Visualizer User Guide

Birst Enterprise Edition

Software Version 7.0

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Getting Started with Visualizer

When working in Visualizer, you can choose to start with the data you want to use or with the type of visualization you want to create, whichever is more intuitive to you. Visualizer will offer you guidance at every step to enable you to create meaningful visualizations.

Visualizer Versus Designer

You may wonder how Visualizer compares with Designer. When would you use Visualizer and when would you use Designer? See Designer Versus Visualizer Reports.

Visualizer Interface

Visualizer has a contemporary and intuitive user interface. Hover and click to experiment and learn the basics.

Visualizer Main Window

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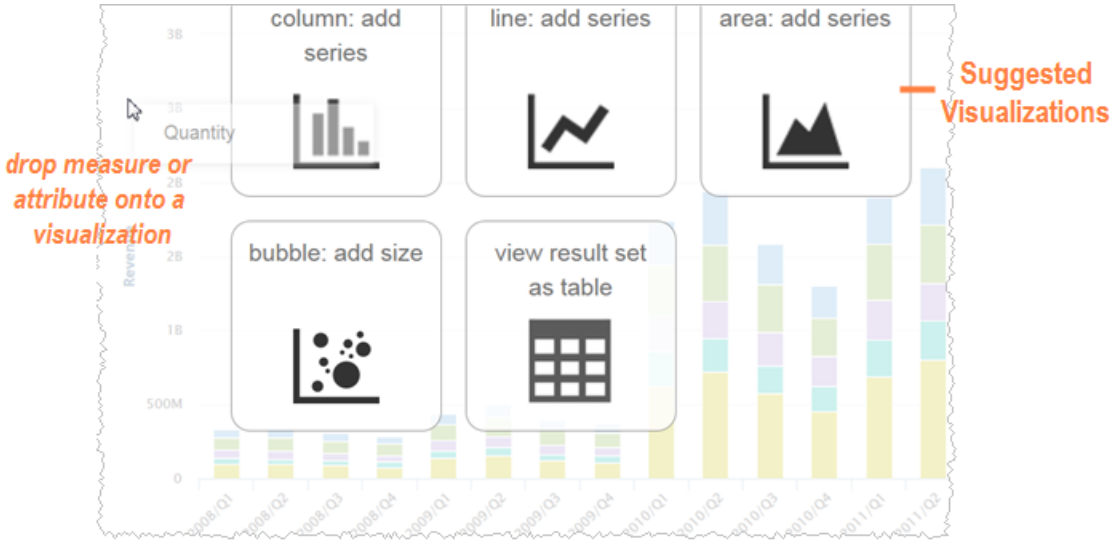
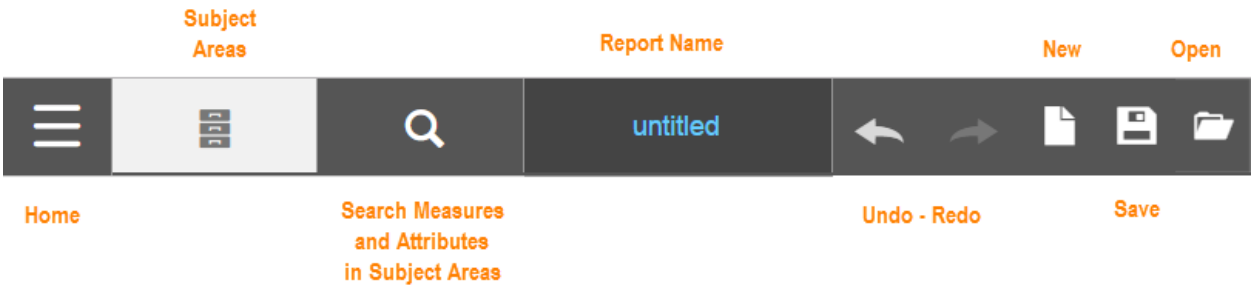
Visualizer Suggestions

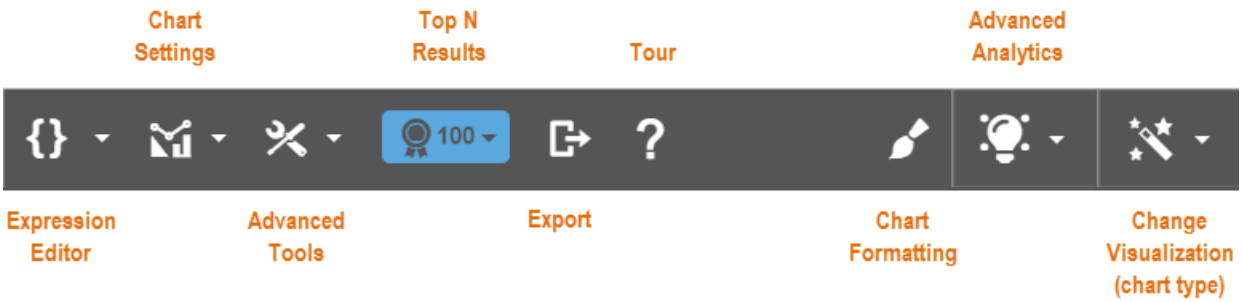


Visualizer Toolbar

The left side of the toolbar:



The right side of the toolbar:



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Visualizer Guided Mode

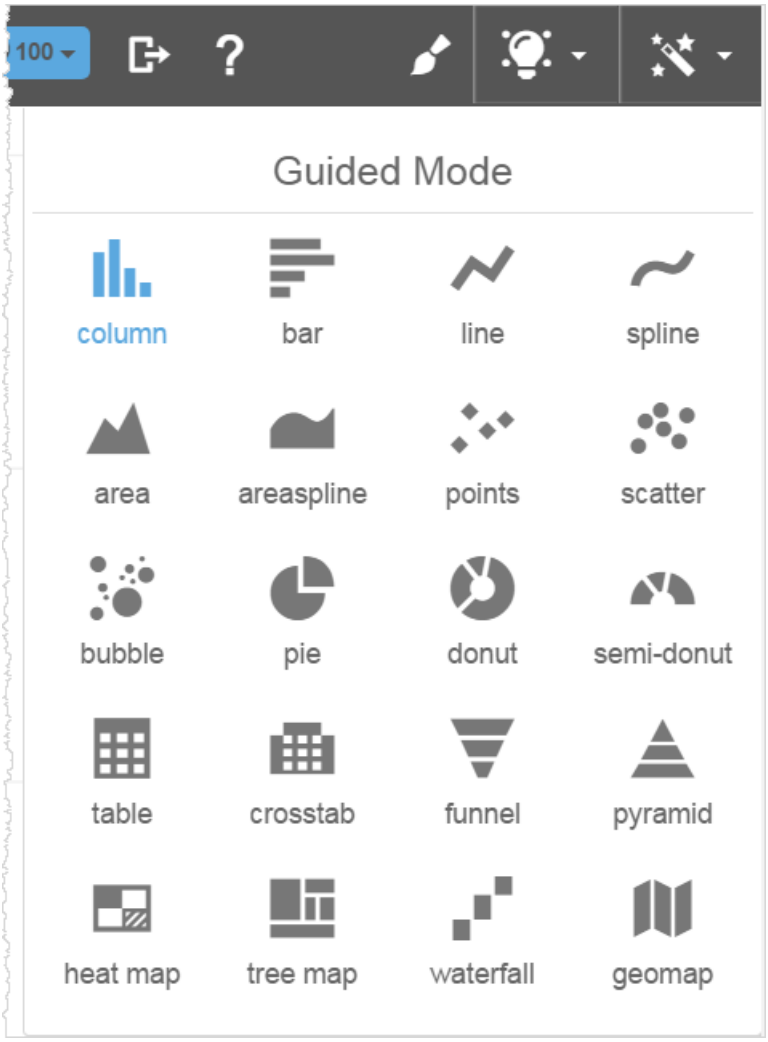

Chart Builder Details

In Chart Builder when you hover over an attribute, measure, or report expression a popup tooltip shows more details about them. For measures, you see the label (alias) name, original name, aggregation, date type, and time series type.

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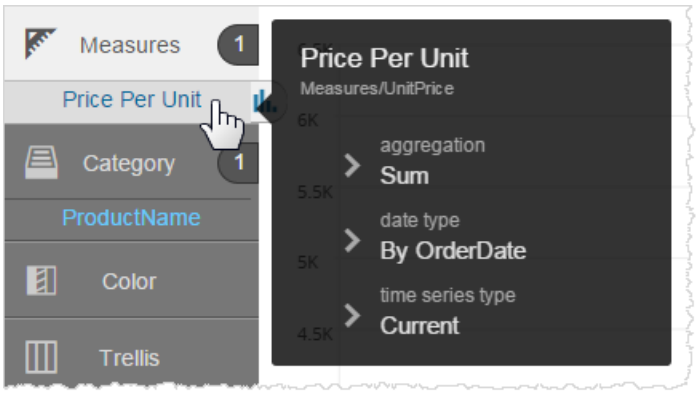

For attributes and expressions, you see the label and the full name.

Accessing Visualizer

Only users in groups that have been granted Visualizer access can see the Visualizer module. Space Administrators can assign Visualizer access to groups.

Visualizer report files (.viz and .viz.dashlet files) are managed by Space Administrators at Admin - Manage Access - Manage Report Catalog, just like reports created in Designer.

To access Visualizer either:

- On the Home page select a space then select the Visualizer module.
- Click the Visualizer link in the navigation bar.
- From a dashboard click the Visualizer icon in the report (dashlet) header or in the Dashlet Actions menu to open a Visualizer report in Visualizer.

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Visualizer Report Basics

Visualizer reports (also called "visualizations") consist of charts (bar, line, scatter, etc.), tabular data (tables and crosstabs), or geomaps (maps. When used with Dashboards 2.0 dashboards, Visualizer reports use responsive design techniques to display well at different sizes, such as on tablets.

Some functionality applies to either charts or tabular data. The following tasks apply to both, for Visualizer reports in general:

- Creating a Report in Visualizer
- Managing Visualizer Reports
- Changing Report Types in Visualizer
- Visually Filtering a Report
- Visualizing Top N Results
- Filtering Data in Visualizer
- Sorting Data in Visualizer
- Creating Custom Groups
- Using Custom Sets
- Using Visualizer Pushdown
- Using As Navigates
- Using Global Filters
- Using Data Buckets
- Removing a Column from a Report
- Drilling in Visualizer
- Report-Level Drill Paths
- Adding an Expression in Visualizer
- Changing Measure Calculations
- Adding a Visualizer Report to a Dashboard
- Opening a Visualizer Report from a Dashboard

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- Creating Column Selectors
- Adding Hyperlinks to a Visualizer Report

See the follow sections for information specific to the type of report you create.

- Chart Reports
- Tabular Reports
- Geomap Reports
- Visualizer Reference

Creating a Report in Visualizer

Tip: Review the basic screen components at Getting Started with Visualizer.

Visualizer gives you flexibility in how you get started creating a report. First, you:

- Access the Subject Area or subject areas as Visualizer allows you to access multiple subject areas with the 5.27 release..
  Tip: See Subject Areas for an overview.

Then you can either:

- Add the data first, then opportunity change the chart type when you know the data you want to use for the report.
- Start with a chart type first, then add the data when you have in mind the type of report you want to create.

Also consider:

- Using Undo and Redo.
- Using Delay Charting mode for improved performance while building complex reports.
- Changing the default result set limit.

To create tabular view of your data, see Working with Tabular Reports.

To create a chart view of your data, see Working with Chart Reports.

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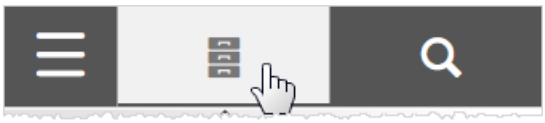
To access Subject Areas in Visualizer

Visualizer supports multiple Subject Areas including custom ones set up by the Space Administrator. In the Help see *Creating a Custom Subject Area*. See .

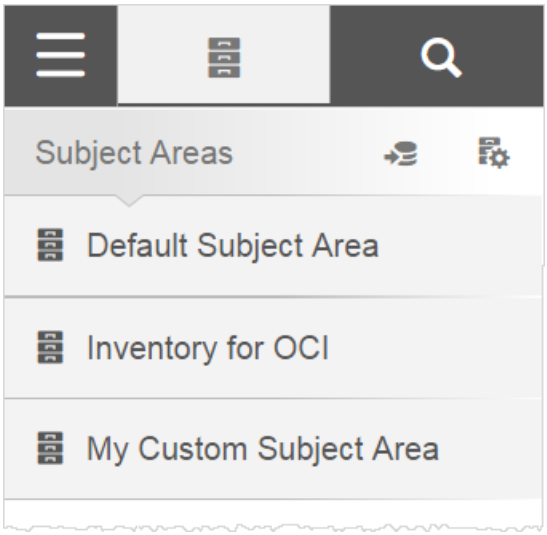
You can select attributes and measures from multiple subject areas for use in a report.

1. In the top menu bar, click Subject Area.



Tip: If you know the name or partial name of an attribute or measure, click the Search button to locate it. The search function returns the fully-qualified names in the Search results, allowing you to pick between objects from multiple subject areas.

Visualizer displays a list of the available subject areas.



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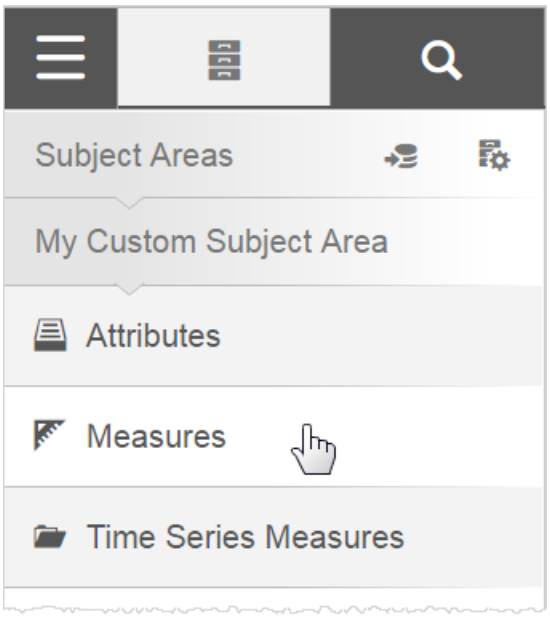
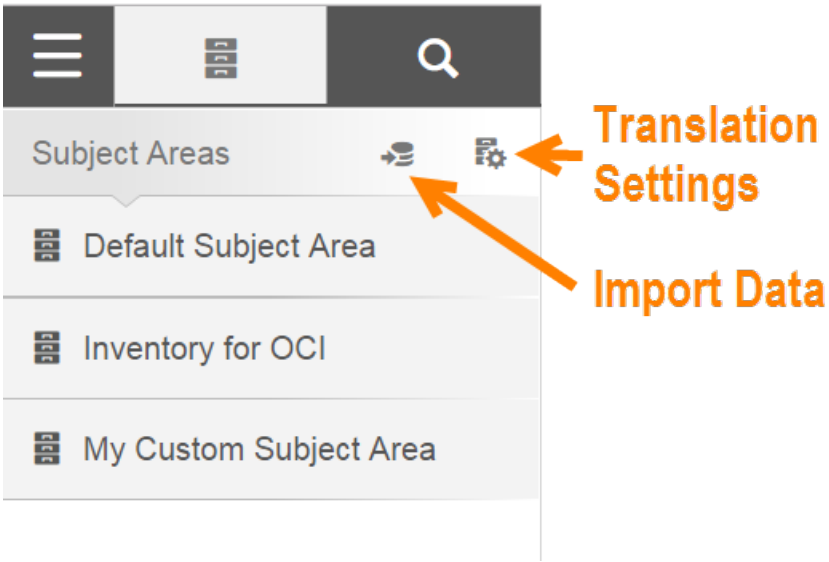
2. Select a Subject Area to access its attributes and measures.



- **Note:** The Subject Area Translation Settings and the Import Data buttons have moved, as shown in the following image:



3. Navigate up and down the subject area lists to add attributes and measures to a report.

Note: The Expression Editor Basic mode now displays attributes and measures from multiple subject areas to build your expressions.

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Starting with Data

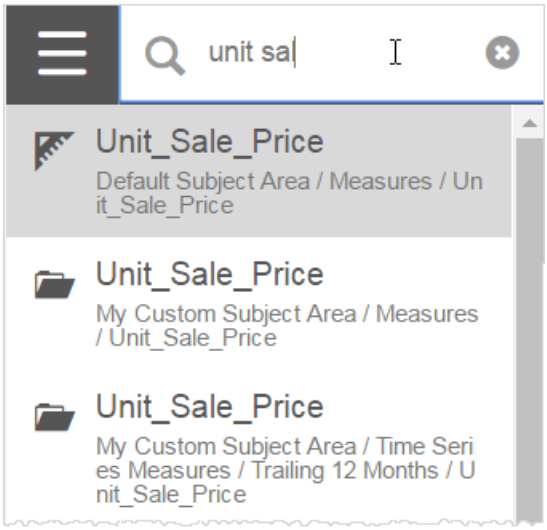
When you are familiar with your data, use Search to quickly find the columns to build your report. When you are not familiar with the columns available in your data, browse the measures and attributes in the Subject Area to see them.

To create a report starting with data

Best Practice: Start with a measure.

1. In Visualizer, locate a measure by either:

- In Search, start typing the name of a measure. Visualizer searches all of the measures, attributes, and folders in the subject areas of the space.



Or:

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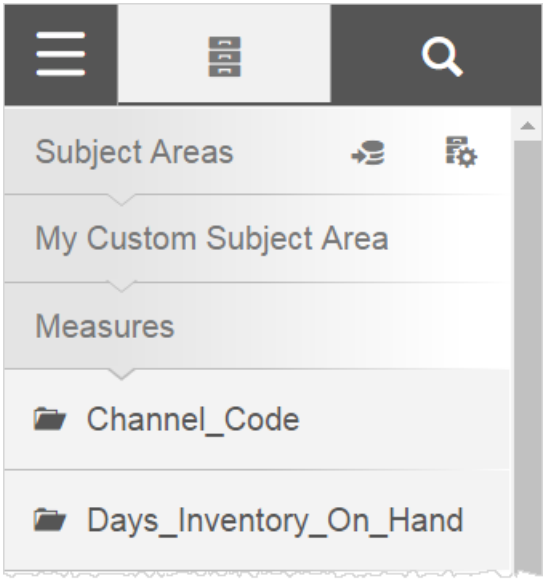
- In the Subject Area, click Measures to browse the list of measures.



Tip: When the name of the attribute or measure includes an underscore (_) or period (.), those characters are omitted from the name in the Subject Area and other parts of the Visualizer interface.

2. Select a measure by either:

- Clicking the name of the measure. (no longer need to double-click)
  Or:
- Dragging and dropping it onto the Canvas.
  Visualizer adds the column to the appropriate bucket in the Chart Builder and builds a visualization on the Canvas. By default, it creates a column chart as indicated by the column icon on the tab next to the measure. **Note**: The Visualizer Chart Builder menu can disappear in a web browser (Chrome, Firefox etc.) if you change the browser font size in the browser settings menu, from medium (recommended) to large or extra-large. If you revert the font size

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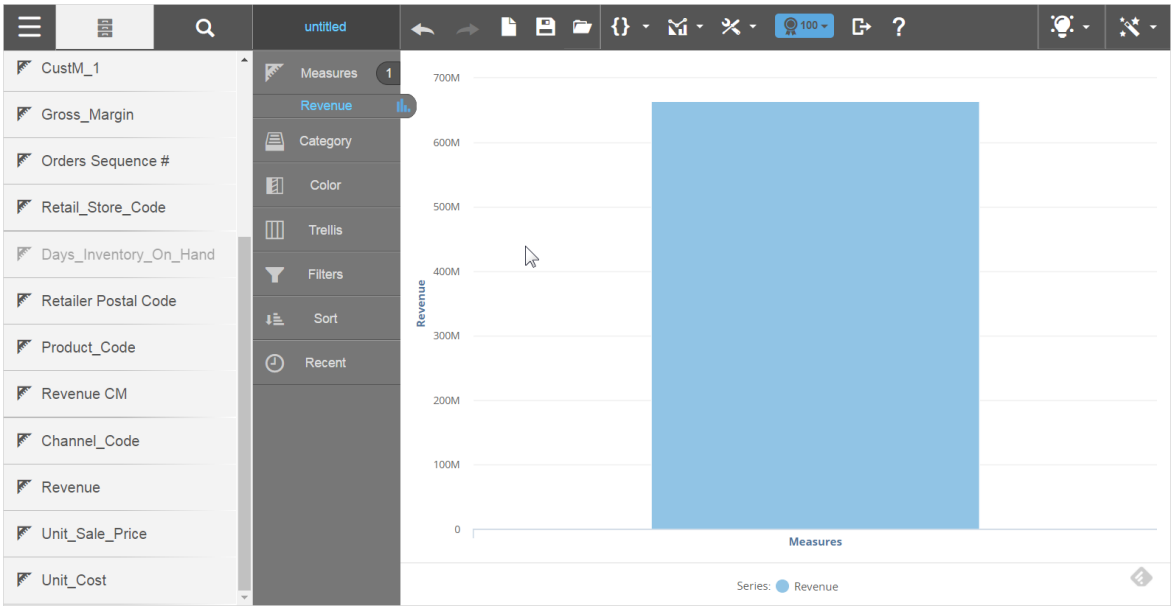
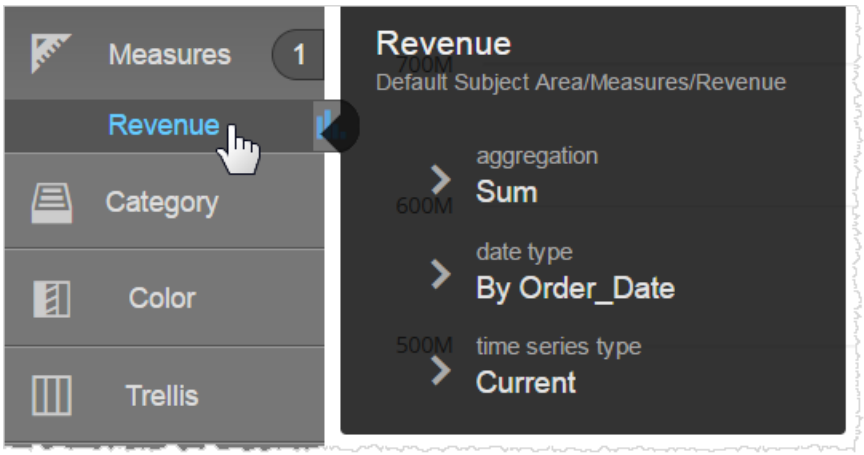
back to Medium, it will restore the staging menu.



3. To see important details about the measure, hover over it in the Chart Builder.



4. To change the properties of a measure, in the Chart Builder click the measure and select from the list of options.

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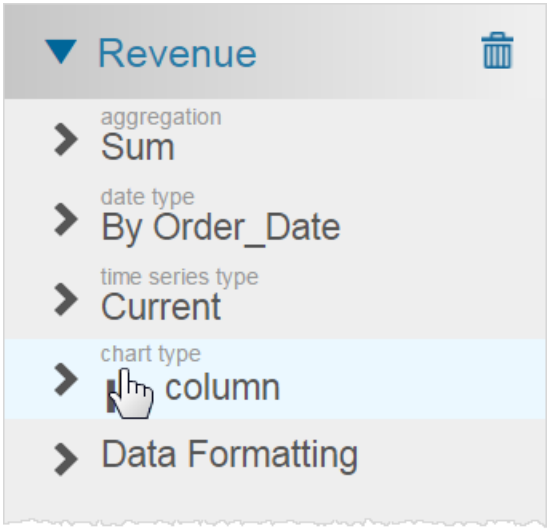

You can change:

- **Aggregation**: Count distinct, count, average, maximum, minimum, or sum.
- **Date type**: By Order_Date, Ship_Date, or other date types that exist in the underlying data model.
- **Time series type**: Current, trailing 12 months (TTM), trailing 3 months, month ago (MAGO), quarter ago (QAGO), year ago (YAGO), quarter to-date (QTD), year to-date (YTD).
  Tip: If you change the time series type, you also need to add a Time attribute such as Time.Month, Time.Quarter, Time.Year to the report.
- **Chart types**: Shows the current chart type and lets you change to another type of chart.
- **Data formatting**: See Formatting the Data in a Visualizer Chart and Formatting Visualizer Tabular Reports.
- **Calculations**: This option appears after you add an attribute along with the measure. See Changing Measure Calculations.

5. To change the label of an attribute or measure, first double-click on its name in Chart Builder, to show its properties list. Then double-click the property name to open the edit box, type the new name, and click Apply (the check box).

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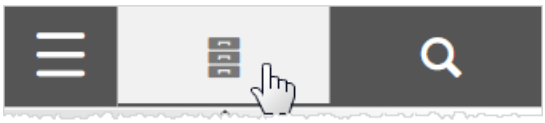
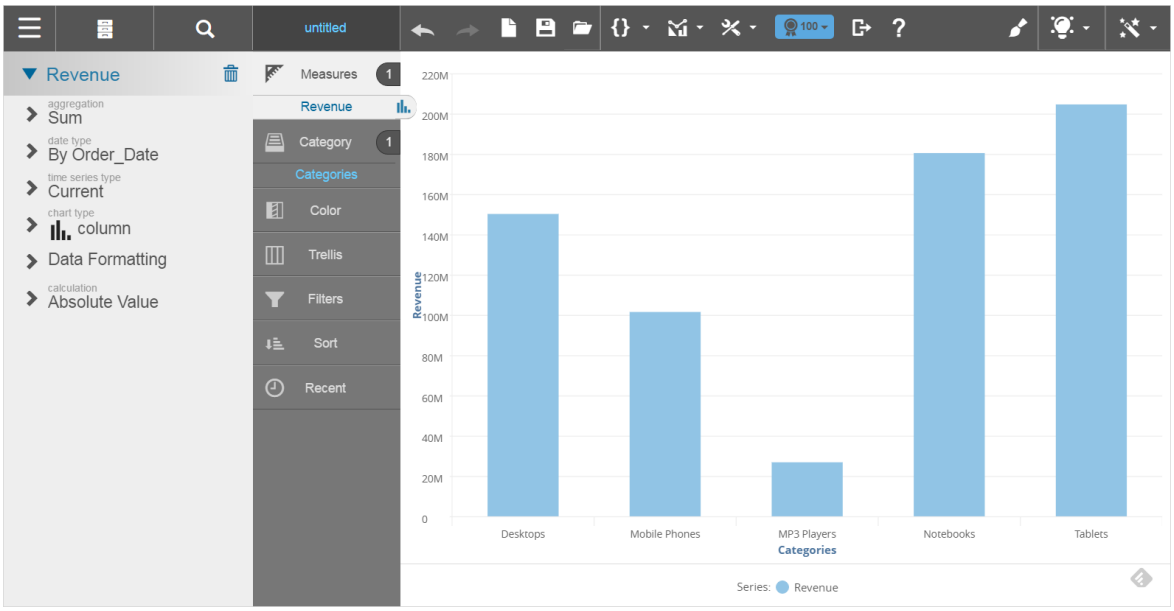
6. Click Subject Area to go back and find the attributes.



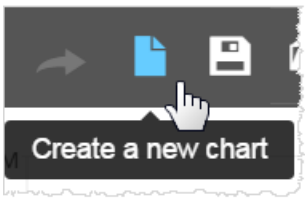
7. Add an attribute.

   Chart Builder adds the attribute to Category and plots a bar chart.



Tips:

- At any time if you want to clear the current report and start over, click Create a New Chart.



- You can drag a column from one section (also called a "bucket") in Chart Builder to another, such as when you want to filter or sort on a column.
- To delete a measure or attribute, drag the name of the measure or attribute from the Chart Builder to the Subject Area and drop it on the Trash.

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- Click on items in the legend to hide or show objects in the visualization. Click the legend icon if you want to show only the selected item (and hide everything else in the visualization). Click the name in the legend to show everything *except* the selected item.
- Visualizer has a 50,000 row limit for tabular data and 2,000 points/rows for chart data.

8. Add any other attributes and measures. Some chart types require columns to be added as colors, shapes or sizes. You can also create trellis charts.
9. Add filters or change the way the data is sorted as needed.
10. Optionally, change the style of the chart by changing its chart type.
11. If needed, you can create an expression and add it to your visualization.
12. You can change the axis labels.
13. Click Save .

Starting with a Chart Type

If you have in mind the type of chart you'd like to create, you can start creating your report by selecting a chart type. Visualizer provides guidance on how to create the chart.

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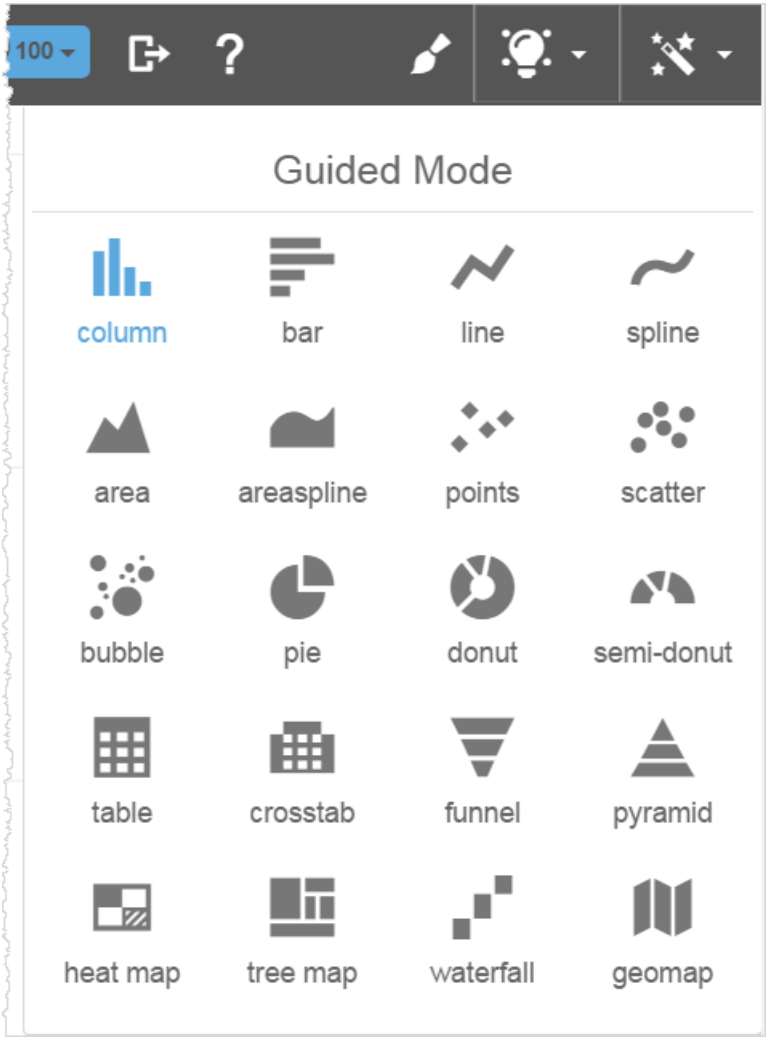
To create a report by selecting the type of chart

1. In Visualizer, click Change Visualization. It shows you the types of available charts.



2. Select the visualization type you want to use.

   Visualizer indicates what attributes and measures are needed to create the report type. Many charts need only one measure and one attribute. Others, such as bubble charts, need more data in order to create a highly useful visualization.

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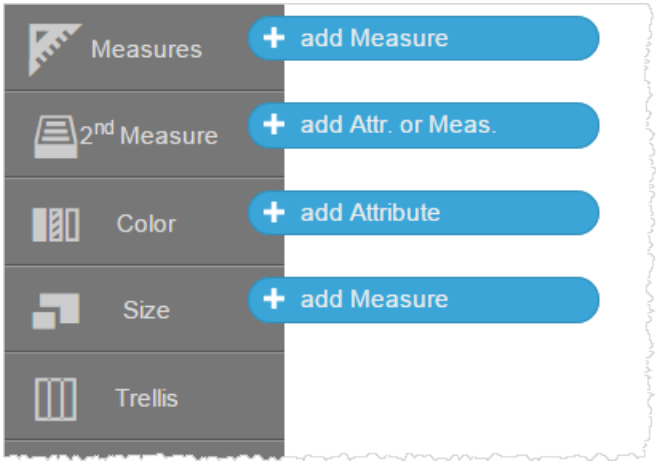

The Chart Builder shows only the sections that are applicable to the chart type. The sections that display (such as Color and Size) differ depending on the chart type you select.

3. Add measures and attributes and save the report as described in the previous section.

Undo and Redo

You can undo and redo most operations from the Visualizer menu bar or by pressing Cntrl-Z/Cntrl-Shift-Z or Command-Z/Command-Shift-Z.

Undo/redo can apply to the last 20 actions. When you save or save-as a report, Visualizer resets the undo/redo history.

Important: Undo/redo is not available when using the Explore in Visualizer feature.

Undo/redo applies to most report-building activities including chart formatting.

Tip: In the Chart Formatting pane, use the keyboard commands. See Keyboard Shortcuts.

The following operations cannot be undone/redone:

- Toggling Delay Charting mode
- Uploading custom maps
- Saved expressions
- Saving and renaming files

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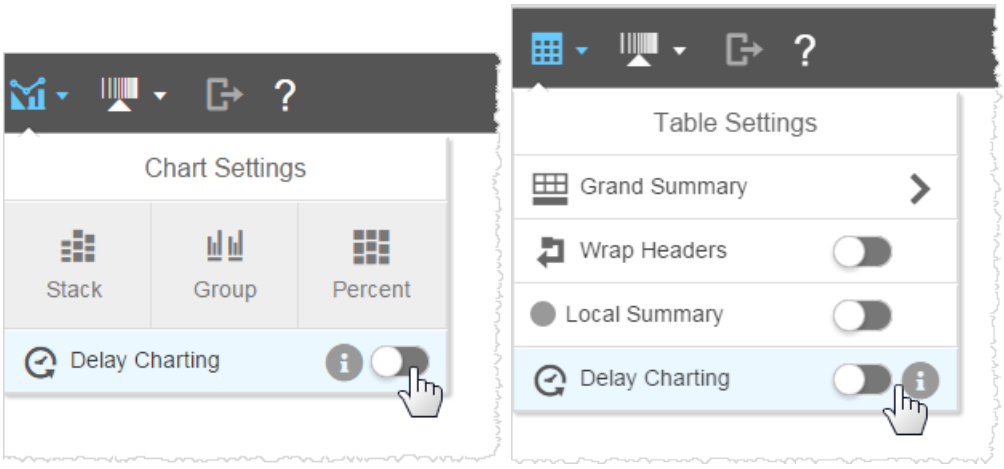
- Editing Column Selectors
- Color palette creation
- Advanced conditional formatting
- Clicking a legend to hide columns
- Creating and saving expressions in the Expression Editor
- End User Data Blending

Delay Charting Mode for Improved Productivity

By default Visualizer builds your charts and tables as you drag-and-drop attributes, measures, etc. When you build a more complicated report and you are familiar with its objects, you may want to avoid the time spent re-rendering the reports. The Delay Charting option caused the report to be rendered when you want it.

To delay rendering

1. From the Settings menu toggle Delay Charting. It is available for both tabular and chart style reports.



The work area displays the Render button.

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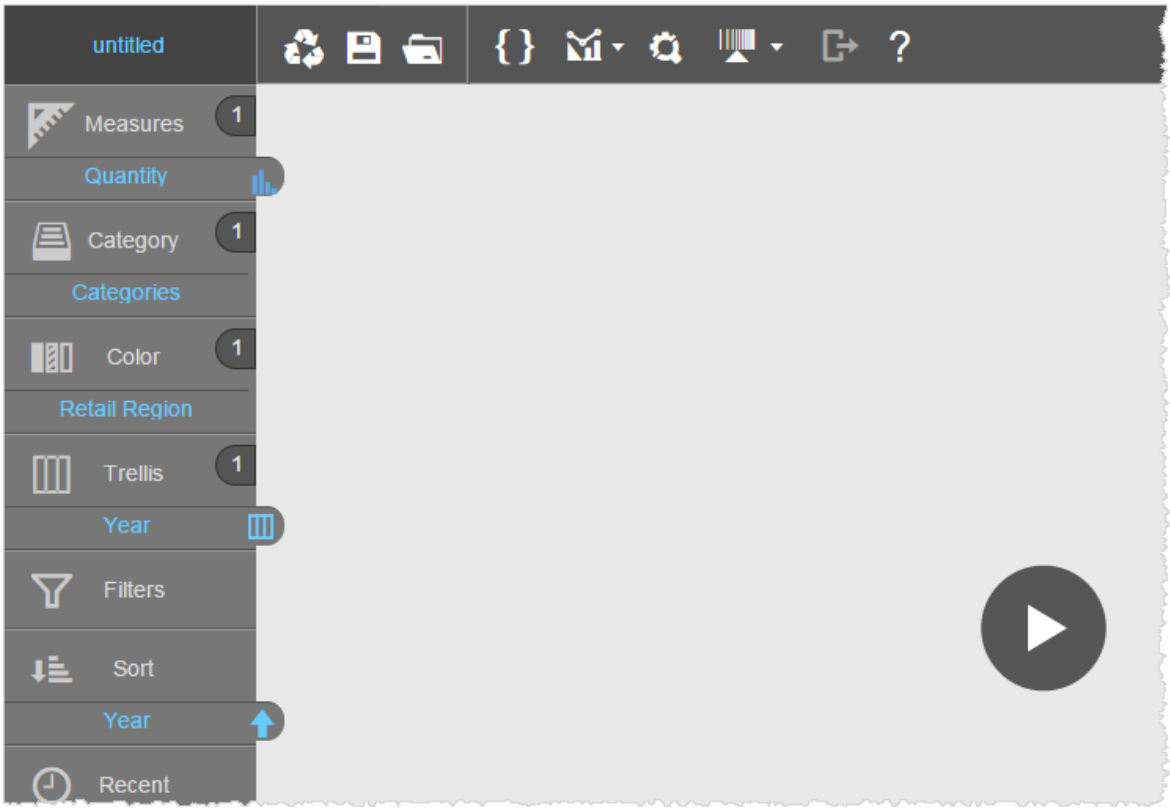
2. Drag-and-drop your measures and attributes. The Chart Builder shows what is in the report but the work area does not show the report yet.



3. Click the Render button.

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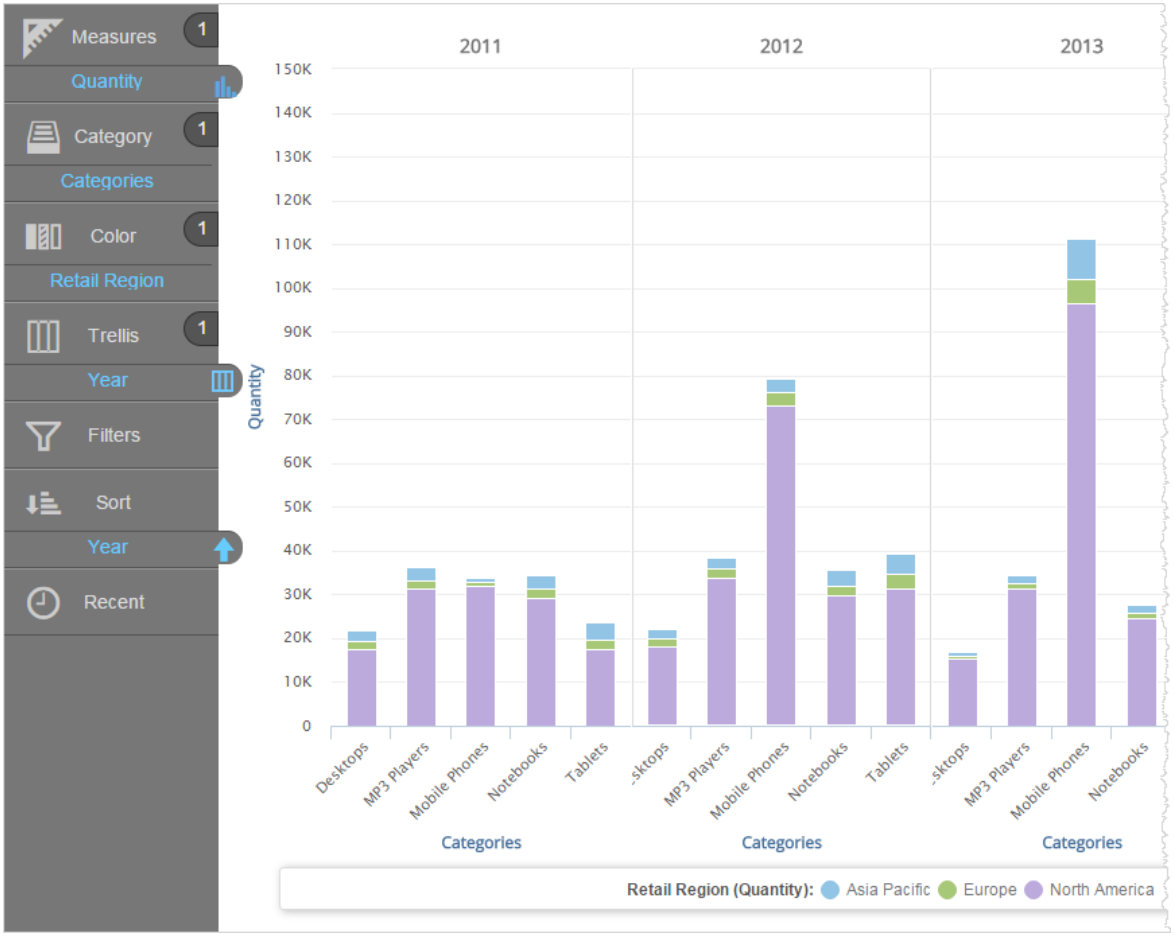
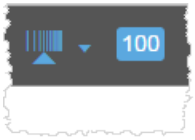
Visualizer renders the chart or table, and resets the mode.



4. To delay rendering again, click Settings - Delay Charting.

The Result Set Limit for Authoring Mode

When you are creating a report, by default Visualizer limits the number of rows in a query result to 100. This is indicated in the Visualizer toolbar.



While creating a report, If the total number of data points in the report are 100 or more, you see a message "Top 100 data points being visualized. Please change the limit to visualize more data points."

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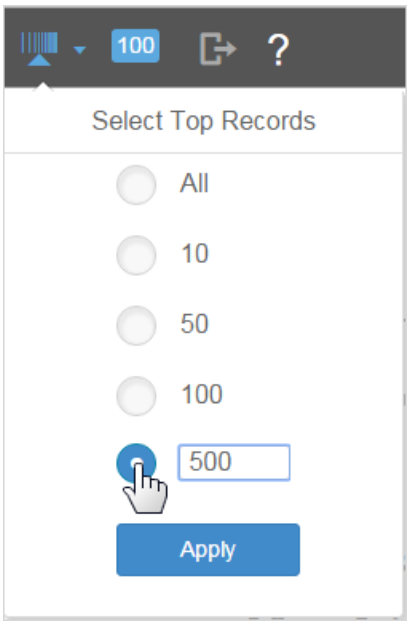
Tip: The default top 100 results are the first rows returned by the query. This is not exactly the same as "Top N" which requires that a sort be applied. See Visualize Top N Results.

Important: Before saving a report, check to make sure the Top N provides what you want for your business users. For example, "All" may be too many rows and may affect performance. Alternatively, 100 rows may not be enough.

To change the result set limit

1. Click the icon.
2. Click the Custom button.
3. Enter the new number.



4. Click Apply.

Managing Visualizer Reports

Visualizer provides the standard report operations, including:

- Save a report
- Open a report
- Copy a report to a different folder
- Export a report to another format

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- Rename a report
- Delete a report
- Create/Rename/Delete a Folder in Visualizer
- See and copy the report query

To save a report

1. To save a report click Save . If it is the first time to save the report, the File Navigator opens.
2. In the left column, select either a private or share folder.

Tips:

- Visualizer reports in the private folder will not be accessible to other users.
- To allow other users to access a Visualizer report when sharing a space, save the report to the shared folder.
- The report name must be unique within a folder.
- Folders that have been created in both Designer and Visualizer are displayed here although only Visualizer reports are individually listed. Reports created in Designer can only be opened from the Designer module.
- A Visualizer report cannot be moved to a different folder from within the Visualizer module. With the 5.27 release, you can create, rename or delete folders in Visualizer. Space Administrators can still move reports to different folders and create and delete folders using Admin - Manage Access - Manage Report Catalog. In the Help see Managing Files in the Report Catalog.

3. Type a name for the Visualizer report in the text box, then click Save.

Visualizer saves the report with a `.viz.dashlet` filename extension to the selected folder

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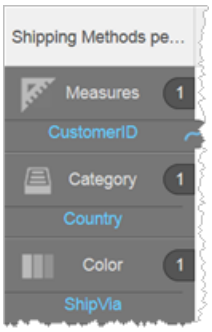
location. It then closes the Report Navigator, and displays the name of the report in the menu bar. The report stays open and ready for more modifications.



Tips:

- Hover over the name of the report to see the path of the report.
- To start fresh with a new visualization click Reset .
- Once a visualization report is saved, you can add it to a dashboard.

To open a report

1. Click Open (the file icon).

2. The File Navigator displays your private folder and the shared folder.
   Tip: You can use the Search box to look for a report by name.
3. Select a folder to see the list of reports in that folder then select the report to open in Visualizer.
   Important: Folders created in either Designer or Visualizer are displayed in the File Navigator although only Visualizer reports are listed. Reports created in Designer can only be opened from the Designer module.

To copy a report

1. Open the report you want to copy.
2. To save a copy click Save As . The File Navigator opens.

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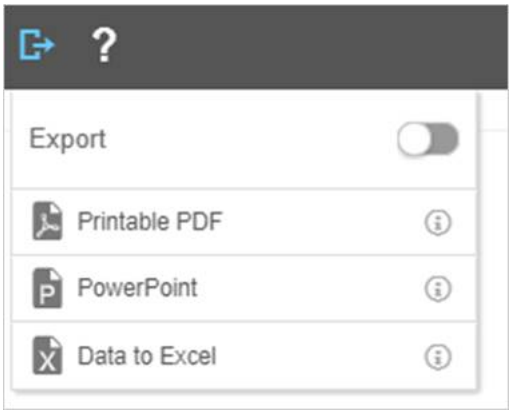
3. Type in the new name of the new report.
4. Click Save As.
5. The File Navigator closes and the new report displays for editing.

To export a report from Visualizer

1. Open the report in Visualizer.
2. Click Export and select from the available export formats.



   - PDF - retains Visualizer formatting
   - PowerPoint - retains Visualizer formatting.
   - Data to Excel - unformatted data
   - Excel Pivot Table - unformatted data

3. Once selected confirmation of file export will appear in the top right of the screen.

Important: To export a report, the user must belong to a user group that has downloads enabled.

To rename or delete a report

1. Open the File Navigator as described in the previous section.
2. Navigate to the report you want to rename or delete.
3. Scroll to the report listing.

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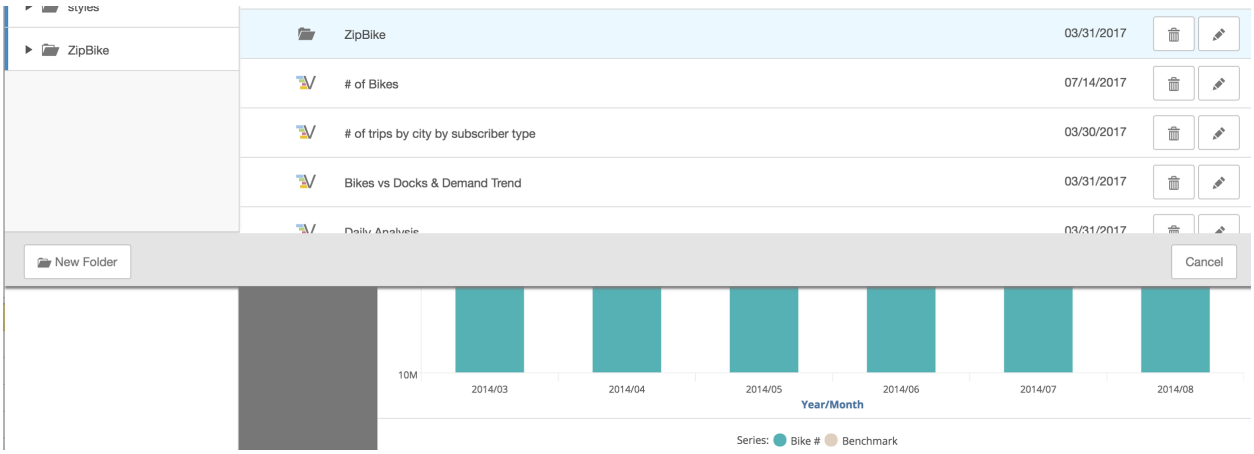
4. To rename the report, click Edit on its listing. Type the new name then click Save.
5. To delete the report, click Trash on its listing. After you confirm the deletion, the report is no longer displayed.
6. Click Done to close the File Navigator.

Create/Delete/Rename Folders in Visualizer

As of the 5.27 release, you can create, rename, and delete folders directly from Visualizer.



To see the report query

1. In edit mode, click Query.

The BQL query or multiple queries that ran on the server display.

2. You can copy the query.
3. Click Done.

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Tip: You can also see the logs that record how the queries go to the data store. See Using Log History.

Changing Report Types in Visualizer

In Visualizer you can switch to a different chart type at any time. If additional measures or attributes are required for the chart type you select, Visualizer provides the guidance you need.

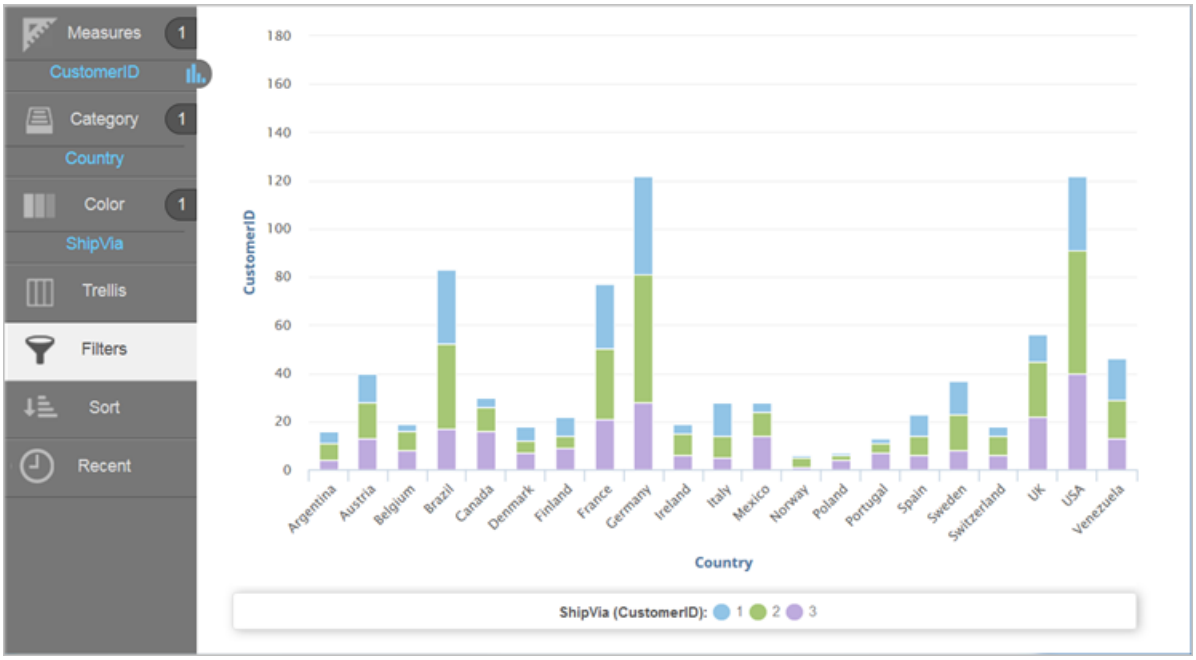
By default new charts use Turbo style, if available. See Using Turbo Charts.

To learn how to combine multiple chart types, see Creating Chart Layers in Visualizer.

To switch the chart type for a report

1. In Visualizer, add one or more measures and attributes to plot a chart. See Creating a Visualization in Visualizer.

   For example, start with a column chart.



