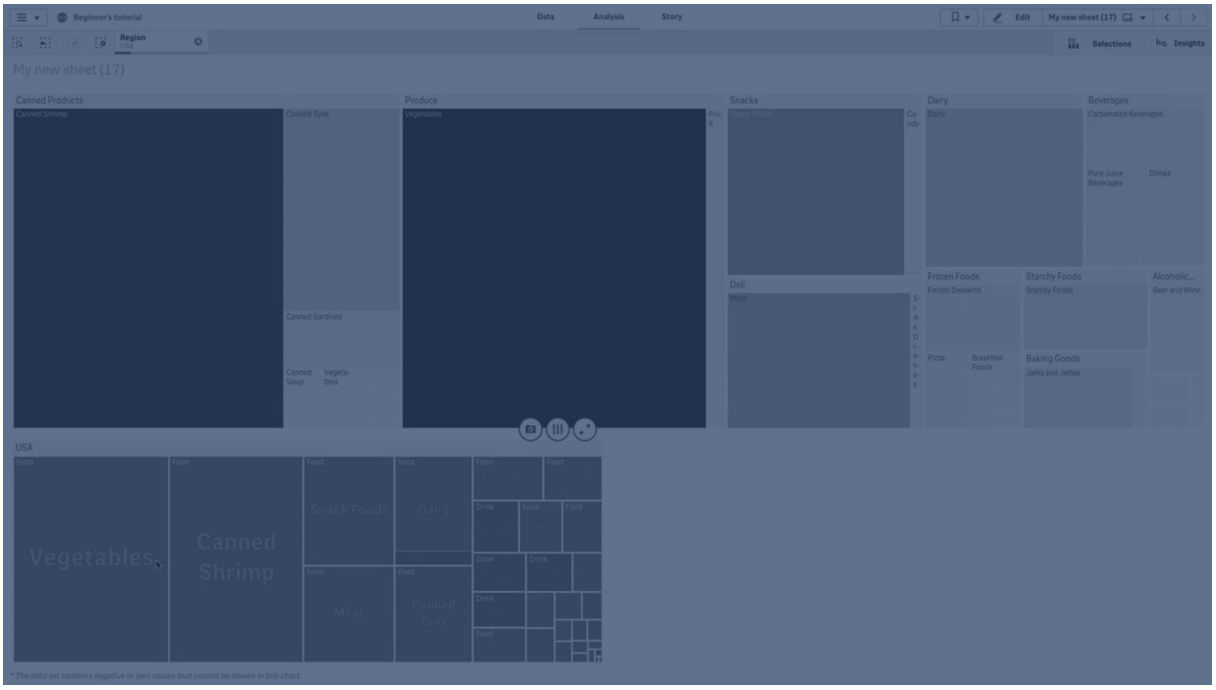
Treemaps display hierarchical data by using nested rectangles, that is, smaller rectangles within a larger rectangle.



In this image you have several product groups, such as Produce, Canned Products, and Frozen Foods. Each product group consists of a large rectangle. You can regard the product groups as branches of the tree. When you select a product group, you drill down to the next level, the product type, for example, Vegetables, Meat, and Dairy. You can regard the product types as sub-branches of the tree. The branches have leaves. A leaf node's rectangle has an area proportional to a specified dimension of the data. In this example, the items Ebony Squash, Bravo Large Canned Shrimp, Red Spade Pimento Loaf, and so on, are the leaves. The leaf nodes are colored to show a separate dimension of the data.

Sorting is automatic according to size. By default, the coloring is by dimension, with 12 colors, but that can be changed in the properties panel. When you have more than one dimension, you can decide which dimension to color by. In this example, the coloring is not by dimension, but by expression (*Avg(Margin)*), a calculated measure and by using this expression, you can see which items have the highest average margin. The darker the color, the higher the average margin.

If the data set contains negative values, a text message is shown stating that the negative values cannot be displayed.



When to use it

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

Advantages

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

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

Disadvantages

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

Negative values cannot be displayed in treemaps.

Creating a treemap

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

Do the following:

1. From the assets panel, drag an empty treemap to the sheet.
2. Click **Add dimension** and select a dimension or a field. This should be the highest level in the hierarchy. It will be displayed as the main group in the chart.

3. Click **Add measure** and select a measure or create a measure from a field. The measure will define the size of a rectangle.
4. Add more dimensions in the order of hierarchy level . The last dimension you add defines the rectangles. The other dimensions define the grouping of the rectangles.

In a treemap you need at least one dimension and one measure, but to make full use of the treemap it is preferable to have two or three dimensions. You can only have one measure, but up to 15 dimensions. We do not recommend using more than three dimensions as the treemap may become unmanageable.

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

Styling the treemap

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and any other applicable properties for the following text elements:
    - **Header labels**: Style the header labels. You can customize the font, font size, and color.
    - **Leaf labels**: Style the labels for the leaf elements.
    - **Legend title**: Style the title of the legend. You can customize the font, font size, and color.

- **Legend labels**: Style the labels of the individual legend items. You can customize the font, font size, and color.

Customizing the background

You can customize the general background and the background of the header area. The general background can be set by color and image, while the background of the header area can be set to a single color.

In the styling panel, you can configure background options.

Setting the general background

The general background of the chart includes the title area, as well as the chart itself, which might be partially covered by the header.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL. When using a background color, use the slider to adjust the opacity of the background. When using a background image, you can adjust image sizing and position.

Setting the header background

The header area is a branch-like frame surrounding the hierarchy of rectangles when two or more dimensions are added to the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, select a background color under **Header background color**.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Display limitations

Large amounts of data

When displaying large amounts of data in a treemap, there may be cases when not each dimension value within a rectangle is displayed with correct color and size. These remaining values will instead be displayed as a gray, striped area. The size and total value of the rectangle will still be correct, but not all dimension values in the rectangle will be explicit.

To remove the gray areas, you can either make a selection or use dimension limits in the properties panel.

Colors and legend

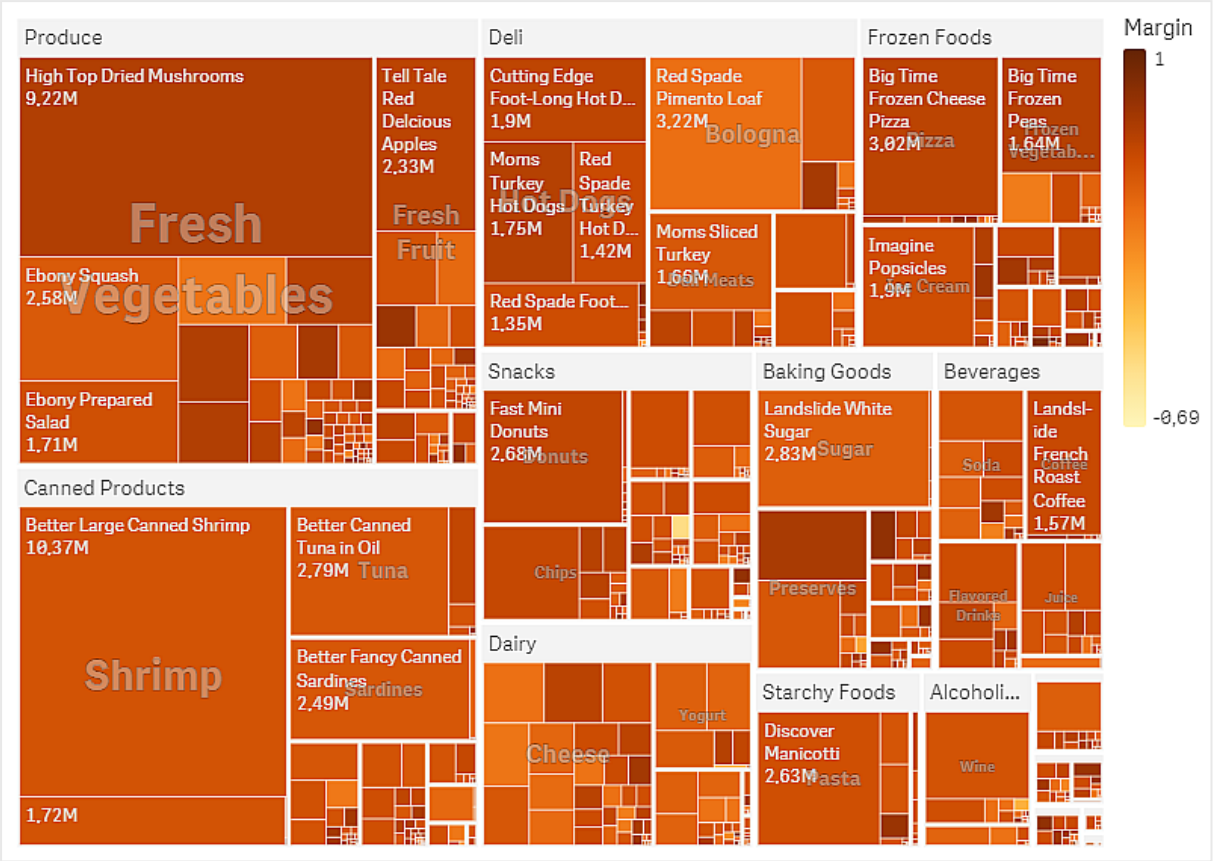
When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Displaying hierarchical data with a treemap

This example shows how to make a treemap to view hierarchical data. You can display a large number of values in limited space and detect patterns that could be hard to spot with other charts.

We will look at sales numbers for different products which are categorized in four levels.

- Product group
- Product sub group
- Product item



Dataset

In this example, we'll use two data files available in the Qlik Sense Tutorial - Building an App. Download and expand the tutorial, and the files are available in the *Tutorials source* folder:

- *Sales.xlsx*
- *Item master.xlsx*

To download the files, go to Tutorial - Building an App.

Add the two data files to an empty app and make sure that they are associated by *Item Number*.

The dataset that is loaded contains sales data for food and beverage products. The *Item Master* table holds the information about the product categories.

Visualization

We add a treemap to the sheet and set the following dimensions and measures.

- **Dimensions > Group**: Product Group (product group)
- **Dimensions > Group**: Product Sub Group (product sub group)
- **Dimensions > Rectangle**: Item Desc (product item description)
- **Measures > Size**: `Sum(Sales)` (sum of sales)

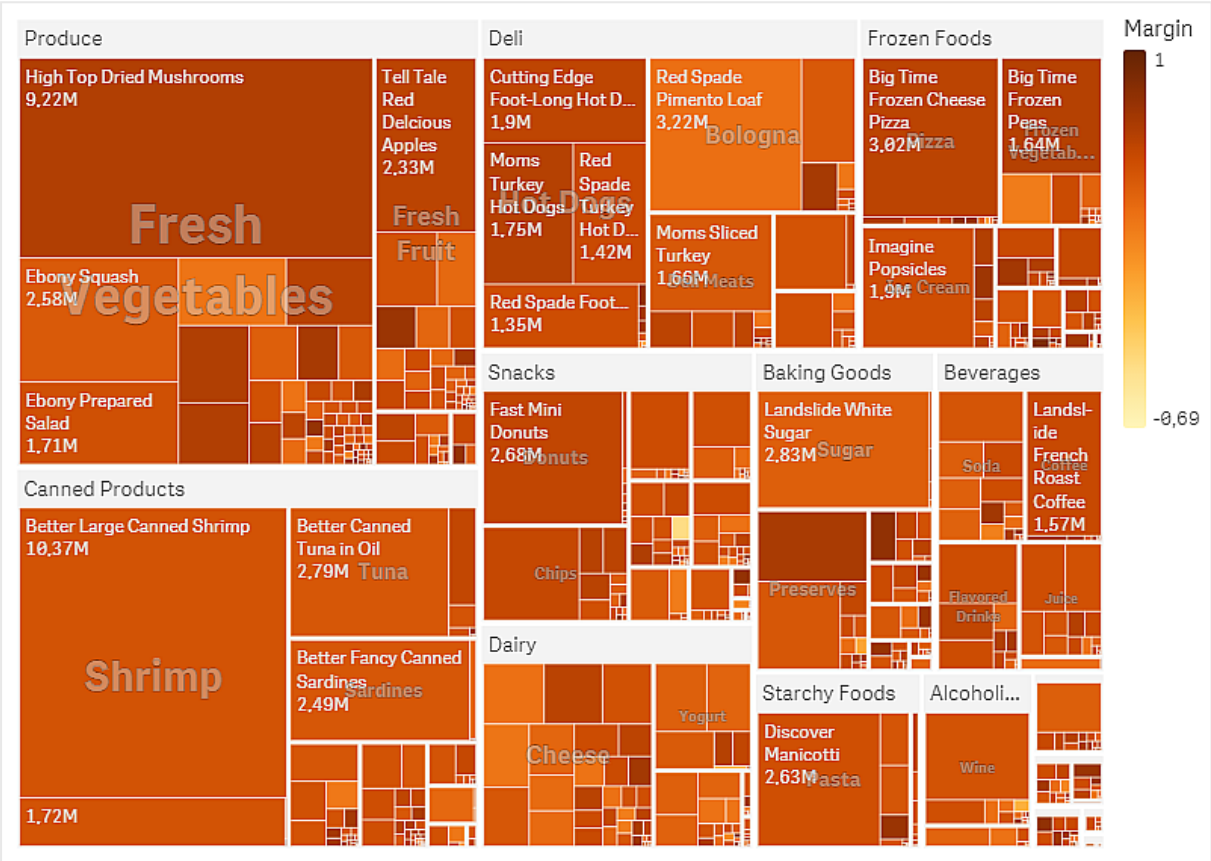
A treemap is created, with a rectangle for each product item. Rectangles are sized according to sales and grouped according to Product Group and Product Sub Group.

But we also want to add some more information to the chart. The rectangles are colored by the product group dimension, but we want to color them by margin to also see which items are most profitable. You can do this in **Appearance > Colors and legend**.

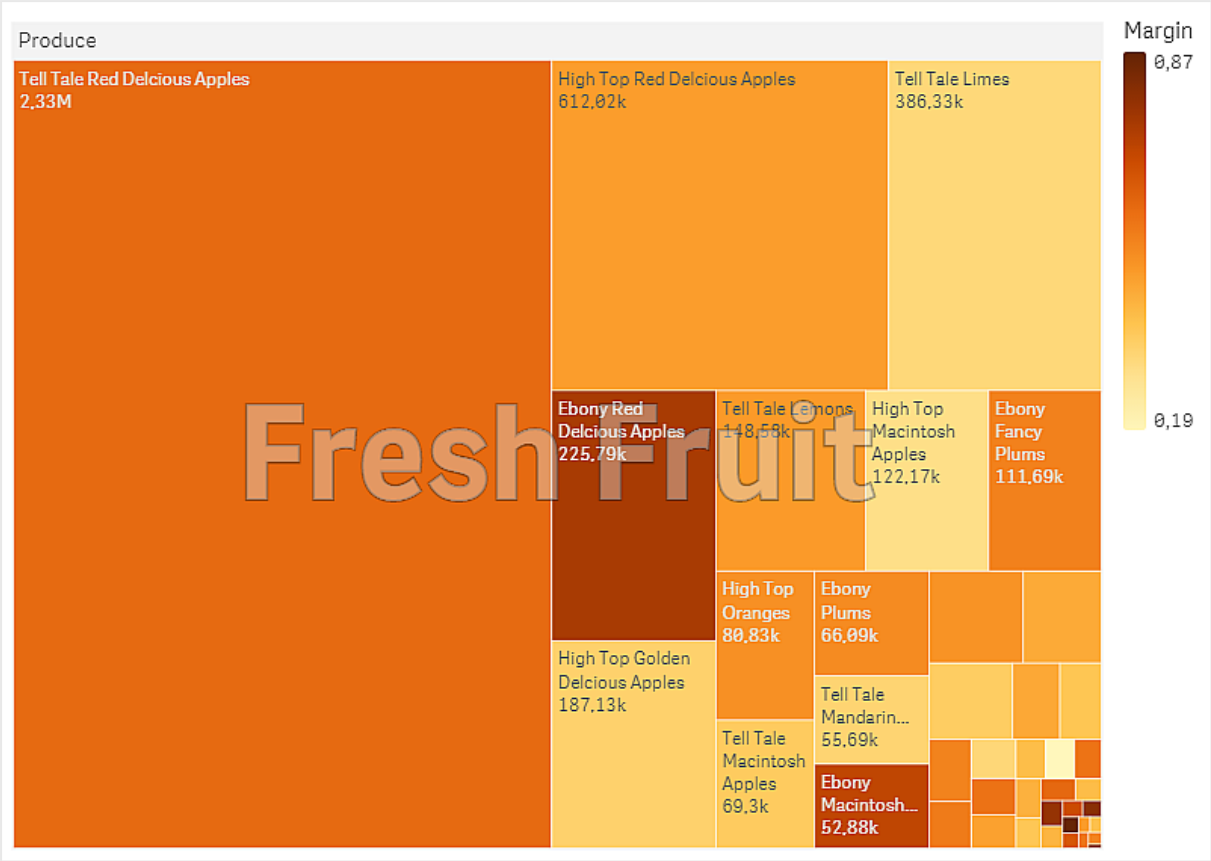
- Set **Colors** to **Custom**.
- Set **Color by measure** to `Avg(Margin/Sales)`

We also want to see the sales values in the chart. You can turn them on with **Value labels Appearance > Presentation**.

Discovery



We can see in the chart that Produce has the largest sales, followed by Canned Products. The coloring by margin allows you to identify product items or groups that stand out. You can drill down in the tree by selecting a product group.

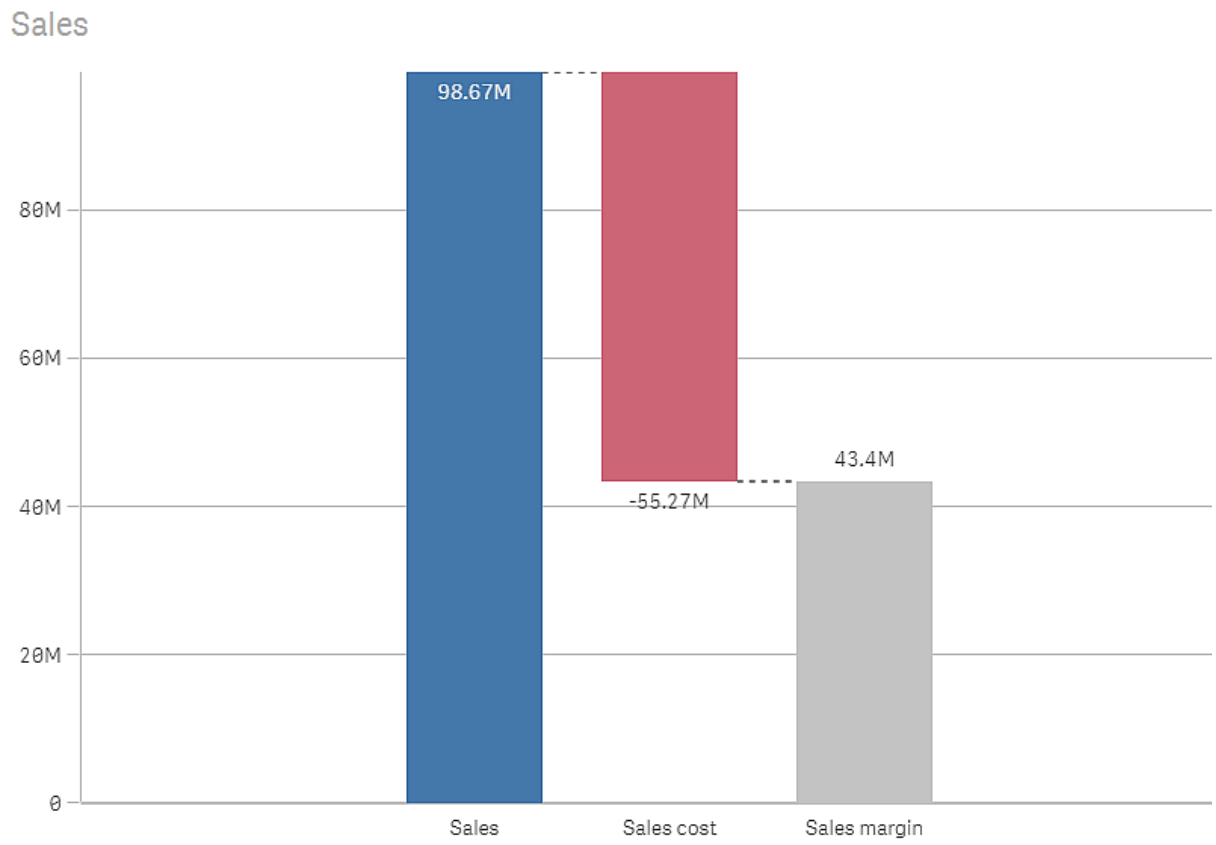


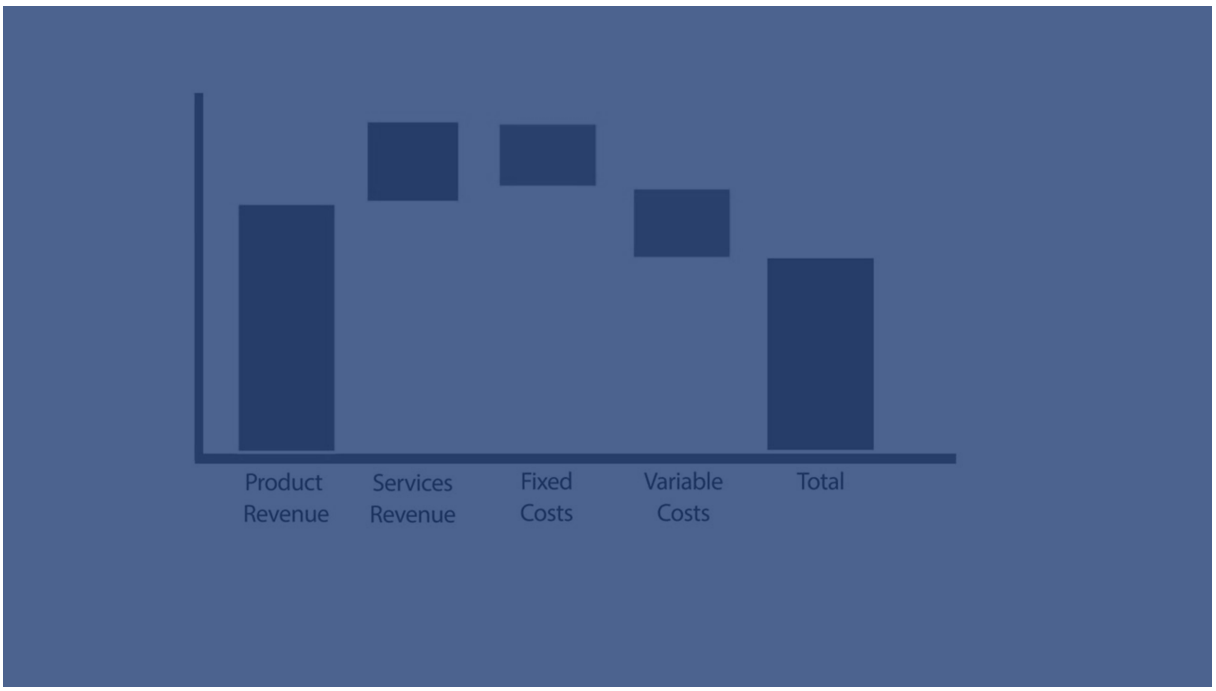
Here we have selected Produce, then Fresh Fruit. Tell Tale Red Delicious Apples are the number one sellers, but margins are higher on Ebony Red Delicious Apples.

Waterfall chart

The waterfall chart is suitable for illustrating how an initial value is affected by intermediate positive and negative values. The starting and the final values are represented by whole bars, and intermediate values by floating bars. You can also show subtotals in the chart.

Waterfall chart displaying Sales, Sales cost, and Sales margin.





When to use it

The waterfall chart is suitable for illustrating how an initial value is affected by intermediate positive and negative values. One example of this is an income statement, when you want to show the positive and negative contributions of different accounts.

Advantages

The waterfall chart provides a quick understanding of the transition of a value.

Disadvantages

The waterfall chart is not relevant for detailed analysis of the data as you can't make selections in the chart or expand the data.

Creating a waterfall chart

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

In a waterfall chart you need to use one measure for each bar in the chart. The order of the measures defines the order of the bars in the chart. For each measure, you need to define how it affects the previous value. You can add up to 15 measures in a waterfall chart.

Do the following:

1. From the assets panel, drag an empty waterfall chart to the sheet.
2. Add the first measure.
   This is the first bar of the chart. By default, it will use the measure operation **Add**, and show a positive value.
3. Add a second measure.
   This is the second bar of the chart. If you want to show this measure as a negative contribution, change **Measure operation** to **Subtract**.
4. Continue to add measures, setting **Measure operation** to **Add** or **Subtract** in the advanced properties panel depending on how you want them to contribute.
5. Add subtotals. There are two ways of adding subtotal bars to the chart:
   - If you have a data field containing subtotal data, add a measure with the subtotal data and select **Subtotals** as **Measure operation**.
   - If you don't have a data field containing subtotal data, you can add an automatically calculated subtotal by selecting the **Subtotals** check box of the measure before where you want the subtotal bar.

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

Defining your measures

You can use the **Measure operation** option of each measure to set how it affects the previous value.

- **Add**
  The measure value adds to the previous bar. If this is the first measure, a whole bar is shown starting at 0.
- **Subtract**
  The measure value subtracts from the previous bar.

  > *If the data already contains a negative sign, the result of subtraction will be a positive change.*

- **Subtotals**
  The measure value is considered a subtotal.

  > *If you do not have sub-totals as a field, you can add subtotals automatically by enabling **Subtotals** in the measure before you want the subtotal.*

In the waterfall chart shown above, the first bar, Sales, is defined as **Add**. The second bar, Sales cost, is defined as **Subtract**, and the third bar, Sales margin, is defined as **Subtotals**.

Styling the waterfall chart

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:

- **Title**
- **Subtitle**
- **Footnote**

4. On the **Chart** tab, set the font, font size, and color for the following text elements:
   - **Axis label**: Style the labels on the axes.
   - **Value label**: Style the labels for the measure values.
   - **Legend labels**: Style the labels of the individual legend items.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

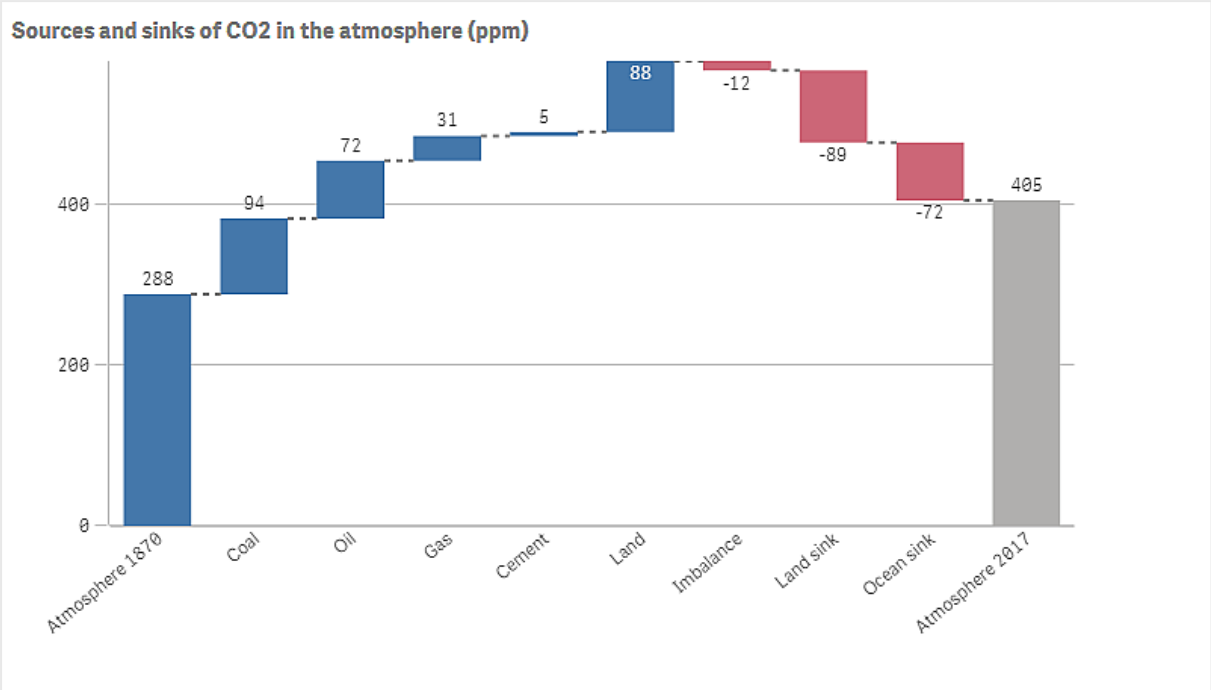
Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Visualizing positive and negative contributions to the result with a waterfall chart

This example shows how to make a waterfall chart to visualize how positive and negative values contribute to the final result.

We want to see the positive contributions to CO2 in the atmosphere, such as oil or gas, in relation to negative factors, such as land sink.



Dataset

In this example, we will use a simple dataset that you can copy to a text file to use as data source. It contains the atmosphere CO2 level in ppm from 1870, as well as the positive and negative contributors to CO2 in the atmosphere in the time between 1870 and 2017.

```
Atmosphere 1870,Coal,Oil,Gas,Cement,Land,Imbalance,Land sink,Ocean sink,Atmosphere 2017
288,94,72,31,5,88,-12,-89,-72,405
```

(Source: CDIAC/GCP/NOAA-ESRL/UNFCCC/BP/USGS)

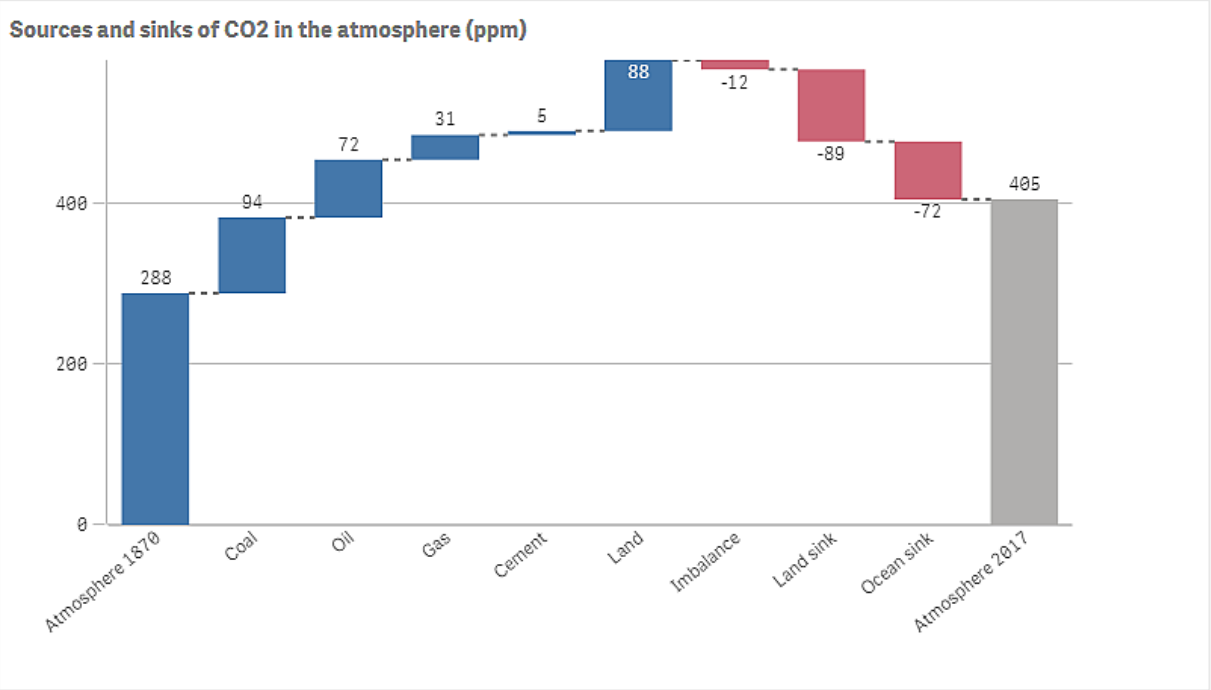
Add the text file as data source in an empty app and load the data. Make sure that you use comma as field delimiter.

Visualization

We add a waterfall chart to the sheet and add the fields as measures in the following order. Edit the label for each measure to remove the `Sum()` part.

- Sum(Atmosphere1870)
- Sum(Coal)
- Sum(Oil)
- Sum(Gas)
- Sum(Cement)
- Sum(Land)
- Sum(Imbalance)
- Sum(Land_sink)
- Sum(Ocean_sink)

To add a bar that shows the calculated result, the CO2 level for 2017, open the final measure and select **Subtotals**. You can set **Subtotal label** to *Atmosphere 2017*.



Discovery

As you can see in the chart, the CO2 level in the atmosphere is higher in 2017 than in 1870. Coal is the main contributor of CO2. Some of the increase is offset by carbon sinks that absorb CO2, for example, the ocean. As we can see, this is unfortunately not enough to stop the increase of CO2 in the atmosphere

Button

You can use buttons to:

- Add quick links for easy selection and navigation in your app
- Reload data

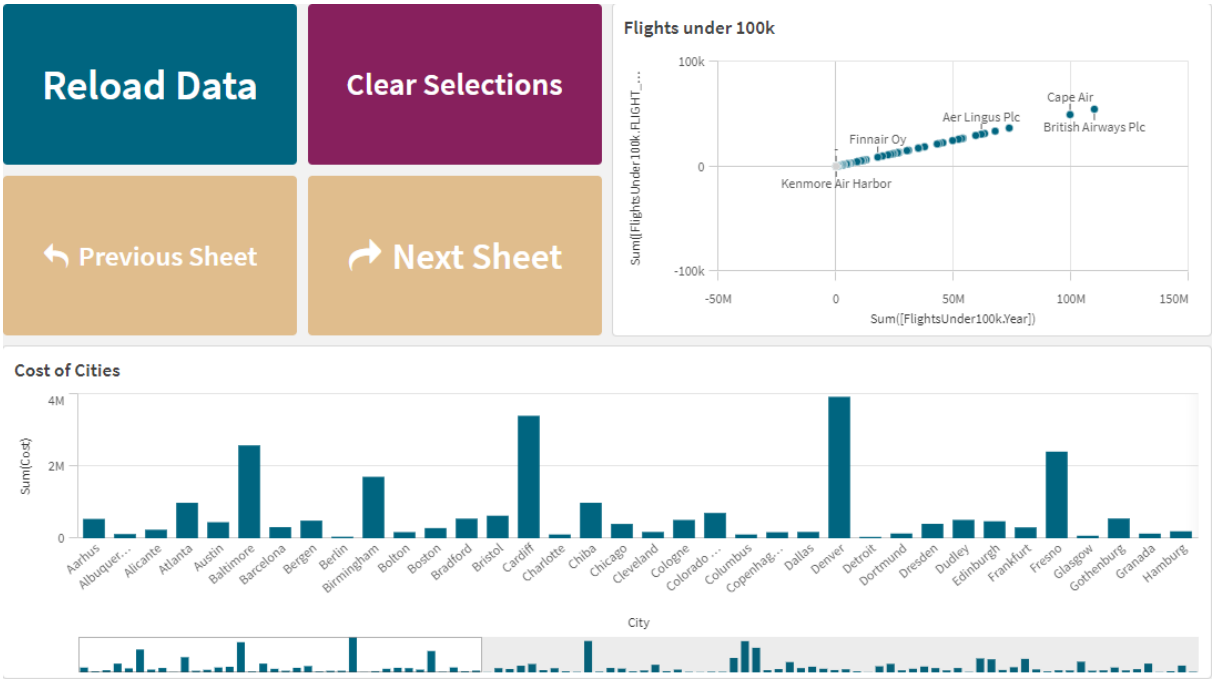
When to use it

The button is useful when you want to help the app user by providing:

- predefined selections or selection controls
- navigation links to other sheets, stories, or websites
- reload data functionality in an app

You can reload data in an app that you own. App users need the appropriate access rights.

Example of buttons in use on a sheet



Creating a button

You can create a button on the sheet you are editing. This shows how to create a button that makes a selection and then navigates to another sheet. It is also possible to create a button that just performs the action, or that navigates.

Do the following:

1. In the **Assets** panel under **Charts**, drag a **Button** object to the sheet.
2. Click **Add action** under **Actions** in the properties panel.
3. Select the action you want to use.
   For some actions you need to provide details for the action. For example, for the **Select values in a field** action, you need to select a field, and which value to select in the field.
4. Select which navigation option to use under **Navigation**. You can navigate to another sheet, a story or a website.
5. Set the label of the button in **Label** under **General** in the properties panel.

You will now have a button that makes a data selection and then navigates to the place in the app you selected.

Setting the action

You can add one or more actions to be performed when the button is clicked. For some actions you need to provide details for the action.

The actions are performed in the order they are listed under **Actions**. You can change the order of an action by dragging it.

Toggle **Runtime evaluation** on or off to change when the expressions in the button are evaluated. If this setting is turned off, the expressions in the button (for example, the value expression for a variable) are evaluated independently of one another. With the setting turned on, the expressions for each action are evaluated at the action's runtime. This allows expression values set in an action to be carried forward for future actions in the chain.

You do not have to add an action if you just want the button to perform navigation.

Related video content

Configuring an action for a button is similar to setting sheet actions. The main differences are:

- Sheet actions are configured under **Actions** in the properties panel when the sheet is the object in focus.
- Button actions are configured under **Actions and navigation** in the properties panel when the button is selected.
- There are some differences between which actions are available for buttons and sheets.

For video content describing the action configurations for sheets, see *Adding actions to sheets (page 21)*.

Apply bookmark

You can apply the selection that is defined in a bookmark that you choose.

Clear all selections

You can clear all selections in all states in the app. You can optionally overwrite locked selections.

Clear selections in other fields

You can clear selections from all fields except the one you specify. You can optionally overwrite locked selections.

If no selections are made in the specified field, all values in this field will be selected.

Move forwards in your selections

You can move one step forwards in your selection history.

Move backwards in your selections

You can move one step backwards in your selection history.

Clear selections in field

You can clear all selections from a field that you specify.

Lock all selections

You can lock all selections in the app.

Lock a specific field

You can lock selections in a field that you specify.

Unlock all selections

You can unlock all selections in the app.

Unlock a specific field

You can unlock selections in a field that you specify.

Select all values in a field

You can select all values in a field that you specify. You can optionally overwrite locked selections.

Select values in a field

You can select a list of values in a field that you specify. Separate the values to select with a semi colon. You can optionally overwrite locked selections.

It is not possible to use fields with date, timestamp, or money data type.

*This button action does not select numeric values that are stored or classified as text. For this purpose, use the **Select values matching search criteria** action instead.*

Select values matching search criteria

You can select all values that match the search results from a search criteria that you specify. You need to specify the search criteria as a string. You can optionally overwrite locked selections.

- If you want to use an expression, you need to enclose it in single quotes, for example, *='=Sum ([Sales Amount]) > 200000'*.
- If you want to search for a partial string, you need to use wild cards (*, ?,^). If you do not use wild cards, only strings that match exactly are selected.

Select alternatives

Select all alternative values in a field that you specify. You can optionally overwrite locked selections.

Step cyclic dimension

Cycle fields in a selected cyclic dimension forward or backward.

Limitations

Step cyclic dimension has the following limitations:

- In Qlik Sense Mobile, buttons with the action **Step cyclic dimension** will only cycle dimension if the button is in a container.
- In Qlik Sense Mobile, buttons with the action **Step cyclic dimension** do not cycle the dimension in offline mode.

Set active field

Set the active field in a cyclic dimension.

Limitations

Set active field has the following limitations:

- **Set active field** uses the position of the selected field in the cyclic dimension. If the fields are reordered in the cyclic dimension, **Set active field** will use the field in the same position as the originally selected field. To resolve this, select the field again in the button properties.

Select excluded

Select all excluded values in a field that you specify. You can optionally overwrite locked selections.

Select possible values in a field

Select all possible values in a field that you specify. You can optionally overwrite locked selections.

Toggle field selection

You can set the button to toggle between the current selection, and a selection that adds selections defined by a search string. You can use wild cards in the search string. If you want to define a list of values you need to use the format *(A|B)*, where A and B are values to select.

Set variable value

You can assign a value to a variable.

Reload data

You can run the load script to reload data.

You can also select **Partial reload**.

Refresh dynamic views

Refreshes the displays of all dynamic objects on the sheet based on the current selection.

Navigation

You can choose to navigate to another sheet, a story, or a website when the button is clicked. You do not have to specify an action if you want to create a simple navigation button. A button can only have one navigation option at a time.

Navigation is not supported in stories.

Go to next sheet

Navigate to the next sheet sequentially.

Go to previous sheet

Navigate to the previous sheet sequentially.

Go to last sheet

Navigate to the last sheet.

Go to first sheet

Navigate to the first sheet.

Go to a sheet

Navigate to a specific sheet, and optionally highlight a specific chart on the sheet.

Under **Sheet**, enter the name of the desired sheet or select it from the list. Under **Chart ID**, enter the object ID for the chart or select the desired chart from the list.

You can obtain the object ID with either of the following methods:

- *In analysis mode, right-click a visualization, and then click **Share** > **Embed**. You can then find the object ID in the dialog.*
- *For certain chart types, you can use the **ObjectId** chart function. For example, add `=ObjectId()` as a dimension along with any measure. The chart ID is displayed and you can write it down for future reference. For more information, see* ObjectId - chart function.

Go to a sheet defined by sheet ID

Navigate to a specific sheet. Enter the sheet ID of the desired sheet. You can find the ID of a sheet in the URL of the browser with the sheet open. The sheet ID follows after `/sheet/` followed by `/`.

Example: Sheet URL

```
qlik.com/sense/app/8f8ffa0e-3fde-48a5-a127-59645923a1fc/sheet/7300b241-f221-43db-bb8b-8c8cc1887531/state/analysis
```

The ID of the sheet is `7300b241-f221-43db-bb8b-8c8cc1887531` in this example.

Go to a story

Navigate to a specific story. Enter the name of the desired story, or select it from the list.

Open a website or email

Open a specified website or email client. Enter the URL to navigate to. Optionally, select **Open in same window** to have the website or email client open in the same window.

Generate on-demand app

Creates an on-demand app based on the current selection. You must select an on-demand app navigation link . The status of the app is displayed as the app is created.

Styling the button

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Adding an icon

You can add an icon to the button under **Appearance** > **Icon**. Choose from a number of preset options.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, switch the **Show titles** setting to off.

Additionally, you can set the text for the button **Label**.

You can style the text that appears in the chart.

Do the following:

1. Under **Appearance** > **Presentation**, click **Styling**.
2. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
3. On the **Chart** tab, set the text properties for the button **Label**. Set the font, emphasis style, text alignment, font size, and color.
   You can also choose from a number of text layout options for this label under **Layout behavior**. The following options are available:

- **Responsive**: You can adjust the font size of the **Label**, with additional text size adjustments applied based on button size and text length. Adjustments are made to fit all text content into the button.
- **Fluid**: You can adjust the font size of the **Label**, with additional text size adjustments applied based on button size only. This re-scaling of the text is independent of text length. If the text is too long, an ellipsis is inserted at the end.
- **Fixed**: You can adjust the font size of the **Label** in pixels. If the text is too long, an ellipsis is inserted at the end.

Customizing the background

You can customize the general background, as well as the background of the button itself. The background of each can be set by color and image. Background options can be configured by expanding **Appearance** > **Presentation** in the properties panel, then clicking **Styling**.

Setting the general background

The general background of the button includes the title area, as well as the chart itself, which is partially covered by the button itself.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Setting the background of the button

The background of the button includes the portion that the user can click to execute the action.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, you can select a background color (single color or expression), and also set the background to an image from your media library.
   When using a background image, you can adjust image sizing and position.

Adjusting the border of the interactive portion of the button

You can adjust the border of the part of the button the user interacts with to perform intended action.

Do the following:

1. Under **Appearance** > **Presentation**, click **Styling**.
2. On the **Chart** tab, under **Border**, switch the border **On** to display it on the button.

3. Adjust the corner radius and width.
4. Set the color of the border, either a single color or with an expression.

Customizing the border and shadow of the entire object

You can customize the border and shadow of the entire object in which the button is located. Note that you can also adjust the border of the clickable button itself.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Disabling and enabling the button

You can set a calculation condition to enable the chart under **Enable chart**. If the condition is evaluated to 0, the button is disabled.

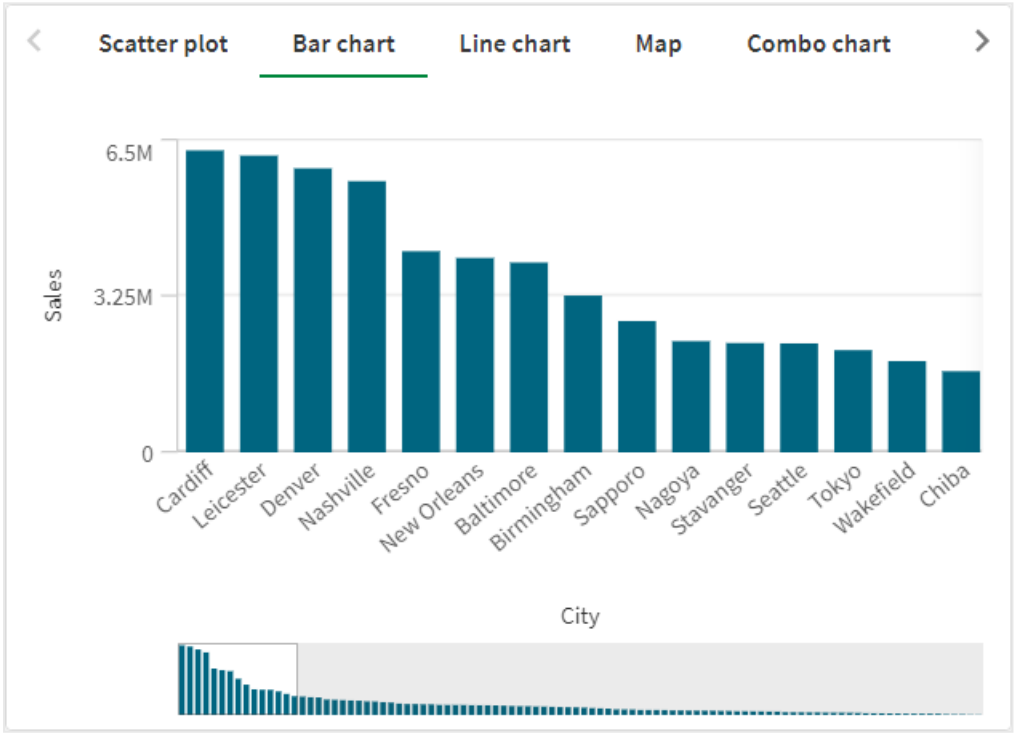
Converting from the **Button for navigation** in the Dashboard bundle

You can convert an existing **Button for navigation** control into a button. There are some limitations when you do the conversion.

- The navigation option to switch to edit mode (**Switch to edit mode**) is not supported.
- The action to select a value and then lock the field (**Select a value and lock field**) is not supported. This will be converted into two consecutive actions, **Select values in a field** and **Lock a specific field**.

Tab container

The tab container is an object that lets you add visualizations in a limited space. You can also show or hide the visualizations inside the tab container based on conditions.



When to use it

The tab container is useful when you want to quickly switch between different visualizations on a dashboard with limited space. You can also use a tab container to show different visualizations based on:

- Which user is accessing the chart.
- The value of a variable.

- The possible number of values in a field by using the **GetPossibleCount()** function in the condition expression.
  Displaying different charts based on selections with a tab container (page 472)

Creating a tab container

You can create a tab container on the sheet you are editing.

Do the following:

1. From the assets panel, drag a **Tab container** object to the sheet.
2. Click **Add** under **Content** in the properties panel.
3. Select a master visualization in **Master items**, or create a new visualization in **Charts**.
   Alternatively: you can add content to your tab container by dragging available visualizations from your sheet, or from your **Master items**, directly on the tab container.
4. Drag the charts in the property panel to set the tab order.

You now have a container with a tab for each visualization you added. You can switch between tabs to show different visualizations.

Adding show conditions

You can add show conditions on the tabs you have created.

Do the following:

1. Click on the chart you want to add a show condition to, under **Content** in the property panel.
2. Add a show condition for the chart in **Show condition**. Typically you would use an If() function.
3. Add another show condition to a different chart.
   The charts will now be shown or hidden depending on the result of the conditions you added. If the condition of a chart results in True, it is shown, and if it is False, it is hidden.

Changing the tab orientation

Tabs can be orientated vertically or horizontally.

Do the following:

1. Go to **Appearance** > **Presentation** in the property panel.
2. Under **Orientation**, select the position of tabs in the tab container.

Changing the default active tab

By default, the first tab is displayed when you view a tab container. You can change this in the property panel.

Do the following:

1. Go to **Appearance** > **Presentation** in the property panel.
2. Use the **Default tab** dropdown to select which chart displays when users view a sheet. The dropdown lists the available charts in the same order they are arranged in the container.
3. If you want to see the new default tab setting take effect, close and re-open your browser.

Styling the tab container

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Tab** tab, set the font, font size, and color for the following text elements:
    - **Label**: Style the labels on the axes.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.

3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. Under **Border**, set the border outline and corner radius.

Adding a shadow

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. Under **Shadow**, set the shadow size and color.

Setting tab width

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. Click **Tabs**.
4. Under **Width**, set the width to be in percentage or pixels.
5. Under **Min/Max**, set the maximum and minimum sizes of the tabs.

Setting the selected tab indicator color

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. Click **Tabs**.
4. Under **Indicator**, select to use a single color or color by expression.
5. If using a single color, select a color.
6. If using an expression, enter an expression.

Styling icons

If you turn on **Show icons**, you can style the icons.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. Click **Tabs**.
4. Under **Icon**, set the size, color, and position of chart icons.

Customizing tab background colors

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. Click **Tabs**.
4. Under **Background color**, select the colors for tabs, selected tabs, and when tabs are being hovered over. You can color by a single selected color or by expression.

Creating a bookmark with a tab container

By default, if you create a bookmark that contains a tab container object with selections, the first tab will be active when the bookmark is selected. To save a different default active tab for the tab container, you can toggle on **Save layout** when creating the bookmark with that tab open. If you set that bookmark as the default bookmark by right-clicking and selecting **Set as default bookmark** in the bookmark list, the sheet will open to the selections and tab that were active when the bookmark was created.

Do the following:

1. Click in the toolbar.
2. Click **Create new bookmark**.
   Change the name and description, if desired.
3. If you want a tab other than the default tab to be the active tab, toggle on **Save layout** with that tab open. This will override the **Default tab** setting in the property panel.
4. Click **Save**.

Display limitations

- You cannot use a master visualization that has a tab container inside another container.
- You cannot add the same master visualization twice in a tab container.
- You cannot create a chart inside a tab container by dropping measures or dimensions on the container.
- The visualization exploration menu is not available for charts that are located inside a tab container, layout container, or legacy container object.
- With the **Show hover menu** setting turned on and the hover menu visible, you may not be able to see arrows for switching between tabs.

Displaying different charts based on selections with a tab container

This example shows how to display different chart content based on user selections using a tab container.

- When a single product group is selected a chart for product sub groups is displayed.
- When more than one product group is selected a chart for product groups is displayed.

Dataset

In this example, we will use two data files from the Qlik Sense Tutorial - Building an App. To download the files, go to Tutorial - Building an App. Download and unzip the tutorial, and find the files in the *Tutorials source* folder:

- *Sales.xls*
- *Item master.xls*

Create a new app and add the two data files. Make sure that they are associated by *Item Number*.

The dataset that is loaded contains sales data. The *Item master* table holds the information about the items ordered, such as product groups.

Measures

We need to create two measures in Master items:

- Sales volume: with the name *Sales*, and the expression `Sum(Sales)`.
- Sales margin in percent: with the name *Margin %*, and the expression `Avg(Margin/Sales)*100`.

Visualizations

We need two different master visualizations based on product group selections. One of them with product group as dimension, the other with product sub group as dimension.

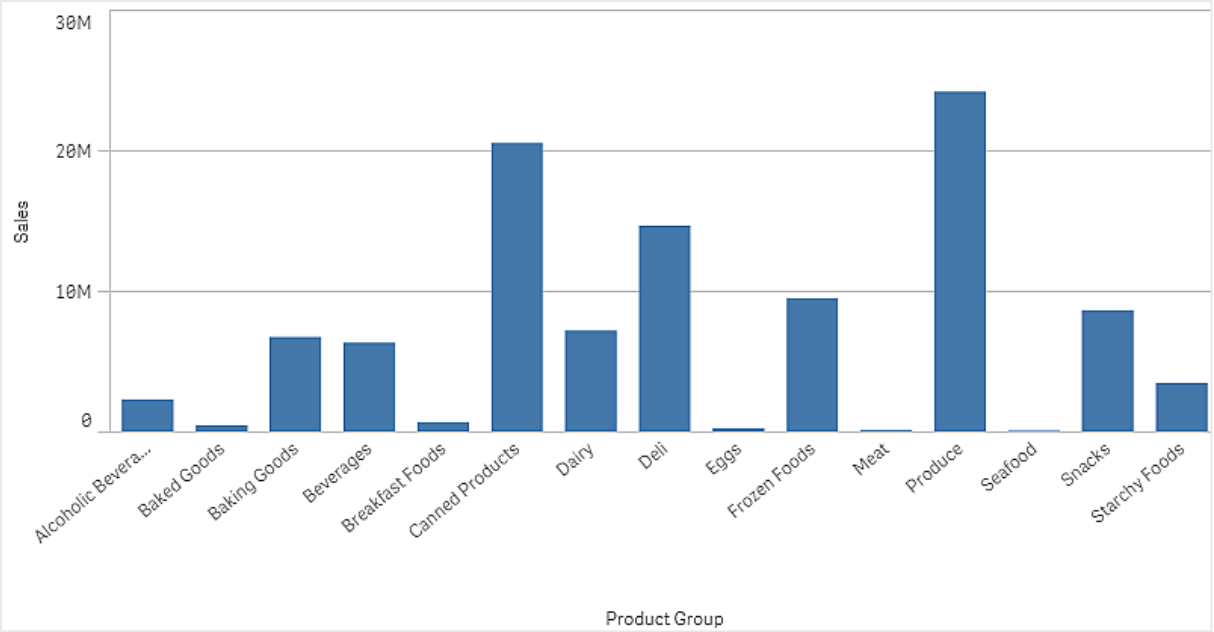
Product group visualization

This is the visualization we want to show when more than one product group is selected.

We add a combo chart to the sheet and set the following data properties:

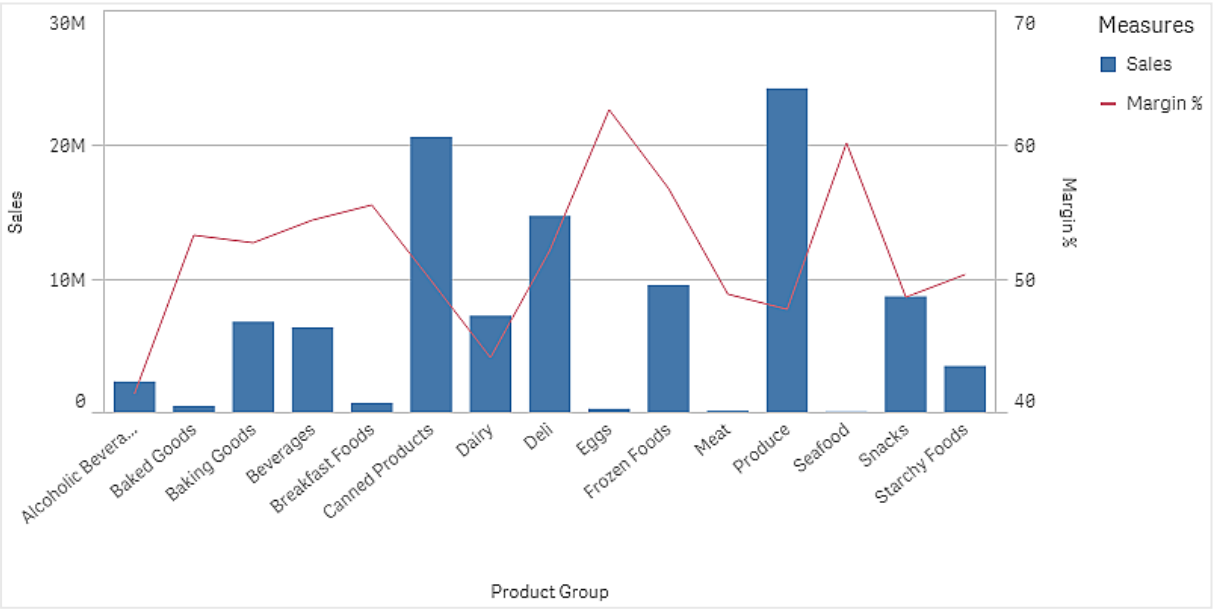
- **Dimension**: Product Group (product group).
- **Measure**: *Sales* (the master measure you created).

The following chart is created, with a bar showing the sales for each product group. It is a bar chart at this stage.



But we also want to show the sales margin, which has a different scale than the sales volume. Sales volume is in the scale of millions, while the margin is a percentage between 0 and 100. If we add margin as a bar next to sales volume, it would be too small to distinguish.

In the properties pane, go to **Measures** > **Height of line**. Use the drop down to add *Margin %* as a measure.



Product sub group visualization

This is the visualization we want to show when a single product group is selected.

Make a copy of the product group visualization, and change the dimension to Product Sub Group.

Master visualizations

You need to create two master visualizations to use in the tab container.

- Add the product group visualization as a master visualization with name Product Group - sales and margin.
- Add the product sub group visualization as a master visualization with name Product Sub Group - sales and margin

You can now delete the two visualizations you created earlier, they are saved as master visualizations.

Tab container

You need to add a tab container to the sheet. Add the two visualizations to the tab container.

- Product Group - sales and margin
  Set **Show condition** to `=GetPossibleCount([Product Group])>1`
- Product Sub Group - sales and margin
  Set **Show condition** to `=GetPossibleCount([Product Group])=1`

You can also hide the selection tabs of the tab container under **Appearance**>**Container**>**Tabs**.

To demonstrate how it works, you can add a filter pane with Product Group.

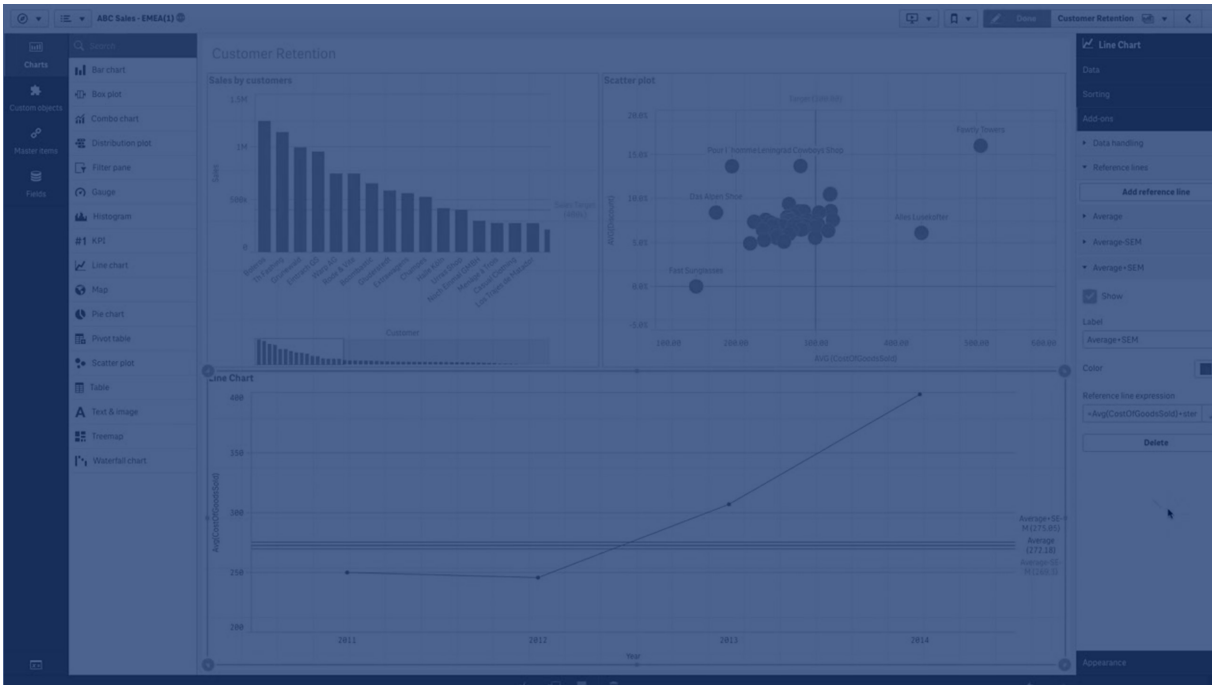
Discovery

You can now make selections in Product Group. When a single product group is selected, the chart displays data for product sub groups of that product group. Otherwise, the chart displays data for product groups.

Reference lines

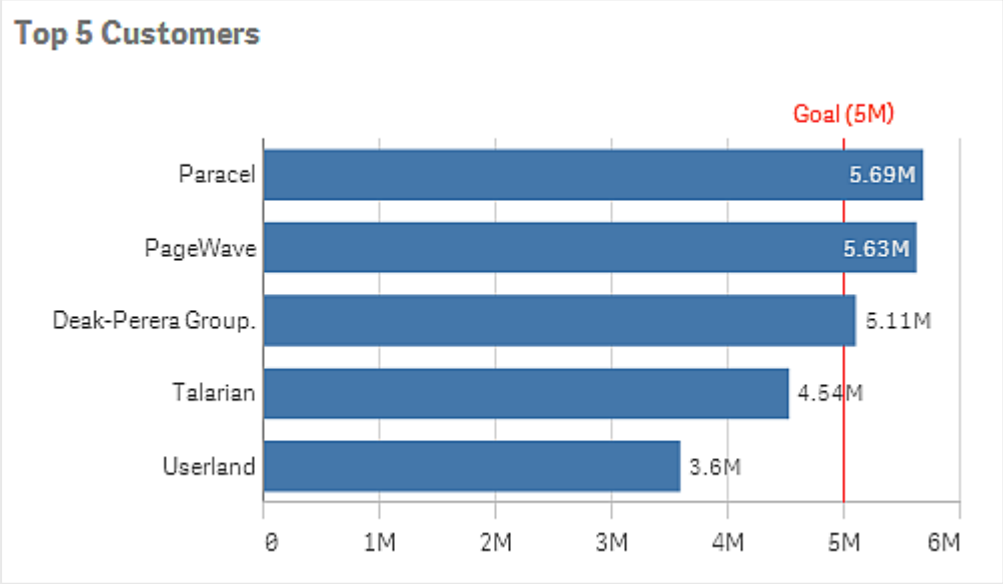
A reference line is a line intersecting the chart area from a given point on the measure axis.

For information about how to create reference lines, see *Adding reference lines to visualizations (page 680)*.



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

Bar chart Top 5 customers with a reference line at 5M.



Reference lines are available in the following visualization types:

- Bar chart
- Box plot
- Combo chart
- Distribution plot
- Gauge

- Histogram
- Line chart
- Scatter plot
- Waterfall chart

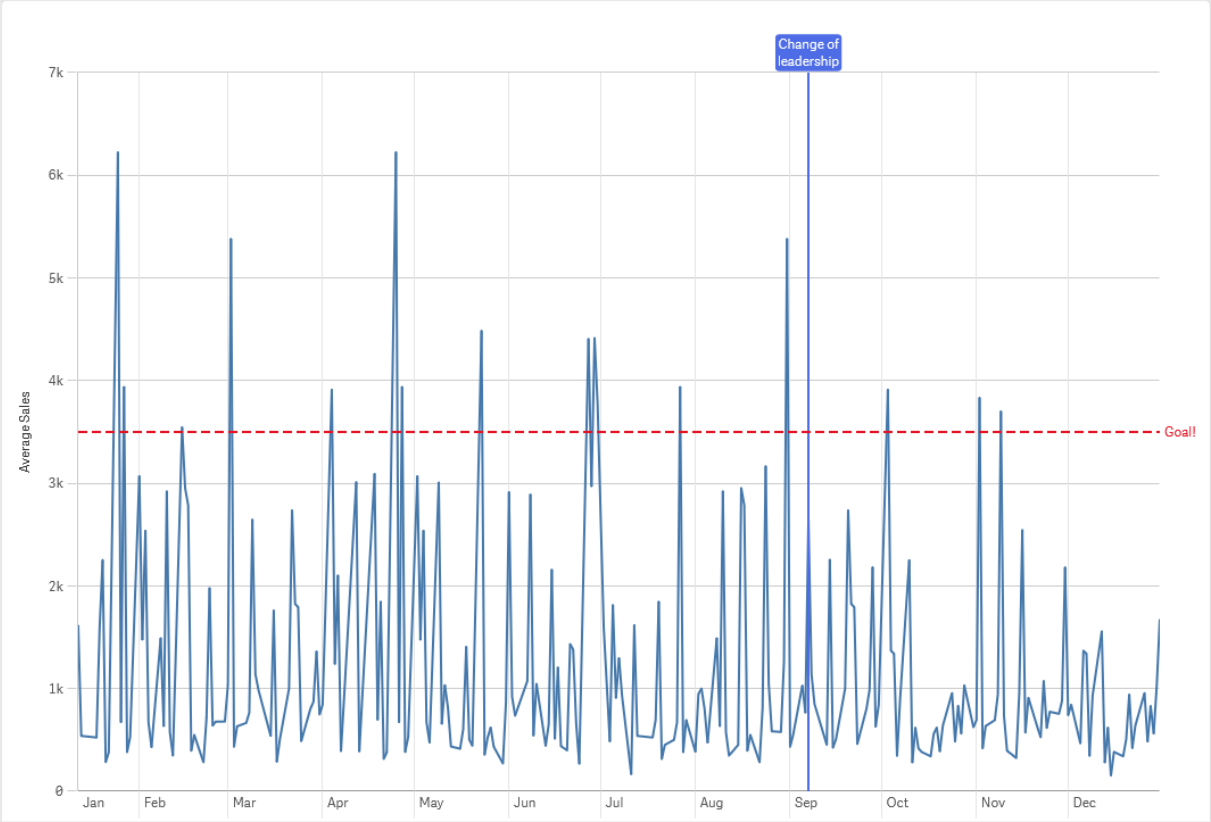
Reference line expression

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

Dimensional reference lines

You can also add reference lines along the dimension axis. Both continuous and discrete axes are supported. It is possible to enter text values for discrete dimensional axes, and numerical values or expressions for continuous axes. On a time axis it is possible to enter an expression that gives a time-based result like a date or a month.

Line chart average sales per month, with a reference line at 3.5k and a dimensional reference line in September.



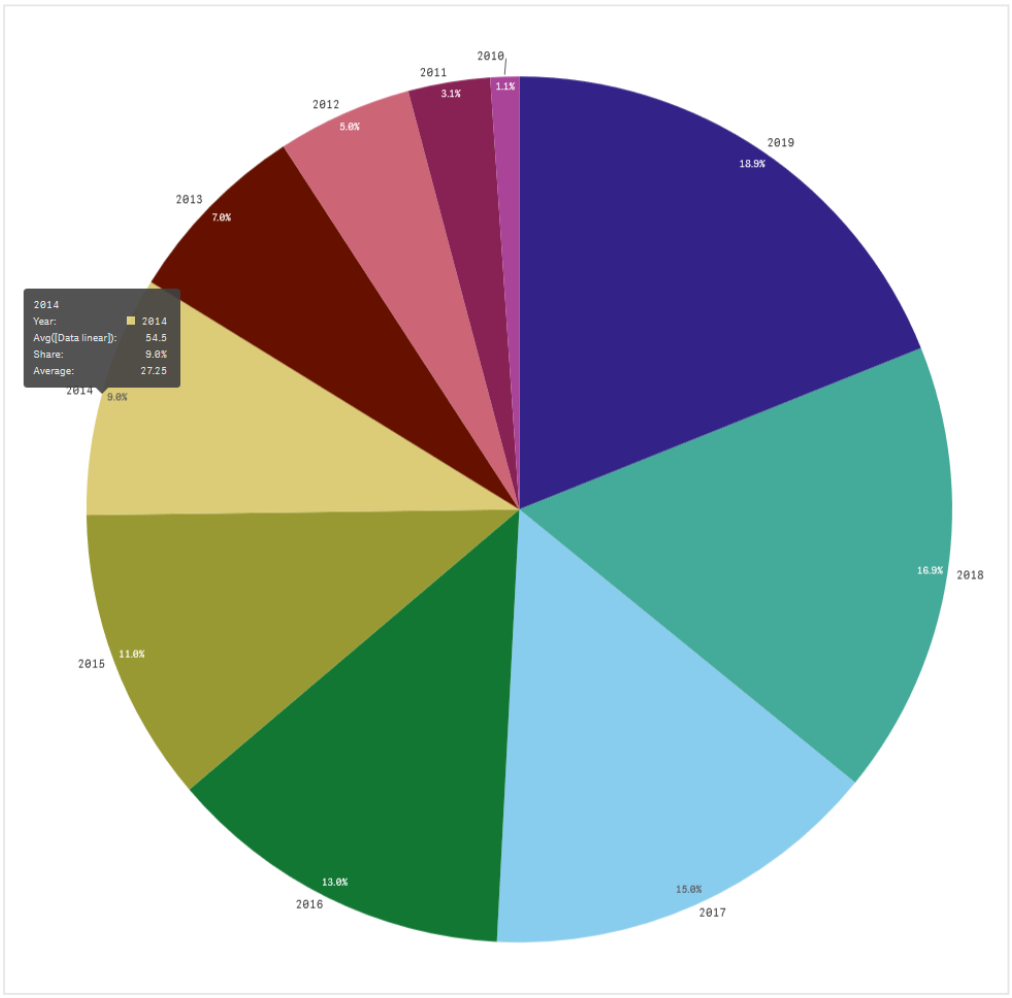
Dimensional reference lines are available in the following visualization types:

- Bar chart
- Combo chart
- Line chart

Creating custom tooltips

Create a custom tooltip to add extra information to a visualization. You can include measures a master visualization chart or an image. Tooltips display when you hover over a visualization.

Custom tooltip over a pie chart slice



Custom tooltips are available with the following visualization types:

- Bar chart
- Bullet chart
- Combo chart
- KPI
- Line chart
- Map
- Pie chart
- Scatter plot
- Treemap

Creating a custom tooltip

Tooltips can contain measures, a chart, or an image. Add a measure from a field or using an expression. Select a chart from the master visualizations available in the app. Choose an image from the media library or by URL. You can also hide the basic rows that appear in a tooltip by default.

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. Select the chart to edit.
3. In the properties panel, click **Appearance**, and then click **Tooltip**.
4. Set the toggle to **Custom**.
5. Optionally, enter a **Title** and **Description** for the tooltip.
   Click f_x to use the expression editor if you need to add more than 512 characters.

   *You can remove basic tooltip rows that appear by default by clicking **Hide basic rows**.*
6. If you want to add a measure, under **Measures**, click **Add measure**. Select a measure from a field using **From a field**, or use an expression. The existing expression displays by default, or you can create a custom expression. Click f_x to open the expression editor. You can change the label of the tooltip using **Label** as well as its formatting using **Number formatting**.
7. If you want to add a chart, under **Chart**, click **Add chart**.
   - From the **Master items** list, select the master visualization to add to the tooltip.
   - Under **Chart size**, select the size of the chart container in the tooltip.
     - **Small**. Sets the width and height of the container to 140 pixels.
     - **Medium**. Sets the width and height of the container to 200 pixels.
     - **Large**. Sets the width and height of the container to 340 pixels.

   *After you add the chart, you can edit it by clicking **Edit master item**. See Editing a master visualization (page 125).*

8. If you want to add an image, under **Images**, Click **Add an image**.
    - Under **Type**, select whether to add the image from your **Media library** or from a URL.
        - **Media library**: Select the image from the media library.
        - **URL**: Enter a URL.
    - Under **Size**, select the size of the image container in the tooltip.
        - **Small**. Sets the width and height of the container to 50 pixels.
        - **Medium**. Sets the width and height of the container to 200 pixels.
        - **Large**. Sets the width and height of the container to 340 pixels.
        - **Original**. Qlik Sense fits the image into the container. If the image is larger than 340 pixels, it is scaled down.

Limitations

Custom tooltips have the following general limitations:

- Custom tooltips are disabled for a bar or line chart if any of the dimensions in the chart are using a show condition.

Limitations of charts in custom tooltips

Charts have the following limitations with custom tooltips:

- Charts will not appear in custom tooltips when selecting visualizations on touch devices.
- Treemap chart must have only one dimension to use the chart in a custom tooltip.
- Chart in tooltip is not supported in Storytelling.
- Using container and trellis container charts inside a custom tooltip is not supported.

Null values in visualizations

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

How Null and NaN values are displayed

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

Visualization type	Null values in dimensions	NaN values in measures
Histogram	-	No representation
KPI	N/A	-
Line chart	-	Empty
Map	No representation	Gray
Pie chart	-	Empty
Scatter plot	-	Empty
Table	-	-
Text & image	N/A	-
Treemap	-	Empty

Dashboard bundle

Dashboard bundle is a set of controls that you can use to enhance navigation and selection in your Qlik Sense app. The controls are optional. You do not have to install or enable them to use Qlik Sense.

Enabling Dashboard bundle

You can install the Dashboard bundle when you install Qlik Sense. If you need to adjust your installation, see: Modifying an object bundles installation.

Dashboard bundle controls

Dashboard controls are in the asset panel under **Custom objects**.

The following controls are included:

- *Animator (page 484)*
  You can animate changes in your visualizations over a period of time.
- *Date range picker (page 486)*
  You can select a single date or a range of dates from a calendar.
- *Layout containers allow you to add visualizations in a limited space. You can also show or hide the visualizations inside the layout container based on conditions. (page 493)*
  Add and arrange visualizations in a container.
- *Add lines to your sheets with the Line control. (page 490)*
  Add vertical and horizontal lines to a sheet.
- *On-Demand reporting control (page 515)*
  You can add a button that creates a Qlik NPrinting report using the current selections in the app.
- *Text objects complements other visualizations by offering options to add text, hyperlinks, and measures. You can also add background images. (page 520)*
  A text object allows app developers to create and format text.

- *Variable input control (page 524)*
  You can set the value of a variable.
- *Video player (page 527)*
  You can add a video to your sheet.

Deprecated controls

These controls have been deprecated by the addition of a native control. New instances cannot be added. Most of these will be removed from your apps in the May 2027 version of Qlik Sense Client-Managed, while others will remain but require migration to the native controls.

Deprecated controls that will be removed from user apps

Existing instances of these controls will be deleted in the May 2027 version of Qlik Sense Client-Managed.

Container
Deprecated by **Tab container**. For more information, see *Tab container (page 466)*.

You can convert a container to a tab container by dragging and dropping a tab container onto a container from the assets panel.

If you need to configure existing instances of this control, please refer to the last version of the help before deprecation.

Share button control
If you need to configure existing instances of this control, please refer to the last version of the help before deprecation.

Show/hide container
Deprecated by **Container**.

If you need to configure existing instances of this control, please refer to the last version of the help before deprecation.

Tabbed container
Deprecated by **Tab container**.

If you need to configure existing instances of this control, please refer to the last version of the help before deprecation.

Navigation button
Deprecated by **Button**.

If you need to configure existing instances of this control, please refer to the last version of the help before deprecation.

Other deprecated controls

NL Insights
Deprecated by native **NL insights** object. Existing instances may need to be migrated manually.

Limitations

When you use objects from Dashboard bundle there are some limitations compared to built-in controls. The following limitations are valid for all controls from Dashboard bundle:

- The user interface of the visualization is not localized to the language that Qlik Sense is using.
- Right-to-left reading order is not supported.
- Accessibility features are not supported.
- It is not possible to edit objects from an object bundle supplied by Qlik with Dev Hub.

The following table shows which additional features are supported, or not supported, for all bundled objects:

- Qlik NPrinting
  There is an *On-Demand reporting control (page 515)*. However, visualizations made in some objects cannot be used in Qlik NPrinting reports.
  On-Demand reporting control is not supported on mobile devices. An On-Demand reporting control button only works when accessed through a personal computer.
- Download
  Downloading as image, PDF, or Excel.
- Storytelling
  Using a snapshot of a visualization created with an object in a story.
- Alternate states
  Making different selections on the same dimension and comparing the selections in a single visualization or in two or more visualizations side by side.
- Qlik Sense Client-Managed Mobile offline

Dashboard bundle capability support

Control	Qlik NPrinting	Download	Storytelling	Alternate states	Qlik Sense Client-Managed Mobile offline
Animator	Not applicable	Excel only	Not applicable	Yes	Yes
Date picker	Not applicable	Not applicable	Not applicable	Yes	Yes
Layout container	Yes	Image and PDF only	Yes	Yes	Not applicable
Line	Not applicable	Image and PDF only	Yes	Yes	Yes
On-demand reporting	Yes	Not applicable	Not applicable	Not applicable	Not applicable
Text	Yes	Yes	Yes	Yes	Yes

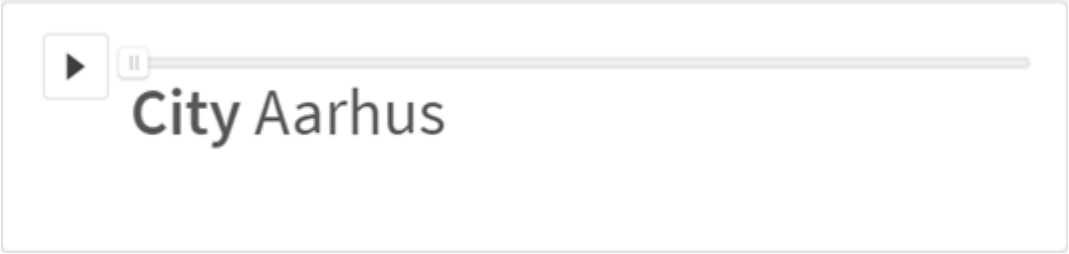
Control	Qlik NPrinting	Download	Storytelling	Alternate states	Qlik Sense Client-Managed Mobile offline
Variable input	Not applicable	Not applicable	Not applicable	Not applicable	Yes
Video player	Not applicable	Not applicable	Yes	Yes	Not applicable

Animator

The animator control animates the changes in values in your visualizations over a range of values. For example, you could view changes in your visualizations over a period of time.

The animator control adds a button and progress slider to the sheet. When pressed, animator cycles through the values of its dimension. Users can use the slider to manually pick values from the dimension to display.

Animator



When to use it

The animator is useful when you want to see your visualizations change over a specified range, such as over a period of time. For example, you could use the animator control to view how visualizations in your sheet change month to month over a period of a year. Animator can be used to animate any dimension values. You could, for example, animate how your sales visualizations change city to city by selecting a dimension containing city vales to use with animator.

The selections animator makes while running through values are applied to your current selections.

Creating animators

You can create an animator on the sheet you are editing. The dimension you select to use with animator contains the range of values you want animated. By default, every value in the dimension will be used as a step. You can customize the number of steps used in the animation as well as how quickly animator moves between steps. Animator runs through dimension values by the order in **Sorting**.

Do the following:

1. In the assets panel, open **Custom objects** > **Dashboard bundle** and drag a **Animator** object to the sheet.

2. Select a field to add as the dimension.

Once you have created the animator, you may want to adjust its animation options and other settings.

Setting animator options

Animator options are set in **Animator Options** in the **Properties** pane.

You can control how fast an animator transitions between values in the selected dimension in **Time Between Steps**. **Time Between Steps** requires values be set in milliseconds.

> *It is not recommended to set **Time Between Steps** lower than 300 milliseconds.*

You can set the total steps the animator runs through in **Total Steps**. The animator will divide the total steps evenly across the dimension values. For example, if there are 10 values in the time dimension selected and Total Steps is set to 5, animator will go to values 2, 4, 6, 8, 10). If Total Steps is set to 0, the animator will use every value.

If you want the animation to show the total building over time for your selected values, select **Aggregate**. When **Aggregate** is selected, each step is aggregated to the previous step.

By default, the animator will run through steps in a loop. You can control this with the **Loop** option.

You can control whether or not the dimension and current value displays in the animator as it runs with **Show Dimension Label** and **Show Dimension Value**.

Customizing styling

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.

3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

Animator has the following limitations:

- Animator does not support drill-down dimensions as the dimension.
- Animator does not support animating trellis charts.
- An animator can have a maximum of 1000 steps.

Date range picker

The date range picker (**Date picker**) lets you select a single date or a range of dates from a calendar. It is included in Dashboard bundle.

Date picker has two modes:

- In single date mode, you select from a simple calendar.
- In date interval mode, you can select a range from the calendar, or any of the predefined ranges that are available.

Dates associated to data appear in black in the calendar. Dates with no associated data appear in grey. Users can select any date.

When to use it

The date range picker is useful when you have one or more date fields that you need to use to filter your selections. Unlike a filter pane, a date range picker will only display date fields.

Creating a date range picker

You can create a date range picker on the sheet you are editing.

Do the following:

1. In the assets panel, open **Custom objects** > **Dashboard bundle** and drag a **Date picker** object to the sheet.
2. Select the date field to use as filter in **Date field**.
   The list contains only fields that are recognized as a date field by Qlik Sense.

   If you want to use a timestamp field, you need to convert it to a date. Use the expression `=date(floor(myTimeStamp_Field))` *instead of* `myTimeStamp_Field`.
3. Select if you want to be able to pick a single date or a date interval in **Single date / interval**.
   Date interval lets you pick a range of dates.
   Single date lets you pick a single date only.

When you have created the date range picker, you may want to adjust its appearance and other settings.

Setting the available date range

You can set the range of dates available to pick by setting the option **Advanced setup** to **On**. You can use expressions or explicit date values. The expressions used below refer to a field named *DateField*.

- Set the first date of the calendar with **Min date**.
  Default value is `=Min( {1} [DateField])`. This expression returns the first date in *DateField* in the full data set.
- Set the last date of the calendar with **Max date**.
  Default value is `=Max( {1} [DateField])`. This expression returns the last date in *DateField* in the full data set.
- Set the date to show when the date range picker is opened with **Start date**.
  Default value is `=Min([DateField])`. This expression returns the first date in *DateField* in the current selection.

Setting locale of the calendar

You can set the locale of the calendar to get local names for days and months. Change the setting **Locale** under **Calendar Settings** > **Language and labels** to the two-letter code of the locale you want to use. For example, you can change the default value of *en* for English to *de* for German.

Using predefined ranges

In date interval mode there are a number of predefined ranges available to pick if **Show predefined ranges** is set to **On**. You can customize the text labels for the predefined range selections with the settings under **Calendar Settings** > **Predefined ranges**:

- **Custom Range** represents the option where you select a date interval freely from the calendar. Default value is Range.
- **Today** represents the date value of today. Default value is Today.
- **Yesterday** represents the date value of yesterday. Default value is Yesterday.
- **Last $ days** represents the two options for showing the last 7 or 30 days. $ is replaced by 7 or 30 in the string. Default value is Last $ days.
- **This** represents the current period. By default **Month** is selected. You can select:
  - **Day**
  - **Month**
  - **Quarter**
  - **Year**
  - **None**
- **Last** represents the previous period. By default **Month** is selected. You can select:
  - **Day**
  - **Month**
  - **Quarter**
  - **Year**
  - **None**

  You can specify how many of the previous periods to include in **Last number of**.
  You can include the current period by selecting **Include current**.

Customizing text labels

You can customize the text labels that are shown when the date range picker is used.

You change the text prompt shown when the date range picker is minimized with the setting **Default Text** under **Calendar Settings** > **Language and labels**. The default setting is 'Select date range'.

Customizing styling

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

The date range picker cannot filter date ranges greater than 28 years or that contain 10,000 or more values. If your date range contains a large number of dates, use another object such as a line chart.

For information about general limitations, see *Limitations (page 483)*.

Date format limitations

Dates in the format *YYYYMMDD* cannot be used in the date range picker. If your app has date values in this format, change the date format in the load script. Examples are shown below.

Examples: Transforming dates for compatibility with date range picker

For the example script below, consider the following:

- `original_date` is the original date field in *YYYYMMDD* format.
- `new_date1`, `new_date2`, and `new_date3` are updated date fields that will be in compatible date formats.
- `original_table` is the table in which the `original_date` field was loaded (not shown). For the purposes of the example showing a complete **LOAD** statement, we perform the transformation on this existing field by using a **RESIDENT** load. However, your own data can be loaded in many different ways depending on your use case.

```
SET DateFormat='M/D/YYYY';

Load
Date(Date#(original_date, 'YYYYMMDD'),'YYYY/MM/DD') as new_date1,
Date(Date#(original_date, 'YYYYMMDD')) as new_date2,
Date(Date#(original_date, 'YYYYMMDD'),'YYYY-MM-DD') as new_date3
RESIDENT original_table;
```

Line

Add lines to your sheets with the **Line** control.

With **Line** controls, you can add vertical and horizontal lines to your sheets. They can be dotted or solid.

Line in a sheet dividing visualizations

When to use it

The **Line** control is useful for helping to group or divide sheet objects, as well as decorating sheets to help improve visual appeal.

Creating lines

Do the following:

1. In the assets panel, open **Custom objects** > **Dashboard bundle** and drag **Line** to the sheet.
2. Adjust the **Line** on the grid.
3. In the properties panel, in **Presentation** under **Orientation**, select **Vertical** or **Horizontal**.
4. Under **Alignment**, select:
    1. **Leading**: Line is placed to the left (vertical orientation) or top (horizontal orientation) of **Line** on the grid.
    2. **Center**: Line is placed in the center of **Line** on the grid.
    3. **Trailing**: Line is placed to the right or bottom of **Line** on the grid.
5. Under **Stroke**, set the following line styling options.
    - **Color**: Select the color of the line.
    - **Width**: Set the width of the line.
    - **Dash**: Set whether the line is solid or dashed. If the line is dashed, the following options are available:
        - **Dash length**: Set the length of dashes in the line.
        - **Dash spacing**: Set the gap between dashes in the line.
6. Optionally, to add a title, subtitle, or footnote, under **General**, select **Show titles**.

Styling **Line** controls

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** tab. You can reset your styles by clicking next to each section.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**

- **Subtitle**
- **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

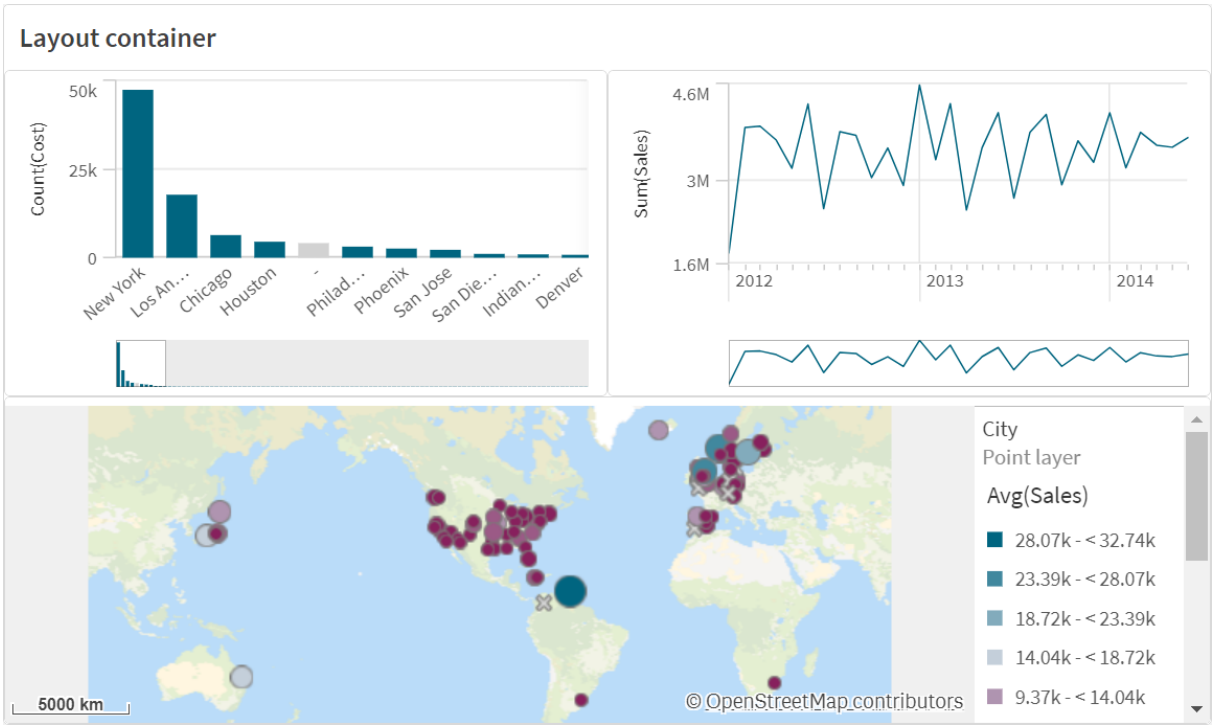
Line has the following limitations:

- You cannot connect the lines in separate **Line** controls together. If you want to have intersecting lines in your sheet, consider using a background image with the lines on the sheet instead.

Layout container

Layout containers allow you to add visualizations in a limited space. You can also show or hide the visualizations inside the layout container based on conditions.

Layout container



A layout container can hold a range of visualizations while occupying a small amount of space on a sheet. When expanded to full sheet, each chart expands as well.

When to use it

The layout container is useful when you want to build a custom display containing multiple charts as a single unit. Unlike the container, which uses tabs to cycle through charts, the layout container is a space where you are free to customize your own layout of the charts in the layout container. As the layout container offers sheet-like arrangement of visualizations, you can functionally store multiple sheets within a sheet that can be expanded for more detail.

You can place visualizations on top of one another. You can use conditions in the layout container to control which visualizations display. For example, you could show visualizations based on:

- Which user is accessing the chart.
- The value of a variable.

As a best practice, be aware the more visualizations that are added to a container, the longer is can take to display visualizations. Too may objects in a layout container might overwhelm the user and make the app slower to render visualizations.

Creating a container

You can create a container on the sheet you are editing.

Do the following:

- In the assets panel, open **Custom objects** > **Dashboard bundle** and drag **Layout container** to the sheet.

You now have a layout container. You can start adding and configuring charts to your layout container.

Adding charts to a layout container

You can copy and paste charts in and out of the layout container, but you must use the right-click context menu.

Do the following:

1. Select a layout container.
2. Click **Add** under **Content** in the properties panel.
   Alternatively, click **Add content** in the layout container.
3. Select a visualization in **Charts**.
4. Click **Add dimension** and **Add measure** to add data to the chart.
5. To resize the chart, do one of the following:
   - Click and drag the corners or edge of the chart.
   - In properties, enter the width and height of the chart in percent.
6. To reposition the chart, do one of the following:
   - Click and drag the chart into position.
   - In properties, enter the x-axis and y-axis positions of the chart, in percent.

   To show grid lines for layout, in properties, under **Presentation** > **Styling**, turn on **Show grid lines**. You can also set the number of rows and columns in the grid, and snap visualizations to the grid lines.
   To keep charts within the borders of the layout container, under **Presentation** > **Styling**, turn on **Keep charts within bounds**.
7. To reorder the layers of visualizations in the layout container, right-click on the visualization in the layout container, select **Reorder chat layers**, and choose to bring the visualization forward or back. Alternatively, click and drag the visualizations in the properties panel.
8. To configure the chart with all properties available for that chart type, click **Edit properties**.
9. Repeat for any additional charts you want to add to the layout container.

Adding show conditions

You can add show conditions on the tabs you have created.

Do the following:

1. Click on the chart you want to add a show condition to, under **Content** in the property panel.
2. Add a show condition for the chart in **Show condition**. Typically you would use an **If()** function.
3. Add another show condition to a different chart.

The charts will now be shown or hidden depending on the result of the conditions you added. If the condition of a chart results in True, it is shown, and if it is False, it is hidden.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
   - **Title**
   - **Subtitle**
   - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

Layout containers have the following limitations:

- You cannot create a chart inside a layout container by dropping measures or dimensions on the container.
- You cannot add a tab container, trellis container, or layout container inside a layout container.
- Keyboard shortcuts are not supported for copying and pasting charts in a layout container.
- The visualization exploration menu is not available for charts that are located inside a tab container, layout container, or legacy container object.
- You cannot add a master visualization to a layout container by dragging it onto an existing object in the layout container. Instead, use the properties panel to add the master visualization to the layout container, or drag the master visualization onto a blank layout container.

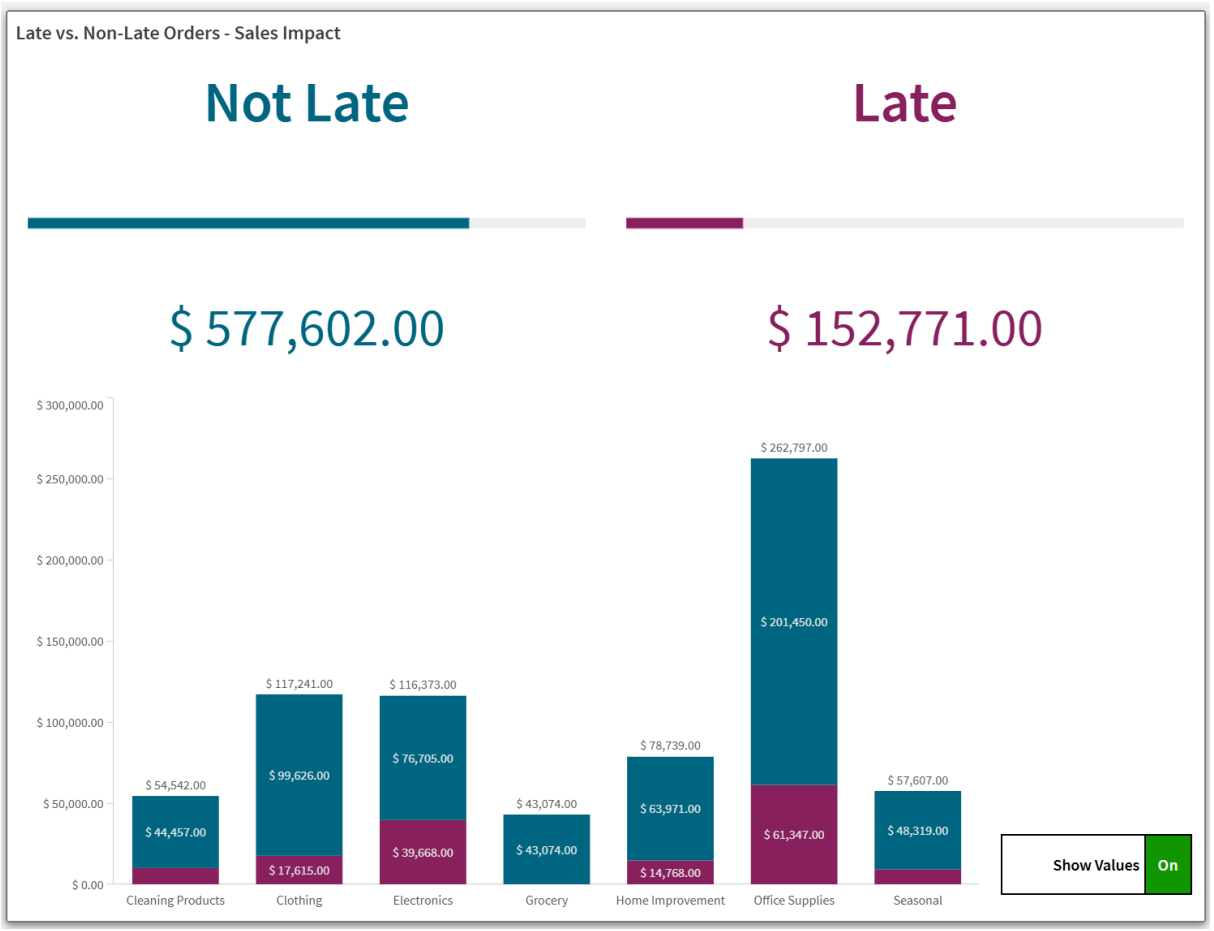
How I made this: Dynamic analysis with the layout container

This example shows you how you can make dynamic, interactive sheet content with the layout container. The layout container supports gridless design and stacked visualizations, allowing extensive control over the arrangement of your analytics content. Additionally, as with other container objects, you can dynamically present different information depending on a variety of conditions, such as variable and selection states.

This example shows you can build a layout container to present information from multiple charts as a single object. Some general design approaches include:

- Arranging similar objects in a symmetrical fashion, using styling to distinguish different sections of data.
- Removing borders from individual objects inside the layout container, and then adding a border around the entire object when finished.
- Displaying different objects or data conditionally depending on user interaction—in this example, a bar chart in which the user can show or hide details.
- Building composite elements consisting of multiple different objects placed next to each other—in this example, an interactive button that mimics an on/off switch.
- Allowing multiple ways for users to select and filter data when they need to take a closer look.

Final result



Preparations

Create a new app and paste the *Example load script (page 498)* into a new section in the Data load editor. Then, load the data.

After loading the data, switch to sheet view.

Example load script

Data for example

```
SET DateFormat='M/D/YYYY';

Sales:

Load

date(Now()-Offset,'MM/DD/YYYY') as [Order Date],

* Inline [

Order ID,Offset,Product Type,Shipment Status,Fulfillment Center,Sales,Late Status,Days Late
1,30,Electronics,Delivered,10036,9950,Not Late,
2,30,Office Supplies,Delivered,10036,4412,Not Late,
```

```
3,30,Office Supplies,Delivered,10038,7480,Late,3
4,30,Home Improvement,Delivered,10035,665,Late,4
5,30,Home Improvement,Delivered,10038,594,Not Late,
6,30,Home Improvement,Stalled,10038,8267,Not Late,
7,30,Clothing,Delivered,10035,1014,Not Late,
8,30,Cleaning Products,Delivered,10036,6999,Late,1
9,30,Electronics,Delivered,10036,733,Not Late,
10,29,Office Supplies,Delivered,10036,3487,Not Late,
11,29,Office Supplies,Delivered,10035,7343,Not Late,
12,29,Office Supplies,Delivered,10036,9239,Late,14
13,27,Cleaning Products,Delivered,10037,1463,Not Late,
14,27,Cleaning Products,Stalled,10035,4688,Not Late,
15,27,Home Improvement,Delivered,10038,5539,Late,2
16,27,Clothing,Delivered,10035,8388,Not Late,
17,27,Office Supplies,Delivered,10035,7560,Not Late,
18,27,Office Supplies,Delivered,10035,5738,Not Late,
19,27,Office Supplies,Delivered,10035,5469,Not Late,
20,26,Home Improvement,Delivered,10037,1435,Not Late,
21,26,Office Supplies,Delivered,10036,5962,Late,1
22,26,Clothing,Delivered,10035,4020,Late,7
23,26,Electronics,Delivered,10036,3888,Late,5
24,25,Office Supplies,Delivered,10037,6496,Not Late,
25,25,Clothing,Delivered,10038,4215,Late,11
26,25,Home Improvement,Delivered,10036,1801,Not Late,
27,25,Grocery,Delivered,10036,6471,Not Late,
28,24,Home Improvement,In Transit,10036,4578,Not Late,
29,24,Office Supplies,Cancelled,10037,3493,Not Late,
30,24,Office Supplies,Cancelled,10035,6572,Not Late,
31,24,Electronics,In Transit,10037,6691,Not Late,
32,24,Office Supplies,In Transit,10038,2721,Late,9
33,24,Grocery,In Transit,10035,8300,Not Late,
34,23,Grocery,In Transit,10035,840,Not Late,
35,23,Office Supplies,In Transit,10036,8972,Not Late,
36,23,Cleaning Products,Stalled,10036,9474,Not Late,
37,23,Home Improvement,In Transit,10038,1935,Not Late,
38,23,Office Supplies,In Transit,10036,1748,Not Late,
39,23,Seasonal,In Transit,10037,1948,Not Late,
40,22,Office Supplies,In Transit,10035,3121,Not Late,
41,22,Electronics,In Transit,10036,7377,Not Late,
42,22,Cleaning Products,In Transit,10037,1492,Not Late,
43,22,Office Supplies,Stalled,10037,7801,Late,6
44,22,Office Supplies,In Transit,10035,4663,Not Late,
45,22,Grocery,In Transit,10035,4649,Not Late,
46,21,Seasonal,In Transit,10038,2612,Not Late,
47,20,Clothing,In Transit,10036,8880,Late,4
48,20,Office Supplies,In Transit,10036,1391,Late,8
49,20,Cleaning Products,Cancelled,10037,1307,Not Late,
50,20,Home Improvement,In Transit,10037,6424,Not Late,
51,20,Grocery,In Transit,10035,5051,Not Late,
52,20,Cleaning Products,In Transit,10035,1286,Not Late,
53,19,Cleaning Products,In Transit,10038,8719,Not Late,
54,19,Office Supplies,In Transit,10037,8576,Not Late,
55,19,Seasonal,In Transit,10038,2866,Not Late,
56,19,Electronics,Stalled,10035,5186,Late,3
57,19,Clothing,In Transit,10038,4079,Not Late,
```

```
58,19,Office Supplies,In Transit,10038,706,Not Late,
59,19,Seasonal,In Transit,10036,6111,Not Late,
60,19,Clothing,In Transit,10036,5677,Not Late,
61,19,Home Improvement,In Transit,10037,3993,Not Late,
62,19,Office Supplies,In Transit,10037,1625,Not Late,
63,19,Seasonal,In Transit,10035,5805,Not Late,
64,19,Home Improvement,In Transit,10035,4453,Not Late,
65,19,Office Supplies,In Transit,10038,2252,Not Late,
66,18,Electronics,In Transit,10038,8362,Not Late,
67,18,Clothing,In Transit,10037,4182,Not Late,
68,18,Cleaning Products,In Transit,10038,9044,Not Late,
69,18,Clothing,In Transit,10035,6531,Not Late,
70,18,Office Supplies,In Transit,10035,8408,Not Late,
71,17,Home Improvement,Stalled,10038,9629,Not Late,
72,17,Seasonal,Preparation,10035,2128,Not Late,
73,17,Home Improvement,Cancelled,10038,1024,Not Late,
74,17,Office Supplies,Preparation,10037,9684,Late,2
75,17,Electronics,Preparation,10036,6753,Late,2
76,16,Clothing,Preparation,10036,3192,Not Late,
77,16,Office Supplies,Preparation,10038,3954,Not Late,
78,16,Office Supplies,Preparation,10035,8377,Not Late,
79,16,Office Supplies,Preparation,10038,2334,Not Late,
80,15,Grocery,Preparation,10037,7178,Not Late,
81,15,Office Supplies,Preparation,10037,1188,Not Late,
82,15,Electronics,Preparation,10035,4908,Not Late,
83,15,Electronics,Preparation,10035,3552,Not Late,
84,15,Clothing,Preparation,10037,875,Not Late,
85,14,Office Supplies,Preparation,10038,7886,Late,4
86,14,Home Improvement,Cancelled,10036,2358,Late,1
87,14,Clothing,Preparation,10037,8368,Not Late,
88,14,Grocery,Preparation,10037,142,Not Late,
89,14,Office Supplies,Preparation,10037,5537,Not Late,
90,14,Home Improvement,Preparation,10035,3231,Not Late,
91,14,Clothing,Preparation,10036,2283,Not Late,
92,14,Office Supplies,Preparation,10038,5952,Not Late,
93,13,Office Supplies,Preparation,10038,5513,Not Late,
94,13,Home Improvement,Preparation,10036,5871,Not Late,
95,13,Grocery,Preparation,10038,4425,Not Late,
96,13,Clothing,Preparation,10037,500,Late,1
97,13,Electronics,Preparation,10037,9792,Not Late,
98,13,Seasonal,Preparation,10035,4576,Not Late,
99,13,Office Supplies,Preparation,10038,228,Not Late,
100,13,Cleaning Products,Preparation,10037,3086,Late,1
101,13,Office Supplies,Preparation,10038,2329,Not Late,
102,12,Home Improvement,Preparation,10036,8862,Not Late,
103,12,Office Supplies,Preparation,10037,3991,Not Late,
104,12,Office Supplies,Preparation,10037,5435,Not Late,
105,12,Grocery,Preparation,10038,2476,Not Late,
106,12,Clothing,Preparation,10037,8362,Not Late,
107,12,Seasonal,Preparation,10035,1496,Not Late,
108,12,Electronics,Preparation,10038,3210,Not Late,
109,11,Clothing,Preparation,10038,7692,Not Late,
110,11,Cleaning Products,Preparation,10037,1585,Not Late,
111,11,Home Improvement,Cancelled,10037,1874,Not Late,
112,11,Office Supplies,Preparation,10037,869,Not Late,
```

```
113,11,Office Supplies,Preparation,10036,8578,Not Late,
114,10,Office Supplies,Preparation,10036,684,Not Late,
115,10,Electronics,Preparation,10036,9889,Not Late,
116,10,Office Supplies,Preparation,10036,4256,Not Late,
117,8,Seasonal,Preparation,10038,9288,Late,7
118,8,Office Supplies,Cancelled,10038,1534,Not Late,
119,8,Seasonal,Preparation,10038,7496,Not Late,
120,8,Electronics,Preparation,10036,8454,Late,3
121,8,Office Supplies,Stalled,10038,1063,Late,
122,8,Office Supplies,Preparation,10037,5958,Not Late,
123,8,Seasonal,Preparation,10036,686,Not Late,
124,8,Grocery,Preparation,10036,1799,Not Late,
125,8,Clothing,Stalled,10036,8485,Not Late,
126,7,Office Supplies,Preparation,10036,6451,Not Late,
127,7,Office Supplies,Pending,10036,1212,Not Late,
128,7,Electronics,Pending,10037,9037,Not Late,
129,7,Electronics,Pending,10037,6522,Late,20
130,7,Electronics,Pending,10038,8865,Late,4
131,7,Clothing,Cancelled,10036,7929,Not Late,
132,6,Seasonal,Pending,10038,9082,Not Late,
133,6,Office Supplies,Pending,10037,6563,Not Late,
134,6,Seasonal,Pending,10038,3513,Not Late,
135,5,Office Supplies,Pending,10035,2340,Not Late,
136,5,Cleaning Products,Pending,10035,590,Not Late,
137,5,Office Supplies,Pending,10035,542,Not Late,
138,5,Cleaning Products,Pending,10035,4809,Not Late,
139,5,Grocery,Cancelled,10035,1743,Not Late,
140,5,Office Supplies,Pending,10035,8312,Not Late,
141,4,Clothing,Pending,10035,5895,Not Late,
142,4,Clothing,Pending,10037,4882,Not Late,
143,4,Clothing,Pending,10037,9106,Not Late,
144,3,Office Supplies,Pending,10036,7422,Late,1
145,3,Clothing,Pending,10038,2686,Not Late,
146,3,Office Supplies,Pending,10037,698,Late,3
147,3,Office Supplies,Pending,10035,9514,Not Late,
148,2,Home Improvement,Pending,10037,6206,Late,2
149,2,Office Supplies,Pending,10035,9158,Not Late,
150,1,Electronics,Cancelled,10036,3204,Not Late,

];

drop field Offset;
```

Part 1: Create the variable

First, create the variable. This variable is the subject of conditions that will be added later. The values of the variable will be changed during analysis by interactions with button objects.

Create the following variable. Set the **Definition** to `=false()`.

- *vViewChartValues*

Creating a variable (page 167)

Part 2: Create the layout container

Do the following:

1. In the assets panel, open **Custom objects** > **Dashboard bundle** and drag a **Layout container** to the sheet.
2. Resize the container so that it is 17 by 10 squares on the sheet grid.

Part 3: Add visualizations to the layout container

Next, add visualizations to the layout container.

Not Late button title

Do the following:

1. Select the layout container.
2. In the properties panel, under **Content** > **Charts**, click **Add**. Select **Button**.
3. Expand the item. Set the **Label** to *Button_NotLateTitle*.
4. Under **Size**, set the following:
   - **Width (%)**: 48
   - **Height (%)**: 9
5. Under **Position**, set the following:
   - **X-axis (%)**: 1
   - **Y-axis (%)**: 1
6. Click **Edit properties**.
7. Expand **Actions and navigation**.
8. Click **Add action**.
9. For the **Action**, select **Select values in a field**.
10. For the **Field**, select *Late Status*.
11. For **Value**, click fx.
12. Add the following:
    ```
    ='Not Late'
    ```
13. Click **Apply**.
14. Expand **Appearance** > **General**.
15. Set *Not Late* as the **Label**.
16. Expand **Appearance** > **Presentation**.
17. Click **Styling**.
18. Under **Border**, set **Outline** to 0 px.
19. Switch to the **Chart** tab. Set the following properties:
    - **Layout behavior**: **Responsive**
    - **Font size**: Maximum value

- **Font color** > **Color**: #006580
- **Background options** > **Color used**: #ffffff

20. Click ← to exit the styling panel.
21. Click the top bar in the panel to return to the layout container.

Late button title

Do the following:

1. Under **Content** > **Charts**, click **Add**. Select **Button**.
2. Expand the item. Set the **Label** to *Button_LateTitle*.
3. Under **Size**, set the following:
    - **Width (%)**: 48
    - **Height (%)**: 9
4. Under **Position**, set the following:
    - **X-axis (%)**: 51
    - **Y-axis (%)**: 1
5. Click **Edit properties**.
6. Expand **Actions and navigation**.
7. Click **Add action**.
8. For the **Action**, select **Select values in a field**.
9. For the **Field**, select *Late Status*.
10. For **Value**, click fx.
11. Add the following:
    ```
    ='Late'
    ```
12. Click **Apply**.
13. Expand **Appearance** > **General**.
14. Set *Late* as the **Label**.
15. Expand **Appearance** > **Presentation**.
16. Click **Styling**.
17. Under **Border**, set **Outline** to 0 px.
18. Switch to the **Chart** tab. Set the following properties:
    - **Layout behavior**: **Responsive**
    - **Font size**: Maximum value
    - **Font color** > **Color**: #87205d
    - **Background options** > **Color used**: #ffffff
19. Click ← to exit the styling panel.
20. Click the top bar in the panel to return to the layout container.

Not Late gauge

Do the following:

1. Under **Content** > **Charts**, click **Add**. Select **Gauge**.
2. Expand the item. Set the **Label** to *Gauge_NotLate*.
3. Under **Size**, set the following:
    - **Width (%)**: 48
    - **Height (%)**: 15
4. Under **Position**, set the following:
    - **X-axis (%)**: 1
    - **Y-axis (%)**: 11
5. Click **Edit properties**.
6. Add *Sum(Sales)* as a measure.
7. In the properties panel, under **Data** > **Filters**, click **Add**.
8. Select *Late Status*. Expand the filter.
9. Keep the default **Values** filter type, and check the *Not Late* checkbox. This filters visualization data to only records that contain a *Late Status* value of *Not Late*.
10. Expand **Appearance** > **General**.
11. Set **Show titles** to **Off**.
12. Expand **Appearance** > **Presentation**.
13. Under **Range limits**, set **Max** to the following:
    ```
    =Sum({1} Sales)
    ```
14. Change the chart configuration from **Radial** to **Bar**.
15. Change the **Orientation** from **Auto** to **Custom**, and make sure **Horizontal** is selected.
16. Turn off **Use library**, and set the **Color** to #006580.
17. Click **Styling**.
18. Under **Border**, set **Outline** to 0 px.
19. Switch to the **Chart** tab. Set the color for the **Value label** to #ffffff.
20. Click ← to exit the styling panel.
21. Expand **Appearance** > **Measure axis: Sum(Sales)**.
22. Set **Labels and title** to **None**.
23. Click the top bar in the panel to return to the layout container.

Late gauge

Do the following:

1. Under **Content** > **Charts**, click **Add**. Select **Gauge**.
2. Expand the item. Set the **Label** to *Gauge_Late*.
3. Under **Size**, set the following:
    - **Width (%)**: 48
    - **Height (%)**: 15
4. Under **Position**, set the following:

- **X-axis (%)**: 51
- **Y-axis (%)**: 11

5. Click **Edit properties**.
6. Add *Sum(Sales)* as a measure.
7. In the properties panel, under **Data** > **Filters**, click **Add**.
8. Select *Late Status*. Expand the filter.
9. Keep the default **Values** filter type, and check the *Late* checkbox. This filters visualization data to only records that contain a *Late Status* value of *Late*.
10. Expand **Appearance** > **General**.
11. Set **Show titles** to **Off**.
12. Expand **Appearance** > **Presentation**.
13. Under **Range limits**, set **Max** to the following:
```
=Sum({1} Sales)
```
14. Change the chart configuration from **Radial** to **Bar**.
15. Change the **Orientation** from **Auto** to **Custom**, and make sure **Horizontal** is selected.
16. Turn off **Use library**, and set the **Color** to #87205d.
17. Click **Styling**.
18. Under **Border**, set **Outline** to 0 px.
19. Switch to the **Chart** tab. Set the color for the **Value label** to #ffffff.
20. Click ← to exit the styling panel.
21. Expand **Appearance** > **Measure axis: Sum(Sales)**.
22. Set **Labels and title** to **None**.
23. Click the top bar in the panel to return to the layout container.

Not Late KPI

Do the following:

1. Under **Content** > **Charts**, click **Add**. Select **KPI**.
2. Expand the item. Set the **Label** to *KPI_NotLate*.
3. Under **Size**, set the following:
   - **Width (%)**: 48
   - **Height (%)**: 9
4. Under **Position**, set the following:
   - **X-axis (%)**: 1
   - **Y-axis (%)**: 27
5. Click **Edit properties**.
6. Add *Sum(Sales)* as a measure.
7. In the properties for the measure, set **Number formatting** to **Money**.
8. Change the **Format pattern** to:
```
$ #,##0.00;-$ #,##0.00
```
9. In the properties panel, under **Data** > **Filters**, click **Add**.

10. Select *Late Status*. Expand the filter.
11. Keep the default **Values** filter type, and check the *Not Late* checkbox. This filters visualization data to only records that contain a *Late Status* value of *Not Late*.
12. Expand **Appearance** > **General**.
13. Set **Show titles** to **Off**.
14. Expand **Appearance** > **Presentation**.
15. Click **Styling**.
16. Under **Border**, set **Outline** to 0 px.
17. Switch to the **Chart** tab. Set the following properties:
    - **Layout behavior**: **Responsive**
    - **Font size**: Maximum value
    - Turn off **Show first KPI title**
18. Click ← to exit the styling panel.
19. Expand **Appearance** > **Color**.
20. Turn off **Library colors**. Set the color to #006580.
21. Click the top bar in the panel to return to the layout container.

Late KPI

Do the following:

1. Under **Content** > **Charts**, click **Add**. Select **KPI**.
2. Expand the item. Set the **Label** to *KPI_Late*.
3. Under **Size**, set the following:
    - **Width (%)**: 48
    - **Height (%)**: 9
4. Under **Position**, set the following:
    - **X-axis (%)**: 51
    - **Y-axis (%)**: 27
5. Click **Edit properties**.
6. Add *Sum(Sales)* as a measure.
7. In the properties for the measure, set **Number formatting** to **Money**.
8. Change the **Format pattern** to:
   `$ #,##0.00;-$ #,##0.00`
9. In the properties panel, under **Data** > **Filters**, click **Add**.
10. Select *Late Status*. Expand the filter.
11. Keep the default **Values** filter type, and check the *Late* checkbox. This filters visualization data to only records that contain a *Late Status* value of *Late*.
12. Expand **Appearance** > **General**.
13. Set **Show titles** to **Off**.
14. Expand **Appearance** > **Presentation**.

15. Click **Styling**.
16. Under **Border**, set **Outline** to 0 px.
17. Switch to the **Chart** tab. Set the following properties:
    - **Layout behavior**: **Responsive**
    - **Font size**: Maximum value
    - Turn off **Show first KPI title**
18. Click ← to exit the styling panel.
19. Expand **Appearance** > **Color**.
20. Turn off **Library colors**. Set the color to #87205d.
21. Click the top bar in the panel to return to the layout container.

Bar chart without value labels

Do the following:

1. Under **Content** > **Charts**, click **Add**. Select **Bar chart**.
2. Expand the item. Set the **Label** to *BarChart_Simple*.
3. For **Show condition**, click $f(x)$.
4. Add the following:
   ```
   =vViewChartValues=false()
   ```
5. Click **Apply**.
6. Under **Size**, set the following:
    - **Width (%)**: 81
    - **Height (%)**: 62
7. Under **Position**, set the following:
    - **X-axis (%)**: 1
    - **Y-axis (%)**: 37
8. Click **Edit properties**.
9. Add *Product Type* as a dimension.
10. Add another dimension: *Late Status*.
    Product Type should now be listed as the **Group** and *Late Status* as the **Bars**.
11. Add *Sum(Sales)* as a measure.
12. In the properties for the measure, set **Number formatting** to **Money**.
13. Change the **Format pattern** to:
    ```
    $ #,##0.00;-$ #,##0.00
    ```
14. Expand **Appearance** > **General**.
15. Set **Show titles** to **Off**.
16. Expand **Appearance** > **Presentation**.
17. Switch from the **Grouped** to the **Stacked** presentation.
18. Set **Grid line spacing** to **Custom**. In the dropdown, select **No lines**.
19. Click **Styling**.

20. Under **Border**, set **Outline** to 0 px.
21. Switch to the **Chart** tab. Set the following properties:
    - **Axis label** font size: 16 px
22. Click ← to exit the styling panel.
23. Expand **Appearance** > **Colors and legend**.
24. Set **Colors** to **Custom** > **By expression**. Use the following expression:
    ```
    =if([Late Status]='Not Late','#006580', if([Late Status]='Late','#87205d'))
    ```
25. Set **Show legend** to **Off**.
26. Expand **Appearance** > **X-axis: Product Type, Late Status**.
27. Set **Labels and title** to **Labels only**.
28. Expand **Appearance** > **Y-axis: Sum(Sales)**.
29. Set **Labels and title** to **Labels only**.
30. Click the top bar in the panel to return to the layout container.

Bar chart with value labels

Do the following:

1. Under **Content** > **Charts**, right-click *BarChart_Simple* and click **Duplicate**.
2. Expand the item. Set the **Label** to *BarChart_Detailed*.
3. For **Show condition**, click f_x.
4. Add the following:
    ```
    =vViewChartValues=true()
    ```
5. Click **Apply**.
6. Click **Edit properties**.
7. Expand **Appearance** > **Presentation**.
8. Turn on **Value labels**.
9. Turn on **Segment labels**, and make sure **Total labels** are on.
10. Click **Styling**.
11. Switch to the **Chart** tab. Set the following properties:
    - **Axis label** font size: 16 px
    - **Value labels** font size: 14 px
12. Click ← to exit the styling panel.
13. Expand **Appearance** > **Colors and legend**.
14. Expand **Appearance** > **X-axis: Product Type, Late Status**.
15. Set **Labels and title** to **Labels only**.
16. Expand **Appearance** > **Y-axis: Sum(Sales)**.
17. Set **Labels and title** to **Labels only**.
18. Click the top bar in the panel to return to the layout container.

Toggle switch for value labels

Create three master visualizations that will be used to build a composite switch button in the layout container. This toggle switch will allow users to turn value labels on and off in the bar chart.

Item 1: Toggle switch base

Do the following:

1. Under **Content** > **Charts**, click **Add**. Select **Button**.
2. Expand the item. Set the **Label** to *ToggleSwitch_Base*.
3. Under **Size**, set the following:
    - **Width (%)**: 16
    - **Height (%)**: 7
4. Under **Position**, set the following:
    - **X-axis (%)**: 83
    - **Y-axis (%)**: 90
5. Click **Edit properties**.
6. Expand **Actions and navigation**.
7. Click **Add action**.
8. For the **Action**, select **Set variable value**.
9. For **Variable**, select *vViewChartValues*.
10. For **Value**, click fx.
11. Add the following expression:
    `=if(vViewChartValues=false(),true(),if(vViewChartValues=true(),false()))`
12. Click **Apply**.
13. Expand **Appearance** > **General**.
14. Set *Show Values* as the **Label**.
15. Expand **Appearance** > **Presentation**.
16. Click **Styling**.
17. Under **Border**, set **Outline** to 2 px.
18. Set the **Border** color to #000000.
19. Set the **Corner radius** for the **Border** to 0 px.
20. Switch to the **Chart** tab. Set the following properties:
    - **Layout behavior**: **Responsive**
    - **Font size**: 0.5
    - **Font color** > **Color**: #000000
    - **Background options** > **Color used**: #ffffff
21. Click ← to exit the styling panel.
22. Click the top bar in the panel to return to the layout container.

Item 2: Button portion representing ON state

Do the following:

1. Under **Content** > **Charts**, click **Add**. Select **Button**.
2. Expand the item. Set the **Label** to *ToggleSwitch_ON*.
3. For **Show condition**, click fx.
4. Add the following:
   ```
   =vViewChartValues=true()
   ```
5. Click **Apply**.
6. Under **Size**, set the following:
   - **Width (%)**: 4
   - **Height (%)**: 7
7. Under **Position**, set the following:
   - **X-axis (%)**: 95
   - **Y-axis (%)**: 90
8. Click **Edit properties**.
9. Expand **Actions and navigation**.
10. Click **Add action**.
11. For the **Action**, select **Set variable value**.
12. For **Variable**, select *vViewChartValues*.
13. For **Value**, click fx.
14. Add the following expression:
    ```
    =false()
    ```
15. Click **Apply**.
16. Expand **Appearance** > **General**.
17. Set *On* as the **Label**.
18. Expand **Appearance** > **Presentation**.
19. Click **Styling**.
20. Under **Border**, set **Outline** to 2 px.
21. Set the **Border** color to #000000.
22. Set the **Corner radius** for the **Border** to 0 px.
23. Switch to the **Chart** tab. Set the following properties:
    - **Layout behavior**: **Responsive**
    - **Font size**: 0.5
    - **Font color** > **Color**: #ffffff
    - **Background options** > **Color used**: #109600
24. Click ← to exit the styling panel.
25. Click the top bar in the panel to return to the layout container.

Item 3: Button portion representing OFF state

Do the following:

1. Under **Content** > **Charts**, click **Add**. Select **Button**.
2. Expand the item. Set the **Label** to *ToggleSwitch_ON*.
3. For **Show condition**, click fx.
4. Add the following:
   ```
   =vViewChartValues=false()
   ```
5. Click **Apply**.
6. Under **Size**, set the following:
   - **Width (%)**: 4
   - **Height (%)**: 7
7. Under **Position**, set the following:
   - **X-axis (%)**: 83
   - **Y-axis (%)**: 90
8. Click **Edit properties**.
9. Expand **Actions and navigation**.
10. Click **Add action**.
11. For the **Action**, select **Set variable value**.
12. For **Variable**, select *vViewChartValues*.
13. For **Value**, click fx.
14. Add the following expression:
    ```
    =true()
    ```
15. Click **Apply**.
16. Expand **Appearance** > **General**.
17. Set *Off* as the **Label**.
18. Expand **Appearance** > **Presentation**.
19. Click **Styling**.
20. Under **Border**, set **Outline** to 2 px.
21. Set the **Border** color to #000000.
22. Set the **Corner radius** for the **Border** to 0 px.
23. Switch to the **Chart** tab. Set the following properties:
    - **Layout behavior**: **Responsive**
    - **Font size**: 0.5
    - **Font color** > **Color**: #ffffff
    - **Background options** > **Color used**: #ff001e
24. Click ← to exit the styling panel.
25. Click the top bar in the panel to return to the layout container.

Part 4: Finalize presentation

Finalize the layout container by adding a title and border.

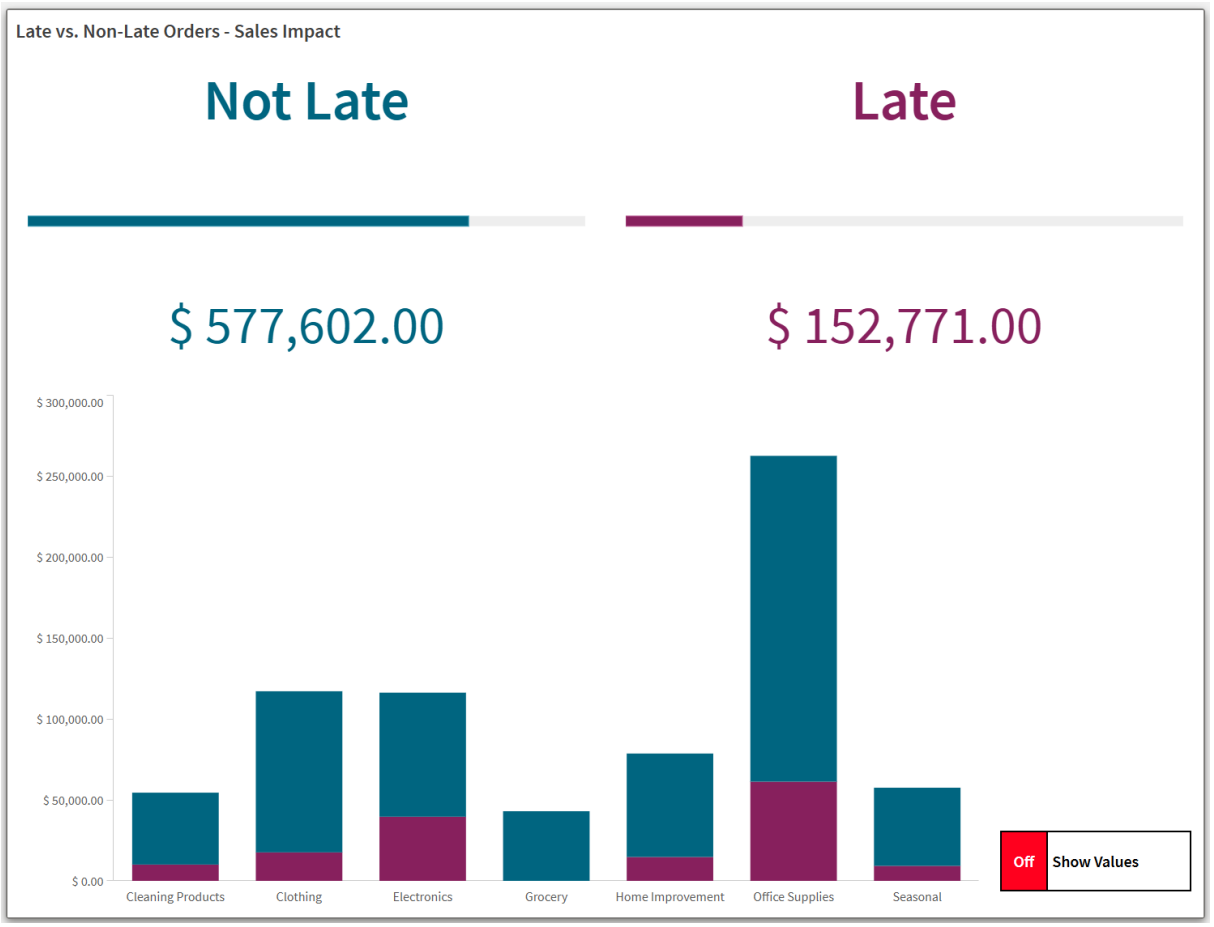
Do the following:

1. In the properties panel, expand **Appearance** > **General**.
2. Set the Title to *Late vs. Non-Late Orders - Sales Impact*.
3. Expand **Appearance** > **Presentation**.
4. Turn on **Keep charts inside**.
5. Click **Styling**.
6. Set the following properties for **Border**:
    - **Outline**: 2 px
    - Color: #7b7a78
7. Set the following properties for **Shadow**:
    - **Medium** size
    - Color: #7b7a78

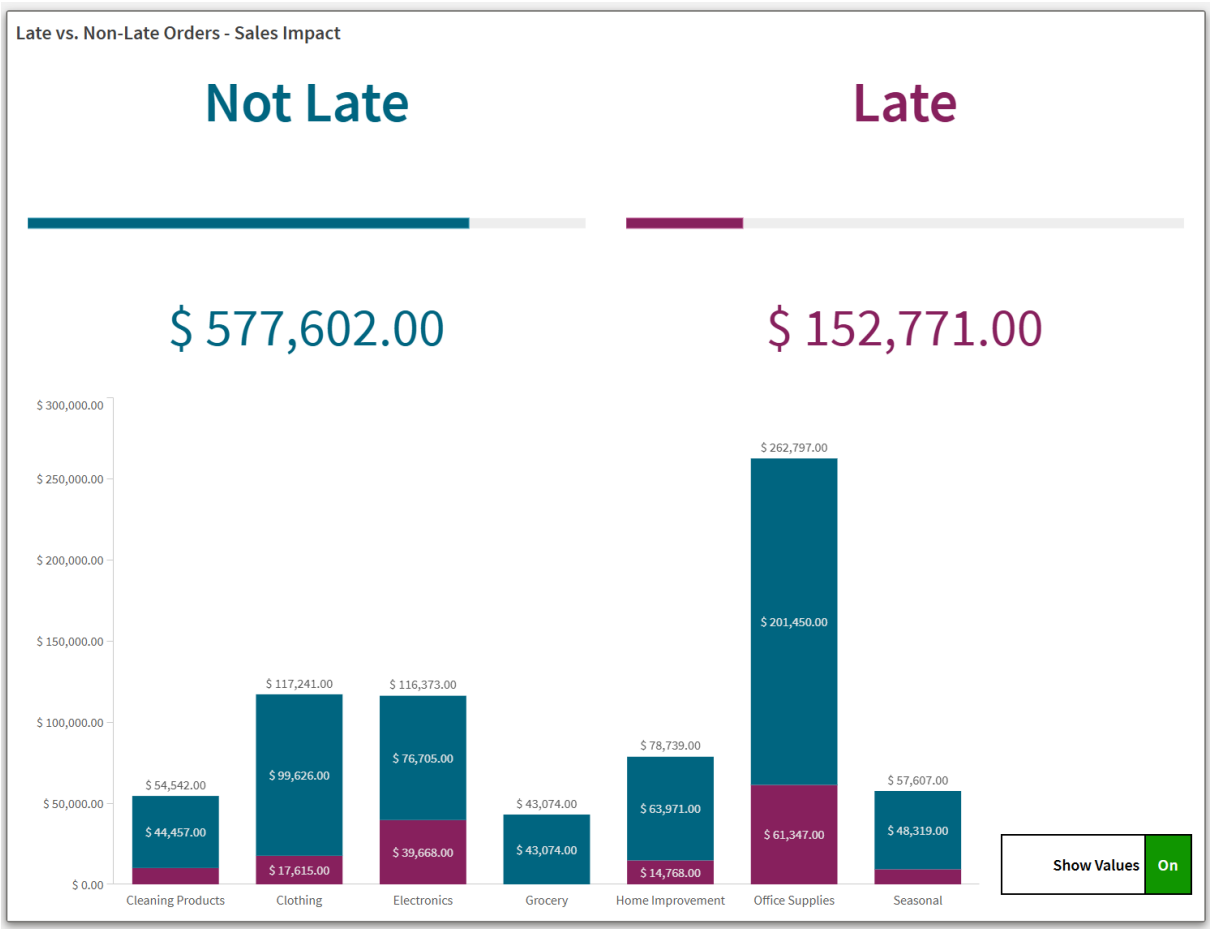
Results

Exit sheet edit mode. Click the toggle switch button to alternate between the simple and detailed bar chart.

*Layout container with **Show values** switched off*

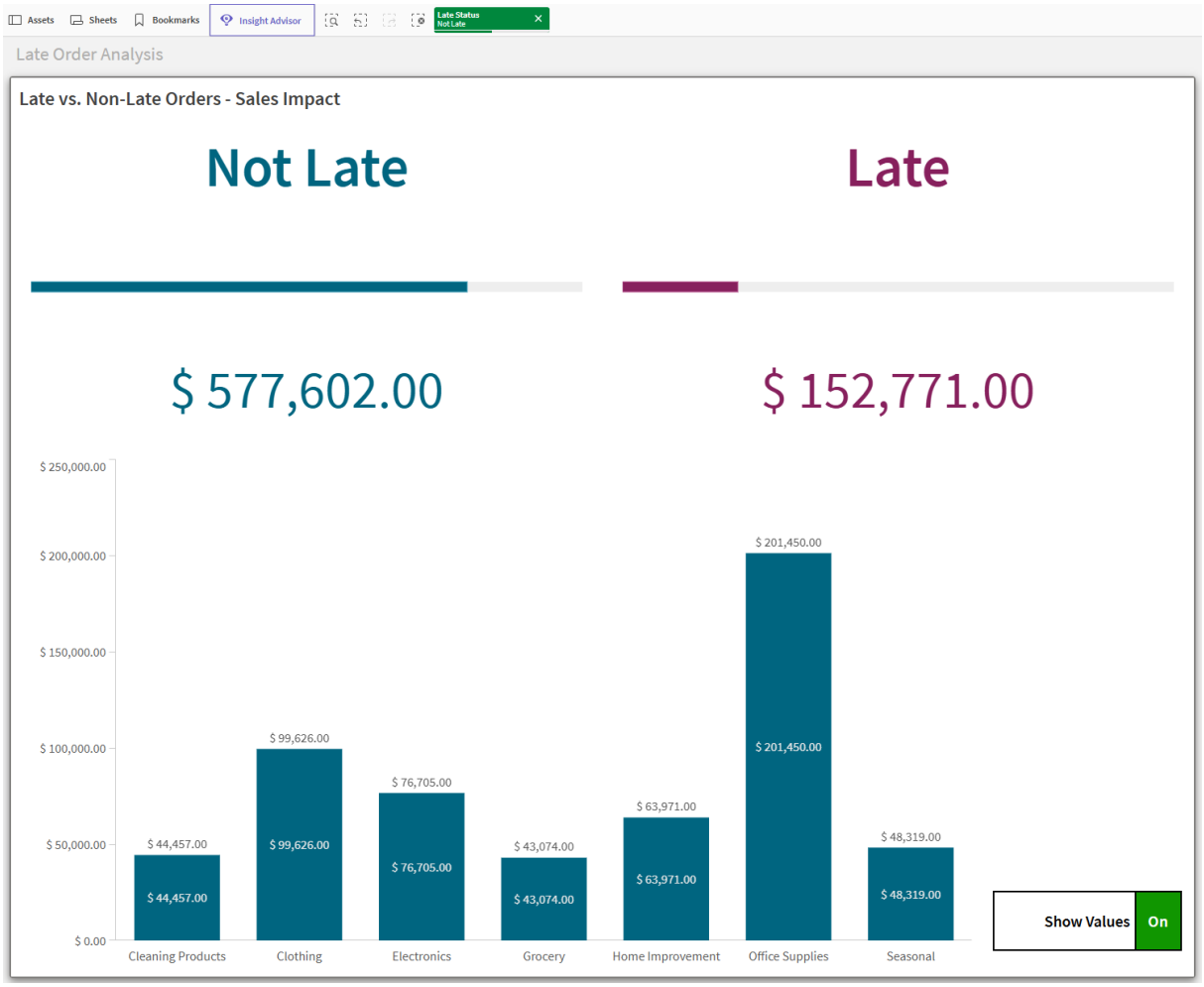


*Layout container with **Show values** switched on*



Click on the *Not Late* and *Late* titles at the top of the chart. Notice that clicking these elements selects the corresponding values in the app.