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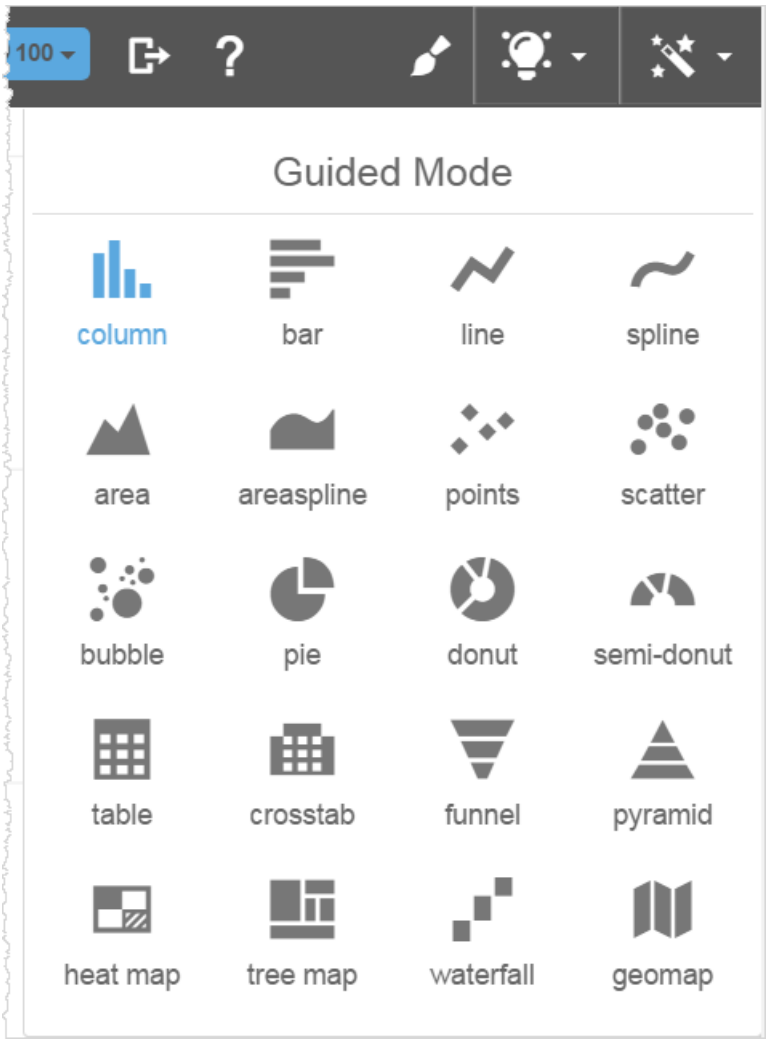
2. Click the Change Visualization button to enter Guided Mode. It shows you the types of available charts, with the current chart type indicated in blue.



3. Select the chart type you want to use. For example, you can change a column chart to a spline chart.

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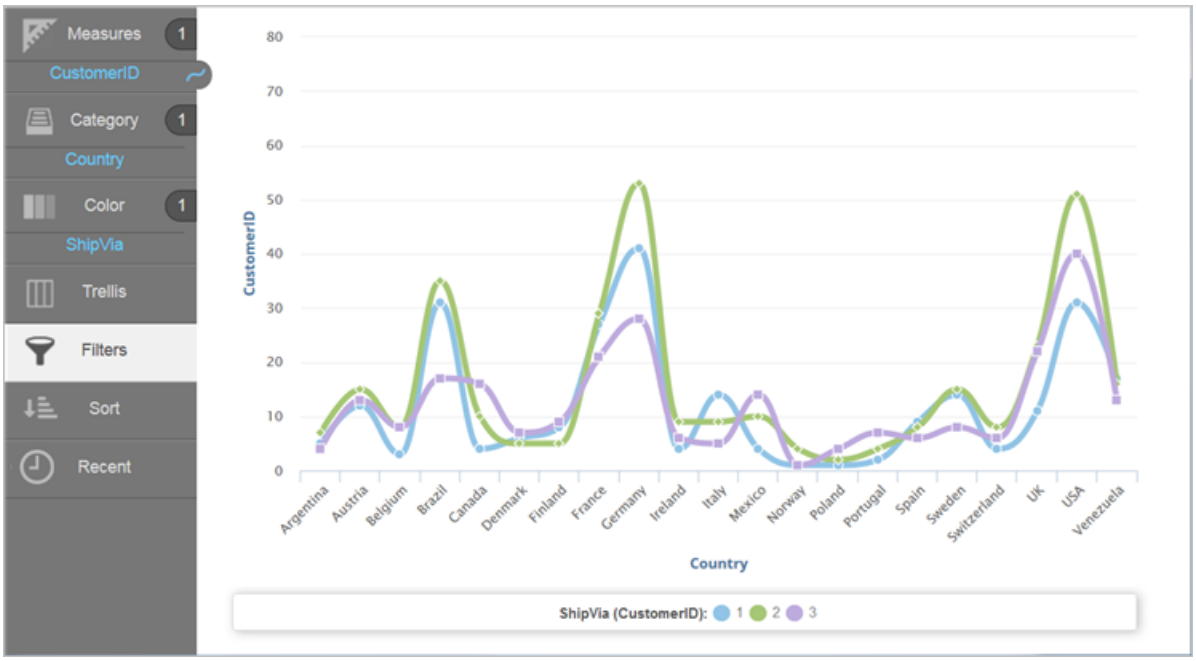
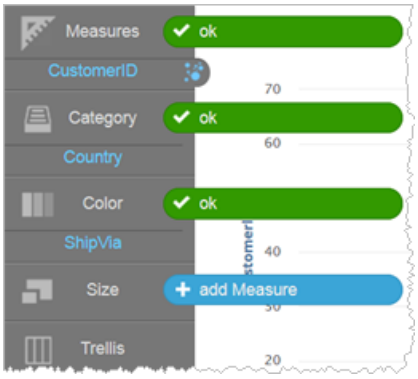


If you select a chart type that requires more measures or attributes than you currently have, Visualizer prompts you to add the required attributes or measures to the necessary buckets. You can either add the additional columns required for the chart or select a different chart type that is appropriate for the measures and attributes you already have.



4. Click Save .

Visually Filtering a Report

You can visually filter data in most reports by dragging a capture rectangle around the attribute values in a chart or table to select only those values. Some reports, such as pie and donut charts, use keyboard commands to filter.

Funnel and pyramid charts do not support visual filtering.

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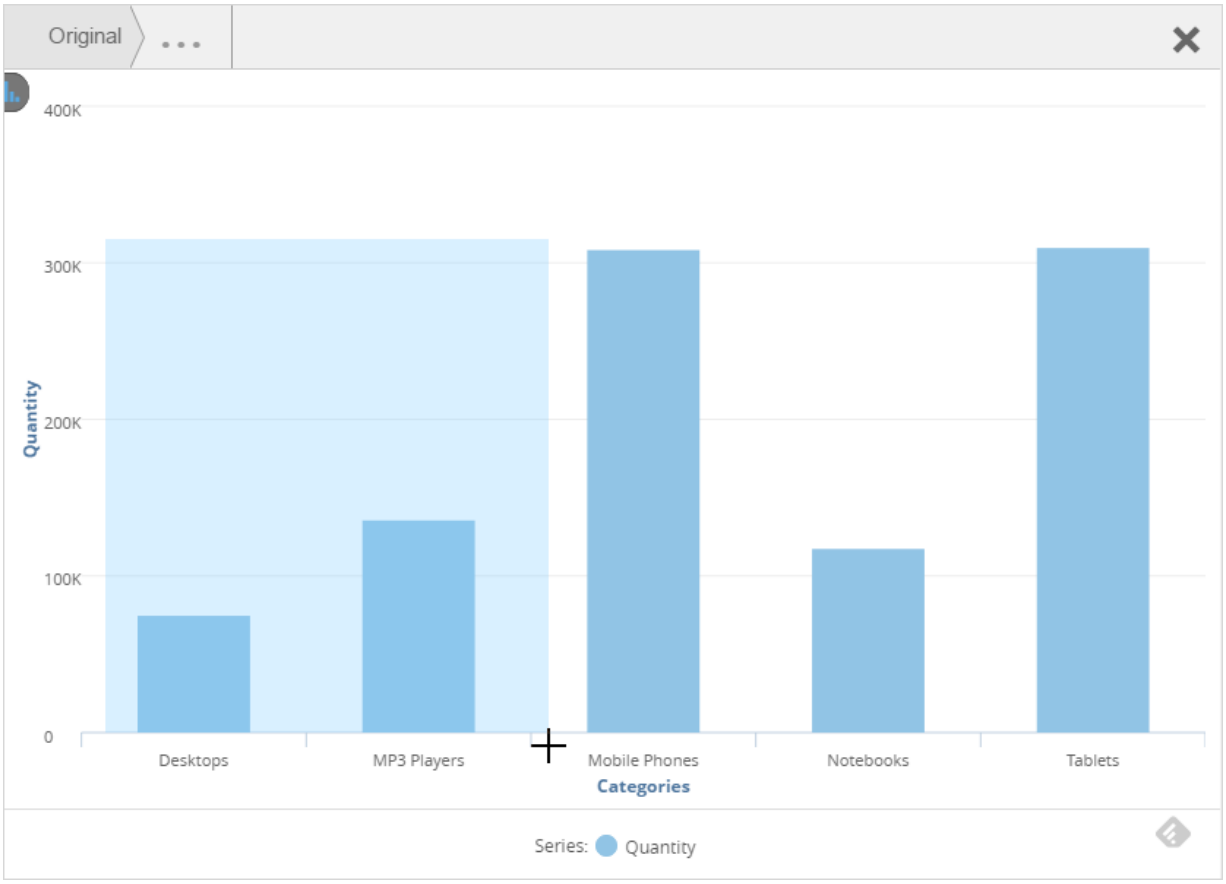
Alternatively, you can filter the data by dragging an attribute or measure to the Filters bucket in the Chart Builder. See Filtering Data in Visualizer.

To drag-select the data to filter

Drag-select works both while editing in Visualizer and when browsing reports in Dashboards 2.0.

1. Click and drag across the desired region.



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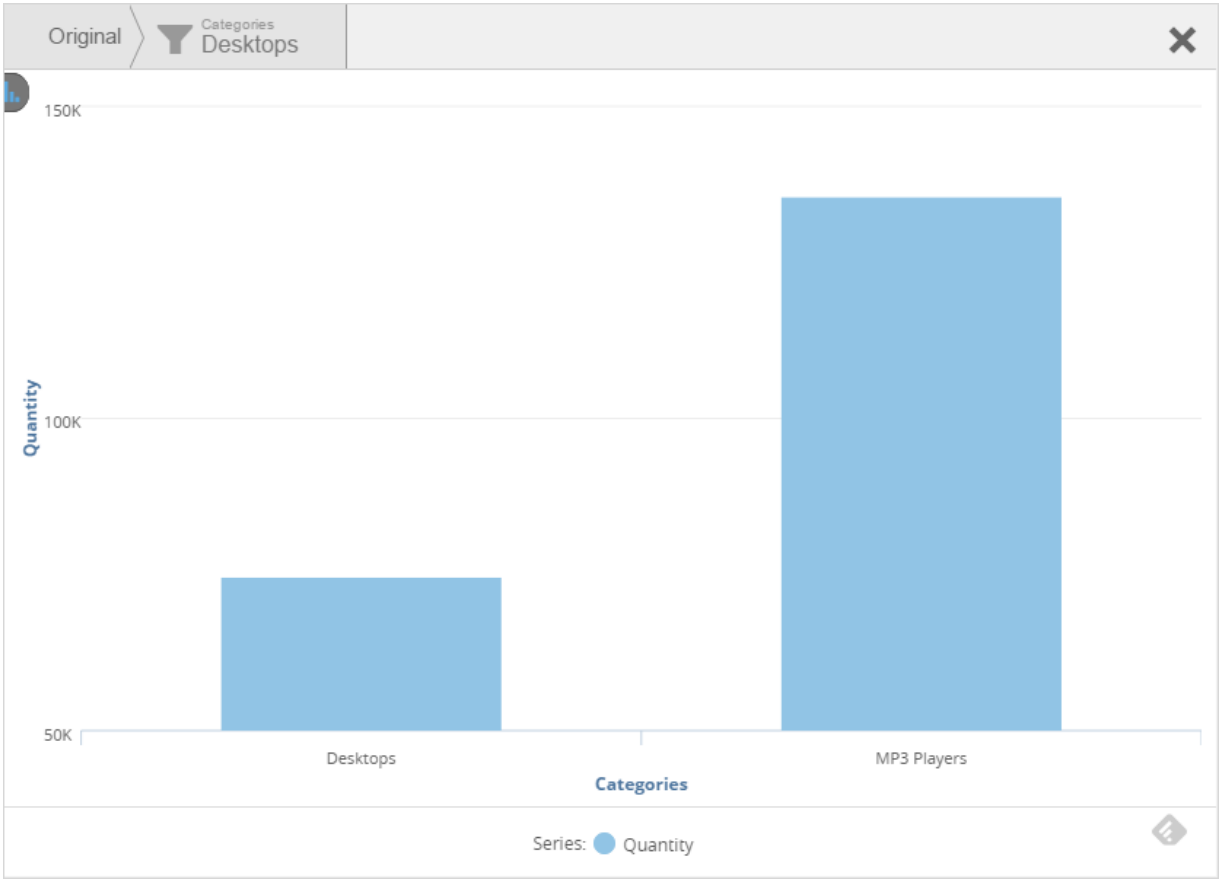
2. Let go the selection. The chart updates based on your selection and the name of the filtered column displays in the Filters bucket.



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Tree Map Visual Filtering

To use keyboard commands to filter pie and donut charts

Pie, donut, and semi-donut charts use keyboard commands instead of drag-select.

1. Press a command key:
    - On a PC: Press Cntrl
    - On a Mac: Press Shift

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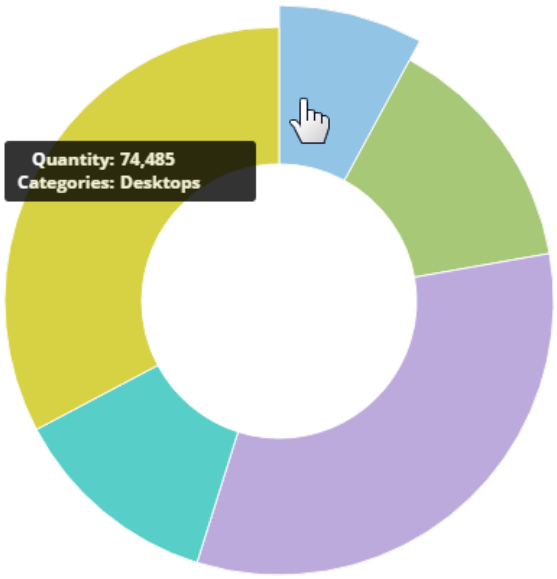
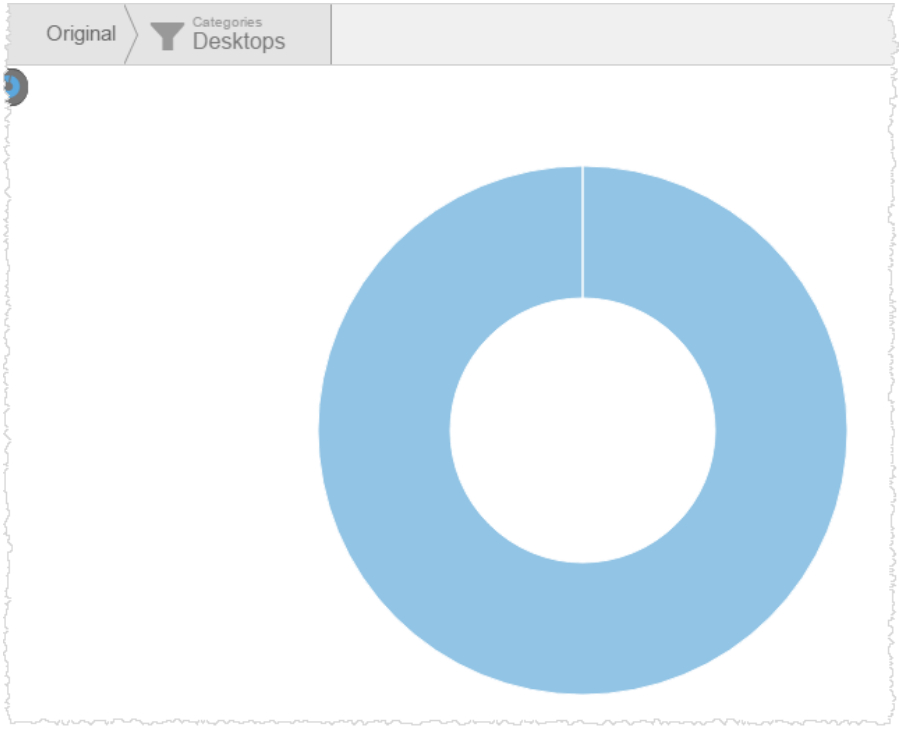
2. Click on a segment of the chart. The segment enlarges.



3. Let go the keyboard. The chart (and dashboard, if in Dashboards 2.0) updates to use the selected filter. You can see the current filter at the top of the work area.



Tips:

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- Click the Filters bucket to see or change the filter conditions.

- You can toggle the filter on and off using the toggle switch.
- You can remove the filter by clicking the Remove icon.
- A visualization can have multiple filters.
- You can use a Visualizer report expression as a filter by dragging and dropping it to the Filters bucket. However, you cannot filter the data using a saved expression (a shareable expression) created in Designer.

Visualizing Top N Results

You can limit the results displayed in a visualization to a subset of the rows returned from an ordered set of data. "Top N" is the set of results at the top of an ordered set. "N" is the number of results to show.

Top N Results is useful when you have a lot of results and you don't need to show all of them in the report. Another scenario is when you want to highlight the top or bottom rows of a set, such as the highest numbers or lowest numbers. Use Sort to change whether the Top N is in ascending or descending order.

You can preset an exact number of rows to return, or you can pass a value chosen by a user from a Dashboards 2.0 filter.

- Tips for using Top N
- To specify the exact number of Top N results
- To use a parameter filter as the Top N value - GETPROMPTVALUE

Tips:

- By default the Top N is set to 100 of the first rows returned by the query, without a sort.
- In Visualizer you can change the value for Top N either before you add measures and attributes or after a report is already created.

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- For large result sets, using “All” can affect performance.
- A Dashboards 2.0 filter can pass a value to Top N using the BQL GETPROMPTVALUE function. During development this value may not yet be available in Visualizer, in which case all rows are returned. You can add a default value to the GETPROMPTVALUE expression to see it work from within Visualizer. Once the report is added to a dashboard and the filter applied, the value updates accordingly.
- Top N also supports the GETVARIABLE expression.
- When Top N is applied on a table, business users can choose to see one of two version of the Grand Summary:
    - “Local” Grand Summary associated with the visible result set after Top N has been applied.
    - “Global” Grand Summary associated with the entire result set, independent of Top N.
- If you want the data ranked in order to show the top or bottom rows, first order the data, either ascending or descending, using Sort in Chart Builder. See Sorting Data in Visualizer.
- During development, you can look at a table view to see the ordered set of data and use it to help decide the number to use for Top N.
- Check to make sure the Top N provides what you want for your business users, and does not return unnecessary rows. Large result sets can affect performance and may not be needed by your users.

To specify the number of Top N results

1. For example, starting with a report of Retail Stores with the highest Revenue with Revenue sorted descending.

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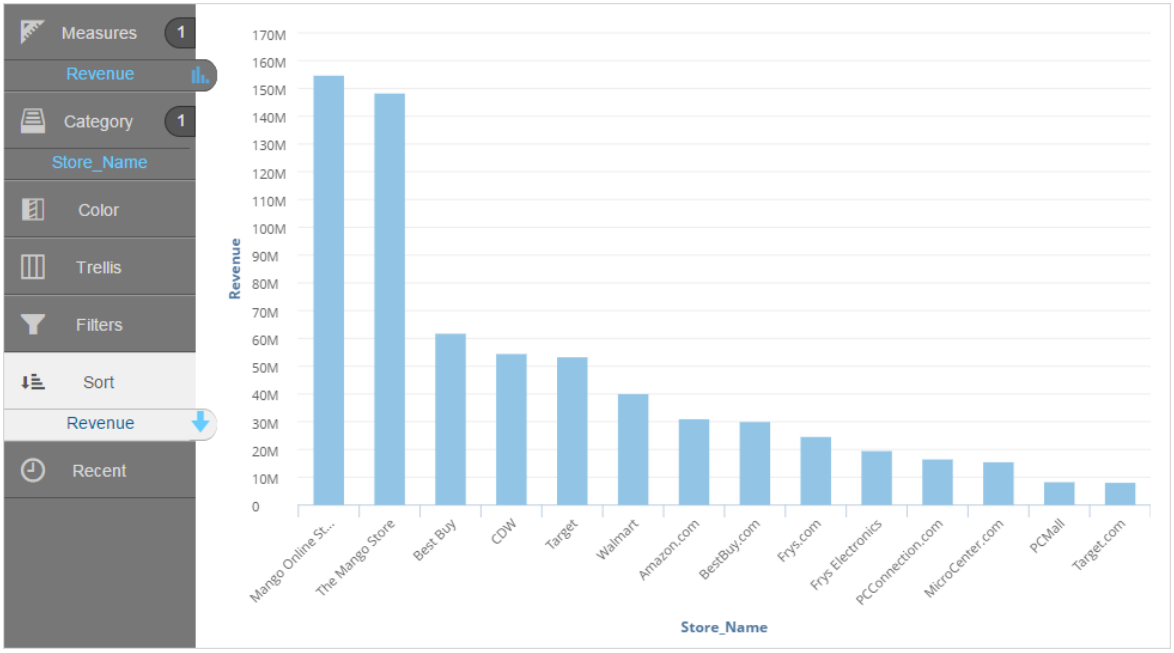
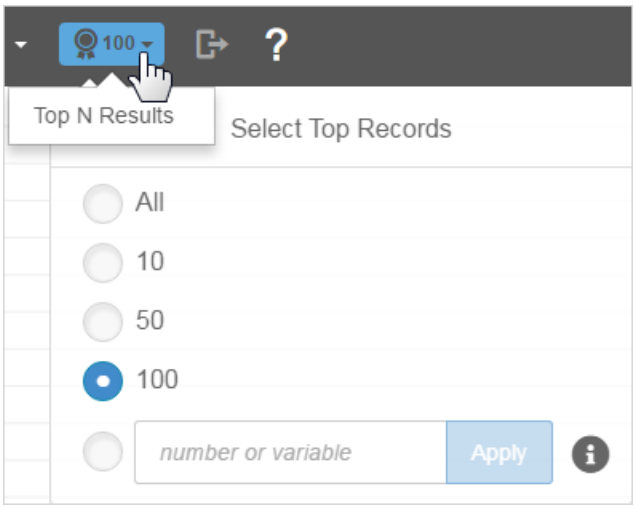


2. Click the Top button to open the Select Top Records menu.



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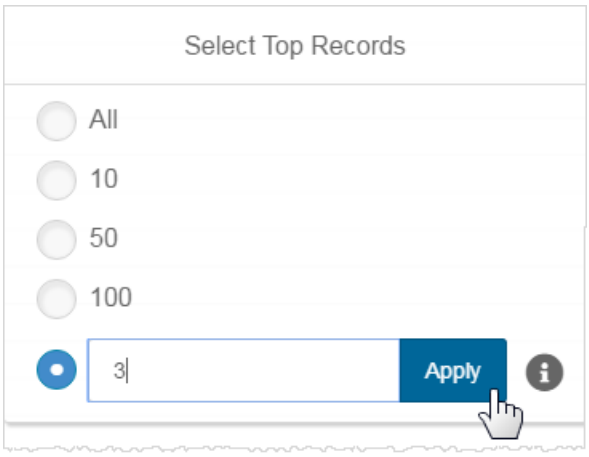
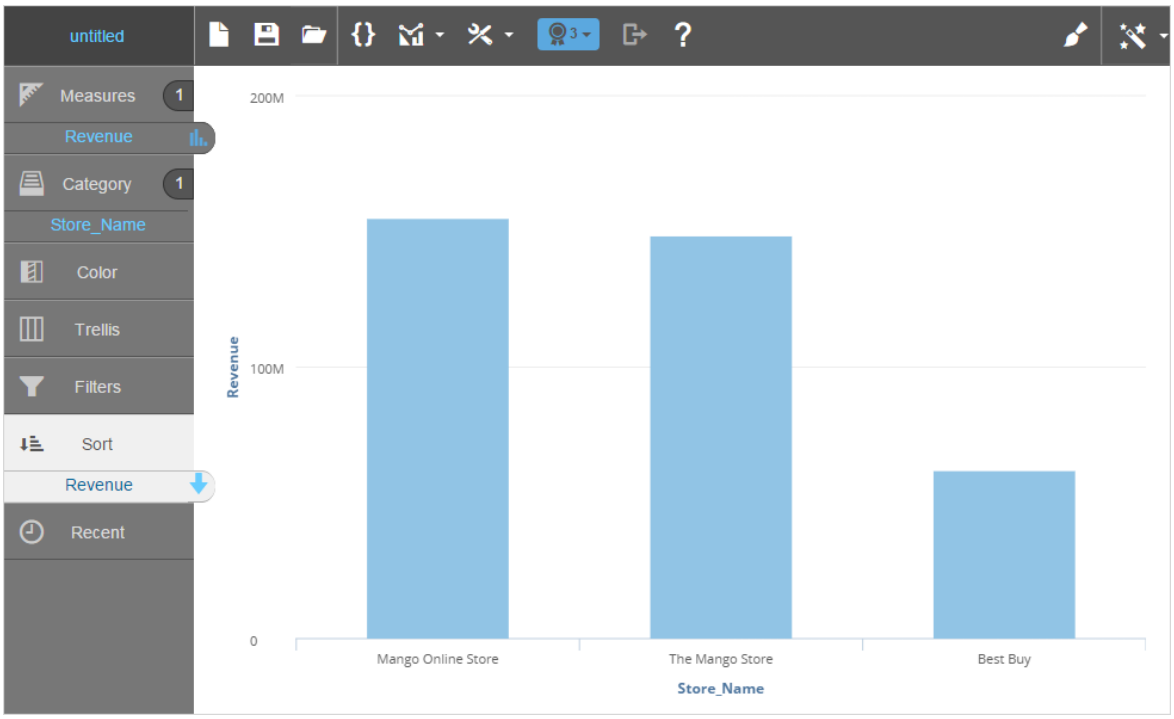
3. Select an option, or enter a number and click Apply. The report updates immediately.



The Top N button at the top shows the current number of results.



To use a parameter filter as the the Top N value

To get the number of rows from a filter that is on the report, use GETPROMPTVALUE. In the Help see *GETPROMPTVALUE and GETPROMPTFILTER*.

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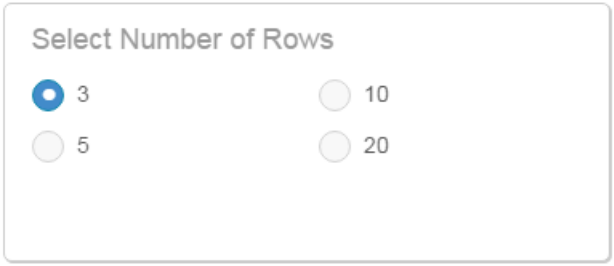
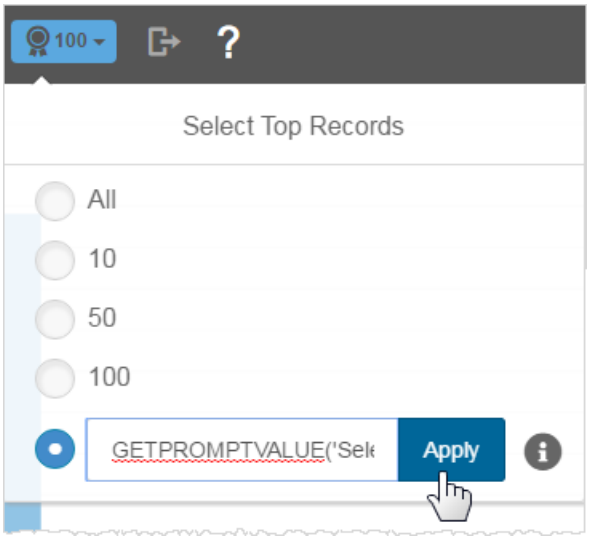
1. For example, to have a business user set the Top N from choices you provide, create a parameter filter in Dashboards 2.0. Use the Make Mandatory option to require a value.



2. In Visualizer, enter the GETPROMPTVALUE expression in the Select Top Records dialog. The first parameter is the name of the dashboard filter, and the second is the default value.

```
GETPROMPTVALUE('Select Number of Rows', '3')
```



Visualizer validates the expression as you enter it. When you click Apply, the Top N button in the Visualizer menu bar shows that it is using a BQL expression.

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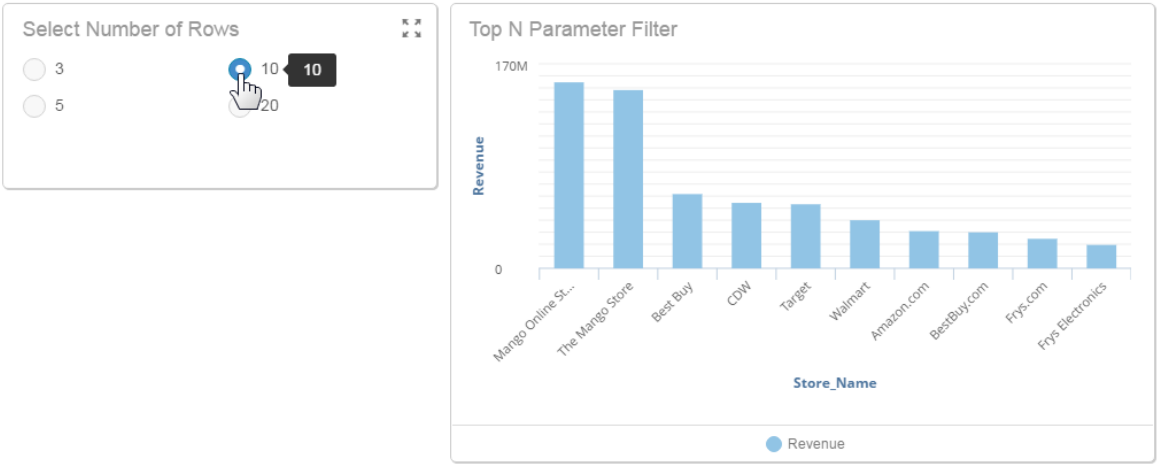
3. When a business user changes the filter, the report updates the Top N value.



Filtering Data in Visualizer

Use the Filters bucket in the Chart Builder to filter the data in one of the following ways:

Drag and drop a measure or attribute from the Subject Area onto the Filters bucket.

- Filter on measures and attributes that have already been added to the report, as described in the following section.
- Alternatively, you can also visually filter a report by dragging a capture rectangle around attribute values in the chart. See Visually Filtering a Visualization.

Tip: When starting a new report, you can add a measure or attribute to the Filters bucket first and configure the filter before adding the measures and attributes. The filter will be applied to any measures and attributes that you subsequently add.

Important: Set-based filters (BQL IN, NOT IN) are not supported in Visualizer.

To filter the data in a report

1. In Visualizer, add one or more measures and attributes to plot a chart. For example, Days Inventory on Hand by Retailer Country sorted by Days Inventory on Hand.

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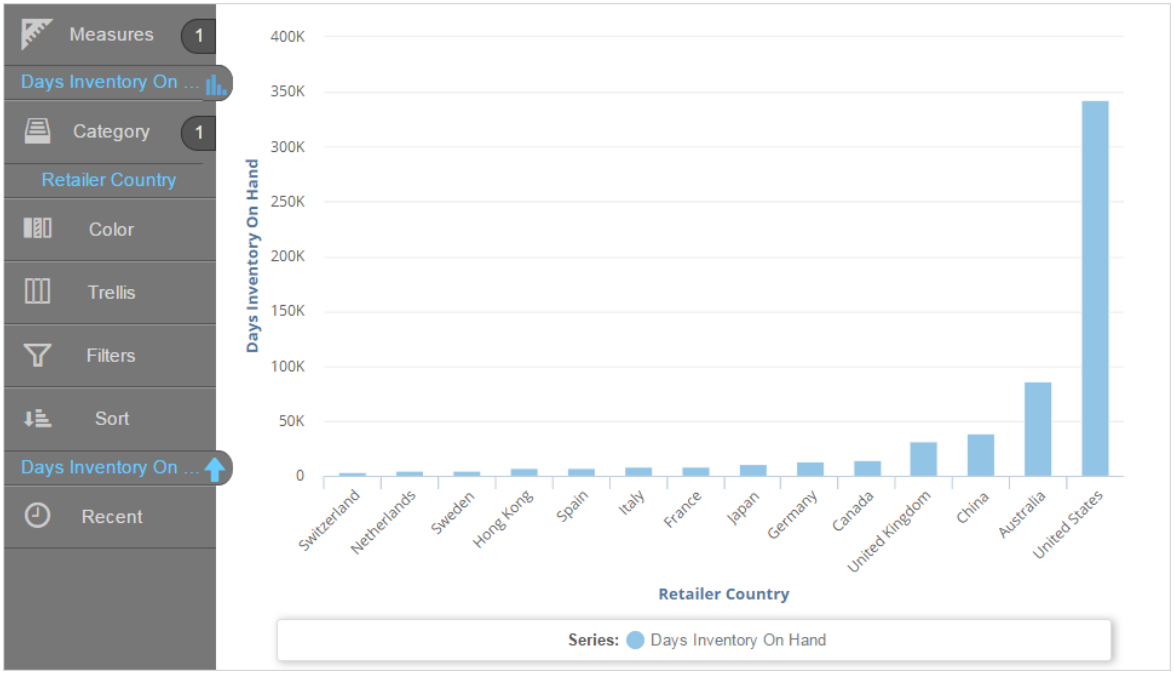
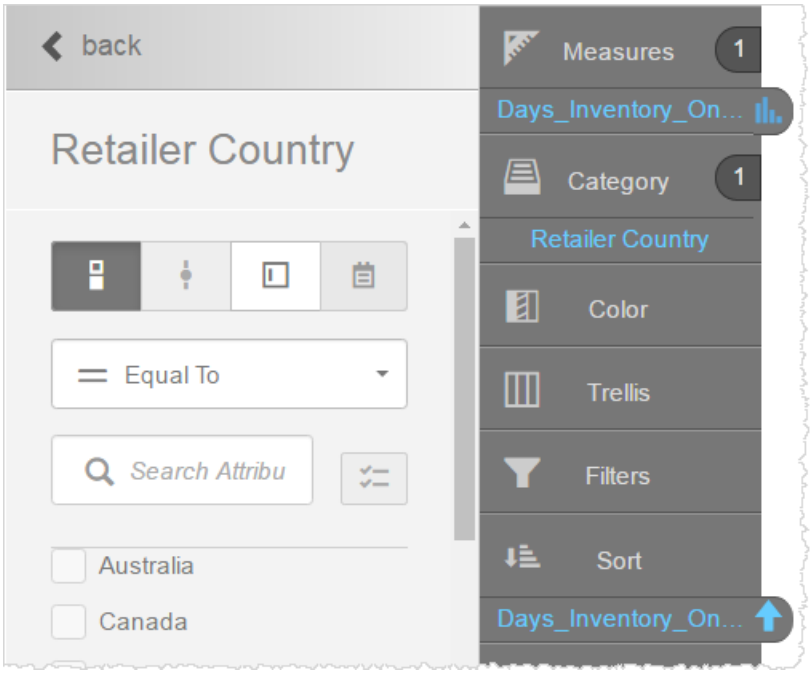


2. Search for or drag and drop a relevant column onto the Filters bucket. For example, drag and drop Retailer Country onto the Filters bucket.

   The Filter Editor opens.



Tip: The Filter Editor lists the first 100 values, though you can find additional values using search.

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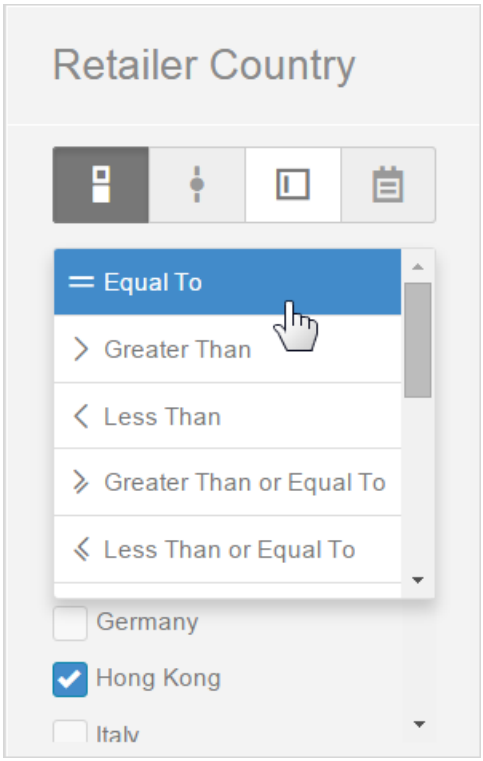
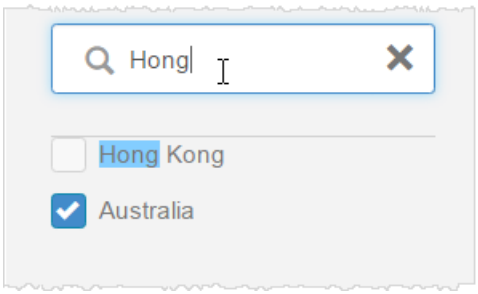
3. Select the filter style. Styles are available based on the data type. Styles include:
    - Check list (**check box**): for multi-select text-based or numeric data types.
    - **Slider**: for date, datetime, and integer data types.
    - **Value**: for text-based data.
    - **Date picker**: for date data types. See Tip below.
4. Select the filter operator. You can:
    - Select values from the list and use the operators to specify a filter set.



    - If there is a long list of filters, use the Search field to quickly find the ones you need.



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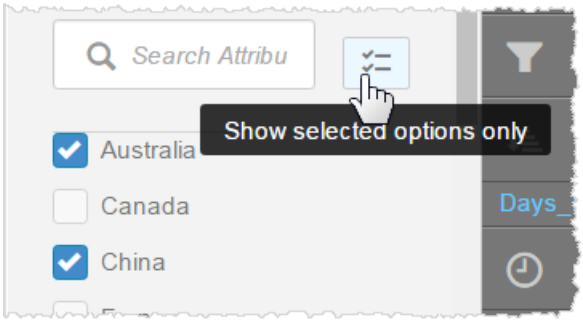
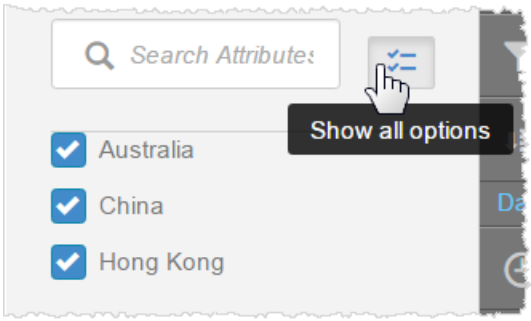
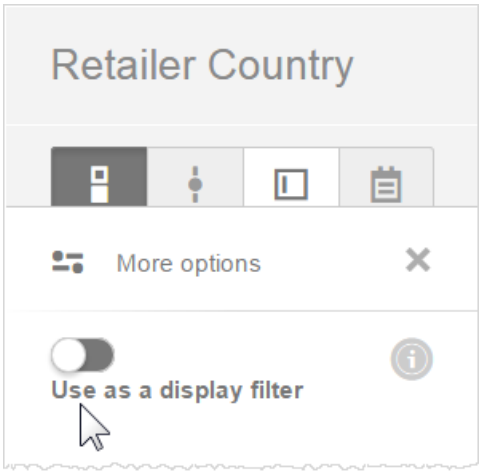
- For long lists, use the Show Selected Options only button.



Click it again to see and scroll the first 100 options.



- If you want the filter to apply against the query result set in memory, select the More Options - Use as a display filter option. By default this setting is off and the filter operation is carried out at the data source.



For details, in the Help see *Introduction to BQL - Queries and Where Calculations Occur*.

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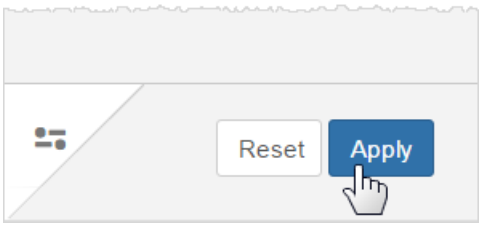
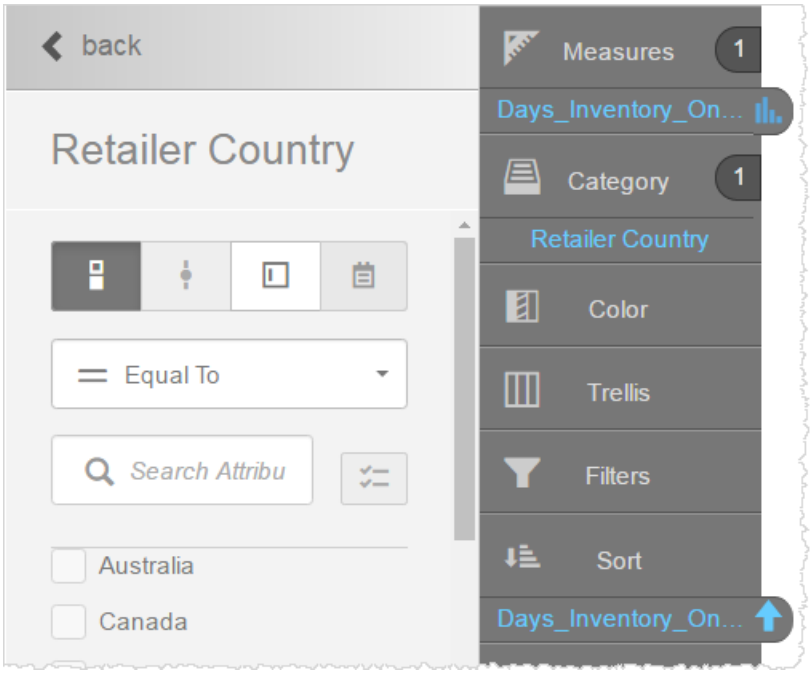
5. Click Apply.



The chart updates to reflect the filter applied to the data.

6. Select the Filter bucket to see the current filter.



Tips:

- You can toggle the filter on and off using the toggle switch. In a dashboard, when a filter is toggled off it maintains its state, but it is not applied to the dashboard.
- To change the filter condition, click on the filter name in the Filters bucket.
- A report can have multiple filters.
- A filter column does not have to be in the Category bucket; it does not have to display in the report.

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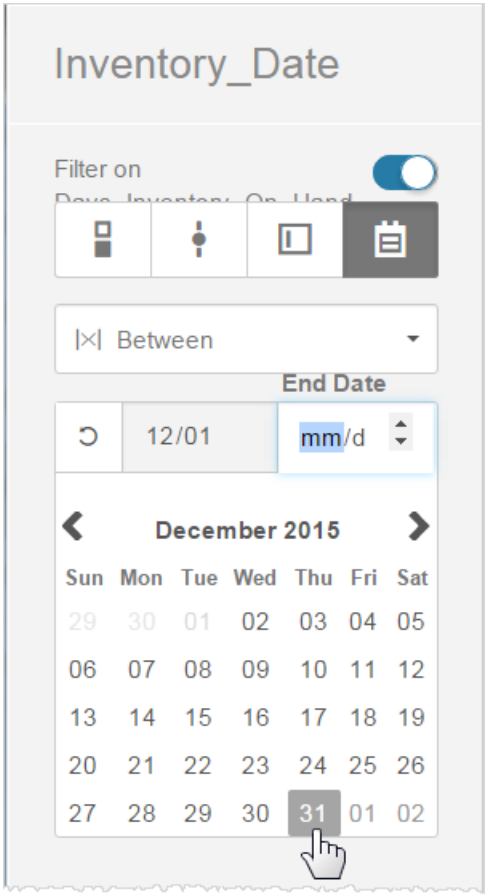
- If you want to filter on a column you are already using in your chart, you can drag the column from its current bucket to the Filters bucket. Visualizer will not remove it from the current bucket and will add it to the Filters bucket.
- You can remove the filter by clicking the Remove icon.
- You can use a Visualizer report expression as a filter by dragging and dropping it to the Filters bucket. However, you cannot filter the data in a report using a saved expression created in Designer.
- To filter on date type attributes, use the range (between) condition and the date picker.



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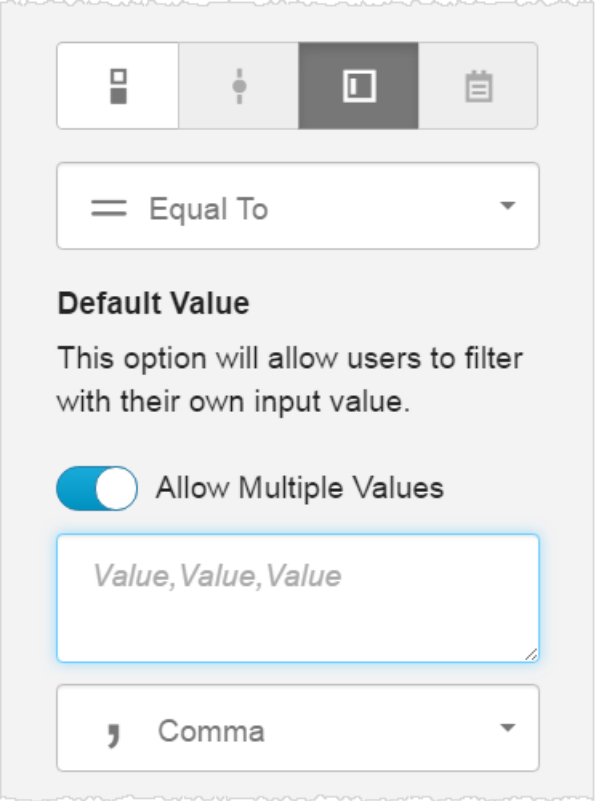
- Text-based value filters can have multiple values separated by a delimiter. Toggle Allow Multiple Values and specify the values and what delimiter to use.



10. Click Save .

Sorting Data in Visualizer

Sort data in a report using Sort in the Chart Builder. Measures can sort ascending or descending. Attributes sort alphabetically or reverse-alphabetically.

To change the way data is sorted

1. Add the attributes and measures you need to create your chart. For example, Units in Stock by Country.

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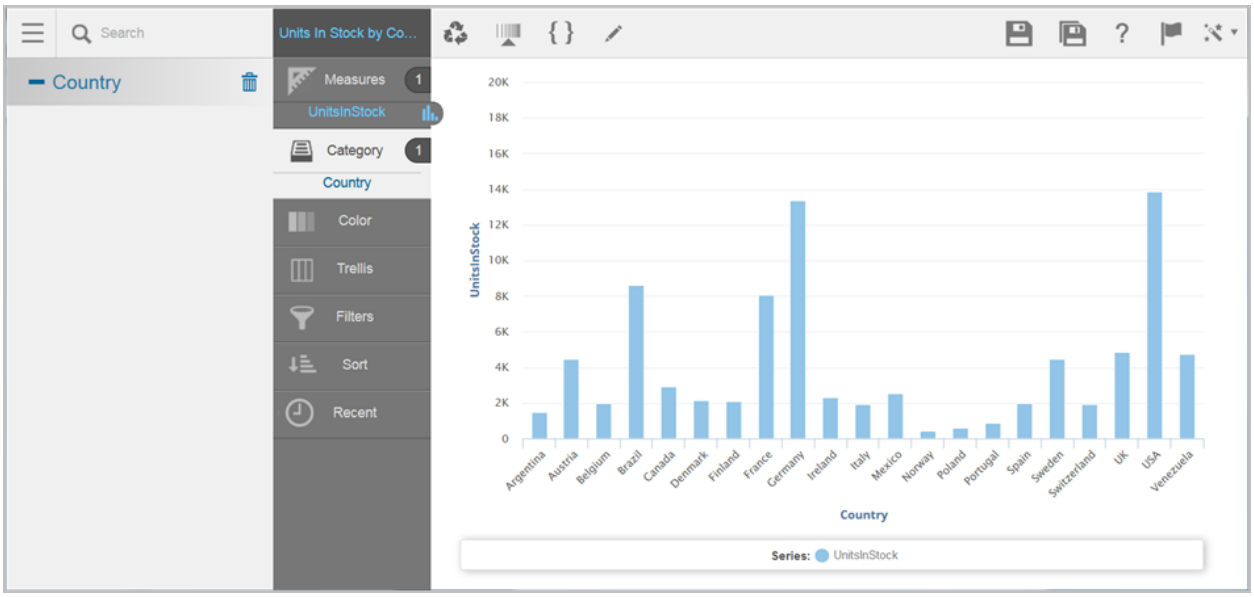
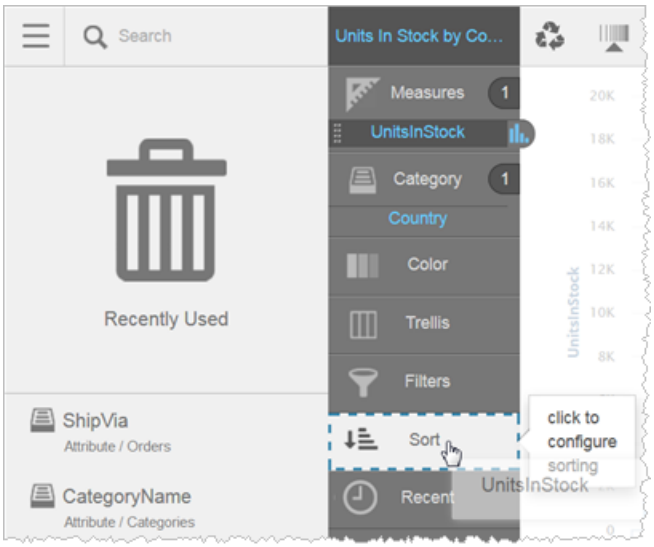


2. To sort, in the Chart Builder drag a column and drop it on Sort. For example, to sort by UnitsInStock, drag UnitsInStock from Measures to Sort.

   Important: Sorts do not take effect by dragging a column from the Subject Area to Sort. You must use a column that is already in the Chart Builder. To hide a column see Adding Tooltips and Hiding Columns.



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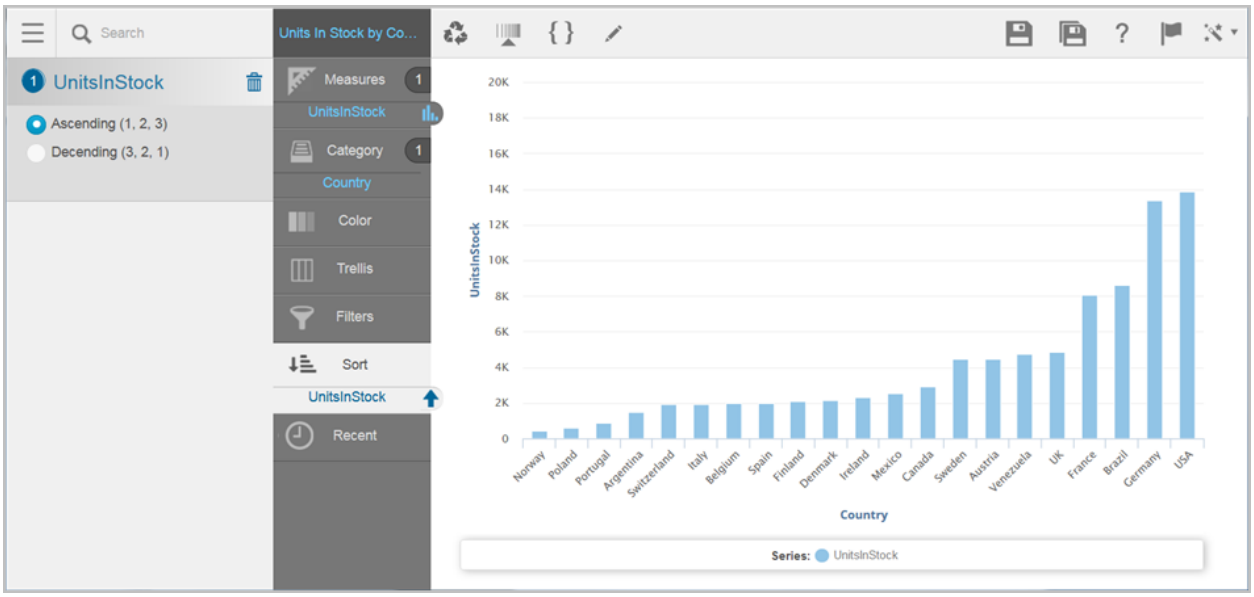
3. Visualizer sorts the measure or category (attribute) according to its default sort criteria. For example, UnitsInStock sorts from lowest to highest.