Layout container with selection Not Late in field Late Status.



On-Demand reporting control

The On-Demand reporting control adds a button to create Qlik NPrinting reports on demand. It is included in Dashboard bundle.

Requirements

- Qlik NPrinting Server (September 2019 or later) with a Qlik NPrinting app that is connected to the Qlik Sense app that you are designing. This Qlik NPrinting app contains your report templates.
- All users generating On-Demand reports need to be added as users in Qlik NPrinting, with a security role that supports running On-Demand reports.
- Users must be logged into Qlik Sense via Windows authentication in order to generate reports or create reporting buttons.
  Windows authentication is configured to use NTML as the default authentication mechanism. If your domain requires you to use Kerberos authentication, you can configure your Qlik NPrinting server according to Kerberos authentication.

When to use it

The On-Demand reporting control is useful when you want the user to be able to print predefined Qlik NPrinting reports within Qlik Sense, using their selections in the app as a filter.

Installing the Dashboard bundle

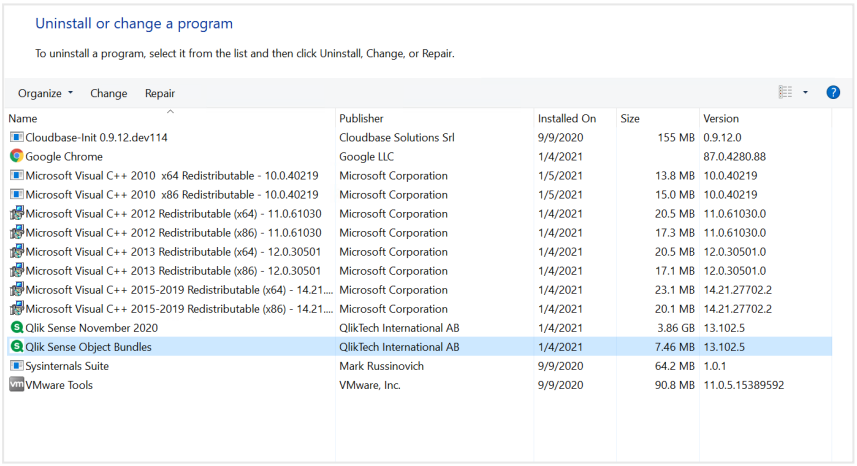
You can install the Dashboard bundle when you install Qlik Sense.

You can add or remove object bundles from your Qlik Sense deployment at any moment. If you have a multi-node installation, object bundles are installed on the central node.

> *You can see which extensions are installed in your deployment by checking the **Extensions** section in the Qlik Management Console (QMC).*

Do the following:

1. In **Windows Control Panel**, open **Programs and Features**.
2. In the list of programs, double-click the object bundle that you want to modify.



3. The Object Bundle Setup Wizard opens. Click **Next**.
4. Select **Change**.
5. On the **Custom setup** screen, click on the bundle icon to select how to modify the bundle installation:
   - If the bundle is installed, select **Entire feature will be unavailable** to uninstall it.
   - If the bundle is not installed, select **Entire feature will be installed on local hard drive** to install it.

   Then, click **Next**.
6. Click **Change**.
   Once the modification if complete, you are required to manually restart the Qlik Sense Repository Service.
7. Click **Finish** to close the Object Bundle Setup Wizard.
8. Manually restart the Qlik Sense Repository Service to apply the changes.

You can verify that the changes have been correctly applied by checking the **Extensions** section in the QMC.

Adding a server as a trusted origin

If you are creating On-Demand reports in Qlik Sense or a QlikView Web Server hosted QlikView AccessPoint, you must add these servers as a trusted origin in Qlik NPrinting web console.

For each server path used to access the Qlik NPrinting web console, you must add a trusted origin. For example, if your server can be accessed through a local domain, a shortened host, or fully qualified URLs, a trusted origin must be added for each of those server paths.

How you enter the server paths in the **Address** field of the trusted origin depends on your security configuration.

Configuration 1: SSL security not setup with Qlik NPrinting web console

A trusted origin is required for each server path used to log onto the Qlik NPrinting web console. For example, if your server is *qlikserver1* and has an IP address of 192.168.0.101, you would add the following trusted origins:

- *http://qlikserver1*
- *http://qlikserver1.domain.local*
- *http://192.168.0.101*

Configuration 2: SSL security setup with Qlik NPrinting web console and third-party

A trusted origin is required for each server path used to log onto the Qlik NPrinting web console. URLs must use HTTPS. For example, if your server is *qlikserver1* and has an IP address of 192.168.0.101, you would add the following trusted origins:

- *https://qlikserver1*
- *https://qlikserver1.domain.local*
- *https://192.168.0.101*

Adding a trusted origin

Do the following:

1. In Qlik NPrinting, click **Admin** > **Settings**.
2. Click **On-Demand Settings**.
3. Click **Add trusted origin**.
4. After **Name**, enter a name for the trusted origin.
5. After **Description**, enter a description for the trusted origin.
6. After **Address**, enter the URL for the QlikView Server.
   The URL must be the base URL (scheme and host) only. For example, `http://qlikserver1` rather than `http://qlikserver1/qlikview/index.htm`.
7. Click **Create**.

Configuring On-Demand settings on Qlik NPrinting Server

You must configure these settings on your Qlik NPrinting Server:

- You must have a connection to a QlikView Server or a Qlik Sense server.
  QlikView Server and QlikView Cluster connections are supported with On-Demand. Local connections are not supported. See: Creating connections.
- If you are connecting to a QlikView Server or Cluster with a QlikView Server Extranet License, the following options must be enabled when configuring the connection:
  - Connection requires authentication
  - Apply user section access for reports
- You must enable your Qlik NPrinting reports for On-Demand.
- You can limit On-Demand report creation through security roles. See: Role based security.

On-Demand is compatible with Chrome, Firefox, and Explorer. It will not run in Microsoft Edge, because the certificates will not download.

Enabling Qlik NPrinting reports for On-Demand creation

Qlik NPrinting reports must be manually enabled for On-Demand creation. Reports must be assigned to the QlikView document or Qlik Sense app with which you want to generate On-Demand reports. On-Demand creation can be enabled during the creation of a new report.

Do the following:

1. In Qlik NPrinting web console, click **Reports**.
2. Open a report or create a new report.
3. Select an app from the **App** drop-down list is connected to the QlikView document or Qlik Sense app for which you want to generate a report.

   On-Demand requests only work with reports based on a single connection. MultiDoc reports are not supported.
4. Select the **Enable On-Demand** check box.
5. Click **Save**.

The report template is now available.

Accepting the Qlik NPrinting web console certificate

The default installation certificate for Qlik NPrinting web console may be registered as invalid by your browser. If your browser registers the Qlik NPrinting web console certificate as invalid, you must accept the certificate before you can use On-Demand in QlikView AccessPoint or Qlik Sense.

If you switch to a different browser or clear your browser's cache, you will have to re-accept the Qlik NPrinting certificate. On-Demand works in Chrome, Firefox, and Explorer. It does not run in Microsoft Edge, because the certificates will not download.

Do the following:

1. Open the Qlik NPrinting web console.
2. Depending on your browser, do one of the following:
    - Choose to continue to the Qlik NPrinting web console.
    - Add a security exception and continue to the Qlik NPrinting web console.
3. Log into your Qlik NPrinting web console.

You can now use Qlik NPrintingOn-Demand using this browser.

Creating an On-Demand reporting button

You can create an On-Demand reporting button on the sheet you are editing.

Do the following:

1. From the assets panel, under **Custom objects** > **Dashboard bundle** drag **On-demand reporting** to the sheet.
2. In the property panel, under **NPrinting Connection** > **NPrinting server URL**, set the server connection. The URL must end with /.
   For example: *https://<server name>:4993/*
3. Under **NPrinting App**, select the Qlik NPrinting app that contains the report template.
4. Under **NPrinting connection**, select the Qlik NPrinting connection.
   As the default, the list only shows Qlik NPrinting connections to the Qlik Sense app you are working in. You can use the **App/Connection filter** toggle to display connections not associated with the current Qlik Sense app.
5. Under **Report Configuration** > **Choose Report**, select the report you want to connect to the button.
6. In **Default Export Format**, select a default export format.
7. Under **Appearances** > **Button Label**, set the button label. For example: *Generate report*.

You have now created an On-Demand reporting button.

Generating a report

You can generate a report that is filtered according to the current selections in the Qlik Sense app. You need to be in analysis mode.

You can only filter on fields that are included in the Qlik NPrinting report template, or the report will fail. It is not possible to filter on selections using an expression.

Do the following:

1. Click on the button that you created.
   The **Export** dialog opens.
2. There are two buttons to choose from:
    a. **Quick Report**: generates a single report with the default output format.
    b. **New Report**: choose from a list of reports that have been made available to you. You can also choose the output format.

3. When the report is generated a download button is activated. Click the **Download** button to download the report.

Limitations

For information about general limitations, see *Limitations (page 483)*.

App selections and set analysis

When you generate a report using the On-Demand reporting control, only the possible values from the combination of all current selections are sent to Qlik NPrinting. As a result, any selected excluded values are not included. This can lead to unexpected results when chart or report elements use set expressions or refer to the default state using alternate states.

Additionally, if the Qlik NPrinting report template contains a filter, it is not possible to make conflicting selections in the Qlik Sense app, or the report will fail.

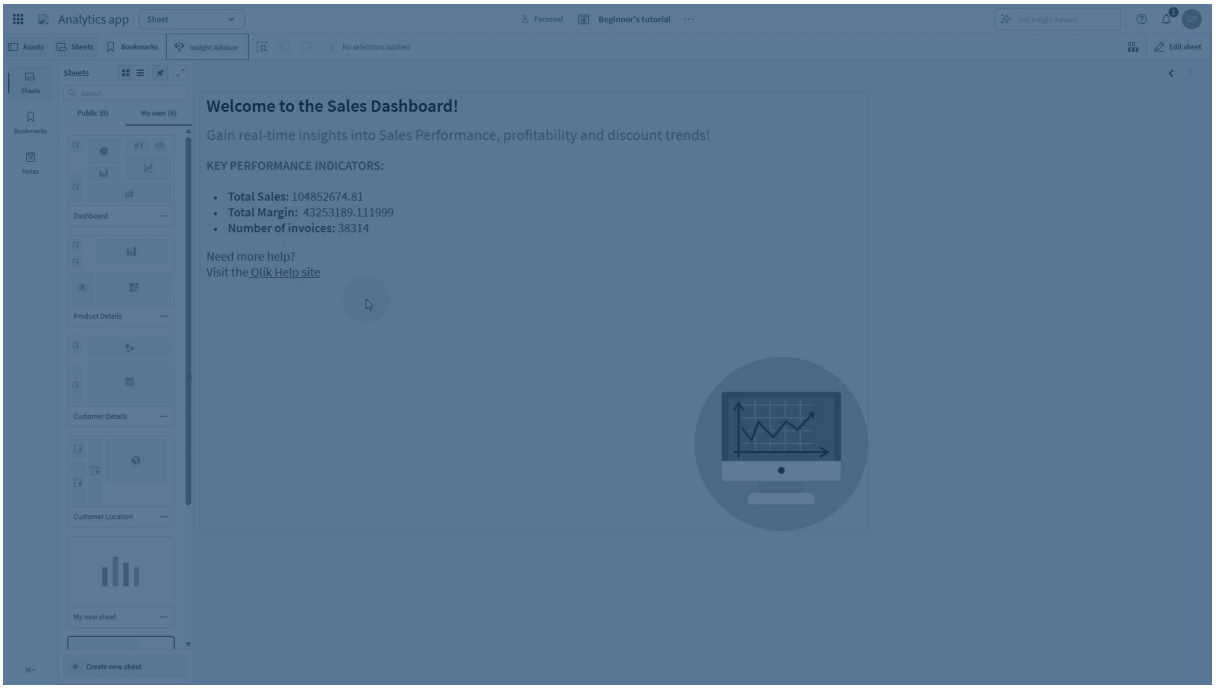
Other limitations

- If the Qlik NPrinting report template contains a filter, it is not possible to make conflicting selections in the Qlik Sense app, or the report will fail.
- When you use the On-Demand reporting control in a mashup, you need to use Windows authentication. Header authentication is not supported.
  Additionally, if the mashup contains multiple apps, you can only use the app where on-demand originates from to filter on-demand reports.
- On-Demand reporting control is not supported on mobile devices. An On-Demand reporting control button only works when accessed through a personal computer.

Text

Text objects complements other visualizations by offering options to add text, hyperlinks, and measures. You can also add background images.

You can format and color the text and align the paragraphs. The background image has sizing and positioning options.



Text is only available in the advanced edit mode.

When to use it

Text is intended for presentation purposes, and does not support selections. However, the measures in **Text** are updated when selections are made. Some typical uses:

- Use it on the first sheet of an app for essential information.
- Display a company image as a background image together with formatted text and measure values to present figures in a compelling way.
- Link to sites with additional information.

Advantages

Text contrasts with the other visualizations. You have many options for making **Text** stand out next to more regular charts.

Disadvantages

When organizing content within the chart, it is advised to use only a few measure values and shorter texts. Otherwise, **Text** will be cluttered.

Creating **Text** objects

You can create a **Text** on the sheet you are editing.

Do the following:

1. Drag an empty **Text** to the sheet from the assets panel.
2. Click **Text** to open the editing toolbar.
3. Add and format text, tables, hyperlinks or measures to **Text**.

*If you double-click a **Text** in the assets panel, it is added to the sheet immediately.*

Styling and formatting text in Text

Text offers several editing and formatting options for text. You can format your text using several styles:

- Paragraph
- Quote
- Heading 1
- Heading 2
- Heading 3
- Unordered list
- Ordered list

You can also select font families and size. You can apply emphases to your text and change text color. You can also add hyperlinks.

Styling and formatting tables in the Text

You can insert tables into **Text** from the toolbar. You can resize column and rows and hide borders. You can insert additional tables inside table cells.

Styling Text

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:

- **Title**
- **Subtitle**
- **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL. When using a background color, use the slider to adjust the opacity of the background. When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Creating a link

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

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 .

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 .

The link is removed, but not the text.

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 value with a grey background, 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:

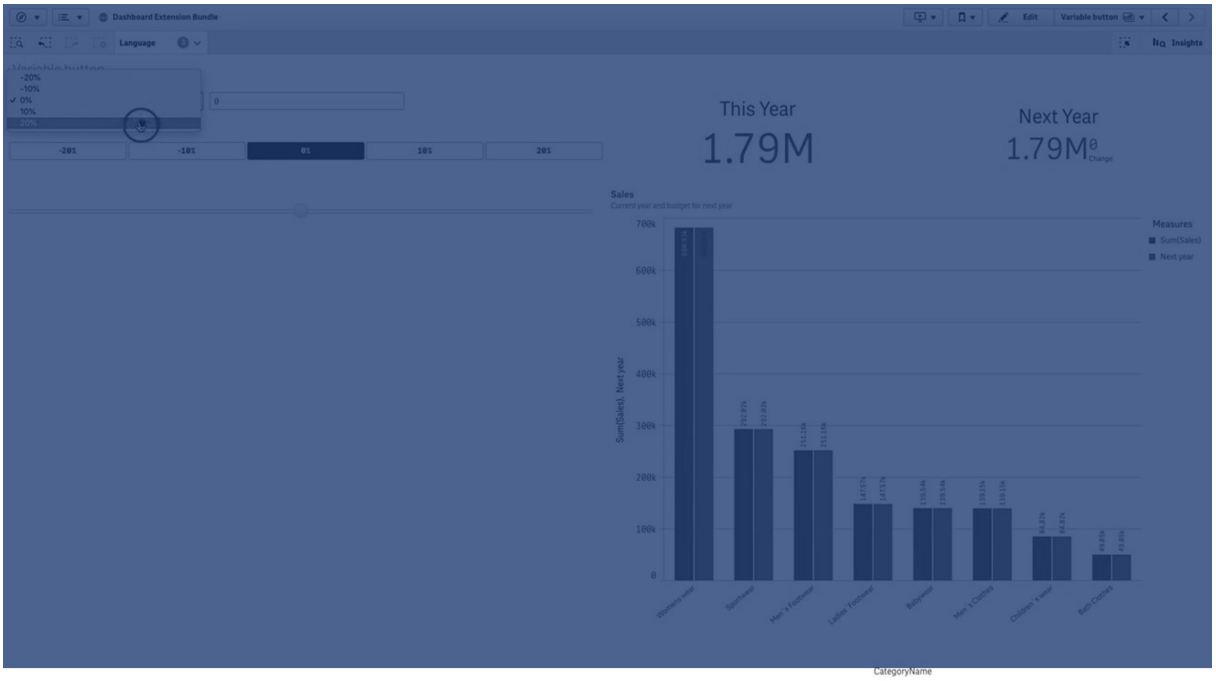
- Place the cursor before the token and press Delete.
- Place the cursor after the token and press Backspace.
- In the properties panel, right-click the measure and select **Delete** in the dialog.
- In the properties panel, click the measure and click **Delete** .

Limitations

You can add a maximum of 100 measures to this chart.

Variable input control

You can use the variable input control to set the value of a variable. It is included in Dashboard bundle.



When to use it

If you have visualizations with expressions that contain a variable, you can use the variable input control to let the user control the variable value.

Creating a variable input control

Creating a variable input control

You can create a variable input control on the sheet you are editing.

Do the following:

1. In the assets panel, open **Custom objects** > **Dashboard bundle** and drag a **Variable input** object to the sheet.
2. Select the variable to use in **Name** under **Appearance** > **Variable** in the property panel.
3. Select how you want to input data in **Show as:**
    - **Buttons** lets you add a number of buttons with one button for each defined variable value. You can select how to display the buttons in **Display**, select **Row** to show them in a horizontal row or **Column** to show them in a vertical column.
      You can define the buttons in two different ways, fixed (**Fixed**) or (dynamic) **Dynamic** with the **Fixed or dynamic values** setting under **Values**.
      If you select to use fixed values, you need to add each button with **Add Alternative** and define a value (**Value**) and a label (**Label**) for each button.
      If you use dynamic values, you define the buttons with a string in **Dynamic values**.Use | to separate buttons, and ~ to separate value from label. For example, *'Germany~GER|France~FRA'* will create two buttons labelled GER and FRA. The first will change the variable value to Germany, and the second changes the value to France. You do not need to specify labels if you want to use values as labels.

- **Drop down** adds a drop down with one item for each defined variable value.
  You can define the items in two different ways, fixed (**Fixed**) or (dynamic) **Dynamic** with the **Fixed or dynamic values** setting under **Values**.
  If you select to use fixed values, you need to add each item with **Add Alternative** and define a value (**Value**) and a label (**Label**) for each item.
  If you use dynamic values, you define the items with a string in **Dynamic values**.Use | to separate items, and ~ to separate value from label. For example, *'Germany~GER|France~FRA'* will create two items labelled GER and FRA. The first will change the variable value to Germany, and the second changes the value to France. You do not need to specify labels if you want to use values as labels.
- **Input box** provides a simple input box that will update the variable value.
- **Slider** creates a slider that updates the variable value. You define the minimum setting with **Min** and the maximum setting with **Max** under **Values**. You can also set the step to use with **Step**. If you select **Slider label**, the selected value is displayed when you drag the slider. The variable value is updated when you stop dragging the slider, but you can select **Update on drag** if you want the variable value to be updated while you drag. This can be useful when you want visualizations based on the variable to update dynamically when dragging the slider. Use this option with caution, as the constant redrawing of charts can be annoying.

Customizing styling

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
   - **Title**
   - **Subtitle**
   - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

For information about general limitations, see *Limitations (page 483)*.

- The slider label can only display numeric values. This means, if the value is a date the numeric value of the date is displayed. If the value is a percentage value, the percentage character is not displayed.

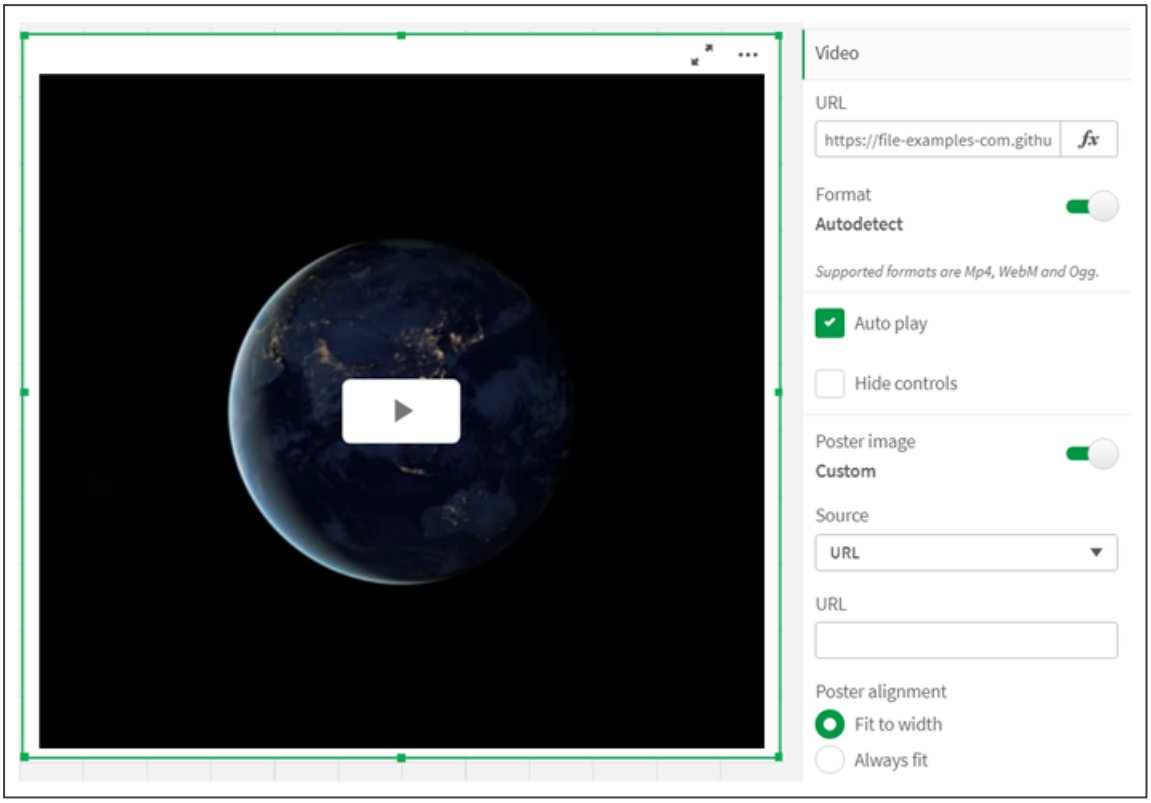
Video player

The video player lets you play videos in different formats from external sources. It is included in the Dashboard bundle.

The following video formats are supported.

- MP4
- OGG
- WEBM
- YouTube

Video player



When to use it

The video player is useful when you want to include a video in your application. For example, you want to show a demo or a training video, add a tutorial, or present corporate news.

Adding videos

You can add video player object to a sheet that you are editing. Add or paste a video link into the video object. The video is streamed from a source; it is not uploaded to Qlik Sense. By default, the video format of the link will be auto-detected, the video will not auto-play, and video controls will be available to app consumers.

Do the following:

1. In the assets panel, open **Custom objects** > **Dashboard bundle** and drag a **Video player** object to the sheet, or click **Add to Sheet**.
2. Add a video as a URL in the video player object field **Add URL**, or in the properties panel under **Video** > **URL**. You can format the URL field as an expression.
3. **Autodetect** format is default setting and it will adjust accordingly based on the URL. You can also turn off **Autodetect**, and then select the correct supported video format.

Once you have added the video, you may want to adjust its options.

Setting video options

Video options are set in the **Properties** pane.

Click **Auto play** if you want the video to automatically start when viewed in analyzer mode. **Auto play** is turned off by default. When **Auto play** is selected, the video starts but it is muted. The app user has to select **Unmute** to turn the sound on.

Click **Hide Controls** to turn off video controls in analyzer mode. By default, video controls are visible.

You can add a **Poster image**. By default, the poster image is turned off. For **Source**, select an external URL that directs to an image, or add an image from your media library.

If a poster image is selected, the selected image is displayed before the video starts playing. **Poster alignment** specifies how the poster image will align inside the video player.

You cannot play the video in edit mode. The video restarts when you switch between analyzer mode and edit mode.

In analyzer mode, you start the video with the play button. You can pause, switch between mute and unmute, and view the video in full screen. You can also share the video player object, and **Take snapshot**.

In edit mode, the right-click context menu provides options for Qlik Sense. In analyzer mode, the context menu provides options for YouTube.

The app developer (edit mode) or app c+onsumer (analyzer mode) must allow YouTube videos to play in Qlik Sense.

Customizing styling

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.

4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

The video player has the following limitations:

- Safari does not support OGG and WEBM formats.
- Qlik Sense Desktop cannot play MP4 format due to limitations in Chromium.
- Qlik Sense Client-Managed Mobile on iOS can only play MP4 compressed in H.264 or MPEG-4 format, but not other MP4, OGG and WEBM formats due to limitations in iOS.
- Qlik Sense Client-Managed Mobile offline is not supported for video playing.
- iPhone adds native video controls. It does not use video player controls, therefore **Hide Controls** will not turn off controls.
- Android does not support OGG format.
- When exporting or printing a sheet that includes a video player object, the video player object will not be included.
- Qlik NPrinting does not support the video player object.

Visualization bundle

Visualizations are an important means of conveying information from massive data. The Visualization bundle is a set of charts that can be used to enhance and increase your Qlik Sense app's charting capacity. The charts are optional. You do not have to install or enable them to use Qlik Sense.

Enabling Visualization bundle

You can install the Visualization bundle when you install Qlik Sense. If you need to adjust your installation, see: Modifying an object bundles installation.

Visualization bundle charts

Visualization bundle charts are in the asset panel under **Custom objects**.

The following charts are included:

- *Funnel chart (page 534)*
  A funnel chart is a visual representation of the connected stages of a linear process.
- *Grid chart (page 541)*
  A chart that displays comparative data and with the values represented as colors.
- *Network chart (page 558)*
  Creates a cluster diagram representing a graphical chart of a computer network.
- *P&L pivot chart (page 571)*
  Creates a pivot table that you can style, for example for profit and loss reporting.

- *Pivot table (page 578)*
  Creates a pivot table with additional styling options not available in the pivot table visualization.
- *Radar chart (page 593)*
  Creates a two-dimensional chart using radial axes to show the scoring of a measure in one dimension or another.
- *Sankey chart (page 599)*
  A flow chart diagram chart visually emphasizing major transfers or flows within defined system boundaries.
- *Trellis container (page 604)*
  Creates a trellis chart based on a master visualization.
- *Variance waterfall chart (page 619)*
  Shows the variance between two measures over the different values of a dimension.
- *Word cloud chart (page 623)*
  A cloud chart of words with their size based on measure value.

Deprecated charts

These charts have been deprecated. New instances cannot be added. Existing instances will be removed from your applications in the May 2027 version of Qlik Sense Client-Managed.

Bar & area chart

New bar & area charts are no longer supported as of May 2021. If you need to configure existing instances of this chart, please refer to the last version of the documentation before support ended: .

Bullet chart

Deprecated by addition of native **Bullet chart**. For new charts, we recommend that you use the native Bullet chart instead of this object. If you need to configure existing instances of this chart, please refer to the last version of the documentation before the introduction of the native chart: .

Heatmap chart

As of February 2022, the Heatmap extension is no longer supported. Apps that use the Heatmap extension will continue to function. If you need to configure existing instances of this chart, please refer to the last version of the documentation before support ended: .

Multi KPI

The Multi KPI will no longer be available in the assets panel for creation of new charts as of April 5, 2025 on Qlik Cloud and the May 2025 version of Qlik Sense Client-Managed. It will still function on dashboards where it was previously added, but will be fully removed in May 2027 for Qlik Cloud and the May 2027 version of Qlik Sense Client-Managed.

For information about the chart, including suggestions for replacing the functionality, see *Multi KPI chart (page 546)*.

Straight table

The straight table has become a native chart.

Limitations

Visualization bundle visualizations have more limitations than built-in visualizations, such as bar charts. The following limitations are valid for all visualizations from Visualization bundle:

- The user interface of the visualization is not localized to the language that Qlik Sense is using.
- Right-to-left reading order is not currently supported.
- It is not possible to edit objects from an object bundle supplied by Qlik with Dev Hub.

The following table shows which additional features are supported, or not supported, for all bundled objects.

- Printing
  Printing a visualization made in an object.
- Qlik NPrinting
  There is an *On-Demand reporting control (page 515)*. However, visualizations made in some objects cannot be used in Qlik NPrinting reports.
- Download
  Download as image, PDF, or Excel.
- Storytelling
  Using a snapshot of a visualization created with an object in a story.
- Alternate states
  Making different selections on the same dimension, and comparing the selections in a single visualization or in two or more visualizations side by side.

Exported radar charts will not include the chart legend.

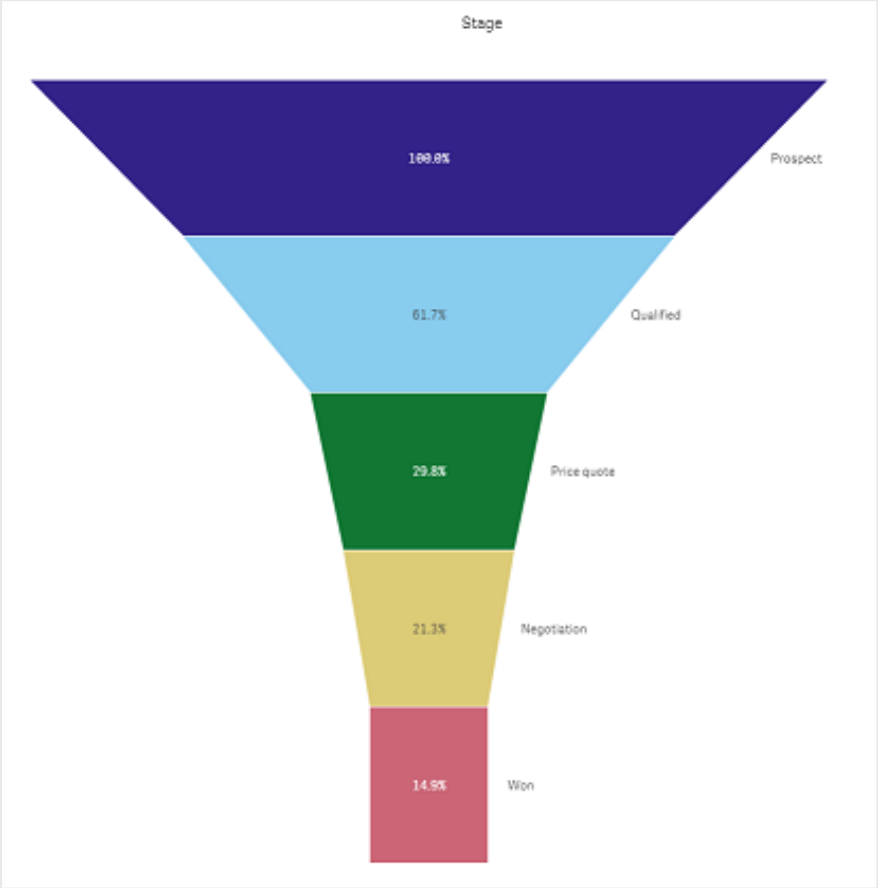
Visualization bundle capability support

Chart	Printing	Qlik NPrinting	Download	Storytelling	Alternate states
Funnel	Yes	Yes	Yes	Yes	Yes
Grid chart	Yes	Yes	Yes	Yes	Yes
Multi KPI	No	No	Yes	Yes	Yes
Network	Yes	No	Yes	Yes	Yes
Org chart	Yes	Yes	Yes	Yes	Yes
P&L pivot	Yes	No	Yes	Yes	Yes
Pivot object	Yes	Yes	Yes	Yes	Yes
Radar	Yes	Yes	Yes	Yes	Yes
Sankey	Yes	Yes	Yes	Yes	Yes
Trellis container	No	No	No	No	No
Variance waterfall	Yes	Yes	Yes	Yes	Yes
Wordcloud	Yes	No	Yes	Yes	Yes

Funnel chart

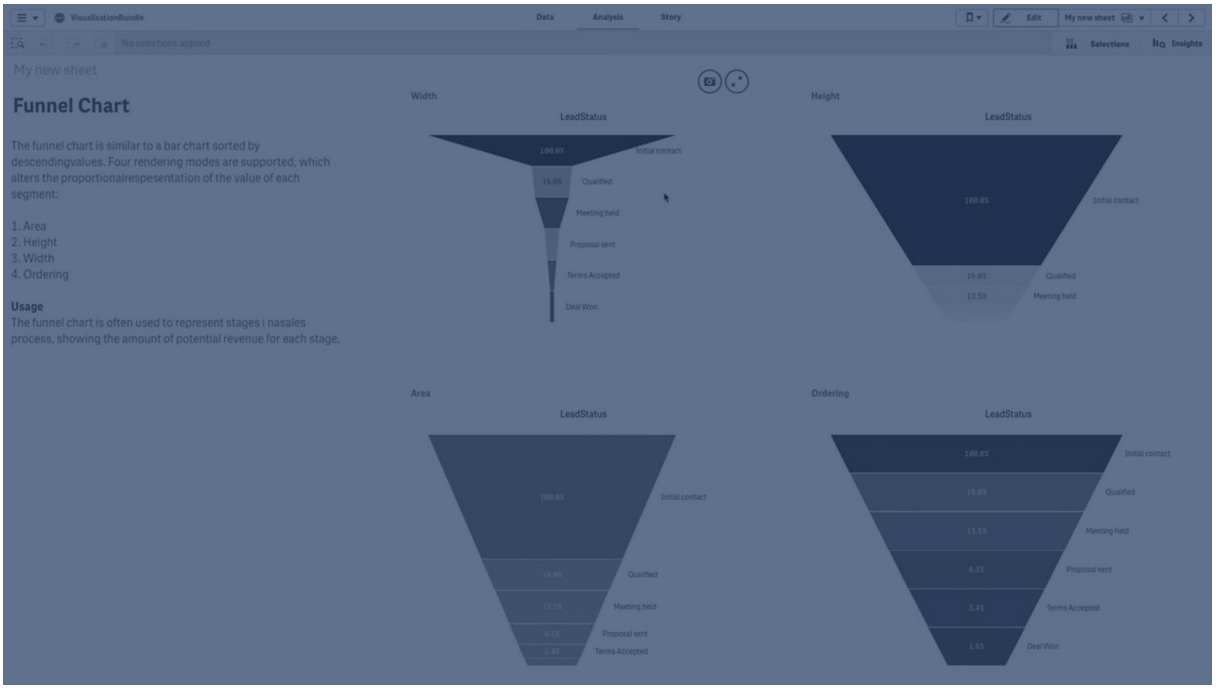
The Funnel chart (**Funnel chart**) lets you add a sequential chart showing the connected stages of a process. Each stage will decrease and should contain a subset of the previous stage. The decrease is gradual, giving the chart an ever narrower funnel.

A funnel chart displaying the conversion rates of prospects to customers in a sales process.



Funnel charts show values across multiple stages in a process. They can represent anything that is decreasing in size. The funnel chart shows a process that starts at 100% and ends with a lower percentage. Each chart segment represents the value of a specific item and can influence the size of other segments. The Funnel chart is included in the Visualization bundle.

- The chart requires one dimension and one measure.
- Unlike bar charts, funnel chart segments are centered to create a funnel shape.
- A chart with increasing stages instead of decreasing is a pyramid graph.



When to use it

The funnel chart is useful to illustrate the stages of a process and the overall decrease of each step, for example:

- Represent a sales process showing the amount of potential revenue for each stage.
- Illustrate the number of sales prospects at each stage in a sales pipeline, i.e. the process from prospective customer to made purchase.
- Identify potential problem areas and bottlenecks of a sales process.
- Communicate a sales process to new team members and vendors.
- Illustrate website visitor trends – from visitor homepage hits to other areas, for example downloads, etc.
- Show order fulfillment with initiated orders at the top, followed by for example, orders in delivery, delivered, canceled and returned.
- Showing the flow of information from top secret to unclassified.
- Representing knowledge areas from general knowledge to expert knowledge.

Creating a funnel chart

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

- The dimension decides how it should be grouped in segments. By default, dimension values are displayed in descending order by measure value.
- The measure is the value that decides the size of each segment.

Do the following:

1. In the assets panel, open **Custom objects** > **Visualization bundle** and drag a **Grid chart** object to the sheet.
2. Click the top **Add dimension** button and select the target dimension (usually target market) of the chart.
3. Click the **Add measure** button to select the measure (what is to be measured) of the chart. Once dimensions (dimension label) and measure (value label) have been selected the funnel chart displays automatically (in color) in the chart field.
4. Click **Done** to revert to the main display field.
5. Click applicable region under **Region**. The chart field will update displaying chosen parameters and details.

Dimension, measure and region details will continue to display in the chart field even when reverting to **Edit** mode.

Changing the appearance of the chart

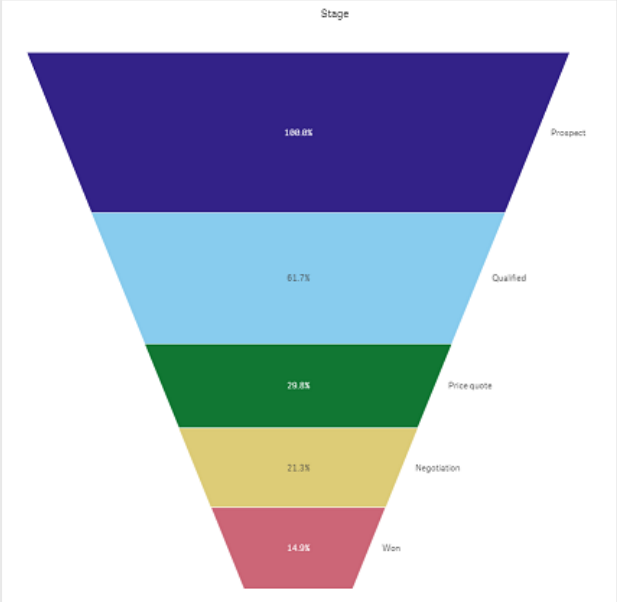
You can customize your chart with one or more features.

Funnel mode

You can set the shape of the funnel with **Appearance** > **Presentation** > **Funnel Mode**.

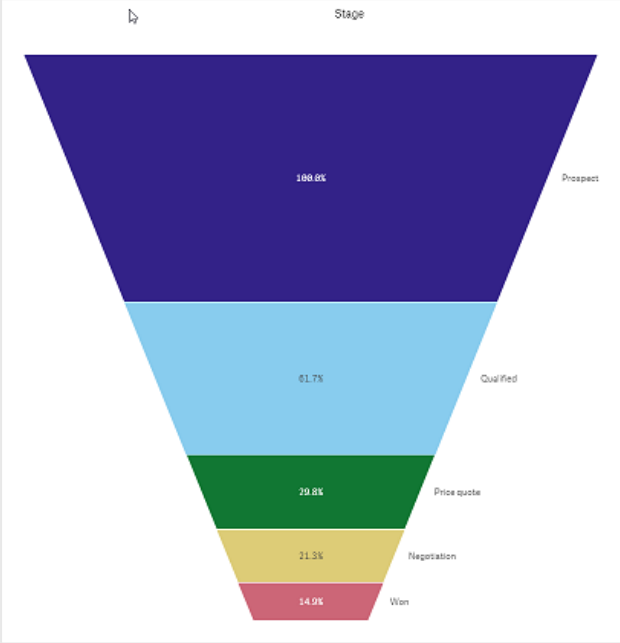
Area

The area of each item is proportionate to the measure. Only the height of the individual segment is affected - not the overall chart or contents.



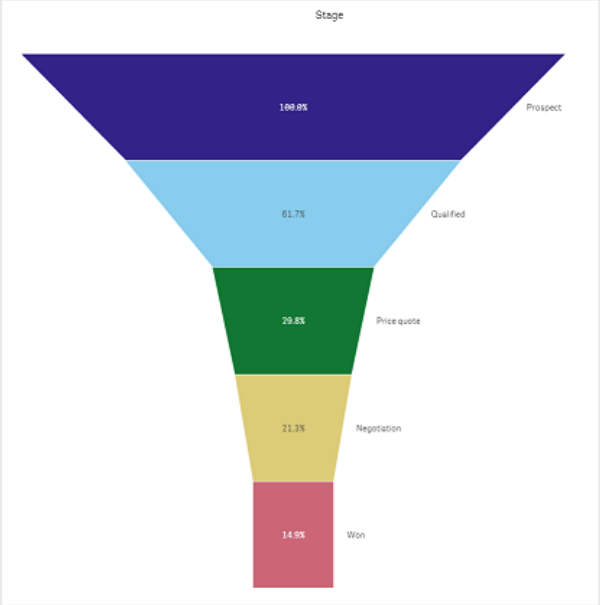
Height

The height of each item is proportionate to the measure. Only the height of the individual segment is affected - not the overall chart or contents.



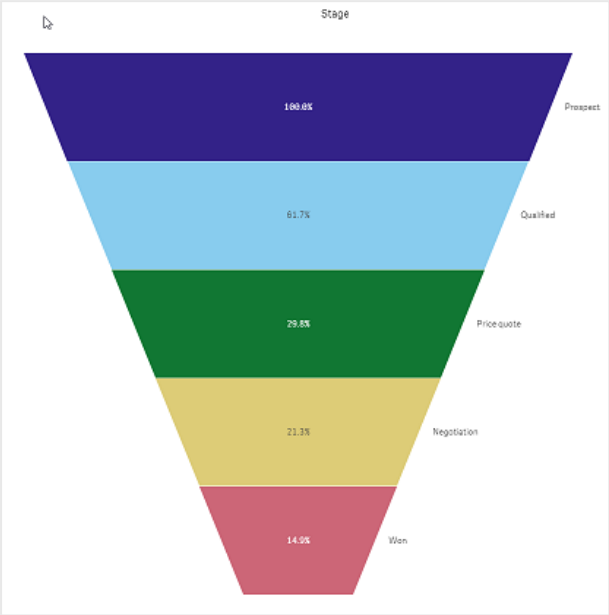
Width

The width of the upper edge is proportionate to the maximum value of the measure. The top segment is always 100% and the following segments are relative in size to the first. The lowest segment is rectangular. This affects the shape of the funnel and each segment has its individual slope.



Ordering

The measure only orders the segments with largest value at the top. The ordering is fixed so the shape of the funnel is not affected.

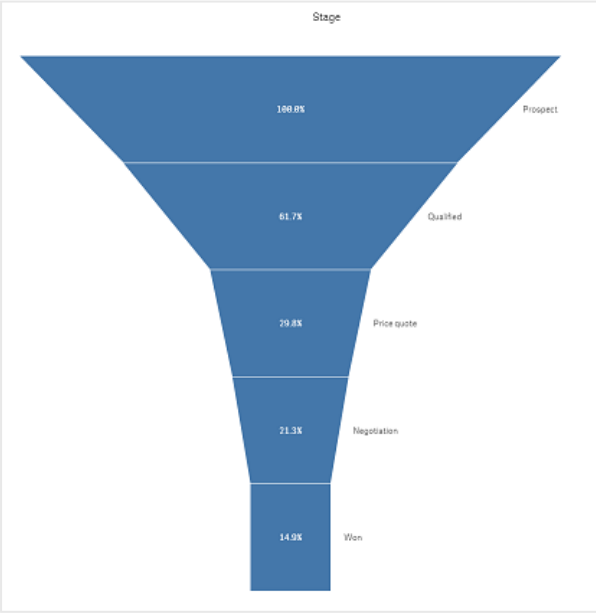


Colors

You can choose how to color the funnel chart by changing the **Appearance > Colors** setting from **Auto** to **Custom**.

Single color

*You can use a single color for the entire funnel chart by selecting **Single color** in **Colors**.*



Color by dimension

You can also color your entire funnel chart by dimension by selecting **By dimension** in **Colors**. There are two gradient color schemes available:

- **12 colors**
- **100 colors**

You can also select to keep persistent colors with **Persistent colors**.

Color by measure

You can color your funnel chart by measure by selecting **By measure** in **Colors**. The measure of the chart is selected as default, but you can change it under **Select measure**. This measure must be unlinked before a new can be selected. You can also change the measure using an expression in the Expression editor ( ).

You can choose between four color schemes. It is also possible to reverse the colors.

- Sequential gradient
- Sequential classes
- Diverging gradient
- Diverging classes

You can also set a color range for your chart based on your measure by setting **Range** to **Custom**. Set the range in **Range > Min** and **Range > Max**. You can use a number or an expression that evaluates as a number.

Color by expression

You can color your funnel chart by measure by selecting **By expression** in **Colors**. You can color it in two ways.

- The expression evaluates as a valid CSS color to color the chart. **The expression is a color code** should be checked.
- The chart is colored by the expression value according to a color scheme. **The expression is a color code** should be unchecked.
  You can also set the range of the colors.

Sorting

Funnel chart elements are automatically sorted from largest to smallest. You can change the sort order in the properties panel. Go to **Sorting**, and drag your dimensions and measurements into the desired order.

Styling and formatting

The position and order of labels for dimension and measure values can be displayed in different ways. You can for example hide the dimension value or display measures as values or as a percentage.

Additionally, you configure the title label to display for the dimension under **Data** in the properties panel. Change the styling of these text elements in the styling panel. See *Using the styling panel to further customize the appearance (page 540)*.

Dimension label

You can choose if you want to show the dimension title label or not with **Appearance > Presentation** > **Dimension title**

Value labels

You can choose how to show value labels for each segment by setting **Appearance > Presentation** > **Value labels** to **Custom**.

- **None** hides the value labels.
- **Share** displays the values as percentage.
- **Values** displays the actual measure values.

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Dimension title**: Style the text of the dimension title that is displayed above the visualization.
    - **Dimension value label**: Style the text of the labels displaying the individual dimension values.

- **Value Label**: Style the text of the measure value labels.
  Use the **Auto contrast color** setting to automatically override the selected value label color with a color that better contrasts the funnel colors.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

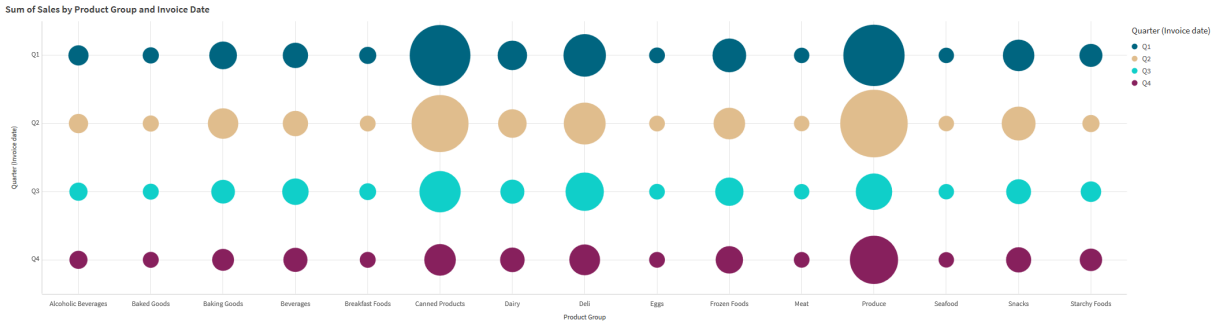
For information about general limitations, see *Limitations (page 533)*.

Grid chart

The grid chart (**Grid chart**) uses symbols of varying size sorted in a grid. The grid chart is included in the Visualization bundle.

Grid charts must have two dimensions and one measure. The dimension values are the x and y axes. The measure is the metric that determines the size of the symbol in each crossing.

Grid chart with circles. Circle color is set by dimension (Quarter) and circle size is based on measure (Sum of Sales)



When to use it

A grid chart is useful when you need to quickly find measure values that stand out from other values. For example: you want to see which products sell well in some months, but poorly in others.

Grid charts do not work well when the measure has:

- Many duplicate values.
- Values that are numerically close to each other.

Creating a grid chart

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

Do the following:

1. In the assets panel, open **Custom objects** > **Visualization bundle** and drag a **Grid chart** object to the sheet.

2. Click the **Add Dimension** button to select the x axis value of the chart.
3. Click the second **Add Dimension** button to select the y axis value of the chart.
4. Click the **Add Measure** button to select the metric being weighed.

The grid chart is now displayed with the dimensions and measures you selected.

Sorting

Grid chart elements are automatically sorted alphabetically or numerically from smallest to largest on the x axis. You can change the sort order of either axes in the property panel.

Do the following:

1. In the property panel, go to **Appearance**>**Sorting**.
2. Click on a dimension.
3. Toggle **Sorting** from **Auto** to **Custom**.
4. You can choose any of these options:
    - **Sort by expression**: **Ascending** or **Descending**.
    - **Sort numerically**: **Ascending** or **Descending**.
    - **Sort alphabetically**: **Ascending** or **Descending**.

Changing the appearance of the chart

You can customize the appearance of your grid chart.

Grid chart with stars. Star color and size is set by measure (Gross Sales).

Customizing the symbols

You can change the shape and size of the symbols from the **Appearance**>**Presentation** tab in the property panel:

- Use the **Symbol size** slider to change size.
- Use the **Symbol** dropdown to change symbol type.

Placing labels on symbols

You can place the individual values of symbols directly onto the chart. From the **Appearance**> **Presentation** tab, toggle the **Labels** from **Off** to **Auto**.

Using a grid chart as a heat map

You can change the layout of a grid chart to a heat map from the **Appearance**>**Presentation** tab in the property panel. From the **Layout** dropdown menu, choose:

- **Standard**: The chart will show individual symbols.
- **Heatmap**: The chart will display data in a grid with a legend ordered by color.

For a visual demo about using a grid chart as a heatmap chart, see Creating a heatmap using a grid chart.

Changing the color scheme

You can change the color scheme of the symbols from the **Colors and legend** tab. Set **Colors** to **Custom**. From the dropdown menu, choose:

- **Single color**: You can choose any color.
- **By dimension**: Under **Color scheme**, you can change how many different colors are used.
- **By measure**: Under **Color scheme**, you can alter the color gradient. Click the **Reverse colors** check box to flip the gradient order. The colors used are based on your app theme.
- **By expression**: You can have a color code in the expression. Or, deselect the **The expression is a color code** check box, and you can alter the color gradient. Click the **Reverse colors** check box to flip the gradient order. The colors used are based on your app theme.

Changing the range limits

You can customize the limits of the ranges if you color by measure or expression. The full range is defined by the value of the dimensions. Go to **Appearance** > **Colors and legend** > **Range** in the properties panel:

- **Min**: Defines the lower limit of the range.
- **Max**: Defines the upper limit of the range.

Changing the scale of the axes

You can customize the presentation of the x and y axes. Go to **Appearance** > **X-axis: [dimension]** or **Appearance** > **Y-axis: [dimension]** in the properties panel. You can set:

- **Labels and title**: Select what labels and title to display.
- **Label orientation**: Select how to display the labels. The following options are available:
  - **Auto**: Automatically selects one of the other options depending on the space available on the chart.
  - **Horizontal**: Labels are arranged in a single horizontal line.
  - **Tilted**: Labels are stacked horizontally at an angle.
  - **Layered**: Labels are staggered across two horizontal lines.

  To view examples of label orientation, see *X-axis and Y-axis (page 692)*.
- **Position**: Select where to display the dimension axis.
- **Number of axis values**:

    - **Auto**: The number of visible bars is determined by the number of dimensions and measures used.
    - **Max**: The number of visible bars is set to maximum.
    - **Custom**: When custom is selected, you can directly set the upper limit to the number of visible bars using **Maximum number**, or by entering an expression. Click **Expression** to open the Expression editor.
- **Show grid lines**: Select whether to display grid lines.

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Axis title**: Style the titles on the axes.
    - **Axis label**: Style the labels on the axes.
    - **Value label**: Style the labels which display the measure value for each dimension value.
    - **Legend title**: Style the title of the legend. The legend is only available for the **Heatmap** configuration.
    - **Legend labels**: Style the labels of the individual legend items. The legend is only available for the **Heatmap** configuration.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

For information about general limitations, see *Limitations (page 533)*.

- The **Number of axis values** setting in the property panel has a limit of 55 per axis.
- Sometimes when you set dimension limits on a grid chart, chart labels will incorrectly display more items than requested.
- When coloring by dimension is used in this chart, a maximum of 100 unique dimension values and 100 unique colors can be plotted on the legend.

Multi KPI chart

The Multi KPI chart (**Multi KPI**) is a visualization that allows you to show multiple KPI values for different dimension values. The values can be individually customized using various conditional formatting settings. This enables an easy view and tracking of goals. It is included in the Visualization bundle.

The Multi KPI will no longer be available in the assets panel for creation of new charts as of April 5, 2025 on Qlik Cloud and the May 2025 version of Qlik Sense Client-Managed. It will still function on dashboards where it was previously added, but will be fully removed in May 2027 for Qlik Cloud and the May 2027 version of Qlik Sense Client-Managed.

Use instead

The old Multi KPI will be retired. Consider replacing the object with other charts. If you have not already, please explore all the new app, sheet, and chart styling settings. Do also make use of the Layout container and the Navigation menu when replacing the functionality. If you used CSS in the past, here is a ≤ list of native settings you can use instead. Note also that CSS can be applied through a theme or through the sheet setting for CSS input.

Features

- The chart shows KPIs using measures and one dimension.
- Up to 15 measures and 80 values can display simultaneously.
- All KPI values can be grouped or displayed individually.
- Each value can be independently customized using for example, colors, icons, labels, font sizes, alignments, styles, links to different sheets, etc.
- The chart supports adding graphics, embedding objects into a chart and to display measures infographically.

When to use it

The multi KPI chart is useful when you want to easily view, understand and track the performance of your goals. It is also helpful when you want to customize individual KPI values using conditional formatting. You can link KPIs to separate sheet and insert objects to represent information or data.

Creating a multi KPI chart

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

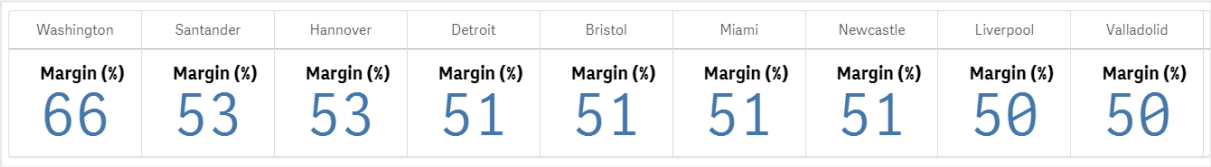
Do the following:

1. In the assets panel, open **Custom objects** > **Visualization bundle** and drag a **Multi KPI** object to the sheet.
2. Click the **Add measure** button and select the main measure of the KPI chart. The main measure and a KPI value for the chosen measure is displayed.
3. Click **Add** under **Data > Dimensions** in the property panel and select dimension.

When you have selected measure and dimension, a multi KPI chart is displayed.

Example:

A chart with the measure (Margin %) shown for different values of the dimension (City).

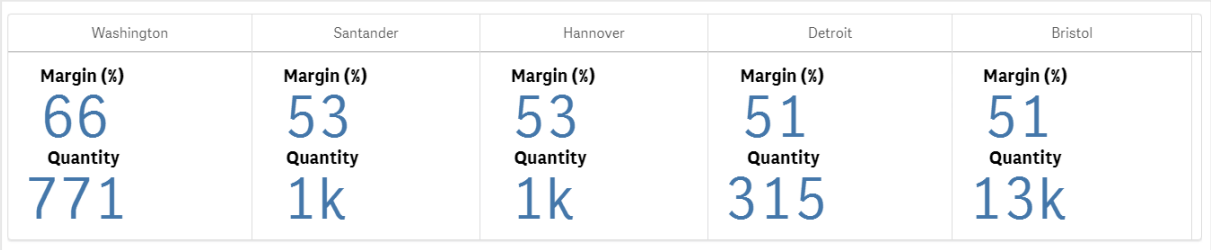


Adding additional measures

You can add additional measures to your chart in property panel under **Data > Dimensions**. The chart updates to reflect the added measures. Up to 15 measures and 80 values can display simultaneously. The main measure is always the top measure listed for each dimension. When you add more measures, they appear under the initial KPI value in the order they are entered.

Example:

A chart with a two measures (Margin %, Quantity) grouped per dimension (City).



Customizing the KPIs

You can customize your KPI values and measures with one or more conditional settings. You can add several KPIs together, group them and link to different sheets. You can also configure KPI values independently by differentiating them with one or more conditional settings such as text, color, icons, graphics, etc.

For conditional settings options, see *Changing a measure/label color (page 551)*.

Customizing styling

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

For information about general limitations, see *Limitations (page 533)*.

Multi KPI charts cannot be used in Qlik NPrinting reports.

Customizing your KPIs

With the Multi KPI chart (**Multi KPI**) values and measures can be customized using one or more conditional settings. You can add several KPIs together, group them, and link to different sheets. KPI values can also be customized independently by differentiating them using one or more CSS-properties such as text color, fonts, sizes, icons, labels, graphics.

The Multi KPI will no longer be available in the assets panel for creation of new charts as of April 5, 2025 on Qlik Cloud and the May 2025 version of Qlik Sense Client-Managed. It will still function on dashboards where it was previously added, but will be fully removed in May 2027 for Qlik Cloud and the May 2027 version of Qlik Sense Client-Managed.

For recommendations on replacing the functionality, see Multi KPI chart (page 546).

KPI values can also be customized independently by differentiating them using one or more css-properties such as text color, background color, fonts, sizes, icons, labels, graphics.

KPI values using icons, different colors, fonts, Master Visualizations

Coloring a Multi KPI

The color option enables all KPI values (measures and labels) to be differentiated by colors. You can change the colors of text, icons and background color. The colors should be valid css-colors.

You can choose from the following options:

- The color palette with a set of predefined colors.
- The color circle (click the easel symbol in the color palette and choose individually).
- Enter a color code string in the field next to the easel symbol.

Changing a measure/label color

Do the following:

1. Click **Data > Measures** in the property panel.
2. Click applicable measure and select to color the value (**Value color**) or the label (**Label color**).
3. Select color from the color palette that opens.

Changing background color

Do the following:

1. You can also set your own color by clicking the easel symbol in the color palette and select color or enter a color code string in the field next to the easel symbol. The colors should be valid css-colors.
2. Click **Appearance > Styles** in the property panel.
3. Click the **Background color** box.
4. Select color from the color palette that opens and the chart updates.

Changing sizes of a Multi KPI

The size of dimensions, measures, labels and icons can be configured using predefined sizes available from a drop-down menu:

- **Dimension labels**: Select the size of the labels from the drop-down menu under **Appearance > Dimensions > Size** in the property panel.
- **Measure labels**: All measures can have individual sizes.

Do the following:

1. Select the size of the measures in the property panel under **Data > Measures**.
2. Select **measure** and click the **Override parameters** box.

3. Enter the label type as a string or in the expression under **Label** and select the size from the options in the drop-down menu under **Size**.

Icons: All icons can be differentiated by applying different colors.

Do the following:

1. Go to **Data > Measures** in the property panel.
2. Select **measure** and choose icon from the icon option.
3. Then choose **icon size** from the drop-down menu under **Icon**.

Changing the fonts of a Multi KPI

You can change the font-family of all labels if you go to **Data > Measures** in the property panel and select applicable measure. Under **Font style** enter a label string and press Enter.

You can also change the font using an expression in the Expression editor (f_x) or apply individual font css properties entered through **Appearance > Styles > Styles (CSS)** in the property panel.

Changing icons

You can set a predefined icon to represent a value and/or label by selecting from the icon set. The icons can then be further customized by differentiating using the colors, fonts, labels and sizes options.

Do the following:

1. Click **Data > Measures** in the property panel.
2. Check the **Select icon** box and click applicable icon from the icons set that opens.

3. Click **OK**. The pop-up will close and your chart update.
4. Choose whether to configure your label or value by selecting **Label** or **Value** under **Icon position**.

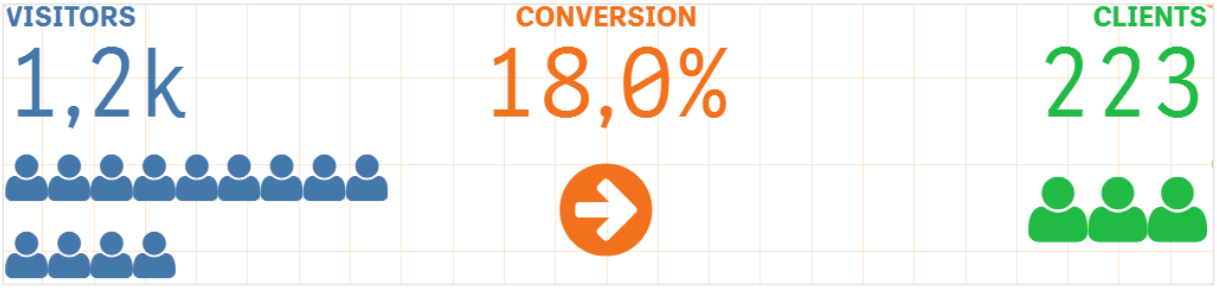
You can also change a value/label to an icon by entering an icon string under **Icon** (**Data > Measures** > applicable measure in the property panel) and then press Enter. Thereafter click **Label** or **Value** under **Icon position** depending on which you want to configure. It is also possible to change an icon using an expression in the Expression editor (f_x). The icons should be valid CSSicons.

Using infographic mode

The infographic mode allows you to show each measure graphically as an appropriate number of icons.

Do the following:

1. Click the applicable measure under **Data > Measures** in the property panel and click the **Icon** button.
2. Select an icon to represent a measure from the predefined icon set (**Icons**) that opens.
3. Click the **Infographic mode** button. The resulting KPI chart updates and graphically shows the measures with applicable number of icons (max. 100 icons per measure).
   You can also select an icon using an expression in the Expression editor (f_x).



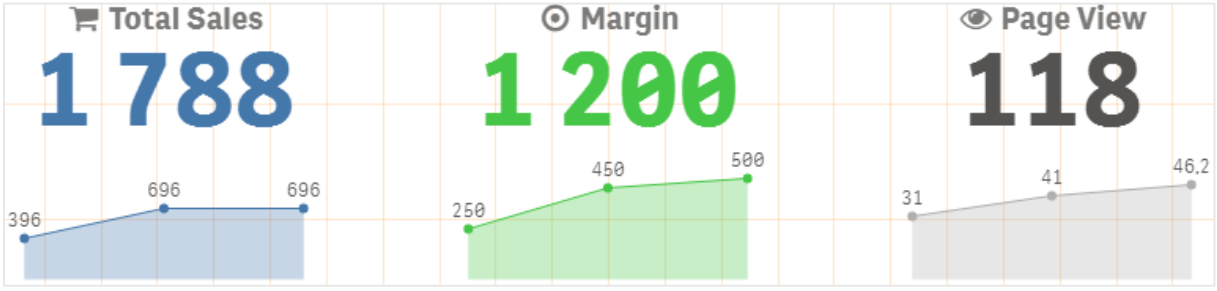
Embedding a master visualization

To graphically illustrate the KPI object, you can embed a master visualization.

Do the following:

1. In the in the property panel go the **Data > Measures** and click **Add**.
2. Click the **Expression editor** (f_x) button.
3. Enter the string *='Drag and Drop here'* into the **Expression editor** and click **Apply**.
4. Drag and drop a master visualization object into the value region of each measure placeholder.

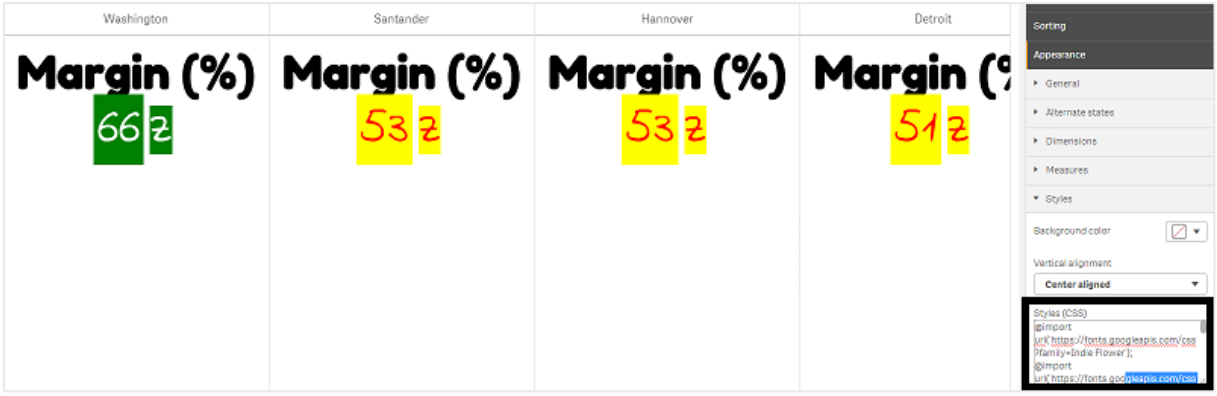
You can also change insert the object ID string into the expression in the Expression editor (f_x) under **Visualization** for each measure (**Data > Measures** > applicable measure in the property panel).



Using Styles (CSS) properties

You can further configure your measures using non-predefined Styles (CSS) property for each measure. This can be icons, changing color of text/icons, label, font, background color, size, etc. Copy and paste the styles into the **Styles (CSS)** field (under **Appearance > Styles** in the property panel).

For icons, enter appropriate classes in the **Icon** field of the chosen measure under **Data > Measures**in the property panel. You can also enter the icon string using an expression in the Expression editor (f_x).



Formatting your KPIs

You can format the chart layout to be presented in different ways.

Alignment

You can configure the main chart text alignment by selecting applicable box under **Alignment** of chosen measure under **Data > Measures** in the property panel.

All KPIs can also be vertically aligned. This alignment can be adjusted to align top, bottom and center or as stretched. Select applicable alignment from the **Vertical alignment** menu under **Appearance > Styles** in the property panel. It is also possible to center align labels by checking the **Center align labels** in the property panel under **Appearance > Dimensions**.

Number formatting

You can also custom format the KPI number values. Different formatting can be applied to the same values. The chart updates to reflect the changed number type.

Do the following:

1. Click **Data > Measures** in the property panel and select applicable measure.
2. Select applicable number formatting from the **Number formatting** menu.

Format pattern

The text of a specific measure can be changed or removed.

Do the following:

1. Click **Data > Measures** in the property panel.
2. Click applicable measure and enter/remove the applicable format string under **Format pattern** and press Enter.

Segment/card

It is also possible to configure the layout of the KPI chart where dimensions and values display in a segment or card layout.

Do the following:

1. Click **Appearance > Dimensions** in the property panel.
2. Choose **Segment** or **Card** layout from the **Show as** menu. The chart will update.

The segment layout can be configured horizontally or vertically under **Appearance > Dimensions > Orientation** in the property panel. Click either the **Horizontal** or the **Vertical** buttons.

Items per row

It is also possible to decide the number of items (KPIs) per line in a chart in the property panel under **Appearance > Measures**. Use the default Auto or select applicable number from the **Items per row** menu (between 1-8).

Borders

You can hide external and internal borders of the chart. By default all borders are visible. To configure borders go to **Appearance > Dimensions** in the property panel and check , as applicable, **Hide external borders** or **Hide internal borders**.

Value/Label layout and formatting

The position and order of labels for both dimension and measure values can be altered and displayed in different ways. Labels can be hidden or displayed vertically or horizontally. By default **Horizontal** is selected.

Dimension label layout

Do the following:

1. Click **Appearance > Measures** in the property panel.
2. Click either **Horizontal** or **Vertical** under **Labels orientation** to select how the labels should display.

Measure value layout

Measure value layout can be set in two different ways.

Do the following:

1. **Existing parameters**:
    a. Click **Appearance > Measures** in the property panel.
    b. Click either **Horizontal** or **Vertical** under **Labels orientation** to select how the labels should display.
2. **New parameters**:
    a. Click **Data > Measures** in the property panel.
    b. Click applicable measure and check the **Override parameters** box.
    c. Enter the label string under **Label** and press Enter.

Label order

You can also adjust the order in which measure value labels appear.

Do the following:

1. Click **Appearance> Measures** in the property panel.
2. Click either **Label, Value** or **Value, Label** under **Labels orientation** to select how the labels should display.

Icon order

You can decide where to show icons - before or after a value. In the property panel under **Appearance > Measures** go to **Icon order** and click either the **Icon, Value** or **Value, Icon** buttons to select which displays first in the chart.

Hide Labels

- **Measure labels**: This option hides the measure label of each KPI. To hide the labels click **Data > Measures** in the property panel and select applicable measure. Then check the **Hide labels** box.
- **Dimension labels**: This option hides the dimension label of each KPI. To hide the labels click **Appearance > Dimensions** in the property panel. Then check the **Hide labels** box.

Hide Values

This option hides the value for each KPI. To hide the value, click **Data > Measures** in the property panel. Then check the **Hide values** box.

Group KPI values

All KPI values can be grouped or displayed individually per measure. Go to the **Data> Measures** in the property panel. Choose applicable measure and check the **Group by dimension** box.

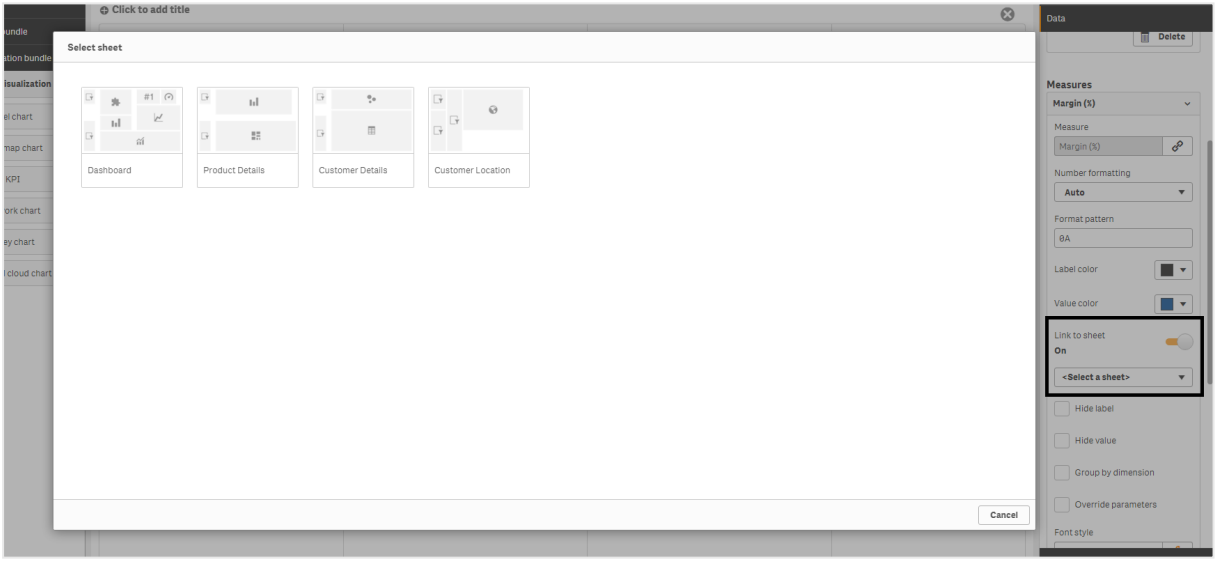
Another option is to enter a dimension value string under **Dimension value** and press Enter. The chart will update. You can also enter the dimension value using an expression in the Expression editor (f_x). The values should be valid CSS values.

Link to a separate sheet

Each measure can be linked to another sheet.

Do the following:

1. Click **Data > Measures** in the property panel and select applicable measure.
2. Move the **Link to sheet** slider to the right to turn the option on.
3. Click the **Select sheet** button and from the **Select sheet** pop-up click the page you want a link to. The sheet will close and your pages link.



Limitations

For information about general limitations, see *Limitations (page 533)*.

Network chart

The network chart (**Network chart**) lets you draw a network of connected nodes and edges from a data set to a sheet. A network chart shows how information flows, how components interact, and where components exist in the network. The network chart is included in the Visualization bundle.

A network chart can provide a broad overview or be very detailed. Nodes represent system components, and edges show the movement of information from one component to another. Network nodes are connected to the nodes they interact with the most. This visualization uses different styles, colors, sizes, and images to represent different levels of a network.

Interact with the network chart by making selections one at a time.

What it contains

You need to define three dimensions with a fourth optional dimension:

- **Node identifier**: This dimension controls which nodes are presented in the chart.
- **Node label**: This dimension sets the label of each node.
- **Node parent**: This dimension sets the parent of a node, and controls the relationships between nodes. It needs to contain the value of the node identifier of the parent to connect to.
- **Node group** (optional): You can use this dimension to group nodes. All nodes in the same group will have the same color.

You can use up to three measures to enhance the diagram. All measures are optional, but you need to add them in the following order:

1. **Tooltip**: You can set a measure value that is displayed in a tooltip when hovering over a node.
2. **Node size**: You can set the size of the node according to a measure.
3. **Edge size**: You can set the width of the lines between nodes according to a measure.

> *You need to add a tooltip before you can set node size. You can set edge size after adding a tooltip and node size.*

When to use it

Network chart diagrams can illustrate computer or telecommunications networks. They show the components of a network and how they interact. For example, a group of connected computers, printers, modems, hubs, and routers. This type of chart is helpful when:

- Planning the structure of a network.
- Coordinating updates to an existing network.
- Reporting and troubleshooting network problems .
- Keeping track of components.
- Documenting detailed network documentation.

Formatting your data

A network chart requires data that is structured consistently according to a network data model where each record can have multiple parents and children. Each record needs to contain at least:

- A field that identifies the node, the node identifier. Node identifier values must be integer values, starting from 0 and in sequential order.
- A field with the name of the node.
- A field that defines the parent node. This value needs to be the node identifier of another node. If this field is empty, and no other record refers to this node, a disconnected node is created.

It is also possible to use a hierarchical data model where each node has a single parent. This will create a tree-shaped chart.

Here is some example data that you can save in a text editor and load in a new app. You need to load both example files. The example shows passenger flows between different airports.

- ID is the identifier of an airport node.
- Name is the name of an airport node. This is used as label of the node.
- LinkTo contains the node identifier of the parent node.
- Group states the group of a node. This can be used to color the nodes according to group.
- Volume is the passenger flow volume between ID and LinkTo. This can be used as a measure in edge size.
- NodeVolume is the total passenger flow volume for a node. This is loaded in a separate table as the chart cannot aggregate the volumes automatically.

Example 1: *Airports1.csv*

```
ID;Name;LinkTo;Group;Volume
0;Frankfurt;;0;
1;London;0;1;5
2;Madrid;0;1;4
2;Madrid;1;1;8
3;Warsaw;0;1;7
4;Arlanda;0;1;1
3;Warsaw;1;1;5
```

```
4;Arlanda;1;1;6
5;Tunis;0;2;8
5;Tunis;2;2;4
6;Berlin;0;1;6
6;Berlin;4;1;4
7;Rome;0;1;6
7;Rome;6;1;3
8;San Francisco;0;3;2
9;New York;0;3;9
```

Example 2: *Airports2.csv*

```
ID,NodeVolume
0,48
1,24
2,16
3,12
4,11
5,12
6,13
7,9
8,2
9,9
```

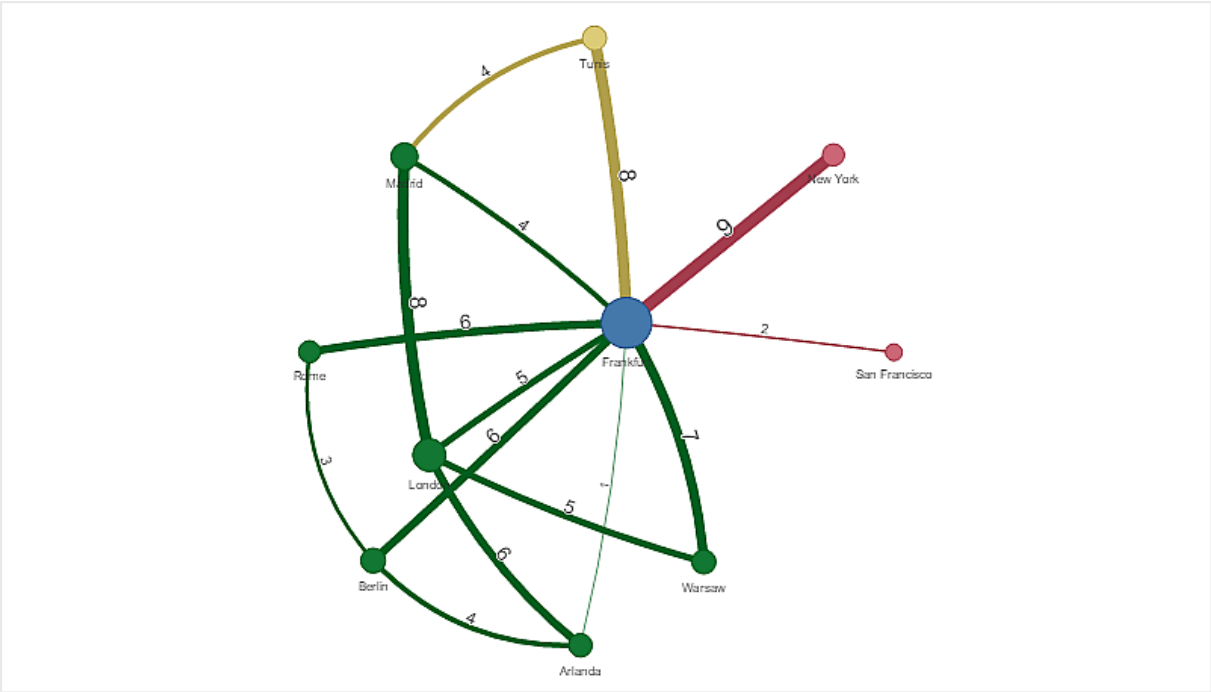
Creating a network chart

This example of a network chart illustrates how different airports are connected worldwide based on base data set. It uses the example data set from Formatting your data. Prepare by saving the example data set in a text file, creating a new app and loading the example data set.

Do the following:

1. In the assets panel, open **Custom objects** > **Visualization bundle** and drag a **Network chart** object to the sheet.
2. Click the top **Add dimension** button and select *ID* as the node identifier.
3. Click the second **Add dimension** button and select *Name* as the node label.
4. Click the third **Add dimension** button and select *LinkTo* as the parent node.
5. Click **Data** in the properties panel. Click the **Add** button under **Node group** and select *Group* as the group dimension.
6. Under Measure, click the **Add** button under **Tooltip**, and select **Volume > Sum(NodeVolume)**.
7. Click the **Add** button under **Node size**, and select **Volume > Sum(NodeVolume)**.
8. Click the **Add** button under **Edge size**, and select **Volume > Sum(Volume)**.

The chart displays:



Changing the appearance of the chart

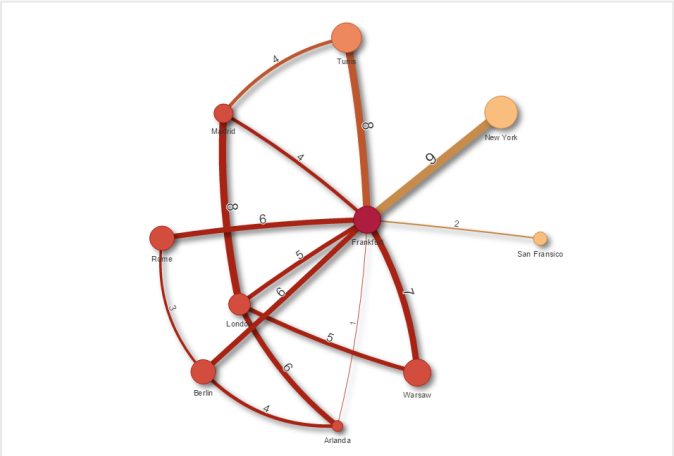
You can customize your chart with one or more features.

Configuring edge type

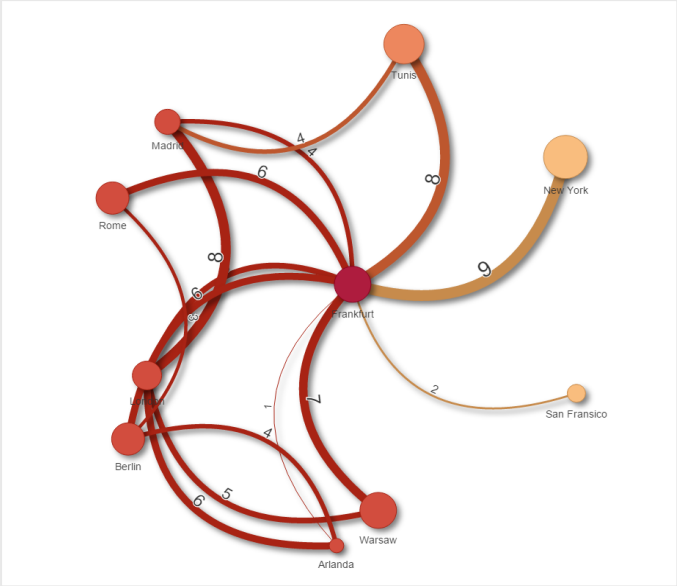
You can configure the shape of the curve between chart nodes under **Settings > Edge Type** in the properties panel. Select the shape option of the chart curves from the menu.

Examples:

A chart with dynamic edge type (curves).



The same chart with curved CW edges.



Toggling edge value

The edge value represents value of the curves between chart nodes and their width. This option hides the numerical value of each curve. To hide the value move the slide button under **Settings > Display edge value** in the properties panel to the left to turn the option off.

Configuring edge label

The edge label value is the numerical value of each chart curve. You can change the position of these or hide the labels.

- **Hide edge label value**: This option hides the edge label of the network chart. Toggle the slide button under **Settings > Display edge value** in the properties panel.
- **Edge label position**: This option decides where on each chart curve the edge value displays, for example: above or below. Select applicable option from the menu.

Configuring node shape

You can customize the shape of the nodes, for example: dot, square, diamond, or triangle. Go to **Settings > Node shape** in the properties panel, and select the node shape from the menu.

Toggling shadow option

This option lets you turn off the shadow effects behind chart curves and nodes (used to highlight background). Toggle the slide button under **Settings > Display shadow** in the properties panel.

Sorting

Sorting is set to Auto with the system choosing the sorting order as the default (under **Sorting** > chosen dimension or measure in the properties panel) for all dimensions and measures. You can change them individually by expression.

Do the following:

1. Open the dimension or measure menu under **Sorting** in the properties panel.
2. Move **Sorting** slide button to the left to turn the option from Auto to Custom.
3. Click the **Sort by expression** check box.
4. Enter an order string under **Expression** and press Enter. You can also change the color using an expression in the Expression editor (f_x).
5. Choose start order by selecting **Ascending** or **Descending** for the menu below.

Number formatting

It is possible to format the measure value. Different formatting can be applied to the same value, for example: money, data,or duration. The chart updates to reflect the changed number type.

Do the following:

1. Click **Data > Measures** in the properties panel and click chosen measure.
2. Select applicable number formatting form the **Number formatting** menu.
3. Enter details in the panel fields. These display when choosing an option other than Auto when to configuring the chart.

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:

- **Title**
- **Subtitle**
- **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

For information about general limitations, see *Limitations (page 533)*.

- Network chart visualizations cannot be used in Qlik NPrinting reports.
- The maximum size of the data set displayed in the network chart is 1400 rows. If the selected data set is larger, nodes and links can be omitted from the chart.
  Use a smaller data set or employ selections to limit the data set.

Org chart

You can use the org chart (**Org chart**) to create organization charts from data with a tree structure. You can navigate through the hierarchy by expanding and collapsing the tree. The org chart is included in the Visualization bundle.

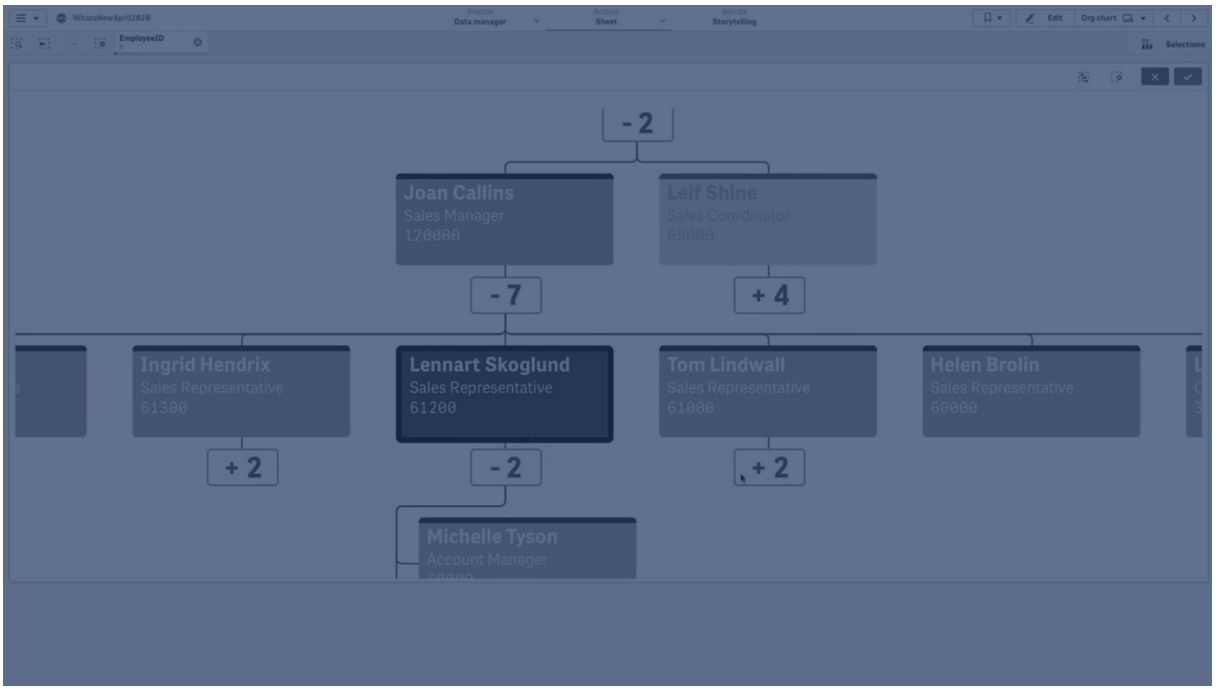
You need to use a data set with two dimensions that define the tree structure.

- The first dimension needs to be the ID of the node. This would typically be an employee ID in a traditional organization chart.
- The second dimension needs to be the ID of the parent node. This would typically be the employee ID of a manager.
  This connects to the first dimension to create a tree structure.
  If this value is empty or points to a node that does not exist, the node becomes a root node at the top of the tree.

Example data set for an org chart

EmployeeID	ManagerID	Name	Title
A101		Mary Bell	CEO
A102	A101	John Bialik	Executive secretary
O101	A101	Lee Mayer	COO
I101	A101	Wendy Sanderson	CIO
T101	A101	Asim Nawrat	CTO
T102	T101	Emily Diaz	VP Products
T103	T101	Christine Nemic	VP R & D

You can also add a measure that is used as a card description.



Preparing the dataset

There are some things you need to consider when preparing the dataset for an org chart.

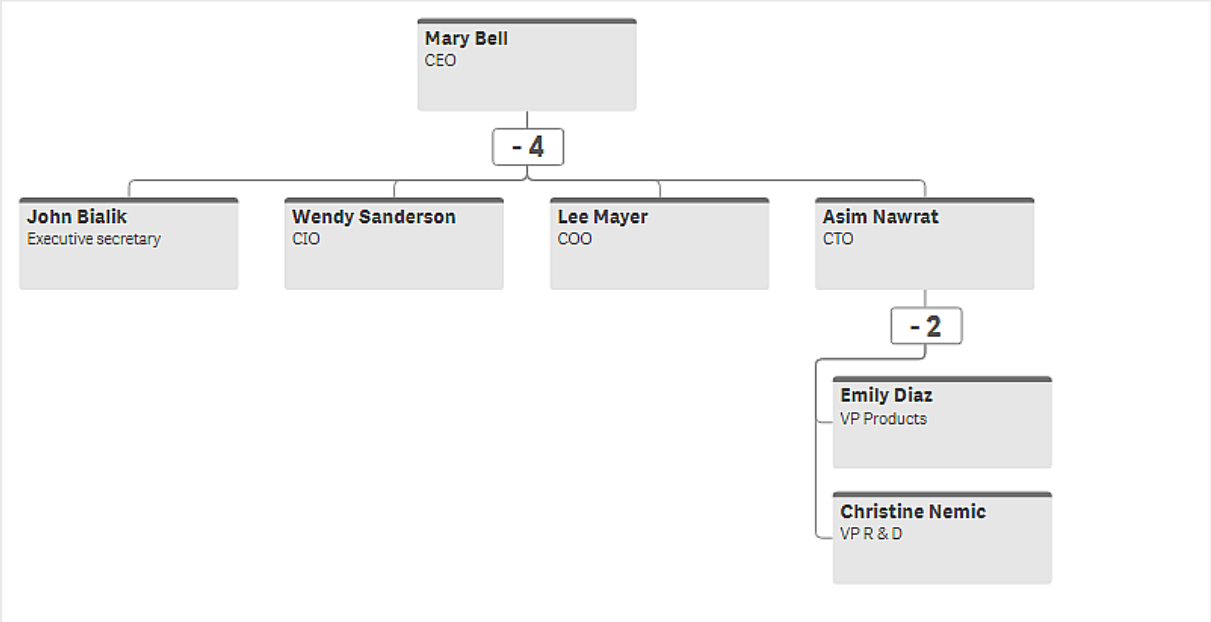
- You need to use a dataset with less than 33000 rows.
  If you use a larger dataset, the excess rows will be ignored. This can result in a tree with incorrect structure. A message is displayed: **The maximum data limit is reached. The tree may display incorrectly.**
- Make sure that the data does not contain circular references.
  Circular references can result in nodes being omitted, or creation of multiple root nodes. One of these messages is displayed:
  Data contains circular references, nodes are omitted.
  No root node, check your data for circular references.
- If a node has more than 99 children, the excess children nodes will not be rendered.
  A message is displayed: **Maximum number of child nodes reached, nodes are omitted.**
- You should avoid having a large number of rows that do not have a parent node. These will be shown as root nodes. The maximum number of root nodes is 99.

Creating an org chart

You can visualize the example data set using an org chart. Every employee is shown as a card in a tree structure that you can expand and collapse.

Do the following:

1. Add an **Org chart** to your sheet.
2. Set the first dimension to be EmployeeID.
3. Set the second dimension to be ManagerID.
4. Add labels to the cards. Expand the EmployeeID dimension to see the label properties.
   a. Set **Card title** to Name.
   b. Set **Card sub-title** to Title.



Changing the appearance of the chart

You can customize the appearance of your org chart.

Adding a measure to set a description

You can display a description by adding a measure. This will replace the value set in the property **Card description**.

Changing the presentation mode

You can set how the org chart displays in **Appearance** > **Presentation** > **Presentation mode**. Org charts can either display the entire tree, or they can collapse and expand. If an org chart is set to **Expand/collapse**, you can also set the org chat to automatically resize to fit every time it is expanded or collapsed.

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. Switch to the **Chart** tab. By default, **Auto contrast** is turned on under **Text color**. This setting automatically adjusts text color of card elements for optimum contrast. Turn the setting off to control text color for each element.
   Set the font, font size, and color for the following text elements:

- **Title**: Style the text of the card titles.
- **Subtitle**: Style the text of the card subtitles.
- **Description**: Style the text of the card descriptions.
- **Measure label**: Style the text of the measure labels.
- **Measure value**: Style the text of the measure values.

Customizing the background

Background styling options are available at both the general and card level.

Setting the general background

The general background includes the title area, as well as the chart itself, which is partially covered by the cards.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Setting the background of the cards

You can define the background color of the cards that appear in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, under **Card background color**, select the color to use for the background of the cards. You can set the color to a single color or an expression.

Setting background color of individual cards

With expressions, it is also possible to style individual cards differently than others. To do this, expand **Data** in the properties panel and expand the first dimension. Set an expression for **Card background color**. For example, it could be a conditional expression such as: `=if(EmployeeID='A101', 'pink')`

Customizing card appearance

You can change the background color of the cards (see *Setting the background of the cards (page 569)*). You can also configure whether the top bar and border appear in cards, and the color to use for them.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, go to **Card appearance**. By default, **Auto contrast** is turned on. This setting automatically adjusts the color of the top bar and border. Turn the setting off to control their color.
   Adjust the following settings:
   - **Top bar**: Choose whether a bar is added at the top of each card for visual appeal.
   - **Border**: Choose whether each card is surrounded by a border.
   - **Border color**: This setting becomes available when **Auto contrast** is turned off. You can set the color of the card borders to a single color, or color them by expression.

Customizing the card images

You can add images to the cards in the org chart (see *Adding images to the org chart (page 571)*). After you have added images, use the styling panel to change how they are presented.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab of the styling panel, under **Image options**, adjust the following settings:
   - **Location**: Adjust how users see the images. You can select to show images in cards only, in a tooltip when users hover over a card, or both.
   - **Alignment**: Choose where in the cards the images appear.
   - **Shape**: You can choose between a rectangular or round shape for the images.
   - **Fit to shape**: This setting becomes available when the **Shape** setting is set to **Rectangle**. With the setting on, each image is resized to fit the content box in which it appears. The image is then clipped.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Selections in the org chart

You can select cards in the org chart. Selecting a card will include all child nodes below a card in the selection.

Adding images to the org chart

You can add an image for each card in the org chart. You configure card images in the **Data** section of the properties panel, when configuring the first dimension.

Do the following:

1. In the properties panel, expand **Data**.
2. Under **Dimensions**, expand the first dimension you added.
3. Under **Image URL**, enter the expression that defines when to use each image. For example, you could have a field named *URLs* in your data model that contains the URL for each card.
   After defining the images, you can use the styling panel to adjust how they are presented. See *Customizing the card images (page 570)*.

Limitations

For information about general limitations, see *Limitations (page 533)*.

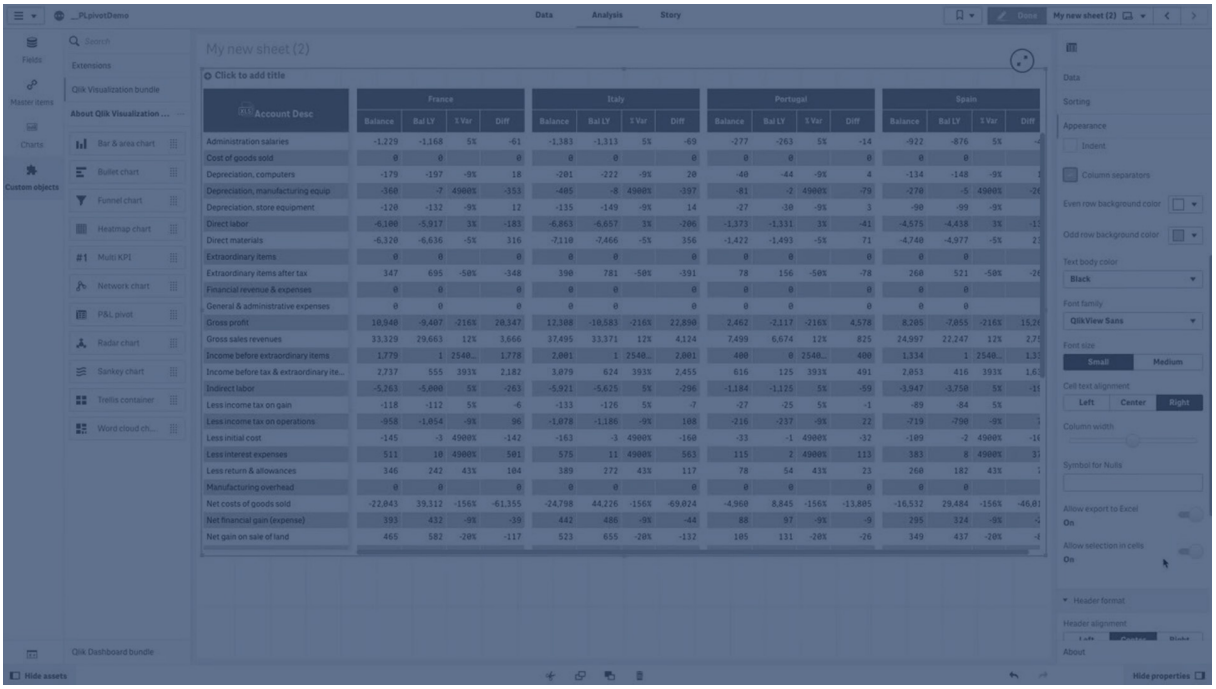
P&L pivot chart

You can use the **P&L pivot** chart to create a pivot table with a layout for profit and loss reporting. You can color cells according to performance and style the chart with custom fonts and alternating row colors. You can also download the chart to Excel including formatting. The **P&L pivot** chart is included in the Visualization bundle. The **P&L pivot** chart is included in the Visualization bundle.

Account Desc	France				Italy			
	Balance...	Bal LY (k)	% Var	Diff (k)	Balance...	Bal LY (k)	% Var	Diff (
Revenues	.	.	.	.	.	.	.	
Gross sales revenues	33,329	29,663	0	3,666	37,495	33,371	0	4,1
Less return & allowances	346	242	0	104	389	272	0	1
Net sales revenues	**32,983**	**29,905**	**0**	**3,078**	**37,106**	**33,643**	**0**	**3,4**
Cost of goods sold	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
Direct materials	-6,320	-6,636	-0	316	-7,110	-7,466	-0	3
Direct labor	-6,100	-5,917	0	-183	-6,863	-6,657	0	-2
Manufacturing overhead	.	.	.	.	.	.	.	
Indirect labor	-5,263	-5,000	0	-263	-5,921	-5,625	0	-2
Depreciation, manufacturing equip	-360	-7	49	-353	-405	-8	49	-3
Other mfr overhead	-4,000	-4,400	-0	400	-4,500	-4,950	-0	4
Net mfr overhead	**-9,623**	**-9,407**	**0**	**-216**	**-10,826**	**-10,583**	**0**	**-2**
Net costs of goods sold	**-22,043**	**39,312**	**-2**	**-61,355**	**-24,798**	**44,226**	**-2**	**-69,6**
Gross profit	**10,940**	**-9,407**	**-2**	**20,347**	**12,308**	**-10,583**	**-2**	**22,8**
Operating expenses	***0***	***0***	***0***	***0***	***0***	***0***	***0***	
Selling expenses	0	0	0	0	0	0	0	
Sales salaries	-4,200	-3,990	0	-210	-4,725	-4,489	0	-2
Warranty expenses	-730	-15	49	-715	-821	-16	49	-8

P&L pivot chart dimensions and measures

Dimensions	Measures	Result
1 dimension	up to 9 measures	A table with one row for each dimension value and one column for each measure.
2 dimensions	up to 8 measures	A pivot table with one row for each value of the first dimension and one column for each measure pivoted using the second dimension.



Coloring cells to show performance

You can color cells to show performance according to a scale of **Poor**, **Fair** and **Good**. All rows and columns are colored by default, but you can choose which columns and rows to color if you want to.

Do the following:

1. Make sure that **Enabled** is set to **On** under **Appearance** > **Color by condition**.
2. Select which rows to color by performance.
   Set **Color all rows by condition** to **Specified rows**.
   Add rows to color by name (dimension value) with **Add row to color**.
3. Select which measures to color by performance.
   Set **Color all measures** to **Specified measures**.
   Add a list of measures by number in **Measure indices** with the first measure of the chart numbered zero. Separate the measures with a comma.

   Example: Color the first, third, and fifth measure.

   0,2,4
4. Set performance limits and colors.
   You can set the range limits for **Poor** and **Fair**.
   - All cells with a value lower than the **Poor** range limit are displayed with the background color and text color set for **Poor**.
   - All cells with a value lower than the **Fair** range limit, but higher than **Poor**, are displayed with the background color and text color set for **Fair**. You should set the **Fair** range limit higher than **Poor**.
   - All other cells are displayed with the background color and text color set for **Good**.

Styling the chart using a style template

You can create a layout for the chart, for example to show a profit and loss report, using a style template.

You need to be able to add and load a CSV file to the app.

Do the following:

1. Create a style template as a CSV file. Use the style template format described below.
2. Load the style template to your app as one field. When you add the file, do not use semicolon as field separator, each row should be loaded as one field.
3. Set **Style template field** under **Appearance** > **Table format** to the name of the template field you added.

You can load several style templates in your app, and change the layout with **Style template field**.

Style template format

The style template is created as a comma separated text file (CSV) using UTF-8 encoding.

The style template rows need to align to the data in your first dimension. You need to refer to a dimension value in the template. The dimension value should be first in every row. You do not need to specify all rows/dimension values in the template. The style template can contain maximum 5000 rows.

Each row in the template should be in the following format. It is not required to use a header row.

```
DimensionValue;Bold;Background;FontStyle;TextColor;Align;FontSize;Comment
```

- DimensionValue
  The dimension value of the row that you want to style.
- Bold
  Set to `<bold>` if you want bold text.
- Background
  Set a background color. You can use `<dark>`, `<night>`, `<soft>`, `<red>`, `<orange>`, `<violete>`, `<blue>`, `<green>` or a color code in RGB format, for example `rgb(183,219,255)`. The default background color is white.
- FontStyle
  You can set the font style to `<italic>` or `<oblique>`.
- TextColor
  You can set the color of the text to `<white>`. The default background color is black.
- Align
  You can center align the text with `<center>`. The default alignment is left for text and right for numeric values.
- FontSize
  You can set the font size to `<large>`, `<medium>` (default) or `<small>`.
- Comment
  You can use the `<comment>` tag to replace all zero values with a space. This is useful when you want to include a sub header row. without values.

You can also use the style tags in any order, and exclude tags that are not used. These rows will give the same result:

```
Operating expenses;<bold>;;<italic>;;;;
Operating expenses;<italic>;<bold>
```

Style template example for profit and loss reporting

```
Cost of goods sold;<bold>;RGB(225,226,226);;;;;
Extraordinary items after tax;<bold>;RGB(193,216,47);;;<center>;<large>;
Extraordinary items;<bold>;;<italic>;;<center>;;<comment>
Financial revenue & expenses;<bold>;;<italic>;;<center>;;<comment>
General & administrative expenses;<bold>;;<italic>;;<center>;;<comment>
Gross profit;<bold>;RGB(193,216,47);;;<center>;<large>;
Income before tax & extraordinary items;<bold>;RGB(193,216,47);;;;<large>;
Manufacturing overhead;<bold>;;<italic>;;<center>;;<comment>
Net costs of goods sold;<bold>;RGB(225,226,226);;;;;
Net gain on sale of land;<bold>;RGB(193,216,47);;;<center>;<large>;
Net Income (Profit);<bold>;#191970;;<white>;<center>;<large>;
Net mfr overhead;<bold>;RGB(225,226,226);;;;;
Net sales revenues;<bold>;RGB(225,226,226);;;;;
Operating expenses;<bold>;;<italic>;;;;
Operating income before taxes;<bold>;RGB(193,216,47);;;;<large>;
Other general & admin expenses;<bold>;rgb(128, 191, 255);<white>;;<center>;<large>;
Revenues;<bold>;;<italic>;;<center>;;<comment>
total general & admin expenses;<bold>;#efefef;;;;;
total operating expenses;<bold>;rgb(128, 191, 255);<white>;;;;
Total selling expenses;<bold>;RGB(225,226,226);;;;;
```

To use this template, you need a data file where the first dimension contains values that correspond to the first item of each row, for example *Cost of goods sold*.

P&L pivot chart styled with the layout template in the example

Account Desc	France				Italy			
	Balance...	Bal LY (k)	% Var	Diff (k)	Balance...	Bal LY (k)	% Var	Diff (
Revenues	.	.	.	.	.	.	.	
Gross sales revenues	33,329	29,663	0	3,666	37,495	33,371	0	4,1
Less return & allowances	346	242	0	104	389	272	0	1
Net sales revenues	**32,983**	**29,905**	**0**	**3,078**	**37,106**	**33,643**	**0**	**3,4**
Cost of goods sold	**0**	**0**	**0**	**0**	**0**	**0**	**0**	
Direct materials	-6,320	-6,636	-0	316	-7,110	-7,466	-0	3
Direct labor	-6,100	-5,917	0	-183	-6,863	-6,657	0	-2
Manufacturing overhead	.	.	.	.	.	.	.	
Indirect labor	-5,263	-5,000	0	-263	-5,921	-5,625	0	-2
Depreciation, manufacturing equip	-360	-7	49	-353	-405	-8	49	-3
Other mfr overhead	-4,000	-4,400	-0	400	-4,500	-4,950	-0	4
Net mfr overhead	**-9,623**	**-9,407**	**0**	**-216**	**-10,826**	**-10,583**	**0**	**-2**
Net costs of goods sold	**-22,043**	**39,312**	**-2**	**-61,355**	**-24,798**	**44,226**	**-2**	**-69,6**
Gross profit	**10,940**	**-9,407**	**-2**	**20,347**	**12,308**	**-10,583**	**-2**	**22,8**
Operating expenses	***0***	***0***	***0***	***0***	***0***	***0***	***0***	
Selling expenses	0	0	0	0	0	0	0	
Sales salaries	-4,200	-3,990	0	-210	-4,725	-4,489	0	-2
Warranty expenses	-730	-15	49	-715	-821	-16	49	-8

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:

- **Title**
- **Subtitle**
- **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL. When using a background color, use the slider to adjust the opacity of the background. When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Downloading the chart in Excel format

You can download the **P&L pivot** chart as an Excel file. When you download the chart using the **Export as XLS** option, the exported .xls file includes custom formatting applied to the chart.

Do the following:

1. Right-click a **P&L pivot** chart, or hover over the chart and click •••.
2. Select **Export as XLS**.

   *Alternatively, select **Download as...** > **Data** to download the chart as an .xlsx file. When using the **Download as...** > **Data** option, custom formatting applied to the **P&L pivot** chart is not included in the Excel file.*

3. Select a location on your computer where you want to store the file.

Limitations

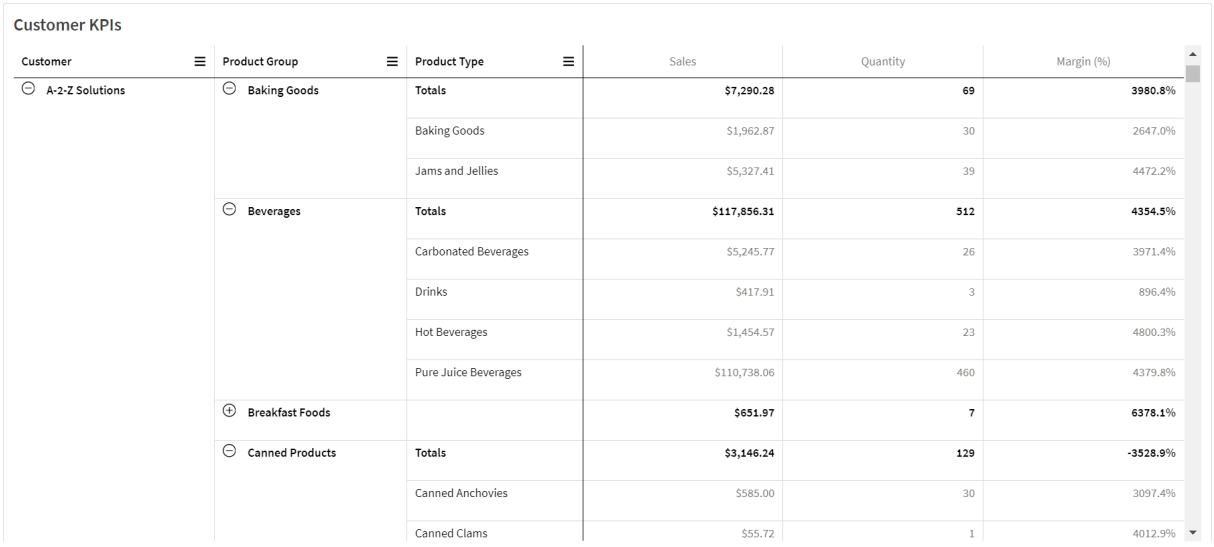
For information about general limitations, see *Limitations (page 533)*.

- There is a limitation for data transfer between Qlik Engine and **P&L pivot**. This limits each request for data to 10000 elements, for example, 1000 rows and 10 columns. **P&L pivot** can make automatic requests for more data using pagination.
  You can set the limit of how much data to request with **Pagination** > **Max pagination loops**. The default value is 20000 elements (**20k cells**) and the maximum value is 40000 elements.
  You can also modify the error message displayed to the user when the data limit is exceeded. The recommended workaround when the data limit is exceeded is to apply filters to the data to limit the data transfer.
- It is not possible to convert a **P&L pivot** chart to another visualization or convert another visualization to a **P&L pivot** chart.

Pivot table

The pivot table (**Pivot table**) in the Visualization bundle presents dimensions and measures as rows and columns in a table. In a pivot table you can analyze data by multiple measures and in multiple dimensions at the same time.

Pivot table, with expansions



Customer	Product Group	Product Type	Sales	Quantity	Margin (%)
⊖ A-2-Z Solutions	⊖ Baking Goods	Totals	$7,290.28	69	3980.8%
		Baking Goods	$1,962.87	30	2647.0%
		Jams and Jellies	$5,327.41	39	4472.2%
	⊖ Beverages	Totals	$117,856.31	512	4354.5%
		Carbonated Beverages	$5,245.77	26	3971.4%
		Drinks	$417.91	3	896.4%
		Hot Beverages	$1,454.57	23	4800.3%
		Pure Juice Beverages	$110,738.06	460	4379.8%
	⊕ Breakfast Foods		$651.97	7	6378.1%
	⊖ Canned Products	Totals	$3,146.24	129	-3528.9%
		Canned Anchovies	$585.00	30	3097.4%
		Canned Clams	$55.72	1	4012.9%

When to use it

Pivot tables are useful when you want to include several dimensions or measures in a single table, and then want to reorganize them to see different subtotals. The Qlik Visualization bundle pivot table offers several different layout and styling options than the pivot table visualization, including:

- Headers for all dimensions
- Header menu options for all dimensions
- Custom null representation

- Customizable column widths by pixel or percentage
- Adjust column widths using mouse
- Totals at top or bottom

Creating pivot tables

Do the following:

1. In the assets panel, open **Custom objects** > **Visualization bundle** and drag **Pivot** to the sheet.
2. Click **Add** and select a field or master dimension for the row dimension.
   Optionally, add more dimensions as rows. The pivot table drills down rows in the order they are added. You can click and drag the dimensions to reorder them.
3. Click **Add** and select a field or master measure for the measure.
   Optionally, add more measures.

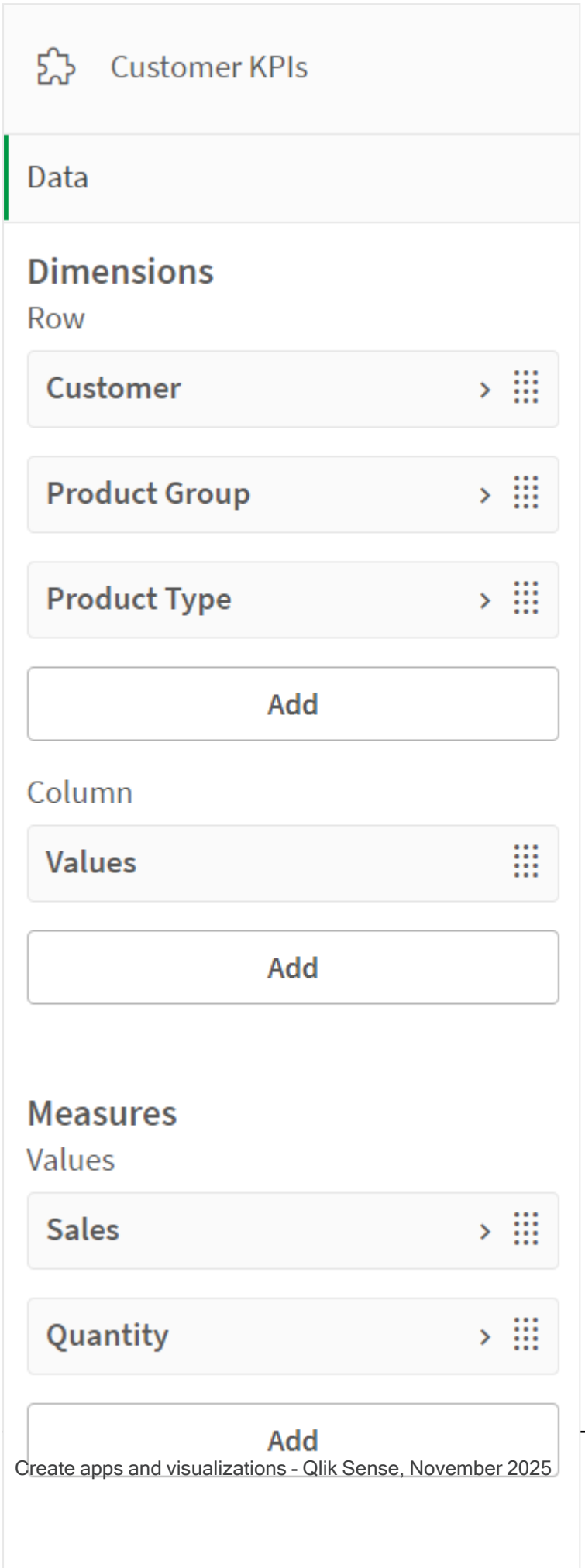
You can adjust appearance and other settings in the advanced properties panel.

Pivoting your data in the properties panel

In the properties panel, you can add measures and dimensions to the pivot table, as well as pivot rows or columns.

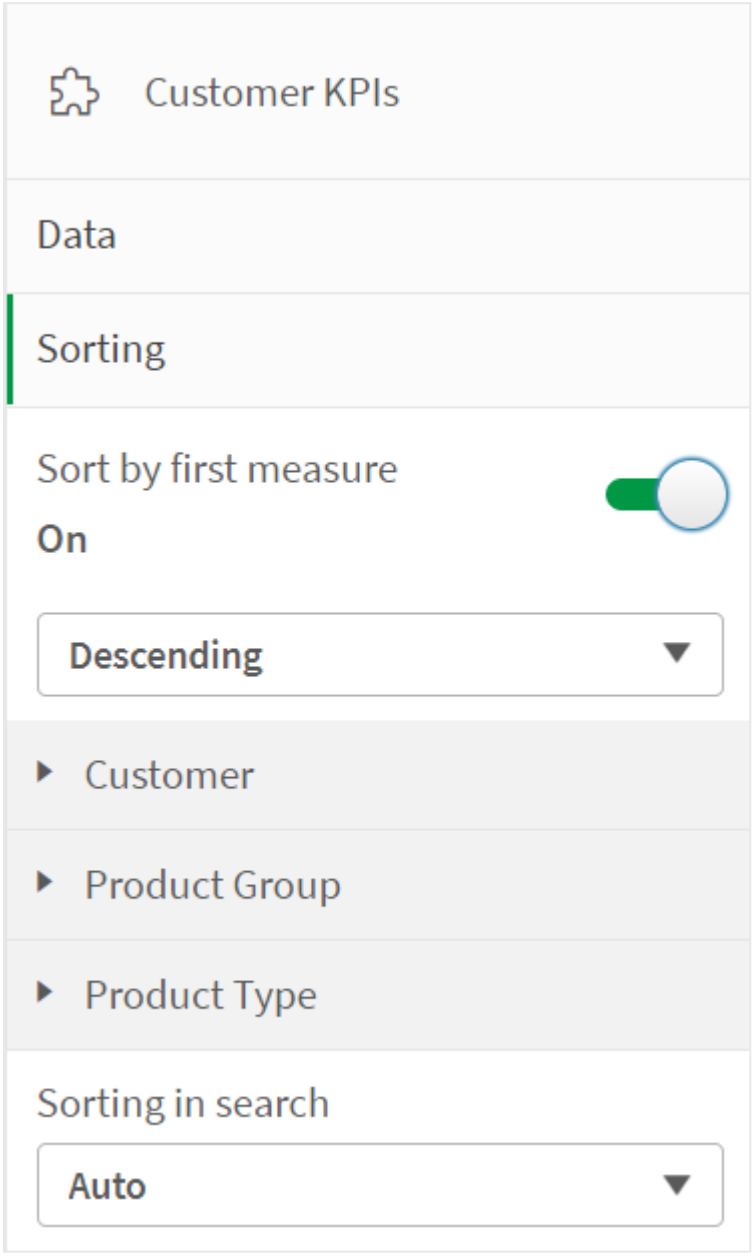
Data

In the data pane, you can add dimensions and measures. You can move items between rows and columns. You can also change item order inside rows or columns. When you use more than one measure, they are grouped and a *Values* item is created.


Customer KPIs
Data
Dimensions
Row
Customer
Product Group
Product Type
Add
Column
Values
Add
Measures
Values
Sales
Quantity
Add

Sorting

On the sorting pane in advanced properties, you can change the internal order of dimensions and measures.



When sorting pivot tables, NULL values are always displayed first.

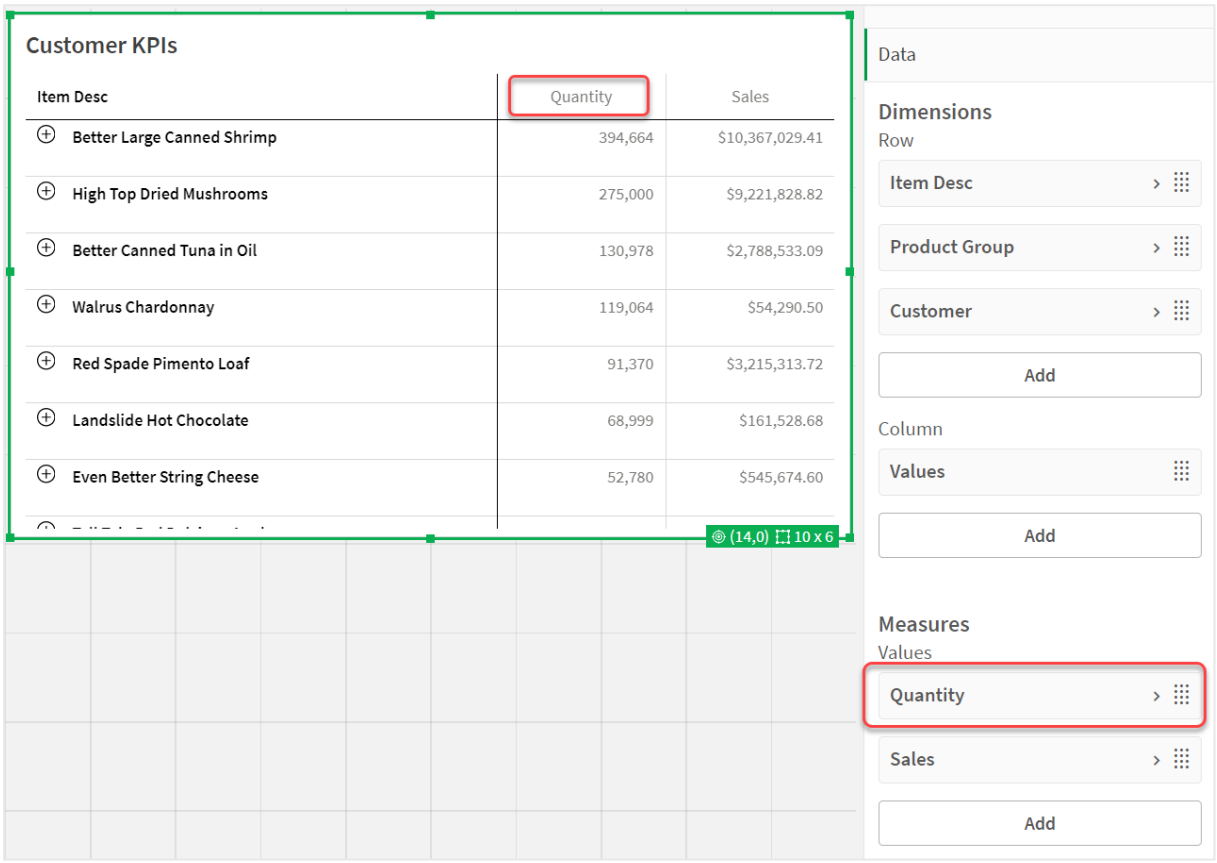
Sort by first measure

If you have more than one measure, a measure group is created. **Sort by first measure** will sort dimension values by the numeric value of the first measure. This sort order will affect all dimensions and take precedence before any other sort order defined under the dimensions.

For example, you have two measures: *Quantity* and *Sales*. In the properties pane, under **Data**> **Measures**, *Quantity* is listed first. If you **Sort by first measure** in descending order, your table is sorted starting with the dimension with the highest *Quantity*.

If **Sort by first measure** is turned off, the table uses the sort order configured for the dimensions.

Pivot table in Edit mode. Sort by first measure has been toggled on.



Limitations:

- This option is only supported if subtotals are calculated. You can calculate subtotals by doing one of the following:
  - In the properties pane, go to **Data**, and click on a dimension. Toggle on **Show totals**.
  - In the properties pane, go to **Appearance** > **Presentation**. Toggle on **Indent rows**.
- This option is not supported for calculated dimensions.
- This option is only supported if all dimensions are in the Row section and all measures are in the Column section.

Dimension sorting

With **Sort by first measure** turned off, the table can be sorted by dimension values. Each dimension can have **Auto** or **Custom** sorting. With **Auto** sorting, field values are sorted alphabetically and numerically in ascending order. With **Custom** sorting, you can turn each of the following settings on or off:

- **Sort by expression**: Sorts by custom expression. **Sort by expression** overrides the **Sort numerically** and **Sort alphabetically** settings. This option should only be used with the first (outermost) dimension in the table.
- **Sort numerically**: Sorts field values starting with a number.
- **Sort alphabetically**: Sorts field values starting with a letter.

Ascending and **Descending** options are available for all three settings.

Sorting in search

The user can click a dimension name in the table to expand a listbox. In the listbox, the user can search and select individual dimension values. The **Sorting in search** setting controls the sort order of the values in a dimension listbox.

You have the following options for the listbox sort order:

- **Auto**: Uses the default sort order. Numbers are sorted numerically in ascending order. Text is sorted alphabetically in ascending order.
- **Inherit from dimension**: Uses the sort order defined for the individual dimension.

Formatting dimension and measure columns

You can format your dimension and measure columns with additional options. You can:

- Limit displayed dimensions
- Format dimension representation
- Format measure representation
- Format measure numbers
- Create conditional columns
- Set background color of cells using expressions
- Set text color with expressions
- Setting column width

Limiting displayed dimensions

Limit the number of displayed values for a dimension. When you set a limitation, the only dimensions displayed are those where the measure value meets the limitation criterion.

Do the following:

1. Under **Data**, select a dimension and expand the properties.
2. Under **Limitation**, select one of the following limitations:
    - **No limitation**: The default value.
    - **Fixed number**: Select to display the top or bottom values. Set the number of values. You can also use an expression to set the number. Click f_x to open the expression editor.
    - **Exact value**: Use the operators and set the exact limit value. You can also use an expression to set the number. Click f_x to open the expression editor.

- **Relative value**: Use the operators and set the relative limit value in percent. You can also use an expression to set the number. Click f_x to open the expression editor.

Formatting dimension representation

You can format dimension columns to show values, links, or images using **Representation** in the properties panel. You can select the following representations:

- **Text**: Displays the dimension values as text. This is the default value.
- **Link**: Displays values as clickable links. Either the dimension value is used or the URL or you can add other URLs to the displayed dimension values.
- **Image**: Displays values that contain an absolute URL to an image display as images.

Formatting links

The character ; is not supported as a query parameter separator in a URL.

Do the following:

1. Under **Data**, select a dimension and expand the properties.
2. Under **Representation**, select **Link**.
3. Under **Link setting**, select one of the following:
    - **Add label**: The dimension contains the destination URL in either the dimension expression or the data table. The links are displayed and ordered by destination URL expression. Under **Link label**, enter a descriptive text label for the destination URL. Click f_x to open the expression editor.
    - **Add URL**: The dimension values become selectable text links that are labels for the URLs. Under **Link URL**, enter the destination URL expression. Click f_x to open the expression editor.

Formatting images

*Images in pivot tables are only accessible from servers and domains that have been safe-listed. Administrators make these resources available in **Administration** by adding **Content-Security-Policies (CSP)** for each server or domain. CSP helps to prevent cross-site scripting attacks by controlling what resources a browser can request from a server.*

The character ; is not supported as a query parameter separator in a URL.

Do the following:

1. Under **Data**, select a dimension and expand the properties.
2. Under **Representation**, select **Image**.
3. Under **Image setting**, select one of the following:
    - **Add label**: The dimension contains the absolute URL to the image in either the dimension expression or the data table. The links are displayed and ordered by the URL expression. Under **Image label**, enter a descriptive text label for the image that displays as alternative text when the image is hovered over. Click f_x to open the expression editor.
    - **Add URL**: The dimension values become labels for the alternative text that displays when the image is hovered over.
      Under **Image URL**, enter the destination URL expression. Click f_x to open the expression editor.
4. Under **Sizing**, select one of the following sizing options:
    - **Always fit**
    - **Fit to width**
    - **Fit to height**
    - **Stretch to fit**
    - **Original size**
5. Under **Position**, select the image position within the cell.

Formatting measure representation

You can format measure columns using **Representation** in the properties panel. You can select the following representations:

- **Text**: Displays the dimension values as text. This is the default value.
- **Image**: Displays measure values as images.
- **Indicator**: Displays customizable indicator symbols in measure cells. Text representations for each value can be shown or hidden alongside these indicators, depending on preference.

Formatting images

*Images in pivot tables are only accessible from servers and domains that have been safe-listed. Administrators make these resources available in **Administration** by adding **Content-Security-Policies (CSP)** for each server or domain. CSP helps to prevent cross-site scripting attacks by controlling what resources a browser can request from a server.*

The character ; is not supported as a query parameter separator in a URL.

Do the following:

1. Under **Data**, select a measure and expand the properties.
2. Under **Representation**, select **Image**.
3. Under **Image setting**, select one of the following:
    - **Add label**: The measure contains the absolute URL to the image in either the measure expression or the data table. The links are displayed and ordered by the URL expression.
      Under **Image label**, enter a descriptive text label for the image that displays as alternative text when the image is hovered over. Click f_x to open the expression editor.
    - **Add URL**: The measure values become labels for the alternative text that displays when the image is hovered over.
      Under **Image URL**, enter the destination URL expression. Click f_x to open the expression editor.
4. Under **Sizing**, select one of the following sizing options:
    - **Always fit**
    - **Fit to width**
    - **Fit to height**
    - **Stretch to fit**
    - **Original size**
5. Under **Position**, select the image position within the cell.

Adding a trend indicator to a measure

You can add a trend indicator to a measure column. This will show a symbol next to the measure value. You can define the ranges that determine which symbol is displayed and in which color it is displayed.

Do the following:

1. In the properties panel, expand **Data** and click a measure.
   The measure properties open.
2. Under **Presentation**, set **Representation** to **Indicator**.
3. Click the rectangle below the **Add limit** button, containing a color and symbol. You can set the color and symbol for the indicator.
   If you add one or more limits, you can adjust the color and symbol for each range by clicking the range in this rectangle.
4. Set additional properties for the indicators, which are detailed in the sections below.

Setting the indicator limits

You need to add the limits for the ranges you want to use for showing indicators with **Add limit**. You can set a limit value in three ways.

- Use the slider.
- Type a value in the text box.
- Set an expression that returns the limit value.

When you have added the limits, you can select the color and the symbol of the indicator for each defined range.

Styling the indicators

You can style the way the indicators are displayed.

- You can show both the indicator and the measure value by selecting **Show values**.
- You can set the value color to the same as the indicator color with **Apply color to value**.

  With this setting on, the indicator color overrides the current cell value color if it is defined in other properties for the chart.

- You can display the indicator to the right or to the left of the value with **Indicator position**.
- When you have one or more limits, toggle on **Gradient** to color the indicators with gradients between the colors.

Formatting measure numbers

You can format measure numbers under **Number formatting** in the properties panel.

If you want to change the number format at app level, and not just for a single measure, it is better to do that in the regional settings in the **SET** statements at the beginning of the script in the data load editor.

Do the following:

1. Under **Data**, select a measure and expand the properties.
2. Under **Number formatting**, select the format:
   - **Auto**: Qlik Sense automatically sets a number formatting based on the source data. To represent numeric abbreviations, the international SI units are used, such as k (thousand), M (million), and G (billion).
   - **Number**: By default, the formatting is set to **Simple**, and you can select the formatting from the options in the list. Change to **Custom** to and enter the format pattern under **Format pattern**.

     Examples:

     - # ##0 describes the number as an integer with a thousands separator. In this example " " is used as a thousands separator.
     - ###0 describes the number as an integer without 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. In this example "." is used as a decimal separator.

     If you add the percent sign (%) to the format pattern, the measure values are automatically multiplied by 100.

- **Money**: By default, the format pattern used for money is the same as set up in the operating system. Use **Format pattern** to change the format pattern.
- **Date**: By default, the formatting is set to **Simple**, and you can select the formatting from the options in the list. Change to **Custom** to and enter the format pattern under **Format pattern**.
- **Duration**: By default, the format pattern used for duration is the same as set up in the operating system. Duration can be formatted as days, or as a combination of days, hours, minutes, seconds and fractions of seconds. Use **Format pattern** to change the format pattern.
- **Custom**: By default, the format pattern used for custom is the same as set up in the operating system. Use **Format pattern** to change the format pattern.

Creating conditional columns

Columns can be conditional, so that they only appear when certain conditions are met.

Do the following:

1. Under **Data**, select a dimension or measure and expand the properties.
2. Under **Show column if**, click f_x to open the expression editor.
3. Enter the expression to determine the conditions for the column to appear.
4. Click **Apply**.

Example

Suppose you have a **Pivot table** or **Pivot** object that contains the following:

- Dimensions are *Product Type* and *Product Name*.
- Measures are *Sum(Sales)* and *Count (distinct InvoiceNumber)*.
- The items under **Columns** are **Values** (default) and the field *Quarter*.

Part 1: Conditional column based on user selections

You might have a large number of years of data in your app, so you do not want to add too much clutter to the visualization. At the same time, you want to encourage granular and interactive analysis.

For the *Quarter* column, you could add the following expression for **Show column if**:

```
GetSelectedCount(Year)=1
```

With this expression, if the user selects a single year in the app, the pivot table breaks down each measure by quarter. If not, the total measure values are shown.

Part 2: Conditional columns using variables

You can use variables to encourage interactive analysis. Suppose you also create a variable *vUserInteraction* with a blank definition. Then, you create two **Button** charts on your sheet, configured with the **Set variable value** action:

- **Show more detail**: Clicking this button sets *vUserInteraction* to a value of `='Yes'`.
- **Show less detail**: Clicking this button sets *vUserInteraction* to a value of `='No'`.

In your pivot table, you could add a number of additional measures to the chart, such as *Count(Quantity)* and *Sum(Cost)*. Then, configure each measure column to have the following value for **Show column if**:

```
'$(Reference)'='Yes'
```

This allows the chart to adapt to whether or not the user wants additional information. If the user clicks the **Show more detail** button, additional measures are added to the table. If not, or if they click **Show less detail**, the additional measures are removed.

- **Show more detail**: Clicking this button sets *vUserInteraction* to a value of `='Yes'`.
- **Show less detail**: Clicking this button sets *vUserInteraction* to a value of `='No'`.

In your pivot table, you could add a number of additional measures to the chart, such as *Count(Quantity)* and *Sum(Cost)*. Then, configure each measure column to have the following value for **Show column if**:

```
'$(Reference)'='Yes'
```

This allows the chart to adapt to whether or not the user wants additional information. If the user clicks the **Show more detail** button, additional measures are added to the table. If not, or if they click **Show less detail**, the additional measures are removed.

Setting background color with expressions

You can define the background color for a column using expressions. For example, you can have cells in the column change background color depending on the values in the column cell. The text color automatically changes to white when a dark background color is used.

Do the following:

1. Under **Data**, select a dimension or measure and expand the properties.
2. Under **Background color expression**, click f_x to open the expression editor.
3. Enter the expression to determine the conditions for the column to appear.
4. Click **Apply**.

Setting text color with expressions

You can define the text color for a column using expressions. For example, you can have cells in the column change text color depending on the values in the column cell.

Do the following:

1. Under **Data**, select a dimension or measure and expand the properties.
2. Under **Text color expression**, click f_x to open the expression editor.
3. Enter the expression to determine the conditions for the column to appear.
4. Click **Apply**.

Setting column width

By default, column width is automatically set. You can manually set column width by:

- Content
- Pixels
- Percentage

You can also manually size the columns by dragging the header borders.

Do the following:

1. Under **Data**, select a dimension or measure and expand the properties.
2. Under **Column width**, select how you want to set column width:
    - **Fit to content**: Columns are sized by the width of the content in the column.
    - **Pixels**: Set the width of the column in pixels.
    - **Percentage**: Set the width of the column by percent.
    - **Auto**: Automatically set the column width with Qlik Sense.

Changing how data is presented

There are several options available for customizing the data presentation in the pivot table. These options are available in the properties panel under **Appearance** > **Presentation**.

Fully expanded

When selected, all values in the pivot table are displayed, rather than some being collapsed. This setting is noticeable when more than one dimension is added.

Indent rows

This setting is also noticeable when more than one dimension is added.

When the setting is turned on, dimensions are nested within each other and expandable. When you expand a top-level dimension row, nested dimensions are displayed with an indentation at the beginning of each row.

With the setting turned off, dimensions after the first dimension are displayed in separate columns in the table and become visible if you expand a top-level dimension row.

Customizing styling

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Header**: Style the text of the headers for all dimensions.
    - **Dimension values**: Style the text dimension values.
    - **Measure values**: Style the text of the measure values.
    - **Measure labels**: Style the text of the measure headers.
    - **Total values**: Style the text of the totals.
    - **Null values**: Style the text of the null values.

Customizing the background

You can customize the background of the chart. You can also color individual dimensions or measures by expression.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.
4. On the **Chart** tab, customize the background color for the following elements:
    - **Header**
    - **Dimension values**
    - **Measure values**
    - **Measure labels**
    - **Total values**
    - **Null values**

Customizing the grid

You can customize the pivot table grid.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **Chart** tab, customize the grid with the following elements:
    - **Row height**: Set the height of rows in lines.
    - **Border**: Set the color of the cell borders.
    - **Divider**: Set the color of the divider between that divides both dimensions and measures as well as header and rows.
    - **Background**: Set the color of the empty area created when you have dimensions in **Column**.