4. You can change the type of sort to apply. Visualizer provides sort options in the Subject Area.

5. You can add additional columns to Sort.

   Tip: When sorting on two measures where one is an expression, the sort on the expression takes precedence. This is because expressions are sorted at mid-tier whereas basic columns are sorted at the database level.

6. Click Save .

Creating Custom Groups

You can use Custom Groups to combine products into higher level categories when working with a field that contains thousands of products. For example, you may want to combine produce items from a long list of products your supermarket offers into a produce category, then further group these produce items into sub-categories such as berries, melons, root vegetables, greens, fresh spices and so on.

This can also be handy if you find you have data inconsistencies that you want to clean up by grouping data. For example, you may have campaign data that contain inconsistent territories or

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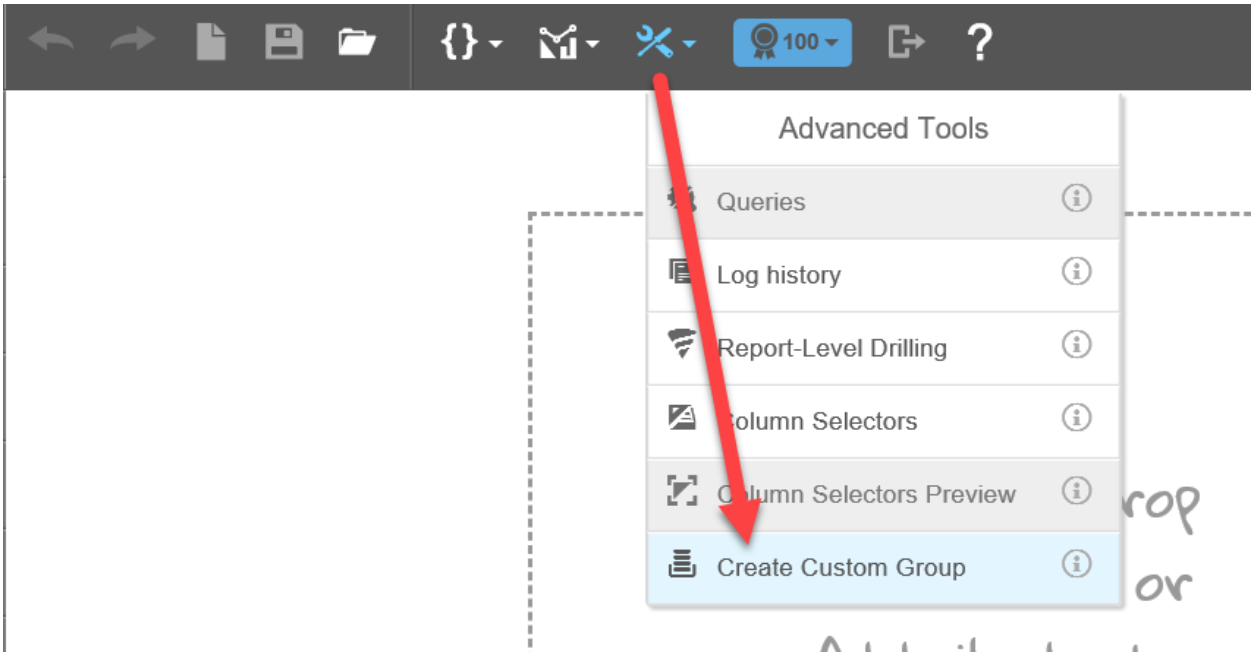
region classifications such as CA, Cali, Calif, California. You can use dynamic groups to place all these variation in the same category for California.

Even items that are not part of a specified group can be added to a generic "Others" group. For example, States other than California would be deposited in the Others folder until you created new state categories to capture that data for various State groups.

Note: To use custom groups, your users must be part of a group that has the “Modify Saved Expression” ACL enabled. You can set this ACL from the Admin module Manage Access > Manage Groups page and select the Modify Saved Expressions checkbox.

To create a custom group, select the Custom Group option from the Advanced Tools menu as follows:



You then provide a new name for your custom group and select the desired attributes to add to that custom group. Any left over attributes not added to a custom group will by default be adding to the "Other" custom group.

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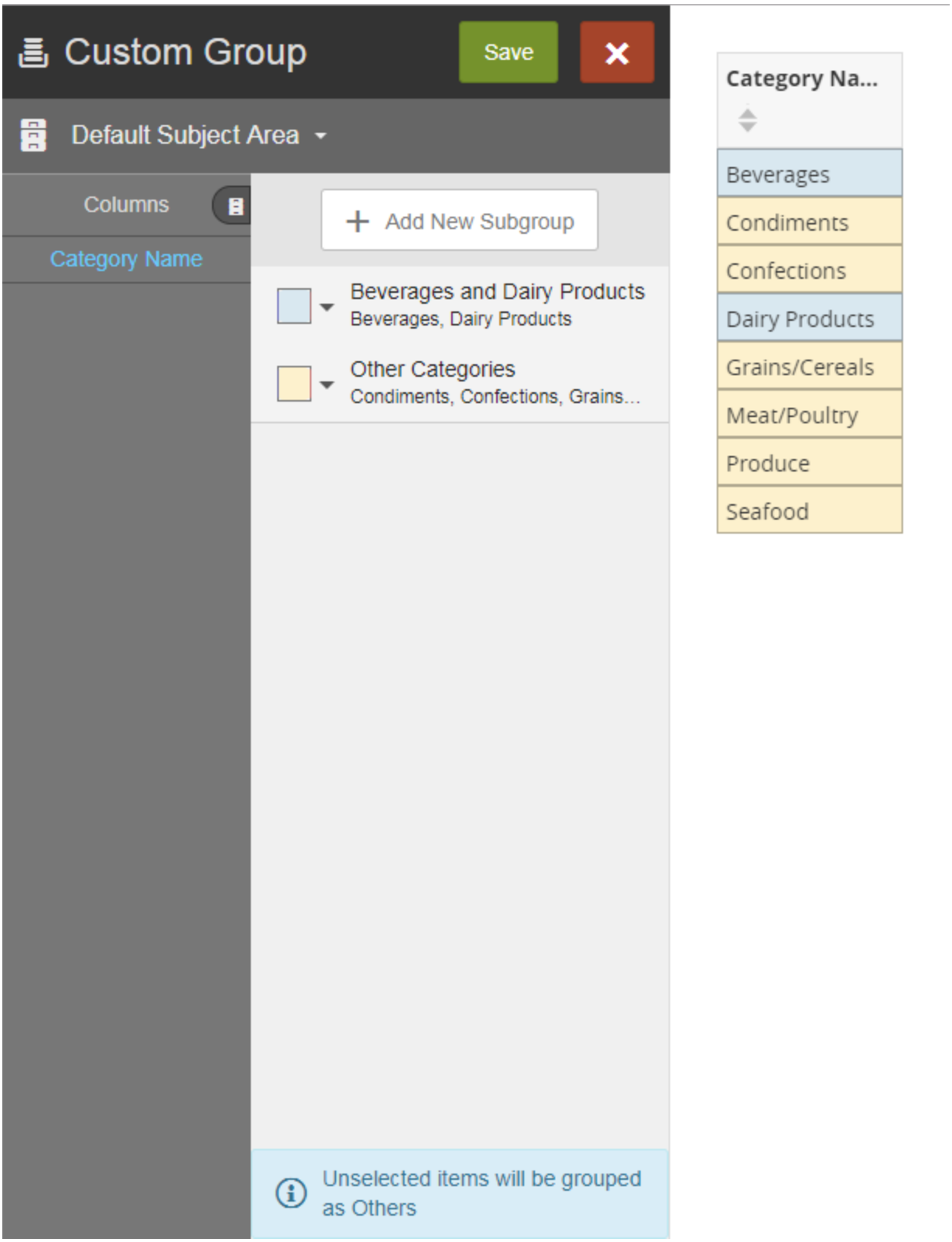

Animated version of custom group creation:

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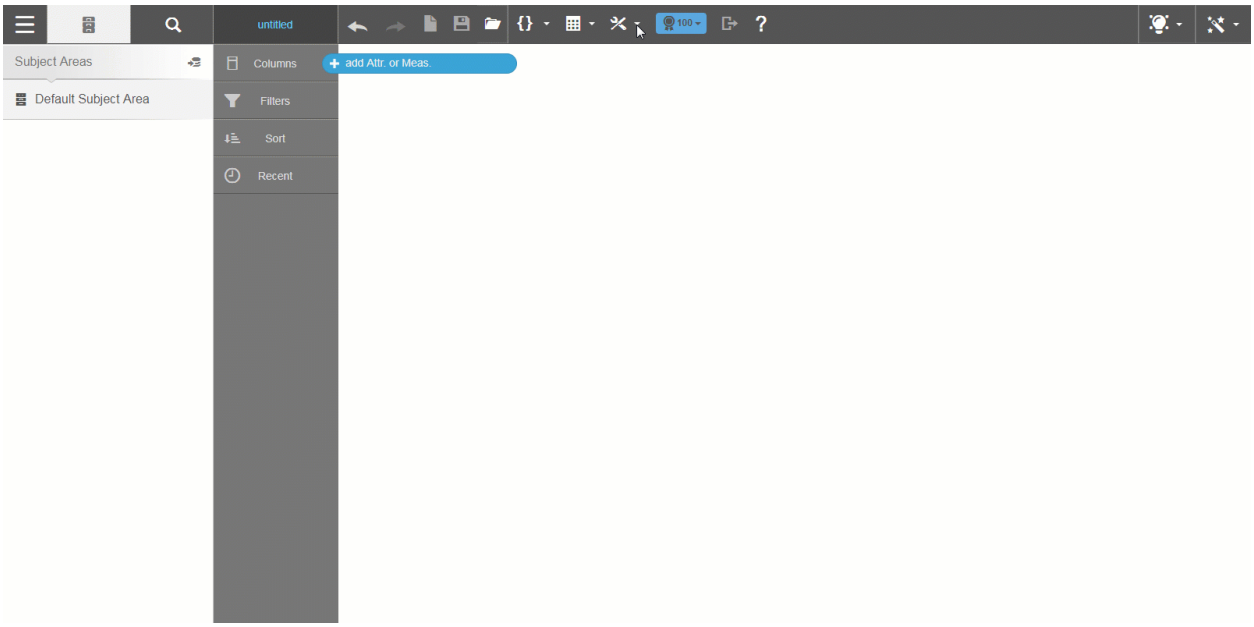

Custom Sets

Visualizer Custom Sets can be used to filter Visualizer reports or as a dashboard filter. You can also use a custom set as an additional column in a Visualizer report. This concept is known as set based filtering in Designer reports so if you are familiar with its usage in Designer, you can apply similar use cases in Visualizer.

The following animated gifs will demonstrate how you can use a Custom Set (based on a Saved Visualizer report) for use in another Visualizer report. If for some reason your browser does not render the embed gifs, you can view the same demo at Working with Custom Sets.

Important: If you move your Custom Set to another report catalog folder, the Custom Set will not work. For more information about the Report Catalog, see Managing Files in the Report Catalog.

Step 1: Create the Custom Set

In this example, the report contains customers by Qty sold in descending order and filtered for quantities that are less than or equal to 7500. Before you can make this a custom set, you must save the report. Then you will select the option to create a custom set. **Important**: You must use a tabular report to create a custom set. **Note:** Custom Sets can be saved to a Custom Subject Area or your default subject area. If you save a custom set to a custom subject area, it is no longer available for use in the default subject area.

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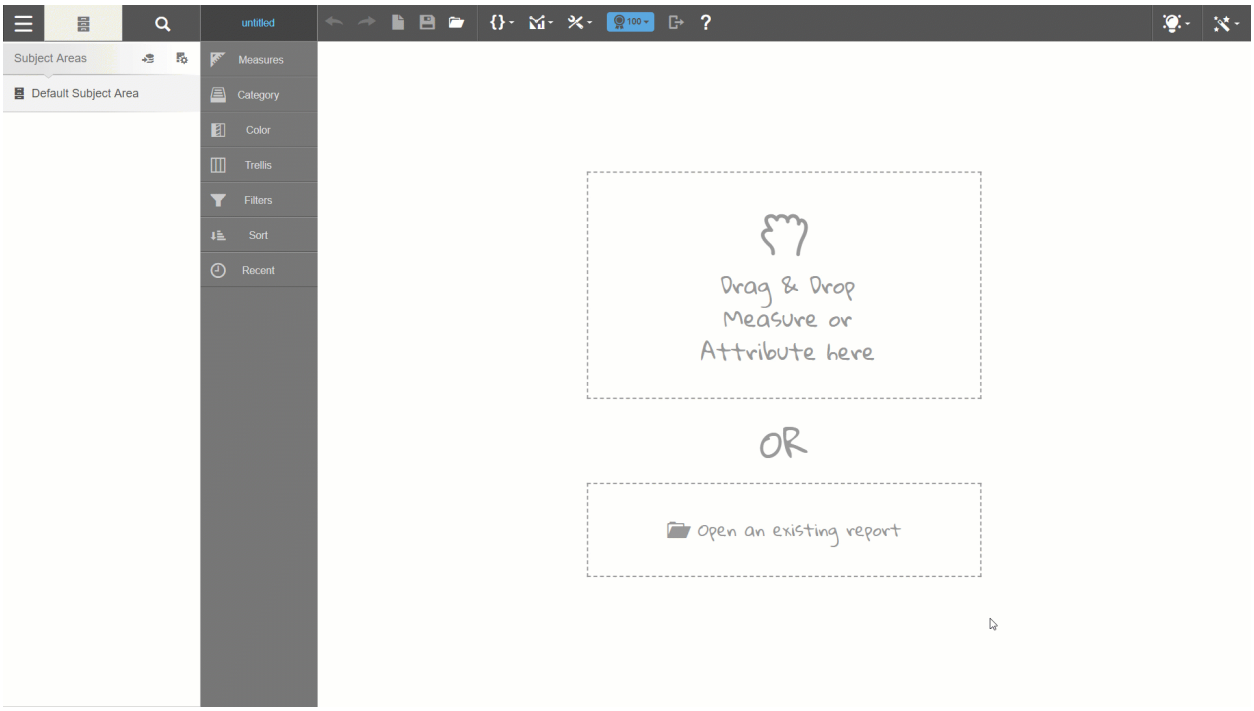
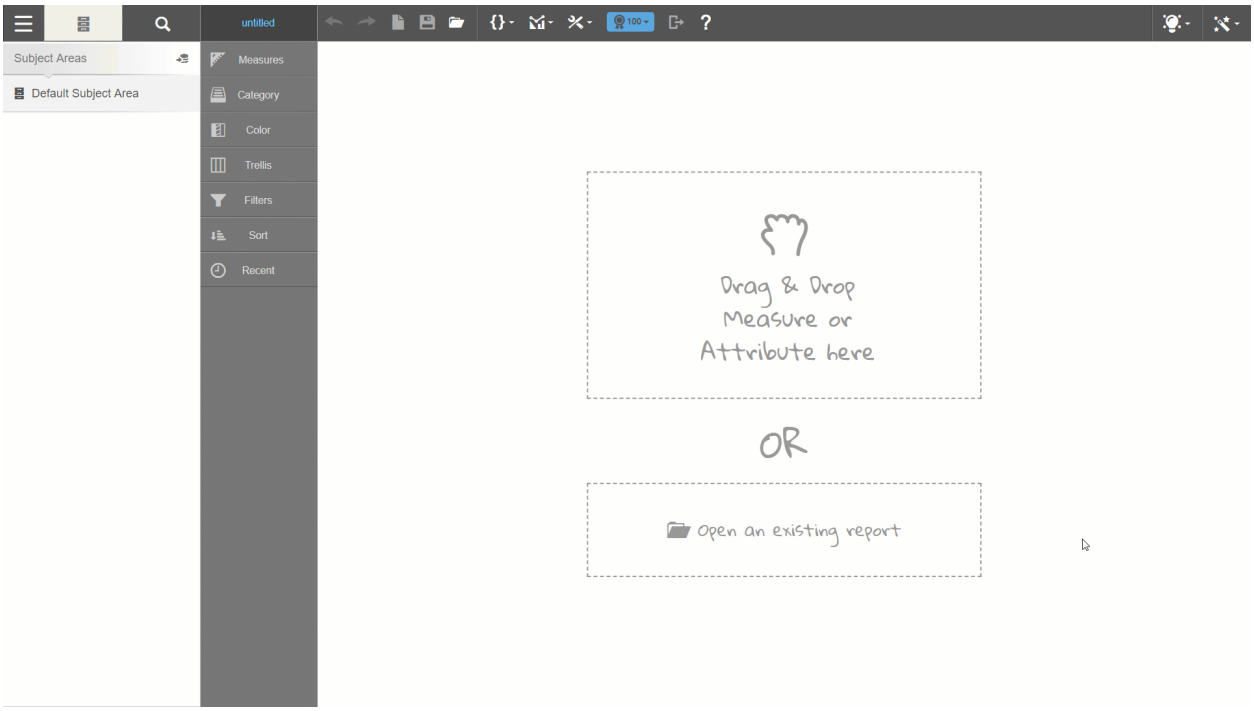


Step 2: Create a new report for which you want to use the custom set(s). Custom sets can be used as additional columns in a report, to filter a report, and to sort a report.

The following example illustrates how to apply custom sets to a Visualizer report as additional columns, filters and sorting.



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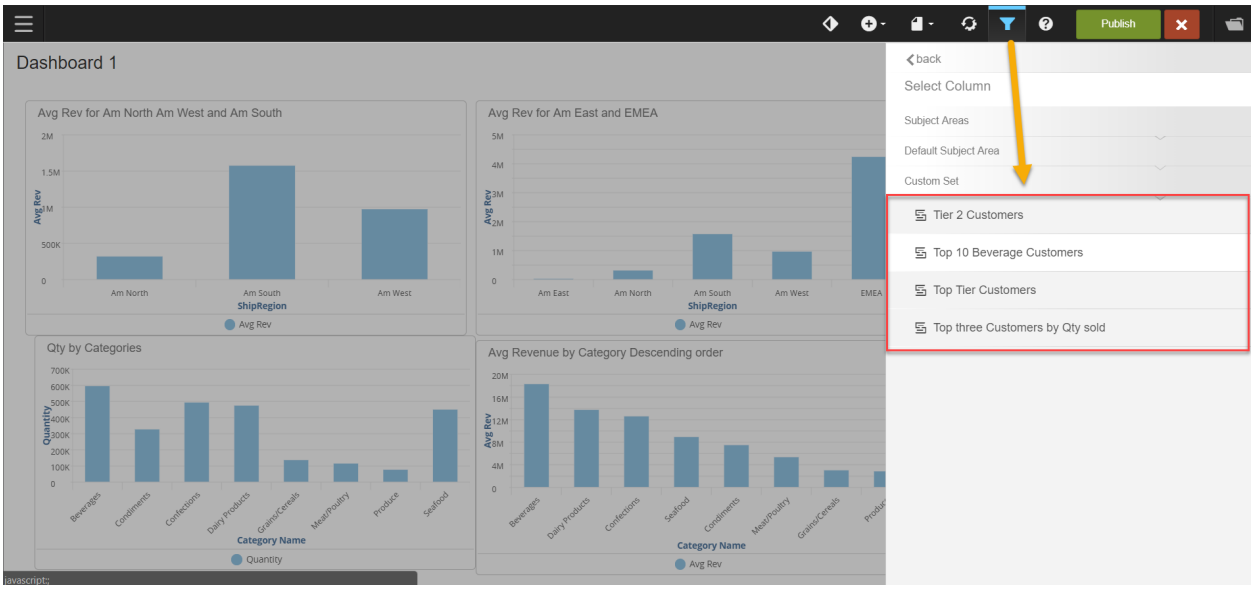
Note: Custom Sets can also be applied as filters on a Dashboard.



Creating Advance Filters using custom sets made easy:

Like other dashboard filters, you can select which dashlets the filter applies.

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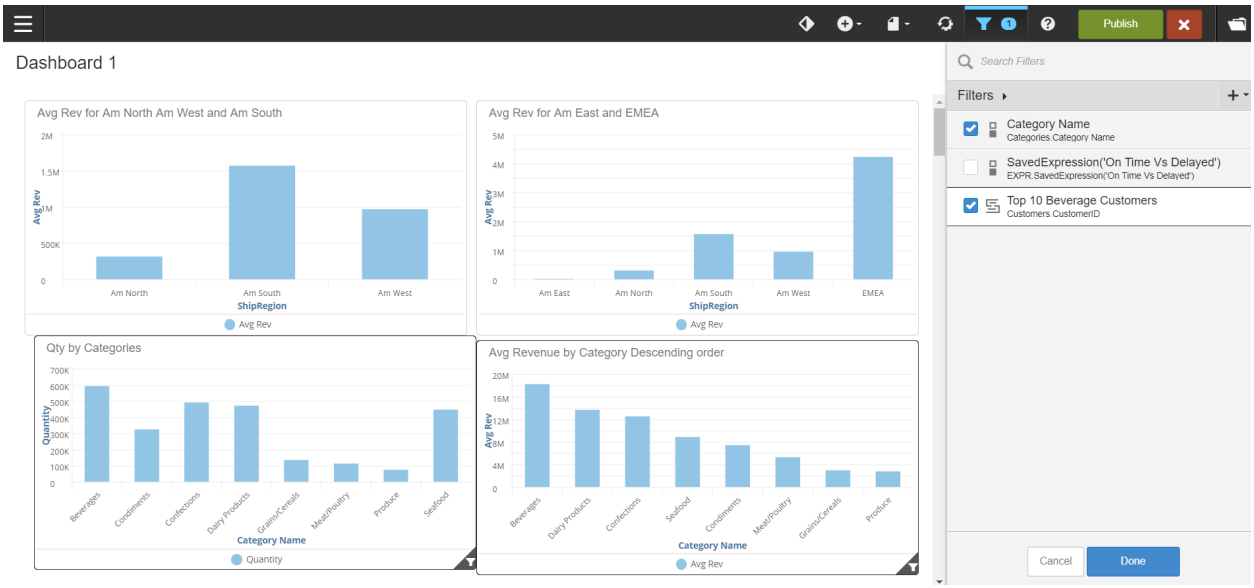
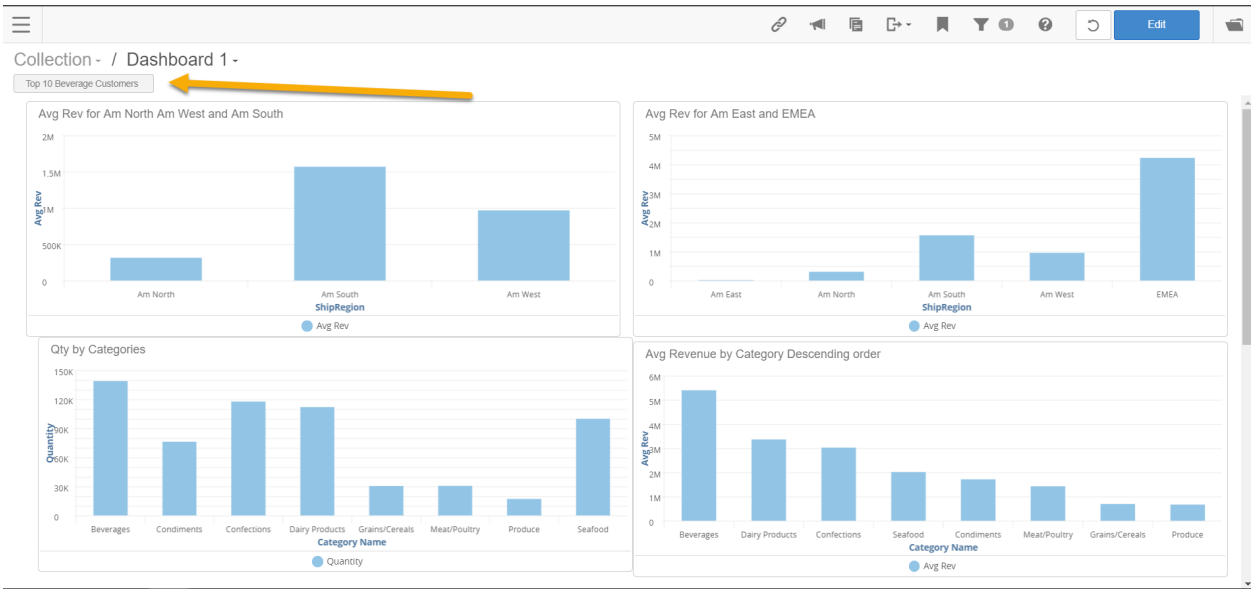


The filter card (applied custom set) displays on the dashboard.



Custom Expressions in Custom Sets

Report level expressions (custom expressions) are handled as post-aggregation (logical layer) calculations in Visualizer reports unless that same report is employed as a Custom Set within a Visualizer report. Custom Sets that employ custom expressions and are employed in another Visualizer report will be treated as pre-aggregation level calculations that run at the database level like custom measures. For more information see Pre-aggregation and Post-aggregation.

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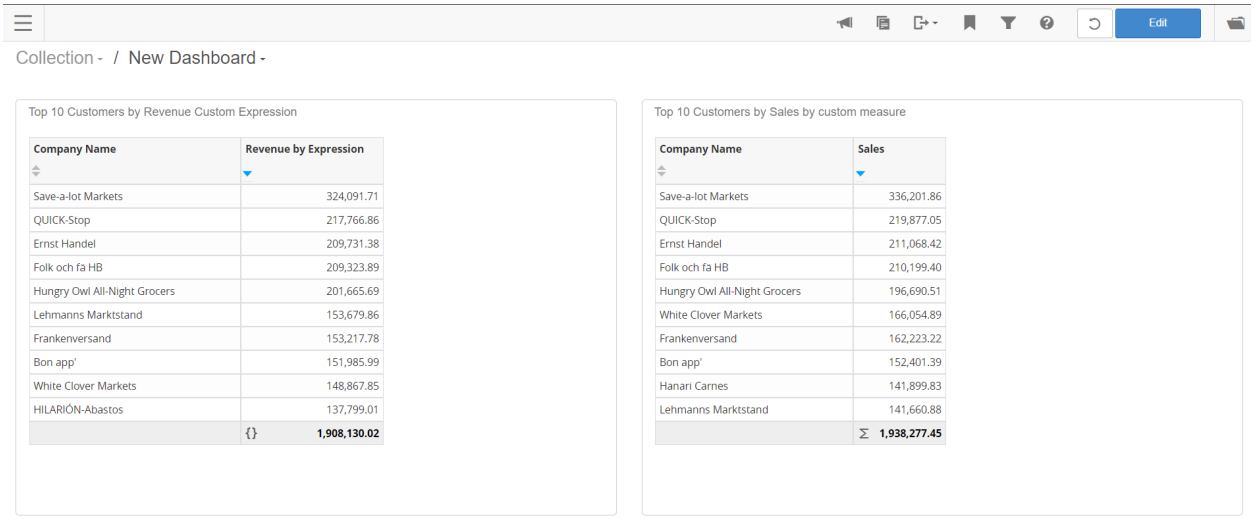
To better illustrate, I created two visualizer reports that utilize pre-aggregation and post-aggregation calculations and inserted them into a dashboard for easy side-by-side comparison. One report uses the Custom Measure Sales which is calculated at the database level or what we call pre-aggregation. The other report uses Revenue that is created by an expression in the Visualizer BQL editor using the following formula, (Quantity * Average unit price). The difference in calculations is because Sales is calculated by multiplying every quantity by its actual price at the time of sale and Revenue is using the average unit price and multiplying by the total aggregated quantity. This is not as accurate as you can see here.



I have also applied a Top 10 result and descending sort which returns not only different measured values but a different result set for the top 10 Customers. In the Sales (pre-aggregation) based report, Lehmans Marketstand is the 10th ranked customer and in the Revenue (post-aggregation) report, Lehmans Marketstand is the 6th ranked customer. Additionally, Hanari Carnes is ranked 8th in the Sales based report and not listed at all in the Revenue based report which has been replaced by the Hillarion-Abastos Customer in the 10th ranked spot.

If I were to save the Revenue (post aggregation) report as a Custom Set and apply it to another report as a filter. The result set would be different than the one listed here because Birst sends the custom expression calculation for Revenue in the Custom Set to the database rather than applying it post aggregation in the logical layer.

The following report uses the Custom Set (based on the Revenue defined by the custom expression) but now the results are identical to the report built using the custom measure, Sales

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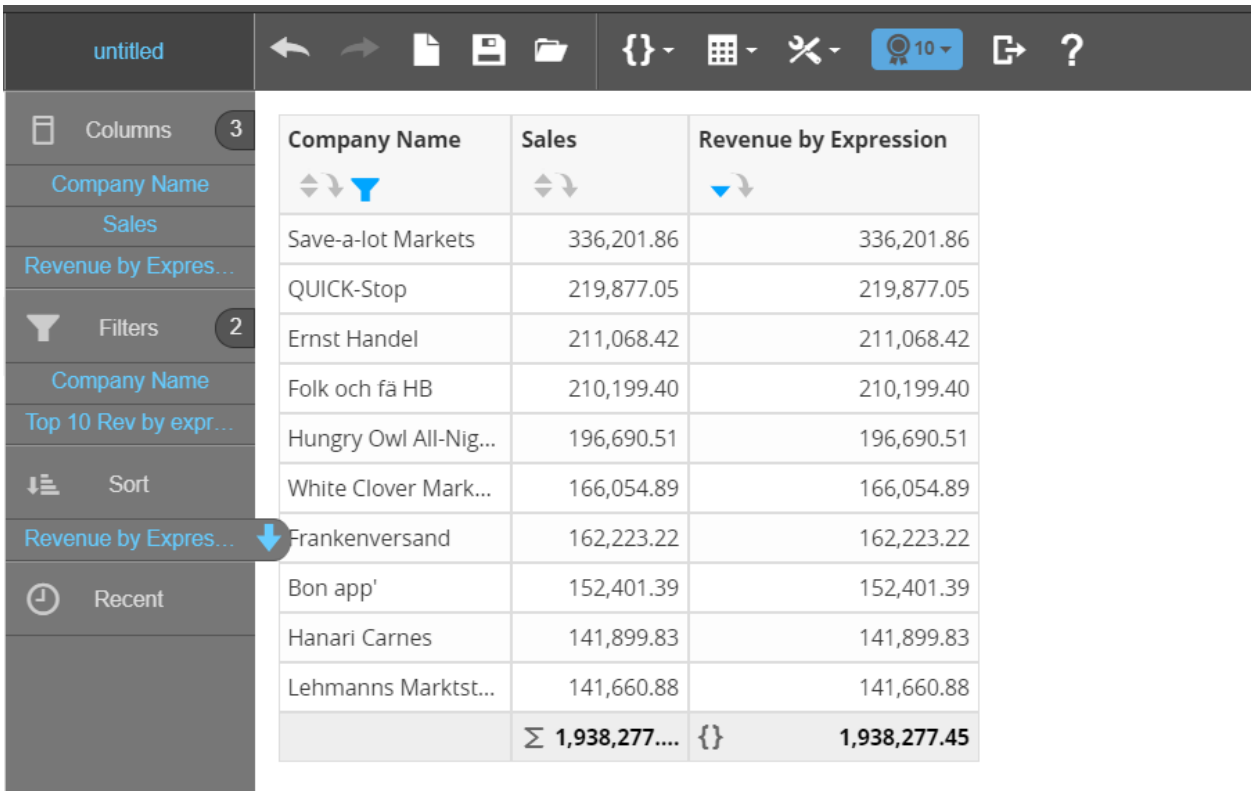
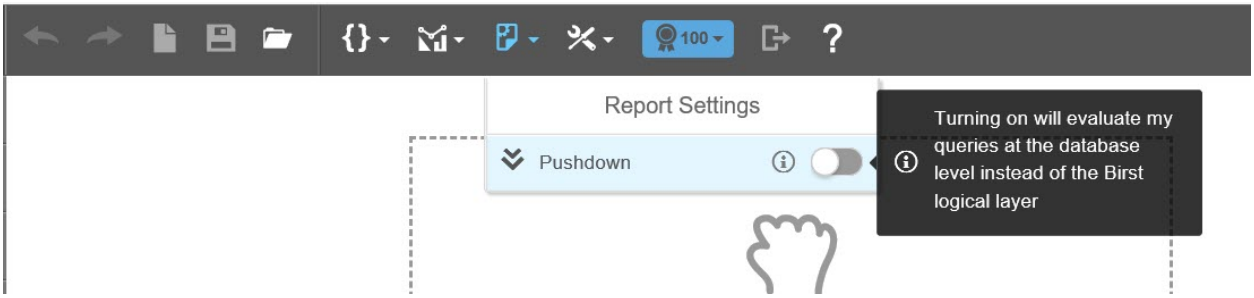
(pre-aggregation). Lehman's is ranked 10th and Hanari Carnes returns to the result set. The measure values were also calculated identically this time because the expression was applied to every row of data in the database just like the Sales custom measure.



Pushdown and Custom Sets

Visualizer Pushdown lets you use pushdown (pre-aggregation calculations) at the Visualizer report level. By default, Custom Sets will automatically enable this feature and prevent users from turning this feature off when employed as a Custom Set.



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Custom Sets Known Limitations

- Using a custom set as a column fails when the custom set was defined using a report containing Custom Groups.
- Custom sets cannot be used as a cluster group in the Visualizer Advanced Analytics feature.
- Custom sets cannot be used as filters on Designer Reports.
- Using a custom set as a column fails when the custom set was defined using a report containing Saved Expressions in its filter.
- Custom set filters are not honored when exporting dashboards or dashlets, with Deep linking, Bookmarks or report notifications.
- Custom sets using Average measures, containing null or 'is missing' values, return unexpected results.
- Cannot use the Benchmark “Advanced Analytics” function with reports using a custom set as a column.
- Cannot save a custom set in a private folder in Birst (if report is in a private folder)
- Custom sets stop functioning if the report defining it is moved to a new report catalog folder.
- Cannot configure Report level drilling using custom sets.
- Column selector does not support Custom sets.
- Custom sets do not support drill across action on a dashboard.
- Custom sets cannot be applied as filters to a web page on a dashboard.
- Custom sets do not support conditional display.
- Custom sets cannot be used for filter groups or linked filters.
- Custom sets cannot be used as embedded filters on as dashboard.
- Deleting the report used to define a custom set renders the custom set unusable.
- If a dashboard prompt is created using a custom set and that custom set is later deleted, the dashboard prompt filter will display an error message each time it is rendered.
- Custom Sets does not support visual filtering.

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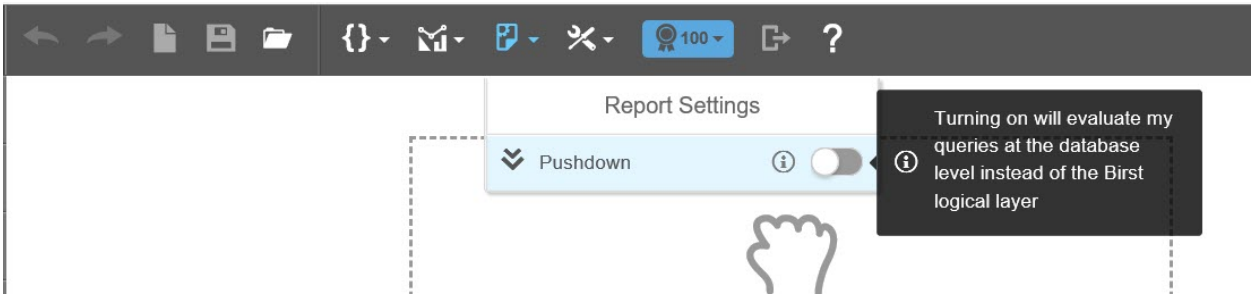
Visualizer Pushdown

Visualizer Pushdown lets you use pushdown (pre-aggregation calculations) at the Visualizer report level.

By default, Custom Sets will automatically enable this feature and prevent users from turning this feature off when employed as a Custom Set.



As Navigates

The "As Navigates" feature is an enhancement for Visualizer (and Designer) reporting that enables users to create a report that includes a measure in a logical query that only has grains available on a subset of dimensions that are included in the query.

This feature must be enabled for the account. To use the "As Navigates" feature, please contact your Birst representative to have it turned on for your account. Once enabled for the account, you will need to enable this feature for at the space level using the Admin Modify Properties page as follows:

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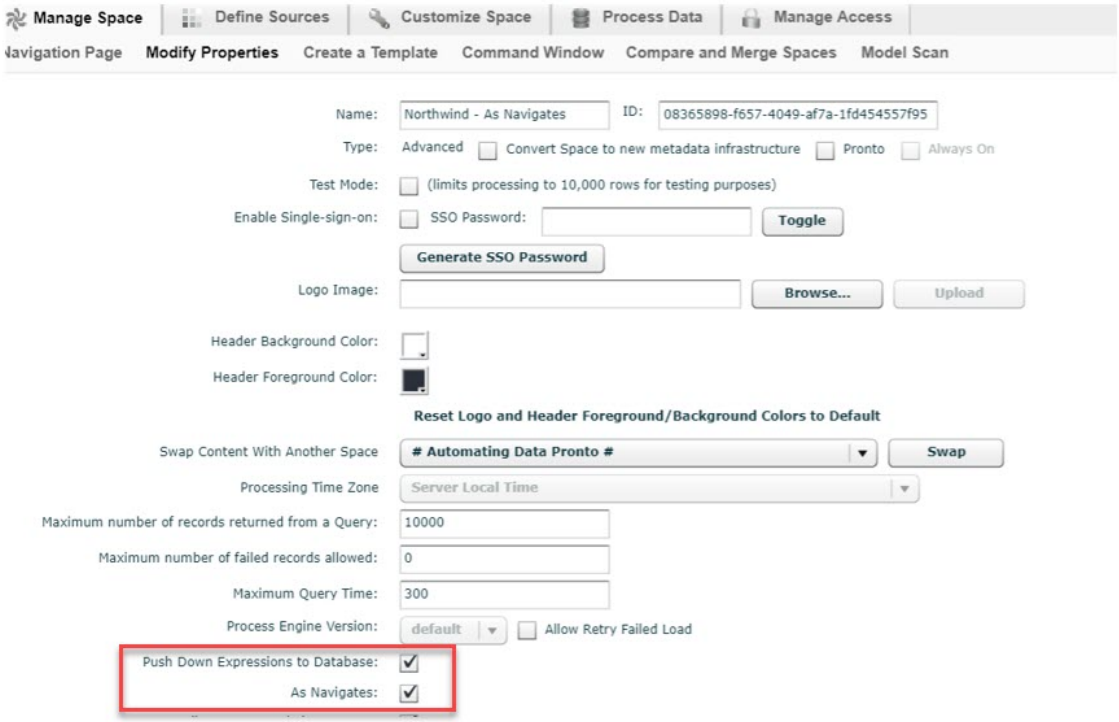

Tip! As a best practice, the "Push Down Expressions to Database "feature should also be enabled if there is a need for filtering reports when "As Navigates" is enabled.

When "As Navigates" is enabled, Designer and Visualizer reports will allow the generated query to navigate a report for which the columns are not joined in the data model.

In the following report the chart uses the

```
SELECT TOP 100 USING OUTER JOIN [OrderDate: Sum: Quantity] 'COL0' ,
[Shippers.CompanyName] 'COL1' FROM [ALL]
```

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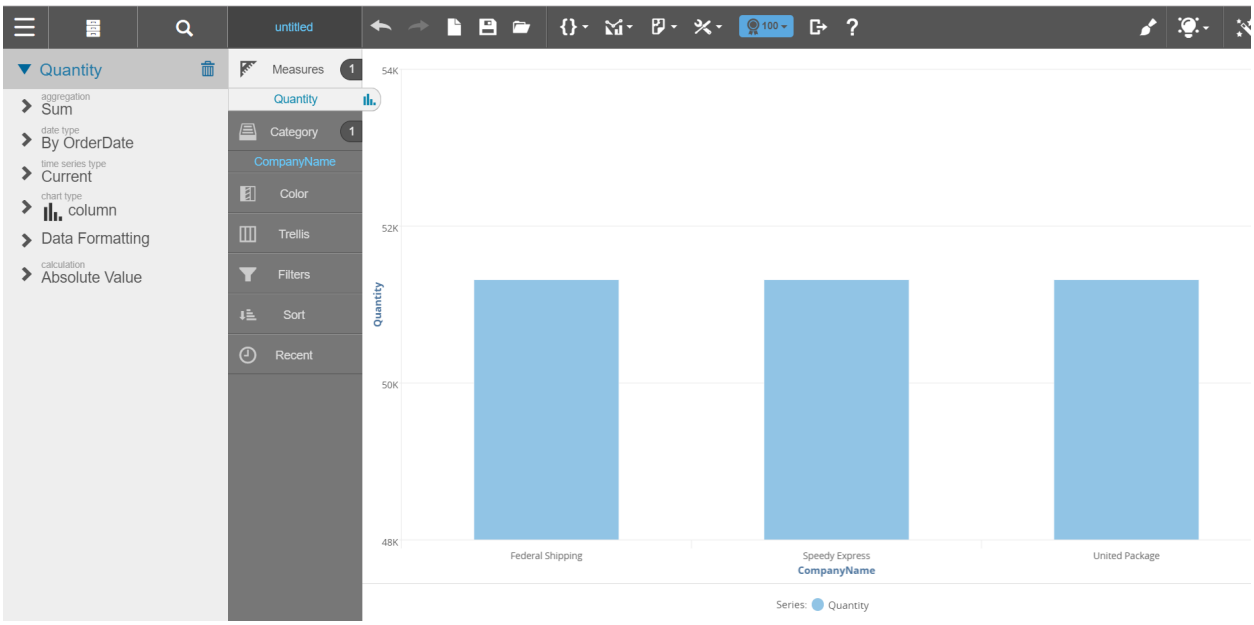

The report generates the following SQL:

```
SELECT TOP 100 SUM(DQT0_D.COL00_) AS 'COL0',DQT1_D.COL11_ AS 'COL1'

FROM

(SELECT SUM(CAST(DW_SF_CATEGORIES_DAY_EMPLOYEES_ORDER_DETAILS_
PRODUCTS0_.Quantity$ AS BIGINT)) AS 'COL00_'

FROM S_N08365898_f657_4049_af7a_1fd454557f95.DW_SF_CATEGORIES_DAY_EMPLOYEES_
ORDER_DETAILS_PRODUCTS DW_SF_CATEGORIES_DAY_EMPLOYEES_ORDER_DETAILS_
PRODUCTS0_) DQT0_D,

(SELECT DW_DM_SHIPPERS_SHIPPERS0_.CompanyName$ AS 'COL11_'

FROM S_N08365898_f657_4049_af7a_1fd454557f95.DW_DM_SHIPPERS_SHIPPERS DW_DM_
SHIPPERS_SHIPPERS0_

GROUP BY DW_DM_SHIPPERS_SHIPPERS0_.CompanyName$) DQT1_D

GROUP BY DQT1_D.COL11_
```

And here is an example when applying a filter to the report with "As Navigates" feature enabled

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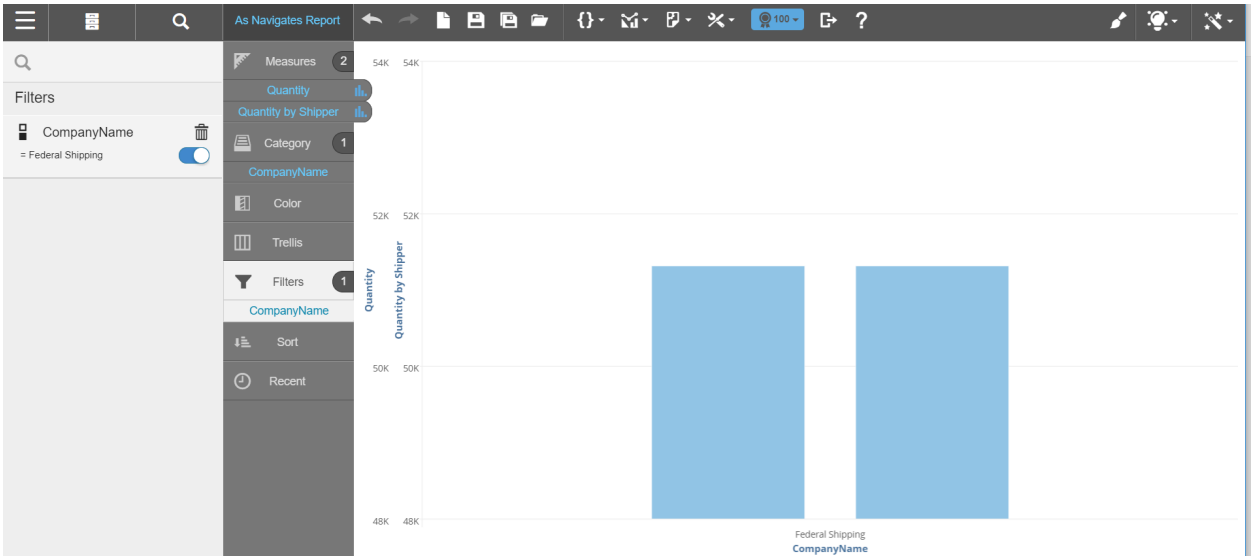
```
SELECT TOP 100 USING OUTER JOIN [OrderDate: Sum: Quantity] 'COL0' ,
[Shippers.CompanyName] 'COL1' FROM [ALL] WHERE ( (
[Shippers.CompanyName]='Federal Shipping' ) )
```



Which generates the following navigable SQL.

```
SQL generated consists of multiple independent queries with filters applied to
the appropriate sub-queries

SELECT TOP 100 SUM(ISNULL(DQT0_D.COL10_,CAST(0 AS FLOAT)) / CAST(DQT1_D.__
ShipperID3_ AS FLOAT)) AS 'COL0',SUM(DQT0_D.COL10_) AS 'COL1',DQT1_D.COL22_ AS
'COL2'

FROM

(SELECT SUM(CAST(DW_SF_CATEGORIES_DAY_EMPLOYEES_ORDER_DETAILS_
PRODUCTS0_.Quantity$ AS BIGINT)) AS 'COL10_',SUM(CAST(DW_SF_CATEGORIES_DAY_
EMPLOYEES_ORDER_DETAILS_PRODUCTS0_.Quantity$ AS BIGINT)) AS 'OrderDate__Sum__
Quantity1_'

FROM S_N08365898_f657_4049_af7a_1fd454557f95.DW_SF_CATEGORIES_DAY_EMPLOYEES_
ORDER_DETAILS_PRODUCTS DW_SF_CATEGORIES_DAY_EMPLOYEES_ORDER_DETAILS_
PRODUCTS0_) DQT0_D,

(SELECT DW_DM_SHIPPERS_SHIPPERS1_.CompanyName$ AS 'COL22_',COUNT_BIG(DW_SF_
DAY_SHIPPERS0_.ShipperID$) AS '__ShipperID3_'
```

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```
FROM S_N08365898_f657_4049_af7a_1fd454557f95.DW_SF_DAY_SHIPPERS DW_SF_DAY_
SHIPPERS0_

INNER JOIN S_N08365898_f657_4049_af7a_1fd454557f95.DW_DM_SHIPPERS_SHIPPERS DW_
DM_SHIPPERS_SHIPPERS1_ ON DW_SF_DAY_SHIPPERS0_.Shippers$Shippers_
1598344664$=DW_DM_SHIPPERS_SHIPPERS1_.Shippers_1598344664$

WHERE DW_DM_SHIPPERS_SHIPPERS1_.CompanyName$=N'Federal Shipping'

GROUP BY DW_DM_SHIPPERS_SHIPPERS1_.CompanyName$) DQT1_D

GROUP BY DQT1_D.COL22_
```

Global Filters

Global Filters provides users with a friendly UI based method for creating reusable filters that can be shared in multiple Visualizer reports and Dashboards in your space.

To create Global Filters, select the Create Global Filters option from the Advanced Tools Menu. Provide a logical name for your Global Filter. Select your filter criteria and modify as needed. You can combine multiple filter criteria together to create advance filters.

Previously, you would need to employ the Expression Editor to create reusable advance filters with some required knowledge of BQL.

Note: You will need to have the "Modify a Saved Expression" user privilege enabled for any users interested in using this feature.

Note: You can nest filter conditions to create advance filters such as the following BQL based version that would require the use of the Expression Editor and knowledge of how to form the desired BQL Expression:

```
([Categories.CategoryName] IN ('Beverages','Dairy')) AND ([OrderDate: Sum:
UnitsInStock] < 10000 OR [OrderDate: Sum: UnitsOnOrder] = 0)
```

We can recreate the above BQL statement using the Global Filter editor as follows:

Step 1: Select Create Global Filter from the Advanced Tools Menu

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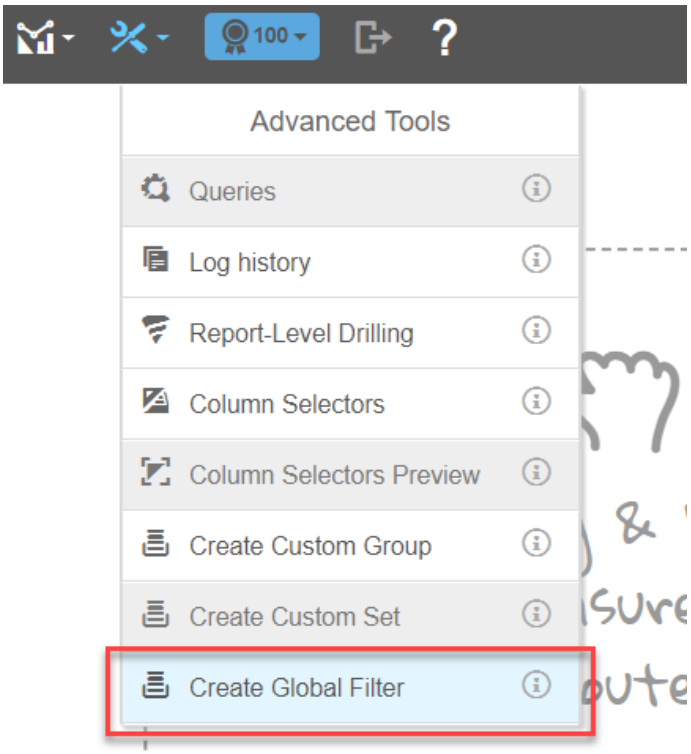
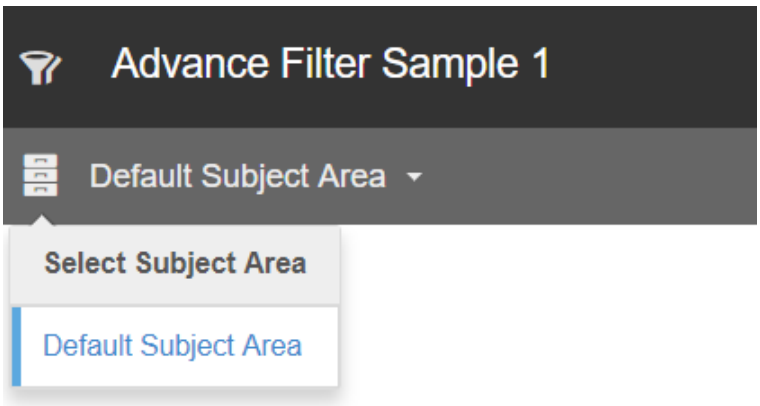


Step 2: Provide a logical name for your Global filter and select a subject area to assign the Global Filter



Step 3: Click Add Filter

Step 4: Select the measure(s) and/or attributes(s) desired.

Step 5: Arrange (nest, group etc.) and apply the available modifiers. At this time, you can choose between And and Or.

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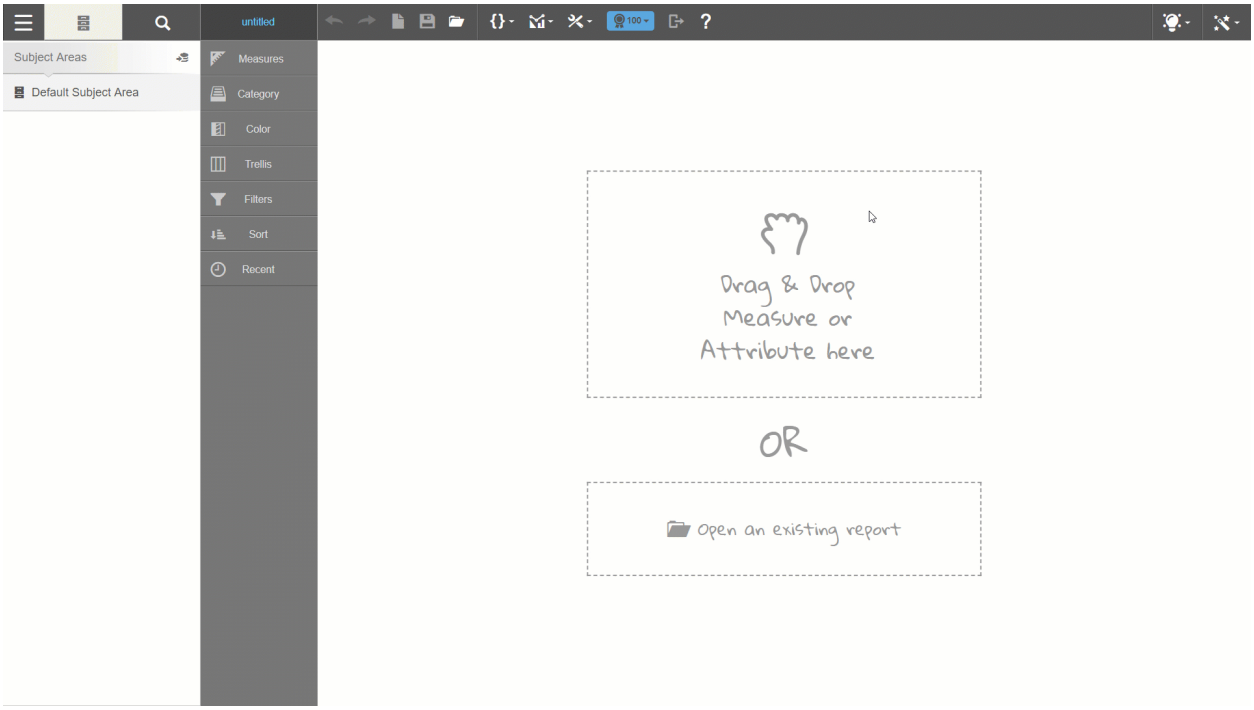
Step 6: Save the Global Filter. You can edit global filters after you save them to a subject area but keep in mind that global filters can be applied to dashboards by other users in your space.

The following gif will walk you through the process to re-create the aforementioned BQL advance filter. If your browser does not play the embeded gif, you can also view the demo at Working with Global Filters.



Alternatively, you might consider combining Custom Sets and Global Filters together to create dynamic value filters. For example, A Custom Set based on a Top N result could vary based on your data set each day which can be applied as filter by itself or some logical combination with a Global Filter.

Global Filters Known Limitations

Export to PDF/Excel does not show filter details when using a global filter.

Normal filter will override the global filter on the same attribute when both are activated simultaneously in a Dashboard.

Cannot configure conditional display using Global Filters.

Global filters do not support drill across on dashboards.

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Dashboards do not display warning message if a global filter has been deleted.

Global filters are not honored when exporting dashboards or dashlets, with Deep linking, Bookmarks or report notifications.

Cannot dynamically change selections of elements in Global filters on a Dashboard.

Multiple global filters using the same attribute can be used on a Dashboard, which could cause conflicted results.

Cannot share Deep Link of a Dashboard filtered with a Global filter.

Cannot copy or use network filter objects across spaces.

Global Filters do not support visual filtering.

Global Filters do not support parent/child filter groups or linked filters.

Global Filters on a dashboard do not currently allow for the exclusion our "Out" operator when using a Global Filter.

Global Filters do not work with Designer reports.

Global filters do not support drill down actions.

Using Data Buckets

Data buckets are similar to Bucketed Measures that Administrators can create with the Birst Administration module. With the introduction of Data Buckets, a Visualizer user can now create a new Attribute based on where a Measure falls in a range of values or as a percentile rank without intervention of a Birst administrator.

Important: Data Buckets only work with the New Repository metadata (document). Spaces built using the old XML based repository will not be able to use the Data Buckets feature. You can easily convert a space using the old repository if needed. For more information about converting a space from the old repository to the new metadata repository. For more information, see Convert an ADR space to the new metadata infrastructure repository.

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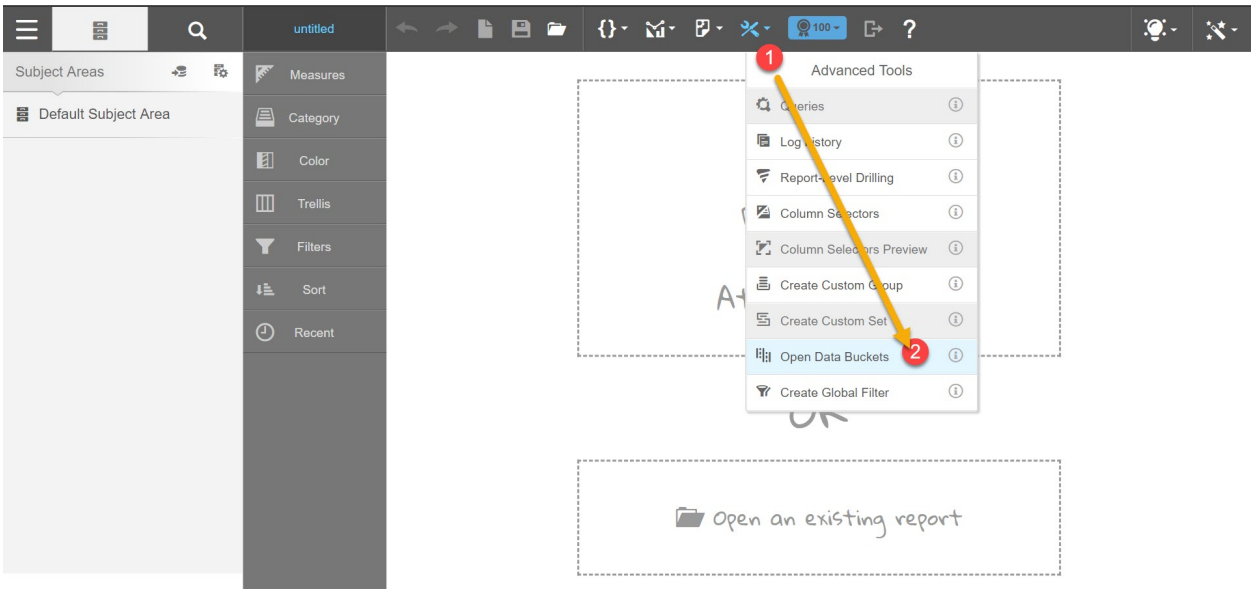

1) You will give your Data Bucket a Name.

2) Designate which subject area you want to save the data bucket.

3) Select a Measure.

4) Select an Attribute.

5) Provide a Default Bucket Category. This is a catch all category for any null values or items that do not fall within a defined bucket.

Select the number of buckets you want to create by supplying an absolute value or by designating the size of the bucket by which you want to create buckets. If you designate the size of the bucket the number of buckets will be auto-generated by the application.

You can designate the number values using the slider or No. of Buckets box.

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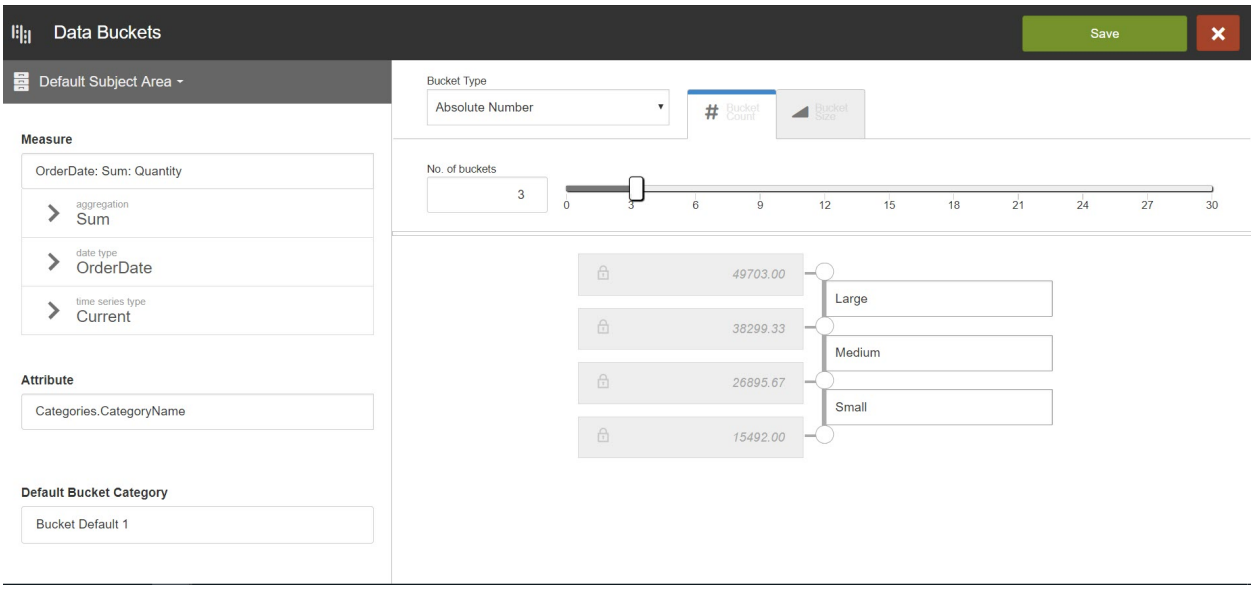
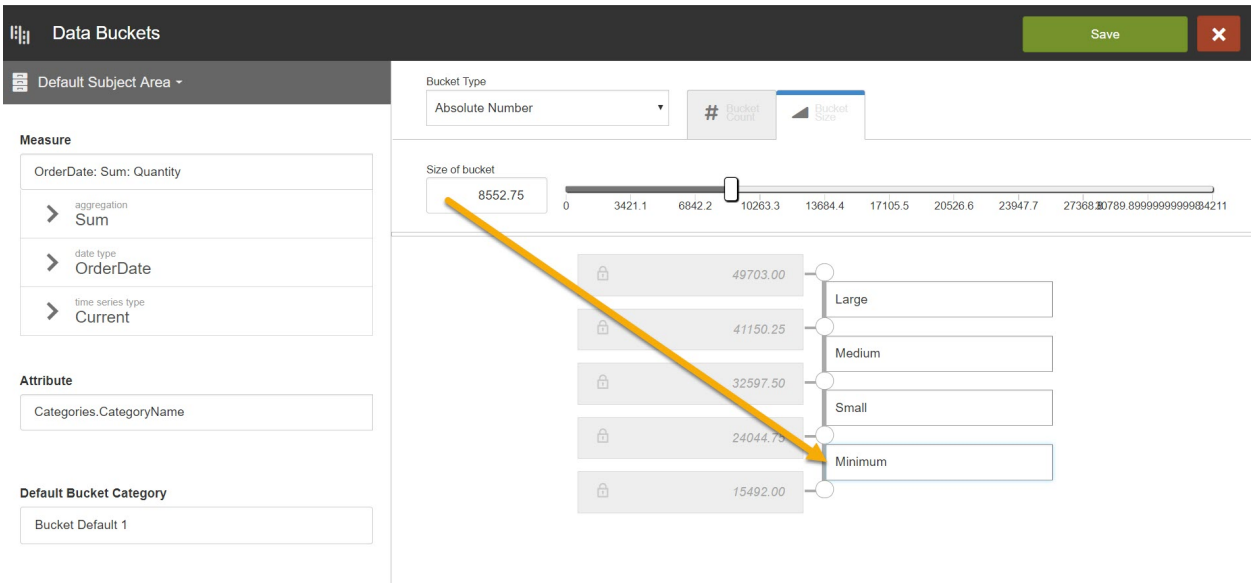


In the above example, we used the absolute value of 3 buckets and provided a label name for each bucket for Large Medium, and Small. For the Measure Quantity for Category Name.

In the following example, bucket size was selected as 10,000 and the system automatically rounded the bucket size to the increment that would populate the buckets equally. This increased the number of buckets from 3 to 4 buckets.



Note: The Data Bucket will be saved in the subject area as an attribute for reports and as a separate function for quick editing.

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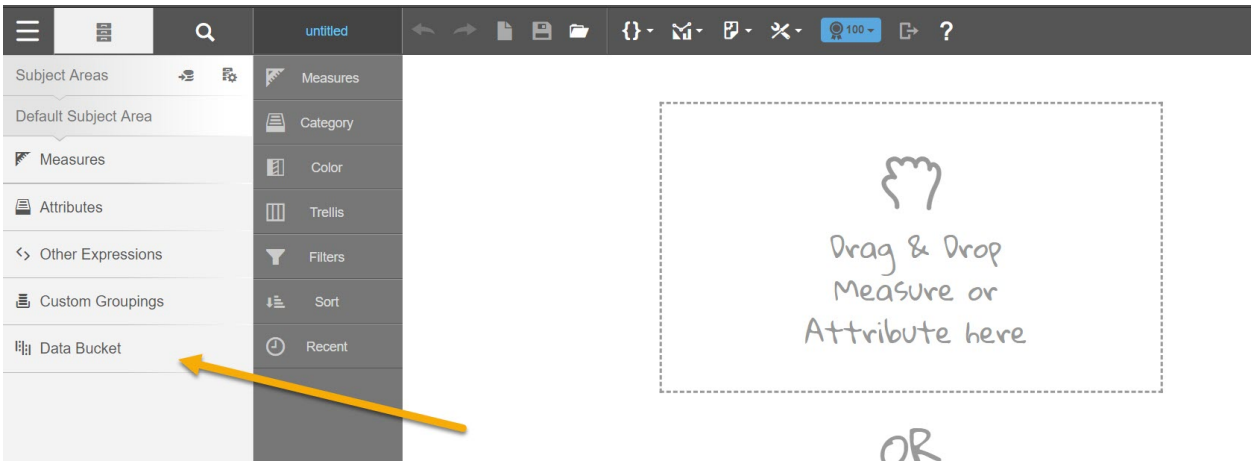
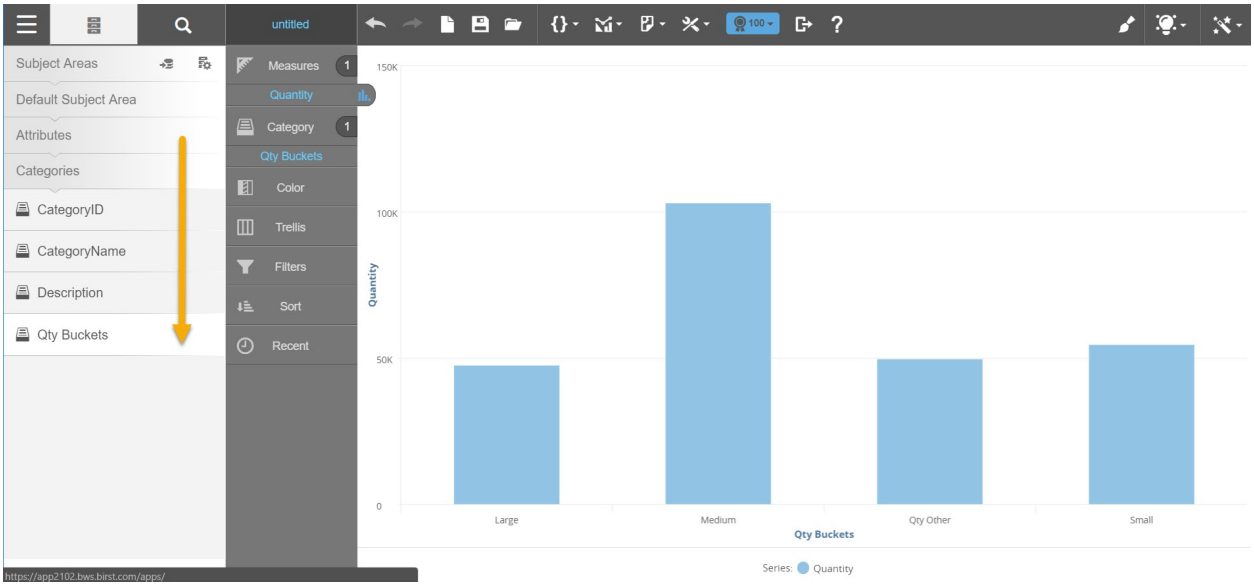
Data Buckets available for quick editing:



Data Buckets available as an attribute to apply to a report:



Removing a Column from a Visualizer Report

If you no longer want to include a column in your chart or table remove it from its bucket in the Chart Builder.

To remove a column from Chart Builder

1. Click on the name of the measure or attribute in the bucket that you want to remove.

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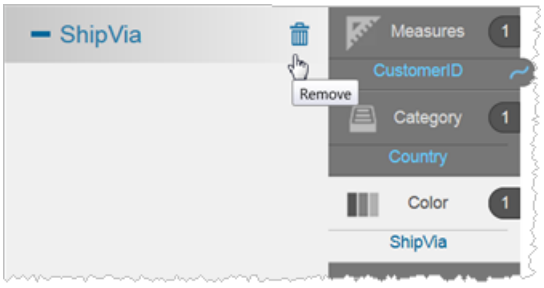
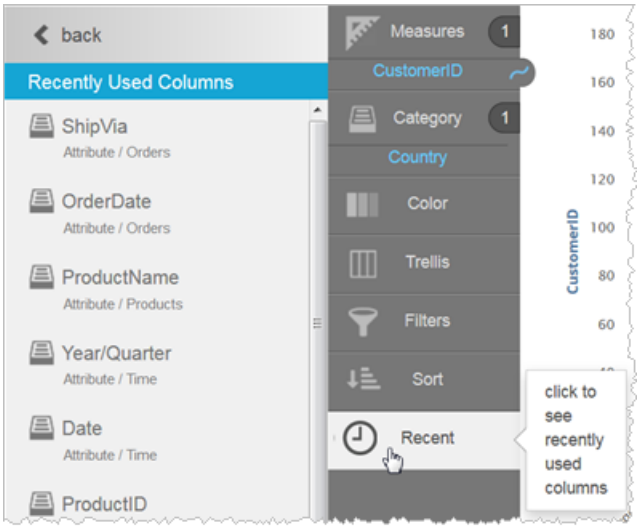
2. Drag the item to the left hand panel. A trash can area appears. Drop the item inside the dotted outline.

Alternatively, you can click on the bucket, then click the Remove icon in the left hand panel next to the name of the column.



3. Visualizer removes the item from the bucket and from the visualization and adds it to the Recently Used Columns list, which you can access by clicking the Recent bucket.



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Tip: You can also move a measure or attribute from one bucket to another. For example you could move an attribute from Color to Shape to visualize the attribute using shapes instead of colors.

Drilling in Visualizer

Visualizer makes it easy to drill down - and up - to display information at different levels of detail. For example, a user could click on a year in a report to view data for each quarter of the year, and click on the quarter to see data for each month in the quarter.

There are different ways that drilling is enabled for reports:

- A Visualizer user can create one or more drill paths for a particular report. See Report-Level Drill Paths.
- A Space Administrator can create drill paths and drill maps for use across the whole space. In the Help see *Creating a Drill Map*.
- A Space Administrator can create a hierarchy in the dimensional model of the space. In the Help see *Creating Hierarchies*.
- The pre-configured Time attributes are already set up for drilling. In the Help see *Time Attributes and Time Series Measures*.

Visualizer displays a Drill icon to indicate that an attribute in the Chart Builder can be drilled to show a different level of detail.

Tips:

- Drill-down is not supported for pie charts.
- If you plan to include a Visualizer chart report in a new Dashboards 2.0 dashboard, be aware that a drill-across at the dashboard dashlet level overrides a drill-down defined at the chart report level.

To drill in Visualizer

1. Add a measure and an attribute configured for drilling. For example, Revenue by the built-in Year attribute. The Chart Builder shows the Drill icon.

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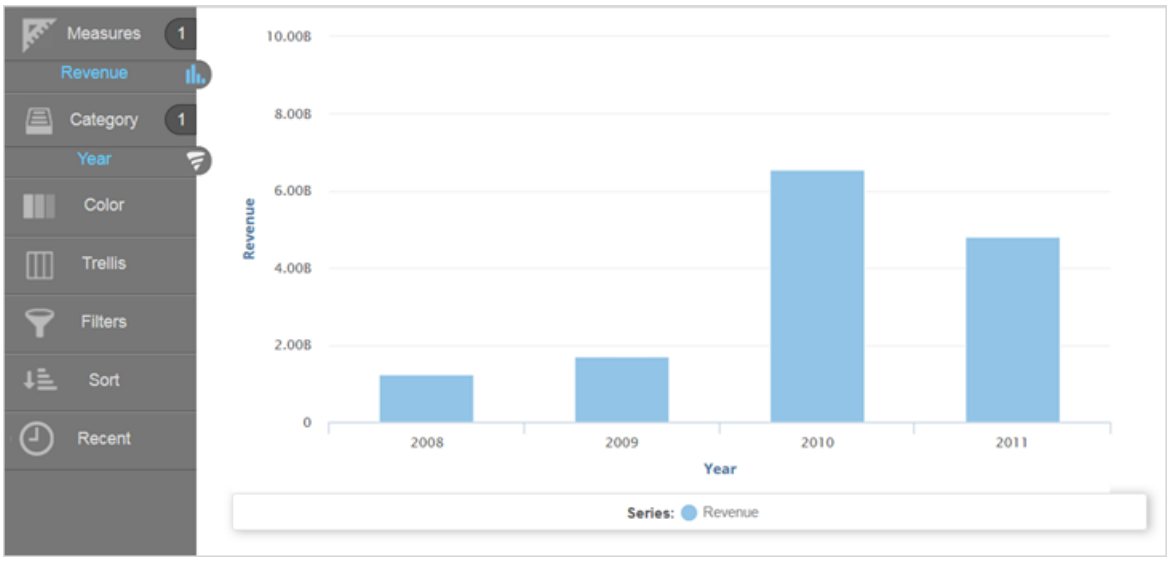
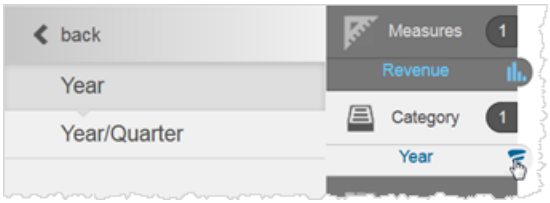
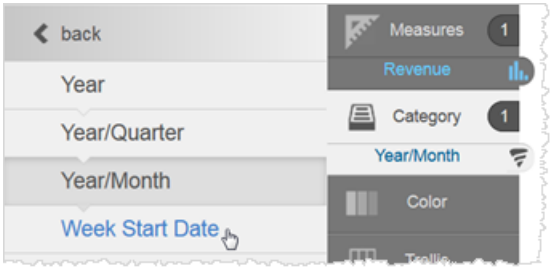


2. Click the Drill icon. Visualizer shows the next level attribute in the Subject Area.



3. You can click on the drilldown attributes in the Subject Area to swap out the attributes in Chart Builder. Visualizer will keep showing the next level down until the last attribute is reached.



4. To interact with the drillable chart, click on a chart component to start the drill down. For example, click a Year column to see the chart change from Year to Year/Quarter. At the top of the chart you see the breadcrumbs of the drill path. Chart Builder also shows the updated

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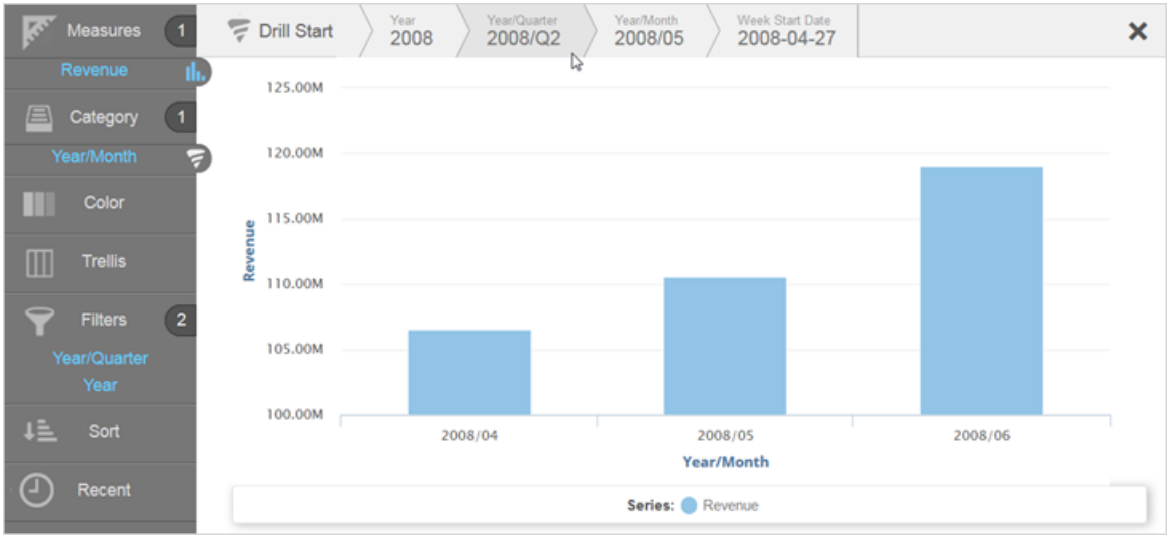
Filters.

5. Keep clicking on the chart to continue drilling. The breadcrumbs update. You can click a breadcrumb to go back to a previous view.



6. Click Save .

7. Add the report to a dashboard. See Adding a Visualizer Report to a Dashboard.

Report-Level Drill Paths and Hyperlinks

When the dashboard or space-level drill paths are not exactly what you want for a particular Visualizer report, you can create one or more custom drill paths for it. A drill path is normally

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associated with an attribute, so if you show multiple attributes then you can have multiple drill paths.

Each report-level drill path must be unique and attributes cannot appear in more than one drill path in the same report.

Drilling behavior follows this hierarchy:

- Dashboard-level drill-across links.
- Report-level drill paths as described in this topic.
- Space-level drill paths
    - Drill maps defined at the space level. In the Help see *Creating a Drill Map*.
    - Hierarchies in the dimensional model of the space.In the Help see *Creating Hierarchies*.
    - Built-in Time series drill paths. In the Help see *Time Attributes and Time Series Measures*.

As Visualizer users click through drill paths, the nodes display across the top of reports. To see how drilling works in Visualizer see Drilling in Visualizer.

Drill paths create filters that apply across a dashboard. When a business user clicks to activate a drill path in Dashboards 2.0, the filter card for that drill node appears.

For table reports, drill paths and hyperlinks are underlined in blue. Also, hovering over a hyperlink may display the link path in the browser, depending upon the browser's support for this functionality.

- Create a report-level drill map
- Disable drilling for an attribute
- Add a hyperlink to a report. In the Help see *Adding Hyperlinks to a Visualizer Report.*

To create a report-level drill path

For example, you have a chart showing Revenue by Region and you want users to be able to drill from a Region column to see a chart showing Revenue by Products in that Region. Then when the user clicks on a Product, a hyperlink for that Product leads to an external website.

The drill path follows: Region > Product > Hyperlink.

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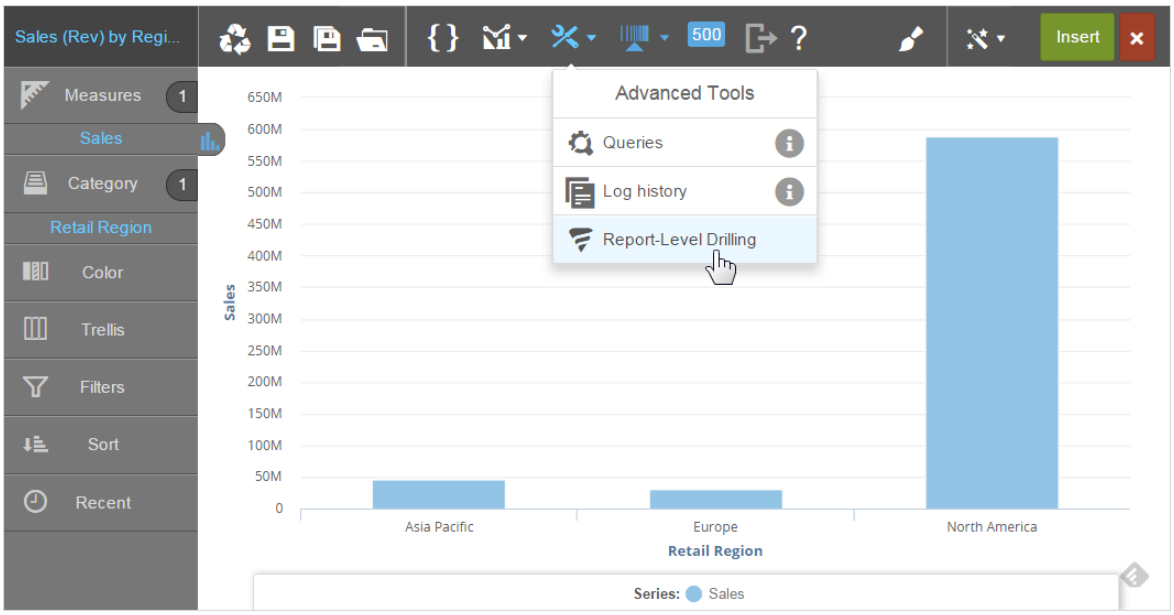
1. From a Visualizer report, click Advanced Tools - Report-Level Drilling.



2. In the Report-Level Drilling window click Add.

3. Name the new Drill Path.

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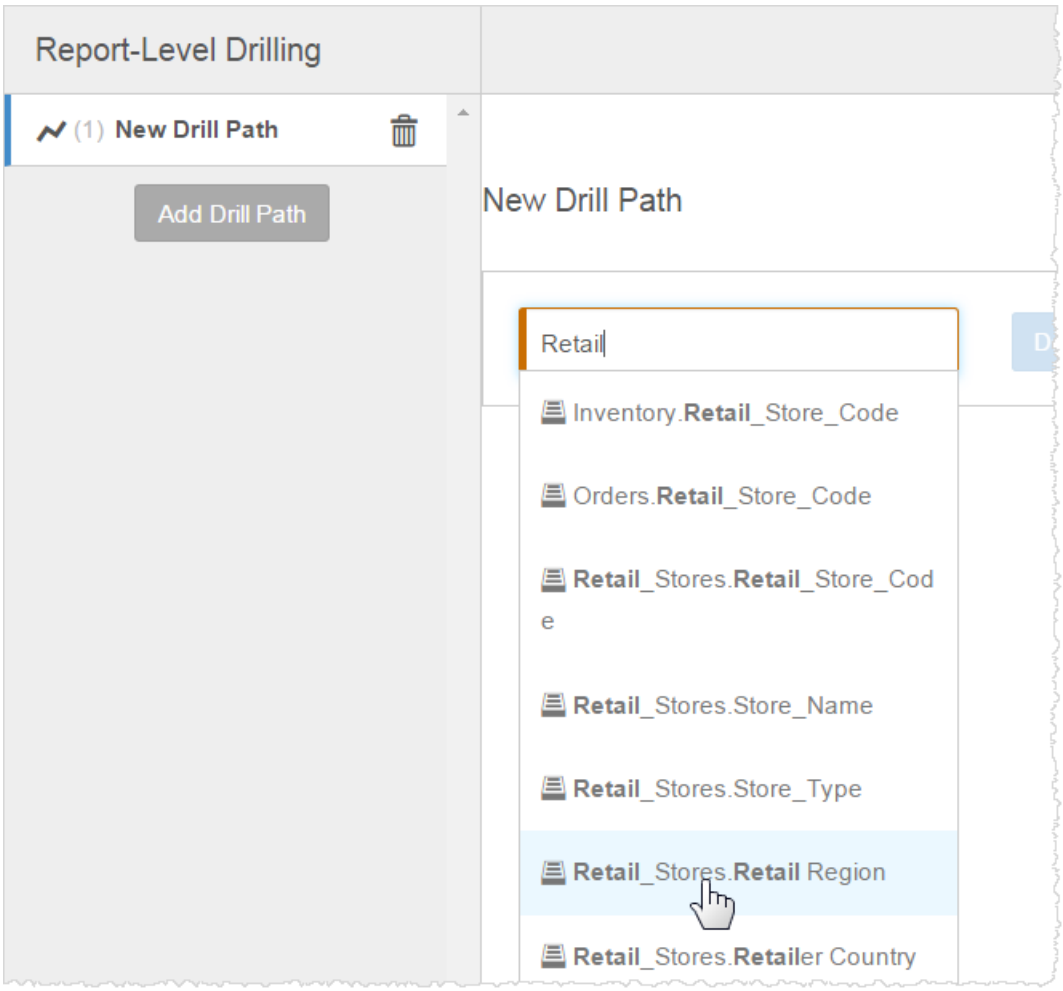
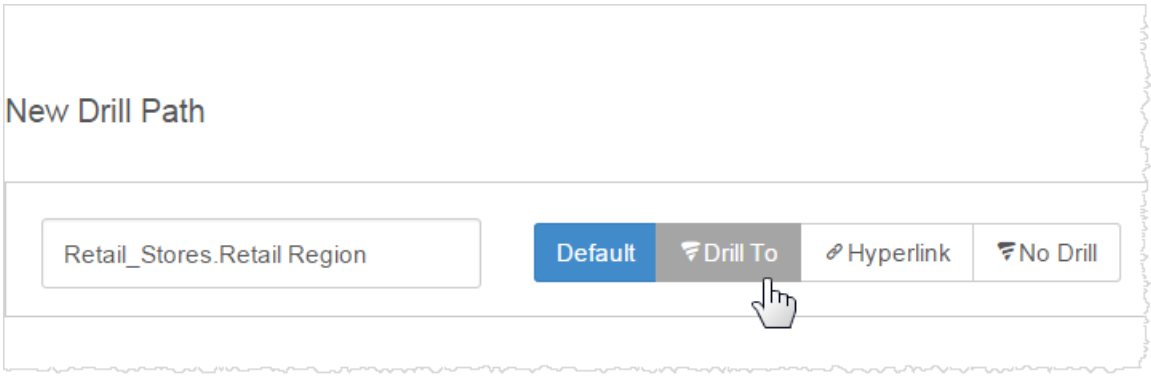
4. In the New Drill Path panel select the first attribute.



5. Click Drill To.



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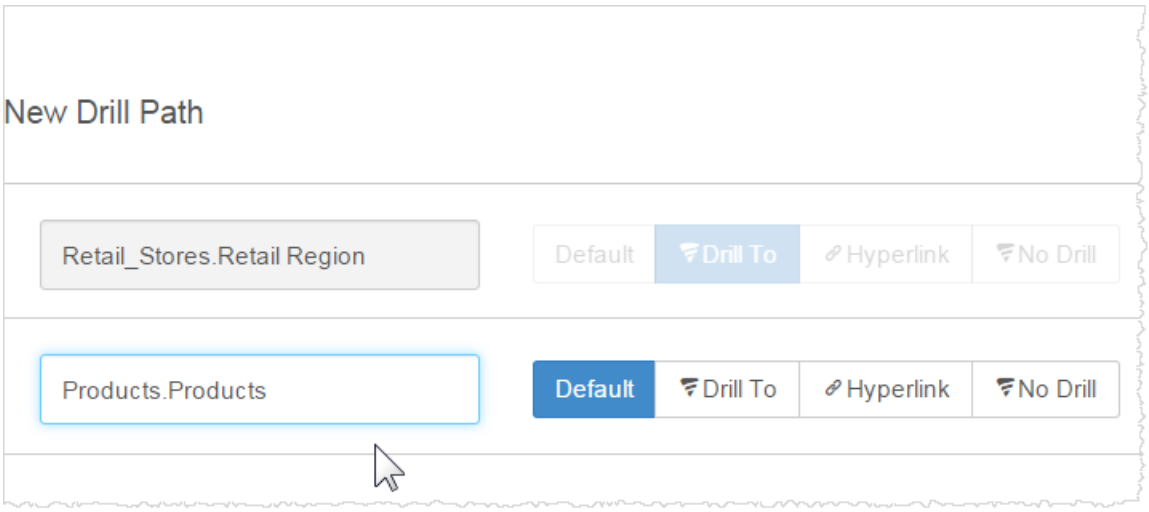
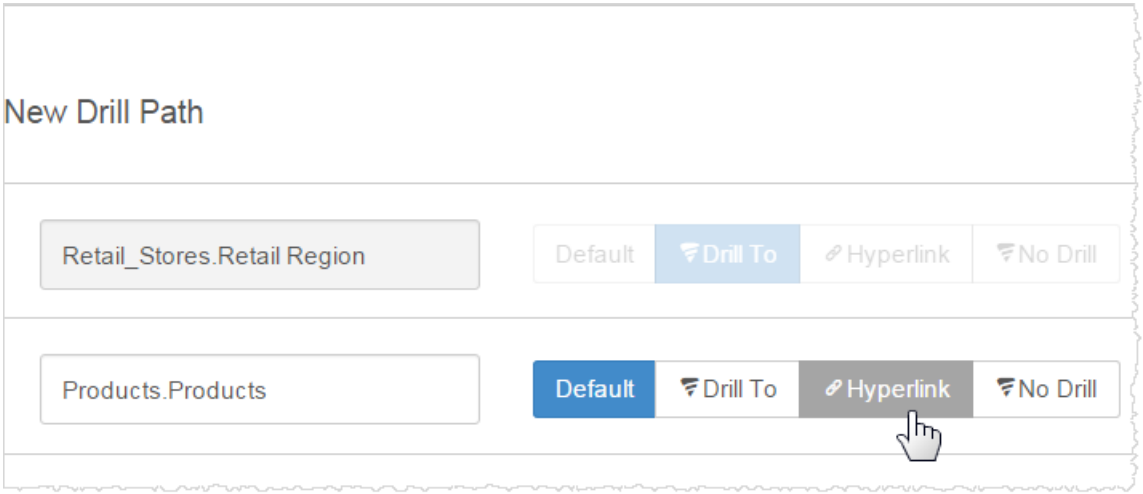
6. Select the second attribute.



7. Click Hyperlink.



8. Enter the URL using BQL syntax. Surround the URL in single quotes. For example, to use the value of Products.Products in a Google search:

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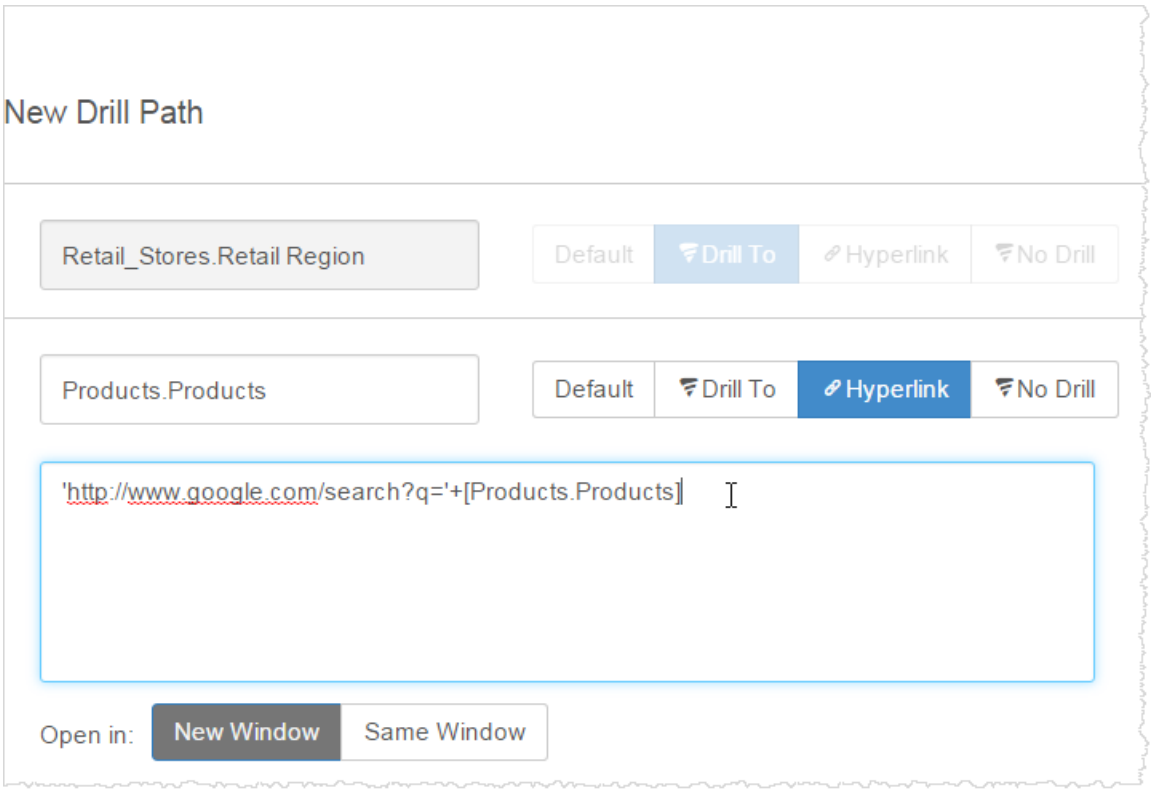
```
'http://www.google.com/search?q='+[Products.Products]
```



9. Select whether to open the URL in a New Window or in the Same Window as the report.
10. Click Done to exit the Report Level Drilling window.
11. Click Save to save the report.
12. Test the report.
    a. Click a Region bar to drill to the Products for that Region. You see the drill path at the top of the report.

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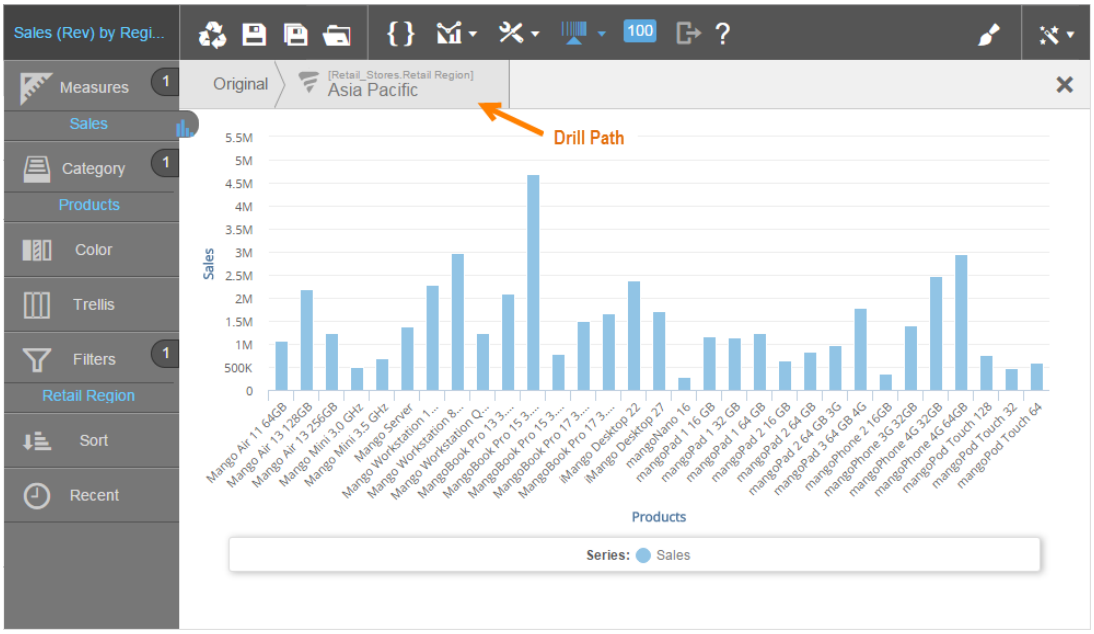

b. Click a Product column to drill to the URL for that Product.

13. Add the report to a dashboard and save the dashboard.

To disable drilling on an attribute

In some cases you may want to disallow drilling on an attribute that is already configured for drilling, such as the built-in Time series.

From a Visualizer report, click Settings - Report-Level Drilling.

1. In the Report-Level Drilling window click Add.
2. Name the new Drill Path.

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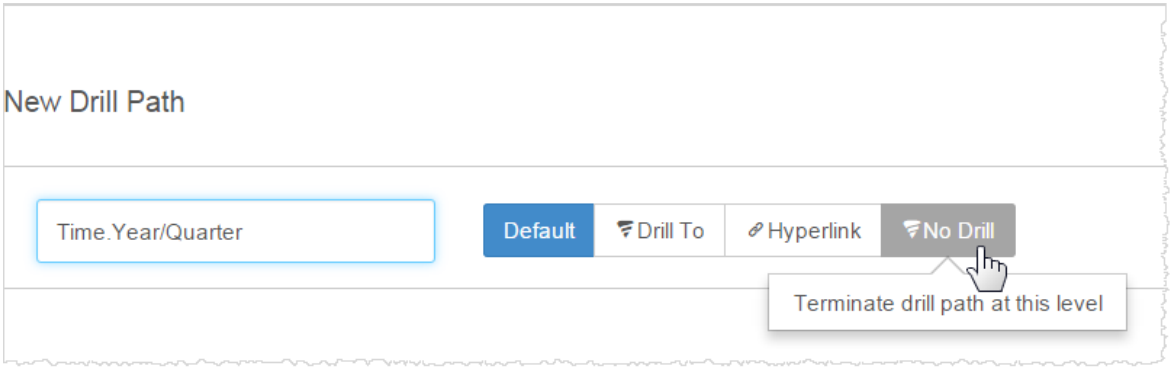
3. In the New Drill Path panel select the attribute that you want to disable.
4. Click No Drill.

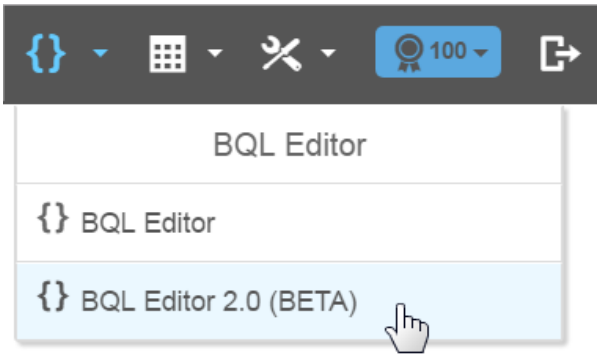


5. Click Done to exit the Report Level Drilling window.
6. Click Save to save the report.
7. Test the report.

Adding an Expression in Expression Builder

The Visualizer Expression Builder helps you add report-level attributes, measures, or filters based on BQL expressions. You can make these available to other reports in the same space using the Make Global option.

Important: In 5.26, a new version of the Expression Builder is in BETA status. It includes integrated syntax help, validation, and pretty-printing.You can access it from the same {} menu.



Important: In 5.27, The Expression Editor Basic mode now displays attributes and measures from multiple subject areas to build your expressions and you can now save expressions in either a Custom Subject Area or the Default Subject Area.

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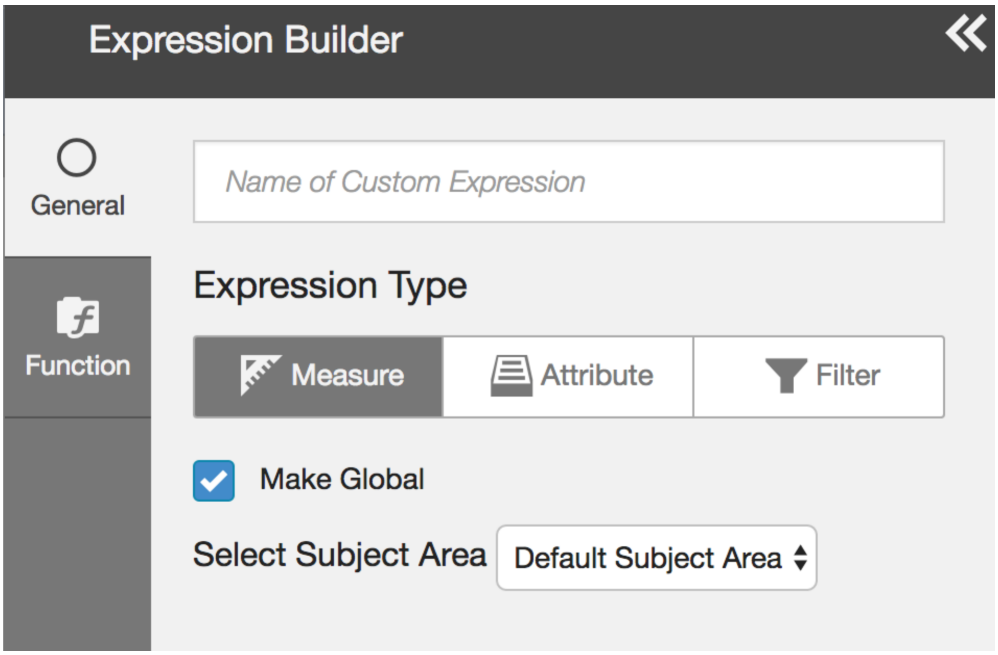

Tip: For Visualizer tables you can use BQL expressions to specify conditional formatting. In the Help see *Conditional Formatting for Tables and Crosstabs*.

BQL provides many functions and operators for expressions in Visualizer. See Supported Functions and Operations in Visualizer Expressions.

The Expression Builder supports a visually-oriented Basic mode and a text-oriented Advanced mode. In Basic mode, the Expression Builder provides type-ahead search to make it easy to add columns, operators, and functions. Use Advanced mode when you want to type a new or copy-paste an existing BQL expression.

Tip: Some functions are supported only in Advanced mode. See Supported Functions and Operations in Visualizer Expressions.

Expressions you create are available in the Visualizer Subject Area and you can use them like any regular measure or attribute.

Important: By default report expressions created in Visualizer are only available for the current report; they are not available for use in other reports. You can make an expression available across the space by clicking Make Global. This is also called a "saved expression". The ability to make an expression global requires the Admin - Manage Access - Manage Groups - Modify Saved Expressions privilege.

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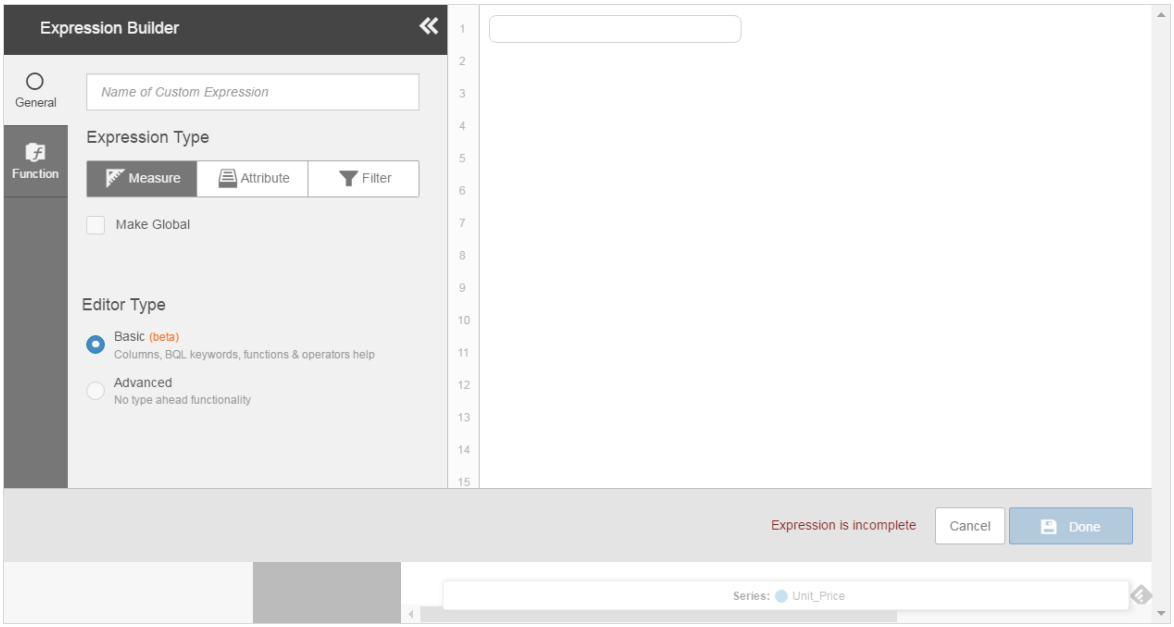
Saved expressions that have been created in Designer can also be used in Visualizer reports.

Expression filters are display filters and apply against the query result set in memory. For details, in the Help see *Introduction to BQL - Queries and Where Calculations Occur*.

To create an expression in Expression Builder

1. In the Visualizer module, click Expression Builder { }. The Visualizer Expression Builder opens.



2. Name the expression. For example, Revenue Expression, a measure that multiplies two existing measures.
3. Select the expression Category, either Measure, Attribute, or Filter. For Revenue Expression, select Measure.
    a. To make an attribute or measure expression available to other reports in the space, click Make Global. These are like "saved expressions" and are listed in the Subject Area for other reports in the space.
    b. Filter expressions can be either display filters (applied to the data in memory) or data filters (applied to the data in the database). Data filters can be leveraged for set-based fil-

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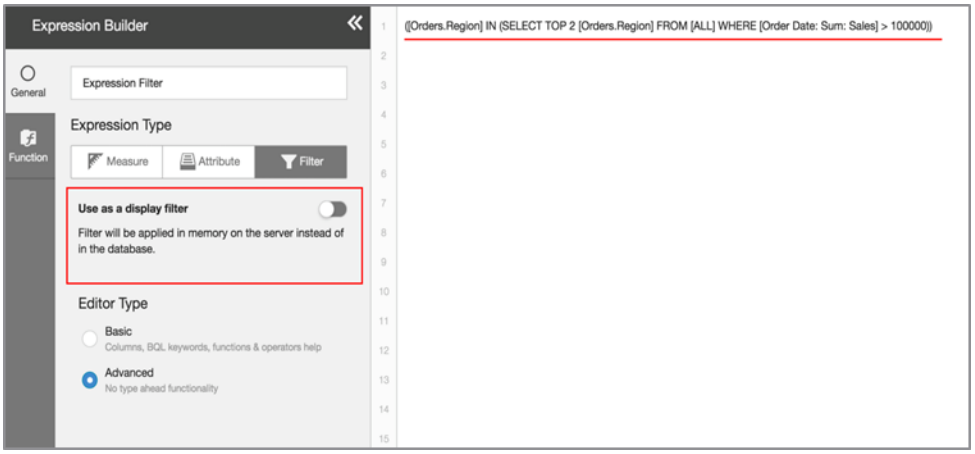
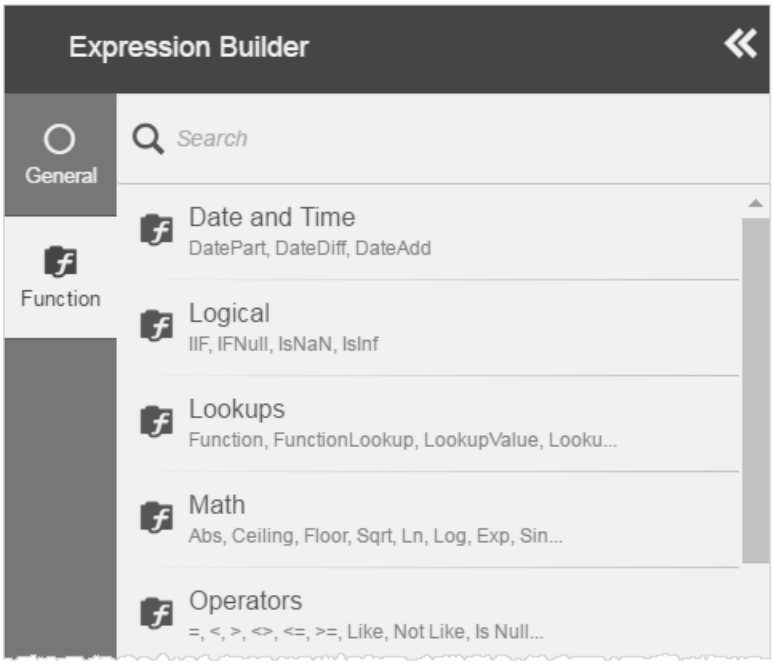
ters.



4. If you are proficient in BQL or have a pre-existing query, select Advanced mode. Enter or paste the query into the text field and click Done.

   Tip: Use the Functions Reference tab to find the syntax for Advanced mode functions.



   In Basic mode, start typing the name of one of the existing measures the Code field. For example, Quantity. Visualizer provides type-ahead search finds the relevant measures. Select the Quantity measure.

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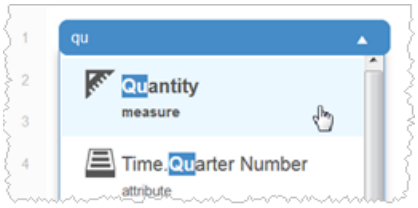
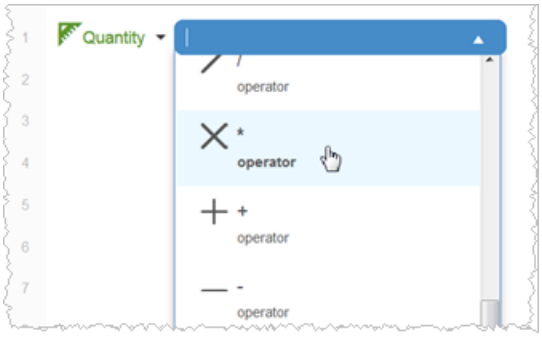


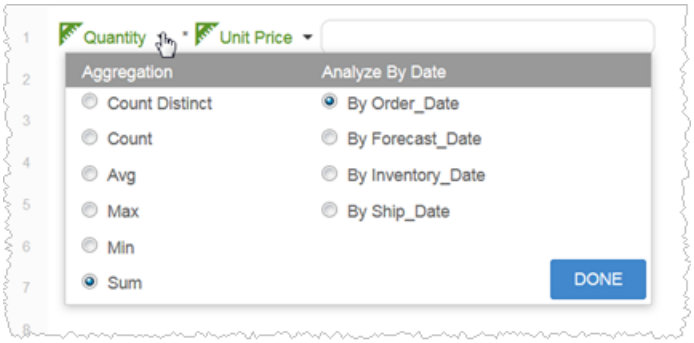
The message "Expression is incomplete" displays at the bottom and Done is unavailable until there is a complete expression in the Code field.

5. Visualizer presents a list of useful operators. Select the operator from the list or type a shortcut such as asterisk (*).



6. Start typing the name of the next measure and select it. For example, Unit Price.
   The editor prompts for additional clauses you may need. This example does not require more.

7. Click the dropdown arrow next to a measure to add Aggregation and By Date information. For example, Quantity uses the defaults Sum and By Order Date.



8. For Unit Price, select Avg and leave the default By Order_Date.
9. Click Done. Visualizer saves the expression and closes the Expression Builder.

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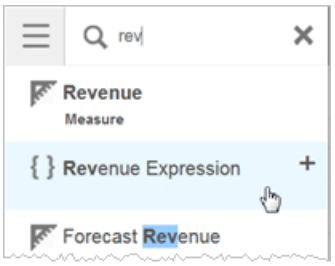
To use an Expression Editor expression in Visualizer

1. To find an expression search for it in either Measures or Attributes in the Subject Area.

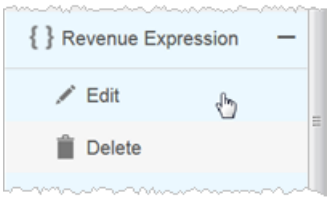


2. Add the expression to your report as you would any other measure or attribute. In the Help see *Creating a Report in Visualizer*.

   Tip: You can use an expression as a filter by dragging it to the Filters bucket.

3. Click Save .

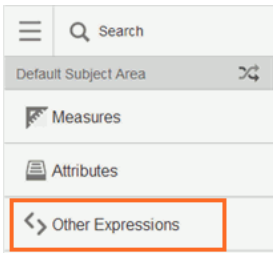
   Tip: To edit or delete an expression, navigate to the expression in the Subject Area and click Add (+).



To use a Designer expression in Visualizer

Important: You cannot filter the data in a Visualizer report using a report expression created in Designer.

1. Click Other Expressions in the Subject Area to view expressions created in Designer.



   If no saved expressions exist for this space, Visualizer does not display the Other Expressions folder.

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2. Double-click the expression to add it to the report or drag and drop it to the Chart Builder.

Changing Measure Calculations

Visualizer provides various configurable options for measures used in reports. One of these is the calculation of the measure across its attributes. By default, the calculation is the absolute value of the measure value.

Tip: In BQL, this is expressed as ABS([*measure*]), for example: `ABS([OrderDate: Sum: Quantity])`

In some cases you may rather use a different calculation in your chart. In addition to Absolute Value, you can apply:

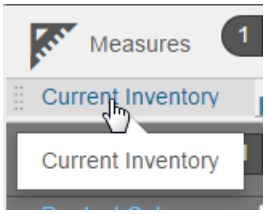
- Percentage Across: each column or row is a percentage of the total

You have access to the BQL in the Expression Editor to customize the calculation.

- Edit the BQL

To use a Percentage Across calculation

1. Add the measure to Chart Builder and select it.



   Visualizer displays the options available for the measure.

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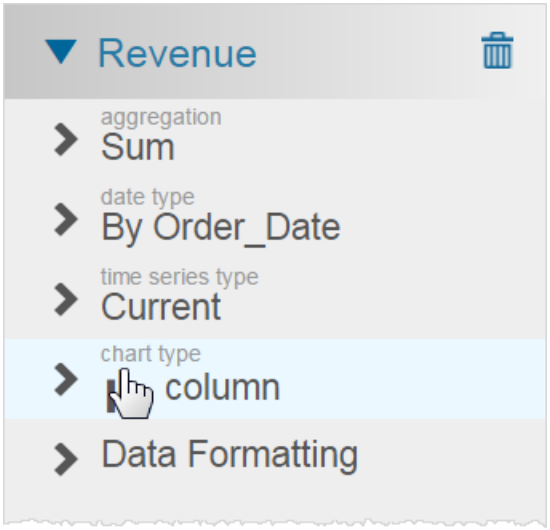

Tip: If you do not see the calculation, then the attribute may be missing. Add an attribute to the chart.

2. Click the calculation option to see a list of possible calculations.

3. Click Percentage Across to see a list of relevant attributes.

4. Click the attribute. Visualizer applies the calculation and:

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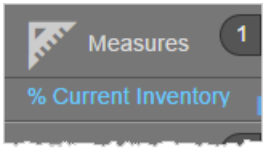
- Updates the item in Chart Builder to show that it is a percentage across calculation.



- Adds the new measure to the Subject Area list of measures.

Tip: Click the plus sign (+) on a calculated measure to delete it.

- Updates the measure axis to show percentages.

Examples of Percentage Calculation

Here is an example of a chart using percentage calculation. As usual, you can format the chart and tooltips to display the percentage values in different ways.

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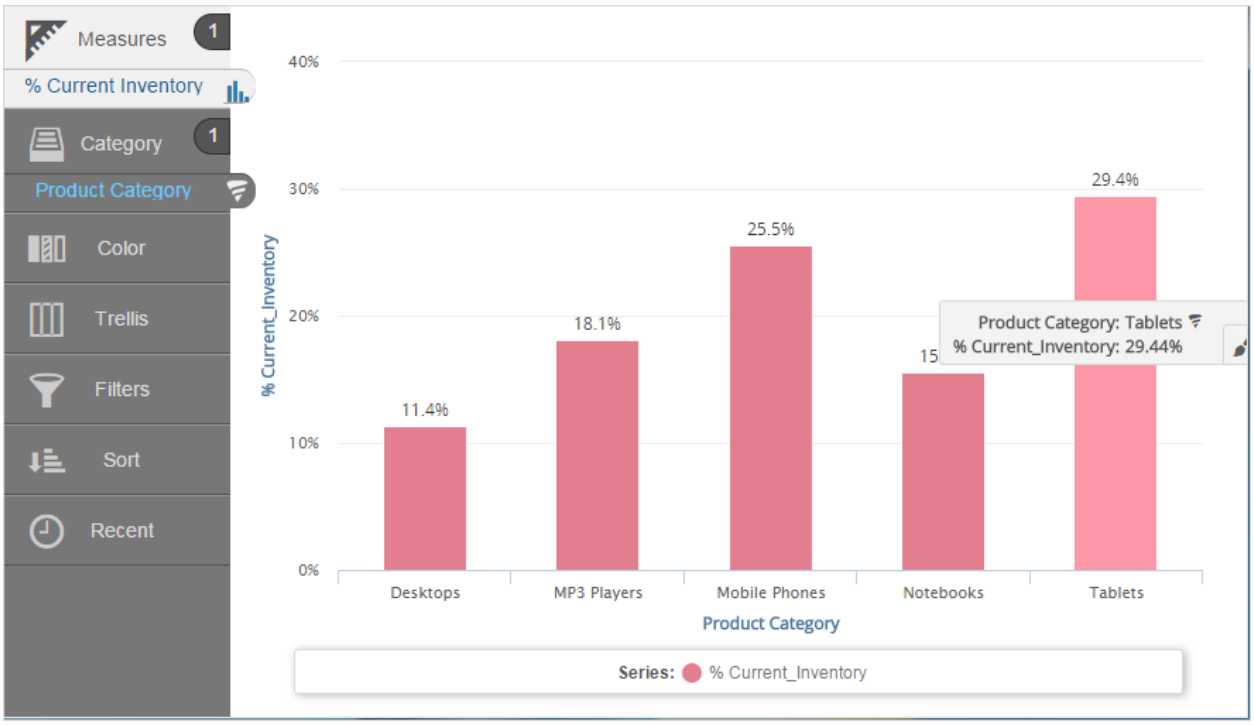

Here is the same information in table format, using a different decimal precision. Notice that the curly brackets { } indicate an expression is being used.

Product Category	% Current_Inventory
Desktops	11.36%
Mobile Phones	25.54%
MP3 Players	18.14%
Notebooks	15.52%
Tablets	29.44%
	{ } **100%**

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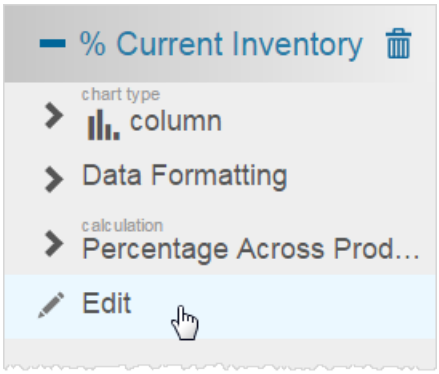
To see and edit a calculation for a custom expression in Expression Builder

1. Select the custom measure in Chart Builder.
2. Click Edit to open the Expression Builder.



   Tip: If you do not see the Edit option, then the measure is not a custom expression.

   The Expression Builder shows the BQL used for the calculation.

3. You can copy and/or edit the BQL. In this example the BQL is:

```
([Inventory_Date: Sum: Current_Inventory]/[Inventory_Date: Sum: Current_
Inventory]{[Products.Total]}) * 100
```

4. Click Done.

Adding a Visualizer Report to a Dashboard

Visualizer and Dashboards 2.0

To add a Visualizer Report to a new Dashboards 2.0 page, from the Home page click Dashboards 2.0. If there aren't any existing dashboards, a new empty dashboard opens. If you already have one or more dashboards, the default one displays. To make a new one, click the Dashboards Folder to open the list. Locate the collection that will hold the dashboard, and click Add Dashboard.

In the Help see *Creating Dashboards 2.0*.

Visualizer and Original or HTML5 Dashboards

You can drag and drop a Visualizer report onto a dashlet in the original Dashboard Editor.

Visualizer reports and Designer reports can coexist on the same HTML5 dashboard page.

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Visualizer reports cannot be viewed in the classic (Flash) version of Dashboards. You add it there and view it in HTML5.

Any prompts that are applied to the dashboard will be applied to the Visualizer reports as well as the Designer reports in the dashboard.

To make changes to a Visualizer report in a dashboard, open the report in Visualizer and make the changes. The changes you make to the Visualizer report are reflected in the dashboards that contain the report.

To include a Visualizer report in an original or HTML5 dashboard

1. In the original Dashboards module, either:

   - Create a new dashboard tab or dashboard page. In the Help see *Creating Dashboards 2.0.*

     Or:

   - Edit an existing dashboard page by right-clicking the dashboard page name and selecting Edit.

     The Dashboard Editor opens.

2. In the Add Reports section select the Visualizer report and drag it to a dashlet. The name of the report displays in the dashlet header.

   Important: The Visualizer report does not display in the dashlet in the Dashboard Editor during editing.

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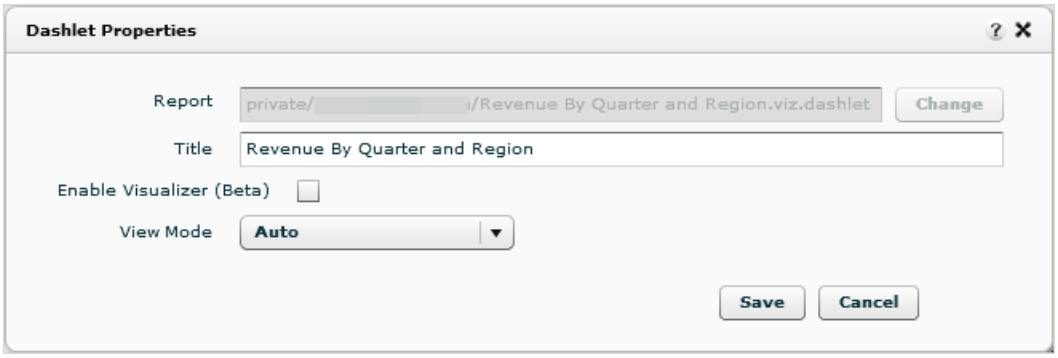
3. Click Edit in the dashlet header. The Dashlet Properties dialog box opens.



Dashboard Editor displays the name and location of the report file in the Report field.

Tip: The Change option is not available for Visualizer reports. To change the Visualizer report in a dashlet, drag and drop a different Visualizer report into it.

4. You can change the Title. The Title is the name that will appear in the dashlet header; by default it is the name of the report.
5. Click Enable Visualizer.
6. Select the View Mode for the way you would like to display the dashlet.
   - Select Default to display headers and borders for the dashlet.
   - Select Auto to use global property settings for headers and borders.
   - Select No Header to *not* display a header for the dashlet.
   - Select No Header & Borders to *not* display a header or borders for the dashlet.
7. Click Save in the dialog box.
8. Click Save at the top of the page to save the dashboard.

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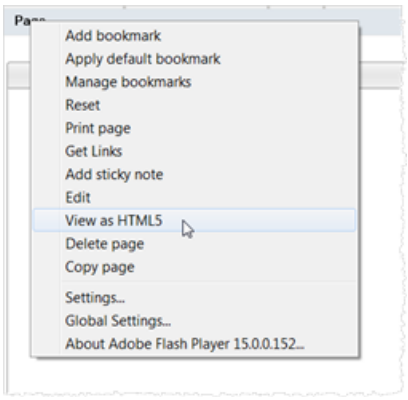
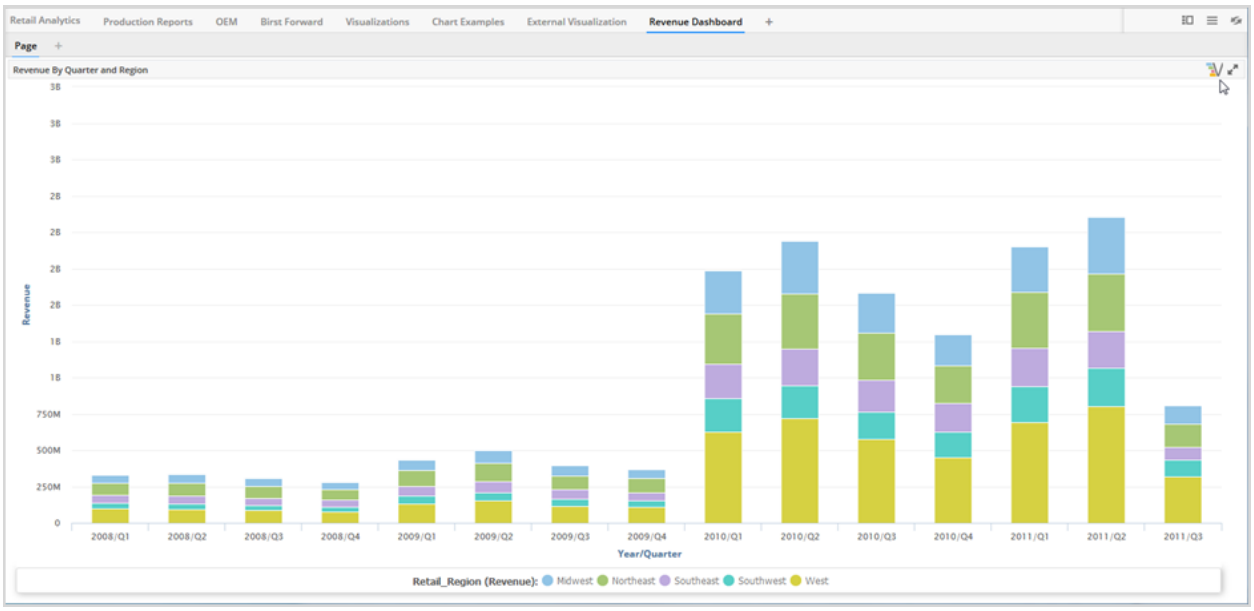
9. Right-click the dashboard Page and select View as HTML5 to see the Visualizer report in the HTML5 dashboard.



10. If you are using the HTML5 Dashboards module, the Visualizer report displays in the dashboard in a new browser.

    If you are not set up to use the HTML5 dashboards in the Help see Assigning Users to the HTML5 Version of Dashboards.



11. The Visualizer symbol indicates that the original report is from Visualizer. Click it to open the report in Visualizer.

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Opening a Visualizer Report from a Dashboard

A Dashboards 2.0 user can open and edit a Visualizer report to perform ad-hoc analysis.

To open a Visualizer report from a new dashboard in Dashboards 2.0

You can open a report from a dashboard directly into Visualizer, edit it, save it, and return to the dashboard editor. Use the fan menu of the report dashlet. In the Help see *Creating Dashboards 2.0*.

To open a Visualizer report from an original HTML5 dashboard

Prerequisite: Check the Enable Visualizer box in the original Dashboard Dashlet Properties to give users the ability to open the report in Visualizer.

1. Open the Dashboards module.
   If you are not using the HTML5 version of Dashboards, right-click the dashboard page containing the Visualizer report and select View as HTML5.
2. From an HTML5 dashboard, click the icon in the dashlet header. The report opens in Visualizer.
   If you do not see this icon, the ability to open the report inVisualizer has not been enabled for this dashlet.
3. Make any changes you want to further explore your data, such as changing how the data is filtered or adding additional metrics.
4. When you are finished, click the close icon in the upper right corner to close Visualizer and return to the HTML5 dashboard.

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Creating Column Selectors

Column selectors let business users change attributes, measures, or both, of a chart or table in Dashboards 2.0. Column selectors allow your reports to become very versatile. For example a report with column selectors can:

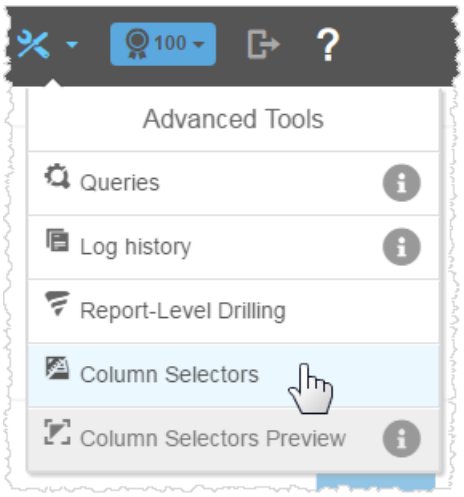
- Apply different attributes that are not related in a hierarchy.
- Provide an alternative way to drill down or up through a hierarchical set of attributes.
- Apply different measures to the same attribute.

Column selectors can reduce the number of reports needed on a dashboard by allowing a single report to do the work of multiple reports.

A column selector applies to a set of attributes and/or a set of measures. You can mix attributes and measures in a column selector. Set up the column selectors in your Visualizer report for use in Dashboards 2.0.

To create a column selector report

1. Add an attribute and a measure to the report.
2. Click Advanced Tools - Column Selectors.



3. In the Column Selectors panel, drag and drop an attribute or measure onto the corresponding bucket.

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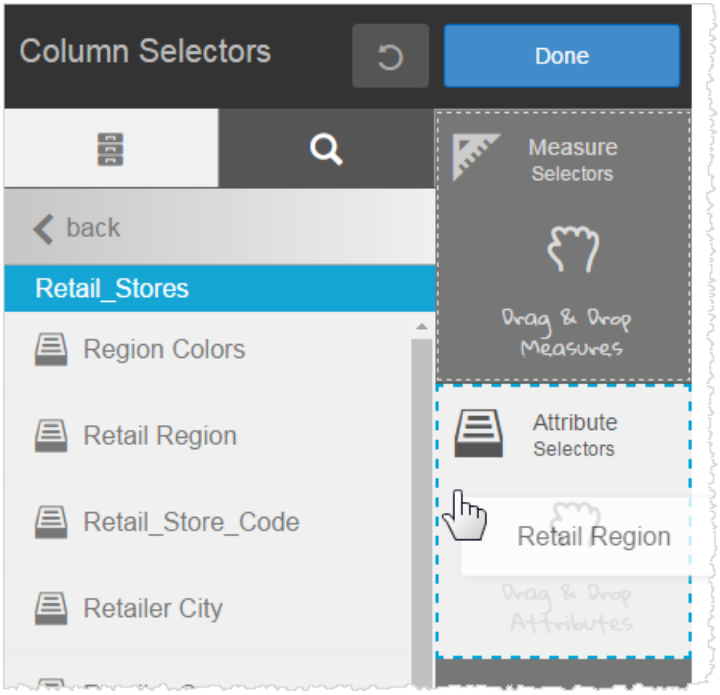
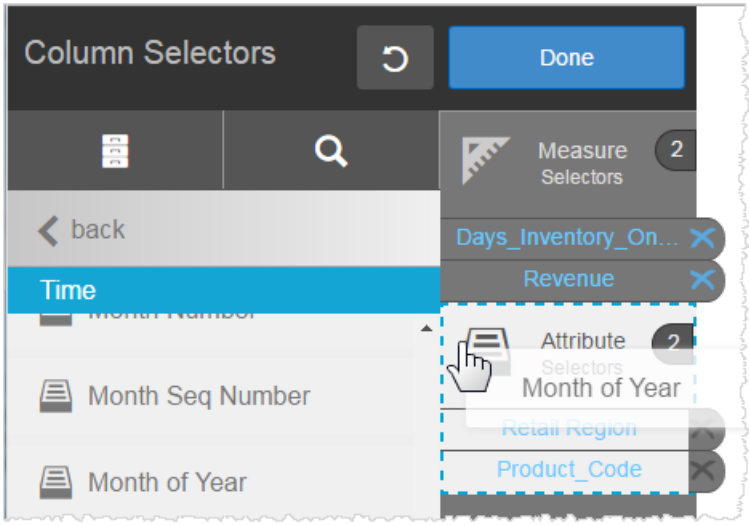


The panel updates with the new selector.

4. Optionally, click Back to go to the list and add more attributes or measures.

   Tip: Remember that the original chart already had at least one attribute and one measure. You do not have to add them as column selectors.



   Tip: Click the X to delete an attribute or measure from a bucket.

5. Click Done.

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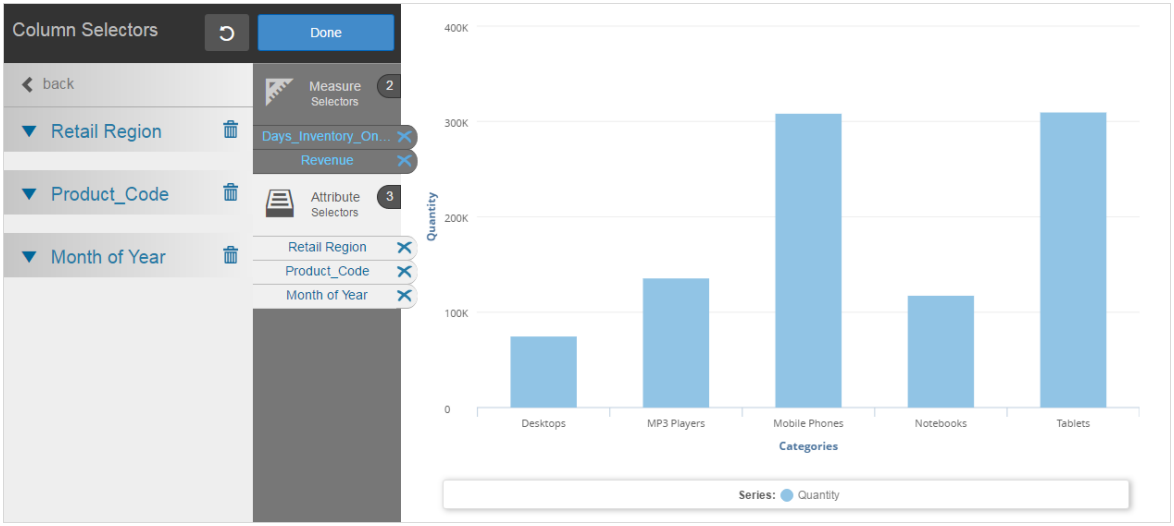
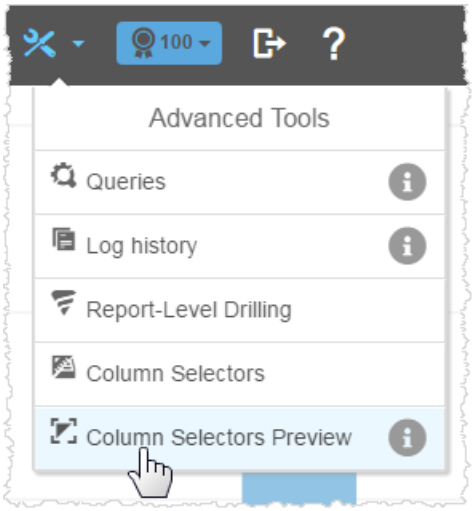
6. 

7. Click Save.

8. Click Advanced Tools - Column Selectors Preview to see the new selectors.



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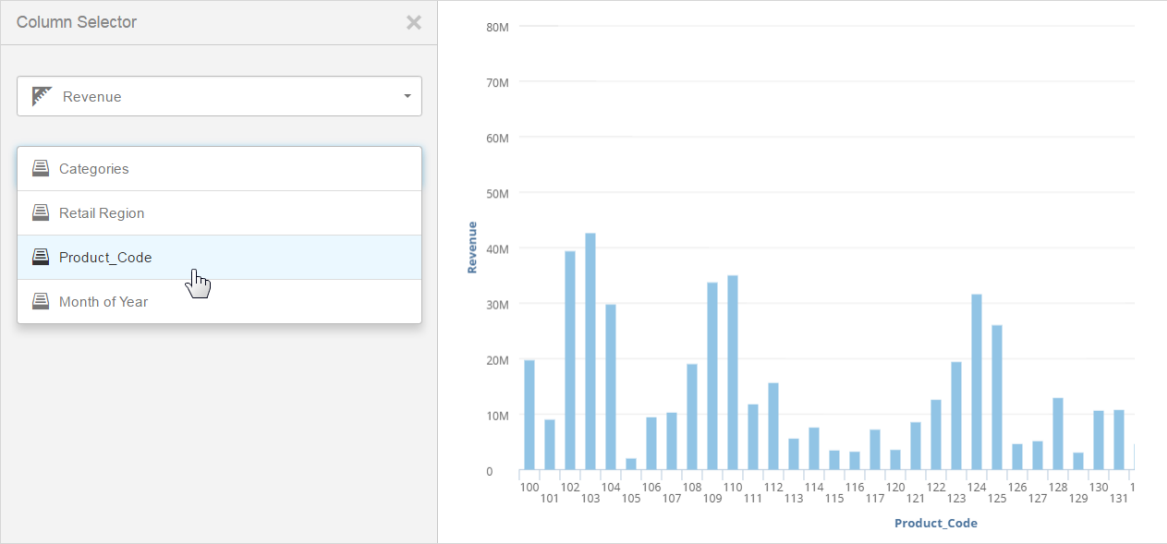
9. Test out the column selectors. Iterate to make changes if needed. Click X to go back to Visualizer.



Next Steps

Add the report to a Dashboards 2.0 dashlet and save the dashboard. In the Help see *Creating New Dashboards*.

When business users access the dashboard, they can click Dashlet Actions - Column Selector and toggle the attributes or measures to update the report. In the Help see *Business User Guide to Dashboards 2.0*.

Adding Hyperlinks to a Visualizer Report

Use report-level drill maps to add a hyperlink to a report. Set a Hyperlink at the end of a drill path. For more about using a hyperlink in a drill path, see Report-Level Drilling.

To add a hyperlink without drilling to different attributes, create a drill path that contains a single node.

To add a hyperlink

For example, you want users to click on a bar to go to a store's Google entry.

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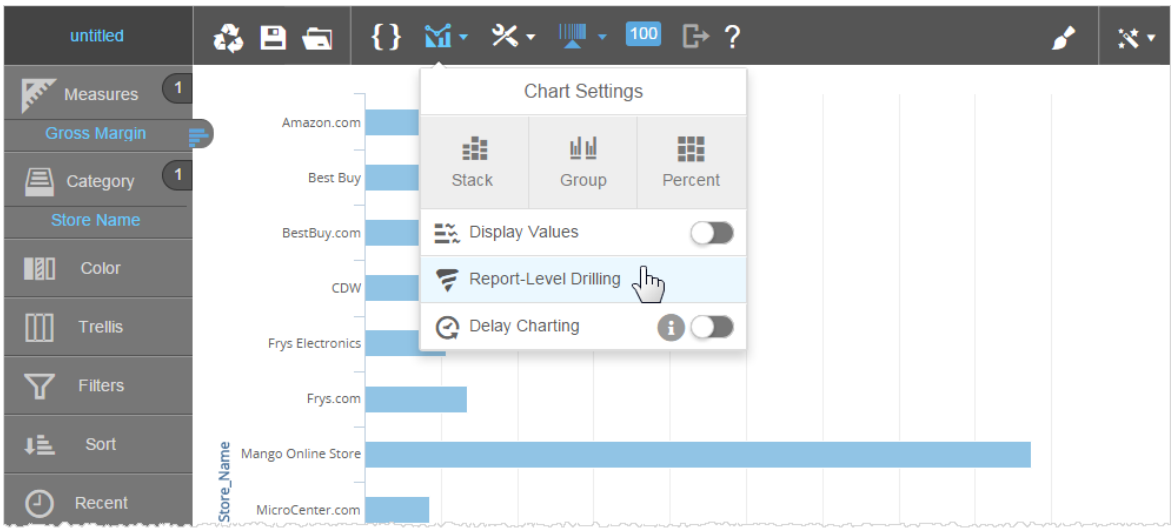
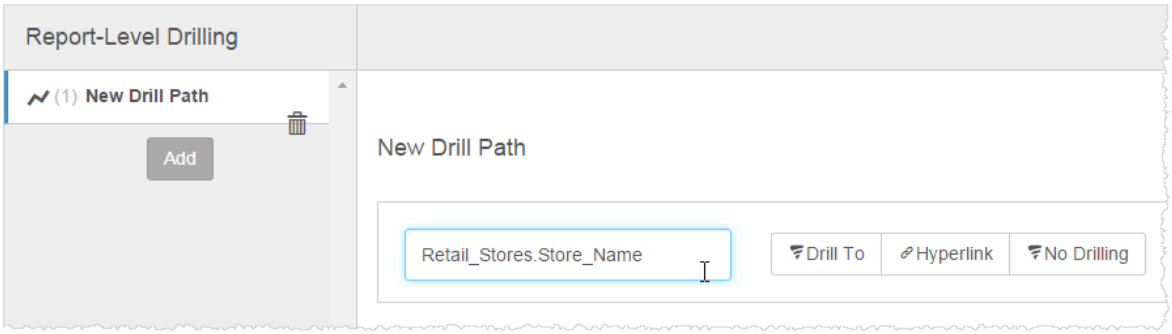
1. From a Visualizer report, click Settings - Report-Level Drilling.



2. In the Report-Level Drilling window click Add.

3. Enter the Store Name attribute.



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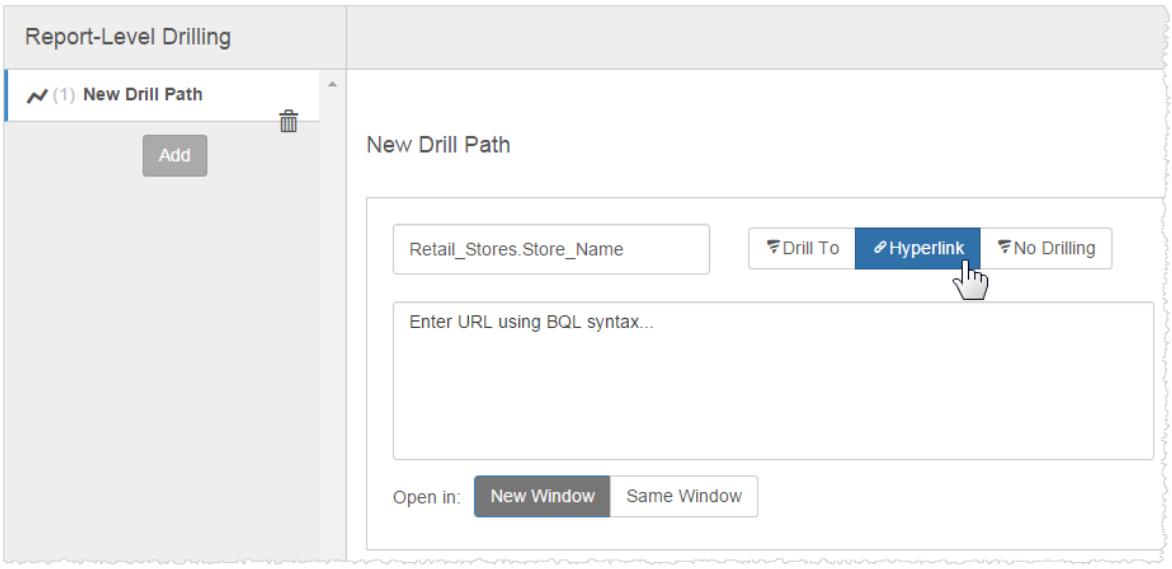
4. Click Hyperlink.



5. Enter the URL using BQL syntax. For example, to use the value of Products.Products in a Google search:

   ```
   'http://www.google.com/search?q='+[Retail_Stores.Store_Name]
   ```

6. Select whether to open the URL in a New Window or in the Same Window as the report.
7. Click X to exit the Report Level Drilling window.
8. Click Save.

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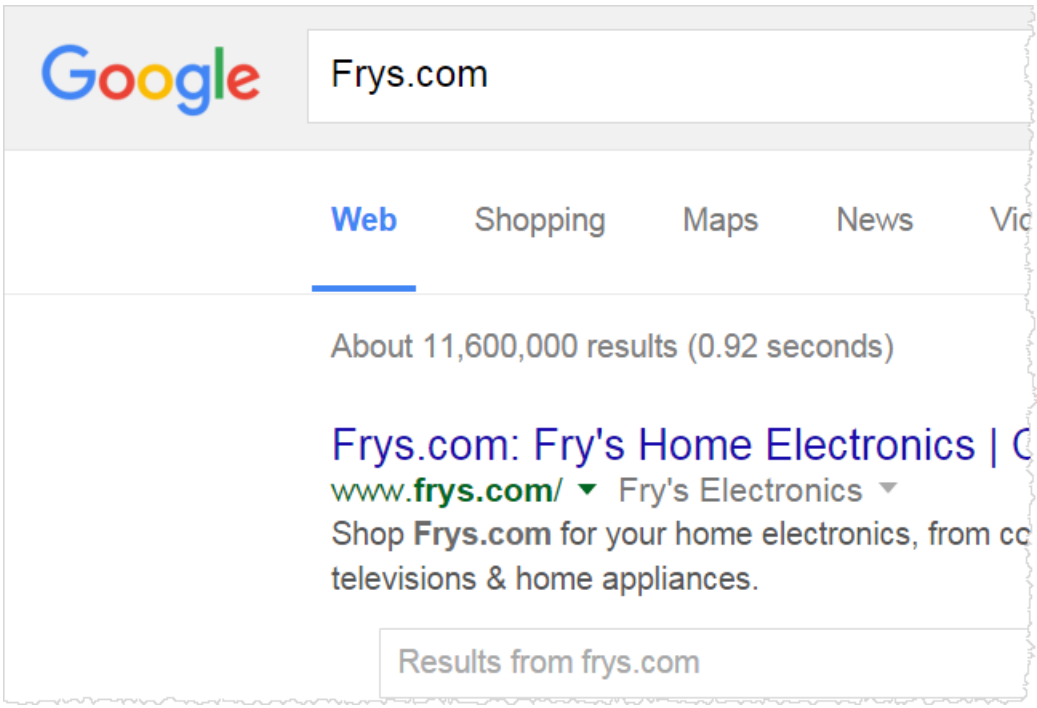
9. Test the report. For example, clicking on the bar for "Fry's" opens the URL.



Deep Linking in Visualizer

You can share Visualizer reports using the “Copy Report URL” icon on the Export Menu. Similar restrictions apply as previously mentioned in Dashboard Deep Linking.

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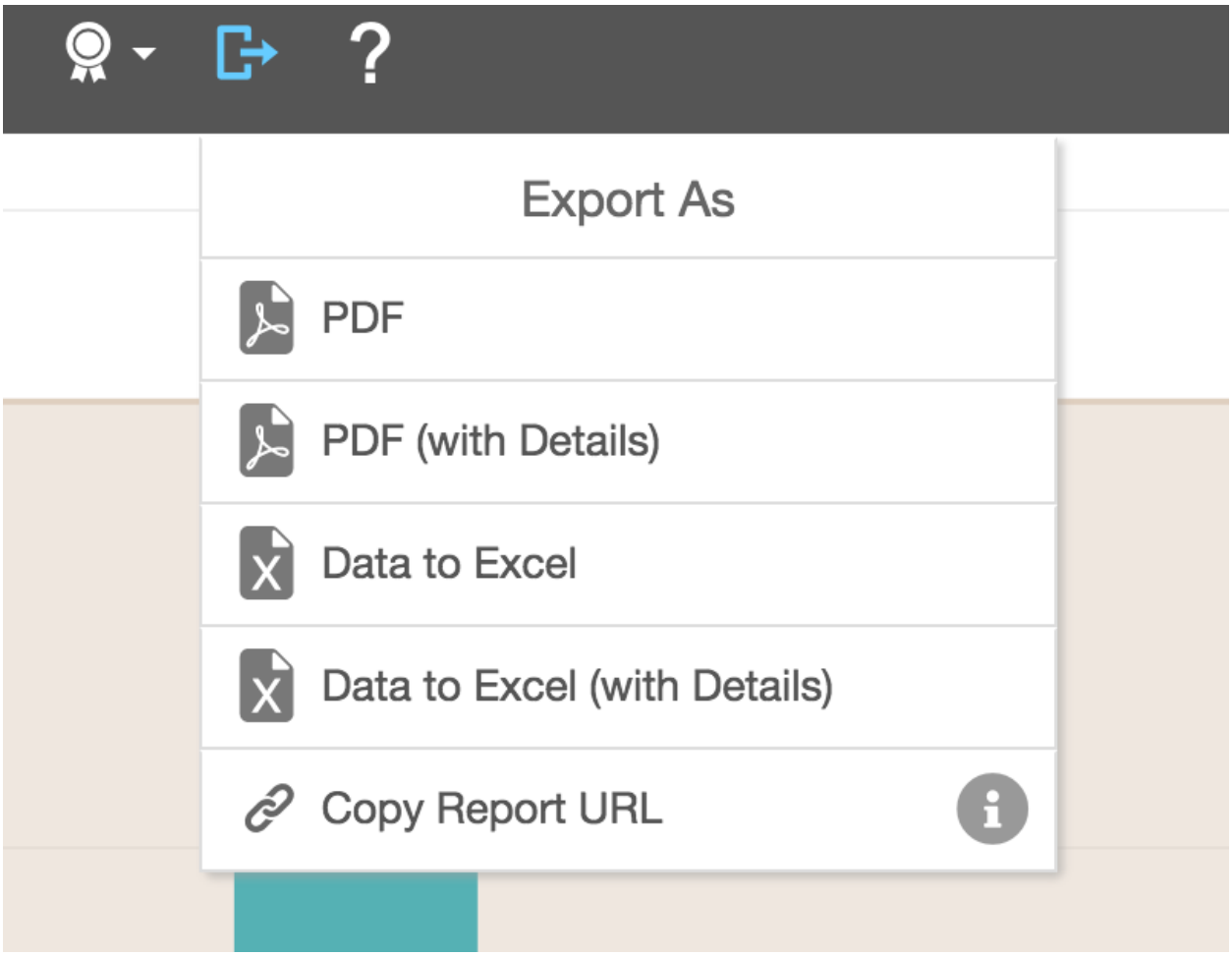

Advanced Analytics

Visualizer 5.26 has a new Advanced Analytics menu that supports:

- Cluster analytics
- Trendlines
- Benchmark

Tip: See Hardik's ThinkTank blog for more discussion as these features develop.

Cluster Analytics

Clusters is a class of unsupervised machine learning algorithms used for classification of data points. It helps users understand the natural grouping or structure in a data set. For details see the

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Wikipedia article on cluster analysis.

Clusters groups data points into different clusters based on the algorithm chosen. Objects in the same group (cluster) are similar (in some sense or another) to each other than to those in other groups.

To use cluster analysis

1. Set up a chart.

   Tips:

   - Clusters are best suited for scatter, bubble, and point charts using Color, Shape, or Trellis in Chart Builder.
   - Trellising clusters in other types of charts can also be useful.
   - Maps are not supported.
   - You can create only one cluster group in a chart.

2. From the Advanced Analytics menu select Cluster. The Cluster Properties panel opens. Visualizer adds Cluster Group to the Chart Builder and displays the clusters.
3. Select the algorithm. EM (Expectation Maximization) is the default. k-means is also available.

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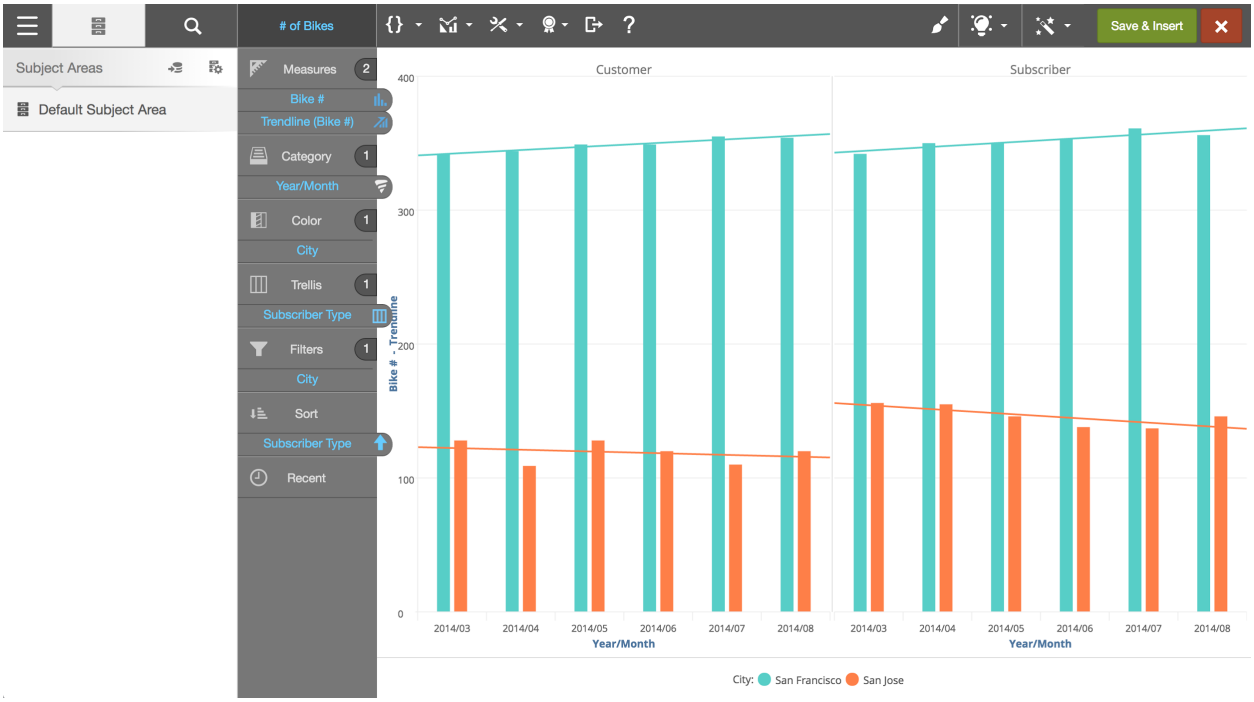
4. Select the Number of Clusters. You can specify the number of clusters in manual mode or let the algorithm select it automatically, based on the dataset.
5. Click Back to close the panel.

Trendline

Trendline identifies an increasing or decreasing trend in the data set. With the 5.27 release, you can add an attribute to a Color, Shape or Trellis in Chart Builder for a report containing a trendline.

Trendline is a class of supervised machine learning algorithms used for regression analysis. Identifies the relationship among the data that helps predict future 'y' values given the 'x'. For details see the Wikipedia articles on supervised learning and regression analysis.



To use trendline analysis

1. Set up a chart.

   Tips:

   - Use an area, areaspline, bar, column, line, or spline chart.
   - You can use only one trendline in a chart.

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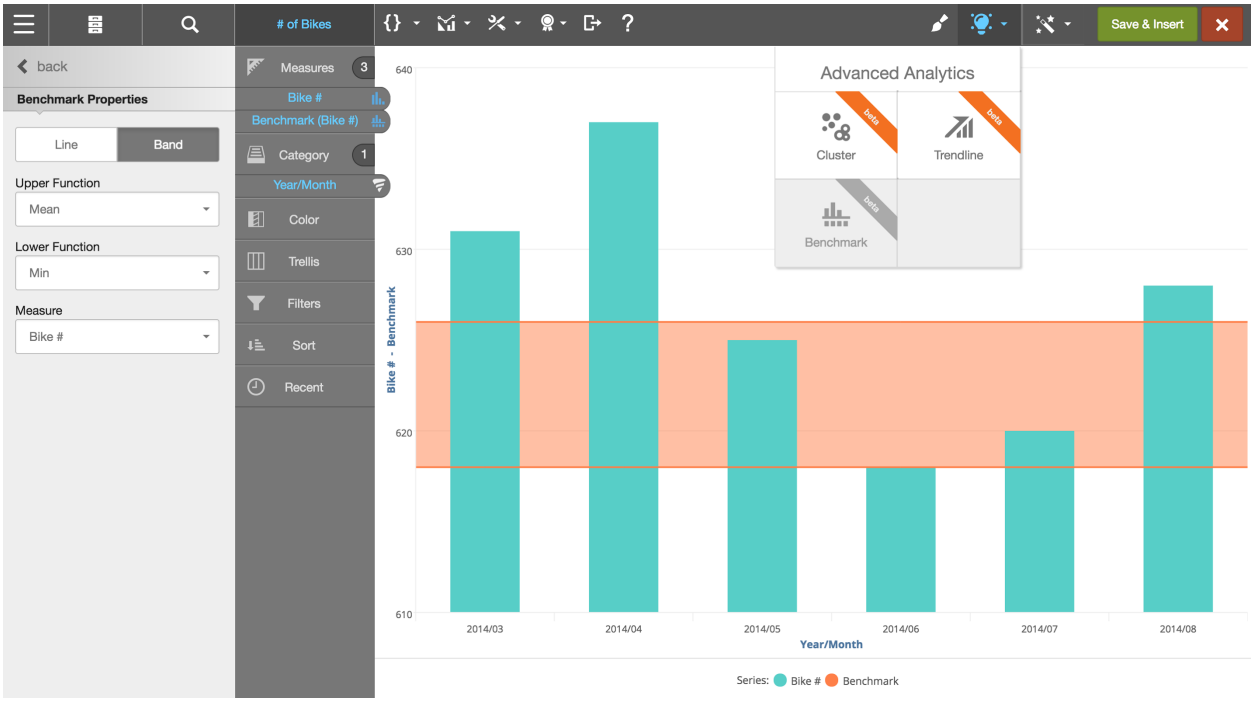
2. From the Advanced Analytics menu select Trendline. The Trendline Properties panel opens.
3. Select the Type. Linear is currently supported and more are planned.
4. Select the Measure against which the trend will be plotted. Visualizer adds the trendline measure to Chart Builder and plots the trendline on the chart.
5. Click Back to close the panel.

Benchmark

The Benchmark functions have been added to 1-Click Advanced Analytics (in Beta). Benchmark provides a reference across the attributes of a measure via a line or band display. A Benchmark can be the Mean, Min, Max, Median, or a Constant of the measure value. A band is a range between two benchmark lines.



To set up a benchmark

1. Set up a chart with a measure and an attribute.

   Tips:

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- Use a bar, column, line, or spline chart.
- Adding an attribute to a Color, Shape or Trellis in Chart Builder will remove the benchmark.
- You can use only one benchmark (line or band) in a chart.