Customizing null values

You can change how null values are represented in the pivot table.

Do the following:

1. Click **Appearance** > **Presentation** in the properties panel.
2. Under **Null value text**, enter the text you want to replace null values with.

Expanding the pivot table fully

You can set the pivot table to always be fully expanded.

Do the following:

1. Click **Appearance** > **Presentation** in the properties panel.
2. Select **Fully expanded**.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Selecting active fields from cyclic dimensions in pivot tables

If a pivot table uses a cyclic dimension, users can select the active fields from the cyclic dimension.

Do the following:

1. Click ☰ on a cyclic dimension column.
2. Click ⟳ **<Dimension name>** and select a dimension from the cyclic dimension.

Expanding and collapsing dimensions during analysis

Depending on how it is configured, the **Pivot table** might allow you to expand and collapse items during analysis. Otherwise, all dimensions will already be expanded.

To expand a dimension, click ⊕. To collapse an expanded dimension, click ⊖.

You can also expand and collapse dimensions using the right-click and ••• menus for the chart.

Do the following:

1. Right-click the chart, or open the options menu by selecting ••• from the hover menu.
2. Click **Expand** / **collapse**.
3. Use the available options:
   - ⊕ **Expand all**: Expand all dimensions.
   - ⊖ **Collapse all**: Collapse all dimensions.
   - ⊕ **Expand <Dimension name>**: Expand a given dimension.
   - ⊖ **Collapse <Dimension name>**: Collapse a given dimension.

Limitations

Pivot tables have the following limitations:

- You cannot pivot data in your Visualization bundle pivot table when your sheet is in analysis mode as you can with the visualization pivot table.

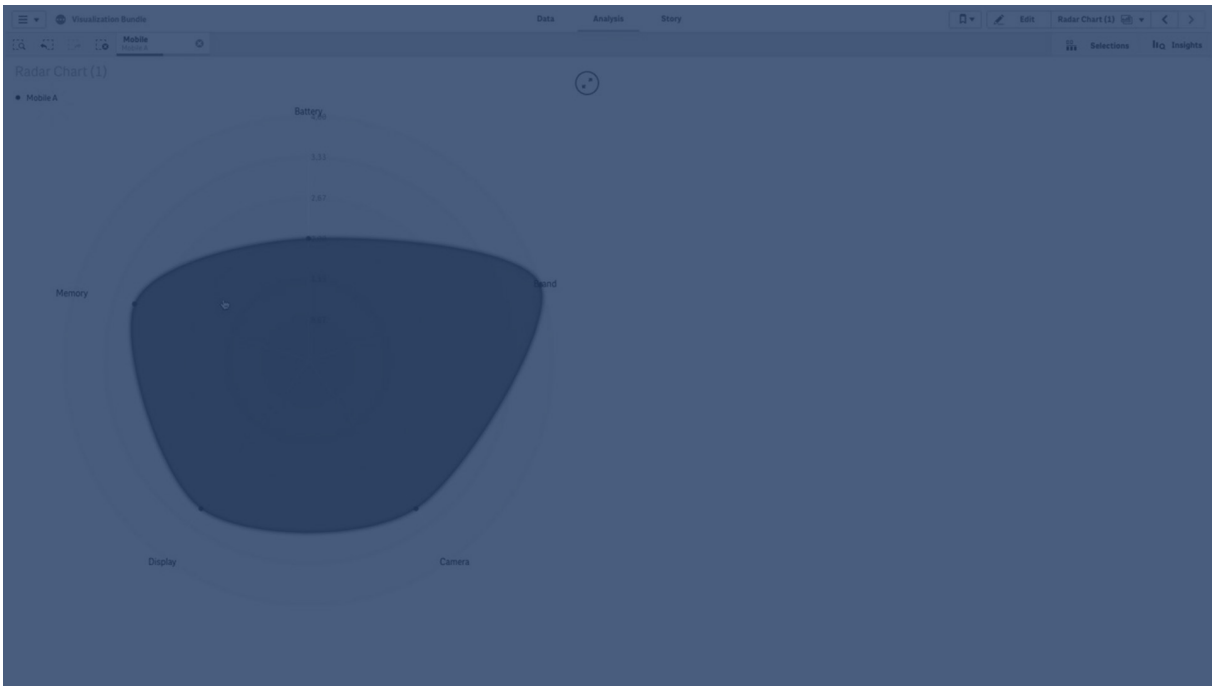
Radar chart

The Radar chart (**Radar chart**) displays a two-dimensional chart using radial axes to chart one or more groups of values over multiple variables. Radar charts can be used to visualize and compare performance to a set standard or to a group's performance. The Radar chart is included in the Visualization bundle.

Radar charts requires two dimensions and one measure. The y-axis goes from the center to the perimeter and the x-axis is the perimeter of the chart. Each value represents the distance from the center of the chart, and displays on axes starting from the center. The center of the chart represents the minimum value, and the edge the maximum value.

A radar chart can show multiple series, each separately connected with their values. The data only goes around the chart once. Adding values only increases the chart's granularity.

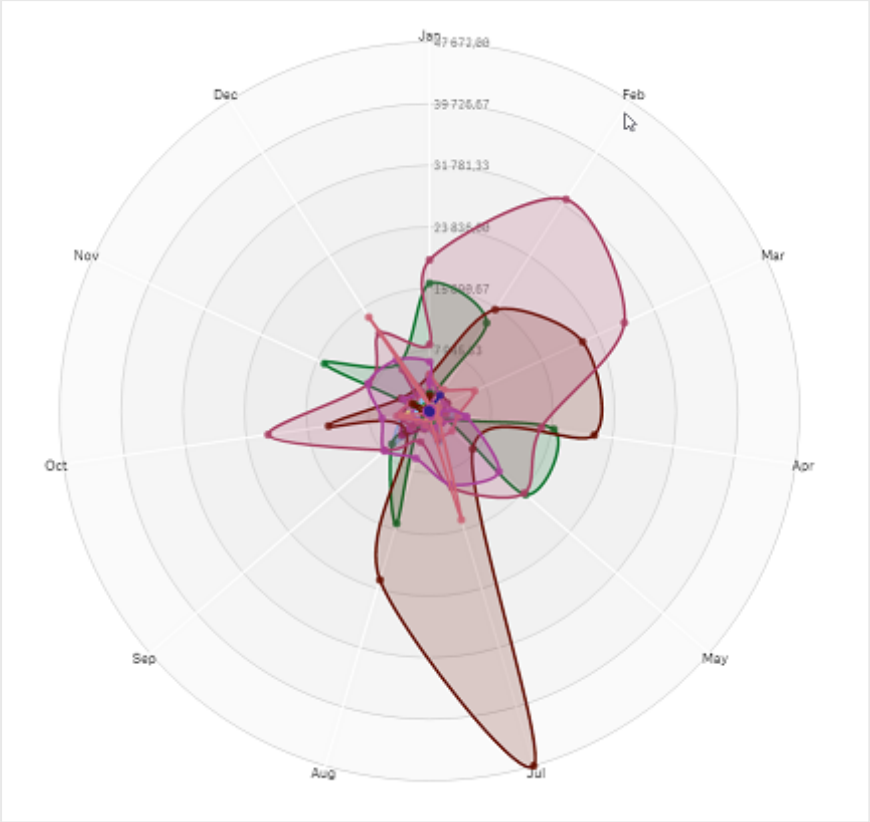
A selection that is made in a radar chart is confirmed instantly. When applicable, make additional selections one at a time.



Understanding a radar chart

A radar chart consists of evenly spaced segments (axes) arranged radially around a point. There is one segment for each data value of the second dimension. The value of each measure is shown by a node on applicable axis. A line connects the values that belong to the same series creating the chart's star-like shape.

A radar chart with one axis for each month of the Date.Month dimension.



When to use it

Radar charts let you compare and measure data with an arbitrary number of variables. This is helpful when comparing something's features or performance over several metrics. For example: before buying a computer, you can compare different computers across several features, such as memory storage processing, and screen size. A radar chart is also useful when:

- Measuring quality improvements and performance.
- Comparing allocated amount versus actual spending in an organization.
- Identifying outliers, commonality, and clusters of data with similar values and features.
- Charting an athlete's strengths and weaknesses.
- Comparing results of small-to-moderate-sized multivariate data sets.

Creating a radar chart

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

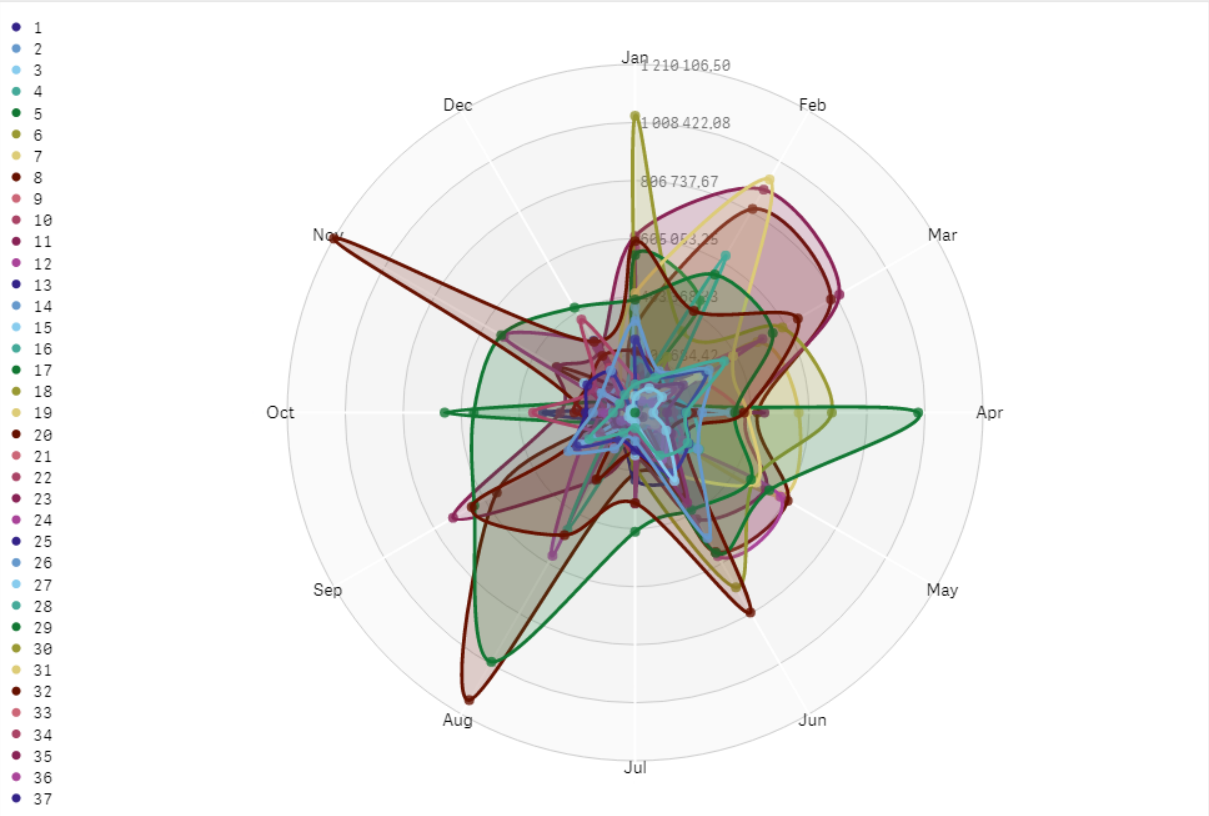
Do the following:

1. In the assets panel, open **Custom objects** > **Visualization bundle** and drag a **Radar chart** object to the sheet.
2. Click the top **Add dimension** button and select the first dimension category to be measured (x-axis).

3. Click the second **Add dimension** button to select the second dimension (y-axis).
4. Click the **Add measure** button to select the measure of the chart.

Once dimensions and measure have been selected the radar chart displays automatically (in color) in the chart field.

A radar chart with two dimensions and one measure.



Changing the appearance of the chart

You can customize your radar chart with one or more features.

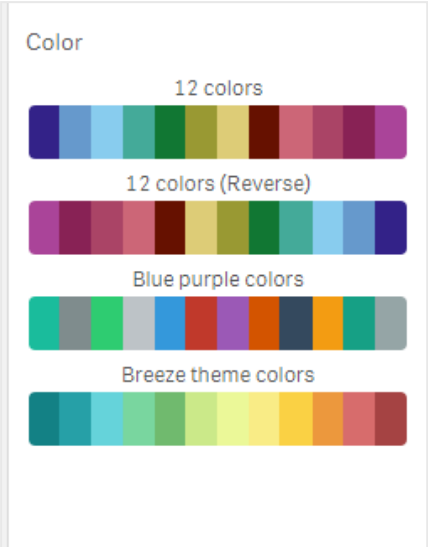
Changing the color scheme

You can change color scheme of your chart by choosing from four predefined options.

Do the following:

1. Click **Appearance > Design** in the property panel.

2. Select a color scheme under **Color**.



Changing the stroke type

You can also customize the shape line connecting each node under **Appearance > Design > Stroke type** in the properties panel. Select the shape from the menu.

Toggling the legend

The legend provides a small text description of each node of the chart. The legend expands to show its text, and the chart shrinks to accommodate the legend. To toggle the legend, move the slide button under **Appearance > Design > Legend** in the properties panel.

Limiting dimensions

You can set limits on your dimension values. To change limitations and terms go to **Data > Dimensions** in the properties panel. Click dimension, and under **Limitation** choose a limitation from the menu.

Toggling titles

This option can hide the name of the radar chart. To toggle the name, click **Appearance > General** in the properties panel. Move the **Show titles** slide button.

Number formatting

The default setting for **Number formatting** for measures and dimensions is **Auto**. You can change this setting to **Number**, and then select a number format.

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

Radar charts have the following limitations:

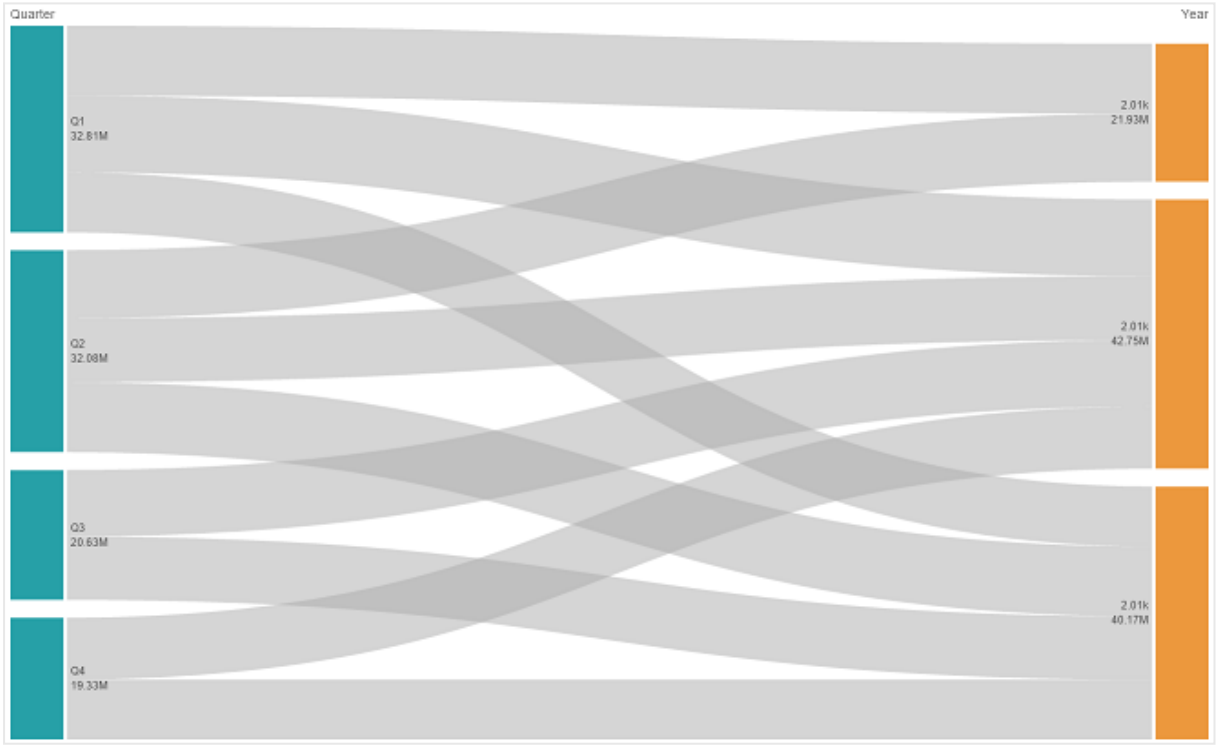
- Radar charts can only process 100 unique values per dimension.
- Exported radar charts will not include the chart legend.
- For information about general limitations, see *Limitations (page 533)*.

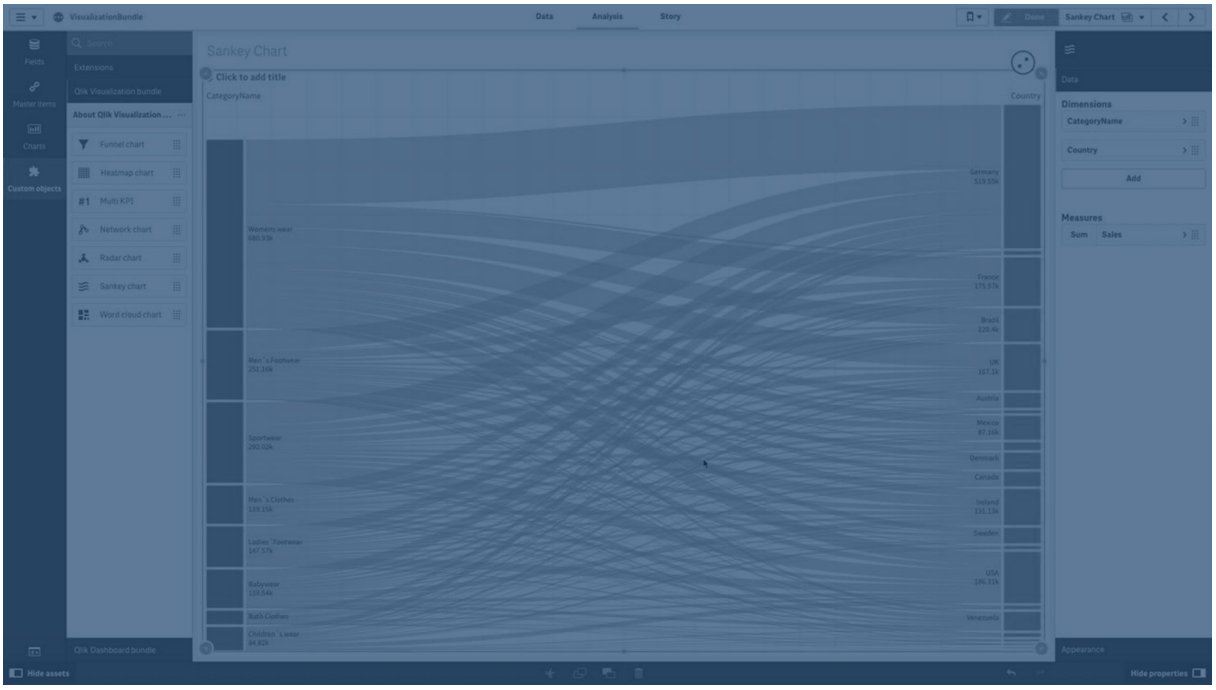
Sankey chart

The Sankey chart (**Sankey chart**) lets you add a specific type of flow chart to the sheet you are editing. The chart visually emphasizes major transfers or flows within defined system boundaries. The width of the chart arrows is shown proportionally to the flow quantity. The Sankey chart is included in the Visualization bundle.

- A minimum of two dimensions and one measure is required. You can use up to five dimensions, but only one measure.
- The dimensions do not need to be of equal size on each side of the diagram.
- You can use the dimension values to set the color of the flows in the chart.
- Link colors can be based on source or target anchor.

A chart with a source dimension (Quarter) and the target dimension (Year).





When to use it

The sankey chart is useful when you want to locate the most significant contributions to an overall flow. The chart is also helpful when you want to show specific quantities maintained within set system boundaries.

Creating a sankey chart diagram

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

Do the following:

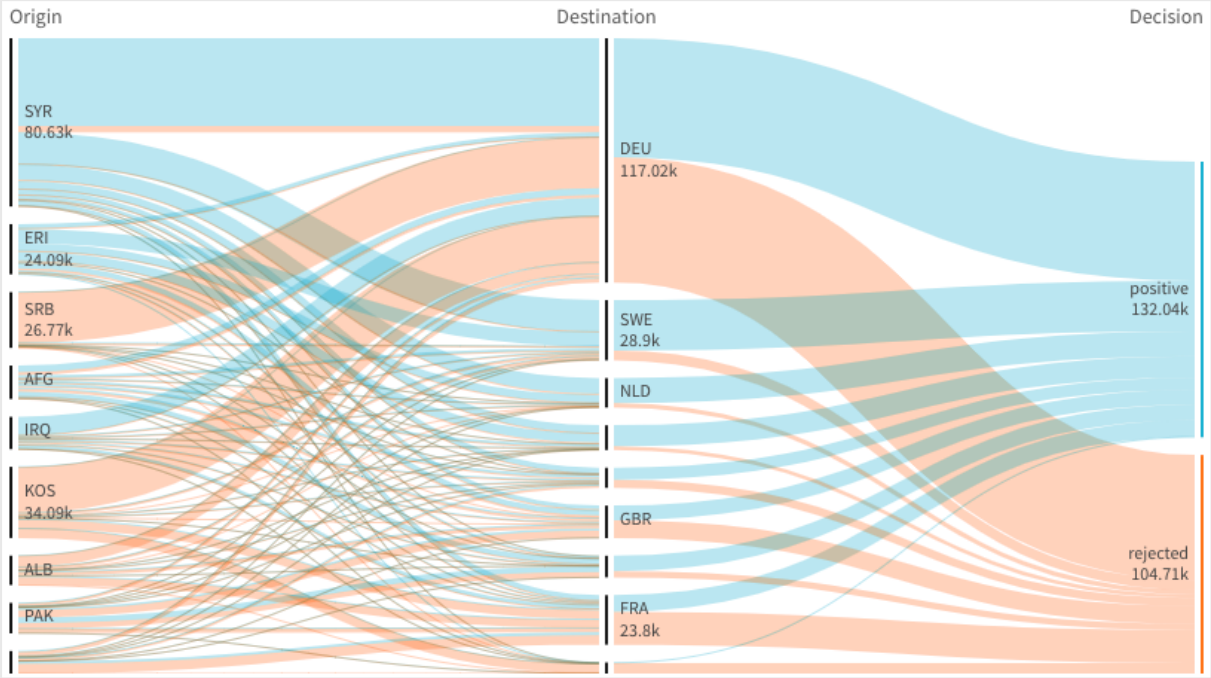
1. In the assets panel, open **Custom objects** > **Visualization bundle** and drag a **Sankey chart** object to the sheet.
2. Click the top **Add dimension** button and select the source dimension for the flow of the chart (appears to the left).
3. Click the second **Add dimension** button to select the target dimension for the flow of the chart (appears to the right).
4. Click the **Add measure** button to select the measure of the chart.

Once dimensions and measure have been selected the sankey chart diagram displays automatically (in color) in the chart field.

Adding additional dimensions

You can add up to five dimensions to your chart in property panel under **Data > Dimensions**. The chart updates to reflect the added dimensions. The dimensions are displayed from left to right, with the first entered dimension always being the source dimension. The target dimension is always displayed to the to the right. When you add more dimensions, they are added to the right in the order they are entered.

A chart with three dimensions: the source dimension (Origin), the target dimension (Decision) and one additional (Destination).



Sorting

Sankey chart elements are automatically sorted from largest to smallest flow. You can change the sort order in the property pane.

Do the following:

1. Click **Sorting** under **Appearance** in the property panel.
2. Toggle **Sorting** from **Auto** to **Custom**.
3. You can toggle **Sort numerically**:
    - Toggle on: Sort numerically by **Ascending** or **Descending**.
    - Toggle off: Drag your dimensions and measurements into the desired order.

Changing the styling and appearance

You can customize your chart with one or more features. Your chart automatically updates.

Link colors

The colors of chart links are based on either the source or target anchors. To apply the source or target anchor color to chart links either use the string *='SOURCE'* or *='TARGET'*. You can also select a separate color by entering a color code string. The color should be a valid CSS color.

Do the following:

1. Click **Presentation** under **Appearance** in the property panel.
2. Enter the applicable string under **Link color**.

3. Press Enter and the chart updates.

You can also change the link colors using an expression in the Expression editor (f_x). It is also possible to color a link that has its intensity based on the Margin % of the dimension values it represents.

Example:

Enter the string `=rgb(round(Avg ([Margin %])*255), 100, 100)` where Margin % is a value between 0-1 and the link will display as red in the chart.

Link opacity

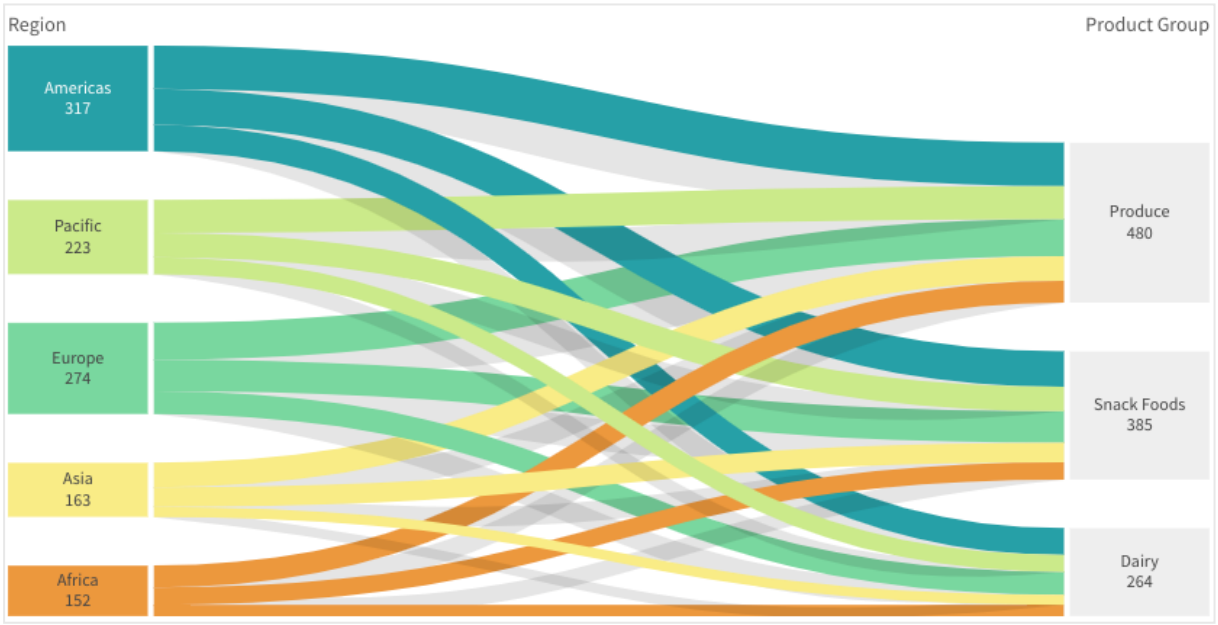
You can adjust link opacity by moving the slide button of the link opacity slider under **Appearance > Link opacity** in the property panel. Also, setting opacity to 1 (furthest right) allows the setting to drop a shadow, giving links a more individually distinct appearance.

Node colors

You can change the node colors of each dimension value. The color should be a valid CSScolor.

Do the following:

1. Select applicable dimension under **Data > Dimensions** in the property panel.
2. Enter the color code string under Node color and press Enter. The chart will update.
   For example: To use the color Aqua (`#00ffff`) set the color code string to `='#00ffff'`. You can also set the node colors using an expression in the Expression editor (f_x).



Node padding and width

You can set both the vertical distance between nodes ("node padding") and the horizontal width of chart nodes ("node width").

Do the following:

1. Click **Presentation** under **Appearance** in the property panel.
2. Move applicable slide button of the Node padding and/or Node width sliders to adjust node settings.

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**
4. On the **Chart** tab, set the font, font size, and color for the following text elements:
    - **Node title**: Style the text of the header for each node in the chart.
    - **Node label**: Style the text of the labels displaying the individual values of the nodes.

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.

3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

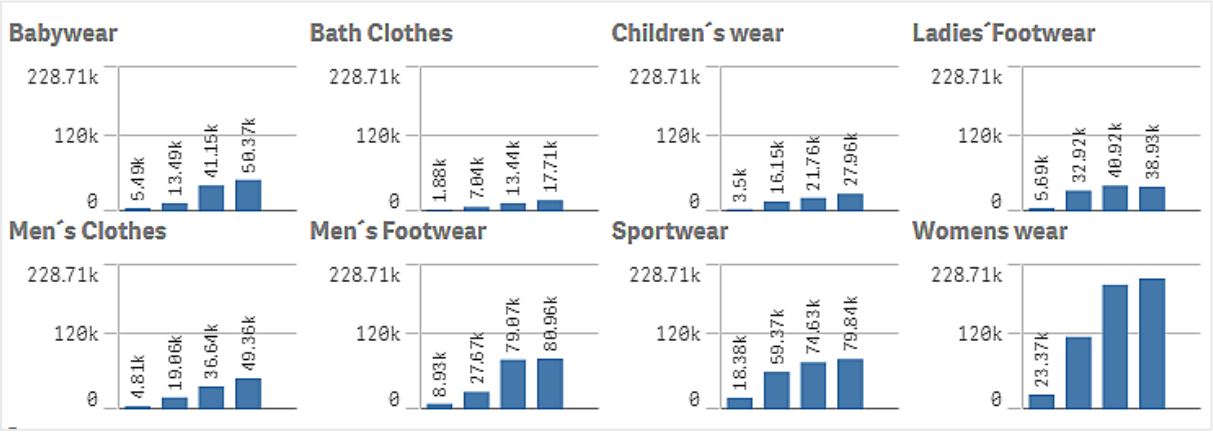
Limitations

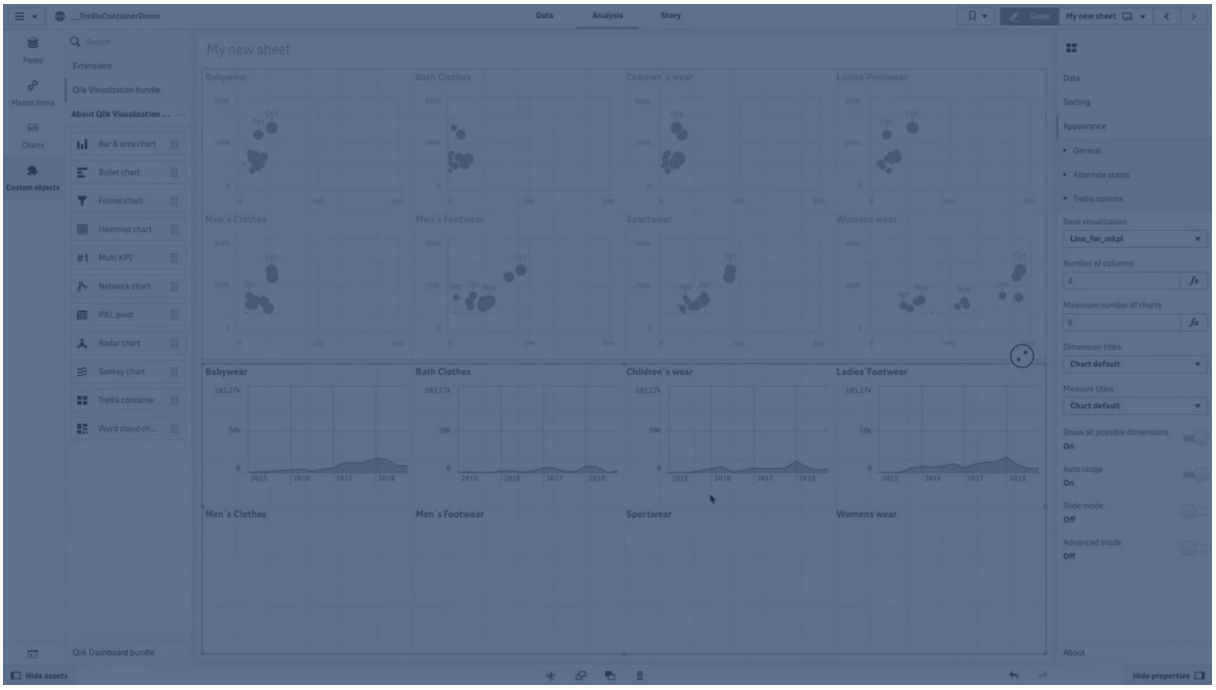
For information about general limitations, see *Limitations (page 533)*.

Trellis container

You can use the **Trellis container** to show a trellis chart based on a master visualization. The trellis chart shows a grid of the same chart for different dimension values. You can use the trellis chart to compare metrics for different groups of data. The Trellis container is included in the Visualization bundle.

Trellis chart based on a bar chart of sales data, shown for different product categories





Creating a trellis chart

You can create a trellis chart on the sheet you are editing. The chart that you want to repeat for different dimension values must be a master visualization.

Do the following:

1. Create the chart that you want to repeat for different dimension values and save it as a master visualization.
2. In the assets panel, open **Custom objects** > **Visualization bundle** and drag a **Trellis container** object to the sheet.
3. Select which master visualization to show in **Appearance** > **Trellis options** > **Base visualization** in the property panel.
4. Select the dimension that you want to use as the first grid dimension in **Data** > **Dimensions**.
5. Optionally, add a second grid dimension to create a grid with one dimension in each axis.

> *If any of the grid dimensions are calculated dimensions, toggle on **Calculated Dimension** in the settings for the dimension.*

You will now see a grid of charts each based on the grid dimensions you selected.

Troubleshooting

I do not see a grid of charts, and receive this message: **Too many dimension values!**

Possible cause

There are more dimension values than the maximum number of charts allowed in the grid.

Proposed action

You can increase the number of charts allowed in **Appearance** > **Trellis options** > **Maximum number of charts**.

Changing the appearance of the chart

You can customize your chart with one or more features.

Setting the number of columns

You can set the number of columns in the chart grid with **Appearance** > **Trellis options** > **Number of columns**.

Setting the y-axis range of charts

You can select which y-axis range to show for the charts in the trellis chart with **Appearance** > **Trellis options** > **Auto range**.

- **On** will show the same range for all charts. This is the best option if you want to compare values between different charts.
- **Off** will show an optimized range for each chart.

Show border

You can show a border for the trellis chart with **Appearance** > **Trellis options** > **Border**. You can adjust width, color and style. It is also possible to define a custom border.

Slide mode

You can view the charts in slide mode instead of a grid by setting **Appearance** > **Trellis options** > **Slide mode** to **On**. In slide mode, you view one chart at a time. You can scroll between the charts.

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. The styling panel contains various sections under the **General** and **Chart** tabs.

You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Configuring how null values are represented

Null measure values

To configure the representation of null measure values for a dimension value, use **Appearance** > **Trellis options** > **Show all possible dimensions**. With **Show all possible dimensions**, you have the following options:

- **On**: The container shows a measure value of 0 for a dimension value where no measure data is present. Suppose that the master visualization aggregates sales by month and there are no sales in October. Here, the Trellis container will still list October as a dimension in the charts (with a value of

0 as applicable).

- **Off**: The container does not show dimension values where no measure data is present. Suppose that the master visualization aggregates sales by month and there are sales in all months except October. Here, the Trellis container will list each month except October in the charts.

Null values in the grid dimensions

It could happen that there are null values in the grid dimension. If you want the Trellis container to visualize these null values, toggle on the Include null values setting.

Do the following:

1. In the properties panel, expand **Data**.
2. Expand the dimension for which you want to show null values.
3. Turn on **Include null values**.

Best practices for creating the master visualization

Here are some tips for creating a master visualization that will work well in a trellis chart:

- Show the title in the master visualization. In the trellis chart, the title is replaced with the grid dimension value of each chart.
- If you use expressions: create a label to hide the set expression.
- If you are using a combo chart: use only one axis, and set the minimum and maximum of the y-axis.
- If you are using a box plot: set the minimum and maximum of the y-axis.
- If you are using a scatter plot: set the x-axis.
- If you are using a map: use advanced mode, and set the layer color and title. For an example, see *Example 2: Coloring on a map chart (page 614)*.

Using advanced mode

Use advanced mode to customize the set expressions and dimension values that will be shown in the Trellis container. Advanced mode allows you to use placeholder values to allow dynamic output tailored to the dimension being shown in each chart in the container.

Activate advanced mode by setting **Appearance** > **Trellis options** > **Advanced mode** to **On**. Advanced mode allows you to:

- Use advanced expressions for labels, titles, subtitles, and footnotes.
- Use advanced expressions to define the data shown in the visualization. For example:
  - **if** expression as chart measure
  - Coloring by measure
  - Joining the Trellis set expression with other set expressions

Do the following:

1. In the properties panel for the master visualization, go to **Appearance** > **Trellis options**, and set **Advanced mode** to **On**.

2. Use the placeholders in the table below in expressions for measures, coloring, chart text, and other properties. They will be replaced in the Trellis container by the corresponding values.

Advanced mode value replacements in a trellis chart

Placeholder	Replaced by value
$(vDim)	Dimension Name
$(vDimValue)	Dimension Value
$(vDimSet)	,[Dimension Name]={'Dimension Value'}
$(vDimSetFull)	{<[Dimension Name]={'Dimension Value'}>}

Use cases and examples

$(vDim)

$(vDim) is useful as an expression for labels, titles, subtitles, or footnotes in the master visualization. For example, in a subtitle:

```
='This chart presents the aggregation by ' & $(vDim)
```

$(vDimValue)

$(vDimValue) is useful in many scenarios:

- Expressions for measure data in the master visualization. For example, as a measure in a **Text & image** or **Text** object:
  ```
  =if(GetSelectedCount([Product Category])=1, Sum({<Region={$(vDimValue)}>} Sales),
  'Please select a product category.')
  ```
- Expressions for label, titles, subtitles, or footnotes in the master visualization. For example, as a footnote:
  ```
  ='This chart presents sales data for' & $(vDimValue) & '.'
  ```

$(vDimSet)

$(vDimset) is useful when you need to join multiple set expressions together. This can be used in an expression for measure data in the master visualization. For example:

```
=sum({<ProductName={'Bike Helmet'} $(vDimSet)>} Sales)
```

For the example above, the Trellis container would restrict the data to *ProductName* values of *Bike Helmet*. A separate chart would be shown for each unique value in the dimension used in the Trellis container.

$(vDimSetFull)

$(vDimSetFull) is useful for setting chart coloring by measure in the master visualization. For example:

```
=Sum($(vDimSetFull) Sales)
```

Long-form examples

For step-by-step examples showing how to use advanced mode, see *Add the data (page 610)*.

Limitations

For information about general limitations, see *Limitations (page 533)*.

Unsupported visualizations

You cannot use the following visualizations in a trellis chart:

- Filter pane
- Histogram
- Container
- Layout container

Multi KPI visualizations with embedded master visualizations

It is not possible to use a Multi KPI chart that contains an embedded master visualization.

Selecting by dimension

If you make a selection on the dimension that is used as grid dimension in the trellis chart, the selection is not reflected in the trellis chart.

Example:

You have a filter pane with countries, and a trellis chart with country as the first grid dimension. When you select a country in the filter pane, the trellis chart will still show a chart for each country and ignore the selection.

Coloring by master measure color

Colors assigned to master measures in a trellis container do not appear unless the trellis container is using the advanced mode.

Trellis container advanced mode examples

This help topic shows examples of how you can use a Trellis container in advanced mode to configure advanced expressions in your charts.

The following variables are shown in this help topic:

- $(vDim)
- $(vDimValue)
- $(vDimSetFull)

For additional examples, see *Using advanced mode (page 608)*.

Example 1: Conditional measure expression

This example shows you how the `$(vDimValue)` variable can be added to measure expressions to make the Trellis container compatible with advanced expressions. The expression used in this chart is a conditional **if** expression.

Add the data

Create a new app and add the load script below into the Data load editor. Then, load the data.

Load script

```
Sales:
LOAD * INLINE [
Region,Country,Item Type,Sales Channel,Order Priority,Order Date,Order ID,Ship Date,Units
Sold,Unit Price,Unit Cost,Total Revenue,Total Cost,Total Profit
Central America and the
Caribbean,Honduras,Household,Offline,H,2/8/2017,522840487,2/13/2017,8974,668.27,502.54,5997054
.98,4509793.96,1487261.02
Asia,Mongolia,Personal
Care,Offline,C,2/19/2014,832401311,2/23/2014,4901,81.73,56.67,400558.73,277739.67,122819.06
Asia,Sri
Lanka,Cosmetics,Offline,M,11/19/2016,419123971,12/18/2016,6952,437.20,263.33,3039414.40,183067
0.16,1208744.24

Asia,Turkmenistan,Household,Offline,L,12/30/2010,441619336,1/20/2011,3830,668.27,502.54,255947
4.10,1924728.20,634745.90
Central America and the
Caribbean,Honduras,Snacks,Online,L,6/30/2016,795490682,7/26/2016,2225,152.58,97.44,339490.50,2
16804.00,122686.50
Australia and Oceania,Australia,Office
Supplies,Online,C,10/27/2015,158535134,11/25/2015,2924,651.21,524.96,1904138.04,1534983.04,369
155.00
Europe,United
Kingdom,Household,Online,L,1/5/2012,955357205,2/14/2012,282,668.27,502.54,188452.14,141716.28,
46735.86
Sub-Saharan
Africa,Djibouti,Cosmetics,Offline,H,4/7/2014,259353148,4/19/2014,7215,437.20,263.33,3154398.00
,1899925.95,1254472.05
Australia and
Oceania,Australia,Cereal,Offline,H,6/9/2013,450563752,7/2/2013,682,205.70,117.11,140287.40,798
69.02,60418.38
Middle East and North
Africa,Libya,Clothes,Offline,H,10/30/2010,705784308,11/17/2010,6116,109.28,35.84,668356.48,219
197.44,449159.04
Central America and the
Caribbean,Haiti,Cosmetics,Offline,H,10/13/2013,505716836,11/16/2013,1705,437.20,263.33,745426.
00,448977.65,296448.35
Central America and the
Caribbean,Belize,Clothes,Offline,M,7/25/2016,807025039,9/7/2016,5498,109.28,35.84,600821.44,19
7048.32,403773.12
Europe,Lithuania,Office
Supplies,Offline,H,10/24/2010,166460740,11/17/2010,8287,651.21,524.96,5396577.27,4350343.52,10
46233.75
Asia,Turkmenistan,Office
Supplies,Online,M,4/23/2013,462405812,5/20/2013,5010,651.21,524.96,3262562.10,2630049.60,63251
2.50
Middle East and North
Africa,Libya,Fruits,Online,L,8/14/2015,816200339,9/30/2015,673,9.33,6.92,6279.09,4657.16,1621.
93
Sub-Saharan
Africa,Djibouti,Cereal,Online,H,5/20/2017,555990016,6/17/2017,8656,205.70,117.11,1780539.20,10
13704.16,766835.04
Middle East and North
```

```
Africa,Pakistan,Cosmetics,Offline,L,7/5/2013,231145322,8/16/2013,9892,437.20,263.33,4324782.40
,2604860.36,1719922.04
North
America,Mexico,Household,Offline,C,11/6/2014,986435210,12/12/2014,6954,668.27,502.54,4647149.5
8,3494663.16,1152486.42
Australia and Oceania,Federated States of
Micronesia,Beverages,Online,C,10/28/2014,217221009,11/15/2014,9379,47.45,31.79,445033.55,29815
8.41,146875.14
Australia and
Oceania,Samoa,Cosmetics,Online,H,7/20/2013,670854651,8/7/2013,9654,437.20,263.33,4220728.80,25
42187.82,1678540.98

Europe,Spain,Household,Offline,L,10/21/2012,213487374,11/30/2012,4513,668.27,502.54,3015902.51
,2267963.02,747939.49
Middle East and North
Africa,Lebanon,Clothes,Online,L,9/18/2012,663110148,10/8/2012,7884,109.28,35.84,861563.52,2825
62.56,579000.96
Sub-Saharan
Africa,Kenya,Vegetables,Online,L,3/18/2012,827844560,4/7/2012,6457,154.06,90.93,994765.42,5871
35.01,407630.41
North America,Mexico,Personal
Care,Offline,L,2/17/2012,430915820,3/20/2012,6422,81.73,56.67,524870.06,363934.74,160935.32
Australia and
Oceania,Australia,Beverages,Offline,H,7/7/2014,240470397,7/11/2014,9389,47.45,31.79,445508.05,
298476.31,147031.74
North America,Mexico,Personal
Care,Offline,M,7/30/2015,559427106,8/8/2015,5767,81.73,56.67,471336.91,326815.89,144521.02
Sub-Saharan
Africa,Mozambique,Household,Offline,L,2/10/2012,665095412,2/15/2012,5367,668.27,502.54,3586605
.09,2697132.18,889472.91
];
```

Create the master visualization

Do the following:

1. Open a sheet in edit mode.
2. Drag a bar chart onto the sheet.
3. Add *Item Type* as a dimension to the bar chart.
4. Add the following expression as a measure:
   `=if(Sum([Units Sold])>=40000, Sum({<Region={$(vDimValue)}>} [Total Profit]), Sum ({<Region={$(vDimValue)}>} [Units Sold]))`
   In the Trellis container, this expression will show:
   - If there are 40,000 or more units sold: The total profit for each distinct region.
   - If there are less than 40,000 units sold, or if the data is null: The total number of units sold for each distinct region.

   For each chart in the container, the `$(vDimValue)` variable will be replaced by the dimension value name for *Region*.
5. For the measure you just added, add the following **Label**:
   `=if(Sum([Units Sold])>=40000, 'Total Profit', 'Items Sold')`

6. In the properties panel, expand **Sorting**. Adjust the sorting so that the chart sorts primarily by the measure value in descending order.
7. In the properties panel, under **Appearance**, expand **Colors and legend**.
8. Set **Colors** to **Custom** and choose the option to color the chart **By dimension**.
9. Turn on **Persistent colors**.
10. Right-click the chart, or use the ••• button, and click **Add to master items**.
11. Give the master item a **Name** (for example, *BarChartExample*), and click **Add**.

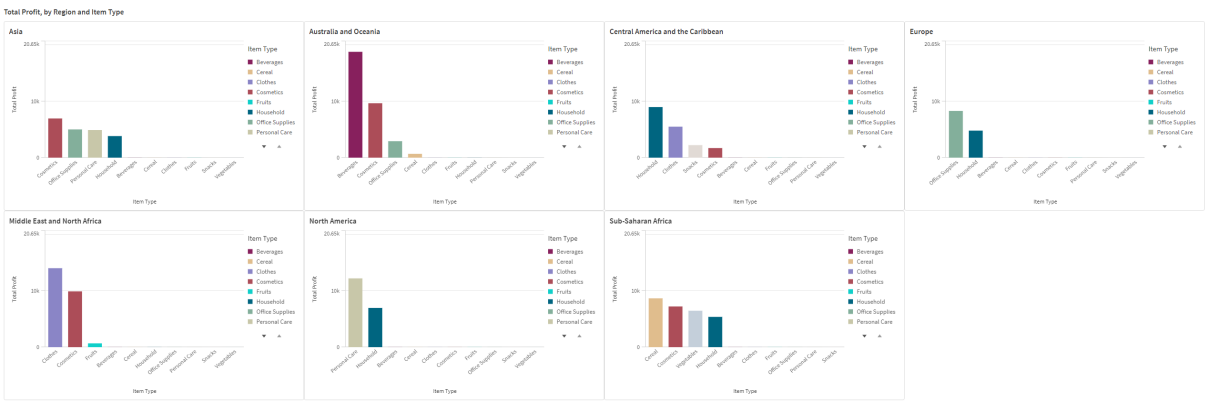
Create the Trellis container

Do the following:

1. Drag a Trellis container onto the sheet.
2. Click **Add dimension**, and select *Region*.
3. Click **Add master visualization**. In the drop down menu, select the *BarChartExample* master item.
4. In the properties panel for the Trellis container, under **Appearance**, expand **Trellis options**.
5. Set **Advanced mode** to **On**.
6. In the properties panel for the Trellis container, under **Appearance**, expand **General**.
7. Toggle on **Show titles** if needed. Add the following expression for the **Title** of the chart:
   ```
   =if(Sum([Units Sold])>=40000, 'Total Profit, by Region and Item Type', 'Total Items Sold, by Region and Item Type')
   ```

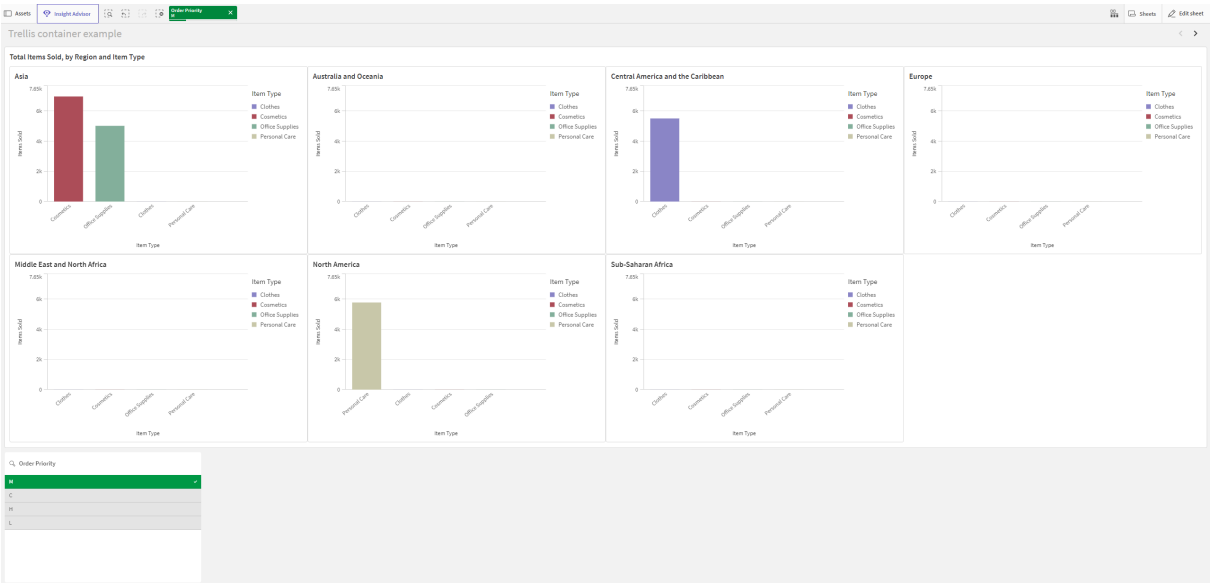
Resize the Trellis container on the sheet so that it has enough space to show all data. Your chart should now look something like the following image.

Example result with no selections made in the app



If you make selections in the app (for example, by selecting a specific *Order Priority*), the measure shown in the chart could change given the lower order volume.

Example result with a selection made in the app



Example 2: Coloring on a map chart

This example will show you how to configure a Trellis container in **Advanced mode** to color a map chart by measure expression. Specifically, it shows the following:

- Using `$(vDimSetFull)` to color map charts by measure.
- Using `$(vDim)` and `$(vDimValue)` in text within the charts (in this case, for the chart subtitles).

Add the data

Create a new app and the load script below into the Data load editor. Then, load the data.

Load script

```
SET DateFormat='MM/DD/YYYY';

[Regional Sales]:

Load RowNo() as OrderID, Year(OrderDate) as Year, * Inline [
Country,OrderDate,Sales
Peru,01/15/2022,227752.86
India,09/24/2023,273204.8
United Kingdom,10/12/2020,196509.42
Brazil,04/09/2022,62936.87
Peru,06/19/2023,343348.25
France,10/08/2021,137087.24
Brazil,04/02/2023,364144.83
France,01/18/2021,147458.3
France,07/31/2021,131735.39
France,08/28/2021,175657.49
Mexico,11/29/2023,347796.5
Brazil,10/22/2021,156415.67
United States,06/26/2022,71698.01
Mexico,07/06/2021,302858.53
```

```
United States,09/02/2023,380184.4
Japan,12/17/2023,138012.27
Spain,01/06/2022,360035.92
Nigeria,07/26/2020,117583.51
India,08/27/2022,319078.12
Nigeria,05/10/2021,185315.61
France,01/22/2021,79605.99
Mexico,11/08/2022,410677.64
United Arab Emirates,01/21/2022,304060.08
Japan,05/01/2020,382370.67
Peru,10/07/2020,163162.77
Japan,10/28/2023,116031.67
Japan,08/13/2021,202813.87
Brazil,12/18/2020,116177.28
France,08/05/2023,251482.97
United States,11/30/2023,354524.01
Brazil,02/27/2022,333082.0
Japan,03/02/2024,272875.61
Japan,10/05/2022,241957.76
Mexico,10/13/2020,415713.42
France,02/01/2021,278095.0
Brazil,04/21/2023,32234.39
United States,03/06/2020,31705.72
Japan,10/16/2021,397489.08
Peru,01/24/2021,164315.87
Peru,08/10/2021,39399.43
Japan,08/19/2021,55312.24
United States,06/19/2021,47950.8
France,04/05/2020,66698.87
Chile,02/05/2023,209699.99
Canada,04/03/2022,40362.07
India,05/07/2023,448813.12
France,11/21/2023,382234.7
United States,05/22/2020,454589.09
Brazil,12/20/2021,46482.62
Peru,04/18/2023,196877.9
Canada,12/22/2021,292966.22
France,12/05/2020,441694.97
Brazil,02/14/2023,172206.44
Mexico,04/11/2022,302489.06
Peru,05/12/2022,293993.12
Peru,04/24/2022,248774.21
Canada,06/04/2024,392124.04
Mexico,03/04/2020,142287.51
Japan,02/27/2022,75894.1
Brazil,05/07/2021,52657.97
Mongolia,01/31/2020,447353.36
France,04/05/2022,275954.94
Brazil,03/03/2022,86689.07
United States,01/27/2023,304884.26
Spain,05/03/2021,143572.48
Australia,03/28/2022,132283.75
Japan,04/20/2021,259819.31
Canada,06/12/2020,366820.82
France,09/15/2020,337837.91
```

```
Japan,07/09/2020,95159.91
Japan,10/19/2021,149382.85
Brazil,09/09/2021,325617.68
Mexico,06/06/2021,324661.14
Brazil,09/28/2022,366444.31
Mexico,05/26/2023,394055.4
Japan,05/30/2021,77322.47
Japan,02/06/2023,187484.72
United States,11/13/2022,307780.43
France,03/26/2022,438656.23
Japan,03/16/2020,237080.43
United Kingdom,12/31/2022,372867.22
Mexico,12/23/2022,251630.19
Kenya,09/11/2023,167978.34
Peru,08/12/2022,174796.28
Brazil,03/20/2020,360178.71
Nigeria,06/04/2024,236178.16
United States,06/19/2022,230182.87
Brazil,12/30/2021,128965.58
Nigeria,07/26/2023,96338.83
Peru,05/16/2021,354580.5
Spain,02/21/2024,107994.23
Mongolia,05/19/2022,240049.35
United States,10/20/2022,302237.71
Brazil,02/11/2022,162125.17
Brazil,02/20/2023,223010.48
Nigeria,06/20/2024,206926.14
Mexico,02/27/2023,378327.98
France,03/07/2022,432543.14
France,05/20/2020,61227.11
Japan,08/26/2020,46839.45
France,01/18/2024,193017.69
France,11/25/2020,290340.4
Canada,08/08/2022,385273.52
United States,09/26/2021,204250.05
United States,08/04/2022,223287.59
Mexico,11/14/2022,256152.68
Brazil,01/15/2020,242880.01
Mexico,11/25/2020,430857.71
United States,06/05/2021,378069.6
France,01/03/2022,316563.84
United Kingdom,05/19/2021,243918.77
United States,05/17/2023,204355.25
Nigeria,03/13/2020,293234.49
Mongolia,06/24/2022,245425.64
Australia,12/19/2020,379893.22
United States,01/01/2021,288622.04
Brazil,05/03/2022,242795.62
Mexico,04/07/2021,227912.73
Japan,11/26/2021,144015.86
Canada,09/17/2020,126427.98
Mexico,08/04/2021,170917.99
Brazil,09/16/2021,302048.81
Japan,12/16/2020,271152.67
Peru,09/10/2021,384189.71
```

```
United States,04/29/2020,454328.73
Peru,08/27/2020,190456.76
Canada,09/29/2022,296216.69
United States,06/20/2020,293064.04
Nigeria,07/21/2023,329696.64
France,03/29/2022,125031.6
Canada,11/28/2020,334136.19
India,01/27/2023,364236.69
United States,04/05/2024,146632.59
Brazil,11/23/2021,442283.3
Canada,09/17/2020,149007.7
Brazil,03/15/2023,170612.37
Peru,02/09/2021,156444.13
Brazil,03/17/2021,217404.08
Mongolia,04/26/2020,312406.89
Canada,10/08/2020,381041.07
Brazil,06/11/2022,347838.35
Peru,01/24/2022,250253.73
Canada,11/30/2020,54392.41
Brazil,12/14/2020,301046.63
United Kingdom,11/30/2023,23456.55
United States,11/18/2021,411647.97
Mexico,10/27/2022,35642.56
Nigeria,01/12/2021,310103.2
Mongolia,04/24/2023,66497.07
Japan,03/01/2020,115616.07
Brazil,11/11/2021,427971.79
Australia,04/30/2020,224772.13
Mongolia,10/31/2020,99216.73
Peru,08/21/2020,403962.65
Peru,01/30/2023,185795.36
Japan,01/25/2023,123502.1
Nigeria,01/12/2024,203772.15
United States,11/13/2020,148393.65
Brazil,12/06/2020,112804.31
United States,07/14/2022,301281.13
Peru,04/09/2020,250693.79
Peru,05/21/2024,393405.04
Japan,03/26/2022,52544.23
Brazil,01/16/2023,90154.56
Mexico,01/22/2023,26075.54
Brazil,11/28/2021,23825.06
Peru,11/09/2020,161572.89
Mexico,07/28/2021,49412.07
Japan,01/11/2021,307169.36
Canada,09/06/2021,73335.63
Nigeria,04/14/2023,1187523.85
France,10/22/2021,72831.06
Brazil,03/07/2020,369401.17
Canada,06/04/2020,341681.27
Brazil,06/20/2021,386016.82
Peru,10/26/2022,32322.15
Canada,04/16/2021,345333.21
Japan,03/24/2020,205311.36
Japan,09/29/2023,415385.44
```

```
Nigeria,03/28/2023,449452.09
France,10/04/2020,95167.1
Japan,08/14/2021,358862.28
Mongolia,06/24/2024,329040.71
France,03/02/2023,132649.55
France,09/20/2022,408825.94
Canada,05/22/2021,423239.99
Spain,09/06/2020,47063.8
Brazil,05/11/2024,393786.01
Mexico,06/02/2023,34370.17
Brazil,01/31/2024,284225.11
Peru,04/17/2023,404147.81
Brazil,11/25/2022,190314.55
Peru,12/03/2021,141599.92
Chile,10/29/2021,244343.67
Japan,09/11/2022,448202.62
United States,02/11/2020,120006.54
France,12/11/2021,97129.11
Peru,01/30/2021,312698.45
France,09/24/2023,195299.87
France,04/10/2024,448665.96
];
```

Create the master visualization

Do the following:

1. Open a sheet in edit mode.
2. Drag a map chart onto the sheet.
3. In the properties panel, create a new area layer for the chart.
4. Add *Country* as the dimension for the area layer.
5. In the *Country* area layer, expand **Colors**.
6. Set **Colors** to **Custom** and select the **By measure** color setting.
7. Add the following expression for **Select measure**:
   ```
   =Sum($(vDimSetFull) Sales)
   ```
8. Add the following **Label** to the measure color: *Total Sales*
9. Expand the **Appearance** > **General** section in the properties panel.
10. Enter the following expression for the chart **Subtitle**:
    ```
    ='Total Sales, ' & $(vDim) & ': ' & $(vDimValue)
    ```
    This expression returns an error in the master visualization, but in the Trellis container, it functions intended. For each unique *Year* value, the title of the chart will be **Total Sales, Year: <year>**.
11. Right-click the chart, or use the ••• button, and click **Add to master items**.
12. Give the master item a **Name** (for example, *MapChartExample*), and click **Add**.

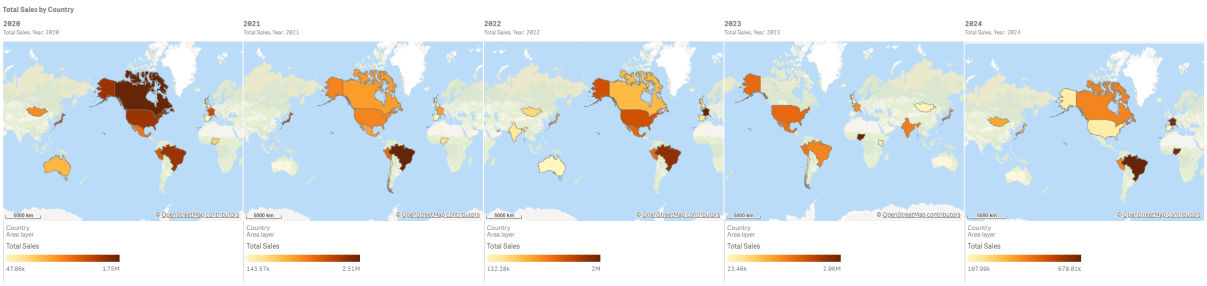
Create the Trellis container

Do the following:

1. Drag a Trellis container onto the sheet.
2. Click **Add dimension**, and select *Year*.
3. Click **Add master visualization**. In the drop down menu, select the *MapChartExample* master item.
4. In the properties panel for the Trellis container, under **Appearance**, expand **Trellis options**.
5. Set **Advanced mode** to **On**.
6. Set **Number of columns** to a value that works best for your sheet and screen size. To match the image below, set this to 5.
7. In the properties panel for the Trellis container, under **Appearance**, expand **General**.
8. Add the following **Title** for the chart: *Total Sales by Country*
9. Resize the chart if needed so that it occupies the entire length of the sheet.
10. Exit sheet edit mode.

To get the same color scheme as shown in the image below, set the app theme to **Sense Classic**.

Example result

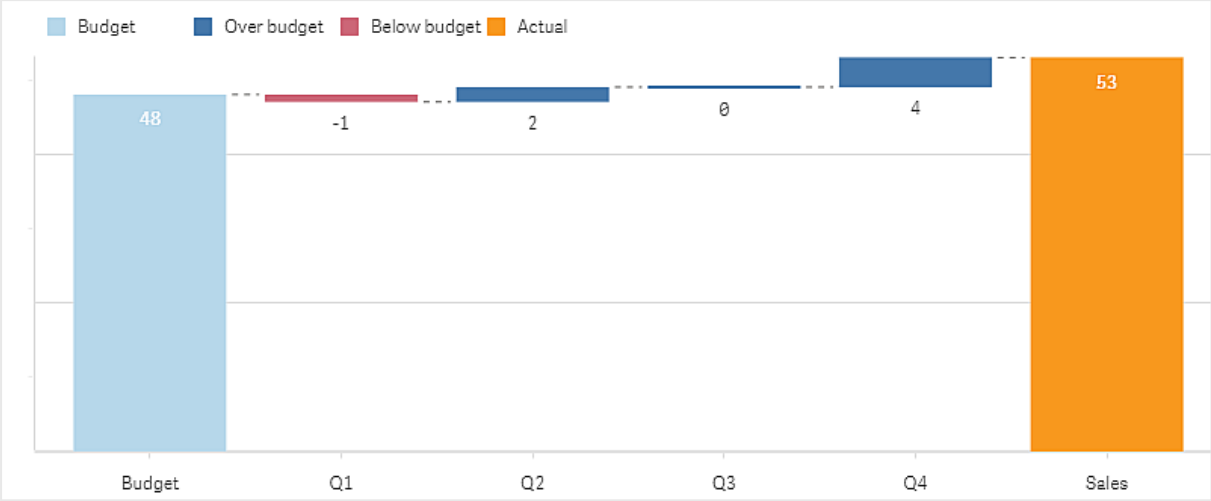


Variance waterfall chart

You can use the variance waterfall chart (**Variance waterfall**) to show the variance between two measures over the different values of a dimension. The variance waterfall chart is included in the Visualization bundle.

You need to use two measures, start value and end value, and one bridge dimension.

Variance waterfall chart showing spending over fiscal quarters



Creating a variance waterfall chart

You can create a variance waterfall chart on the sheet you are editing.

Do the following:

1. In the assets panel, open **Custom objects** > **Visualization bundle** and drag a **Variance waterfall** object to the sheet.
2. Click the **Add dimension** button to select the bridge dimension.
3. Click the first **Add measure** button to select the measure to use as start value.
4. Click the second **Add measure** button to select the measure to use as end value.

The variance waterfall chart is now displayed with one bar for the start value measure and one bar for the end value measure. Between the measure bars you will see the variance for each value of the bridge dimension.

Changing the appearance of the chart

You can customize the appearance of your chart.

Labels

You can turn off value labels by setting **Appearance** > **Presentation** > **Value labels** to **Off**.

Legend

You can customize the legend labels by setting **Appearance** > **Presentation** > **Labels** to **Custom**. You can set a custom text for the following legend labels:

- Start value (**Start value**)
- End value (**End value**)
- Positive variance (**Positive label**)
- Negative variance (**Negative label**)

You can also hide the legend by setting **Appearance** > **Colors and legend** > **Show legend** to **Off** or change the position of the legend with **Appearance** > **Colors and legend** > **Legend position**.

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Example of a variance waterfall chart

In this simple example we will show how quarterly sales numbers contribute to sales compared to budget.

Dataset

The dataset we use contains sales numbers and budgeted sales for each quarter. You can paste it into a text file and load it in Qlik Sense.

```
Quarter,Sales,Budget
Q1,9,10
Q2,14,12
Q3,12,12
Q4,18,14
```

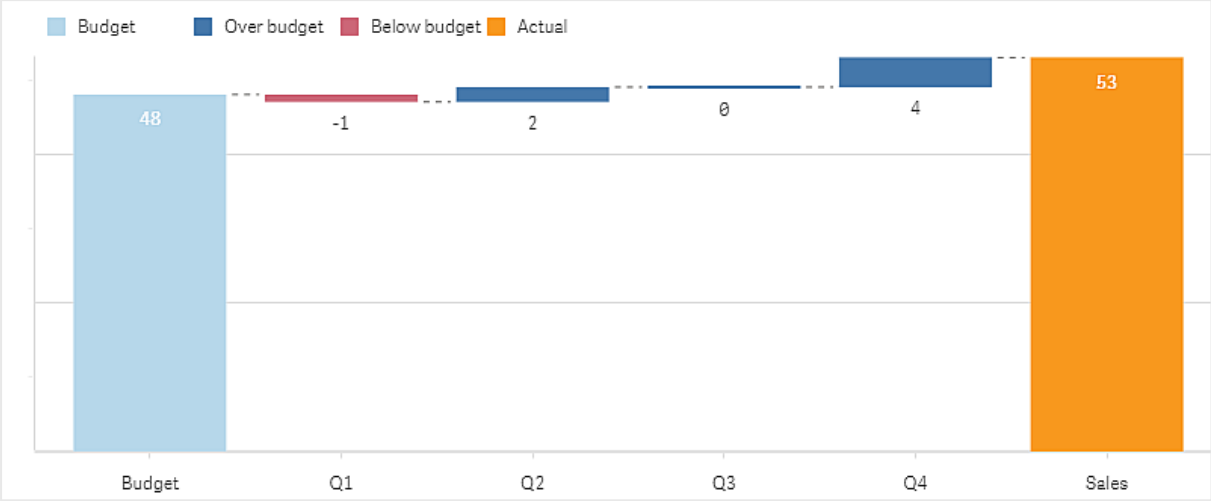
Visualization

You can now create a variance waterfall chart.

- Add `Quarter` as dimension.
- Add `Sum(Budget)` as the first measure.
- Add `Sum(Sales)` as the second measure.

The variance waterfall chart is created. We have adjusted the labels and colors in the example.
You can clearly see that Q1 had sales below budget, but the year ended with sales over budget, and that Q4 was the largest contribution.

Variance waterfall chart showing spending over fiscal quarters



Limitations

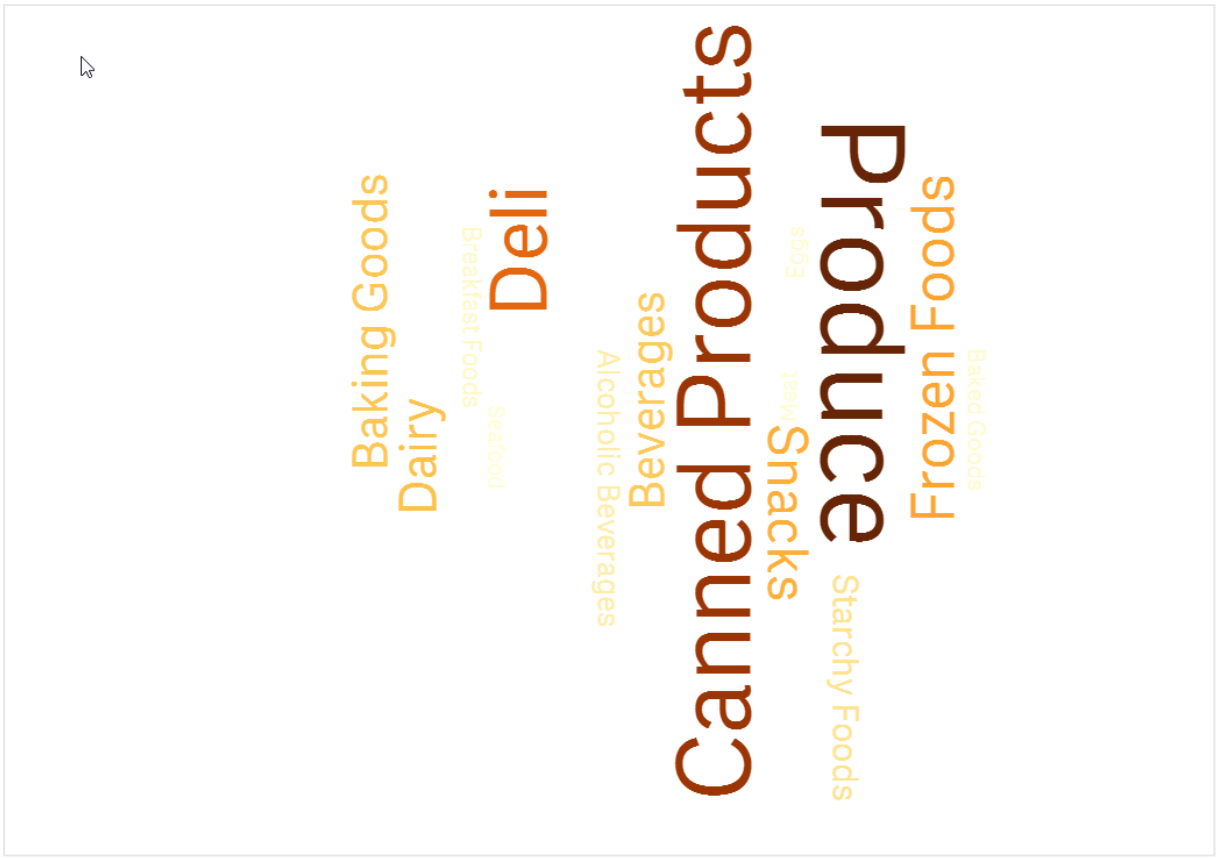
For information about general limitations, see *Limitations (page 533)*.

- It is not possible to use a variance waterfall chart in a Trellis container.
- You need to use the same number format for both measures to get correct number format for the dimension variance bars.

Word cloud chart

The Word cloud chart (**Word cloud**) lets you visualize text data. Text values are displayed with their size based on a measure value. The measure can be anything you want to measure against, for example: times used, alphabetically, by importance, or by context. You can customize your chart with different shapes, fonts, layouts, and color schemes. It is included in the Visualization bundle.

A word cloud chart displaying food items in different sizes and colors.



Requirements

Word cloud charts must have one dimension and one measure.

When to use it

A word cloud chart lets you visualize and identify the importance of a value against a measure. The more important the value is against the measure, the larger it displays in the cloud.

Creating a word cloud chart

You can create a word cloud on the sheet you are editing.

Do the following:

1. In the assets panel, open **Custom objects** > **Visualization bundle** and drag a **Word cloud chart** object to the sheet.
2. Click the **Add dimension** button and select the dimension.
3. Click the **Add measure** button to select the measure of the chart.

Once a dimension and a measure have been selected, the word cloud chart displays automatically.

Changing the appearance of the word cloud

You can customize your word cloud with one or more features.

Changing the orientation

You can set the number of orientations with **Appearance > Design > Orientations** in the properties panel. You can set an integer from 1 to 10.

- 1 will display all words in the same direction, set with **Appearance > Design > Start angle**.
- 2 will display words in two orientations, **Appearance > Design > Start angle** and **Appearance > Design > End angle**.
- 3-10 will display words in the same number of orientations between **Appearance > Design > Start angle** and **Appearance > Design > End angle**.

Example:

A word cloud chart displaying food items in different orientations.

Adjusting the start and end angles

You can adjust the starting point (angle) parameter of the word cloud under **Appearance > Design > Start angle**, and the end point under **Appearance > Design > End angle** in the properties panel. The angles can have positive or negative numbers.

Changing font size

You can set maximum word font sizes under **Appearance > Design > Font max size** and the minimum under **Appearance > Design > Font min size** in the properties panel.

If you set a large font size, this can result in the larger words not being displayed in the chart as they do not fit.

Changing scale

The word could chart scale can be either in linear or in log scale. Select scale **Linear** or **Log** under **Appearance > Design > Scale** in the properties panel. Only positive values can be used for the log scale. Zero or negative values return nothing.

Setting custom ranges

You can also specify a range of colors or select from a predefined color scheme.

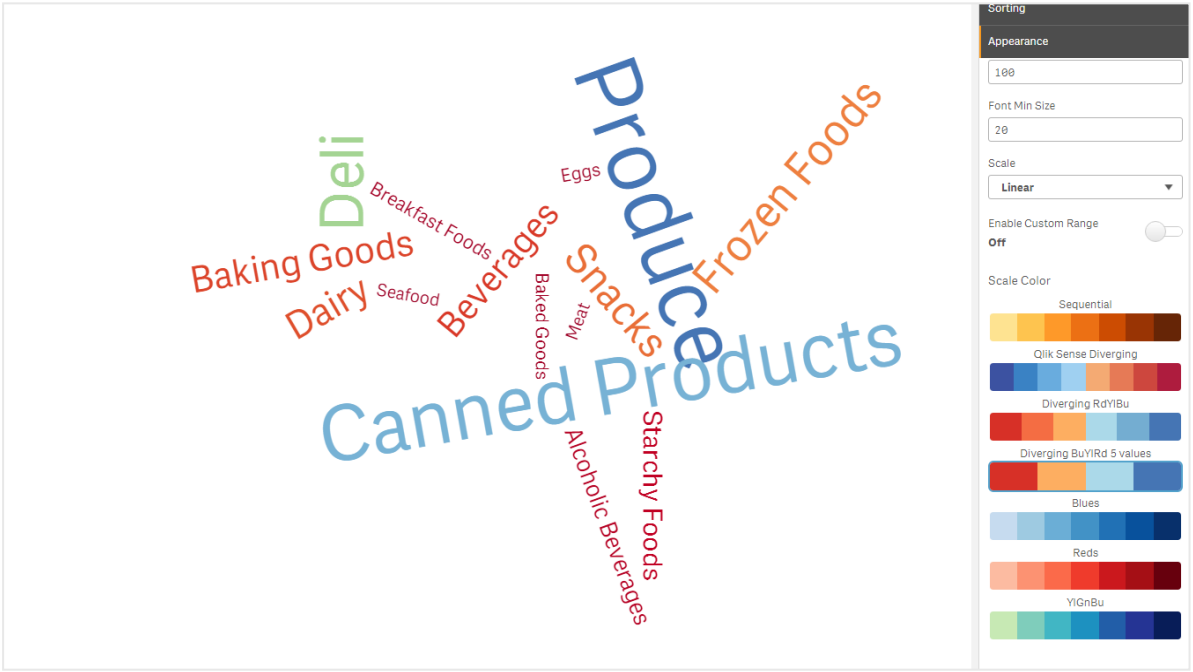
Do the following:

1. Click **Appearance > Design** in the properties panel.
2. Ensure that the **Enable color range** is set to On (default).
3. Click the color palette beside **From**, and choose a color.
4. Click the color palette beside **To**, and choose a color.

You can set your own color range by clicking the easel symbol in the color palette, and selecting a color. You can also enter a color code string in the field next to the easel symbol. The colors should be valid CSS colors.

Do the following:

1. Click **Appearance > Design** in the properties panel.
2. Move the **Enable custom range** slide button to the left to turn the option off.
3. Select a color scheme under **Scale color**.



A word cloud chart displaying food items in different sizes and colors.

Formatting numbers

It is possible to format the measure value. Different formatting can be applied to the same value, for example as money, date, duration. The chart updates to reflect the changed number type.

Do the following:

1. Click **Data > Measures** in the properties panel and click a measure.
2. Select applicable number formatting form the **Number formatting** menu.

3. Enter details in the panel fields. These display when choosing an option other than Auto when further configuring the chart.

Using the styling panel to further customize the appearance

You have a number of styling options available under **Appearance** in the properties panel.

Click **Styling** under **Appearance** > **Presentation** to further customize the styling of the chart. You can reset your styles by clicking next to each section. Clicking **Reset all** resets styles for all available tabs in the styling panel.

For general information about styling an individual visualization, see *Applying custom styling to a visualization (page 717)*.

Customizing the text

You can set the text for the title, subtitle, and footnote under **Appearance** > **General**. To hide these elements, turn off **Show titles**.

The visibility of the different labels on the chart depends on chart-specific settings and label display options. These can be configured in the properties panel.

You can style the text that appears in the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab, set the font, emphasis style, font size, and color for the following text elements:
    - **Title**
    - **Subtitle**
    - **Footnote**

Customizing the background

You can customize the background of the chart. The background can be set by color and image.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, you can select a background color (single color or expression). You can also set the background to an image from your media library or from a URL.
   When using a background color, use the slider to adjust the opacity of the background.
   When using a background image, you can adjust image sizing and position.

Customizing the border and shadow

You can customize the border and shadow of the chart.

Do the following:

1. In the properties panel, expand the **Appearance** section.
2. Under **Appearance** > **Presentation**, click **Styling**.
3. On the **General** tab of the styling panel, under **Border**, adjust the **Outline** size to increase or decrease the border lines around the chart.
4. Select a color for the border.
5. Adjust the **Corner radius** to control the roundness of the border.
6. Under **Shadow** in the **General** tab, select a shadow size and color. Select **None** to remove the shadow.

Limitations

For information about general limitations, see *Limitations (page 533)*.

- The word cloud chart can handle maximum of 100 words per entry.
- Words that take up more space than the chart are not displayed. You can adjust the font size to show more values, but we do not recommend that you use fields with long text values.
- Word cloud charts cannot be used in Qlik NPrinting reports.

3.6 Creating and editing visualizations

You create visualizations from predefined charts, fields, or custom objects. Once added to your sheet, you can edit and refine your visualizations.

Your visualization design is guided by the data in your fields and the unlimited potential for exploring associations and correlations through measures and dimensions.

Get started here: *Creating visualizations (page 629)*.

After creating a visualization, you may want to make adjustments to improve how it conveys information to users. For example, you can change the data used, or adjust the appearance of the visualization. You can add more dimensions or measures for further depth of information or remove some to improve clarity. Learn more about editing your visualizations here: *Editing visualizations (page 630)*.

Adherence to design principals and clear communication of information is key to creation of apps that engage and invite data discovery. All skill levels will benefit from reviewing best practices for designing visualizations. See *Best practices for designing visualizations (page 639)*.

Creating visualizations

You create visualizations by dragging the chosen type of visualization onto the sheet from the assets panel and configuring its properties settings. For instructions on creating specific types of visualizations, see that visualization type in *Visualizations (page 181)*.

Do the following:

1. Drag the visualization from the assets panel onto the sheet, or double-click the visualization.
2. Add dimensions and measures to the visualization.
   You can add dimensions and measures using the buttons on the visualization. Or you can drag a field from the **Fields** tab of the assets panel, and then select it to use it as a dimension or measure. The number of dimensions and measures that are required depends on which visualization you select.
3. Adjust the presentation: for example: sorting, coloring, or labeling.
   For more information, see *Changing the appearance of a visualization (page 687)*.

You can also add a visualization by copying visualizations. This is useful if you want to use existing visualization settings in another visualization type. For more information, see Copying a visualization from an existing visualization (page 679)

Custom objects are added in a similar manner. You start creating a visualization by dragging a visualization extension onto the sheet. For more information, see *Creating a visualization using a custom object (page 678)*.

You can use containers to save space on your dashboard, by quickly switching between tabs with different visualizations.

The types of data you have in your tables and fields impacts whether they can be used as dimensions or measures.

- Dimensions determine how the data in a visualization is grouped. For example: total sales per country or number of products per supplier. For more information, see *Dimensions (page 106)*.
- Measures are calculations used in visualizations, typically represented on the y-axis of a bar chart or a column in a table. Measures are created from an expression composed of aggregation functions, such as **Sum** or **Max**, combined with one or several fields. For more information, see *Measures (page 111)*.

Editing visualizations

After creating a visualization, you may want to make adjustments to improve how it conveys information to users. For example, you can change the data used, or adjust the appearance of the visualization. You can add more dimensions or measures for further depth of information, or remove some to improve clarity, and streamline a visualization.

The data in a visualization can be changed. For example, you might correct an invalid dimension or measure, or unlink a measure from a master measure so you can modify it without changing the master measure. For more information, see *Changing the data of a visualization (page 682)*.

The appearance of a visualization can be edited to improve design and enhance understanding. There are a number of different ways you can adjust the appearance of your visualizations:

- Colors: Coloring is one of the best ways to highlight values in your visualizations. Qlik Sense provides a range of different coloring options.
  For example, you can assign specific colors to the distinct values in a master dimension to ensure that those values use the same colors across all your visualizations.
  For more information, see *Coloring a visualization (page 696)*.
- Sorting: The sorting of your dimensions and measures helps ensure that content is presented in a logical and understandable manner.
  For more information, see *Change the sorting of a visualization (page 693)*.
- Titles and labels: Titles and labels can be changed for clarity and detail.
  For example, in a pie chart showing sales by region, you could add an expression providing the total sales sum.
  For more information, see *Changing the appearance of a visualization (page 687)*.
- Presentation: Different visualizations have different options that can be adjusted to enhance the display of data.
  For example, you can set bars in a bar chart to display as grouped or stacked, as well as vertically or horizontally.
  For more information, see *Changing the appearance of a visualization (page 687)*.

You can convert a visualization into another visualization type, and preserve your settings. For more information, see *Converting a visualization to another kind of visualization (page 718)*.

You edit visualization properties in the properties panel.

Do the following:

1. Click **Edit sheet** in the toolbar.
   The properties panel for the sheet opens to the right.
   If it is hidden, click **Properties** from the toolbar.
2. Click the visualization that you want to edit.
   The properties panel now shows the properties of the visualization.
3. Make your changes under **Properties**.
4. Make your changes in the properties panel.
5. Click **Done editing** in the toolbar.

Applying filters to visualizations

In the sheet edit mode, apply filters to visualizations to narrow the focus of a field to a specific subset of data. For example, if you have a field containing countries, you could use filters to only display data for specific countries of interest.

To apply a filter to a visualization, select a field and then select the type of filter used. You can apply several different kinds of filters to your visualization. You can filter using:

- **Values**: Filter using selected values from a field. For example, filter results to include only those values you select from a field.

- **Search**: Filter using matches from a search. For example, filter results to include only those that start with a specific code prefix.
- **Condition**: Filter matching specified conditions. For example. filter results to only include those that meet a numeric threshold.
- **Clear selection**: Filter to exclude selections made in other visualizations. For example, selecting a field whose selections made in other visualizations will not be applied to this visualization.

Filters can only be applied to fields. You can apply multiple filters to a visualization. Filters can only be applied to visualizations containing a measure.

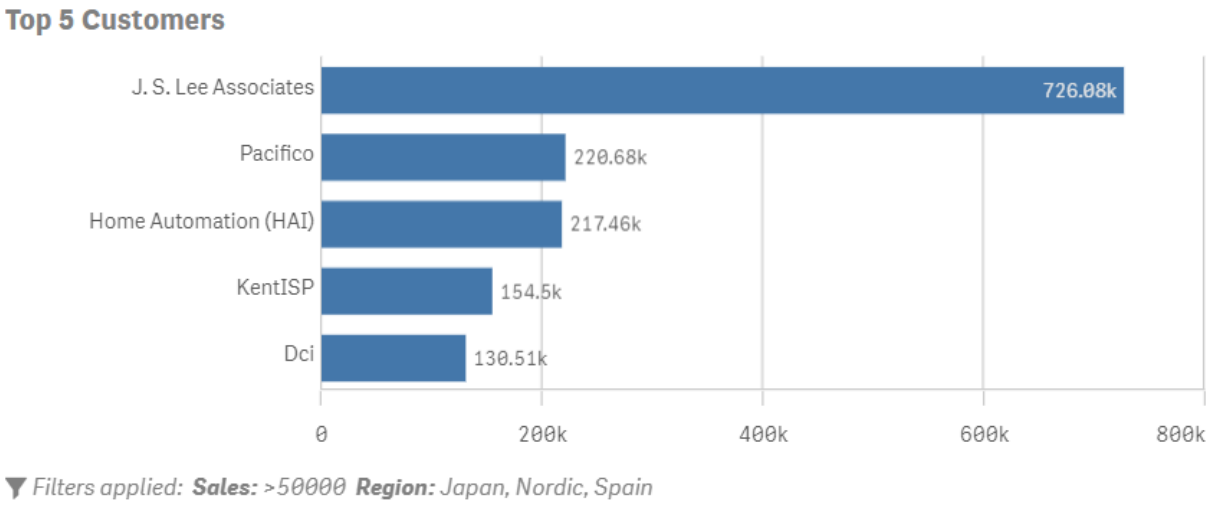
You can also create complex filters with set analysis.

Viewing and interpreting the applied filters

The filters applied to a visualization are shown in the footnote at the bottom of the visualization. You can see the filters applied to the chart regardless of whether you are developing or consuming the analytics.

Adding a footnote to a visualization will remove the **Filters applied** footnote.

A chart with filters applied



The format of the filters listed in the **Filters applied** footnote depends on how you have configured the filters.

Values filter

If you have applied a **Values** filter, the values selected are shown. For example: **Region: Japan, Nordic, Spain**

Search filter

For filters with the **Search** option, the search value is displayed with wildcard symbols as needed:

- The * wildcard is used in the place of zero or more characters, including spaces. This wildcard is flexible and matches any character or any block of characters in a specific position.

- The ^ wildcard is used to filter values by the character or characters at the beginning of a word within a field value. This wildcard is only used in conjunction with other wildcards.

For example: **City: *^New***. In this example, the *City* field is being filtered to only show field values that begin with the string *New*. This could, for example, include values such as *New York*, *New Orleans*, and *Newark*.

Condition filter

For filters with the **Condition** option, operators and other symbols are used. Depending on the configuration, a filter might show:

- A simple combination of field and operator. For example: **Year: >2022**. A visualization with this filter would only include data with a *Year* of later than *2022*.
- An advanced expression using one or more equals signs. For example: **Product: =sum (Sales)>1000000**. A visualization with this filter would include *Product* items that have total *Sales* exceeding *1000000*.

Clear selection filter

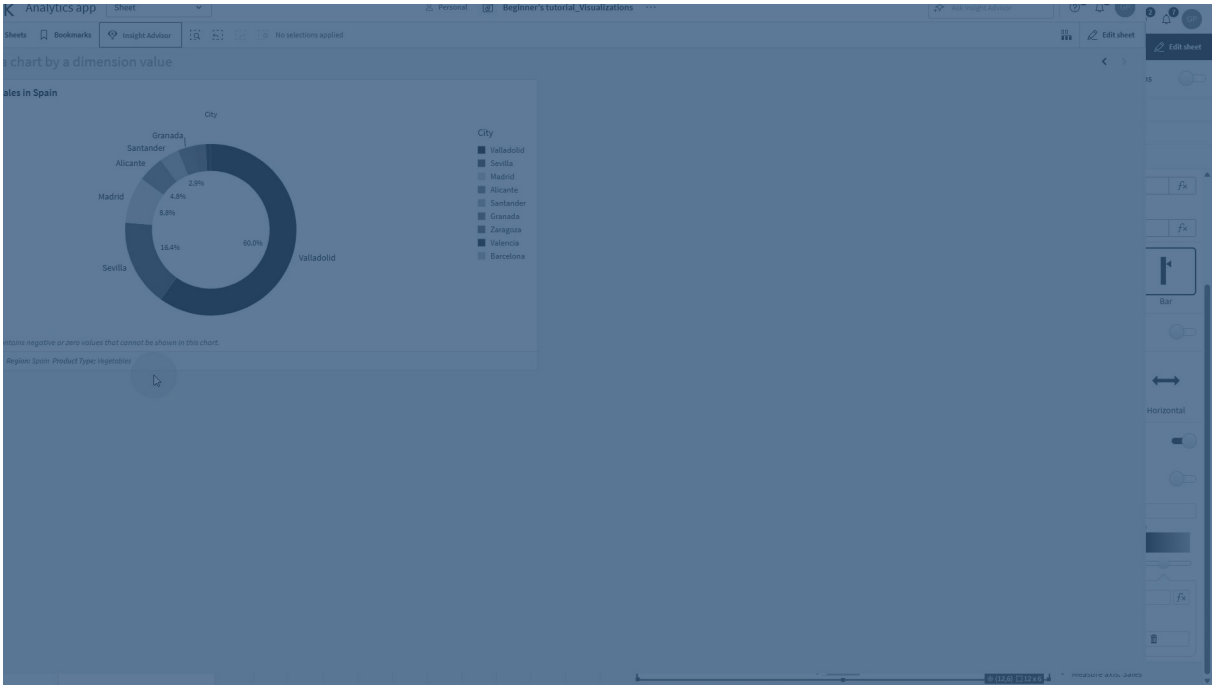
For filters with the **Clear selection** option, the text **ALL** is displayed along with the filter field to indicate that none of the field values will ever be hidden in the chart. For example: **City: ALL**

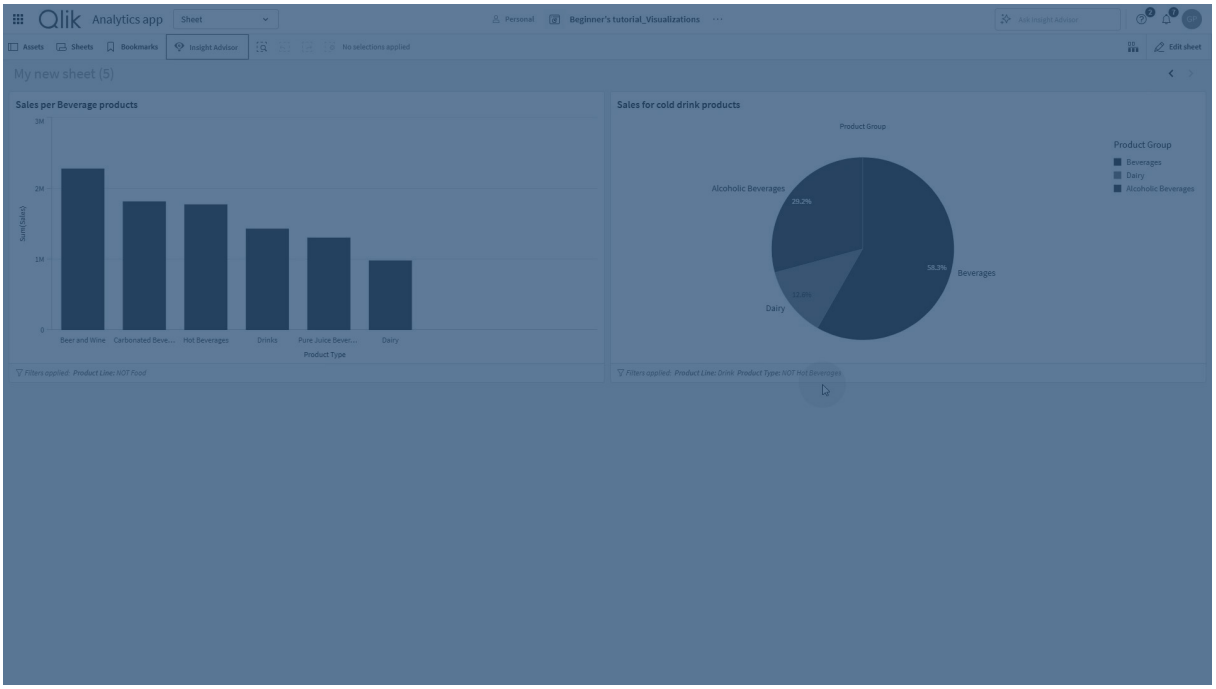
Filters that use **Exclude**

Any filters that use **Exclude** will contain the text **NOT**, along with the filter. For example: **Region: NOT Sweden**

Filtering with values

Filter data by selecting values from a field to include or exclude from the visualization. This is useful if you want to quickly limit the scope of dimension values in your visualization. For example, if you included a field that contained clients of your organization, you could use a value filter to only include results for specific clients.





Do the following:

1. In edit mode, select the visualization to which you want to apply a filter.
2. In the properties panel, in **Data**, under **Filters**, click **Add** and select a field.
3. Expand the field and select **Values**.
4. Optionally, to exclude the selected values, select **Exclude**.
5. Select the values to include or exclude from the list.

Filtering with searches

Filter values based on searches for the specified values in the field. This is useful when you want to filter on data based on a partial phrase or string. For example, you have a field that contains record IDs for your organization. Each record ID includes a specific prefix to classify the record. You could use a search filter to filter on the record prefixes.

The following search types are included:

- **Contains**: Any strings that contain your entered search value. For example, entering *je* will return any strings containing *je*.
- **Matches exactly**: Any exact matches with your entered search value. For example, entering *je* would return all instances of the string *je*.
- **Starts with**: Any strings that start with your entered search value. For example, entering *je* would return *jeans* and *jean shorts*, but not *blue jeans*.
- **Ends with**: Any strings that end with your entered search value. For example, entering *gg* would return *egg*, but not *eggs*.
- **Beginning of word**: Any words in a string that start with your entered search value. For example, entering *je* would return *jeans*, *jean shorts*, and *blue jeans*.

The search filter works best with string values, but you can search for numeric values as well.

Do the following:

1. In edit mode, select the visualization to which you want to apply a filter.
2. In the properties panel, in **Data**, under **Filters**, click **Add** and select a field.
3. Expand the field and select **Search**.

4. Optionally, to exclude the selected values, select **Exclude**.
5. From the list, select the type of search to use.
6. Enter the value for which to search.

Filtering with conditions

Filter on conditions in a selected field or filter on a comparison between two fields. For example, you could filter all values from a field that are under a threshold value. Your conditions can use fixed values or calculated values.

You can compare to a fixed value or you can compare it to a calculated value from a measure. For example, you could include all values whose *Sales* value is over $1,000 or you could include all values whose *Sales* value is over the average *Gross Sales* value.

Condition supports two kinds of filters: **Compare** and **General**.

Filtering with comparison conditions

Compare looks at values from your selected field and compares them to a specified condition. For example, you could take the field *Sales* and filter out all sales under $5,000 from being included in the visualization.

Do the following:

1. In edit mode, select the visualization to which you want to apply a filter.
2. In the properties panel, in **Data**, under **Filters**, click **Add** and select a field.
3. Expand the field and select **Condition**.
4. Optionally, to exclude the selected values, select **Exclude**.
5. Select **Compare**.

6. Under **Condition**, select the condition to use and whether to use a fixed value or a calculated value.
7. If you are using a fixed value, enter the value or values required for your condition.
8. If you are using a calculated value, select the modifiers and fields to create the measures that define the comparison condition.

Filtering with general conditions

General uses an aggregation to filter your data. First you define a measure. Then it filters matching values from your selected field based on the conditions you specify for that measure.

For example, you have a chart showing regional sales figures. You want to see regional sales figures only where the sum of sales for cities in that region was over $1,000,000. You add *City* as the filter. For your general condition, you set the field as *(sum)Sales* with the condition **Greater than or equal to** *1000000*.

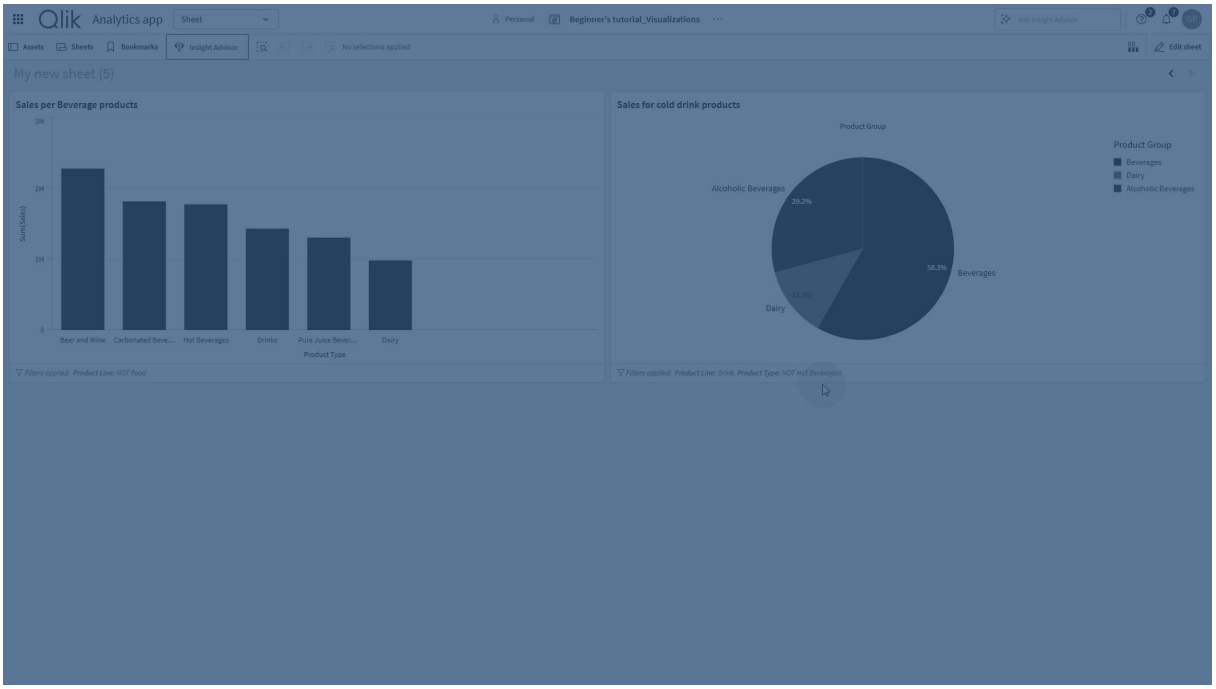
Do the following:

1. In edit mode, select the visualization to which you want to apply a filter.
2. In the properties panel, in **Data**, under **Filters**, click **Add** and select a field.
3. Expand the field and select **Condition**.
4. Optionally, to exclude the selected values, select **Exclude**.
5. Select **General**.
6. Under field, select the modifier and field to use to specify the measure to use in the filter. For example, *(avg)Sales*.
7. Under **Condition**, select the condition to use and whether to use a fixed value or a calculated value.
8. If you are using a fixed value, enter the value or values required for your condition.
9. If you are using a calculated value, select the modifiers and fields to create the measures that define the comparison condition.

Filtering by clearing selections

Exclude external selections for the selected field in this chart. When you select clear selection, any selections made in other charts for the selected field are ignored. However, selections made on that field within this chart would be reflected in other charts.

For example, I have a chart that only shows results from *Region* for *Germany*, *Japan*, and *Spain*. I do not want selections made in other charts for *Region* to impact this chart. By selecting *Region* to be filtered with clear selection, other *Region* selections outside this chart will not impact the chart.



Do the following:

1. In edit mode, select the visualization to which you want to apply a filter.
2. In the properties panel, in **Data**, under **Filters**, click **Add** and select a field.
3. Expand the field and select **Clear selection**.

Advanced alternatives to visualization filters

Visualization filters are helpful for building visualizations quickly. For more advanced use cases, you might want to use set analysis instead, or use a combination of visualization filters and set analysis. For example:

You have created a sheet where all visualizations on the sheet need to have the same filter. Other sheets in the app need to use a similar arrangement of visualizations, but with different filters on the same field. You can add filters individually to each visualization on the sheet. Alternatively, you can use any of the following:

- Set analysis. With set analysis, data is filtered using an expression rather than by applying filters. For example, on one sheet, a bar chart could use *=Sum({<ProductType={'Grocery'}>} Sales)* as a measure, to filter for the *Grocery* field value. In the next sheet, a similar bar chart could use *=Sum ({<ProductType={'Dairy'}>} Sales)* as a measure, to filter for the *Dairy* product category.
- Bookmarks. For example, rather than creating multiple sheets with the same arrangement, you could create a single sheet containing no filters, and then create bookmarks in the app to allow users to control the filters (selections) themselves.

Limitations

Filters have the following limitations:

- Filters are not supported in the following visualization types:
    - Box plot
    - Button
    - Filter pane
    - Histogram
    - Navigation menu
    - Tab container
- Filters are only supported in chart layers in map charts.
- Filters are not supported with the following objects from the Visualization Bundle:
    - Trellis container
- Filters are not supported with the following objects from the Dashboard bundle:
    - Animator
    - Date picker
    - Layout container
    - Line
    - Variable input
    - Video player

Best practices for designing visualizations

Decluttering your apps

Too much information in an app makes it difficult to see what is important. Today's modern user interface style is a cleaner, simpler, flatter style of design. A simplified design subtly guides the reader and allows them to stay focused.

Less is more

Users often try to include too much information in one app. Line charts with several measures can be confusing and difficult to interpret. Try creating several smaller visualizations to spread this information out onto the page. It also allows the reader to efficiently compare and contrast visualizations that are side-by-side. You can also use alternative dimensions and measures to allow the reader to quickly switch between measures without overcrowding a visualization. For more information, see *Changing the data of a visualization (page 682)*.

There are number of different ways you can improve the aesthetics and functionality of your app. Depending on your audience and what data you want to highlight, the way you design your visualization may have a serious impact on the reader's interpretation of the data.

Know your limits

Consumers of your visualizations may be working with limited screen space or resolution. Qlik Sense uses responsive design to address these limitations. However, if screen space or resolution is too limited, certain design accommodations are necessary. These can include:

- A subset of data being displayed in bar charts and line charts. When the number of dimension values exceeds the width of the visualization, a mini chart with a scroll bar is displayed.

- Collapsed menus for selecting data filters. When the number of dimension values exceeds the space available for the filter pane, the menu is collapsed. App consumers have to click on the dimension name in the title of the filter pane to open a new pane. They can then make their selections in the new pane. Additionally, when there is limited space, dimension names may appear as ellipses in filter pane titles. App consumers have to click on the ellipses to view the name of the filter pane.
- Truncated names in chart legends. Names that are too long for the space available for dimensions and measures are truncated. An ellipses is added to the end of truncated name. App consumers can hover their mouse pointer over the truncated name to view the complete name.
- Missing legends, labels and titles.

App consumers can expand visualizations to address some of these issues. However, we recommend that you test your apps on devices where the apps may be consumed. You can also use various tools to test, such as responsive design mode in Firefox (Ctrl + Shift + M). If necessary, you can move visualizations to new sheets reduce the amount of data shown in visualizations, and so on.

Color accessibility

The spectrum of colors is narrower for people who have color-based visual impairment. They may interpret your visualization differently than you intended.

For example, some people see the colors red and green more as yellow or brown. This form of red-green color vision deficiency is the most common. This is worth noting since red often carries a negative connotation in data visualizations, especially in finance.

A red or green KPI status can be confusing. You can use shapes with colors as performance indicators to make your designs more accessible. For example, use a red empty circle to denote bad, a green full circle for good, and a triangle as a warning symbol that only appears when a KPI status is at an unacceptable level.

Lines, bars, and pie slices can be difficult to distinguish when the colors are distorted.

For more information, see *Changing the appearance of a visualization (page 687)*.

Filter and icon placement

Filers and icons are an essential part of data visualization, but it can be difficult to know where to place them or how to sort them. You can often anticipate where the user will begin to read based on a few well-established design principles.

Left placement

Several popular websites use left-side navigation tiles and filters. This is due to the fact that many languages read from left to right. As a result, the left-side of the screen is where these readers look most frequently. Users who are scanning for content tend to gravitate toward the left side of the screen. The farther to the right objects are, the less users will look at them. If all your filters and icons are stacked vertically on the left, it gives them equal weight.

Alternately, with languages where text is written right to left, the opposite of this is true. This should be kept in mind if your apps are translated into these languages.

Top placement

Another common placement option for icons and filters is along the top of an app. By not placing filters or icons on the left it gives more space for larger visualizations with distracting menus. When filters and icons are placed above visualizations they are also seen as separate from the content below. This can help show the reader that you are prioritizing the filters or icon. If all your filters and icons are side-by-side at the top, the one furthest to the left carries more weight and is prioritized by the reader.

For more information, see *Structuring an app using sheets (page 10)*.

Information hierarchy

Sometimes you want your reader to prioritize certain visualizations over others. You can show hierarchy of information by using a few key design best practices. For example, you can use different sizes to emphasize some visualizations. Larger information is seen as more important: by increasing the font or chart size, you can show the reader where to look first.

Page placement also plays a part in information hierarchy. The information at the top of a page is perceived as more important than information at the bottom of the page because it is read first. Information on the first page is perceived as more important than information on the last page.

Adding context to KPIs

KPIs are a great way to communicate some of the big ideas inside your app. However, KPI values do not provide any context to the numbers and calculations that are happening behind the scenes. A green light next to a KPI does not tell the reader if the goal was barely achieved, or if you greatly surpassed it.

To help bring context to your KPIs, include supporting information next to the value in smaller text. For example, you can compare the current KPI value with the value from the previous year. You can also add a small bar chart without axes or values to provide information about the current trend.

Avoid the pitfalls of data visualization

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

Color abuse

Do not overdo colors. Be aware that the wrong color in the wrong place might cause confusion rather than clarity. Also, the same color may mean different things in different parts of the world.

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.

Style over substance

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.

Creating visualizations with Insight Advisor

Explore your data and create visualizations with Insight Advisor Analysis Types and Insight Advisor Search. Insight Advisor creates visualizations for you using the Qlik cognitive engine and your app logical model. Click **Insight Advisor** in a sheet to use Insight Advisor Search and Insight Advisor Analysis Types.

Insight Advisor Analysis Types

Select the type of analysis you want to see, such as breakdown, trend over time, or mutual information. Then select the data you want used in the analysis. Insight Advisor generates charts using your choices. Insight Advisor Analysis Types is the fastest way to create charts when you know what you want to see and the data sources to use, but not how to build the analysis yourself.

Creating analyses by selecting analysis types (page 643)

Navigating Insight Advisor (page 651)

Insight Advisor Search

Enter a natural language question or statement. Insight Advisor then uses the Qlik cognitive engine to interpret your question and create visualizations to answer your questions from your data model. Insight Advisor Search is the fastest way to create charts when you have a specific question to answer.

You can also select fields and master items from the assets panel. Insight Advisor generates results based on your selections.

Creating analyses using search (page 645)

Creating analyses by asset selection (page 646)

Navigating Insight Advisor (page 651)

Users can also access Insight Advisor in the hub with Insight Advisor Chat.

Insight Advisor and the logical model

Insight Advisor creates visualizations using the Qlik cognitive engine and a logical model of your data. The logical model defines how fields in your data model should be used a dimensions or measures, as well as the relationships between fields. By default, Insight Advisor builds a logical model by learning from user interactions. If you add charts to sheets or edit charts, Insight Advisor learns these preferences.

You can also create your own custom logical model for the app. Business logic lets you to define the relationship and use of data in your logical model. When business logic is turned on, precedent-based learning is not available. If you define calendar periods and set them as default periods, period analysis and period performance analysis types are available.

As of August 2022, Insight Advisor, including business logic, is no longer supported with Qlik Sense Desktop. In November 2022, Insight Advisor will be upgraded to a new experience. This will only be available on Qlik Sense Enterprise on Windows. Users who want to continue using Insight Advisor and business logic on Qlik Sense Desktop should not upgrade to August 2022.

Creating visualizations with Insight Advisor Analysis Types and Insight Advisor Search

You can generate charts using Insight Advisor in three ways:

- Select the type of analysis you want to see and the fields or master items that should be used with it. Insight Advisor Analysis Types then generates matching analyses .
- Ask Insight Advisor a question and let Insight Advisor Search generate charts using natural language analytics.
- Select fields or master items and let Insight Advisor Search generate charts through auto-analysis of your data.

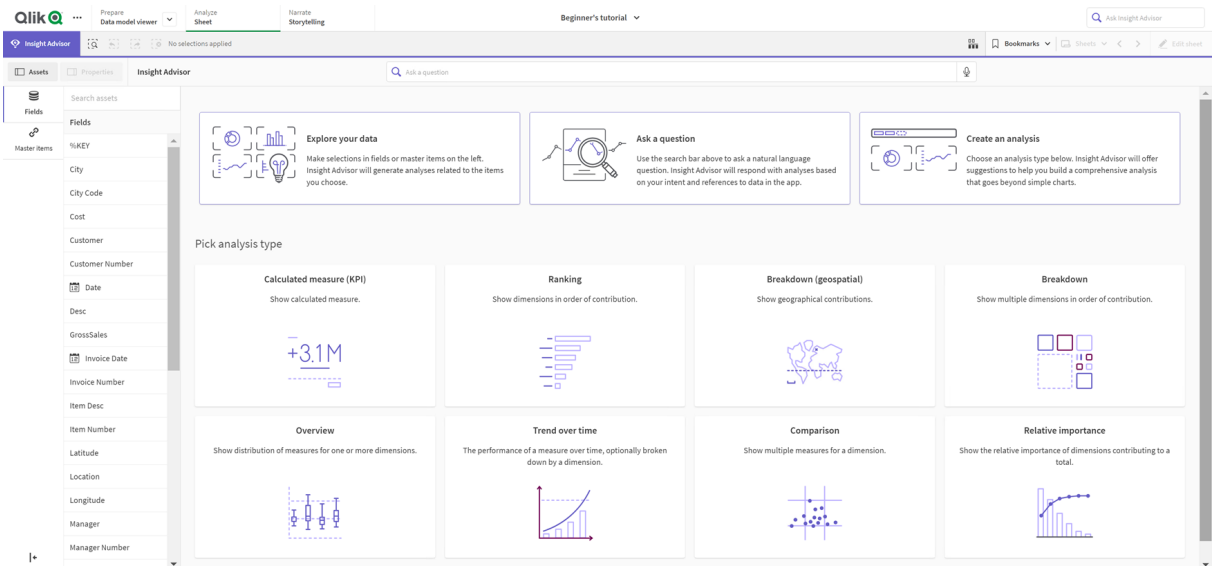
The data assets available to you in Insight Advisor depend on if the app uses business logic to define its logical model and your space permission. If you have **Can view** permission will only be able to see master items, unless the app defines its logical model with business logic.

Creating analyses by selecting analysis types

Pick an analysis type and then add fields to create analyses with Insight Advisor Analysis Types. This is a fastest method of creating visualizations when you know what analyses you want to see and the data you want to use, but not how to build the analyses yourself.

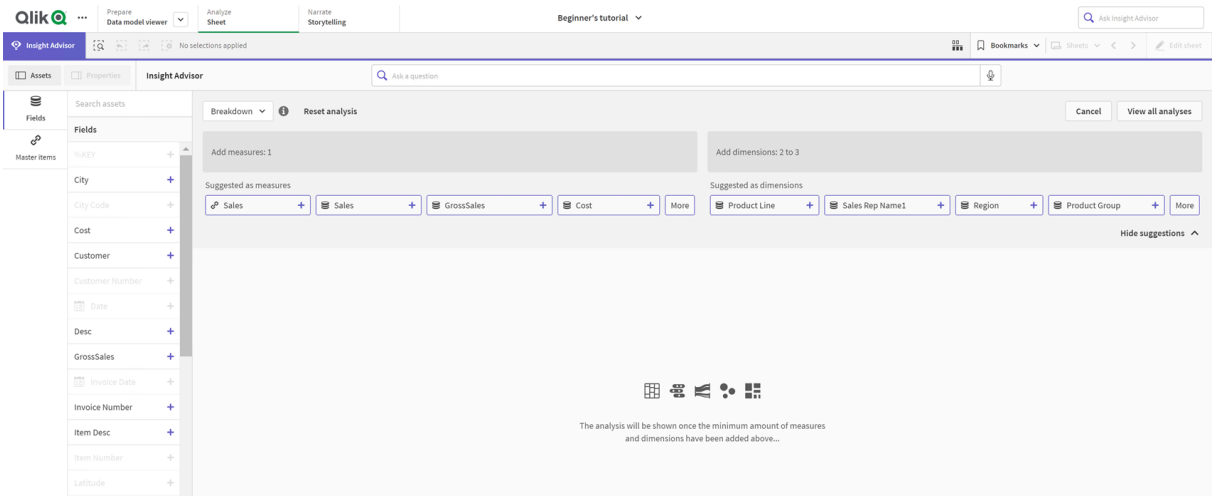
Click **Create an analysis** on the Insight Advisor start page. In **Analysis options**, all available analysis types display with descriptions of their use.

Analysis options



After selecting an analysis type, you then select fields or master items to use in the analysis. Insight Advisor offers suggestions of assets to use for each parameter. You can change analysis types by selecting a new analysis type from the dropdown or clicking **View all analyses** to view the analysis options. You can clear your selections by clicking **Reset analysis**.

Building an analysis



Do the following:

1. In a sheet, click **Insight Advisor**.
2. Click **Create an analysis**.

3. Under **Analysis options**, select your analysis type.
4. Add the required fields or master items for your analysis type.
   When you have added the required fields, Insight Advisor generates your charts.

Creating analyses using search

Ask Insight Advisor Search natural language questions and it generates relevant charts using field names, field values, and master items. You can search Insight Advisor in the following ways:

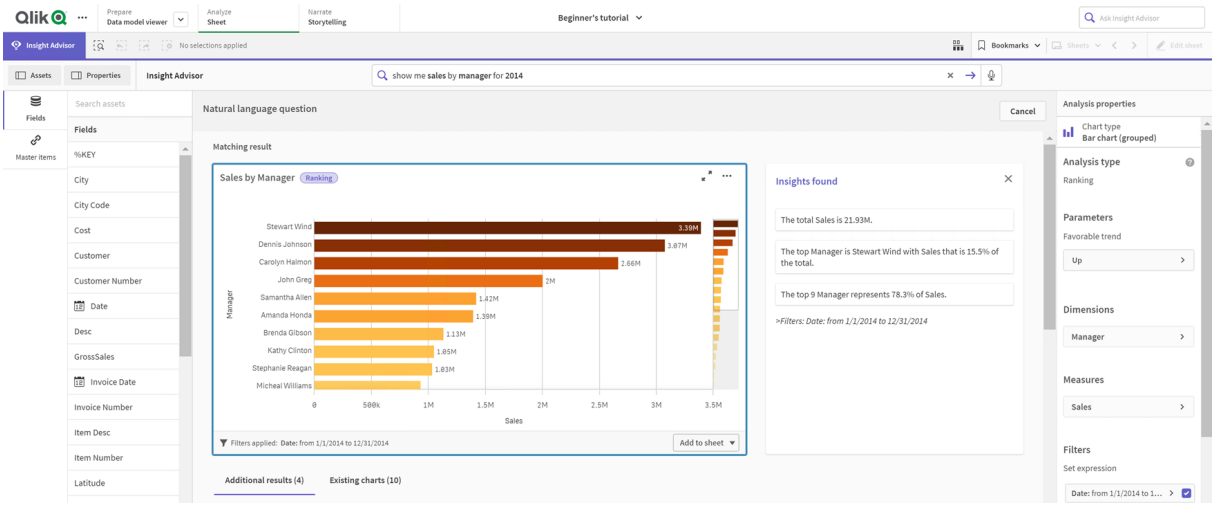
- Enter a natural language question or statement, such as *what are the top products for sales* or *Show me Product by Revenue in Sweden*. Natural language questions work best when they refer to field or master items directly.
  For guidelines on using natural language in your searches, see *Using natural language with Insight Advisor (page 655)*.
- For information about language support in Insight Advisor Search, see *Supported languages (page 650)*.
- If your browser's voice-to-text capability is supported in Insight Advisor, you can click the microphone icon to ask Insight Advisor your question.

> *Qlik Sense Desktop does not support voice-to-text capabilities for questions.*

Insight Advisor uses the fields or terms you specify. It may use additional fields in the generated visualizations. Insight Advisor uses any precedents you have given it for hiding charts, setting fields as dimensions or measures, or excluding fields from analysis. In Qlik Sense Enterprise, Insight Advisor can use precedents learned from other published apps if they use a similar or identical data model.

For natural language questions, Insight Advisor tries to find a matching Insight chart result. If one is found, it shows related results as well. You can click ℹ to view how Insight Advisor generated results from your question. .

Matching result with natural language insights



If you receive the following error message: "Unable to generate insights - Please try again later," you might not meet the CPU requirements for Insight Advisor.

Do the following:

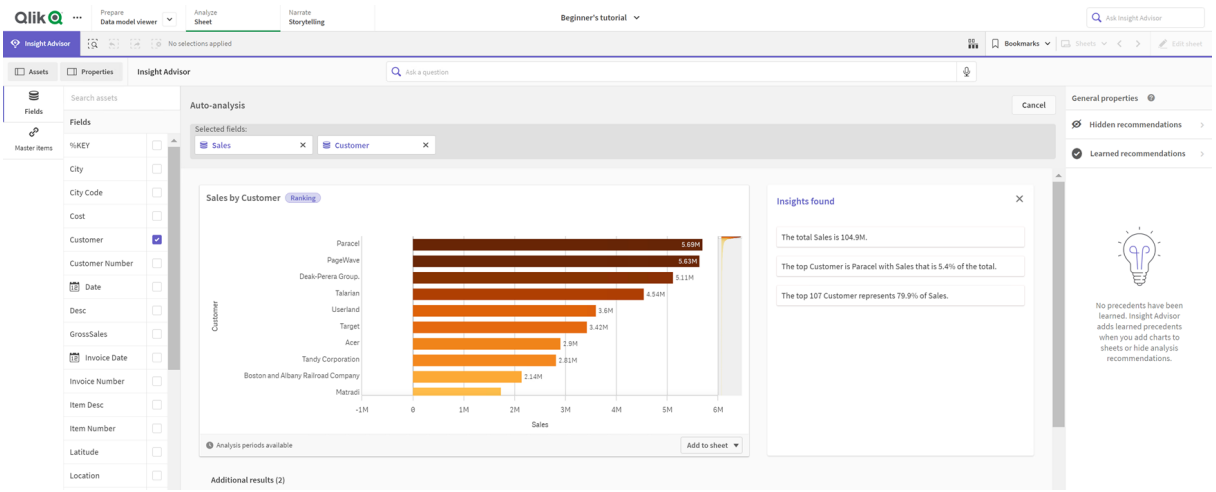
- In a sheet, enter a question or statement in the **Ask Insight Advisor** search bar and click →. Alternatively, click **Insight Advisor**, enter a question in the Insight Advisor search bar and click →.

Creating analyses by asset selection

Select fields and master items to use in charts and let Insight Advisor Search auto-generate charts, select assets to use from the assets panel. You can also enter asset names in the Insight Advisor search bar. Insight Advisor then uses the fields you selected to generate charts. It may use additional fields in the generated visualizations.

Insight Advisor uses any precedents you have given it for hiding charts, setting fields as dimensions or measures, or excluding fields from analysis. In Qlik Sense Enterprise, Insight Advisor can use precedents learned from other published apps if they use a similar or identical data model.

Insight Advisor analyses generated by selection



Do the following:

1. In a sheet, click **Insight Advisor**.
2. In the assets panel, select fields and master items to create analyses.
   Alternatively, enter field or master item names in the search bar.
   As you select assets, Insight Advisor generates visualizations.

Voice-to-text data transfer considerations

In many internet browsers, Insight Advisor voice-to-text search functionality uses the Web Speech API for external processing of voice-to-text data. This is used by both Insight Advisor Search and Insight Advisor Chat. The user's internet browser may send the audio recorded by the browser API to an external source

for transcription. Voice processing will be handled by the web service chosen by the user's web browser. As a result, the captured information could be sent to a third-party server. Qlik is not responsible for the data processing by this third-party.

If users want to restrict this information flow to their relevant third-party browser (turn off the voice-to-text feature), this might be achieved through specific controls, including settings within their browser of choice and other security configurations.

Using Insight Advisor analyses

You can expand an Insight Advisor analysis by selecting it or clicking ↙↗. You can then make selections in the analysis.

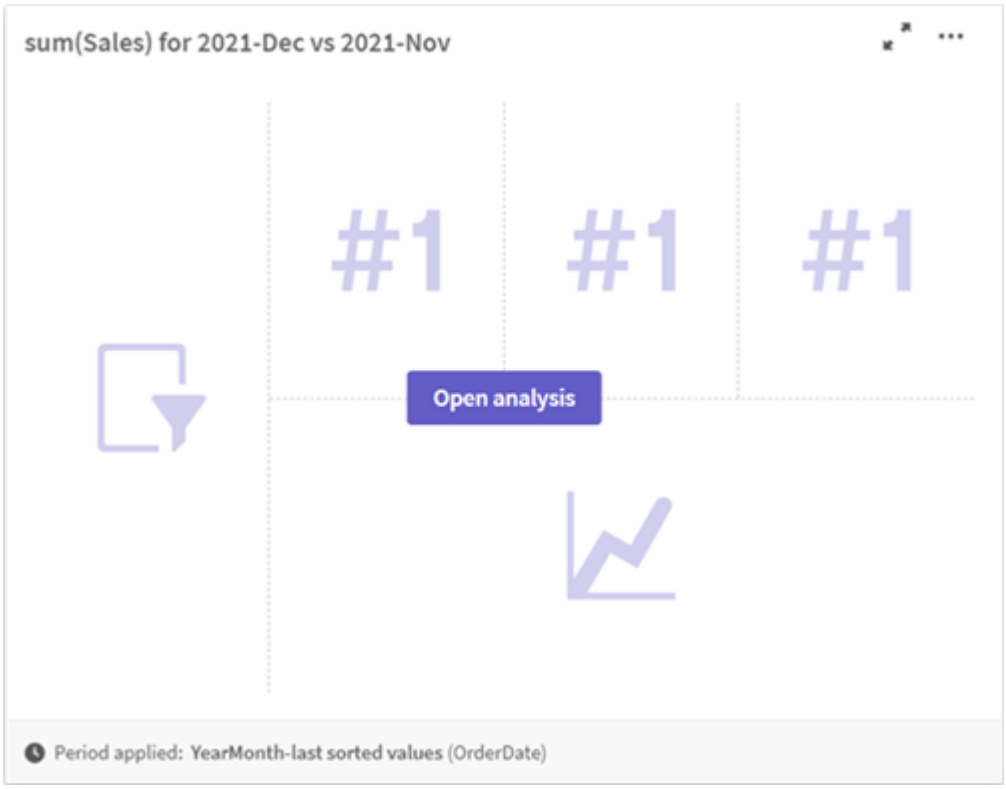
Note the following regarding selections:

- Selections apply to all analyses.
- Selections made in charts from your sheets are kept when you open Insight Advisor.
- Selections do not affect the charts created by Insight Advisor.

If an analysis is new, you can add it to your sheets. If the chart exists in a sheet, you can click the sheet name at the bottom of the chart to go to that sheet.

Some analysis types, such as period over period dashboard, provide multiple related visualizations rather than a single chart. These show a preview of the kind of visualizations included in the analysis. Click **Open analysis** to view the analysis with data.

A period over period dashboard analysis



You can view additional options by clicking •••. The following options are available:

- **Full screen**: Expand a chart to make selection.
- **Edit analysis properties**: Edit the chart properties to change dimensions, measures, and the chart type.
  Editing Insight Advisor analysis properties (page 648)
- **Add to sheet...**: Add the chart to a new or existing sheet.
- **Add to new sheet**: Add the charts to a new sheet (period changes, period changes (detailed), period over period, period over period (selected) analysis types only).
- **Download**: Download the chart as an image, PDF, or data.
- **Hide**: Hide charts that you do not want Insight Advisor to use again. You can view the charts hidden from your current search in **General properties**.

  ***Hide** is not available in apps using business logic.*

Editing Insight Advisor analysis properties

Edit Insight Advisor analysis by selecting a chart and clicking . The following properties are available in **Analysis properties**:

- **Chart type**: If available, select a different chart type. For an outline of the alternate chart types available for the different analyses, see *Insight Advisor analysis types (page 656)*.
- **Favorable trend**: (Rank analysis only) Indicate if the favorable trend for ranking is to increase or decrease.
- **Parameters**: Make adjustments to parameters specific to the analysis type of the chart.
- **Dimensions** and **Measures**: Change the fields used as **Dimensions** or as **Measures**. You can change the measure aggregation. Reorder measures or dimensions by dragging them.
  Dimensions and measures from Insight Advisor analysis can be added to your master items. Click a dimension or measure and then click **Add new**.
  If you specified filters in a natural language question, such as specific field values, you can modify them as well.
- **Details**: View information about why the chart was generated and the precedents Insight Advisor has learned from a chart. Select details by clicking them to change or reject them. You can set fields as dimensions or measures or exclude fields from future analysis. You can hide charts from future analysis by selecting **We suggested a chart for this combination of data** and clicking **Hide this chart**.
- **Analysis period**: Change which period from business logic calendar periods is applied to the chart. You can adjust the analysis period by selecting new values from **Period 1** or **Period 2**.
  Select an analysis period for rank type charts to view period and period performance analysis types.

  ***Analysis period** is only available when business logic is turned on and calendar periods have been created for the app. If there is no business logic, **Analysis period** is available if the app has date/time fields with autoCalendar derivations in the load script.*

Editing calendar period Insight Advisor analyses

If a default calendar period is assigned to a group, additional period analysis types are available for Insight Advisor analysis. Default calendar periods are created in business logic. These have different properties than other charts. The following types are available:

- **Period changes**: Shows the change of a measure from the current or latest period in the selected analysis period.
- **Period changes (detailed)**: Compares a change in a measure from the current period to the previous period. The change is measured using a forecasted target value. You define the percentages for meeting the target, almost meeting the target, and missing the target.
- **Period over period**: Compares a change in a measure of the current period versus the previous period.
- **Period over period (detailed)**: Compares changes in a measure over time between periods. It includes a filter pane for exploring dimension values period over period.

These analysis types have unique properties. **Period changes** and **Period over period (detailed)** have the following properties:

- **Breakdown**: Select the dimension to use with the measure to view the period changes.
- **Measures**: Select the measure for which you want to see period changes.
- **Analysis period**: Select the analysis period. You can adjust the analysis period by selecting new values from **Period 1** or **Period 2**.

Period over period has the following properties:

- **Measures**: Select the measure for which you want to see period changes.
- **Analysis period**: Select the analysis period. You can adjust the analysis period by selecting new values from **Period 1** or **Period 2**.

Period over period (detailed) has the following properties:

- **Parameters**: Set the percentage limits, expected change margin, and expected change rate.
- **Favorable trend**: Indicate if the favorable trend for the measure is to increase or decrease.
- **Breakdown**: Select the dimension to view the detailed period changes with the measure.
- **Measures**: Select the measure for which you want to see period changes.
- **Analysis period**: Select the analysis period. You can adjust the analysis period by selecting new values from **Period 1** or **Period 2**.

These analysis types have unique properties. **Period changes** and **Period over period (detailed)** have the following properties:

Insight Advisor learns your preferences for that chart if you add it to a sheet or click **Learn** after editing the chart. Precedents set by a user only apply to that user's instance of Insight Advisor.

Managing general properties

In **General properties**, you can view and edit your hidden and learned charts and the precedents you have set for generating charts.

General properties are not available when business logic is turned on.

The following properties are available:

- **Hidden recommendations** contains charts you have hidden from searches. You can click to show the chart again in searches.
- **Learned recommendations** contains charts you selected **Learn** on after editing. You can delete learned charts by clicking .
- **Your defined preferences** shows all the preferences Insight Advisor has learned. You can delete preferences by clicking .

You can clear all hidden charts, learned charts, and preferences by clicking **Clear all**.

Supported languages

Qlik Sense supports English natural language questions.

If your Qlik Sense deployment includes access to a Qlik Sense SaaS tenant, administrators can enable additional support for the following languages:

- German
- Spanish
- French
- Italian
- Dutch
- Polish
- Portuguese
- Russian
- Swedish

English is used by default for browsers not set to a supported language. The language used for questions can be changed by selecting a new language from the **Language** button. For more information, see Enabling multi-language natural language questions in Qlik Sense Enterprise on Windows.

Limitations

The following section lists limitations for Insight Advisor.

General limitations

Insight Advisor has the following general limitations:

- Insight Advisor supports master items that use dollar-sign expansions in their expressions with the following limitations:
    - Expressions and captions for master items are expanded once and the results are cached. The dollar-sign expressions are not reevaluated until the expressions change or the cache

expires (usually 30 days after the evaluation).
    - Dollar-sign expressions that are defined in a way that expands to values, such as `=sum(Sales)`, are not supported. These expressions cannot be combined with filters in Insight Advisor. Dollar-sign expressions must expand to expressions to be used in Insight Advisor.
- In published apps, only master items are available for use in Insight Advisor. Insight Advisor Chat can use fields from published apps when creating Insights charts. If you go to Insight Advisor using from **Explore this further**, your search may not be available.
- If a field name contains only numerical values, that field will be used when generating results from a natural language question instead of a superlative (such as top or bottom with the same numerical value).
  For example, if you searched for *top 3 service providers* and one of your fields was named *3*, *3* will be used in the results instead of the top 3 results for service providers.
- English questions using the *trend* keyword with one measure and a time filter are not supported.

Limitations for natural language insights

The following limitations apply to natural language insights in Insight Advisor:

- Natural language insights are not always included with supported analysis types, depending on how a natural language question is processed and the data being used.
- Natural language insights only provide a general statement when the question includes more than two filters or more than two data value filters on a dimension. The filters used are included in the response, however.
- Natural language insights are available for the following analysis types:
    - Ranking
    - Trend over time
    - Comparison
    - Breakdown (geospatial)
    - Clustering
    - Correlation
    - Process control (mean)

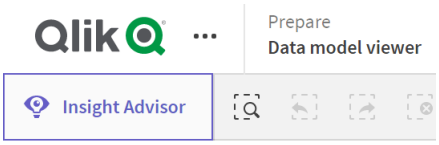
Navigating Insight Advisor

Click Insight Advisor in a open sheet to open Insight Advisor Search and Insight Advisor Analysis Types.

Insight Advisor is available from the sheet view of an app. Click the **Insight Advisor** button to open Insight Advisor.

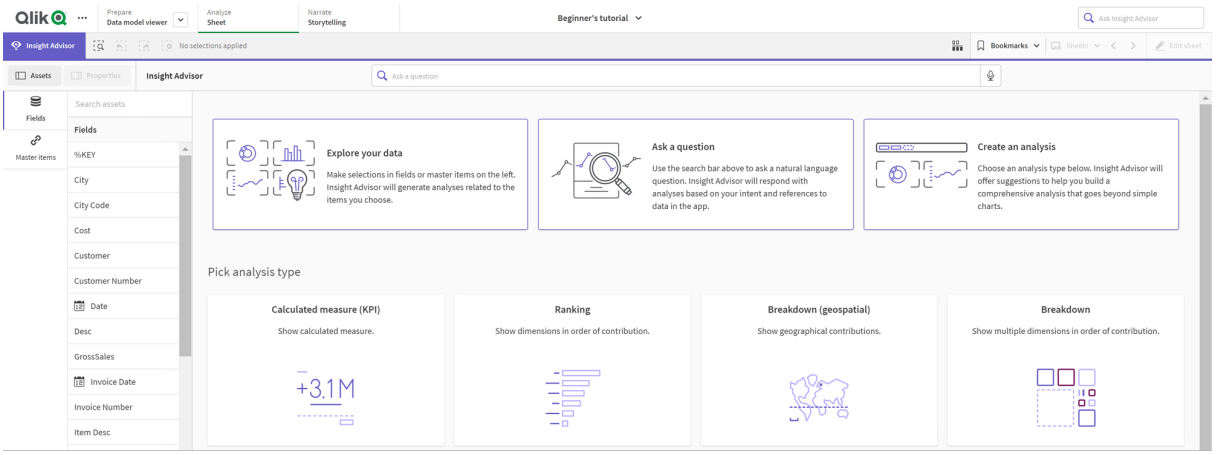
Insight Advisor is not available when a sheet is in edit mode.

Insight Advisor button



From Insight Advisor, you can start generating analyses with Insight Advisor Search or Insight Advisor Analysis Types.