2. From the Advanced Analytics menu select Benchmark. The Benchmark Properties panel opens. Visualizer adds the line or band to Chart Builder and plots a Mean line on the chart.
3. If you want a band, click Band.
4. Select the Function or Upper Function that is calculated for the measure. Functions include:
   - Mean (sum of all values divided by the count of rows)
   - Min (smallest value in the set)
   - Max (largest value in the set)
   - Median (middle value in the set, where half are lower and half are larger)
   - Constant (you enter a fixed number)
     Visualizer plots a line on the chart.
5. If using a band, select the Lower Function.
   Visualizer plots the line or band on the chart.
6. Optionally, choose a different measure.
7. Click Back to close the panel.

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Working with Chart Reports

There are many ways to organize your charts in Visualizer. The following topics show you how to refine the charts you are creating:

- Formatting Visualizer Charts
- Formatting Data in a Visualizer Chart
- Adding Attributes Using Colors, Sizes, or Shapes
- Creating Trellis Charts in Visualizer
- Creating Chart Layers in Visualizer
- Using Turbo Charts
- Creating Color Palettes for Attributes
- Adding Tooltips and Hiding Columns

Formatting Visualizer Charts

Customize the formatting of your charts. For the chart in general you can:

- Assign a color palette to the whole chart and/or to individual measures
- Clone and modify or create new custom color palettes
- Show or hide and format the legend
- Change label texts
- Show or hide the labels
- Merge or split multiple axis
- Move axis to the left or right, above or below, the chart
- Format X axis elements
- Format Y axis elements
- Change the axis scale
- Toggle display values on/off on bar or column charts and format the display values
- Format tooltips

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- Apply conditional color formatting that overrides the default palette for category attributes
- Change a waterfall chart from vertical to horizontal

Tip: In Dashboards 2.0 you can modify the style of axis and labels on a per-report basis. In the Help see *Setting Chart Element Styles*.

To apply consistent formatting for measure data across data axis labels, tooltips, and display values see Formatting Data in a Visualizer Chart. Formatting at the chart level, as described in this topic, overrides the data level formatting.

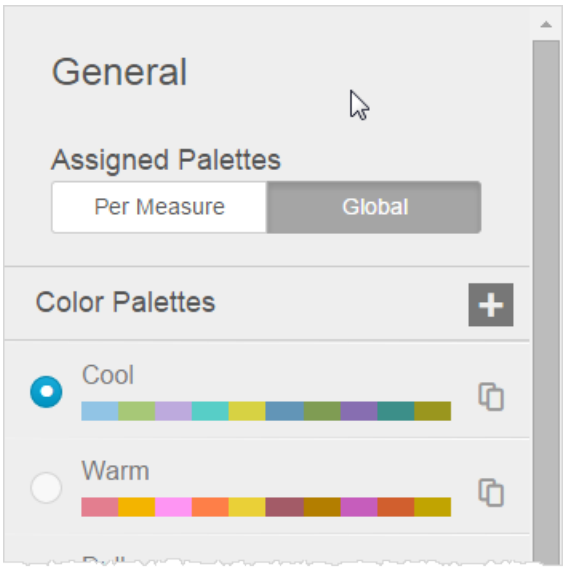
To assign a color palette to a chart

You can assign a built-in or custom color palette to the whole chart and to each measure.

Color palettes are shared across an account and are available to all spaces within an account.

Tip: Use color palettes along with dashboard themes. You can assign Visualizer palettes to themes for consistency across dashboards. See Color Reference and in the Help see *Applying Themes to Dashboards*.

1. Click Chart Formatting . The Chart Formatting panel opens.
2. Click the General tab to see the palette options. Click Global and select a palette to set a color scheme for the entire chart.



3. Click Per Measure to see measures and their current color palettes.

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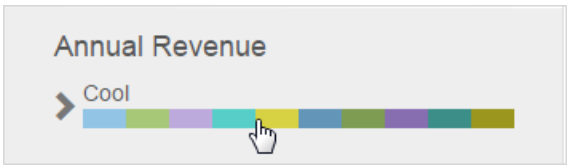
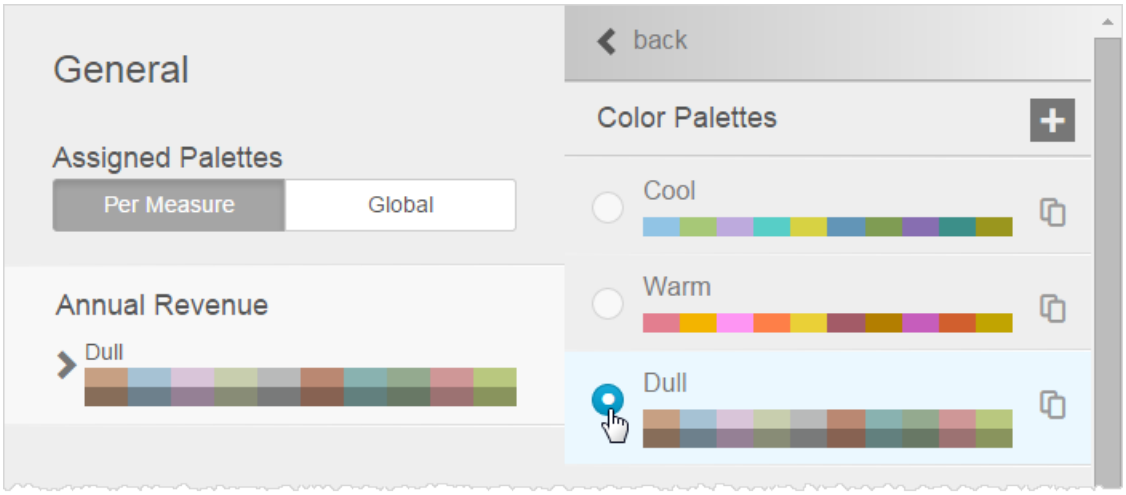
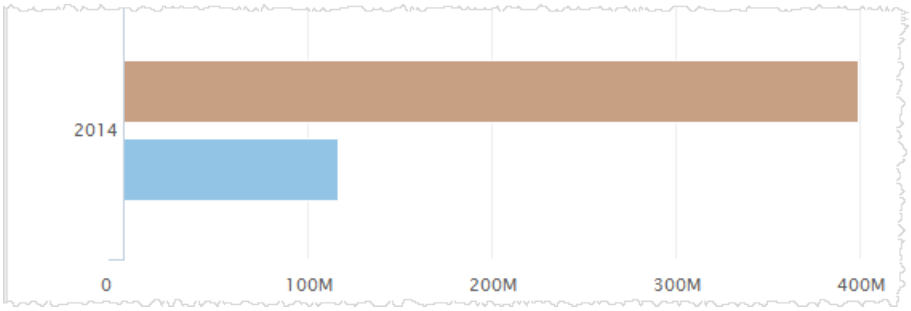
4. Click a measure's palette to open a list of available palettes.



5. Click a palette and click Back.



6. The chart immediately updates so you can preview the colors.



7. Click Done.

To copy and modify an existing color palette

Only the creator of a palette or the Account Administrator can modify an existing account's palettes.

1. Click Chart Formatting . The Chart Formatting panel opens.
2. Click the General tab to see the palette options.
3. Click either Per Measure or Global, depending on the scope of the changes.

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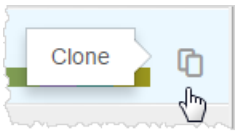
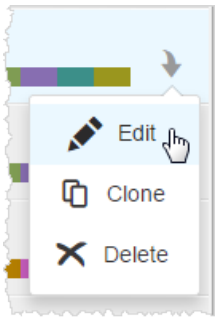
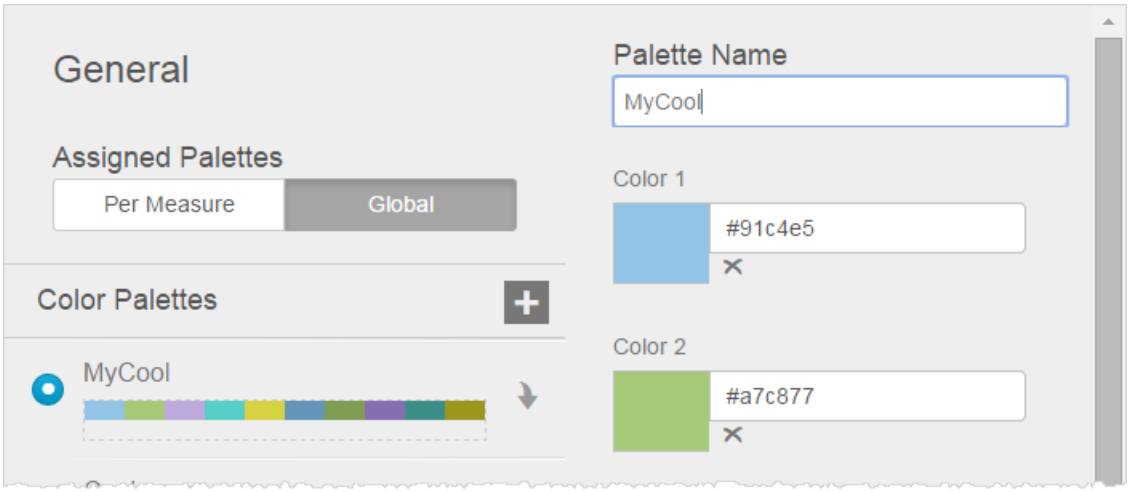
4. Click Clone on the palette you want to copy and modify.



5. Click the Edit on the cloned palette.



6. In the Palette Editor, name the new palette.



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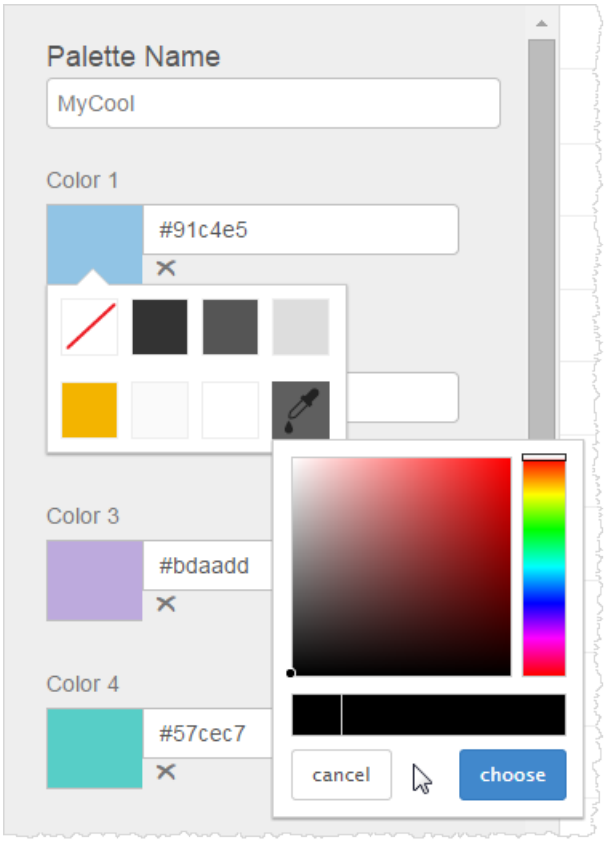
7. Use the Color Picker to change colors in the palette. Alternatively, you can enter the hex codes.



8. Click Done.

To add a color palette

1. Click Chart Formatting . The Chart Formatting panel opens.
2. Click the General tab to see the palette options.
3. Click either Per Measure or Global, depending on the scope of the changes.

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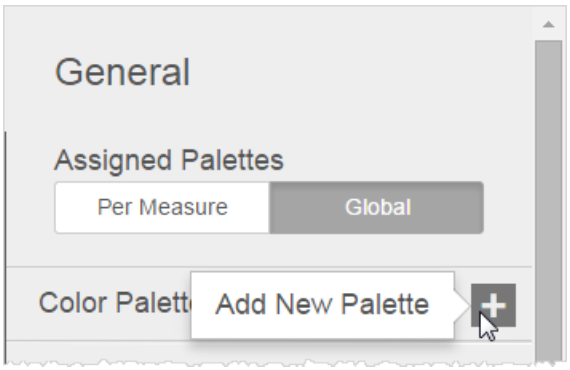
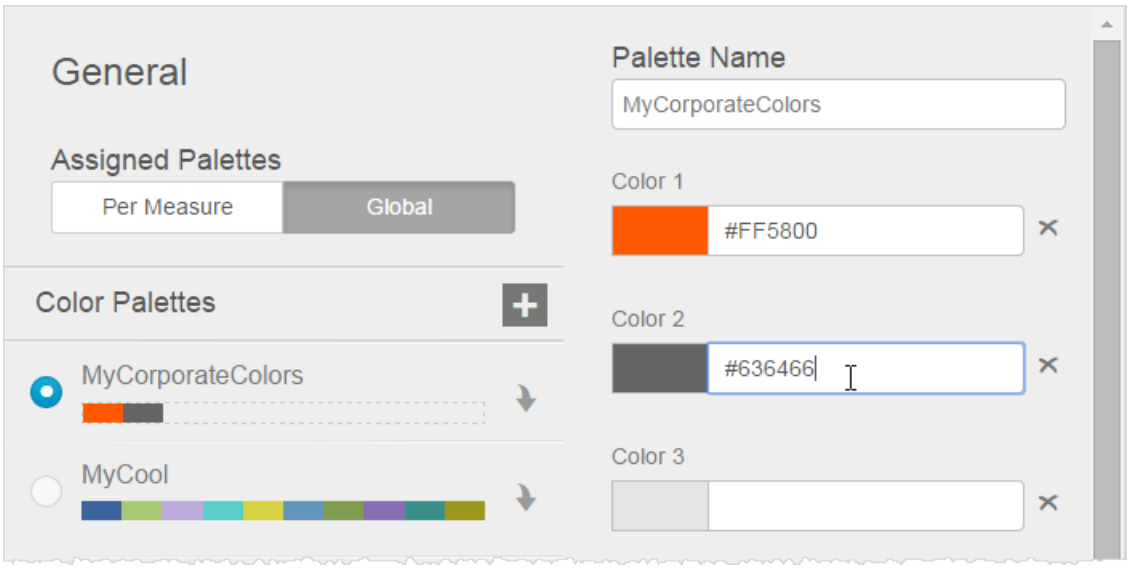
4. Click Add Color Palette.



5. Name your new palette.
6. Use the Color Picker or enter the hex values for the colors. When you finish one color another field appears.



As you enter the colors, the chart previews them.

Tip: The order of the colors, from left to right, determines the default order of the colors as they are applied in charts.

7. When you finish your palette, click Done. The new palette displays in the Chart Formatting Color Palettes tab.

To format legends

1. Either:

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- Hover over the legend bar then click the Formatting icon.

Or:

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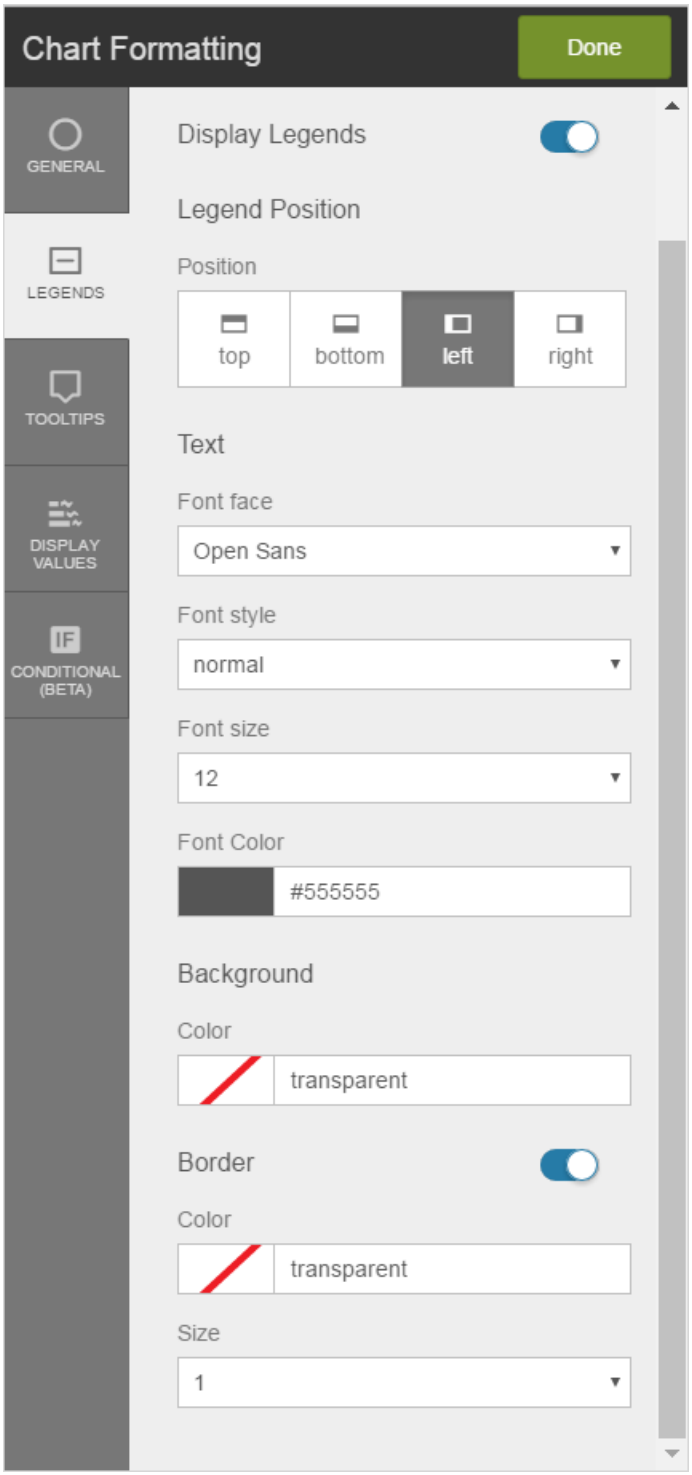
- Click Chart Formatting then click the Legends tab.

  The Chart Formatting Legends panel opens.



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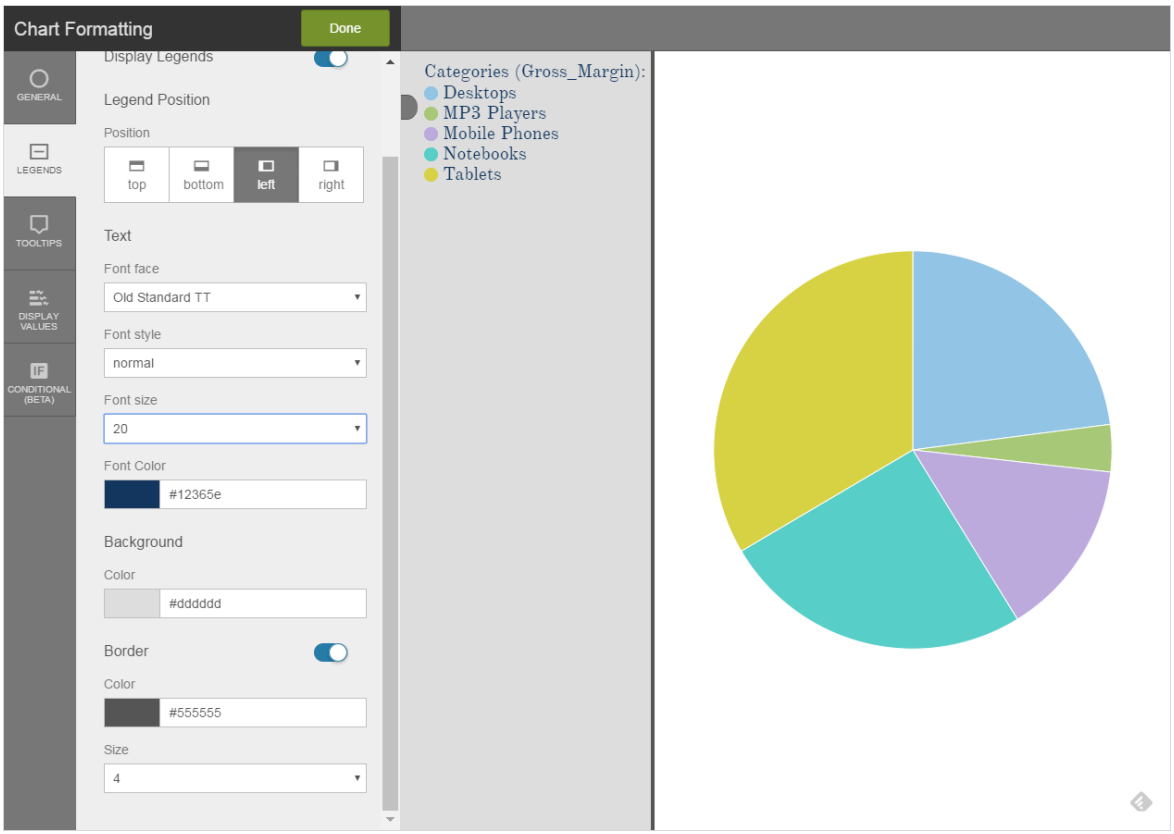
2. Toggle whether to display the legend or not.
3. Change position of the legend.
4. Format the text.
5. Change the background color of the legend.
6. Format its border.
7. Click Done. For example:



To change axis label (alias) text

1. Double-click the label for either the X axis or the Y axis of your chart.

2. Type the label you would like to use and type Enter or click Check.

   Tips:

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- If you do not want to display an axis label, delete all of the text.
- To restore a label, click Reset Alias.

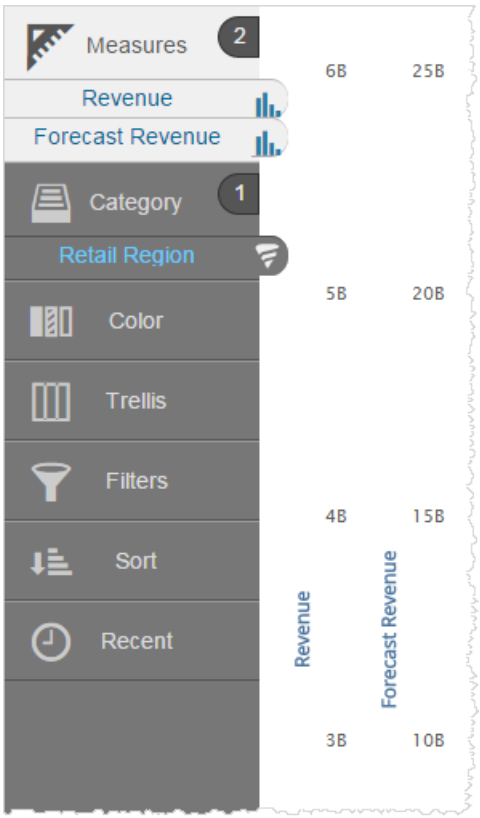
- If labels overlap each other, Visualizer may not display all of them. This is to avoid visual clutter, especially when reports resize to smaller displays.

To merge or split multiple axis

If you have a chart with multiple measures that use the same basic data types and ranges, you can merge the axis so that multiple measures use the same axis.

By default Visualizer may automatically merge some axis.

For example, Revenue and Forecast Revenue use the same type of monetary data in slightly different, but compatible, ranges.



To make the chart easier to quickly understand, you may want to merge the axis.

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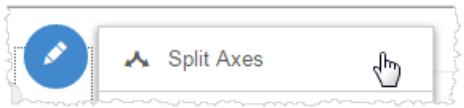
1. Hover over an axis to see the Axis menu and click it.

2. Click Merge All Axis (On Left or Right, depending on where the axis exist).

Tip: If you do not want a merged axis, hover over it, click the Axis menu and select Split Axis.



To move axis to the left or right, up or down

1. Hover over an axis to see the Axis menu and click it.

2. For an X axis click Move Right or Move Left. For a Y axis click Move Up or Move Down.

Visualizer repositions the axis.

To format X axis labels

1. Click Chart Formatting .

The Chart Formatting panel opens.

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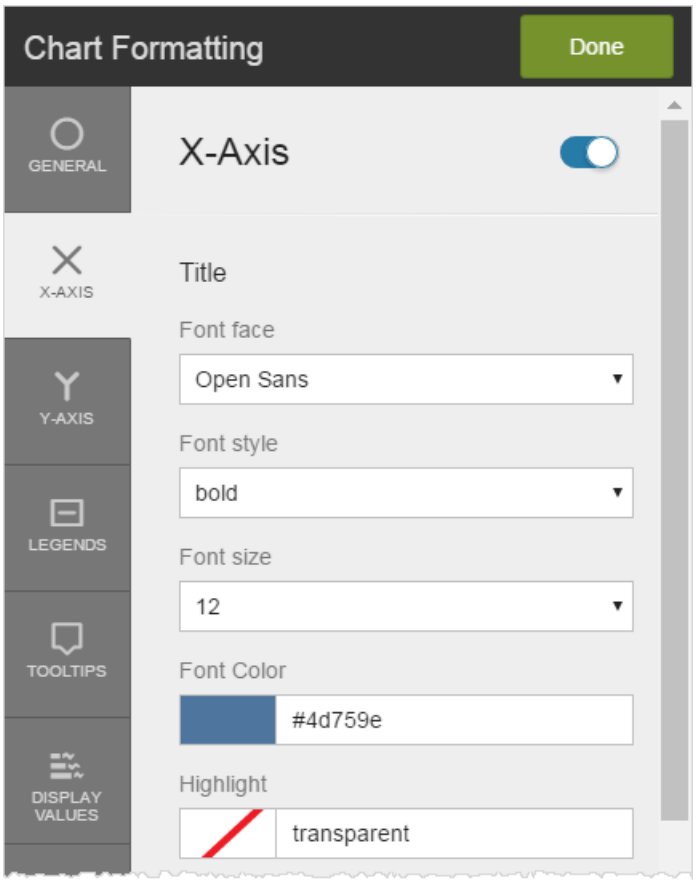
2. Click the X-Axis tab. The X-Axis formatting panel opens.



3. At the top of the panel, you can toggle the X axis Off or On. When Off, it does not display on the chart.
4. Change the font face, style, size, color, or background highlight of the X axis main label.

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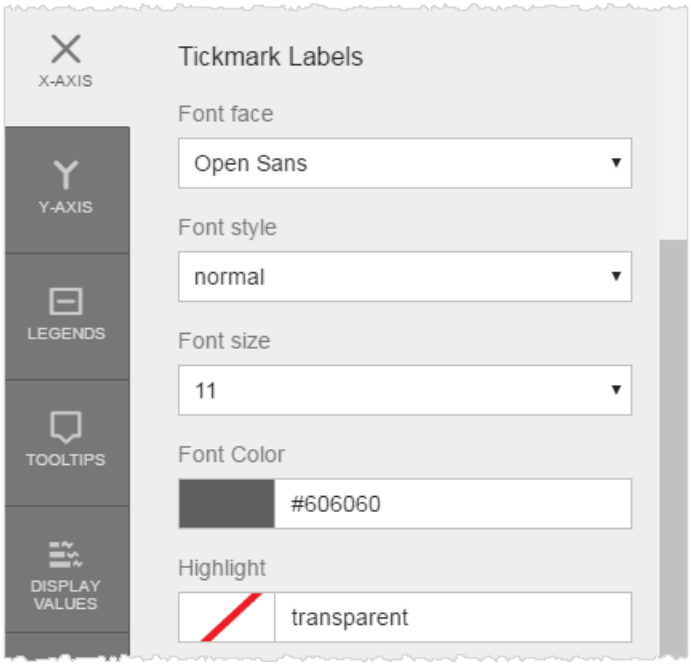
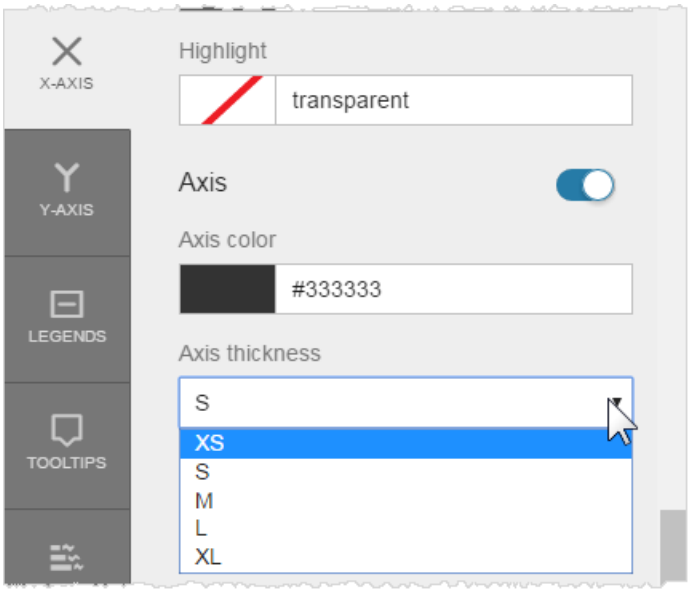
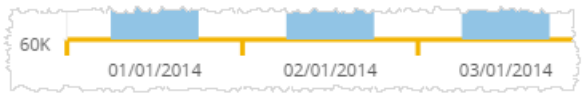
5. Scroll down to change the font face, style, size, color, or background highlight of the X axis tick-mark labels.



6. Scroll down to change the color or thickness of the X axis baseline rule, or toggle it off.



For example, a yellow XL baseline:



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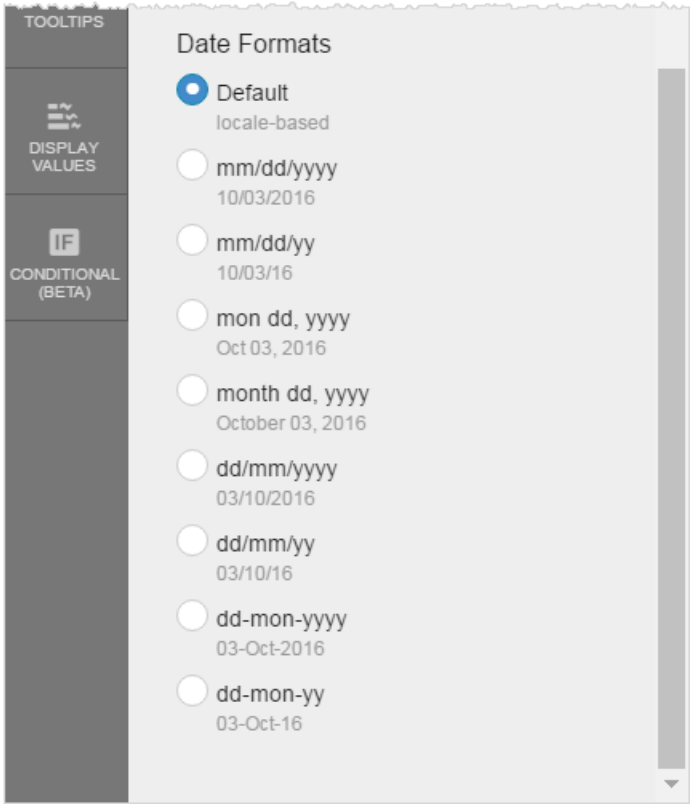
7. If using a date type on the X axis, you can change the date formatting.



8. Click Done.

To format Y axis labels

Formatting at the Y axis level overrides formatting at the data level. See Formatting Data in a Visualizer Chart.

1. Click Chart Formatting and then click the Y-Axis tab. The Chart Formatting panel opens.
2. You can toggle the Y axis Off or On.
3. Change the font color, face, background highlight, size, or style of the Y axis main title.

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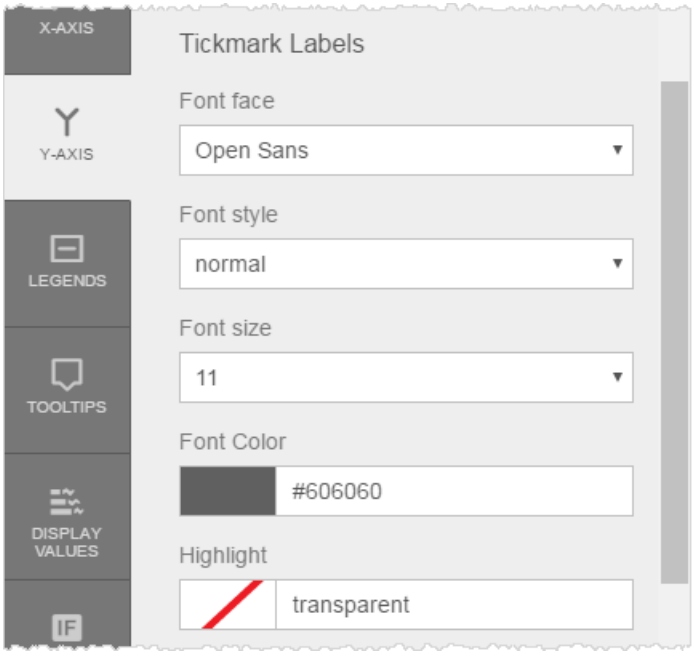
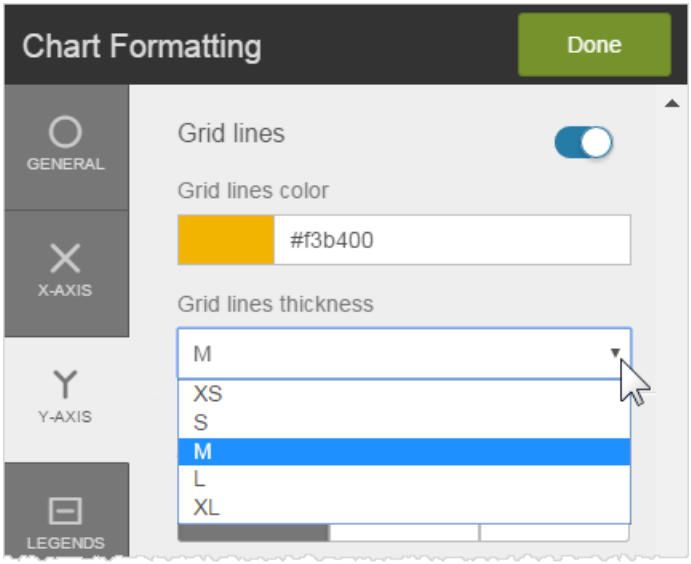
4. Change the font color, face, background highlight, size, or style of the Y axis tickmark labels.



5. Format the grid lines. You can change the color and thickness of grid lines. You can also toggle them off altogether.



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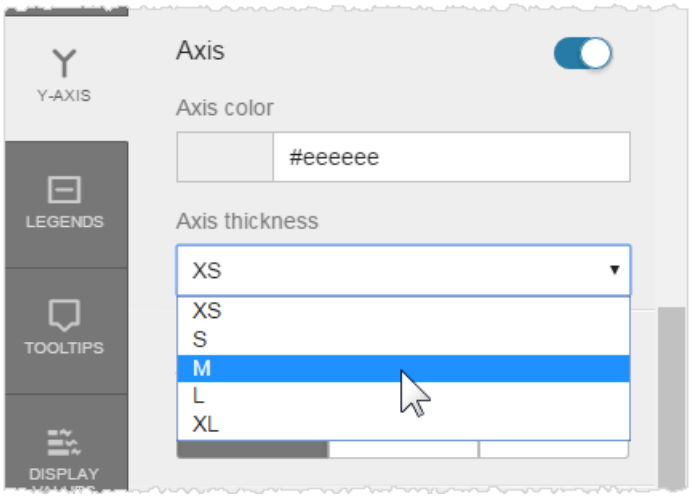
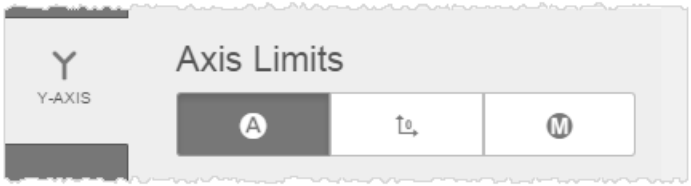
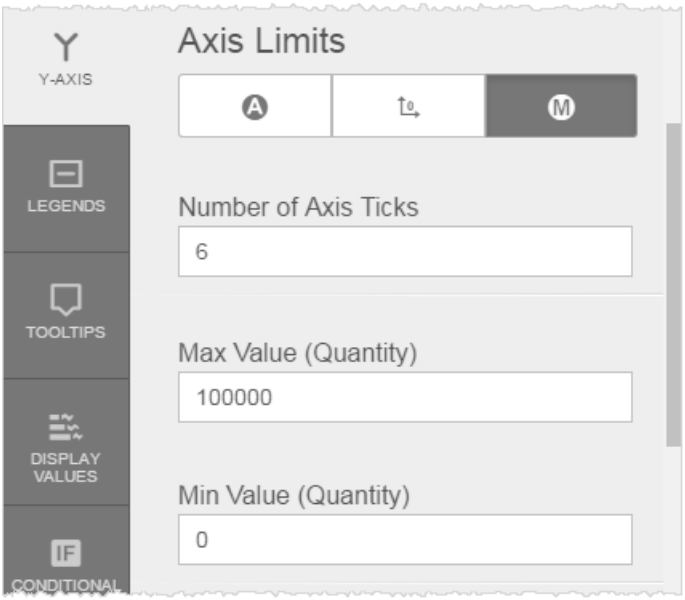
6. Scroll down to format the Y axis vertical rule, or toggle it off. By default the rule is gray and the smallest thickness.



7. Format the Y Axis Limits. By default they are set to Automatic.



You can set them to start at zero, or manually enter the Number of Axis Ticks and the Min and Max value range.



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8. Change formatting of the Y axis data:
    - Change the Units display format. The default is take from the underlying data.
    - If appropriate, change the Suffix to percentage.
    - Set the decimal precision.
    - Choose a currency prefix.
9. Click Done.

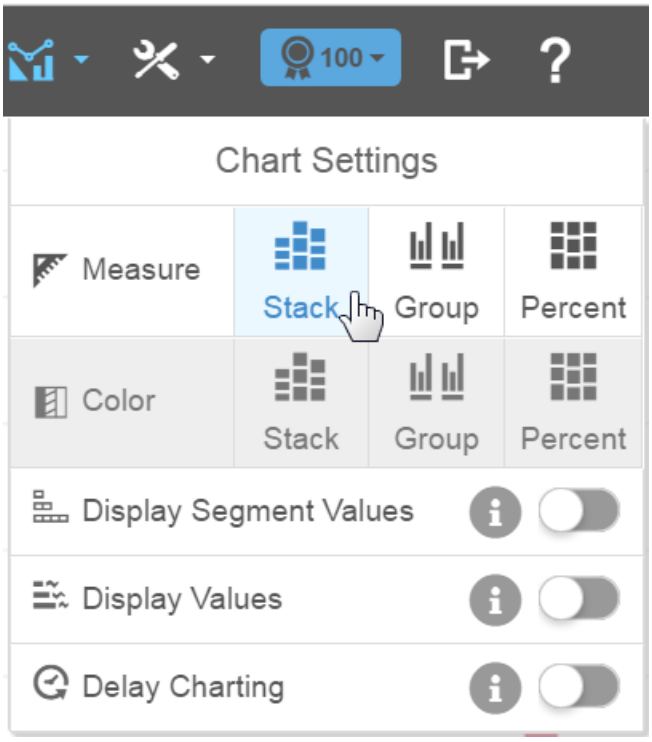
To change the scale of a Y axis

See To format Y axis labels. Change the Axis Limits Min and Max values.

To stack multiple measures on a bar, column, or waterfall chart

By default on bar, column, or waterfall charts, multiple measures are grouped. You can change these to stacked or percentage.

1. Click Chart Settings.
2. Change the Measure formatting.



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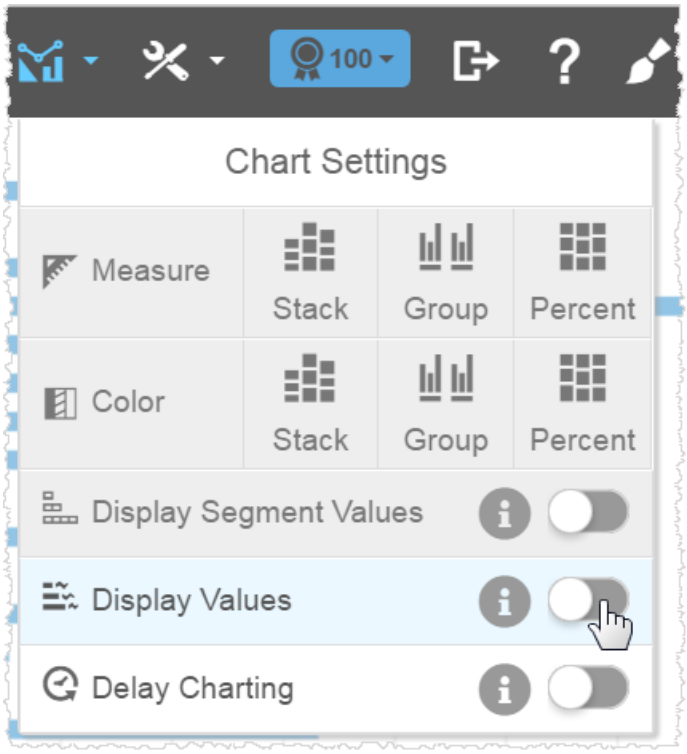
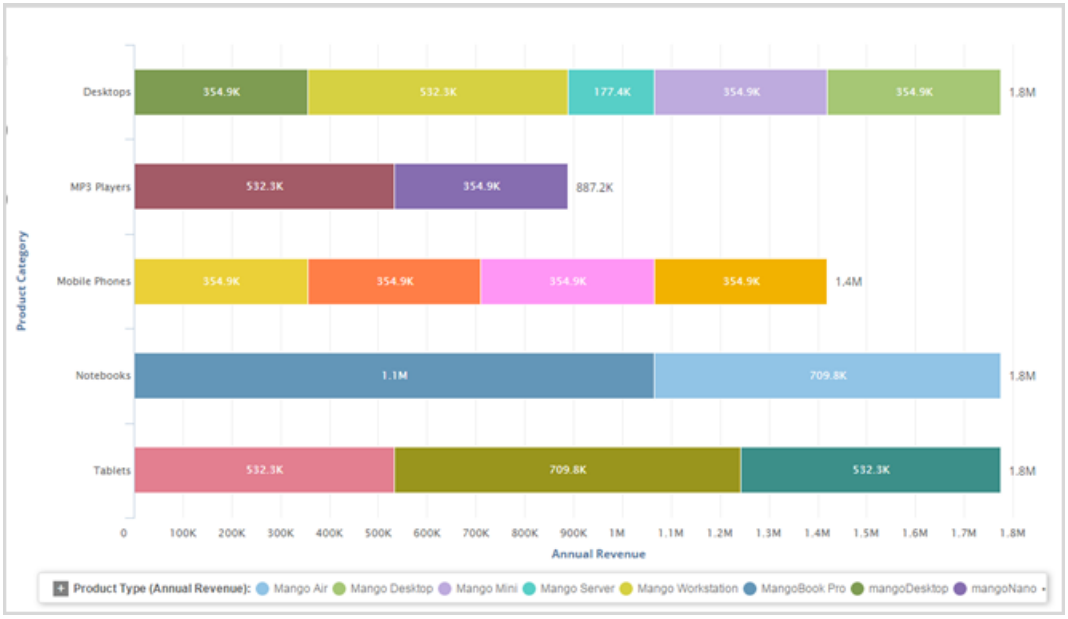
To show display values on a bar or column chart

1. Click Chart Settings.

   The Chart Settings list shows the Display Values toggles.



2. Toggle the Display Values option. The value of the measure displays at the end of the bars in a column or bar chart. If you have a color attribute you can display the segment values.



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To format display values

Formatting at the display values level overrides formatting at the data level. See Formatting Data in a Visualizer Chart.

Tip: Some display values do not apply to charts that use percentage values, such as pie, donut, or semi-donut charts. For example, units, suffix, and currency do not apply to a pie chart, but would apply to a bar chart.

1. Click Chart Formatting and then click the Display Values tab.
2. The Chart Formatting panel opens. You can set display values for all measures and/or for each measure.

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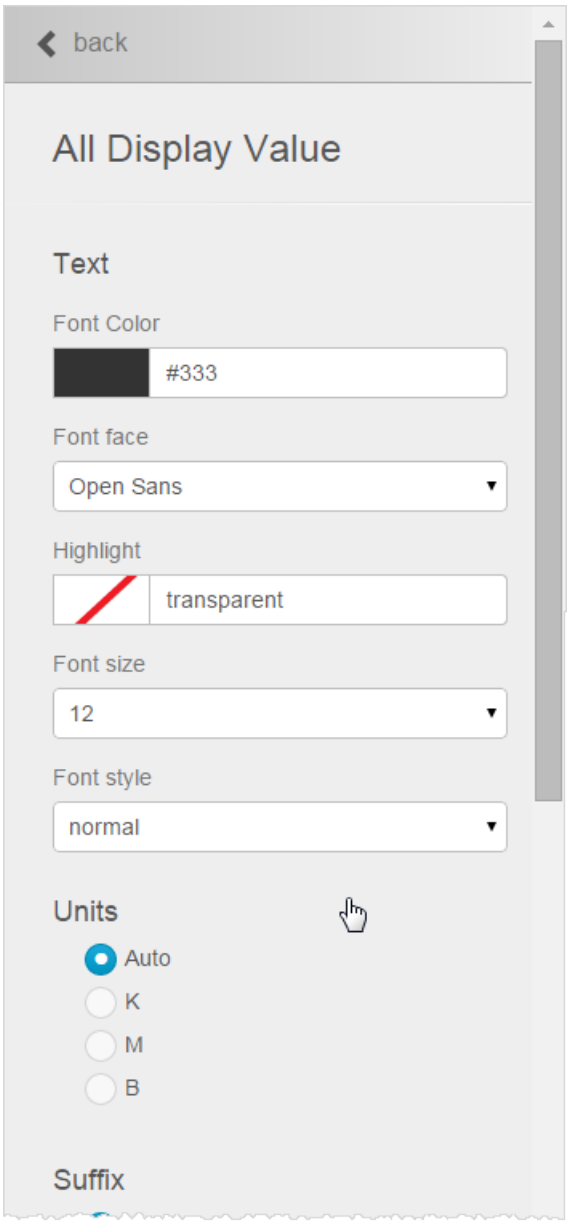
3. Click All Display Values.



- Specify the font color, face, highlight, size, and style to apply to the entire chart.
- Specify the units, suffix, decimal precision, and currency sign to apply to the entire chart.
- Click Back.

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4. Click a measure to apply formatting specific to the measure.
    - Specify the units, suffix, decimal precision, and currency sign to apply to the measure.
    - **Tip**: You cannot specify font formats for each measure. Use All Display Values to specify font formatting.
    - Click Back.
5. Iterate for each measure.
6. Click Done.

To format tooltips

Formatting at the tooltip level overrides formatting at the data level. See Formatting Data in a Visualizer Chart.

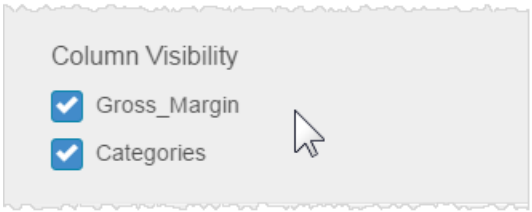
You can change the font style, units, suffix, decimal precision, and currency symbol used in tooltips.