Insight Advisor



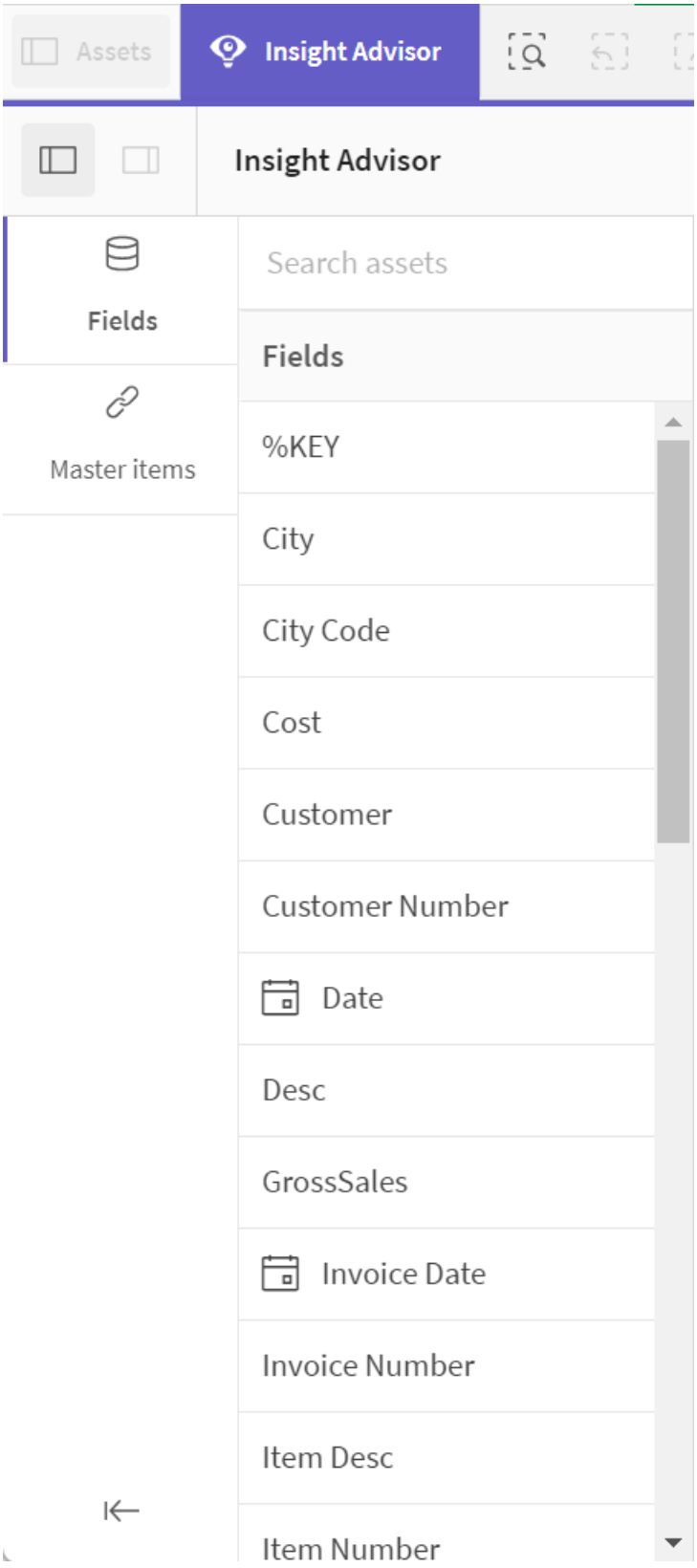
Enter a question or select fields from the assets panel to start creating analyses with Insight Advisor Search. Click **Create an analysis** to start building analyses with Insight Advisor Analysis Types. You can also select from the common analysis types to start with Insight Advisor Analysis.

Insight Advisor assets panel

In Insight Advisor Search, you can create queries by selecting fields and master items. In Insight Advisor Analysis Types, you can select fields and master items to use in your analysis.

If the app is published, only master items are available.

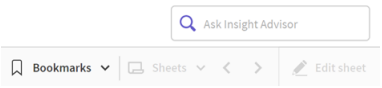
Insight Advisor assets panel



Insight Advisor search box

You can also access Insight Advisor Search by entering a natural language question in the search box.

Search box



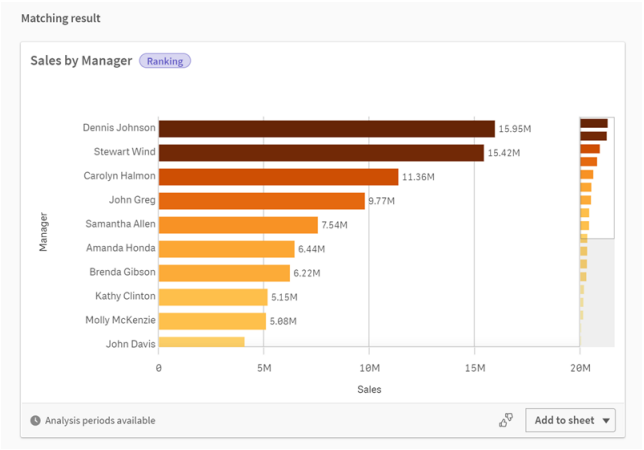
You can enter your search here, either by entering asset names or using natural language. If you used a natural language question, you can click ℹ to view the filters generated from your question.

Insight Advisor analyses

These are the charts created by Insight Advisor. Insight Advisor Analysis Types shows the primary chart for your analysis type, with alternative chart types for your analysis beneath. Insight Advisor Search indicates the number of results and breaks them down as follows:

- How many results are found.
- How many charts already exist in your sheets.
- How many charts are newly generated by Insight Advisor.

Analyses generated by Insight Advisor



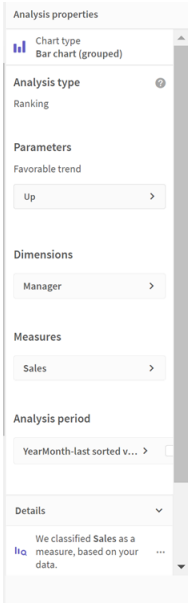
Insight Advisor charts can be added to existing or new sheets. Charts can also be downloaded as an image, PDF, or as an Excel spreadsheet containing the data used in that chart.

Using Insight Advisor analyses (page 647)

Properties panel

The properties panel contains options for editing analysis and changing the precedents you have set in Insight Advisor.

Properties panel in Insight Advisor



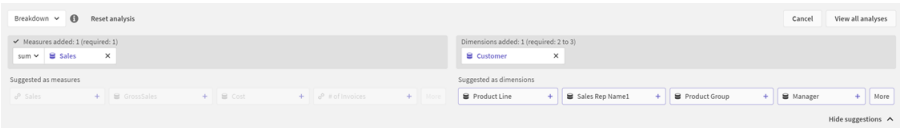
In **General properties**, you can view and edit your charts and the precedents you have set for generating analysis. For more information, see *Managing general properties (page 649)*.

In **Analysis properties**, you can edit an analysis and view details. You can see the **Analysis type** used to create the chart. Click ? to learn more about the analysis type used. For more information, see *Editing Insight Advisor analysis properties (page 648)*.

Insight Advisor Analysis Types parameters

When using Insight Advisor Analysis Types, you select the parameters for your analysis. You can select from the assets panel or from the recommendations for each parameter type.

Parameters for Insight Advisor Analysis Types



Using natural language with Insight Advisor

Insight Advisor supports natural language questions, such as *Show me Product Inventory for Japan under 2500*.

Natural language questions support three kinds of filters:

- Time: A unit of time or date. For example, *Show me 2019 Sales*.
- Category: A value from one of the dimensions. For example, *Show me Sales by Product for Sweden*.

- Measure: A value or values from a measure. For example, *Show me Sales for Sweden by Product under 1K.*

You can search for facts, comparisons, and rankings. Facts are statements such as *What are my sales*, or *Show expenses over time for 2019*. You can ask for a comparison by adding *vs* or *compare* to your question. For example, *Compare sales to expenses over time*. You can ask for rankings by adding *top* to your question. For example, *Show me top 10 product by sales for 2020*.

Qlik Sense supports English natural language queries.

English is used by default for browsers not set to a supported language. The language used for queries can be changed by selecting a new language from the ***Language*** *button. For more information, see* Enabling multi-language natural language queries in Qlik Sense Enterprise on Windows.

If your Qlik Sense deployment includes access to a Qlik Sense SaaS tenant, administrators can enable support for additional languages. For more information on supported languages in Insight Advisor Search, see Supported languages.

Natural language searches need to reference field names and values in your data model. You can also tag master items with synonyms using tags on your master items. Use the format *alt:<term>* in synonym tags. If you wanted to use *cities* as a synonym, you would tag the master item *alt:cities*. For more information, see *Tagging master items (page 155)*.

Click on a chart generated by Insight Advisor to provide feedback on the visualization. You can indicate a positive or negative response, and write a comment.

When searching field values, natural language queries only search the first 100,000 values per field in the question.

For more information about natural language questions, see Qlik Sense Natural Language Query features.

Insight Advisor analysis types

Insight Advisor provides results using a wide range of analysis types. These analysis types provide best practice visualizations for generated charts.

Different analysis types are used depending on the inputs of the search and the characteristics of your data. The Qlik cognitive engine determines the best analysis type for your search depending on the available data. The following table describes the analysis types. Not all conditions for each analysis type are listed. The table also lists charts potentially available as alternatives when editing an Insight Advisor analysis.

Analysis types

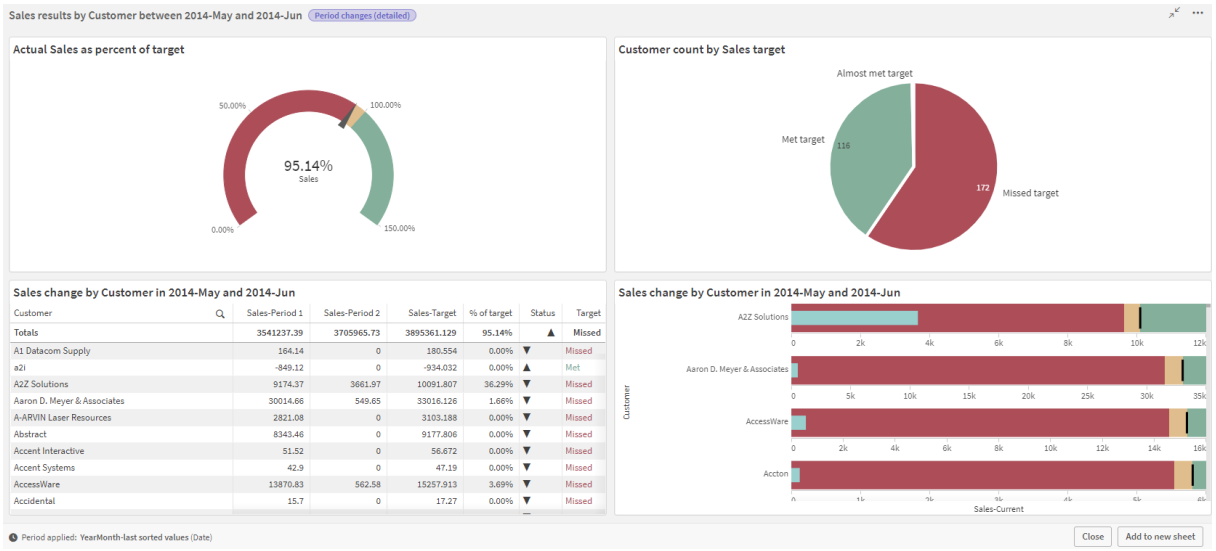
Analysis type	Description	Dimensions	Measures
Breakdown	View nested dimensions of data that provide a breakdown of relative contributions to a measure.	2-3	1
Breakdown (geospatial)	Group data by simple and hierarchical geographic divisions.	1-2	1-2
Calculated measure (KPI)	Summarize performance in a given business segment or dimension using a key performance indicator (KPI).	0	1-2
Clustering (k-means)	Cluster data points aggregated by similarities from 2 measures over a dimension using a machine learning k-means algorithm.	1	2
Comparison	Compare two measures for a dimension.	1	2
Correlation	Identify complementary and inverse relationships between two data values.	0-2	2
Mutual information	Create a measure of certainty between pairs of values using a machine learning algorithm that applies random data distributions. The dependency indicator ranges between 0 percent (no dependency) and 100 percent (strong dependency). Mutual information selects one field (measure or dimension) as the target and then selects 1 to 10 dimensions or measures as drivers. Results for this analysis type for the same fields or selections might vary due to the random data selection.	variable	variable
Overview	Describe how data ranges relate to each other in terms of an absolute measure.	1-2	1
Period changes	Build a sheet with measures, rank, and comparison analysis for dimensions across different time periods. Requires a default calendar period set for the group containing the measure in the logical model.	1-2	1

Analysis type	Description	Dimensions	Measures
Period changes (detailed)	Build a sheet with measures, rank, and comparison analysis for a hierarchy of dimensions across different time periods. Requires a default calendar period set for the group containing the measure in the logical model.	1	1
Period over period	Compare dimensions across time periods. Requires a default calendar period set for the group containing the measure in the logical model.	1	1
Period over period (selected)	Compare dimensions across time periods. It includes a filter pane for selecting dimension values. Requires a temporal fields with autoCalendar-derived field selected as a part of the query.	1-3	1
Process control (mean)	Monitor data against expected statistical ranges based on mean values.	1 date/time dimension	1
Process control (rolling mean)	Monitor data against expected statistical ranges based on nearby values.	1 date/time dimension	1
Ranking	Rank dimension values by relative importance with a measure.	1-2	1
Ranking (grouped)	Rank hierarchical dimension values by relative importance with a measure.	1-2	1
Relative importance	Show the size of dimension values that contribute to the whole. Can also be used to perform Pareto or 80-20 contribution analysis.	1	1
Trend over time	Show data trends over time, optionally broken down by a dimension with low cardinality.	1 date/time dimension and optionally 1 other dimension	1-3
Values (table)	Show data organized in rows and columns that show measures and dimensions.	0-10	0-10
Year to date	Compare dimensions over the same period in a previous year.	1	1

Using smart sheets in Insight Advisor for period-based analyses

Use smart sheets in Insight Advisor to automatically build full sheets for your Qlik Sense app. Smart sheets are specifically designed for building period-based analyses.

Smart sheet automatically generated by Insight Advisor



Access the smart sheet builder from Insight Advisor Analysis Types when you select any of the following analysis types:

- **Period over period (selected)**
- **Period changes**
- **Period changes (detailed)**

> *The **Period over period** analysis type is a similar analysis type, but technically only builds single visualizations. It is mentioned here because the requirements for working with this analysis type are the same as for the smart sheet-based analysis types.*

Requirements

The following table outlines what you need to be able to use the **Period over period**, **Period over period (selected)**, **Period changes**, or **Period changes (detailed)** analysis types.

Requirements for working with period-based analysis types in Insight Advisor

Analysis type	Requirements
Period over period	At least one calendar period defined using autocalendar.
Period over period (selected)	At least one calendar period defined using autocalendar.

Analysis type	Requirements
Period changes	One of the following: • At least one calendar period defined using autocalendar. • At least one calendar period defined using a custom calendar.
Period changes (detailed)	One of the following: • At least one calendar period defined using autocalendar. • At least one calendar period defined using a custom calendar.

Using calendar periods and autocalendar

Using autocalendar in your app is the easiest way to guarantee you will be able to use all period-based analysis types. This is because autocalendar automatically adds a number of calendar periods into the app to make period-based analyses easier.

When you build an app and load data with Data manager, autocalendar is automatically created in the script if date fields are detected in the data.

If you are not able to use these analysis types in your app, it is because you have not created the required calendar period. This could be due to a number of reasons, including:

- Your app was built using scripting, and you did not manually insert the autocalendar script into the load script.
- You do have autocalendar in the app, but all calendar periods were removed in the app's business logic.
- Your app has at least one calendar period, but it was created using a custom calendar (with custom calendars, the **Period over period** and **Period over period (selected)** analysis types are not available).

Adding autocalendar to your load script

If you have built your app in Data load editor and have not defined a custom calendar, you can insert the autocalendar script directly into the app's load script and change the names of the fields you wish to link to autocalendar.

Adding or re-adding calendar periods

If calendar periods have been deleted from your app's business logic, add at least one of them back to access the available period-based analysis types. For autocalendar-defined calendar periods, these can be either **Last sorted value** or **Relative**.

Creating smart sheets

For a full example of how to create a smart sheet and add it to a sheet in a Qlik Sense app, see Building an app. Look for the section **Create a sheet from analysis types**.

Editing visualizations created by Insight Advisor

Insight Advisor selects and generates charts driven by analysis types. Analysis types and chart functions are chosen based on the inputs of the search and characteristics of the data. Business analysts design the business logic components of apps and can also edit properties and extend the functions underlying the charts further. For more information, see Business logic. For more information on analysis types, see .

The following examples show ways that Insight Advisor charts can be edited through properties and the expression editor to enhance visualizations that best capture and frame your data. These examples are based on charts that can be generated and then extended from the Insight Advisor business logic tutorial app. .

> *Screenshots for these examples are from Qlik Sense SaaS and may differ in Qlik Sense Enterprise on Windows. Screenshots in the examples may differ depending on the date on which you loaded the business logic tutorial app.*

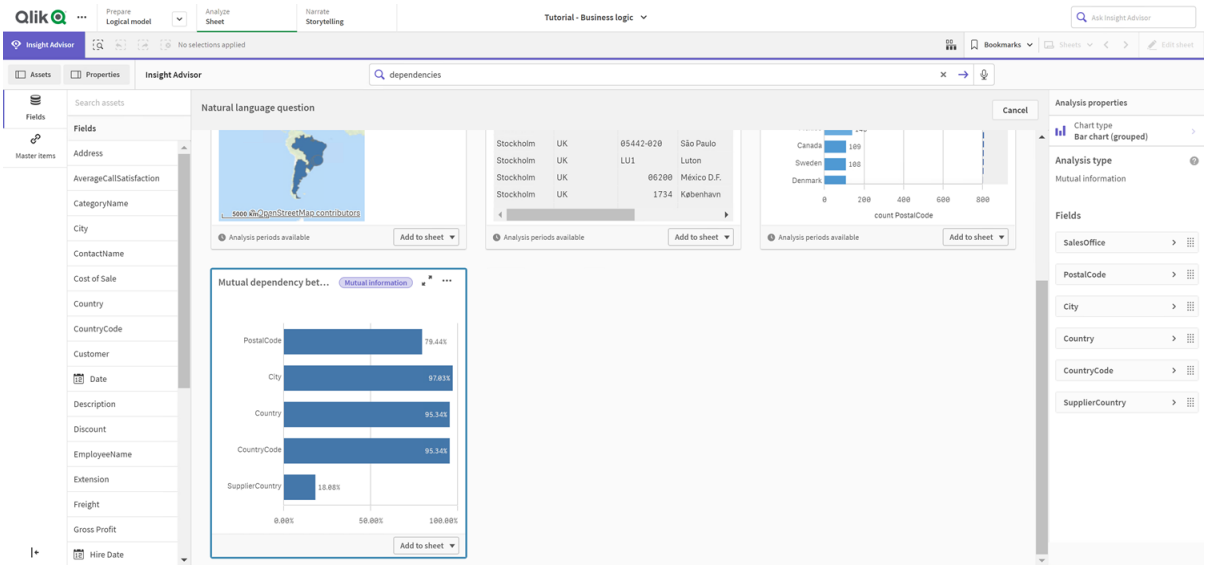
Mutual Information: Changing measures for improved charts

Statistical dependencies between a specified value (measure) and other selected items is presented in Insight Advisor by the **Mutual Information** chart. The dependency ranges between 0% (no dependency) and 100% (strong dependency). This example shows how you can replace measures to present more interesting and meaningful relationships in the chart.

Do the following:

1. In the business logic tutorial app, enter the search *dependencies* in the search box. Look for a result displaying **Mutual dependency between SalesOffice and selected items**.

   Default results for Mutual Information search



2. Select **Add to sheet** in the chart, then **Create new sheet**.
3. From the app overview, click **Sheets** to view the sheets. Select **My new sheet** and give the sheet a **Title** and **Description**. For this example, name the sheet *Mutual Information Sales* and an optional description *Mutual information between sales fields*.
4. Click **Edit sheet** in the toolbar and select the mutual dependencies chart.
5. Click anywhere in the chart title to change the title from **Mutual dependency between SalesOffice and selected items** to *Mutual information around sales*.
6. Modify the fields analyzed in this chart. Insight Advisor selected four measures to include in the chart that are related to geography. This was a reasonable interpretation of what dependencies the field *SalesOffice* might have because *SalesOffice* was classified as a **city** in the logical model of the app. Modify the measures in the properties panel and change them to fields that will better reflect how *Sales* is impacted by variables related to sales quantity, cost of sales, and sales support.
    a. Select **Data** in the properties panel and in the **Measures** section; expand the measure *SupplierCountry*. Select f_x in the **Expression** field to open the **Edit expression** dialog. Click **Apply**.
    Edit the expression by replacing *SalesOffice* with *Quantity* and replace *SupplierCountry* with *Discount*.
    Select the **Label** field. Replace *SupplierCountry* with *Quantity and Sales*.
    Edit field parameters

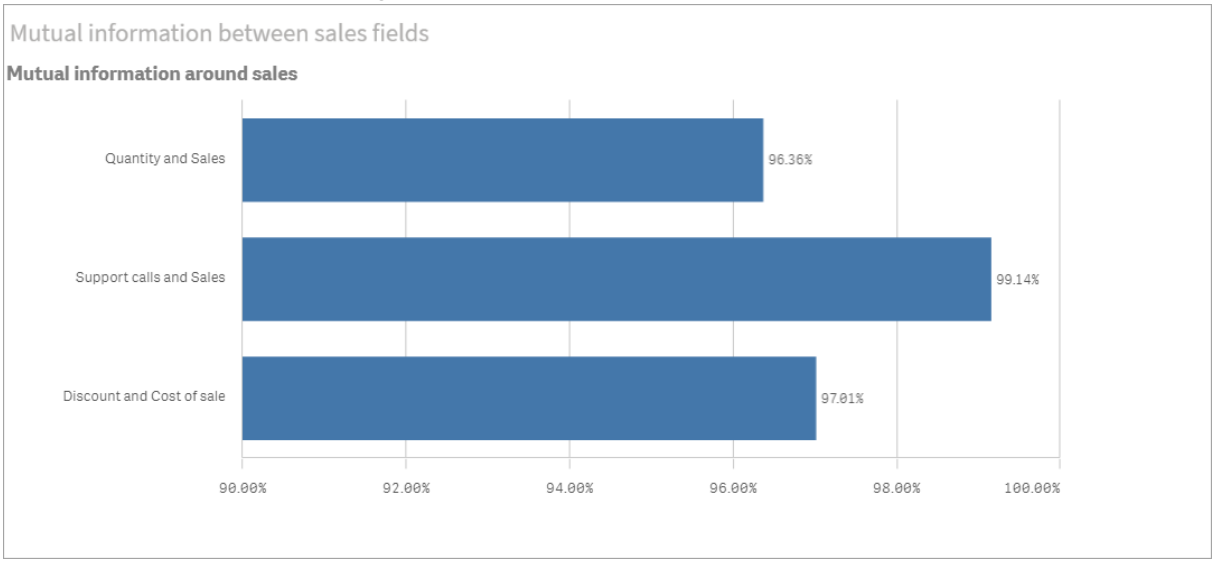
    Edit expression

    ```
    1  =MutualInfo([Quantity],[Discount], 'dd', Null(), 10000)
    ```

    b. Expand the measure *SalesOffice and PostalCode*. Select f_x in the **Expression** field to open the **Edit expression** dialog.
    Edit the expression by replacing *SalesOffice* with *Sales* and replace *PostalCode* with *SupportCalls*.
    Select the **Label** field . Replace *PostalCode* with *Support calls and Sales*.
    c. Expand the measure *SalesOffice and City*. Select f_x in the **Expression** field to open the **Edit expression** dialog.
    Edit the expression by replacing *SalesOffice* with *Discount*, and replace *City* with *Cost of Sale*.
    Select the **Label** field. Replace *City* with *Discount and Cost of sale*.
    d. Delete the measure *SalesOffice and Country* by right-clicking on the measure and choosing **Delete**.
    e. Delete the measure *SalesOffice and CountryCode* by right-clicking on the measure and choosing **Delete**.
7. Edit the X-axis range. These three measure comparisons all represent high levels of dependency. To emphasize the differences in values and make the chart more interesting, modify the range of the bar chart:
    a. Expand the **Appearance** section and then **X-axis**.
    b. Switch **Range** from **Auto** to **Custom**.
    c. Select **Min/Max** for values to set. Set **Min** to 0.9 and **Max** to 1.

8. Select ✔**Done editing**.

Mutual Information chart after editing



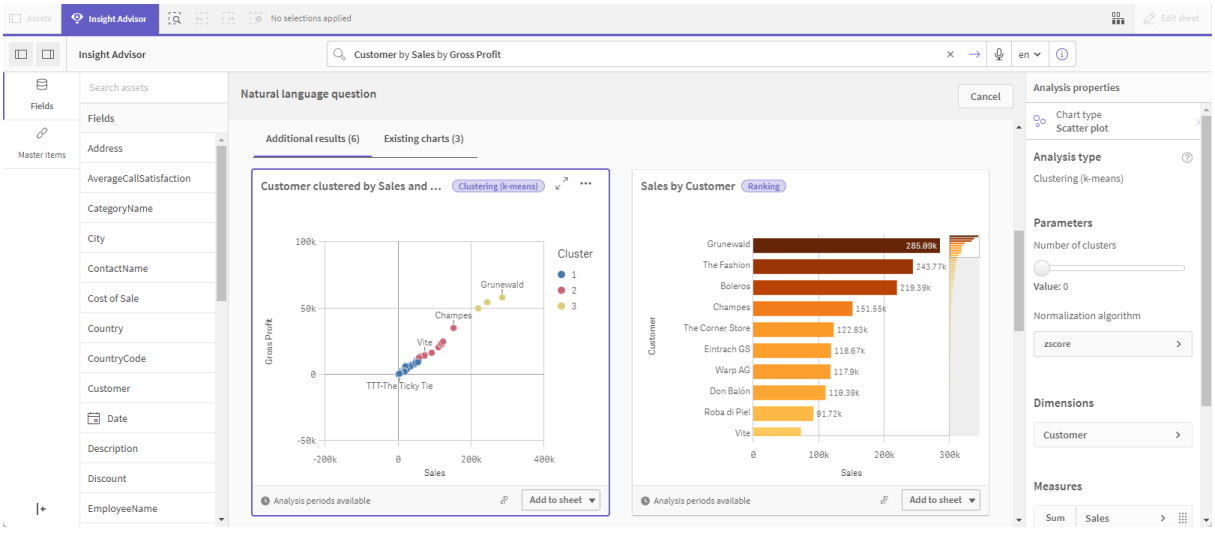
K-Means clustering: Editing the number of clusters and selections

Insight Advisor generates a **scatter plot** chart driven by k-means functions to group similar items into clusters. The following example shows how you can specify the number of clusters generated by the chart and remove outlying datapoints. For more information, see and .

Do the following:

1. In the business logic tutorial app, enter the search *Customer by Sales by Gross Profit* in the search box. Look for the result titled **Customer clustered by sum(Sales) and sum(Gross Profit) (K-Means)**.

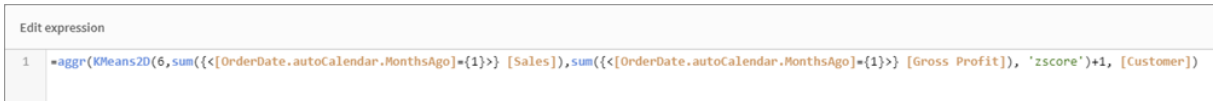
Default results for kmeans search



2. Select **Add to sheet** in the lower right of this chart, then ⊕**Create new sheet**.

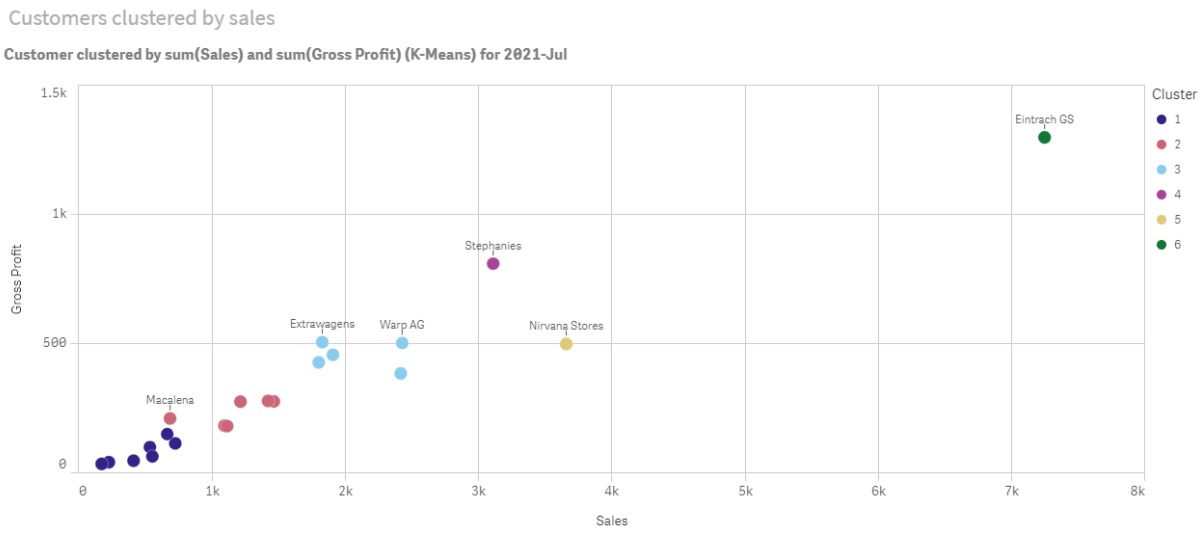
3. From the app overview, click **Sheets** to view the sheets. Select **My new sheet** and give the sheet a **Title** and **Description**.For this example, name the sheet *Customers clustered by sales* and add the description *Kmeans applied to customer data by Sales and Gross Profit*.
4. Select **Edit sheet** in the toolbar and select the k-means cluster chart.
5. Modify the scatter plot chart:
    a. Enlarge chart: Make the chart larger to take up the canvas by dragging the lower right corner.
    b. Edit the number of clusters argument. Expand the **Appearance** section and then **Colors and legend**. Insight Advisor has colored the clusters by dimension. Select under the **Select dimension** field to open the expression editor. Modify the **num_clusters** argument by changing the value 0 to 6 (Insight Advisor utilized auto-clustering where if 0 is entered for the number of clusters, an optimal number of clusters for that dataset is automatically determined). Select **Apply**.

    Edit the first parameter in the expression (num_clusters)

    c. Edit axis ranges: The default chart that is generated shows range that is less than 0. Negative numbers are not meaningful in this context and this range takes up space in the chart. In the **Appearance** section, expand **X-axis: Sales** and change **Range** from **Auto** to **Custom**. Note that **Min** automatically resets to 0. Expand **Y-axis: Gross Profit** and change **Range** from **Auto** to **Custom** and note that **Min** automatically resets to 0 for the Y-axis as well.
6. Select **Done editing**.
7. Deselect data: Data can be excluded from the chart by deselecting items that are not of interest. Exit edit mode by selecting **Done editing** and open the **Selections tool** . Search for **Customer** and select all customers except the following customers: **Big Foot Shoes**, **Boleros**, **Bond Ltd**, **El Carnevale**, **Fritid AB**, **Las Corbatas**, **The Fashion**, and **Vite**.

KMeans scatter plot chart after edits



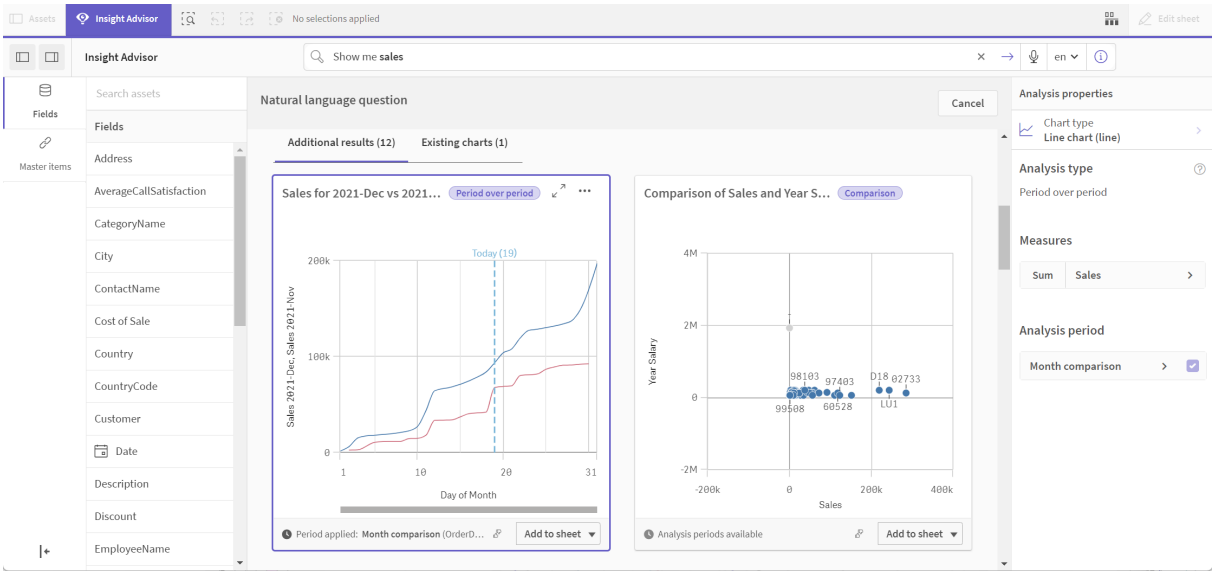
Period over period analysis: Changing the analysis period

Insight Advisor supports creation of behaviors to use a preferred default calendar period with a measure group. The following example demonstrates how to change the calendar period to view results for a different period. You can change the calendar period property to generate a **Period over period** chart that displays sales over the last year rather than over the last month.

Do the following:

1. From the business logic tutorial app, enter the search *Show me sales* in the search box. Locate the **Period over period** result.

   Period over period result for sales search



2. Select the **Period over period** chart to display options to the right.

3. Expand **Analysis period** in the properties panel to display calendar period options.
4. Select **Quarter comparison**.
5. Change the value in **Period 1** to *2020-Q1*.
6. Change the value in **Period 2** to *2021-Q1*.
7. Sales now displays the results for the first quarter of 2021 compared to the first quarter of 2020.

Period analysis chart after changing the Analysis period

Creating visualizations using Insight Advisor chart suggestions

Qlik Sense offers a wide range of visualizations to use with your data. Deciding on the correct chart type can be challenging when creating your first Qlik Sense app.

Insight Advisor chart suggestions enable you to select data fields and let Insight Advisor choose the dimensions, measures, and visualization types. As you add or remove fields, the suggested visualization adjusts itself based on your changes. You can customize a suggested visualization with a focused set of properties.

If you started a visualization, enabling **Chart suggestions** will change your visualization to a suggested visualization.

> *If you enable **Chart suggestions** and then disable them, you will lose changes made to your visualization. You can restore your old visualization by undoing the changes. However, if you navigate away from Sheet view or make changes in the assets panel, you will not be able to undo and restore your visualization.*

Creating a new visualization using chart suggestions

Do the following:

1. Click **Edit sheet** in the toolbar.
   The assets panel opens on the left-hand side.
2. From **Fields**, drag and drop a field into your sheet.
   Fields suggested as dimensions are added as tables or histograms. Fields suggested as measures are added as KPIs.
   To add fields as filter panes hold the shift key when you drag and drop the field.
3. Add additional fields by doing one of the following:
   - Drag and drop a field onto the visualization created from the first field, or on **Suggest** on the right-hand side.
     Qlik Sense determines if the field should be used as a dimension or as a measure, and which measure aggregation to use.
   - Click **Add** on the properties panel and select a field.
   - Drag and drop a field on **Drop item here** under **Dimensions** or **Measures**.

   The visualization will change as fields are added to it.
4. Optionally, remove unwanted fields.
5. Click **Done**.

Changing an existing visualization using chart suggestions

You change an existing visualization by adding fields or removing unwanted fields. Enabling **Chart suggestions** in the properties panel on the right-hand side changes the selected visualization to a chart suggestion based on the fields of the visualization. You can change the suggestions made by Qlik Sense. For example you can:

- Drag fields between **Dimensions** and **Measures** to change how a field is used. Moving a field to **Dimensions** removes its aggregation. Moving a field to **Measures** assigns it an aggregation.
- Choose a different aggregation for a field used as a measure. Your aggregation choice will be used whenever you use this field as a measure, while **Chart suggestions** is enabled.
- Use **Change chart type** to choose a different type of chart from the one suggested.

Adjusting the settings when using chart suggestions

You can adjust the settings in the properties panel for **Data** and **Appearance**. The properties panel for visualizations created with chart suggestions contains a focused set of properties settings. Disabling **Chart suggestions** brings back access to all available properties. For descriptions of the available fields see the visualization properties topics in *Visualizations (page 181)*.

Limitations when using chart suggestions

- You cannot enable **Chart suggestions** for a master visualization.
- You cannot enable **Chart suggestions** for filter panes, histograms or maps.

- Charts with **Chart suggestions** enabled are not supported in Qlik NPrinting reports. To include charts created using chart suggestions in Qlik NPrinting reports, disable **Chart suggestions**.
- You can only change the aggregation of a measure when its label is the default label.
- You cannot drag a master dimension to **Measures**. You cannot drag a master measure to **Dimensions**.
- You can only drag a field from **Measures** to **Dimensions** if its expression is simple. For more information on how to use expressions in visualizations see *Using expressions in visualizations (page 160)*.

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: 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:

Upper limits on name lengths

Situation	Upper limit
Names (title, dimension, footnote...)	Max 255 characters.
Descriptions	Max 512 characters.
Expressions	Max 64,000 characters.
Tags	Max 31 characters per tag and max 30 tags per master item.
Text & image chart:	Max 12,000 characters.

Naming conventions

You can refer to a number of entities by their names in Qlik Sense, such as:

- Fields
- Dimensions
- Measures
- Variables
- Bookmarks

Some characters are reserved for system purposes in Qlik Sense. To avoid potential errors, avoid using the following characters in names:

- :
- =
- [
-]
- {
- }
- (
-)
- $
- ´
- `
- '

If you use long names for your dimensions and measures they will be displayed truncated. “...” will be shown to denote that part of the name is hidden.

Max number of characters in expressions

The maximum number of characters that can be written in a vizualization expression is 64,000. If you attempt to build an expression with more than this number, the expression will be truncated.

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 formats for the number, date, time, and timestamp functions. These formats 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 to the left of the decimal point, use the symbol "#".

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:

Example of number formats

Number format	Description
# ##0	describes the number as an integer with a thousands separator. In this example " " is used as a thousands separator.
###0	describes the number as an integer without 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. In this example "." is used as a decimal separator.

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.

Special number formats

Format	Description
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:

Examples of special number formats

Example	Result
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.

Symbols to format a date

Symbols	Description
D	To describe the day, use the symbol "D" for each digit.
M	To describe the month number, use the symbol "M". 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.

Symbols	Description
W	To describe the weekday, use the symbol "W". "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)

Examples of date formats

Example	Result
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.

Symbols to format a time

Symbols	Description
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):

Examples of time formats

Example	Result
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):

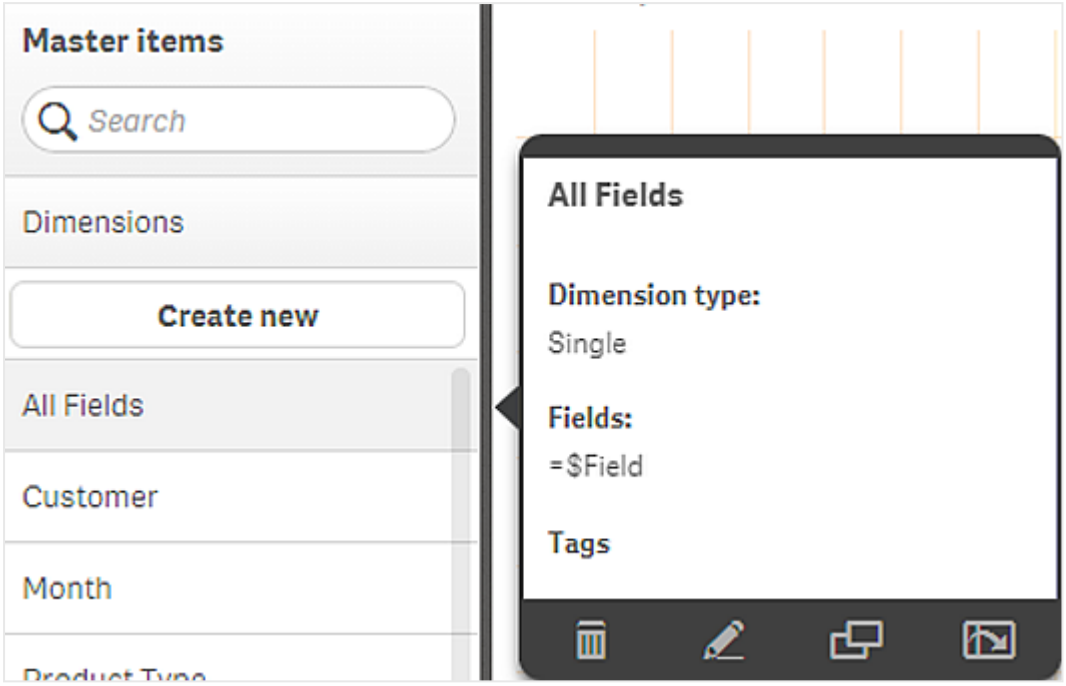
Examples of time stamp formats

Example	Result
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.

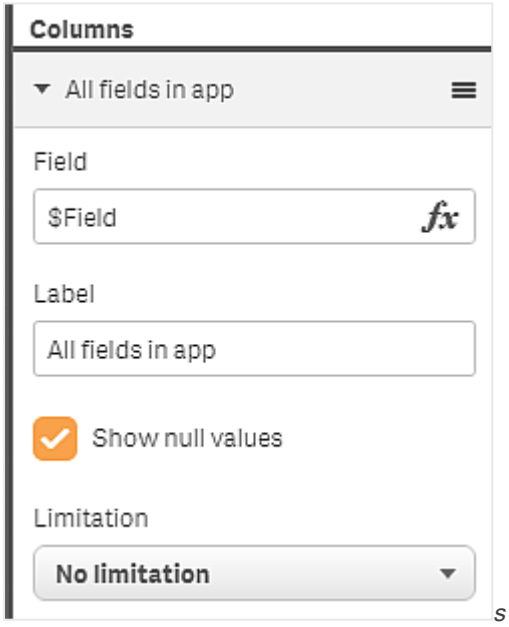
Using system fields in a visualization

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 .



A system field added as dimension in the properties panel.



s

Using alternate states for comparative analysis

If you want to perform comparative analysis you can use alternate states in Qlik Sense. Alternate states allow you to make different selections on the same dimension, and compare the selections in a single visualization or in two or more visualizations side by side.

You can use alternate states in visualizations in two different ways:

- Applying a state to the visualization. This connects the selection of the visualization to the selection of the state.
- Using states in the set expression of a measure. This is useful to compare measure values of different states.

Creating alternate states

You can create a new alternate state in **Master items**:

1. Next to **Alternate states**, click +.
2. Provide a name for the new state. There are some naming limitations:
    - Do not use $, 0, or 1 as a state name.
    - Do not use a state name starting with $ or $_ followed by a number, for example, $3.
    - Do not use a state name already used as a bookmark name.

You have now created a new alternate state that you can use to perform comparative analysis. Typically you would want to create another new state to compare the two states.

Applying alternate states to sheets and visualizations

You can apply a state to a visualization or a sheet. If you apply a state to a sheet, all visualizations on the sheet inherit the state unless you apply another state to a specific visualization. When you apply a state to a visualization, it reflects the selections made in the state. Any selections you make will be applied to the state and be reflected in other visualizations that have the same state applied.

The easiest way to apply an alternate state is dropping it on a sheet or a visualization, and then selecting **Apply state**.

You can also apply an alternate state with the **State** setting in the property panel:

- For a sheet, you find the setting under **Alternate states**.
- For a visualization, you find the setting under **Appearance** > **Alternate states**.

You can select:

- Any alternate state defined in **Master items**.
- **<inherited>**, in which case the state defined for the sheet is used.
- **<default state>**, which represents the state where no alternate state is applied.

Using alternate states in visualizations

Besides applying a state to a visualization you can also use alternate states in the set expression of a measure. This is useful when you want to compare measure values for different dimension selections side by side.

You can set the alternate state as an identifier in the set expression. If you want to use the measure `Sum (Sales)` in your visualization, for example a bar chart, with a state called *Group1* you use the following expression as measure:

```
Sum({Group1}Sales)
```

To compare with a different state called *Group2*, you can create another measure with the expression `Sum ({Group2}Sales)`.

The bar chart will now show sales for the selection in *Group1* side by side with sales for *Group2*.

Getting information about the selection of an alternate state

You can see the selections of different states in the selections bar.

You may also want to be able to use information about which, and how many selections are made in an alternate state in labels or titles of visualizations. You can use the following chart functions with the **state_name** parameter to return selections associated with the specified state name:

- **GetCurrentSelections()** to return all current selections.
- **GetFieldSelections()** to return current selections of a field.
- **GetSelectedCount()** to return the number of selected values in a field.

Expanding variables in alternate states

You can specify which state to use when expanding a variable. Changes in a specific state do not affect variable values that are expanded in another state. If you do not specify a state, the variable is expanded in the default state.

Example:

If you have a state named `MyState`, and a variable named `vMyVar`:

- `$(vMyVar)` expands the variable in the default state.
- `$({MyState} vMyVar)` expands the variable in the `MyState` state.

Limitations

It is not possible to add visualizations to master items if you have set the state of the visualization to any other value than <inherited>.

Comparative analysis example

In this example we want to be able to compare the sales numbers of product lines for different selections of sales regions. We want to select the regions we compare dynamically, either as single regions or a combination of regions.

Dataset and app

If you want to follow this example, you need to download the Qlik Sense Tutorial - Building an App to get the dataset. If you have completed the tutorial you can use the app you created. Otherwise you need to create an app, add all six data files in the *Tutorials source* folder, and associate them using automatic recommendations in the data manager.

Create alternate states

For this example we need two alternate states. In **Master items** > **Alternate states**:

1. Create a new state called *Group 1*.
2. Create a new state called *Group 2*.

You have now created the two alternate states we need in this example.

Create filter panes for selection

Do the following:

1. Add a filter pane with the field *Region*.
2. Edit the label of the filter pane to say *=StateName()*. This is to make it easier to tell them apart, as the state is not indicated in the filter pane. The **StateName()** function returns the state that is applied to the function.
3. Drop the state *Group 1* on the filter pane and select **Apply state**.
4. Add another filter pane with the field *Region*.
5. Edit the label of the second filter pane to say *=StateName()*.
6. Drop the state *Group 2* on the second filter pane and select **Apply state**.

You have now created the two filter panes that are used to control the selections of each of the two states. When you make a selection in the *Group 1* filter pane, the same selection is applied to the state *Group 1* which is reflected in all visualizations connected to that state.

Create a bar chart for analysis

Do the following:

1. Create a master item measure with name *Group1Sales*.
   Set **Expression** to `Sum({[Group 1]}[Sales])`.

This expression sums the sales for all selections in the *Group 1* state.
Set **Label expression** to `'Sales '&GetCurrentSelections(chr(13)&chr(10), '=', ',' ,9,'Group 1')`.
We use a label expression to be able to show the current selection of the state as a label in the chart, instead of the default label.

2. Create another master item measure with name *Group2Sales*.
Set **Expression** to `Sum({[Group 2]}[Sales])`.
Set **Label expression** to `'Sales '&GetCurrentSelections(chr(13)&chr(10), '=', ',' ,9,'Group 2')`.
3. Add a bar chart to the sheet.
4. Set the *Product Line* field as dimension.
5. Add the measures *Group1Sales* and *Group2Sales*.

You have now created a bar chart that shows the sales by product line for the two groups of regions selected in the filter panes. When you make a new selection in one of the filter panes, the corresponding measure value changes according to the new selection.

Discovery

You can now make selections in *Group 1* and *Group 2*, and see the results of the selected combinations of regions in the bar chart.

Creating a visualization using a custom object

You can enhance your apps with custom-objects.

Custom objects that are available are:

- visualization extensions
- object bundles supplied by Qlik:
  - *Dashboard bundle (page 481)*
  - *Visualization bundle (page 531)*

You can find custom objects in the assets panel under **Custom objects** when you are editing a sheet.

You can build your own visualization extensions in the Dev Hub.
≤ For the Dev Hub, see Dev Hub .

Adding a custom object to the sheet

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

Do the following:

1. Click **Edit sheet** in the toolbar.
2. Click in the panel on the left-hand side to expand custom objects.
3. Drag a visualization extension onto the 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.

> *If you double-click a custom object, it is added to the sheet immediately.*

4. Change the required settings for the custom object in the properties panel. The required settings are defined by the extension developer, this can be dimensions, measures, or other settings.

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

Copying a visualization from an existing visualization

You can copy a visualization:

- Within the same sheet.
- Between sheets in the same app.
- Between sheets belonging to different apps (see *Considerations (page 679)* for more information).

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 in the assets panel.
4. Click to paste the item.

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.*

Considerations

- 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.
- When copying visualizations between two apps, the apps must exist in the same deployment of Qlik Sense Enterprise on Windows.
- You cannot copy and paste visualizations between different environment types (for example, between an app in Qlik Cloud Analytics and an app in Qlik Sense Desktop).

Adding trend and reference lines to visualizations

Use trend lines to visualize changes in measure values over time. Use reference lines to mark specific measure and dimension values on a chart.

Adding trend lines to visualizations

Trend lines are available for bar charts and line charts. Trend lines are added when you configure a measure in the chart.

For more information about trend lines, see *Trend lines (page 117)*.

Do the following:

1. Click on an existing bar or line chart.
2. In the properties panel, expand the **Data** section.
3. Under **Measures**, expand the measure for which you are adding trend lines.
4. Under **Trend lines**, click **Add trend line**.
5. Define the **Label** and **Type** for the trend line.
6. Use the **Colors** slider to define **Custom** or **Auto** coloring.
7. Use the **Dashed** checkbox to give the line a dashed or solid appearance.

Adding reference lines to visualizations

Reference lines can help users interpret a visualization, providing guidance on what to look for during analysis. Reference lines are separately defined for measures and dimensions.

For more information about reference lines, see *Reference lines (page 474)*.

Adding reference lines for chart measures

Do the following:

1. Click on an existing chart that supports reference lines.
2. In the properties panel, expand the **Add-ons** section.
3. Expand one the following sections depending on your chart type and data:
    - **Reference lines**: Applicable to most chart types that support reference lines.
    - **Primary axis reference lines** and **Secondary axis reference lines**: Applicable to combo chart with data on multiple axes.
    - **X-axis reference lines** and **Y-axis reference lines**: Applicable to scatter plot. For more information about configuring scatter plot reference lines, see *Scatter plot (page 380)*.
4. Click **Add reference line**.
5. Optionally, define a **Show condition** and **Label**.
6. Under **Reference line expression** ,enter the expression to define the measure value for which the reference line is shown.
7. Style the reference line with the **Color**, **Line type**, and **Colored background** settings.

To remove an existing reference line, expand the reference line and click **Delete**.

Adding dimensional reference lines

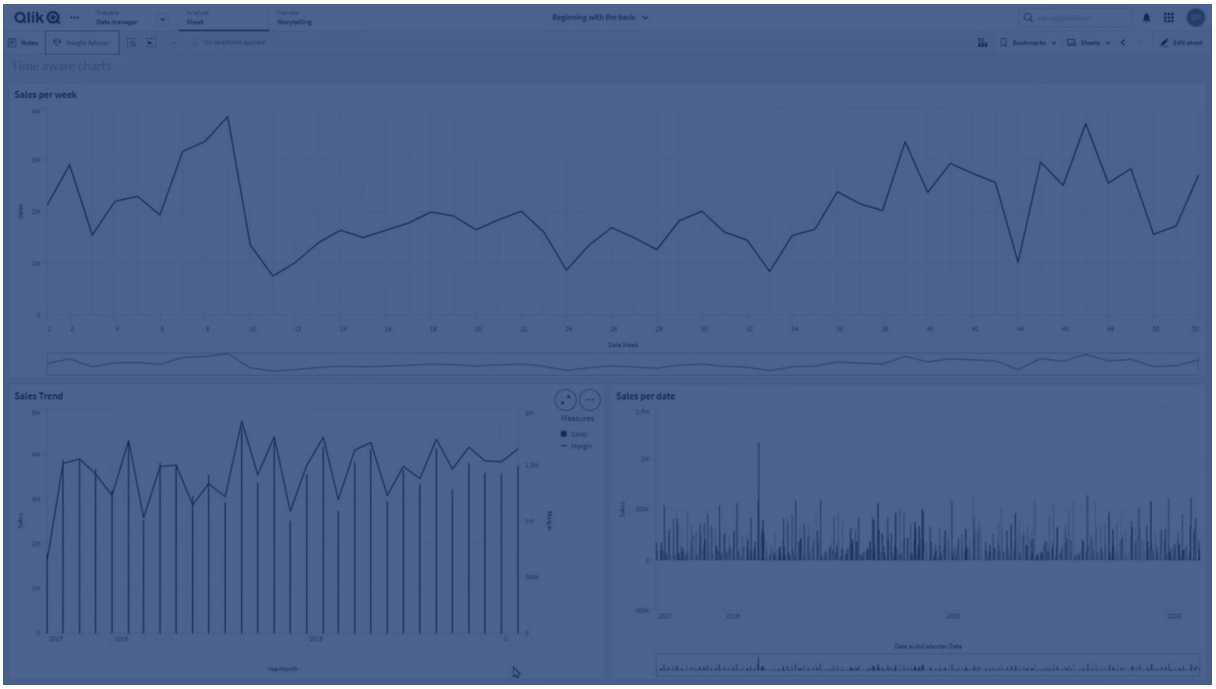
Do the following:

1. Click on an existing chart that supports dimensional reference lines.
2. In the properties panel, expand the **Add-ons** section.
3. Expand **Dimension reference lines**.
4. Click **Add reference line**.
5. Optionally, define a **Show condition** and **Label**.
6. Under **Dimension value**, enter the expression to define the dimension value for which the reference line is shown.
7. Style the reference line with the **Alignment**, **Color**, **Line type**, and **Colored background** settings.

To remove an existing dimensional reference line, expand the reference line and click **Delete**.

Creating time-aware charts

Time-aware charts are visualizations that use a continuous scale to provide a complete and accurate view of time-based data. That is, when you enable continuous scaling on the x-axis in a chart with date fields, data points are separated from each other by a distance relative to their associated time. As well, the axis labels are evenly separated whether or not there is data for that point and the chart view is compressed to avoid scrolling.



Continuous scale is supported for line charts, bar charts, and combo charts.

A continuous scale is most commonly used with date fields such as:

- Second
- Minute
- Hour
- Week
- Month
- YearMonth
- Quarter
- YearQuarter
- Year
- Date
- Timestamp

Adding a continuous scale

Do the following:

1. In sheet view, click **Edit sheet** in the toolbar.
2. Click the line chart that you want to edit.
3. In the properties panel, click the **Appearance** tab.
4. In the **X-axis** section, check **Use continuous scale**.
   The chart is compressed and the data points and labels are readjusted.

Making selections in a time-aware chart

When navigating a time-aware chart, you can zoom into a smaller time span to take snapshots of the data displayed and select data values. selections made on a time axis using range selection select all data values (even those that are not visible). Selections made on the measure axis or using lasso selections only select visible values.

Changing the data of a visualization

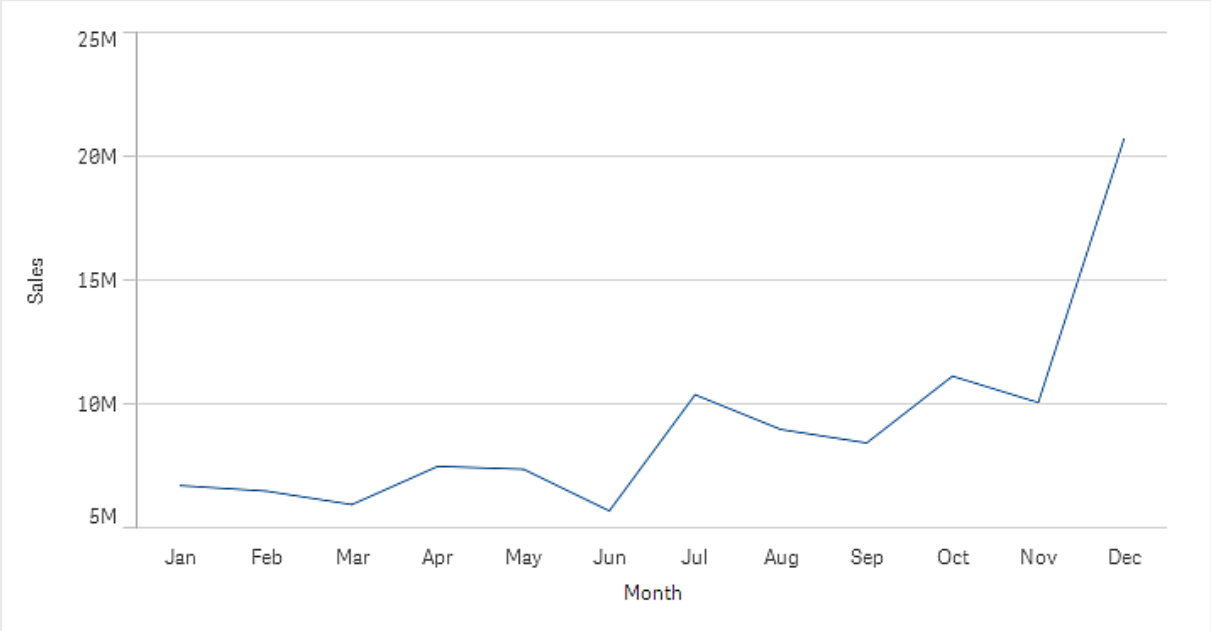
The data displayed within a visualization can be changed after the visualization is created.

For example, you may want to add additional dimensions or measures to a chart to add depth to the existing data. Alternatively, you may need to correct an invalid dimension or measure.

Adding dimensions and measures to a visualization

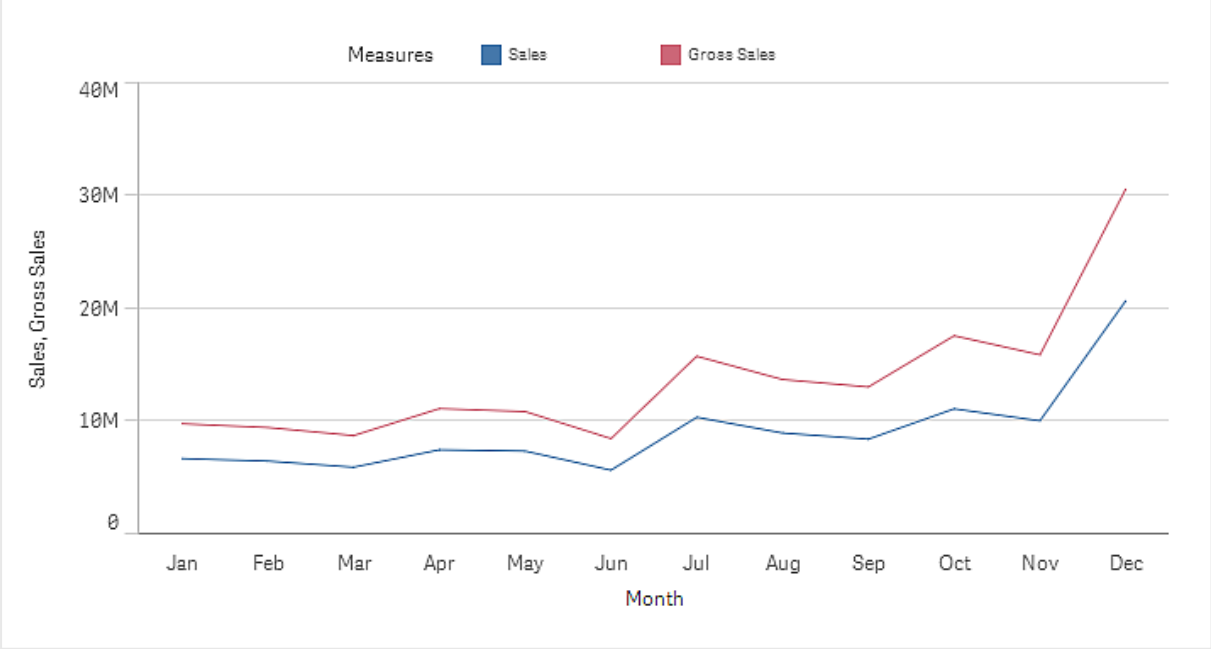
You can add multiple dimensions and measures to a visualization to add depth to the data displayed. Addition dimensions and measures enabled you to view more information in a single visualization. For example, the image below contains a visualization with the measure *Sales* and a dimension *Month*.

Line chart with the measure Sales.



You can add a second measure, *Gross Sales*. The example line chart now gives use more context by enabling a comparison of *Gross Sales* to *Sales*.

Line chart with the measures Sales and Gross Sales.



Do the following:

1. In the properties panel, click the **Data** tab.
   The **Data** tab is expanded.
2. In the **Dimensions** or **Measures** section, click **Add** to add a dimension or measure.
   A dialog with a text box opens. Below the text box all available dimensions or measures are listed, grouped into **Dimensions** or **Measures** (that is master items) and **Fields**.
3. Start typing in the text box.
   A list of matching fields and dimensions or measures 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.*

   > *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 dimension or measure that you want to use.

The dimension or measure is added to the visualization. The new dimension or measure settings are shown in the properties panel.

Adding alternative dimensions and measures to a visualization

Alternative dimensions and measures are dimensions and measures that are added to a visualization, but are not displayed until a user chooses to switch which dimensions and measures are being displayed during visual exploration. You can toggle which of your dimensions and measures are displayed using the exploration menu of a visualization.

Adding alternative dimensions and measures to a visualization

> *You can add alternative dimensions and measures to all chart types but changing alternative dimension and measures in the visualization can only be done in bar, line, and combo charts. Only alternative dimensions can be changed in the pie charts visualization and only alternative measures in scatter plots.*

Alternative dimensions and measures enable you conserve space on your sheets. Rather than make multiple similar visualizations of the same type, you can use alternative dimensions and measure with a single visualization. You can then switch between the displayed dimensions and measures. For example, if you wanted to see total sales by product category and total sales by product subcategory, you could add product category as a dimension and product subcategory as an alternate dimension in the same visualization.

Alternative dimensions and measures enable you to have more dimensions and measures associated to a visualization that the display limit. 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. Alternative dimensions and measures enable you to exceed that limit.

Alternative dimensions and measures can be added like normal dimensions and measures in the properties pane. You can also drag dimensions and measures in the **Data** section of the properties panel into the **Alternative dimensions** or **Alternative measures** section.

Do the following:

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

   > *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 dimension or measure that you want to use.

The alternate dimension or measure is added to the visualization.

Editing data in a visualization

You can edit and adjust the data in a visualization. You may need to edit an existing dimension or measure to adjust it to create a stronger visualization or correct an invalid dimension or measure. You may also want to edit a master item in a visualization to change the master item across all visualizations.

Invalid dimensions and measures

Dimensions and measures are invalid when the associated expression cannot be interpreted by Qlik Sense.

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 and the text **Invalid dimension** 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.

Editing a dimension

You can edit dimensions, including master dimensions. In the properties panel, under **Data**, select the dimension that you want to edit.

Dimensions have the following properties:

- **Field**: Start typing the field name to display a list of matching fields to choose from. You can also click f_x to open the expression editor, where you can create a calculated dimension.
- **Label**: Enter a name for the dimension.
- **Include null values**: When this is checked, the visualization will include the null values of the dimension, presented as a gap or a dash, depending on the type of visualization. For example, if 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.
- **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**.
- **Master item**: Edit a master dimension to update all instances where the dimension is used, or create a new master dimension by adding a dimension to the master items.

Editing a measure

You can edit measures, including master measures. In the properties panel, under **Data**, select the measure that you want to edit.

Measures have the following properties:

- **Expression**: Enter the expression. You can also click f_x to open and use the expression editor. You can also apply a **Modifier** to automatically adjust the original expression. See *Applying a measure modifier (page 686)*.
- **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.
- **Master item**: Edit a master measure to update all instances where the measure is used, or create a new master measure by adding a measure to the master items.

Applying a measure modifier

Using a modifier, a measure expression can be automatically customized for a specific analytical purpose. For example, you might want an expression in which data is presented as an accumulation rather than standalone values.

Do the following:

1. In the properties panel, expand the **Data** section.
2. Under **Measures**, expand the measure to which you are applying a modifier.
3. Underneath the **Expression**, click **Modifier**.
4. Use the drop down menu to select a modifier.
5. Fill in the parameters specific to the modifier you are using.

When you are finished, click **Output expression** to view how the original expression was modified.

For more information about measure modifiers, see *Modifiers (page 113)*.

Editing master items

Dimensions and measures that are linked to a master item are displayed with a in the properties panel. You can edit the master item to update all instances that use the dimension or measure, or you can unlink the item from its master to edit only the current instance of the dimension or measure.

A visualization that is linked to a master item is indicated by **Linked visualization** on the sheet. You can edit a master visualization to update all instances that use the visualization, or you can unlink a visualization from its master to edit only the current instance of the visualization. Unlinking a visualization does not unlink any master dimensions or master measures used in the visualization.

Deleting dimensions and measures

In the properties panel, you can delete a dimension or measure. Long-touch or 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.

> *You can undo a deletion by clicking . Changing which sheet you are viewing will prevent you from undoing your deletion.*

Changing 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.

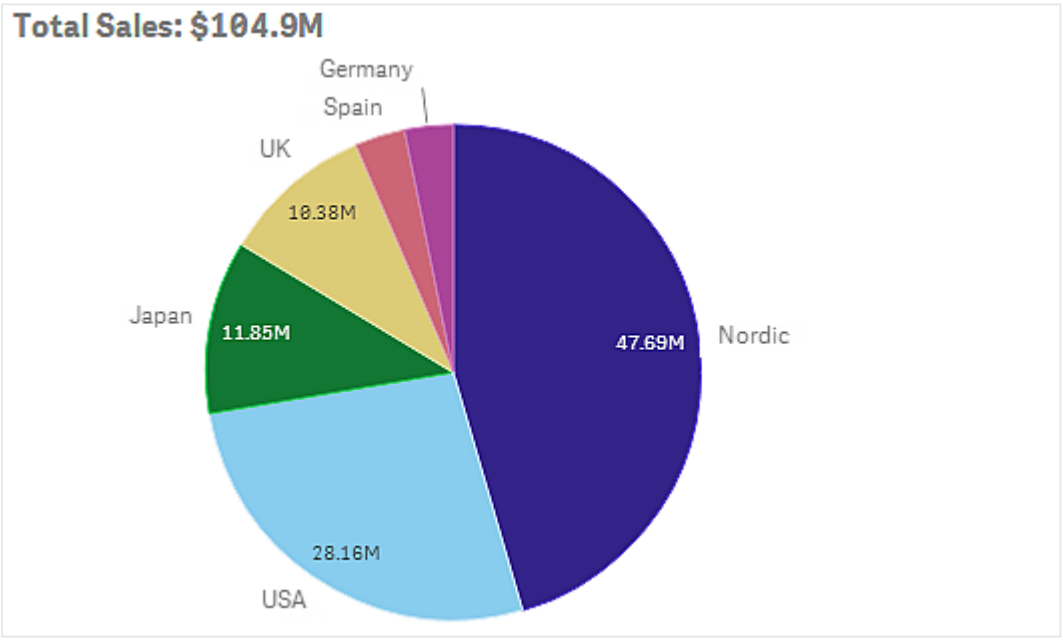
General

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 strings 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 f_x to open the expression editor. No equals sign is needed.

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

Show details: **Hide** by default. When set to **Show**, users can click ⓘ when analyzing to view details such as descriptions measures and dimensions.

Presentation and styling

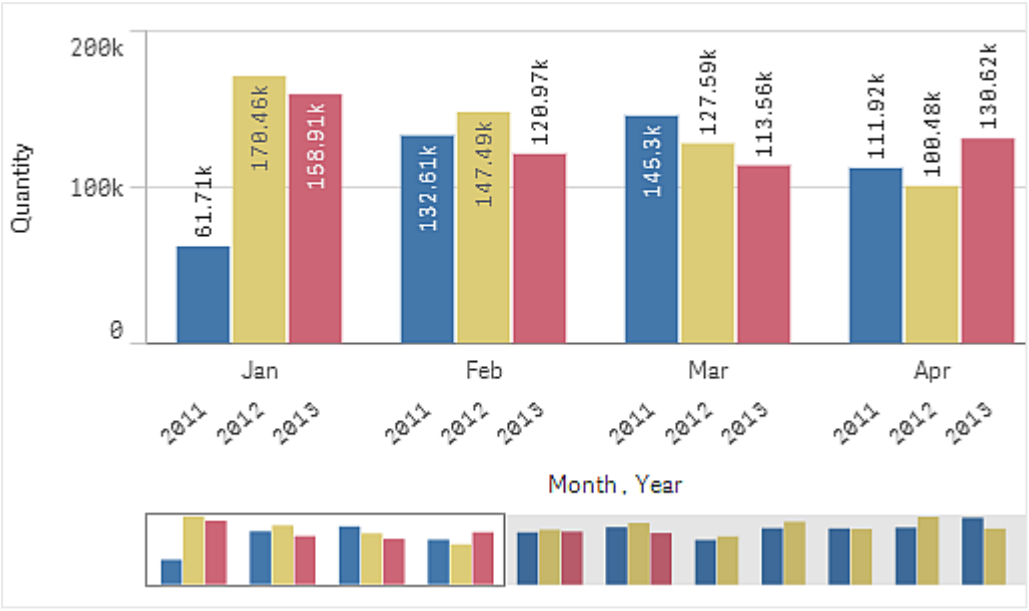
Many of the presentation settings only apply to a certain visualization.

Presentation settings in visualizations

Visualization	Description
Bar chart	Set the bars to be displayed grouped or stacked, vertically or horizontally.
Box plot	Select to show whisker ticks and grid lines. You can show the visualization vertically or horizontally.
Combo chart	Select whether to show labels for measures added as markers. You can select to show grid lines based on primary or secondary axis, and adjust spacing between them.
Distribution plot	Select to show point, background or both. You can show the visualization 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.
Histogram	Select to show grid lines.
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	Turn on/off navigation. Set the size of the bubbles in a scatter plot. Set the compression resolution for large data sets in 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:

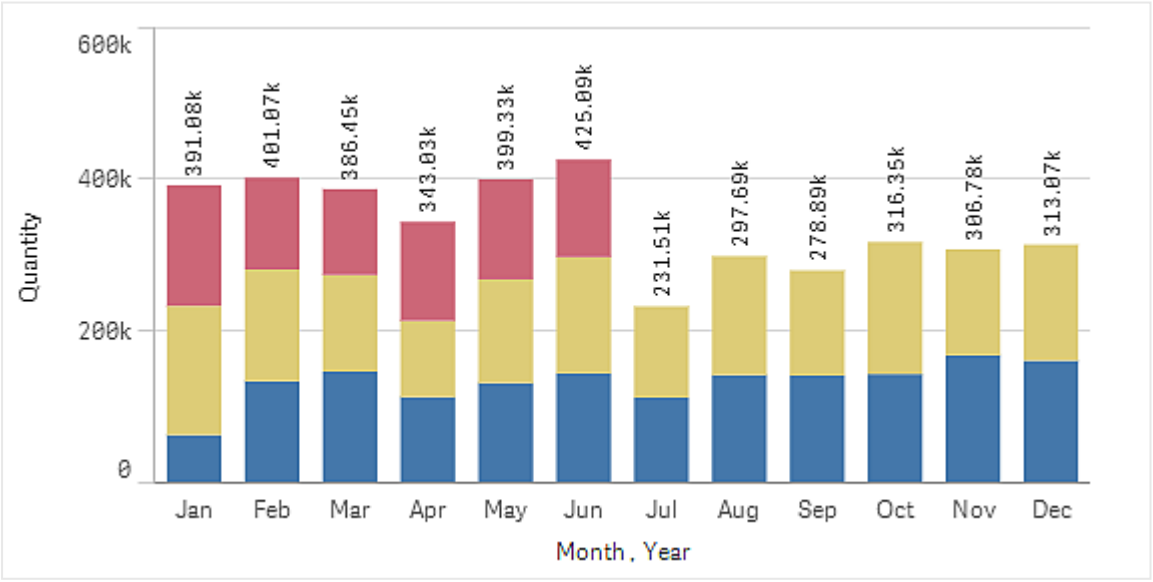
A bar chart with two dimensions is by default presented with the bars grouped.



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**.

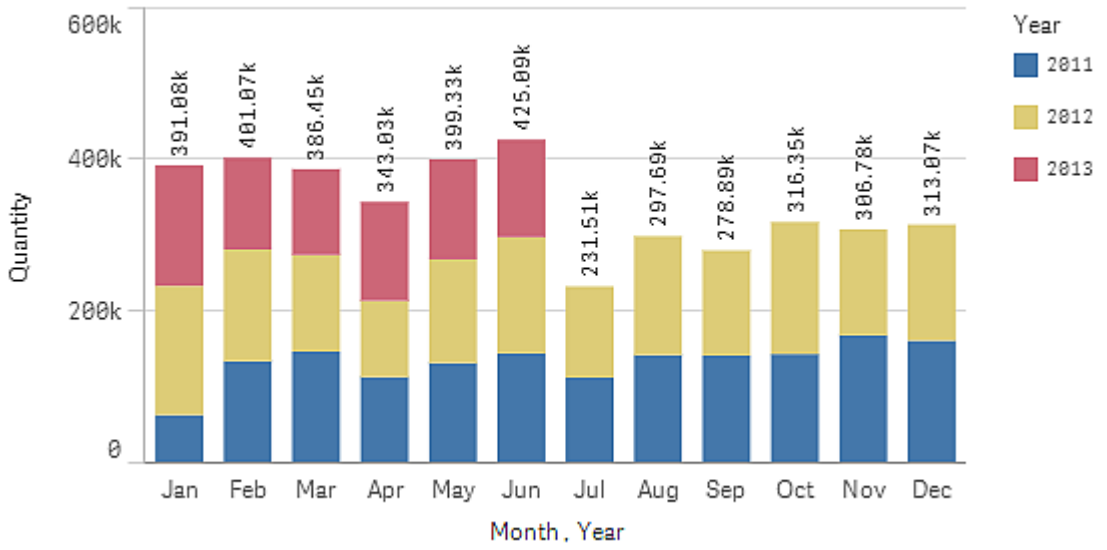
With stacked bars it is easier to compare the quantity between different months.



Now it is quite easy to compare the quantities per month. There is a legend to display the years.

Under **Colors and legend**, **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).



Styling

Apply additional customization to the visualization by using the styling panel. The styling panel is available in the properties panel. Under **Appearance** > **Presentation**, click **Styling**.

For more information, see *Applying custom styling to a visualization (page 717)*.

Colors and legend

The **Colors and legend** section of the properties panel sets your color and legend options. Qlik Sense automatically colors visualizations as they are added to your sheets. As a best practice, it is recommended to add or change colors only when it serves as purpose in the visualization. Too many colors or indistinct color choices can make visualizations less clear.

You can manually set the colors and legends by deselecting the **Auto** option and selecting your color preferences. Qlik Sense enables you to color your visualizations by:

- Single color
- Multiple colors
- Dimension
- Measure
- Master items
- Expression

For more information on different visualization coloring options, see *Coloring a visualization (page 696)*. For examples of each of these methods of coloring visualizations and the settings used can be found, see *Example 1: Coloring by a dimension in the visualization (page 713)*.

X-axis and Y-axis

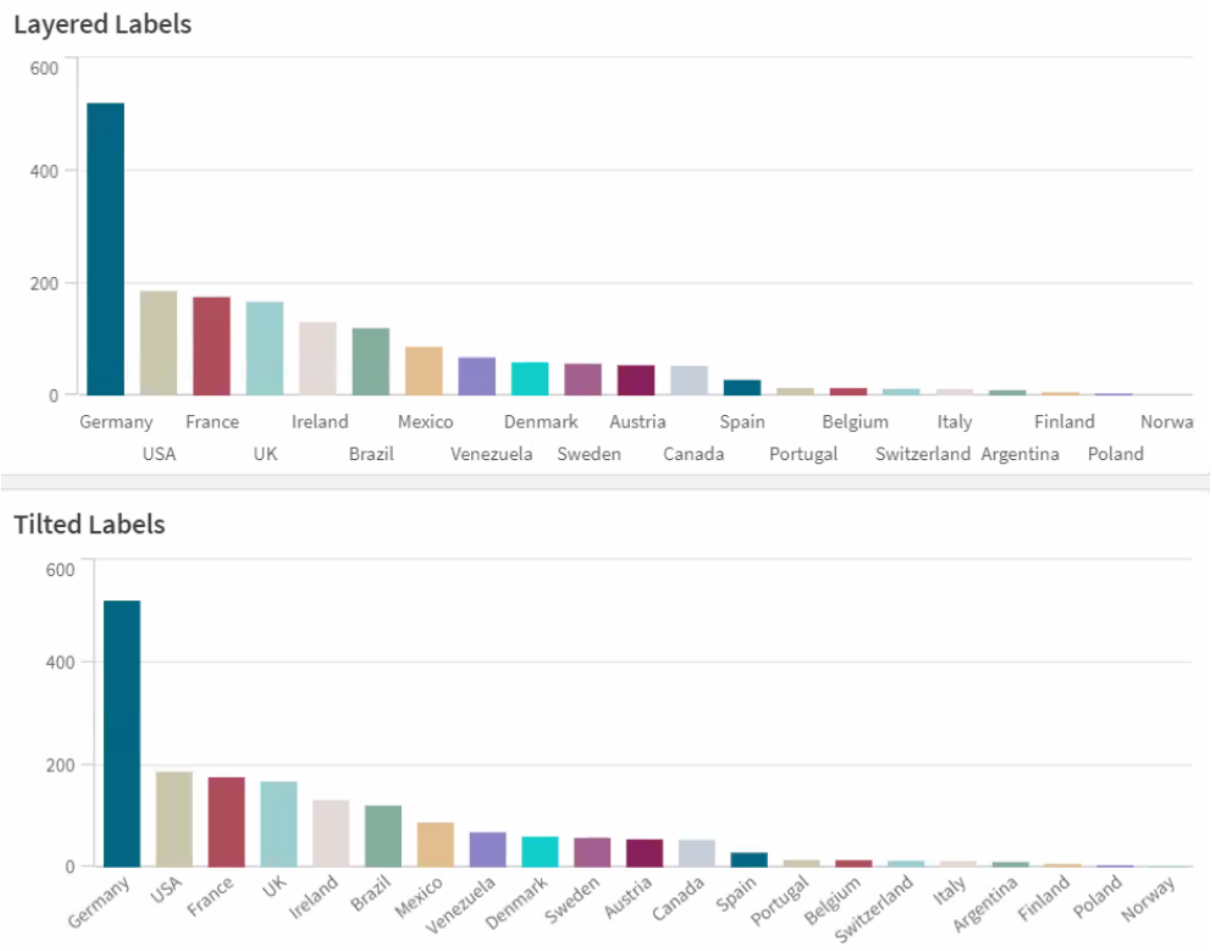
For both the y-axis and the y-axis, you have options for deciding what combination of labels and title to display, as well as their orientation and position. Sometimes it may feel unnecessary to have labels and/or a title, because the visualization is self-explanatory and then it would be good to be 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.

Label orientation: You can change the orientation of data labels on the dimensions axis (usually the x-axis). In the properties panel, under **Appearance** > **X-axis <dimension name>**, there is a drop-down menu for label orientation. By default, this is set to **Auto**. If there is not enough room for a label to fully appear on the chart, it will be truncated with an ellipsis. The following options are available:

- **Auto**: Automatically selects one of the other options depending on the space available on the chart.
- **Horizontal**: Labels are arranged in a single horizontal line.
- **Tilted**: Labels are stacked horizontally at an angle.
- **Layered**: Labels are staggered across two horizontal lines.

Examples of layered and tilted labels



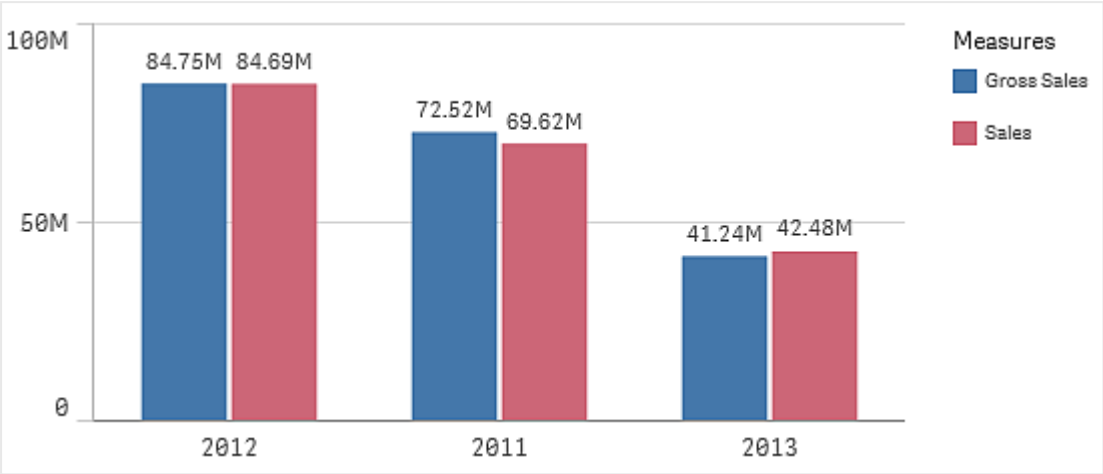
Change the sorting of a visualization

You can change the sorting order of 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.

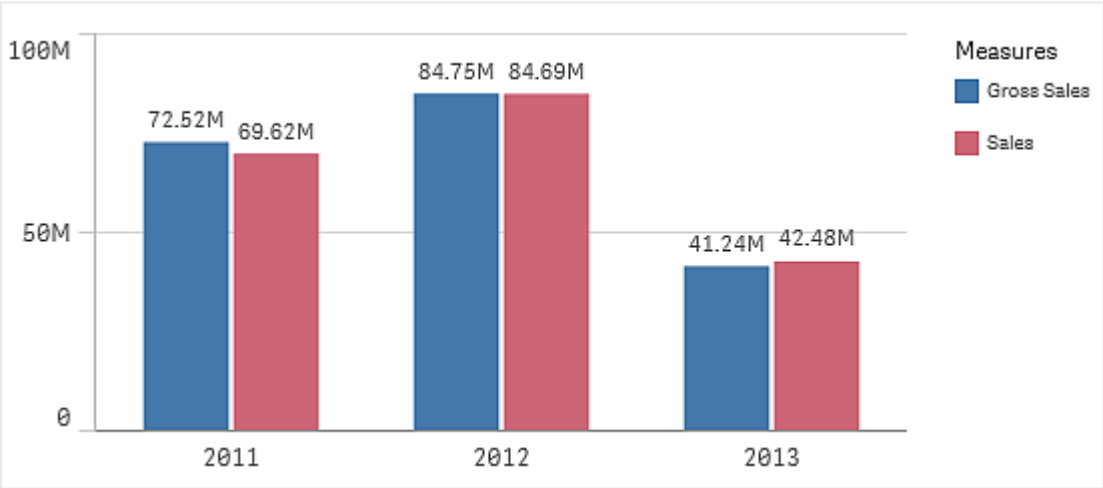
In the following screenshot, the primary sorting is on the measure *Gross Sales*.

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*.



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:

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

Additionally, you can sort by load order by switching to **Custom** and leaving all sorting options unselected.

If you have set a custom order for a field that custom order will override any selected internal sort order in **Sorting**.

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.

Default sorting in visualizations

Visualization	Description
Bar chart	By default, a bar chart with one measure and one dimension is presented with vertical bars sorted descending on the measure. When a dimension has less than 10 values, the sorting is by dimension, alphabetically.
Box plot	By default, a box plot is sorted by the center line. You can also sort by first whisker, box start, box end or last whisker.
Combo chart	Sorted by the first item added, either the dimension or the measure.
Distribution plot	By default, a distribution plot is sorted by the outer dimension.
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**.
Histogram	The histogram does not have any sorting section.
KPI	By default, the first added measure becomes the main value.

Visualization	Description
Line chart	By default, a line chart is sorted by the dimension.
Map	A map layer can only have one dimension. Sorting is used to determine the order points or areas are added to the map.
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 (it is used to set the color on large data sets) in the scatter plot. You can only have one dimension in a scatter plot.
Table	By default, the column presents the dimensions and measures in the order they were added. 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.
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.

Coloring a visualization

Qlik Sense automatically colors visualizations as they are added to your sheets. You can manually set the colors in your visualizations to meet your requirements or preferences.

Color options for most visualizations are set in the properties panel, in **Appearance** > **Colors and legend**. By selecting **Custom**, you can manually apply colors to your visualizations using the following methods:

- Color by single color
- Color by multiple colors
- Color by dimension
  Dimension fields can also be dragged and dropped from the assets panel onto a visualization to color the visualization by dimension (if supported by the visualization type).
- Color by measure
  Measure fields can also be dragged and dropped from the assets panel onto a visualization to color the visualization by measure (if supported by the visualization type).
- Color by expression

Tables and pivot tables can only be colored by expression. Options for coloring tables and pivot tables are found in the properties panel in **Data**.

If you want to keep colors consistent for dimensions or measures between different visualizations, you can assign specific colors to master items in your library. Most visualizations will use any colors assigned to master items automatically. In cases where a visualization uses both a master dimension and a master measure with assigned colors, the color assigned to the master dimension is used by default. You can select which master item color to use or disable master item colors entirely.

For more information, see *Assigning colors to master items (page 147)*.

You can also assign colors to individual master dimension values to ensure the colors of different values are consistent across visualizations.

For more information, see *Assigning colors to master dimension values (page 150)*.

To keep visualizations clear when you manually set colors, you should select colors for accessibility and only use different colors when they serve a purpose.

Color by single color

When you color by single color, one color is used for all objects in the chart. Coloring by a single color is best used for visualizations, such as bar or line charts, with a single dimension and measure.

If you have a master dimension or master measure that has a color assigned to it, you can color the visualization by that single color. In cases where a visualization uses both a master dimension and a master measure with assigned colors, the color assigned to the master dimension is used by default. You can select which master item color to use or disable master item colors entirely.

The following options are available when **Single color** is selected from **Colors** in **Appearance** > **Colors and legend**:

Options for color by single color

Option	Description
Use library colors	Select to use master item colors. In cases where a visualization has both a master dimension and a master measure that have colors assigned to them, you can select which to use in the visualization. This option is available when a master dimension or master measure used in the visualization has a color assigned to it.
Color	Select a color using the color picker. You can select a color from the default palette, enter a hex value for a color, or select a color from a color wheel.

Color by multiple colors

When you have multiple measures in a visualization, you can select **Multicolor** to color each measure with a different color. Qlik Sense offers a 12 color and a 100 color palette to apply to the visualization. By default, **12 colors** is selected as the color scheme dimensions.

If you are using master measures in your visualization, you can also choose to use them in your visualization. When a visualization is colored by master measures, master measures will use their assigned colors and any other measures are assigned colors from the **12 colors** scheme.

The following options are available when **Multicolored** is selected from **Color:**

Options for color by multiple colors

Option	Description
Use library colors	Select to use master item colors. In cases where a visualization has both a master dimension and a master measure that have colors assigned to them, you can select which to use in the visualization. This option is available when a master dimension or master measure used in the visualization has a color assigned to it.

The following options are available when **Multicolor** is selected from **Colors** in **Appearance** > **Colors and legend**:

Options for color by multiple colors

Option	Description
Use library colors	Select to use master item colors. In cases where a visualization has both a master dimension and a master measure that have colors assigned to them, you can select which to use in the visualization. This option is available when a master dimension or master measure used in the visualization has a color assigned to it.
Color scheme	Select the color scheme used in the visualization. The following schemes are available: **12 colors**: The colors are reused when there are more than 12 values. The 12 colors in this color scheme can all be distinguished by people with a color vision deficiency. **100 colors**: The colors are reused when there are more than 100 values. Not all of the 100 colors can be distinguished by people with a color vision deficiency.

Color by dimension

When you color a visualization by a dimension, all values in the visualization are colored by the corresponding values in the dimension field selected. By default, the visualization is colored by the primary dimension of the visualization, but you can select other dimensions. Qlik Sense offers a 12 color and a 100 color palette. By default, **12 colors** is set as the palette for color by dimensions.

If you are using a master dimension, you can color the visualization using the colors assigned to the distinct values of that dimension.

Coloring by dimension is useful when you want to keep track of related information in your visualizations, such as coloring multiple charts by the dimension of *Region* to clearly see the values related to each region in each chart.

The following options are available when **By dimension** is selected from **Colors** in **Appearance** > **Colors and legend**:

Options for color by dimension

UI item	Description
Select Dimension	Select the dimension used to color this visualization with this field. By default, if you have already selected a dimension for the visualization, it is set with that dimension. Click ▼ to select a different dimension. You can enter an expression by clicking *fx* to open the expression editor
Persistent colors	When selected, colors persist between selection states. If cleared, colors will be changed and reassigned for different dimension values as selections are made in the visualization.

UI item	Description
Color scheme	Select the color scheme used in the visualization. The following schemes are available: **12 colors**: The colors are reused when there are more than 12 values. The 12 colors in this color scheme can all be distinguished by people with color vision deficiency. **100 colors**: The colors are reused when there are more than 100 values. Not all of the 100 colors can be distinguished by people with color vision deficiency.
Library colors	Select to use master dimension color values. This option is available when a master dimension is used in the visualization.

Color by measure

When you color a visualization by a measure, all values in the visualization are colored by a gradient or class based on the values in the selected measure. By default, the visualization is colored by the primary measure of the visualization, but you can select another measure. There are four available color schemes.

Coloring by measure is useful when you want to clearly see objects colored by their corresponding measure value.

The following options are available when **By measure** is selected from **Colors** in **Appearance** > **Colors and legend**:

Options for color by measure

UI item	Description
Select Measure	Select the measure used to color this visualization. By default, if a measure has been added to the visualization, that measure is selected. Click ▼ to select a measure. You can enter an expression by clicking *fx* to open the expression editor
Color scheme	Select the color scheme used in the visualization. The following schemes are available: **Sequential gradient**: The transition between the different color groups is made using different shades of colors. High measure values have darker hues. **Sequential classes**: The transition between the different color groups is made using distinctly different colors. **Diverging gradient**: Used when working with data that is ordered from low to high, for instance, to show the relationship between different areas on a map. Low and high values have dark colors, mid-range colors are light. **Diverging classes**: Can be seen as two sequential classes combined, with the mid-range shared. The two extremes, high and low, are emphasized with dark colors with contrasting hues, and the mid-range critical values are emphasized with light colors.
Reverse colors	Select this option to switch which colors are used for low values and which colors are used for high values in the selected color scheme.

UI item	Description
Range	Set the measure value ranges used to color the visualization. When set to **Auto**, Qlik Sense creates ranges based on the detected minimum and maximum values. When set to **Custom**, Qlik Sense automatically creates ranges based on user-defined minimum and maximum values. You must enter values or expressions that calculate those values in the fields **Min** and **Max**. You can enter an expression by clicking fx to open the expression editor

Color by expression

Coloring by expression applies colors to a visualization based on a user-defined expression. This enables you to use expressions to define both the colors used and the values upon which the colors are applied in a visualization. You could, for example, use an expression to set conditional colors in a chart.

The following options are available when **By expression** is selected from **Colors** in **Appearance** > **Colors and legend**:

Options for color by expression

UI item	Description
Expression	Enter an expression by clicking fx to open the expression editor. For more information, see *Examples (page 704)*.
The expression is a color code	Selected by default. In most cases, it is best to keep this setting. When the selection is cleared, the expression evaluates to a number, which in turn is plotted against one of the chart gradients.
Label	Enter the label to appear for the legend. **This expression is a color code** must be cleared.

UI item	Description
Color scheme	Color scheme sets the colors used in the visualization. The following color schemes are available: **Sequential gradient**: The transition between the different color groups is made using different shades of colors. High measure values have darker hues. **Sequential classes**: The transition between the different color groups is made using distinctly different colors. **Diverging gradient**: Used when working with data that is ordered from low to high, for instance, to show the relationship between different areas on a map. Low and high values have dark colors, mid-range colors are light. **Diverging classes**: Can be seen as two sequential classes combined, with the mid-range shared. The two extremes, high and low, are emphasized with dark colors with contrasting hues, and the mid-range critical values are emphasized with light colors. **This expression is a color code** must be cleared.
Reverse colors	When selected, the color scheme is reversed. **This expression is a color code** must be cleared.
Range	This setting sets the value ranges for coloring results in the visualization. **Auto**: Qlik Sense creates ranges based on the detected minimum and maximum values. **Custom**: Qlik Sense automatically creates ranges based on user-defined minimum and maximum values. You must enter values or expressions that calculate those values in the fields **Min** and **Max**. You can enter an expression by clicking fx to open the expression editor **This expression is a color code** must be cleared.

Color by expression in table visualizations

Expressions can be used to color table and pivot table backgrounds and text. This enables you to use expressions to define both the colors used and the conditional values upon which the colors are applied in a visualization. You could, for example, use expressions to change text and background colors depending on the values within different table cells.

The following options are available in **Data** for coloring table and pivot table visualizations:

Options for coloring table and pivot table visualizations

UI item	Description
Background color expression	Enter an expression by clicking fx to open the expression editor. The text color automatically changes to white when a dark background color is used. For more information, see *Examples (page 704)*.
Text color expression	Enter an expression by clicking fx to open the expression editor. If you use the same expression as in the background color, the text will not be visible. For more information, see *Examples (page 704)*.

Color by expression

Coloring by expression sets colors using a user-defined expression. When coloring by expression, you can define both what colors to use and which values to use them with, enabling more control over how colors are used in the visualization.

For example, you might highlight values of particular interest, or differentiate between values within different value ranges. Coloring by expression can also be used to color a visualization by values not included within a visualization, such as coloring products and the sum of their monthly sales by the country of origin for the product.

When you select to color **By expression**, you can choose to either use the expression as a color code or to define how **By measure** color options are applied to the visualization using an expression.

The following visualizations support color by expression:

- Bar chart
- Combo chart
- KPI chart
- Line chart
- Map
- Pie chart
- Pivot table
- Scatter plot
- Table
- Treemap

You can also use color by expression to set a background color on a sheet. For more information, see *Structuring an app using sheets (page 10)*.

Legend selection is not available in a visualization when coloring by expression. Visualizations that are colored by expression with a color code do not support legends.

Coloring by expression as a color code

By default, if you choose to color by expression, **The expression is a color code** is enabled. If you have this option selected, your expression must include a color code in a supported expression format to define the colors to use. Using this method provides you with manual control over visualization colors as well as the conditions for the colors being used in a visualization. With tables and pivot tables, you can use expressions to define the background color and the text color of columns.

When coloring by expression, objects in visualizations are colored gray if the expression contains errors or if objects in the visualization have multiple colors they could be assigned in the expression.

Examples

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

Example: Coloring by random color range

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

This example uses ARGB color. It starts with alpha value that sets full opacity, and then uses the rand() function to generate random values for the red, green, and blue colors, creating a random color.

Example: Coloring by single measure value

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

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

Example: Coloring by single measure value using an aggregated expression

if(avg(Value) > avg(Total aggr(avg(Value), Name)), Blue(), Brown())

In this example, there is a condition. If the *avg(Value)* value is greater than the aggregated *avg(Value)* value of the entire table, then the corresponding measure value is colored blue. If the *avg(Value)* value is less than the aggregated *avg(Value)* value of the entire table, then the corresponding measure value is colored brown.

Example: Coloring by multiple measure values

if(Sum(Sales) > 3000000, 'green', if(Sum(Sales) > 2000000, 'yellow', if(Sum(Sales) > 1000000, 'orange', red())))

In this example, there are multiple conditions. If Sum(Sales) is greater than 3,000,000, then corresponding measure values will be colored green. If Sum(Sales) is between 2,000,000 and 3,000,000, then the corresponding measure values will be colored yellow. If Sum(Sales) is between 1,000,000 and 2,000,000, the corresponding measure values will be colored orange. All other measure values will be colored red.

Example: Coloring by multiple dimensions

if([CompanyName]= 'A Corp', rgb(100, 149, 227), if([CompanyName]= 'B Corp', rgb(100, 149, 200), if ([CompanyName]= 'C Corp', rgb(100, 149, 175), if([CompanyName]= 'D Corp', rgb(100, 149, 150), 'grey'))))

In this example, the expression is used to define a RGB color for each specific dimension value in the field CompanyName.

Example: Coloring table object font and background by measure value.

if(Sum([Sales]) < 10000, 'red', green())

if(Sum([Sales]) > 200000, 'gold',)

In this example, two expressions are used to color the background and text of the *Sales* column. 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 than $200000 have the text color 'gold'.

Customer KPIs

Customer	Sales	Quantity	Margin (%)	# of Invoices
Totals	**$104,852,674.81**	**1,816,372**	**4127.8%**	**38314**
A-2-Z Solutions	$196,298.49	1,418	3841.7%	58
A-ARVIN Laser Resources	$4,053.05	25	3792.6%	13
A Superior System	$103,728.12	868	4074.5%	167
A&B	$92,120.60	891	4202.9%	18
A&G	$12,502.61	133	4708.0%	12
A&R Partners	$30,392.45	156	3409.9%	6
A1 Datacom Supply	$259,599.52	5,830	4025.7%	111
a2i	$451.64	14	5983.7%	9
A2Z Solutions	$69,977.36	454	4121.1%	94
AA-Wizard	$94,209.44	917	4660.6%	41
Aadast	$351,243.31	881	3707.3%	35
Aaron D. Meyer & Associates	$90,017.11	1,869	4404.1%	58

Coloring by expression without a color code

You can color by expression without a color by disabling **The expression is a color code** when you enable coloring by expression. In this method of coloring, the expression is used to evaluate to a numeric value that is plotted against a **By measure** chart gradient, treating the expression like a measure when coloring by measure.

> *When coloring by expression, objects in visualizations are colored gray if the expression contains errors or if objects in the visualization have multiple colors they could be assigned in the expression.*

Example:

*100*Sum([Sales Margin Amount])/Sum([Sales Amount])*

In this example, charts would have **By measure** color gradients applied to them based on the profit margin percentile calculated in the expression.

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.

Color keywords

Qlik Sense supports W3C recommended color keywords. With color keywords, specific colors are defined by a name which corresponds to a RGB hex value. Enter the color name in the expression to use the color.

Use the following links to find out more about W3C color keywords:
≤ http://www.w3.org/TR/CSS21/syndata.html#value-def-color
≤ https://developer.mozilla.org/en-US/docs/Web/CSS/color_value

Example:

'cornflowerblue'

This example generates a blue color with the hex value of #6495ed and a RGB value of (100, 149, 237).

Qlik Sense color functions

The following color functions can be used in expressions when coloring by expression.

- 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 f_x to open the expression editor.

If the expression is valid, the visualization is updated.

Visualization support for coloring methods

Not all Qlik Sense visualizations support the same coloring options. Additionally, some visualization types have specific behaviors or limitations when using certain coloring methods.

Color methods supported by visualizations and their limitations are determined primarily by the kinds of data the visualizations displays. For example, visualizations that only support displaying measures cannot be colored by dimension or through using master dimensions.

Color method support by visualization

The following table outlines color method support by visualization type.

Color methods that are supported in the visualization

Visualizations	Single	Multicolor	Master measure	Master dimension	Dimension	Measure	Expression
Bar chart	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Box plot	Yes	-	-	-	-	-	-
Combo chart	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distribution plot	Yes	-	-	-	-	-	-
Filter pane	-	-	-	-	-	-	-
Gauge	Yes	Yes	Yes	-	-		-
Histogram	Yes	-	-	-	-	-	-
KPI	Yes	Yes	-	-	-	-	-
Line chart	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Visualizations	Single	Multicolor	Master measure	Master dimension	Dimension	Measure	Expression
Map	Yes	-	-	Yes	Yes	Yes	Yes
Pie chart	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pivot table	-	-	-	-	-	-	Yes
Scatter plot	Yes	-	-	Yes	Yes	Yes	Yes
Table	-	-	-	-	-	-	Yes
Text & image	-	-	-	-	-	-	-
Treemap	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Visualization coloring limitations and behaviors

Different visualizations have different behaviors with the methods of setting color in visualizations. This section outlines specific considerations when coloring different visualizations.

Line chart

Line charts do not support coloring by measure if they have two or more dimensions.

Map

Colors assigned to master dimensions that contain geopoint data or area data (polygons of geopoints) cannot be used to color a map.

Pie chart

Pie charts do not use master item colors when **Auto** is selected under **Colors and legend**.

Examples of visualization color settings

You can use a number of different methods to control the use of colors in your visualizations.

You can manually apply colors to your visualizations using the following methods:

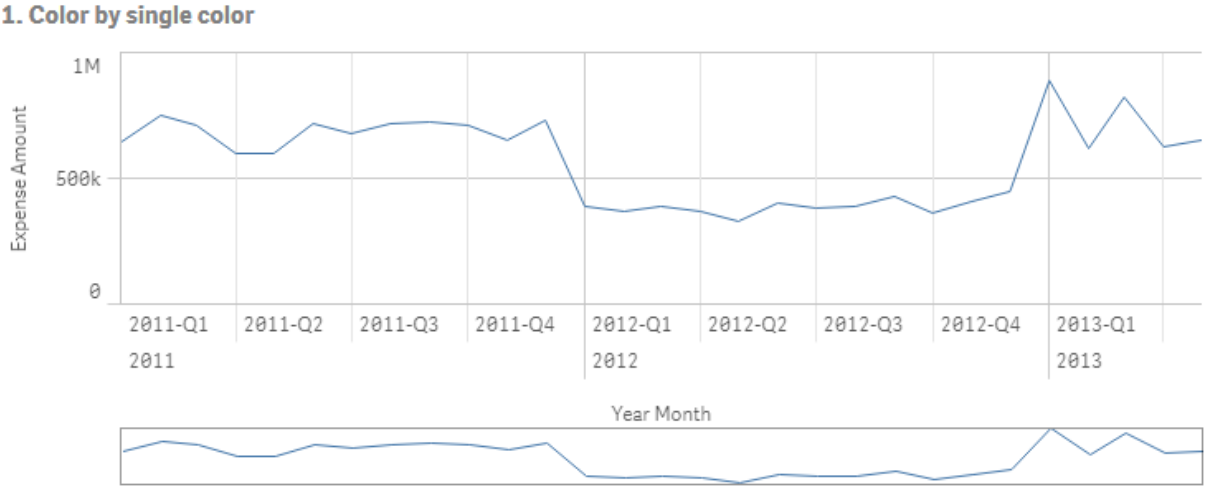
- Color by single color
- Color by multiple colors
- Color by dimension
- Color by measure
- Color by expression

In the example dashboard below, each method of setting colors has a corresponding visualization. This section outlines each example as well as the specific settings used in the properties panel.

Color by single color

Visualizations can be colored with a single user-defined color. Colors can be selected from a palette or color wheel or by entering a hex color code.

In this example visualization, a single color has been applied to the line chart.



Properties panel settings

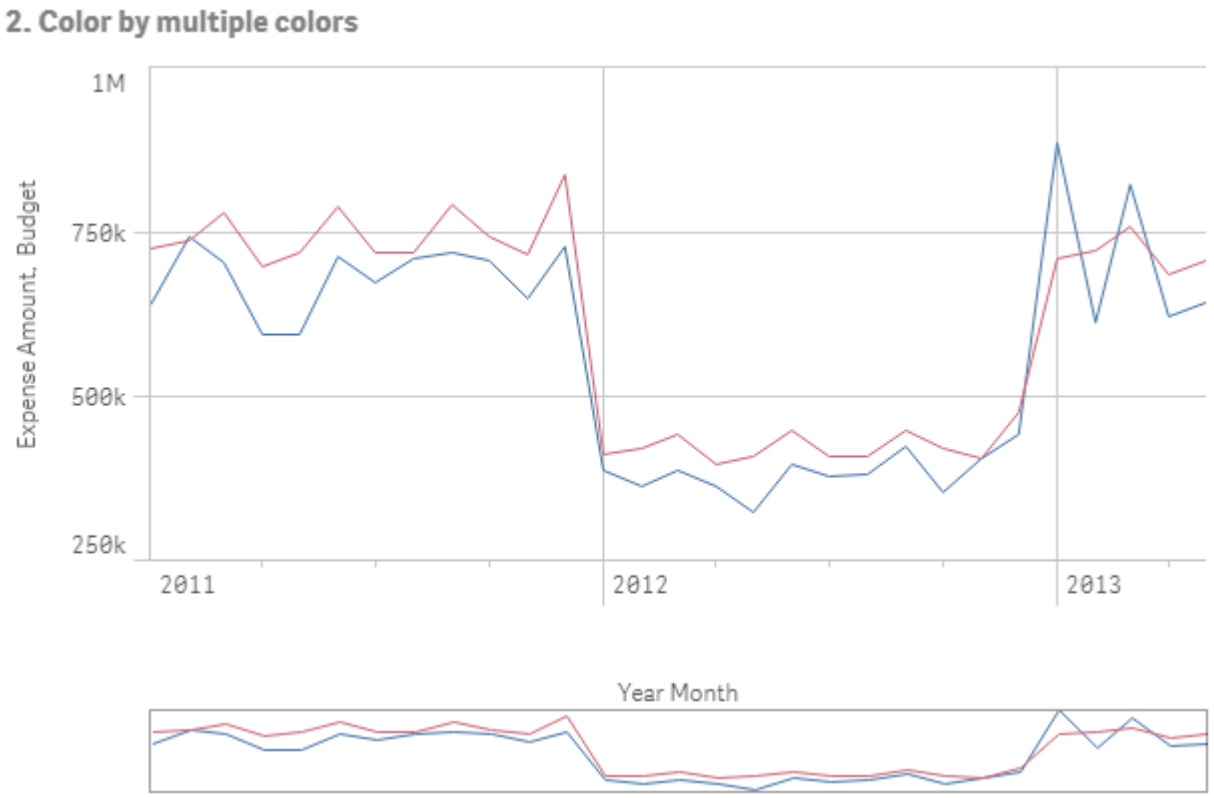
For this visualization, the following properties were set in the properties panel under **Appearance** > **Colors and Legends**:

- **Colors**: Set to **Custom** and **Single color**. **Color** set as hex value *4477aa*.

Color by multiple colors

Visualizations with multiple measures can have different colors applied to each measure. When a visualization is colored using **Multicolor**, colors are automatically applied from a default color scheme of 12 colors or 100 colors.

In this example visualization, multiple colors have been applied to the measures of *Expense Amount* and *Budget* in the line chart.



Properties panel settings

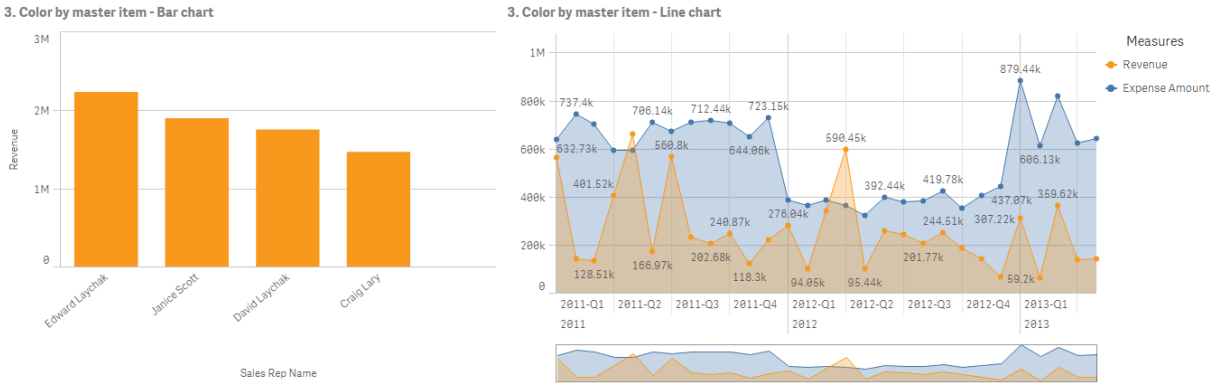
For this visualization, the following properties were set in the properties panel under **Appearance** > **Colors and Legends**:

- **Colors**: Set to **Custom** and **Multicolored**.
- **Color scheme**: Set to **12 colors**.

Color by master item

Colors can be kept consistent across visualizations for dimensions or measures through setting colors in master items. When set to use master item colors, visualizations will use all colors associated to the master items in the visualization. Master item colors can be used when **Color** is set to **Single color** or **Multicolor**.

In these example visualizations, both the bar chart and line chart share a master measure, *Revenue*, that is colored orange. In each visualization, the same assigned color is used for each instance of *Revenue*. The line chart is colored by a second master measure, *Expense Amount*, which is colored blue.



Master measure settings

For this visualization, the following settings were applied to the master measures in **Edit measure**:

- **Color**: Hex color set as *f8981d* for *Revenue* and *4477aa* for *Expense Amount*.

For more information, see *Assigning colors to master items (page 147)*.

Properties panel settings

For the bar chart, the following properties were set in the properties panel under **Appearance** > **Colors and Legends**:

- **Colors**: Set to **Custom** and **Single color**.
- **Use library colors**: Set to enabled.

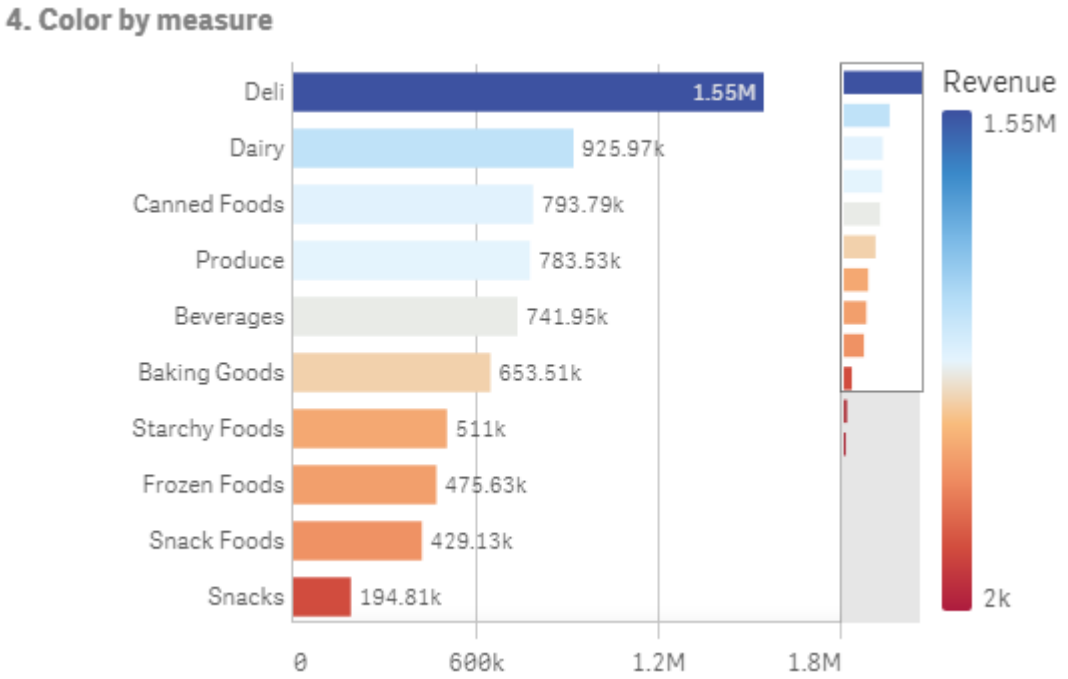
For the line chart, the following properties were set in the properties panel under **Appearance** > **Colors and Legends**:

- **Colors**: Set to **Custom** and **Multicolor**.
- **Use library colors**: Set to enabled.

Color by measure

When a visualization colored by measure, sequential or diverging gradients or classes are applied to values in the chart based on the values of the selected measure. Visualizations can be colored by measures within the visualization or they can be colored with measures associated to values in the visualization.

In this example, this bar chart is colored by the measure used in the visualization, *Revenue*. A diverging gradient has been applied to the values in the chart based on the *Revenue* value for each dimension value.



Properties panel settings

For this visualization, the following properties were set in the properties panel under **Appearance** > **Colors and Legends**:

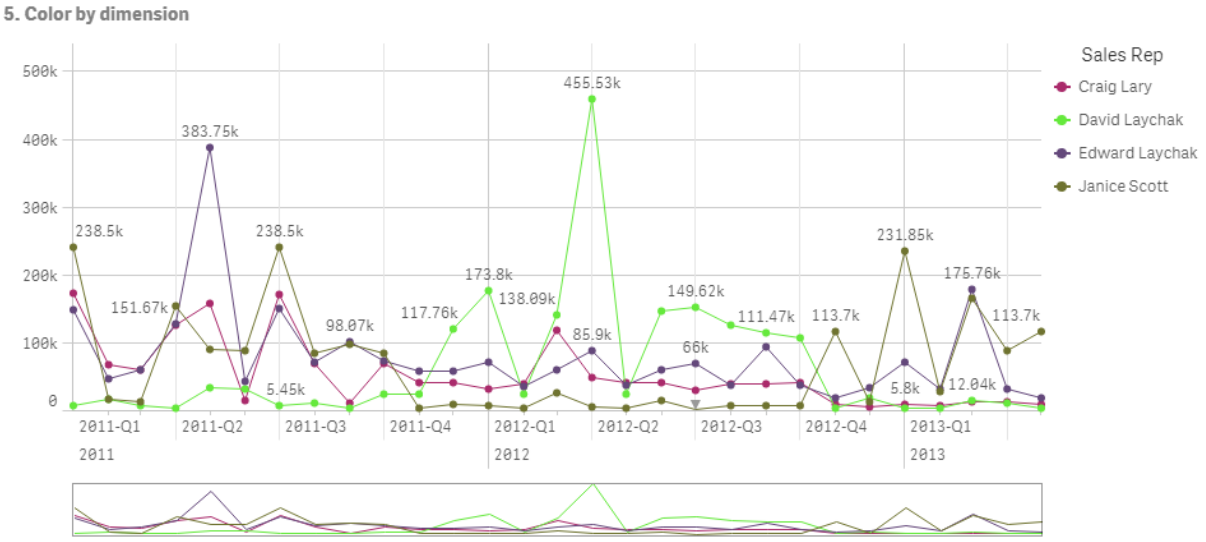
- **Colors**: Set to **Custom** and **By measure**. The measure selected is *Revenue*.
- **Color scheme**: Set to **Diverging gradient**.
- **Reverse colors**: Set to enabled.
- **Range**: Set to **Auto**.

Color by dimension

When a visualization is colored by dimension, each value within the visualization is assigned a color based on an associated value from the coloring dimension. When colored by dimension, colors are automatically applied from a default palette set of 12 or 100 colors.

Example 1: Coloring by a dimension in the visualization

In this example, the line chart is colored by the dimension of the different sales representatives, using the **100 colors** scheme. Each sales representative has their own distinct color in the visualization.



Line chart colored by dimension

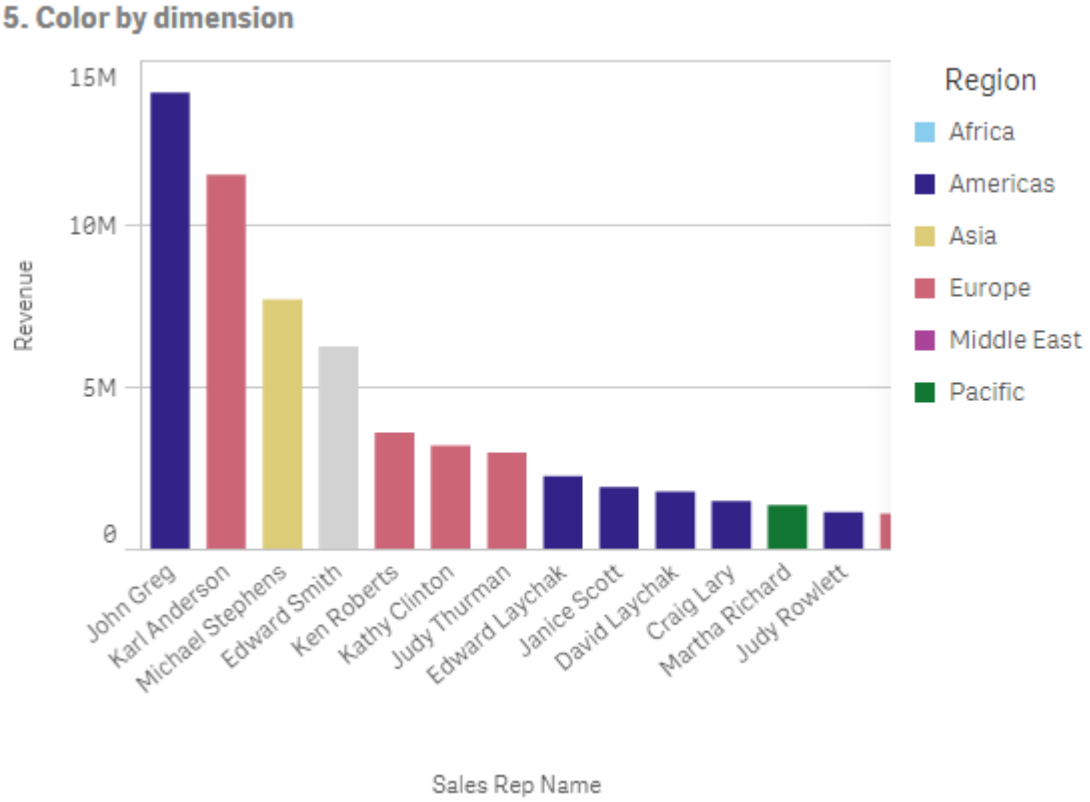
Properties panel settings

For this visualization, the following properties were set in the properties panel under **Appearance** > **Colors and Legends**:

- **Colors**: Set to **Custom** and **By dimension**. The dimension *Sales Rep Name* is selected.
- **Persistent colors**: Set to enabled.
- **Color scheme**: Set to **100 colors**.

Example 2: Coloring by a dimension not included in the visualization

In this example, the bar chart is colored by the dimension of **Region**, using the **12 colors** scheme. The bar for each sales representative is colored by the region in which they work.



Properties panel settings

For this visualization, the following properties were set in the properties panel under **Appearance** > **Colors and Legends**:

- **Colors**: Set to **Custom** and **By dimension**. The dimension *Region* is selected.
- **Persistent colors**: Set to enabled.
- **Color scheme**: Set to **12 colors**.

Color by expression

You can use expressions to set specific colors to appear with specific values, enabling conditional coloring of values in your visualizations. When a visualization is colored by expression, you define the colors and how the colors are applied to values within the expression.

Example 1: Color by expression in a table

In this example, the table visualization uses two expressions, one for the background color and one for the text. These expressions apply conditional colors to the background and text based on which rows contain the top 10 and bottom 10 values for *Revenue*.

6. Color by expression

Customer	Revenue
Homebound	$1,263,085.68
Icon Site Builders	$9,420.32
Kari & Associates	$7,364.12
Livermore Laboratories (LSLI)	$50,151.75
MATRIX	$512,901.49
Pacific Matics	$24,625.51
Ra Co Amo	$1,203,542.53
Ready-to-Run	$98,191.57
Remedy	$226,538.83
Reuters Usability Group	$45,384.54
RFI Corporation	$1,772,832.86
Satronix	$126,630.22

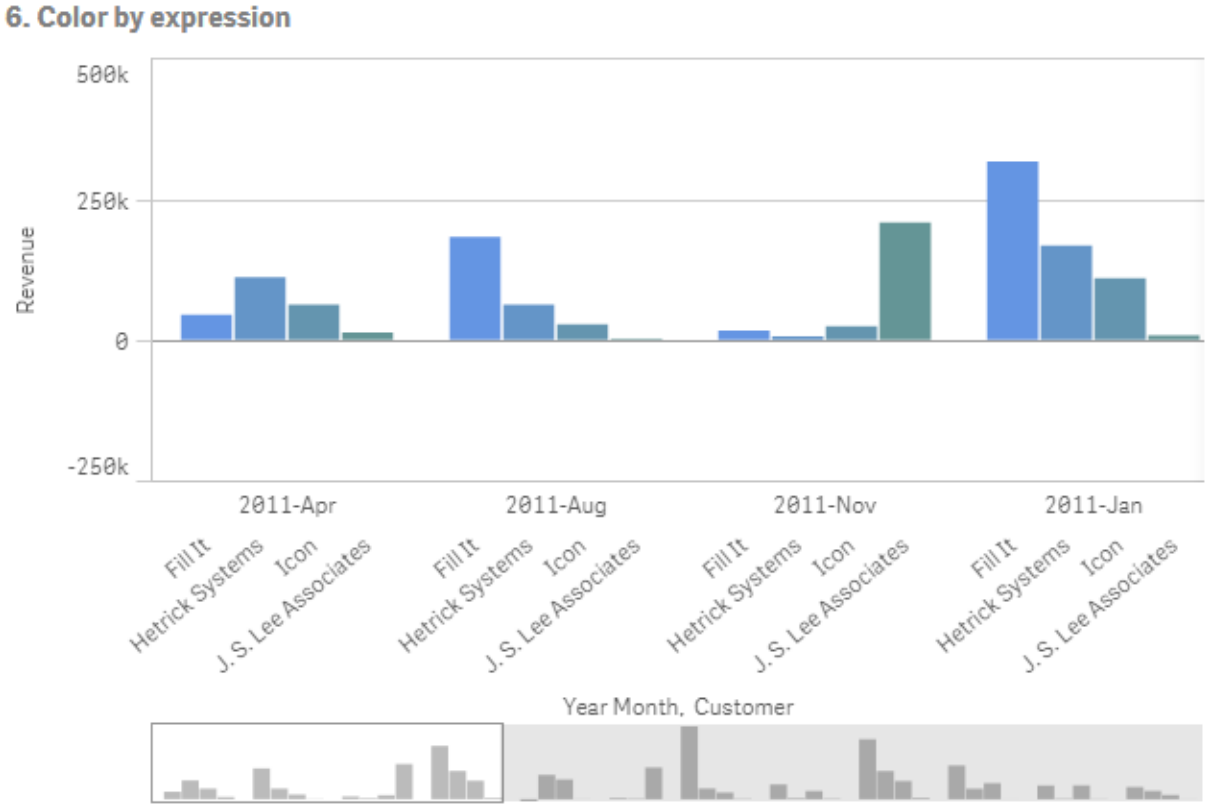
Properties panel settings

For this visualization, the following properties were set in the properties panel under **Data** > **Columns**:

- **Background color expression**: *if(Rank(Sum([Sales Quantity]*[Sales Price])) <= 10, 'honeydew', if (Rank(-Sum([Sales Quantity]*[Sales Price])) <= 10, 'mistyrose',))*
- **Text color expression**: *if(Rank(Sum([Sales Quantity]*[Sales Price])) <= 10, 'green', if(Rank(-Sum ([Sales Quantity]*[Sales Price])) <= 10, 'red',))*

Example 2: Color by expression in a chart

In this example, the bar chart uses an expression to assign specific colors to different values in the *Customer* field.



Properties panel settings

For this visualization, the following properties were set in the properties panel under **Appearance** > **Colors and Legends**:

- **Colors**: Set to **Custom** and **By expression**.
- **Expression**: Set to *if([Customer]= 'Fill It', rgb(100, 149, 227), if([Customer]= 'Hetrick Systems', rgb (100, 149, 200), if([Customer]= 'Icon', rgb(100, 149, 175), if([Customer]= 'J. S. Lee Associates', rgb (100, 149, 150), 'grey'))))*.
- **This expression is a color code**: Set to enabled.

Applying custom styling to a visualization

By default, the styling properties of a visualization are determined by the app theme. You can override the app theme for individual visualizations by using the styling panel. In the styling panel, you can also style individual charts with properties that are not available in the app theme.

The styling panel is available in the properties panel. Under **Appearance** > **Presentation**, click **Styling**. The properties available to customize depend on the chart type.

Examples of styling properties you can customize include, but are not limited to:

- Chart title, subtitle, and footnote
- Background color and image
- Measure, dimension, and axis labels

For a list of customizable properties available for each chart type, see the corresponding chart-specific help topic.

Copying and pasting visualization styling

If you have applied custom styling to a visualization, you can copy its styling properties and paste them onto another visualization. With this option, you can quickly align the styling of your visualizations without editing them in the properties panel or adding a custom theme.

You can copy and paste styles between different chart types. The entire style definition is applied to the chart. Therefore, if a chart contains properties that do not apply to the chart receiving the styling, these properties are still transferred to the receiving chart.

Do the following:

1. In sheet edit mode, right-click a chart or open the options menu by selecting the ••• button next to it.
2. Click **Copy style**.
3. Right-click the chart onto which you want to paste the styling, or open its options menu.
4. Click **Paste style**.

Limitations

- You cannot copy and paste the styling of a master visualization.
- You cannot copy and paste the styling of a map.
- You cannot copy and paste the styling of a button.

App themes

If you are looking to change the styling for all visualizations in the app, it might be easier to change the app theme. For increased control over specific styling aspects of all app visualizations, consider developing a custom theme and applying it to the app.

For more information about styling an app, see *Styling an app (page 35)*.

Converting a visualization to another kind of visualization

You can convert from one visualization type to another by dragging a chart from the assets 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. If a visualization requires an additional primary dimension or measure, the first listed alternative dimension or measure is used by default. If no alternative dimensions or measures exist and one is required the new visualization, you will be prompted to add one.

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 assets panel 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 map or a text & image visualization, nor can you convert a master visualization.

Embedding a visualization or a sheet in a web page

You can integrate Qlik Sense visualizations or sheets into an `iframe` element on a web page with the Single Integration API. This could for example be a web page on your intranet. You select which visualization or sheet to embed, and make some settings to customize selections, interaction and appearance. Then you can copy the `iframe` code containing the URL of the object and add it to your web page.

The embedded object will be subject to the same access rules as the original object and app. This means that anyone who wants to view the embedded object must have:

- Access to Qlik Sense.
- Access to the app. If the app is unpublished (in **My work**), you are the only one with access.
- Access to the sheet. If the sheet is unpublished (in **My sheets**) in a published app, you are the only one with access.
- Access to any bookmark used for selection. Private bookmarks will be applied for you, but not for anyone else.
- Same access to the data used in the selection as you, if section access is used to restrict data access.

Embedding a sheet

You can embed a sheet in your web page.

Do the following:

1. In the app navigation bar, click ••• and select **Embed sheet**.
2. Customize selections, appearance and interaction options for the embedded sheet.
3. Click **Open preview in new tab** to see a preview of the embedded sheet.
4. Click **Copy**.

You now have the `iframe` code of the sheet in your clipboard, ready to add to your web page.

Embedding a visualization

You can embed a visualization in your web page.

Do the following:

1. Right-click on the visualization or click the hover menu •••.
2. Select **Share**. Then choose **Embed**.
3. Customize selections, appearance and interaction options for the embedded visualization.
4. Click **Open preview in new tab** to see a preview of the embedded visualization.
5. Click **Copy**.

You now have the `iframe` code of the visualization in your clipboard, ready to add to your web page.

Setting appearance and interaction

You can customize how you can interact with the embedded object.

- **Allow interaction**
  You can select if you want the user to be able to interact with the embedded object.
- **Enable context menu**
  You can select if you want the context menu to be available when the embedded object is right-clicked.
- **Language**
  You can select which language to use in menus for the embedded object.
- **Theme**
  You can select which theme to use for the embedded object.

Selections in the embedded object

You can choose if the user can make selections in the embedded object, and which selection state to show in the embedded object.

- **Use current selections**
  You can select to use the current selections in the app.
- **Show selections bar**
  You can select to show the selections bar above the sheet.
- **Clear app selections on refresh**

You can select to clear all selections made in the app when the object is rendered.

- **Apply bookmark**
  You can select to apply a bookmark and use the selections defined in the bookmark.

When the page containing the embedded object is rendered, the initial selection state is defined by the order of execution and your settings.

1. **Clear app selections on refresh**
2. **Apply bookmark**
3. **Use current selections**

When you make selections in the embedded object, they will be replicated in the app. If you select **Clear app selections on refresh**, for example, and use the embedded object, selections are cleared in the app.

*You can use **Open preview in new tab** to preview the embedded object, and interact without affecting selections in the app.*

Limitations of embedded objects

- **Embed sheet** and **Embed chart** features are not available on devices with a small screen.
- The sheet title is not included when embedding sheets.
- The URL is limited to 2083 characters due to browser limitations. If your URL is too long, this is most likely due to a large number of individual selections.

  You can create a bookmark with the same set of selections, and apply the bookmark. This will create a shorter URL.
- Depending on the size of the shadow, and the amount of padding around the visualizations around it, shadows applied to charts can be cut off when the chart with the shadow is embedded outside of Qlik Sense.
- The **Copy cell value** option is not available for embedded tables.

3.7 Troubleshooting - Creating visualizations

This section describes problems that can occur when creating visualizations in Qlik Sense.

I cannot find the fields in the assets panel

I can find **Charts** and **Master items** in the assets panel, but not **Fields**.

Possible cause

You are working with a published app. Some content is not available in the assets panel in a published app.

My chart is not sorted correctly

I set my chart to sort automatically on the dimension, but the results are not sorted correctly.

Possible cause

The dimension is an expression with a result that has a different data type than the data fields used in the expression.

Proposed action

Change sorting of the dimension to **Custom**, and select a sorting option that matches the result of the expression. For example, if your expression concatenates two fields to a string, like `Month (salesDate)&'/'&Day(salesdate)`, select to sort alphabetically.

My calendar measures display incorrect aggregations in visualizations

When I use my calendar measures in visualizations, I see incorrect aggregation results. For example, calendar measures created from identical fields and aggregations but different time ranges may display identical totals.

Possible cause

The table containing the aggregated field is not associated to the table containing the date field, preventing accurate aggregation of the field by the selected time ranges.

Proposed action

Create an association between the table containing the aggregated field and the table containing the date field. If there is no association possible, in **Data manager**, add a table that includes a date field that has an association to the table containing the aggregated field.

There are no time ranges to select in **Create calendar measures**

When I have a date field selected in the **Create calendar measures** dialog try to create calendar measures from a field, there are no time ranges to select in the **Create calendar measures** dialog.

Possible cause

The selected date field does not have the correct time flags to work with calendar measures. If you have no valid date fields, you cannot create calendar measures. If you have at least one valid date field, all date fields will be available in **Date field**. However, only those with the correct time flags set in autoCalendar enable the selection of time ranges from the Time Range drop-down list.

Proposed action

Select a date field that uses autoCalendar. If you are unsure which calendar is associated to your date field, date fields in the **Field** section of the **Assets** panel display which calendar it uses when clicked.

My date field selected for calendar measures does not use the correct calendar

I have two calendars to which I have manually added time flags. My time flags have the same names as those in autoCalendar, making both qualified for use with calendar measures. However, only one of my

calendars has the same definition for the time flags as autoCalendar. I have a date field associated to both calendars . When I try to create calendar measures using that date field, the calendar with the correct names but different definitions than autoCalendar is used.

Possible cause

In cases where a date field is associated to multiple calendars and each calendar has the correctly named time flags set in it, calendar measures uses the first qualified calendars defined in your data load script.

Proposed action

Move the script section containing the calendar you want to use with calendar measures before other qualified calendars in your data load script.

I cannot edit a variable value

I cannot edit a variable that is listed in the variables dialog.

Possible cause

The variable is defined in the script.

Proposed action

Edit the variable in the script, using the data load editor, or delete the variable from the script, using the data load editor, to make the variable editable from the variables dialog.

For more information, see *Editing a variable (page 168)*

You cannot rename a variable.

The map is placing the locations in my location field incorrectly

When I add a location field to a layer in my map, the locations do not display in the correct places.

Possible cause

The map does not have enough context to locate the locations in your field. This can happen when a location in the field shares a name with a number of other possible locations on the map.

Proposed action

Set **Scope for Location** in your layer to **Custom** and enter additional information. Alternatively, qualify your location field using an expression that contains additional fields with relevant geographic information. If your location field contained cities and you had *Country* and *State* fields, you could use `[City]&','&[State]&','&[Country]`.

No map is displayed

I am using Qlik Geoanalytics server, the background map is not displayed.

Possible cause

Your browser cannot access *qlikcloud.com* or your firewall settings or proxies prevent the use of JavaScript from *qlikcloud.com*. .

Proposed action

Visit the status page from your browser.

If your browser cannot access *qlikcloud.com* contact your system administrator for assistance.

If the page prints "ok" then your browser can access *qlikcloud.com*. Make sure that JavaScript from *qlikcloud.com* is allowed.

Do the following:

- Add https://*.qlikcloud.com as a trusted site. (recommended)
- Enable JavaScript from untrusted sites. (not recommended)

Error message: The data contains invalid geometries that could not be shown on the map. Review your data for errors and try again.

I loaded geoshapes from a KML file to Qlik Sense. When I try to add the field to my map, an error message tells me that my data contains invalid geometries that could not be shown on the map.

Possible cause

There is an error in your geometries that is preventing Qlik Sense from displaying them on the map or your geometry data may be in an invalid format.

Proposed action

Review your geometry data for errors and try again.

Error message: The following locations could not be found: <locations>. Review the values in your data and try again.

I added my location field to my map and I received an error messaging telling me locations in my location field could not be found.

Possible cause

Qlik Sense could not find the location. There may be a spelling error in the name or the location is not available in the Qlik Sense location database.

Proposed action

Review the values in your data for errors and try adding the field again. If a location cannot be found, you can alternatively manually add it using coordinates for points or geoshapes for areas.

Error message: The following locations could not be located: <locations>. Review the values in your data and try again.

I added a location field to my layer and I received an error message telling me that certain locations in my location field could not be located.

Possible cause

Qlik Sense could not find the location. There may be a spelling error in the name or the location is not available in the Qlik Sense location database.

Proposed action

Review the values in your data for errors and try adding the field again. If a location cannot be found, you can alternatively manually add it using coordinates for points or geoshapes for areas.

Error message: The following locations had more than one result: <locations>. Set a custom scope to clarify which locations to display.

I added a location field to my layer and I received an error message telling me that certain locations in my field had more than one possible result on the map.

Possible cause

One or more locations in your location field are ambiguous, with multiple possible locations on your map.

Proposed action

Set **Scope for Location** in your layer to **Custom** and enter additional information. Alternatively, qualify your location field using an expression that contains additional fields with relevant geographic information. If your location field contained cities, you , such as: `[City]&','&[County]&','&[State]`.

Error message: Some lines could not be shown because of invalid data in the width expression. Review your data for errors and try again.

I entered a field or expression to control the width of the lines on my map and I received an error message telling me that certain lines have invalid data.

Possible cause

There is an error in your width expression that is preventing Qlik Sense from displaying specific lines on the map.

Proposed action

Your expression may contain non-numeric values. Review your data for errors and try again.

Error message: Some density points could not be shown because of invalid data in the weight expression. Review your data for errors and try again.

I entered a field or expression to control the density of the points on my map and I received an error message telling me that certain densities have invalid data.

Possible cause

There is an error in your weight expression that is preventing Qlik Sense from displaying specific densities on the map.

Proposed action

Your expression may contain non-numeric values. Review your data for errors and try again.

I added an image background layer and cannot see my image

I added an image background layer to my map visualization, but I cannot see it on the map.

Possible cause

Depending on the projection of your map and the scale of the image, the map may be too zoomed out to see the image.

Proposed action

Do one of the following:

- In **Map settings**, enable **Auto-zoom**. Add a layer containing location data that would put it over the same area as your image background layer.
- In **Presentation**, enable **Show debug info**. The map now includes coordinates for the center of the displayed area.