Tip: By default all tooltips show a black background that cannot be changed.

1. Click Chart Formatting then click the Tooltips tab.

   The Chart Formatting Tooltips panel opens.
    - If there is only one measure, all of its formatting options display.
    - If there are multiple measures, text formatting for all of them together, for consistency, is at the top. Later you can select individual measures to format the other items.

1. Check which measures and attributes display in the tooltip.



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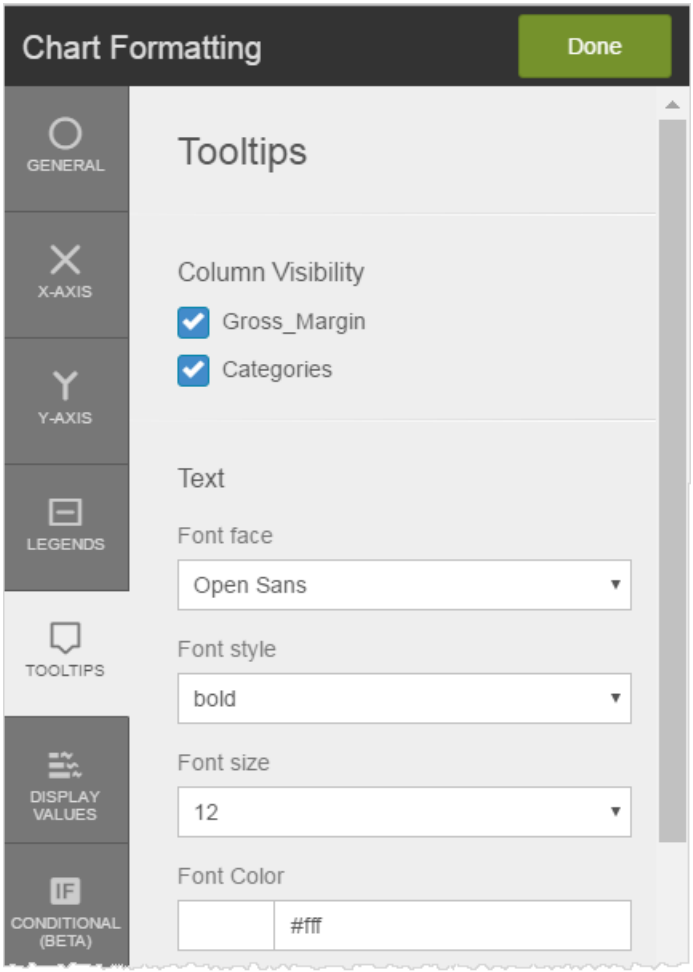
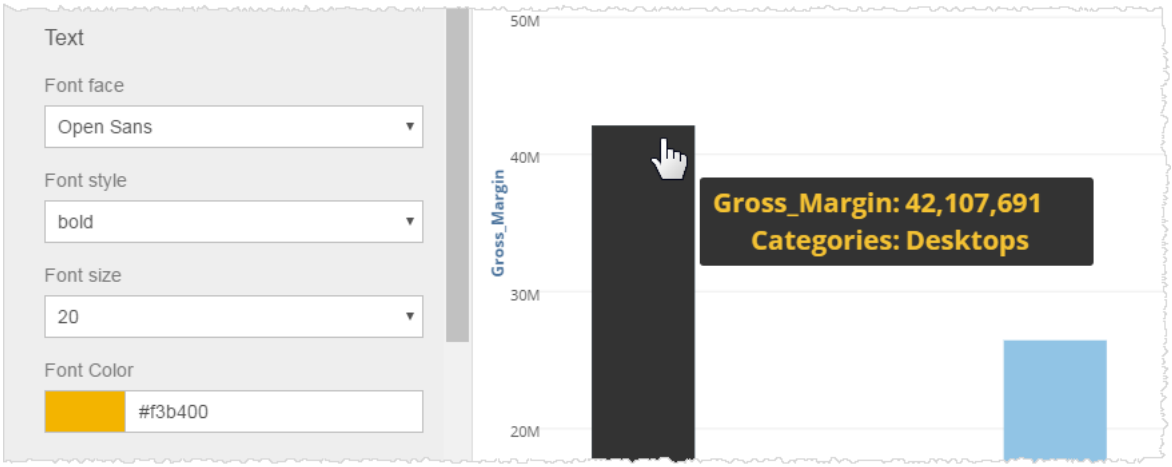
2. Change the font color, face, background highlight, size, or style of the tooltip text.



The tooltip formatting updates. For example:



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3. Format the data:
    - Change the Units. The default is take from the underlying data. The numbering style changes based on the Unit.
    - If appropriate, change the Suffix to percentage.
    - Set the decimal display.
    - Choose a currency prefix.
4. Click Done.

Tip: To change the measures that display in a tooltip see Adding Tooltips and Hiding Columns.

To apply conditional formatting

1. Create a chart that includes a color attribute.
2. Click Chart Formatting . The Chart Formatting panel opens.
3. Click the Conditional tab. The Basic formatting tab opens. By default the conditional is toggled on.

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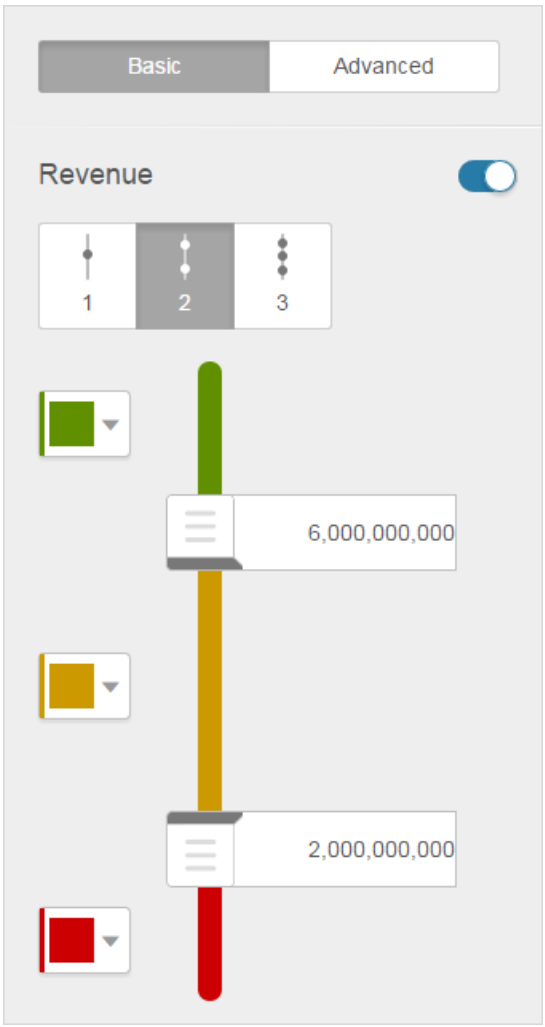
4. Select color overrides. For example, conditions for a range of Revenue.



For another example, conditions when using a time dimension.

5. Optionally, click the Advanced tab for expression-based conditional formatting. See Supported Functions and Operators in Visualizer Expressions.

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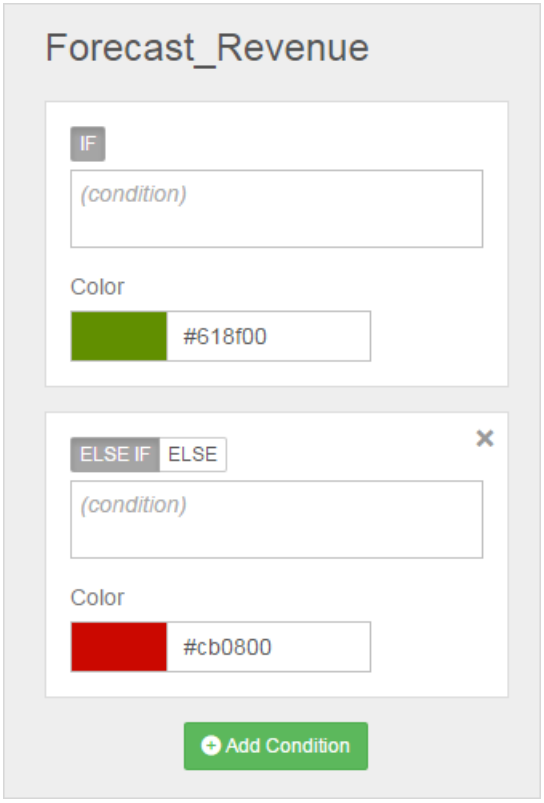
When you are done, click Apply.



6. Click Done.

   Tip: You can toggle the condition off without changing all of the settings.

To change a waterfall chart from vertical to horizontal

By default a waterfall chart has a vertical orientation. To change it to horizontal, click Chart Settings and toggle the Horizontal Waterfall tab.

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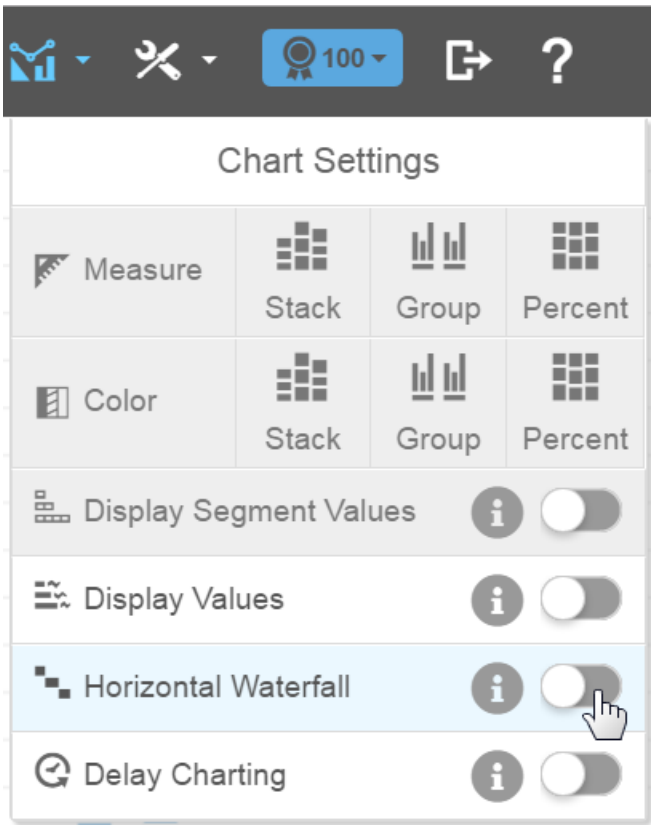

Formatting Data in a Visualizer Chart

Visualizer provides formatting options for measure data displayed in axis, tooltips, and display values. You can format:

- Unit symbols that represent magnitude, such as M for millions
- Suffix symbol for percentages (%)
- Decimal precision display
- Currency symbols

You can format currency symbols and decimal places for any measures, including:

- Measure type expressions created in Visualizer. See Adding an Expression in Expression Builder.
- Saved expressions created in Designer and listed as Other Expressions in the Subject Area.
- Custom measures created in the Admin module.

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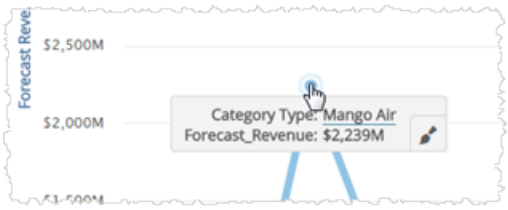
Tip: Currency and date formatting also depends on the user's language locale setting. In the Help see Changing the Language.

Example Data Formatting

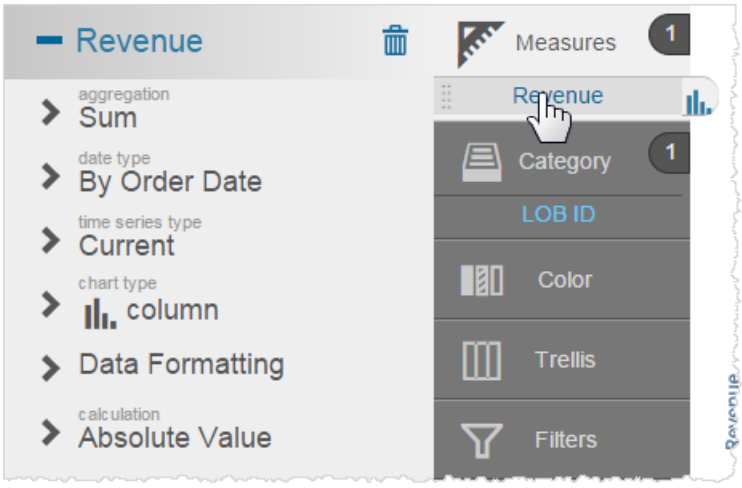
A measure's Data Formatting applies across the visual elements that use the measure. For example, unit, decimal precision, and currency symbol settings apply to both Y axis labels and tooltips.



Tip: You can override the data formatting at the chart formatting level for axis, tooltip, and display values. For example, you can set the Y axis unit on a chart to be different than the tooltip unit. See Formatting Visualizer Charts.

To format the measure values in a chart

1. Click a measure in Chart Builder. The options menu opens with a section for each measure.



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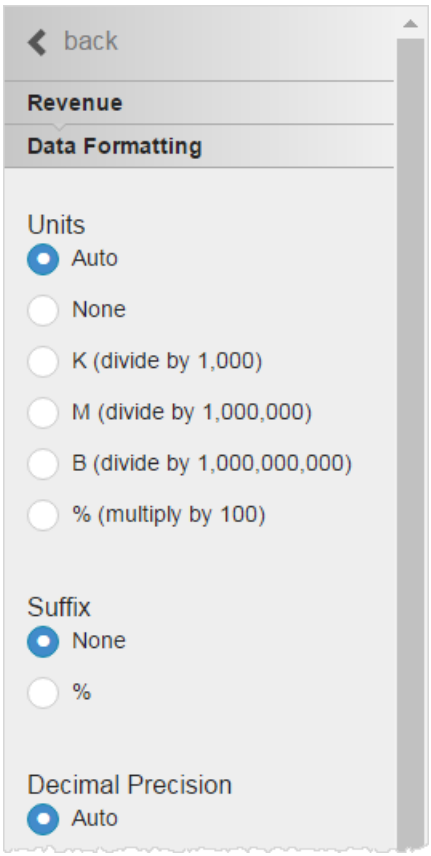
2. Click Data Formatting for the column you want to change. Visualizer displays the options with the defaults highlighted.



3. Select the unit for formatting numbers. Options include:

   - Auto default - commas (150,413,715)
   - None - no commas (150413715)
   - K - divide by 1,000 (150,413.71K)
   - M - divide by 1,000,000 (150.41M)
   - B - divide by 1,000,000,000 (0.15B)
   - % - multiply by 100 (15,041,371,500%)

   When you select an option, Visualizer immediately updates the chart axis and the tooltips.

4. Select the suffix, for display purposes only.

   - % - percent

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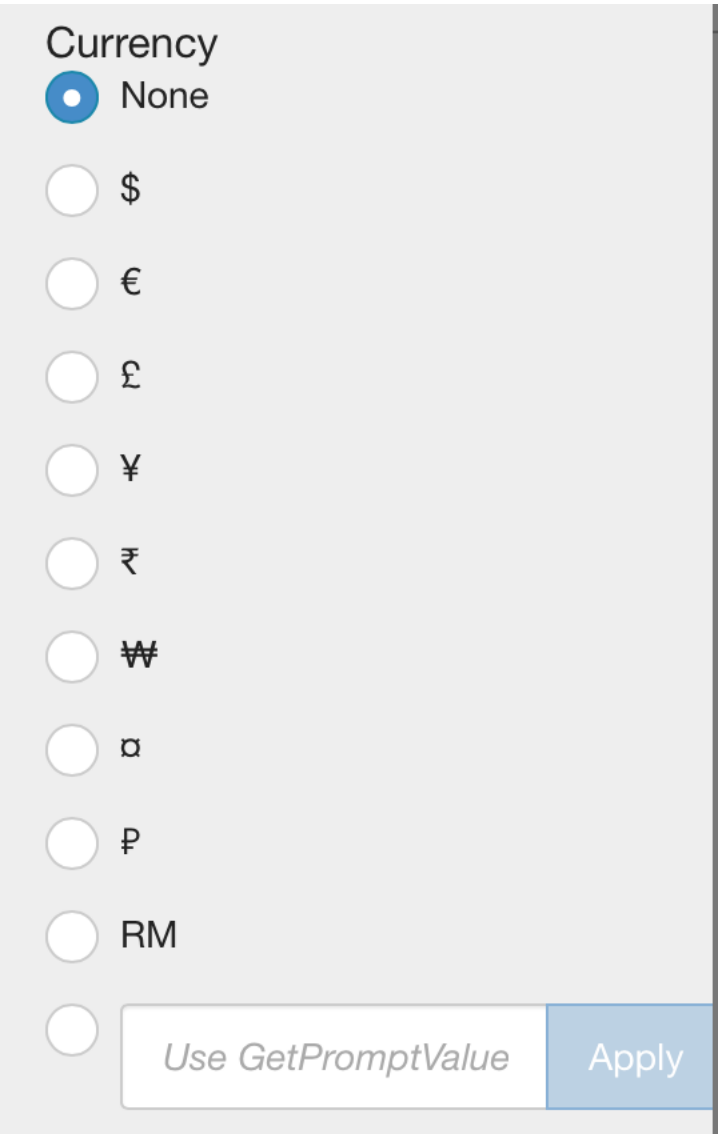
5. Select the decimal precision.
6. Select the currency symbol. This is for display only, it does not change the data.



Tips:

- Visualizer supports dynamic currency symbols. You can define a variable and use it as the currency format by entering the `GetVariable('variable_name')` syntax. See Using Variables.
- Dynamic currency symbols using GetVariable is not supported in the Pro version.

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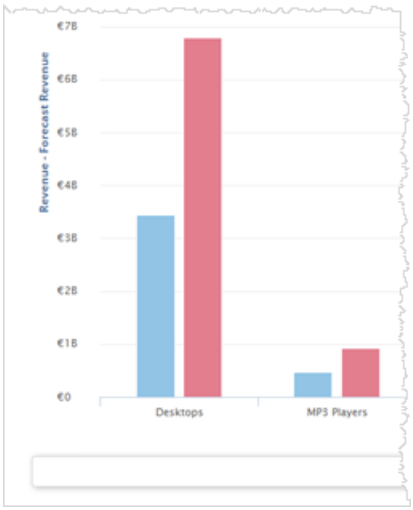
- If you have merged more than one measure on the axis and the currency symbol is not the same for each measure, Visualizer does not display a currency symbol on the axis. To display a currency symbol on a merged axis, set both measures to use the same currency. For example, set Revenue and Forecast Revenue to both use Euros.



7. Click Save .

Tip: You can override formatting at the data level with formatting at the chart level. See Formatting Visualizer Charts.

Adding Attributes Using Colors, Sizes, or Shapes

You can use colors or shapes or sizes to add attributes for more complex charts. Based on the type of the column you add, Visualizer helps you choose between different visual elements and different chart types.

After you add the first measure and attribute, as you drag another attribute from the Subject Area to the Chart Builder or Canvas, Visualizer recommends how the measure or attribute can be visualized. Drop the measure or attribute over the option you want and Visualizer creates the new chart style.

You can:

- Add colors
- Add sizes

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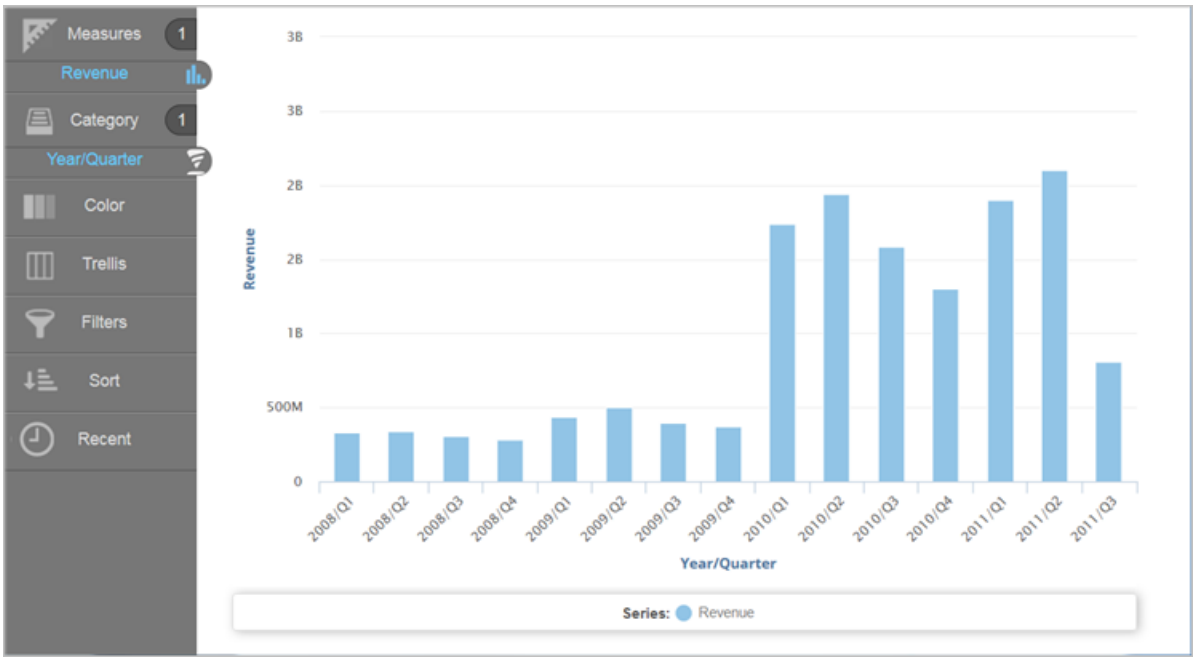
Add shapes

To add colors to a chart

1. In Visualizer, add a measure and an attribute to plot a chart. For example, Revenue by Year/Quarter as a column chart.



2. You can divide the columns into colored sections that represent another visual dimension. Search or browse for an attribute and drag it to the Chart Builder. You can either:

   - Drag and drop the attribute onto Color.
   - Drag and drop the attribute onto one of the suggested visual options. This is also a way to change the chart type.

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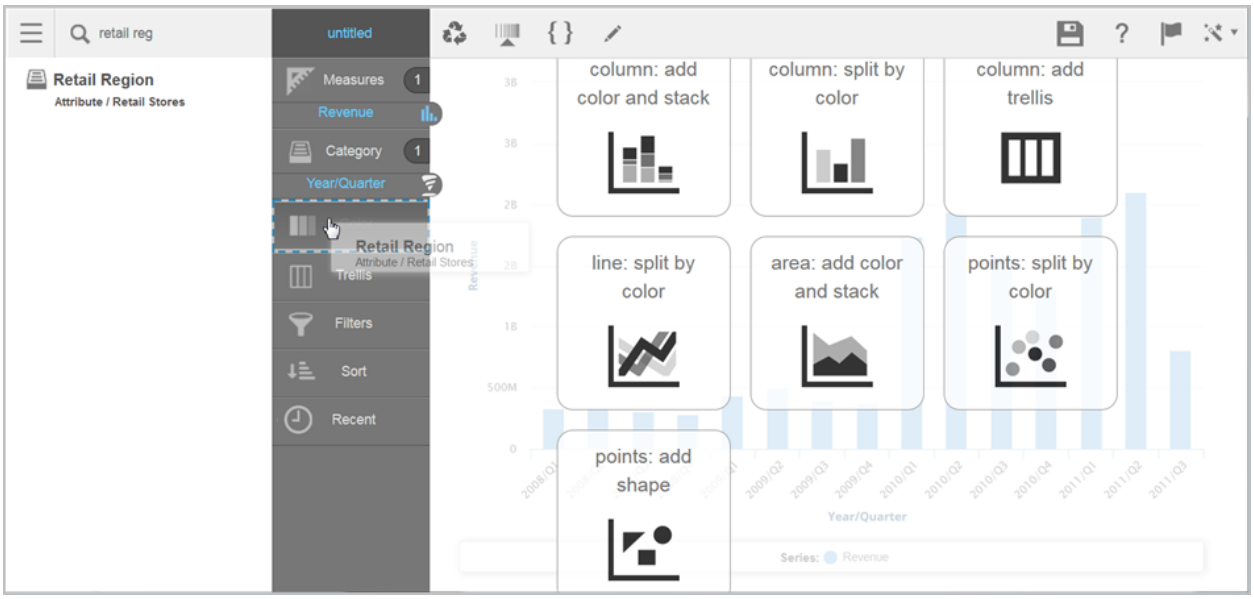
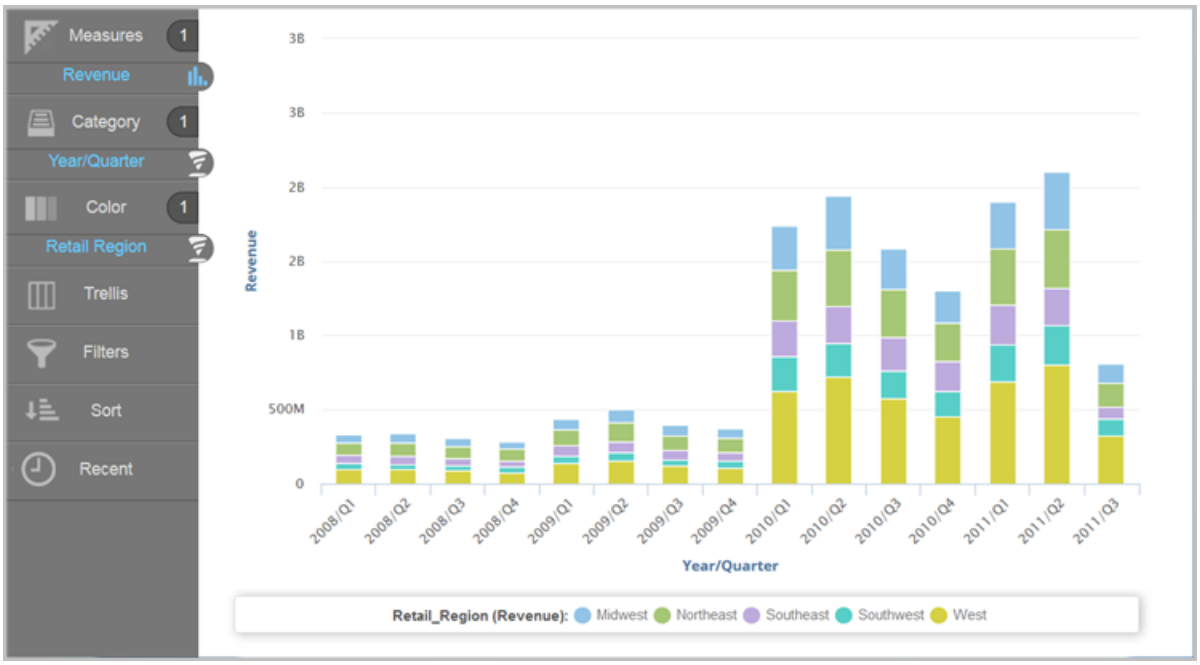


For example, adding Retail Region to Color.



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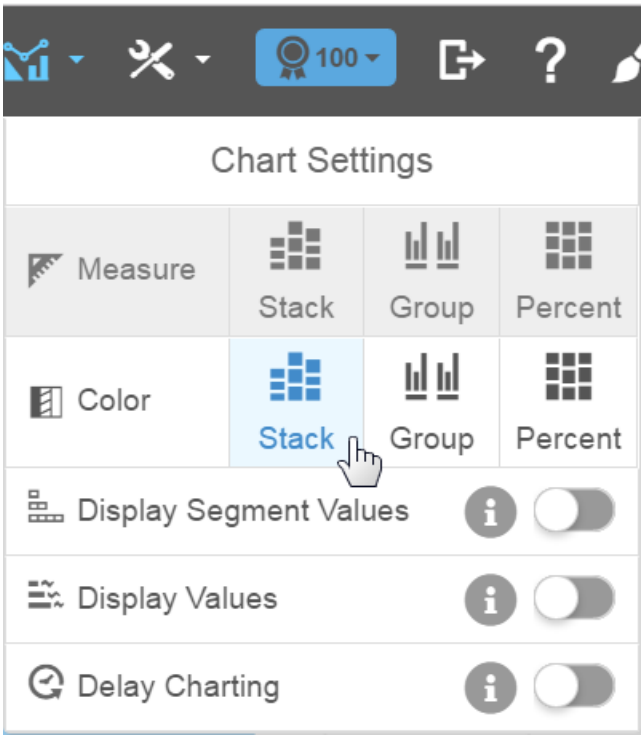
When you use the Color bucket, the Chart Settings menu allows you to select different ways to visualize your data for your chart type.



If you display segments such as with a stack, you can toggle the Display Segment Values option to show the values within the segment, space permitting.

You can change how the Region dimension colors appear in a column chart. For example, show the color bars by percentage.

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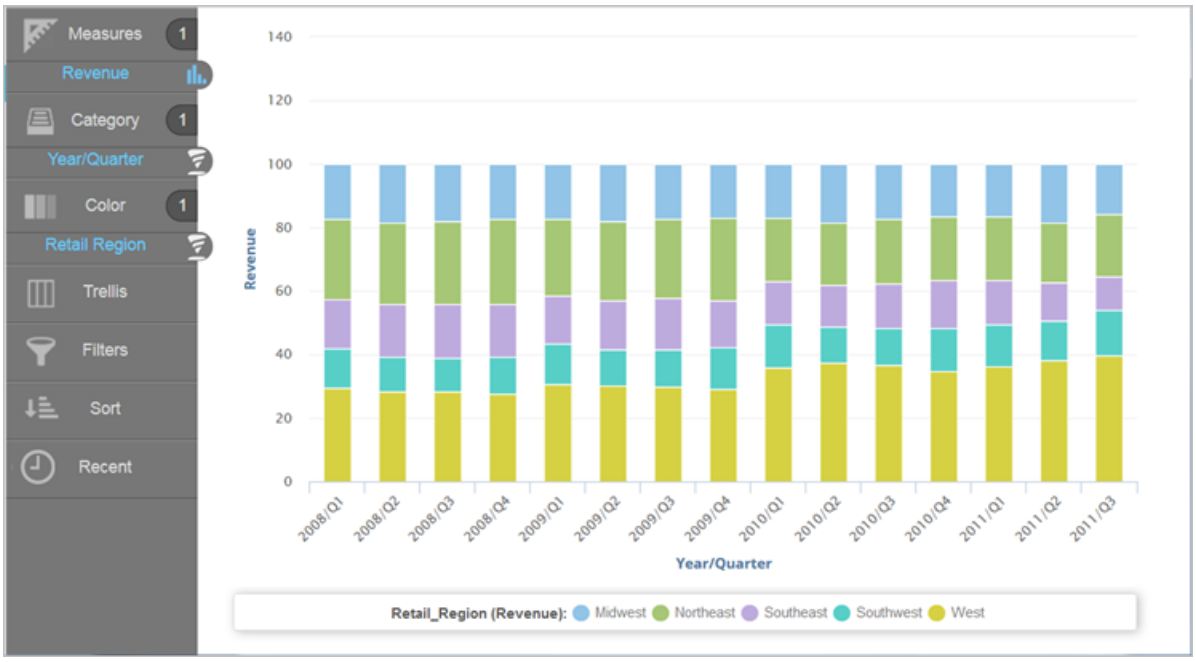

3. Click Save .

For more color palette options see Creating Color Palettes for Attributes.

To add sizes to a visualization

Some visualizations are more useful when you add a dimension represented as Size.

1. You can add a measure to a bar chart and change it to another chart type that uses Size. Visualizer suggests charts that work best with Size. Following on from the previous example, drag the Quantity measure to the Canvas and choose bubble chart from the options.

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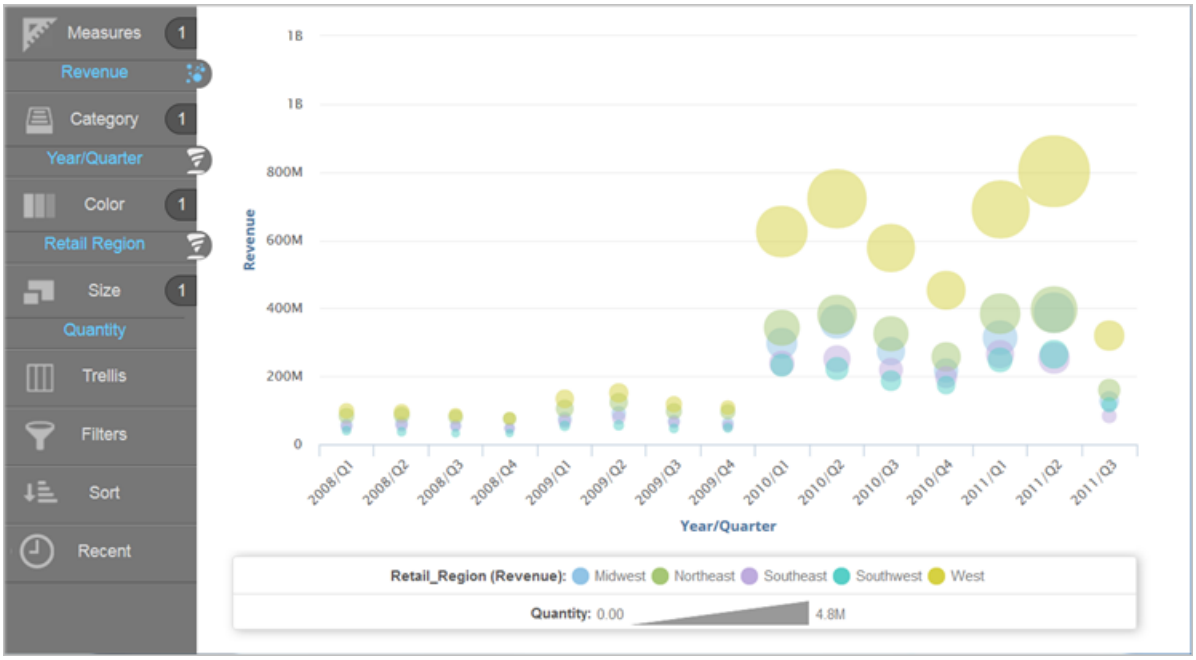
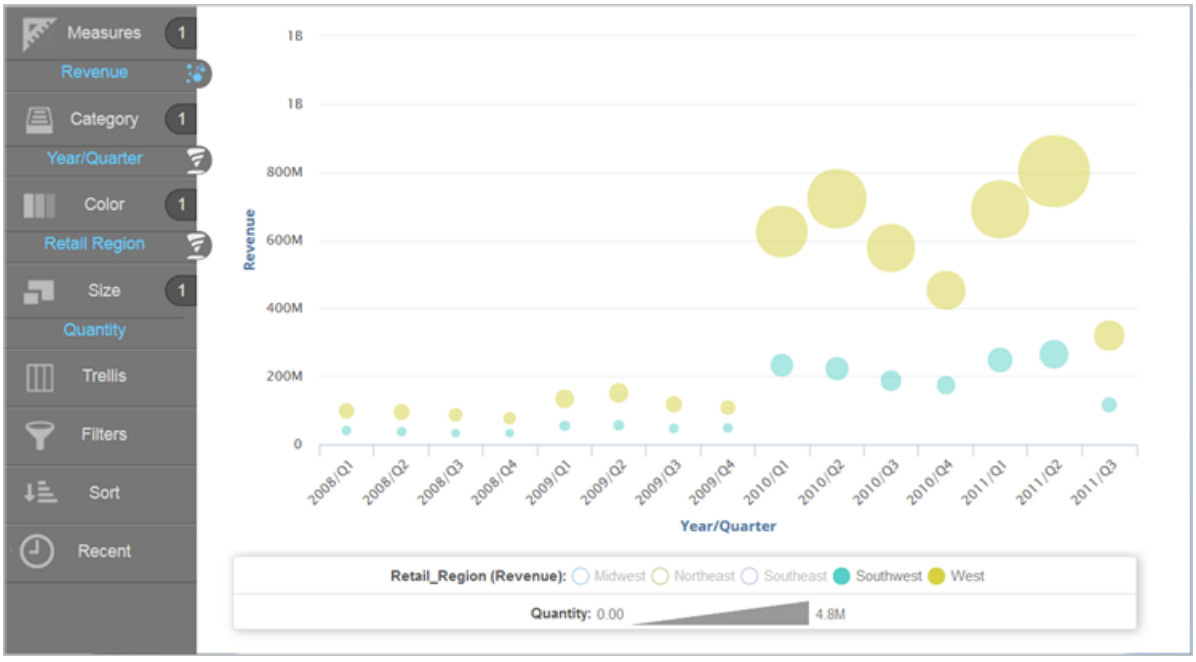
Visualizer creates a bubble chart using the Quantity measure as the size of the bubbles.



Tips:

- In a bubble chart, click on items in the legend to hide or show bubbles in the chart.



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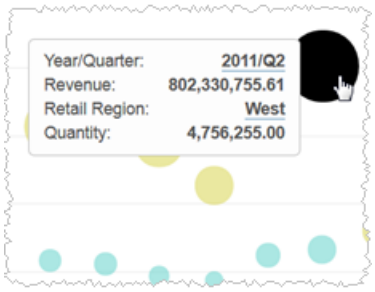
- Hover over a data point to see its details.



2. Click Save .

To add shapes to a visualization

Some visualizations are more useful when you add an attribute represented as Shape.

1. You can add an attribute to a bubble chart and change it to another chart type that uses Shape. Visualizer suggests charts that work best with Shape. Following on from the previous example, drag the Store Type attribute to the to the Canvas and choose scatter chart from the options.

Visualizer creates a scatter chart using the Store Type attribute as the style of the shape.

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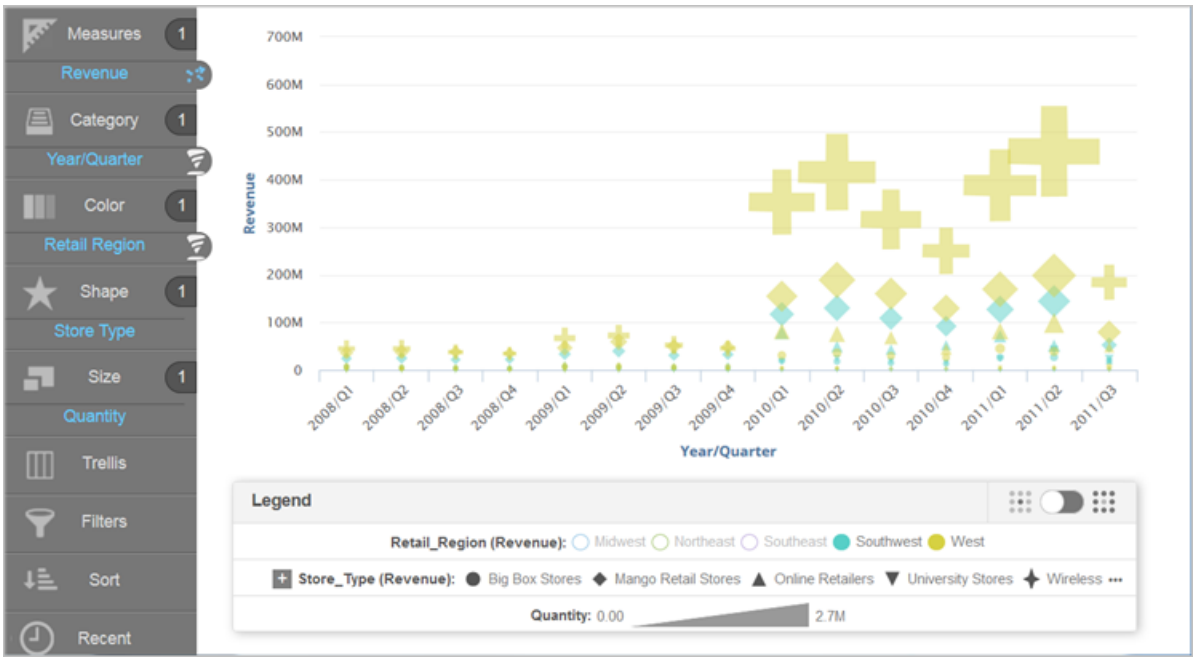
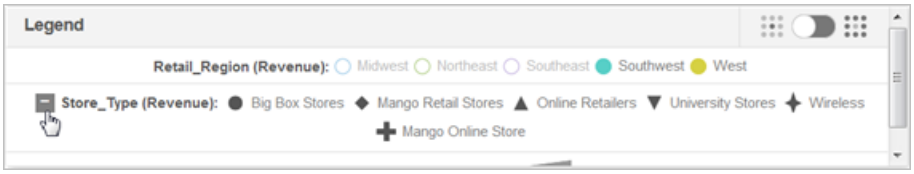


Tips:

- The Legend has an Include/Exclude toggle to show or hide labels in the visualization.

- When a Legend gets large it hides some of the items. To see hidden items click Plus .



2. Click Save .

Creating Trellis Charts in Visualizer

You can create trellis charts in Visualizer using Trellis in the Chart Builder. Use trellis charts to identify patterns and trends across a series of charts.

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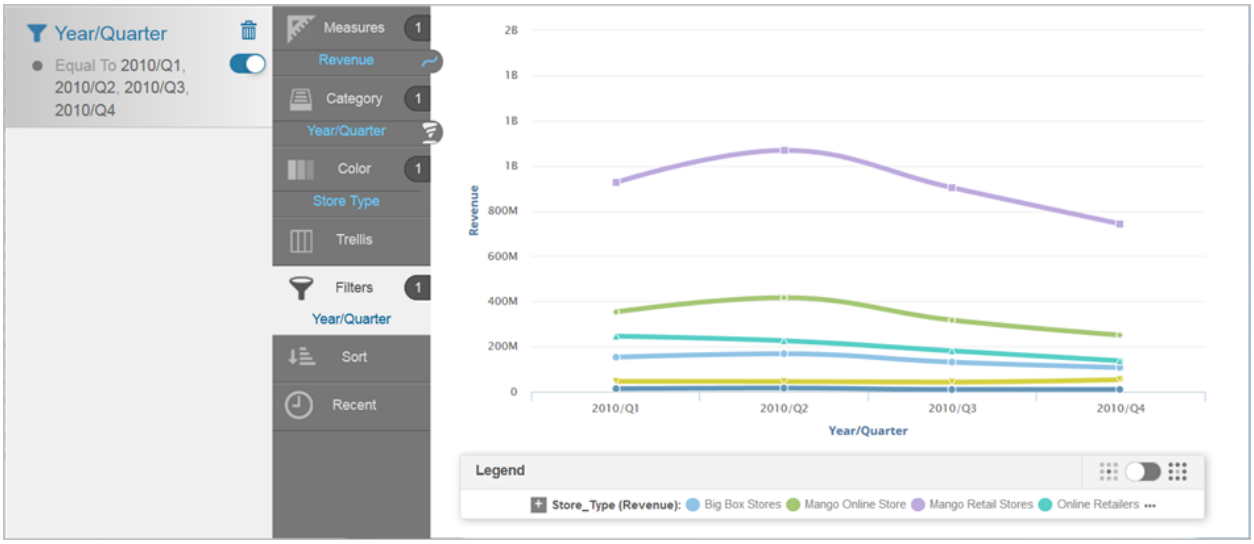
Since a trellis includes smaller charts, it works best to start with simple charts that are easy to understand and easy to compare.

To create trellis charts in Visualizer

1. In Visualizer, add one or more measures and attributes to plot a chart. You want to see a miniature version of the chart for each one of a particular attribute. For example, start with Revenue by Year/Quarter and Store Type, filtered by the four quarters of 2010.



2. Add an attribute by either:

   - Dragging the attribute and dropping it on one of the suggestions.
   - Dragging the attribute and dropping it on Trellis in the Chart Builder.

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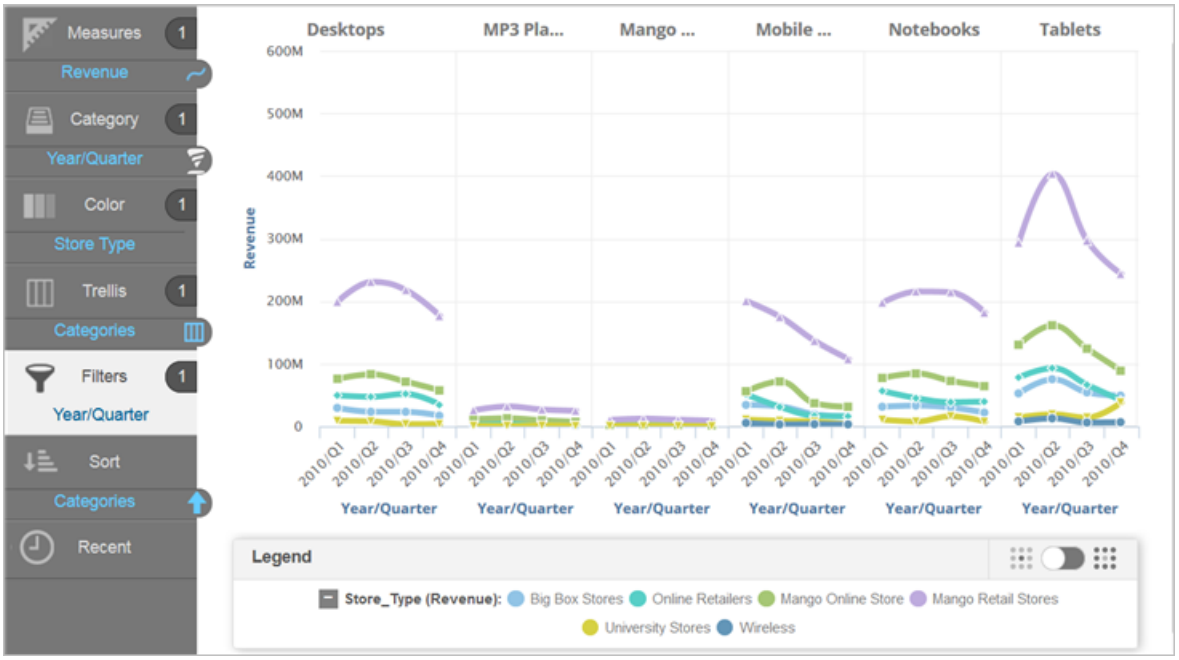
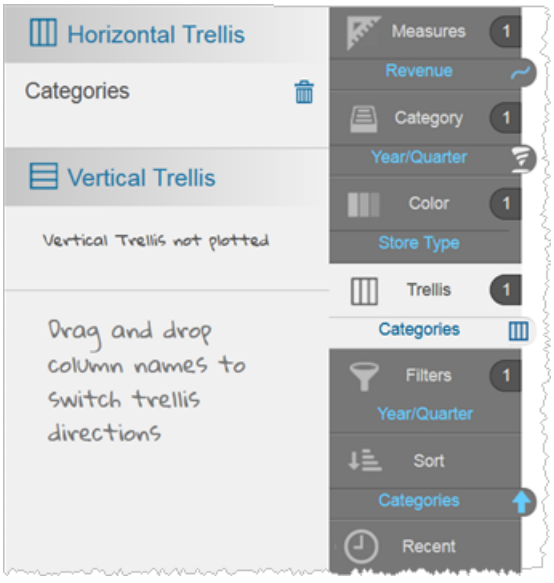
For example, add the product Categories attribute and transform the Spline into a Trellis.



Tip: To remove the trellis charts, drag the attribute from Trellis in the Chart Builder and drop it on the Trash in the Subject Area.

3. Click Trellis in the Chart Builder to see the different options for trellis charts. For example, the Categories attribute is arranged as a horizontal trellis (the charts are stacked horizontal to each other).



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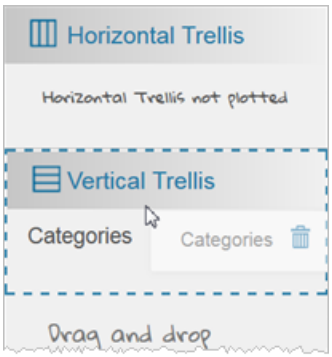
4. You can change the charts in the trellis to a vertical arrangement. For example, drag and drop Categories from the Horizontal Trellis area to the Vertical Trellis area.



5. For this example the vertical trellis visualization is not as useful as the horizontal trellis. Drag the attribute back to the Horizontal Trellis area to restore the more effective chart.

6. Click Save .

Creating Layered Charts in Visualizer

You can combine more than one chart type to create layered charts, such as overlaying a column chart with a line chart or spline chart.

To create two chart layers

1. In Visualizer, add one or more measures and attributes to plot a chart. For example, Revenue by Year/Quarter as a column chart.

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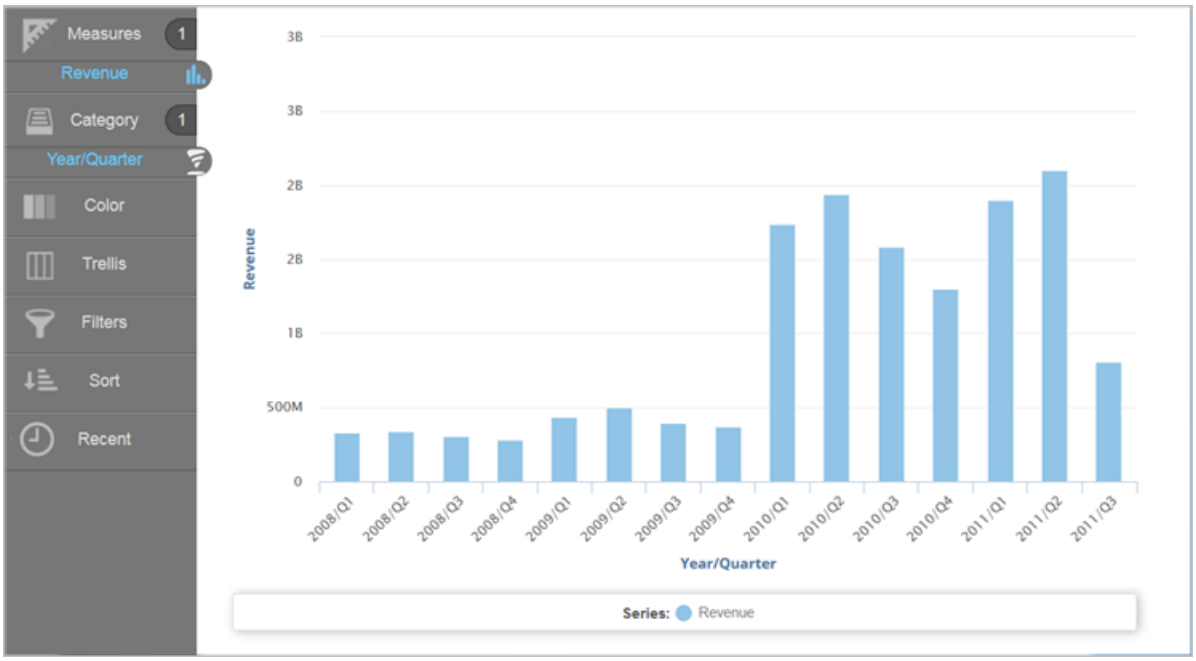

2. Add a measure and specify a different type of chart. For example, drag the Quantity measure and drop it on the Line suggestion.

Visualizer creates the line layer for Quantity.

The Revenue tab has a column icon to indicate it is a column chart and the Quantity tab has a line icon to indicate it is a line chart.

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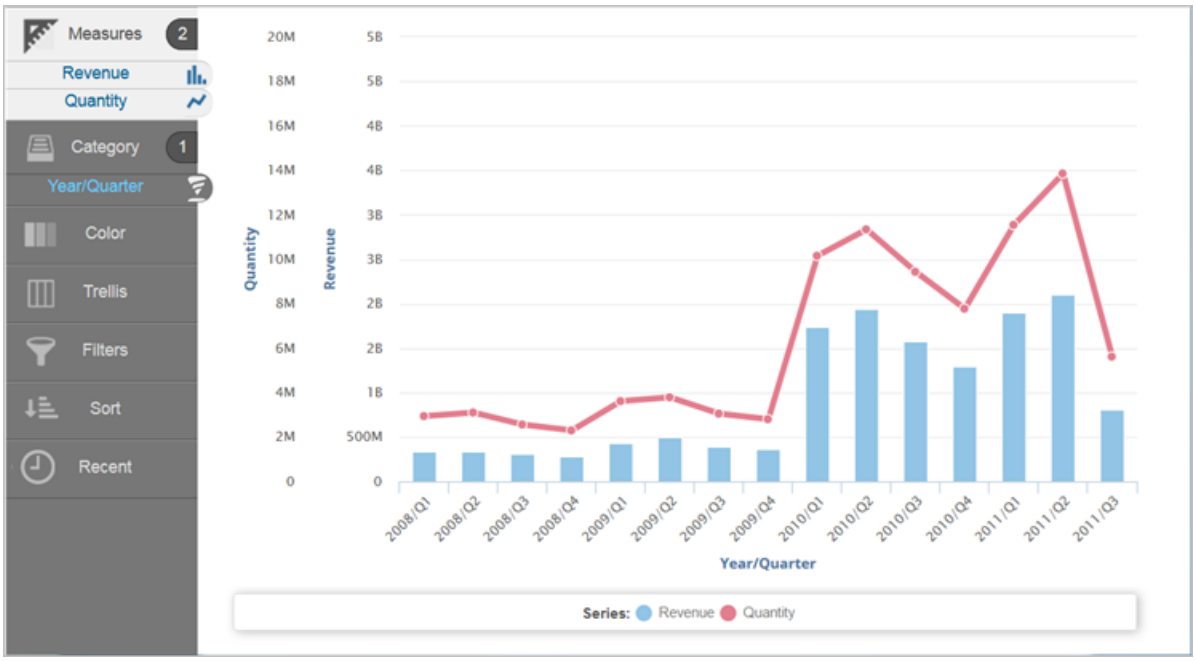

Tips:

- To change the line chart to a spline chart, click the tab with the Line icon then select spline from the list of chart types.
- If your chart has more than one axis, you can click Merge Axes to combine the axes into one. If the scales are too different (as in this case) merging the axes may not produce desirable results. To spit a merged axis, click Split Axes.

3. Click Save.

Using Turbo Charts

Visualizer gives you the option of using Turbo charts that render more quickly than standard charts. This is particularly useful for charts on dashboards that are viewed on mobile devices. By default on Birst Mobile apps, all charts render in Turbo mode if available.

By default all new Visualizer charts use Turbo. You have the option of updating old charts to the new style.

Important: Review the information in this topic before updating charts. Once saved, an updated chart cannot be reverted to the old style. See the 5.23 Release Notes for Upgrade Notes and Known Issues.

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Currently supported Turbo-style charts include:

- Area
- Area Spline
- Bar
- Bubble
- Column
- Donut and Semi-donut
- Funnel
- Heat map
- Line
- Pie
- Points
- Scatter
- Spline
- Tree map
- Waterfall

Tip: Visualizer continues to support additional Turbo chart types over time. The Geomap chart style is only available in the old style.

Differences Between Old-style and Turbo Charts

The following are differences that will affect the behavior or look-and-feel of reports that are changed to Turbo. Stylistically, Turbo does not exactly match the old style.

Improvement to sorting report attributes by attributes that are not displayed

Old-style charting does not allow the Visualizer user to designate which attribute should be sorted by a hidden (sometimes called "unvisualized") Sort attribute. Turbo adds this functionality and requires users to set what displayed attribute should be sorted by the attribute that is not displayed.

For example, in the old-style charting a sorting attribute that is not shown on the report does not indicate what is actually sorted.

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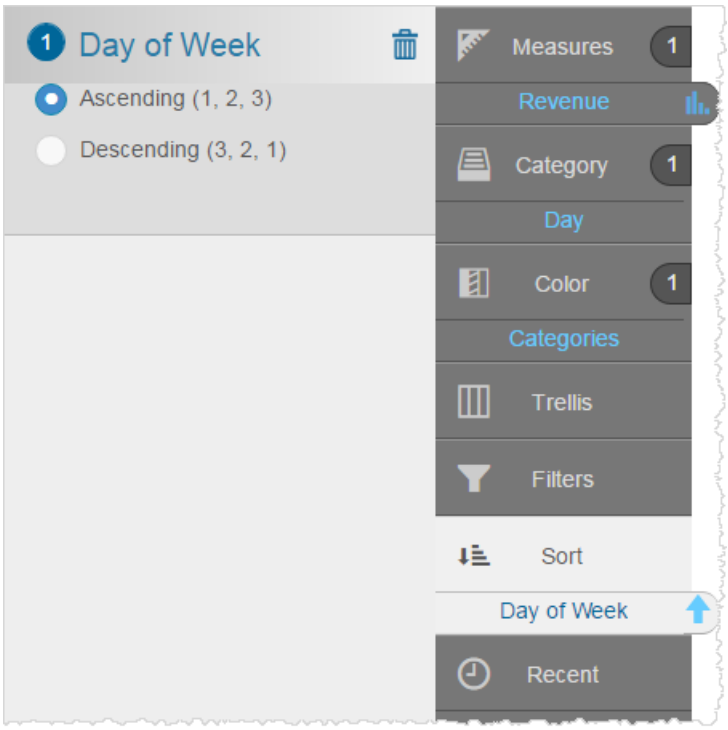
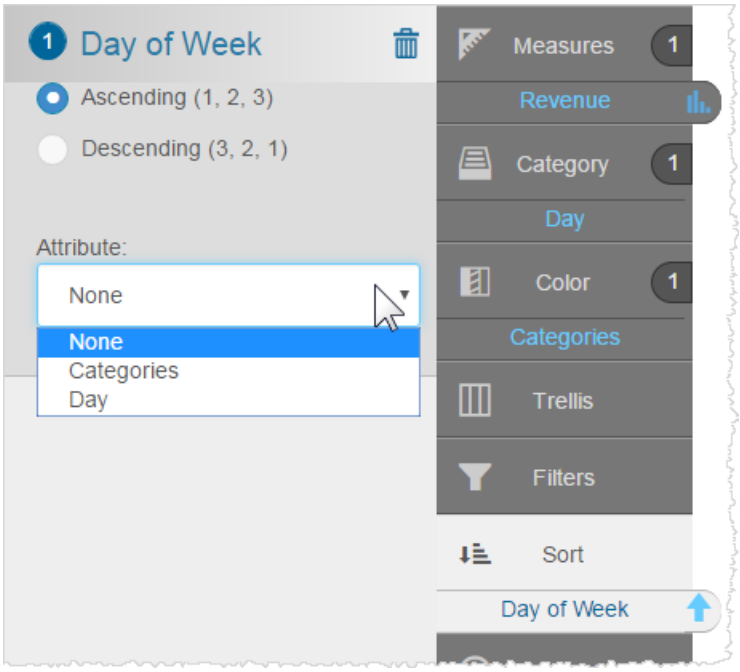


In a Turbo chart, users can select which attribute is sorted.



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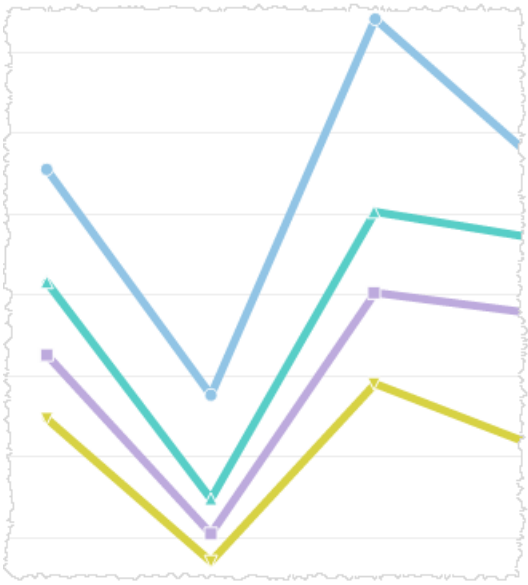
Change in the order of how colors are allocated

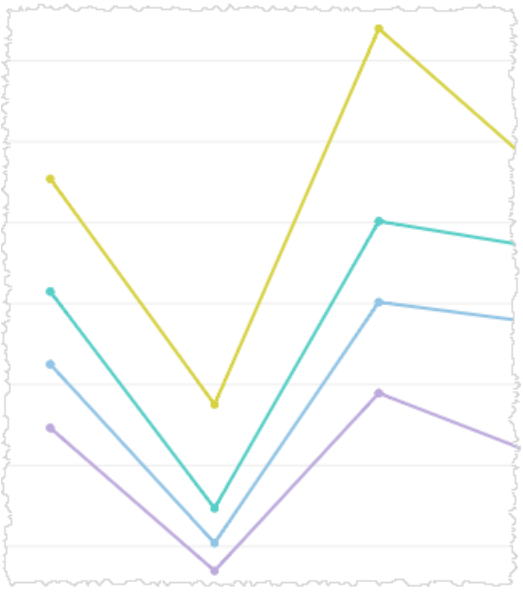
Old-style charts had a problem where colors were not allocated in the order of color attribute values. Turbo chart now correctly allocated the colors in proper order. Due to this change, the order of stacked Color attribute values will change. An example of a line chart with different color ordering is shown in the screenshots below.

The thickness of the lines and points on line/spline/area/areaspline charts are different

Ostyle:



Turbo style:



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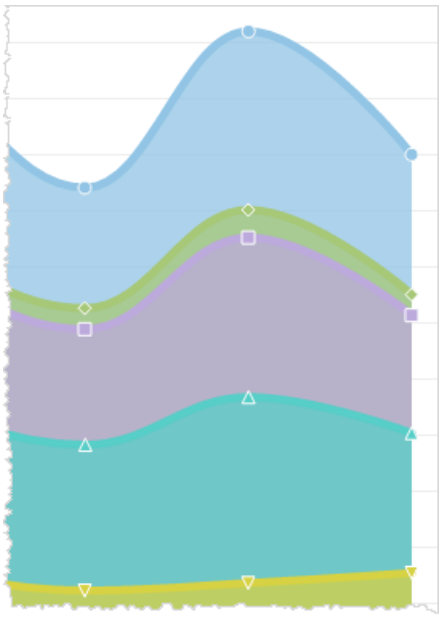
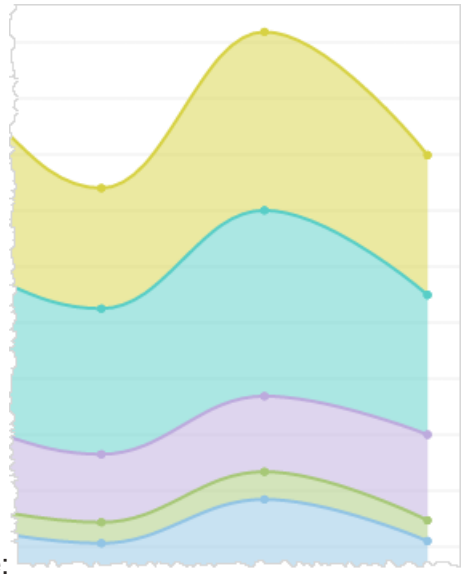
Point shapes and border/shadow in line/spline/area/areaspline chart are different

Old style:



Turbo style:



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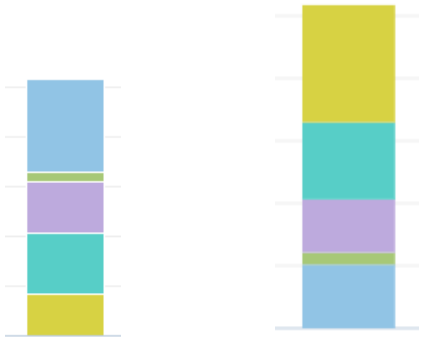
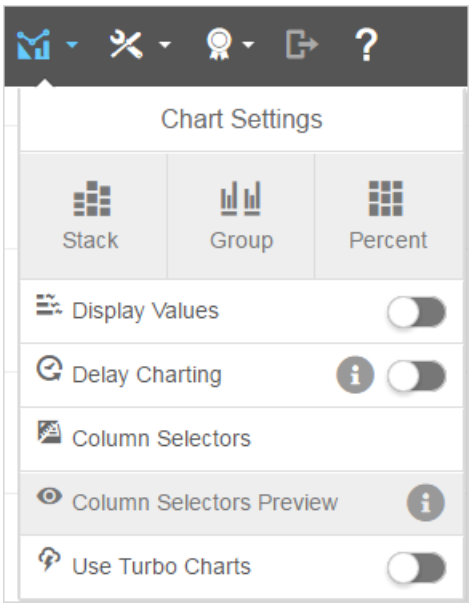
Rectangles in Turbo chart images do not have white dividers/borders



To update old-style charts to Turbo

1. Open the old chart in Visualizer.
2. In the Chart Settings menu toggle the Use Turbo Charts option.



   This option applies only to the open chart, not to any other charts.
3. Try out the new chart. If you change your mind, toggle it back.
4. Save the chart.

   Important: If you change a chart to Turbo and save it, it can never be changed back.

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Creating Color Palettes for Attributes

Space Administrators can specify a color palette that applies a particular color to a value of an attribute. This is helpful for keeping a consistent color scheme across charts that use the same attribute.

When you set up a color palette for an attribute as described in this topic, you can also apply the palette to other charts that use the same attribute.

Attribute palettes take precedence over Theme palettes. In the Help see *Applying Themes to Dashboards*.

Important: This applies only to charts that use the same attribute in the Color bucket in Chart Builder. If a chart does not have a Color attribute it cannot be assigned to one of these palettes. There is one Color attribute per chart.

If color is not assigned, then a color is picked from the default color palette and assigned. The color picked from the default palette is dependent on position of the value within the complete list of values for that attribute.

Only palette creators can update or delete their custom palettes. Account Administrators can also update or delete palettes.

To set up a color palette that is consistent for attribute values

1. Create a chart that has at least three attributes, one of which is a Color attribute in Chart Builder.

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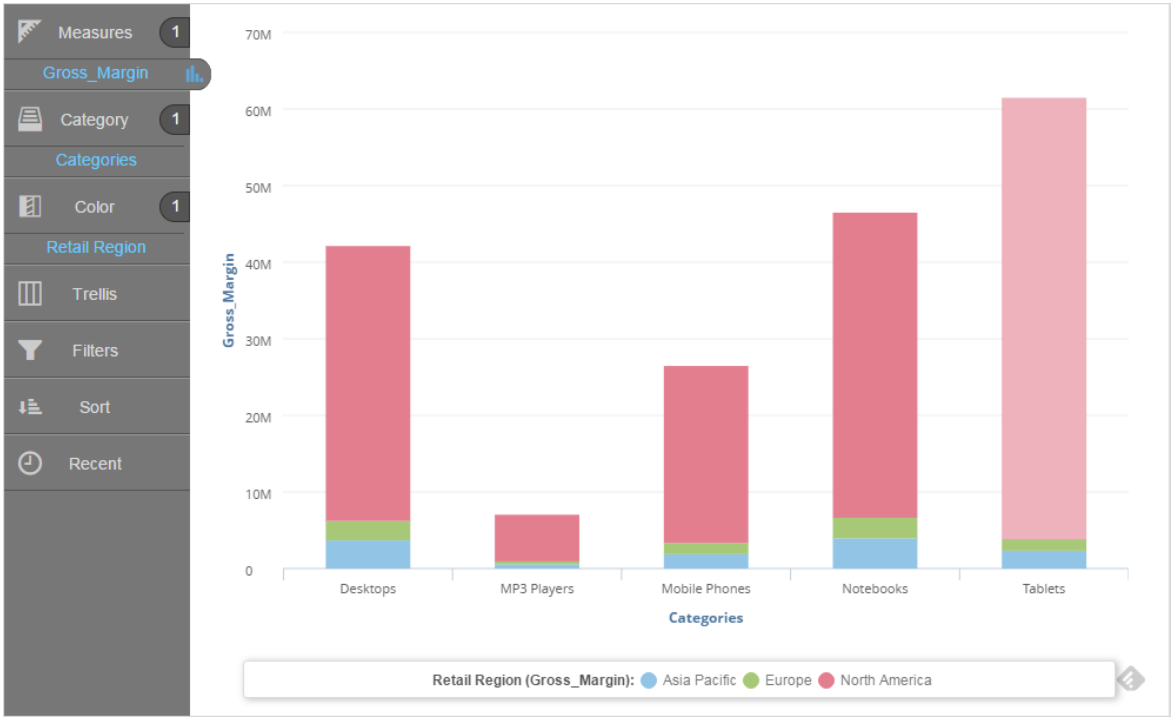
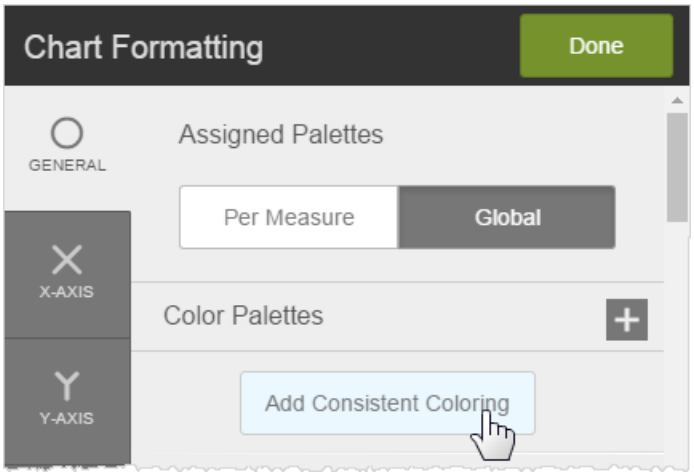


2. Click Chart Formatting (the paint brush icon).

3. In the Chart Formatting General tab click Add Consistent Coloring. By default these are Global palettes.



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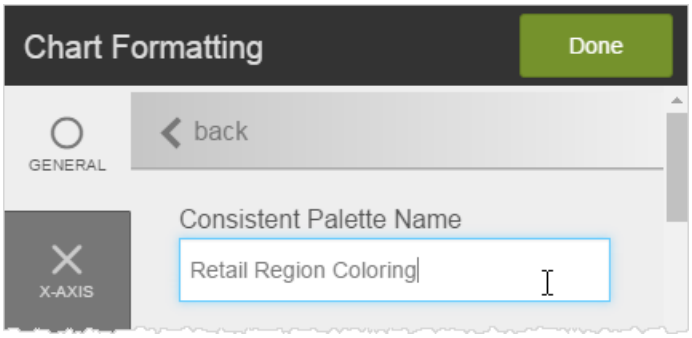
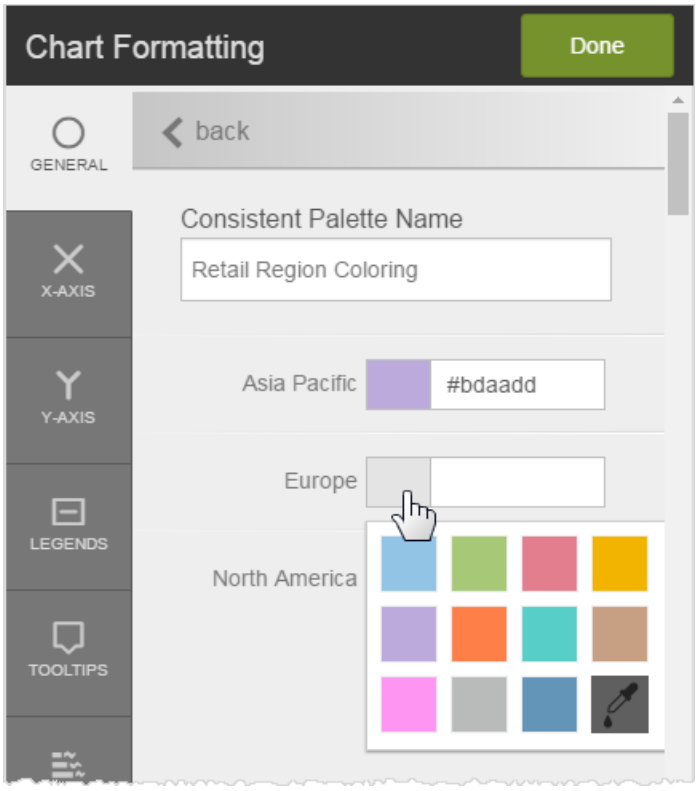
4. Optionally, In the Consistent Palette definition panel, rename the palette. By default the name uses the name of the attribute used as the Color attribute in Chart Builder.



5. Assign the colors to the attribute values.



6. Click Done. Visualizer displays the new Consistent palette.

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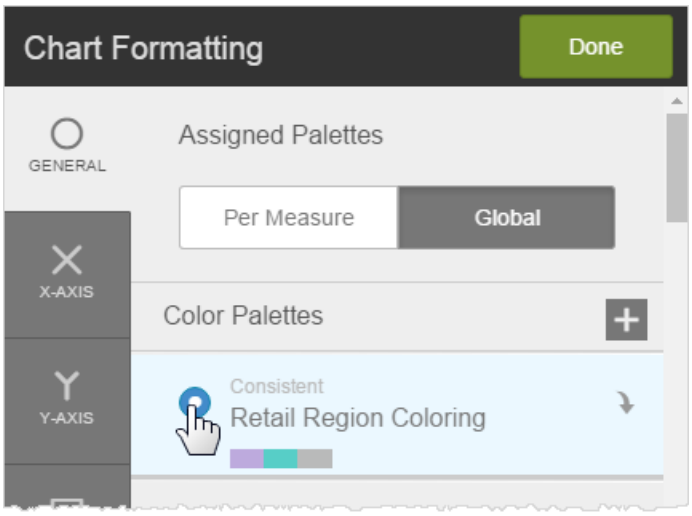
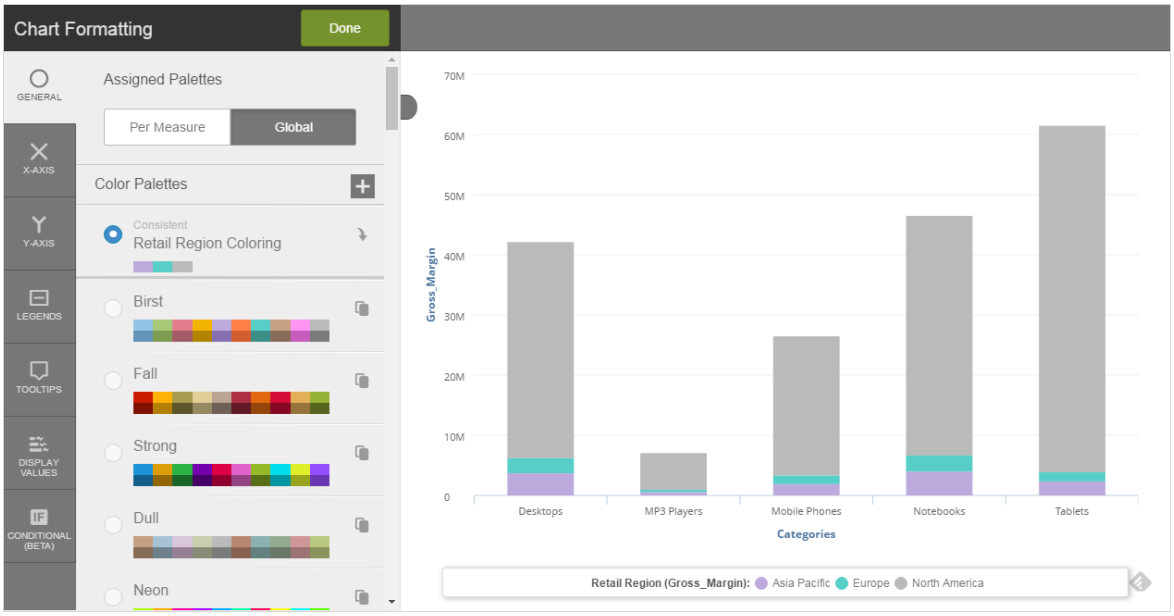
7. Click the palette to assign it to the chart.



Visualizer updates the chart to use the new palette.



8. Click Done.
9. Apply the same Global palette to other charts that use the same attribute in a Color bucket.

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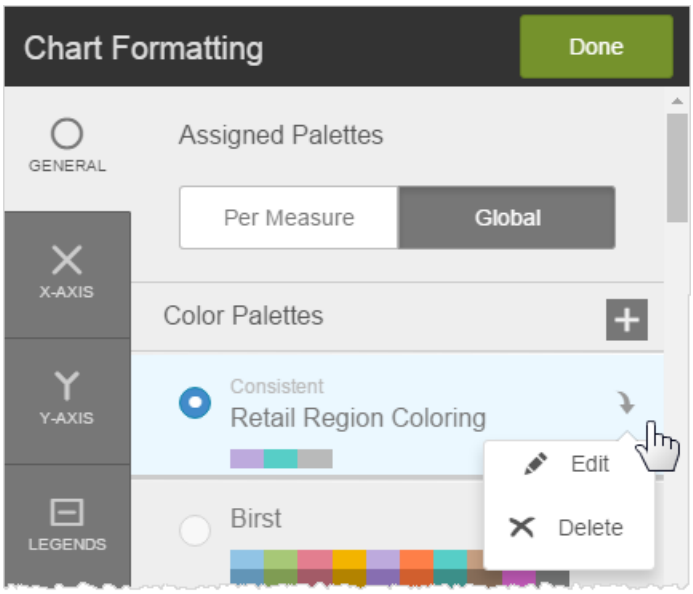
10. To edit or delete an attribute's palette click the down arrow.



Adding Tooltips and Hiding Columns

- Default Column and Tooltip Displays
- Changing How Tooltips Display
- Changing the Measures in a Tooltip and Hiding Columns
  - To show data from a hidden sort column in a tooltip
  - To show data from multiple columns in a tooltip
  - To completely hide a column

Default Column and Tooltip Displays

By default, all columns display when you drag them into Measures or Categories in the Chart Builder.

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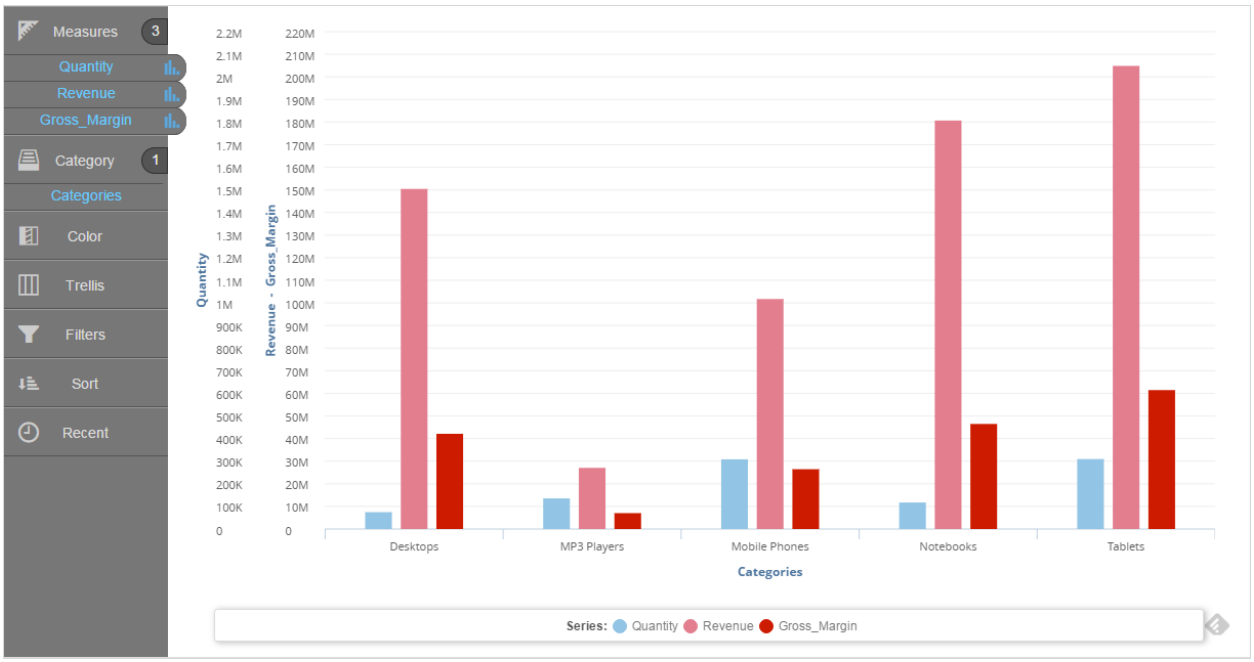
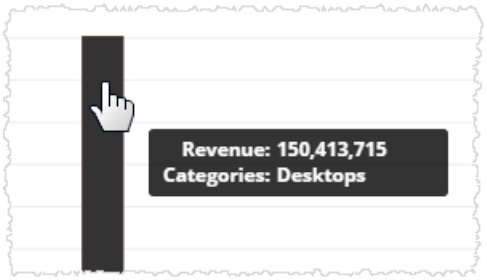


By default, tooltips display:

- The measure name and data for the column
- The attribute name and value



Changing How Tooltips Display

There are different ways to change the look of tooltips:

- **Colors and fonts**: By default tooltips have a black background with white text. You can change the text. See Formatting Visualizer Charts - To format tooltips.
- **Formatting style for prefixes, suffixes, and decimal precision**: To format styles consistently at the chart level see Formatting Data in a Visualizer Chart. To override chart-level settings for individual columns see Formatting Visualizer Charts - To format tooltips.

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Changing the Measures in a Tooltip and Hiding Columns

You can change the measures that display in a tooltip, which also involves hiding columns. You can:

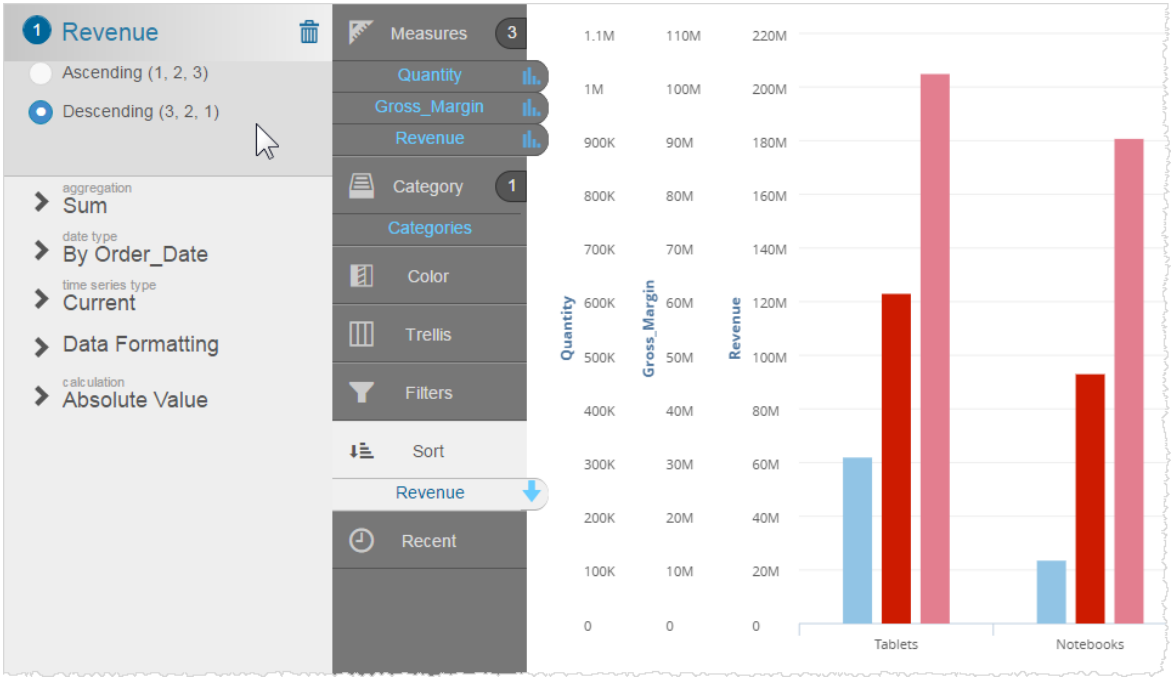
- **Display hidden column data in the tooltip of another column**: You can hide a column from the report and have its data shows up only in the tooltip of another measure.
- **Show multiple measures in tooltips**: Tooltips can show multiple measures.
- **Completely hide a column**: You can use a combination of the previous two methods to hide a column entirely.

To show data from a hidden sort column in a tooltip

For some reports you want to sort or filter by a particular column but you don't really need the column to show in the chart or table. You can chose not to display the column and instead use a tooltip to show it when the pointer hovers over the displayed measure column or columns. This option is in the Chart Type panel of the Measure Properties.

For example, to sort by Revenue, hide it from the chart, and show it in the tooltips of Quantity and Revenue:

1. Drag Revenue from the Measures section to the Sort section and set it to Descending



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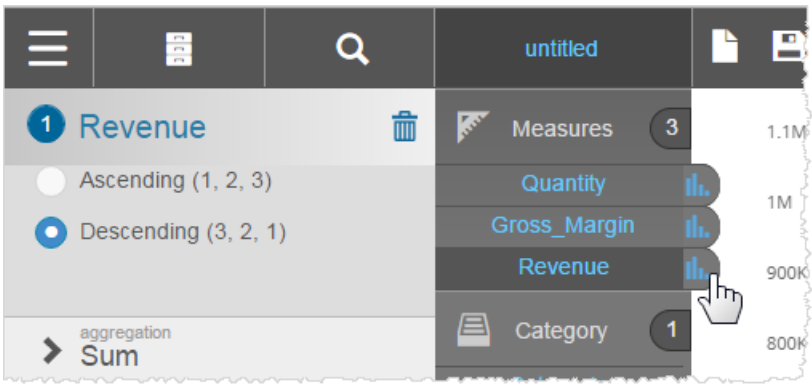
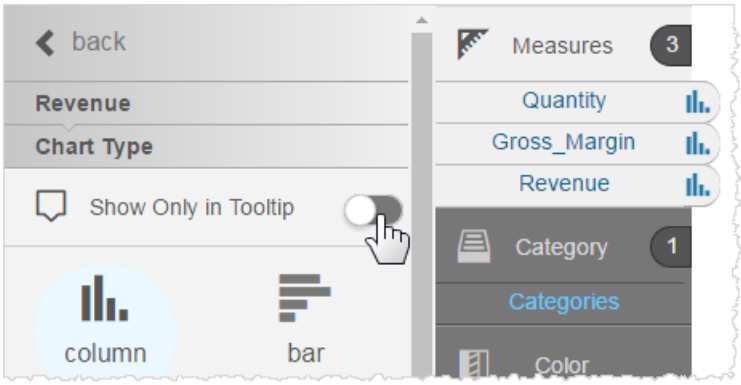
2. In the Measure section, click the icon next to Revenue.



3. In the Revenue Chart Type panel, click Show Only in Tooltip.



The measure no longer displays in the main report, it displays only in the tooltips of the other

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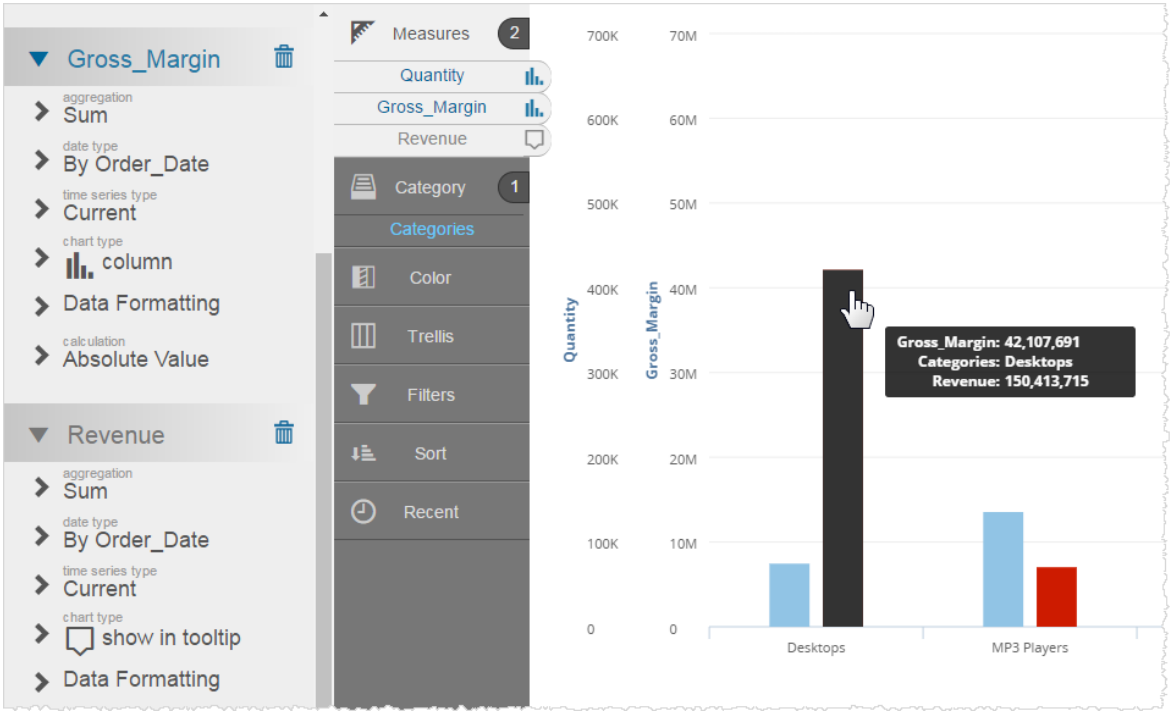
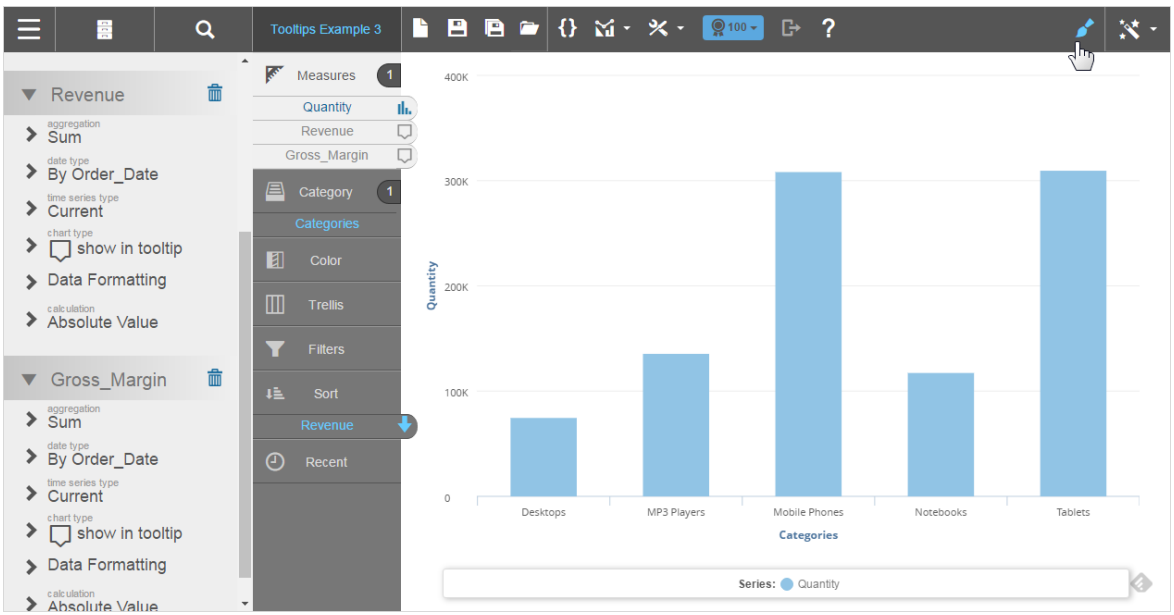
measure.



To show data from multiple columns in a tooltip

By default when you set measures as "Show Only in Tooltip", the tooltips show all of them. You can change which ones are displayed or not.

1. With a chart that has multiple measures as "Show Only in Tooltip", open the Chart Formatting panel.



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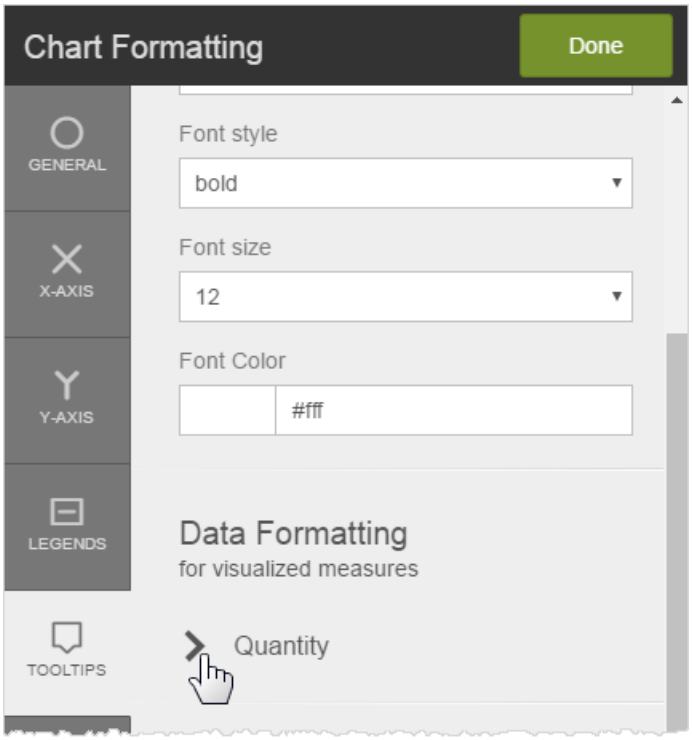
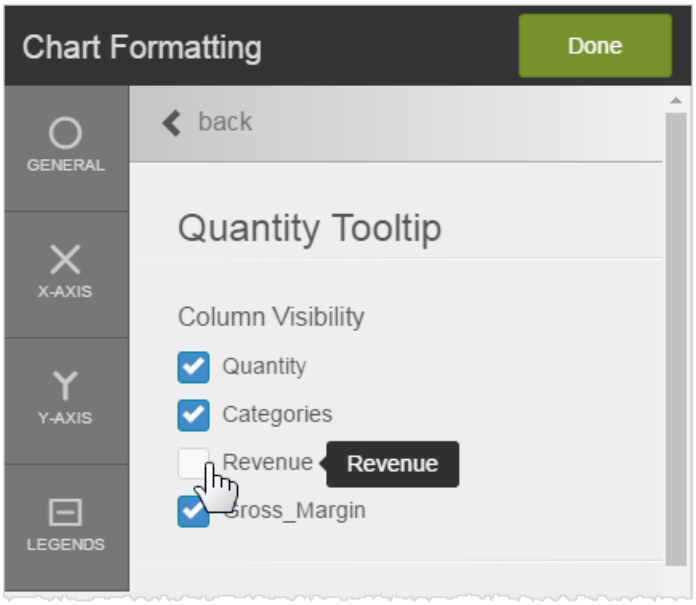
2. In the Chart Formatting Tooltips tab Data Formatting section, click the name of the measure that has the tooltips you want to change.



3. The Column Visibility section lists the measure data that can be displayed and you can uncheck the ones you don't want to see in the tooltip.



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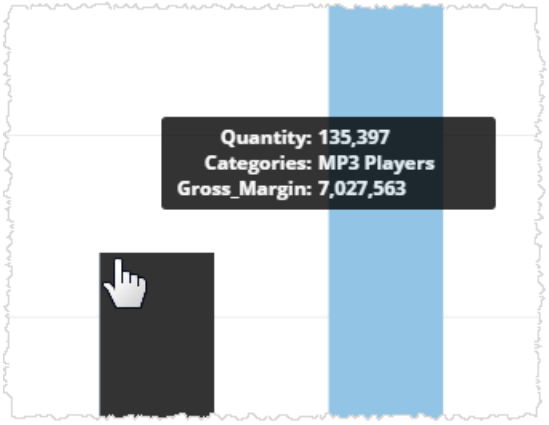
The measure data no longer shows in the tooltip.



To completely hide a column

To hide a column from both the report display and from tooltips:

1. In the Chart Type panel for the measure, turn on Show Only in Tooltips.
2. In the Chart Formatting Tooltips tab, go to each measure and uncheck it from Column Visibility.

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Working with Tabular Reports

Visualizer provides powerful table and crosstab reports.

Tip: Visualizer tabular reports can be exported as Excel or PDF from Dashboards 2.0. In addition, crosstab reports can be exported as Excel pivot tables.

This section includes the following topics:

- Creating a Table in Visualizer
- Formatting Visualizer Tabular Reports
- Formatting Data in a Visualizer Table
- Creating a Crosstab Report in Visualizer
- Conditional Formatting for Tables and Crosstabs

Creating a Table in Visualizer

You can view data in a tabular format rather than as a chart. Create a table from either an existing visualization report or make a new one.

Tip: Switching to table mode on an existing chart is a great way to preview the underlying data.

- To create a table from another visualization
- To create a new table
- To create a break by report

To create a table from another visualization

1. Open an existing visualization report in Visualizer. For example, Revenue by Quarter and Region.

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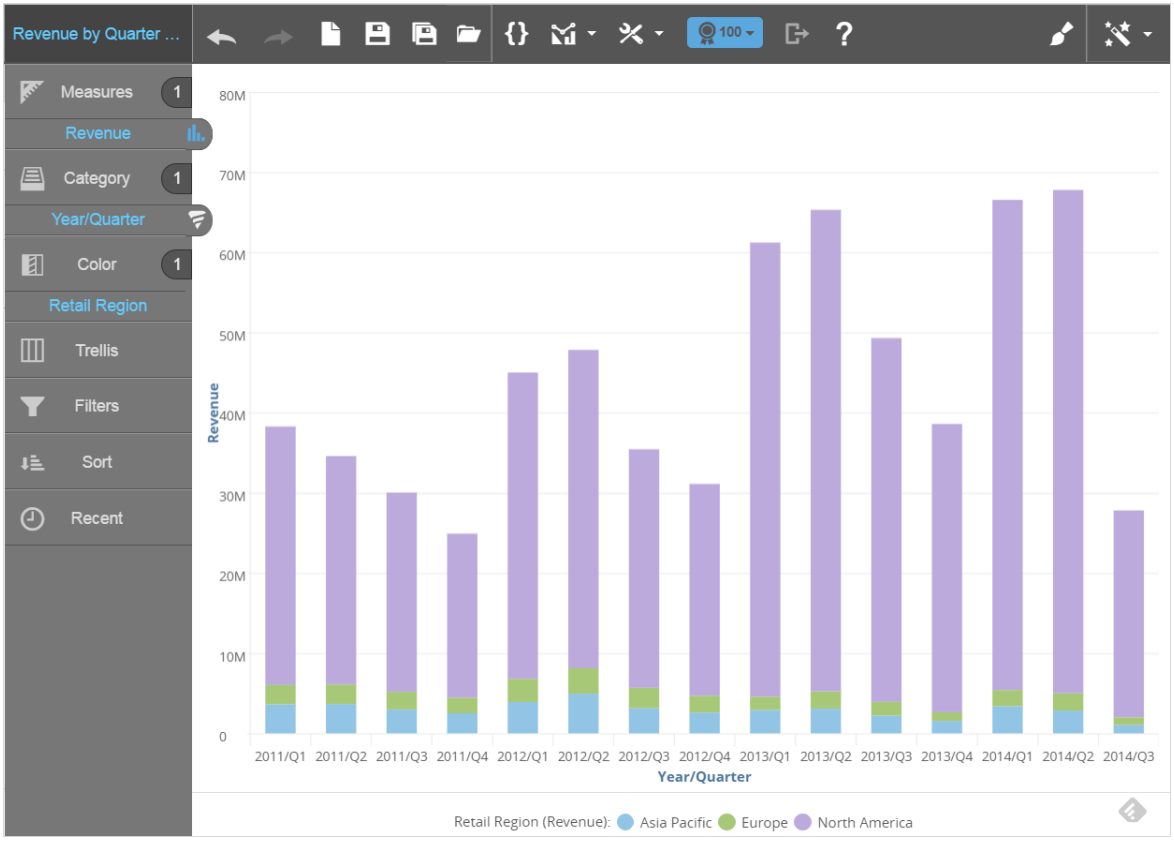

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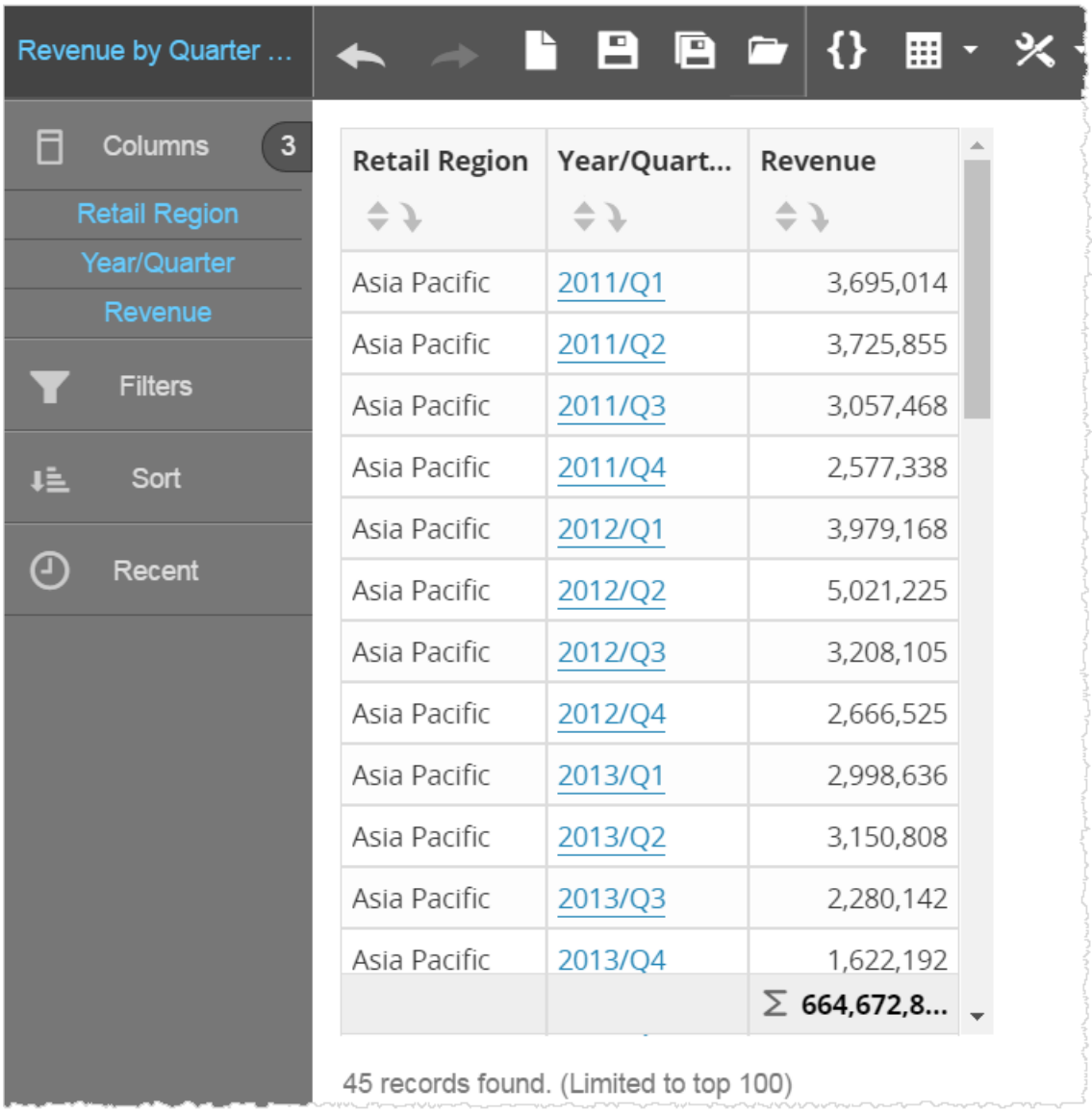
2. From Guided Mode select table. Visualizer converts the existing chart to a table.



3. Click Save As and save the table with a new name.

4. Continue formatting the table. See Formatting Visualizer Tabular Reports.

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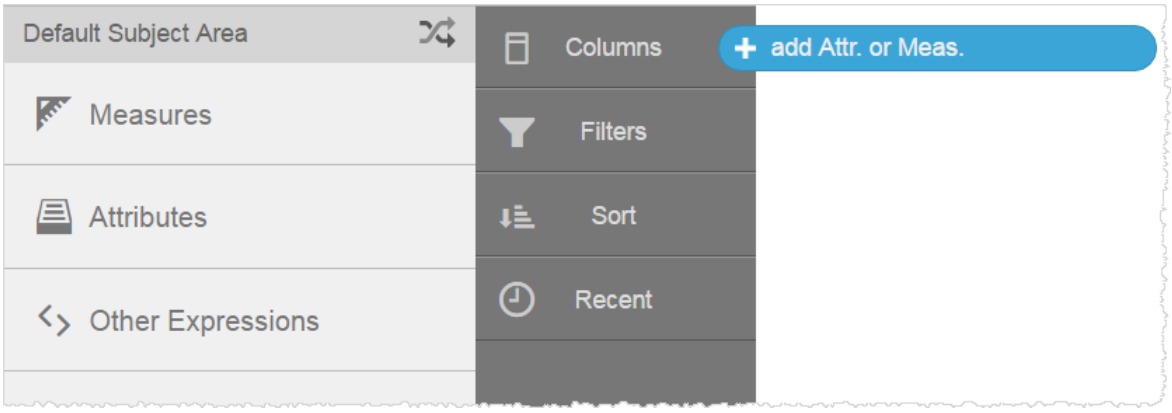
To create a new table

1. If Visualizer is not already empty, click Create New Chart.

2. From Guided Mode select table.
3. The Chart Builder prompts you to add attributes and measures. For tables, all measures and attributes are put in the Columns section.



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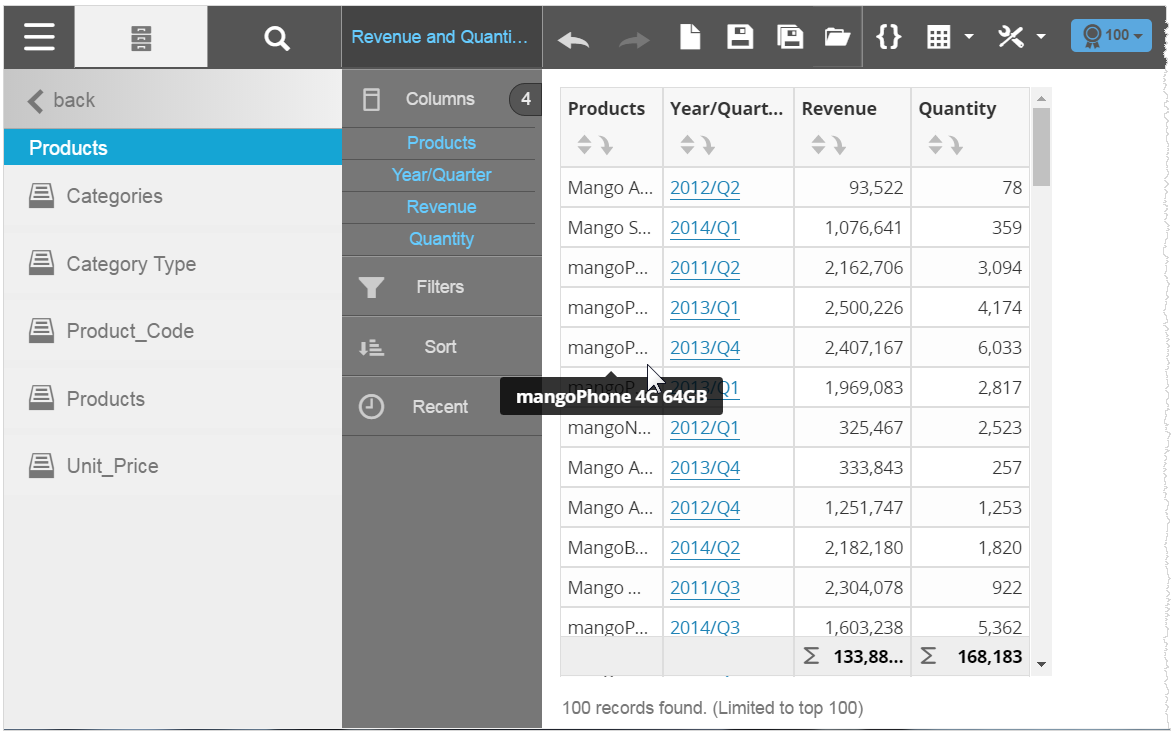
4. Drag and drop measures and attributes to the table from the Subject Area.



5. Click Save to name and save the new table.

6. Continue formatting the table. See Formatting Visualizer Tabular Reports.

To create a break by report

Select the column attribute you want to create sections for, click the drop-down arrow to reveal additional actions and select Break By.

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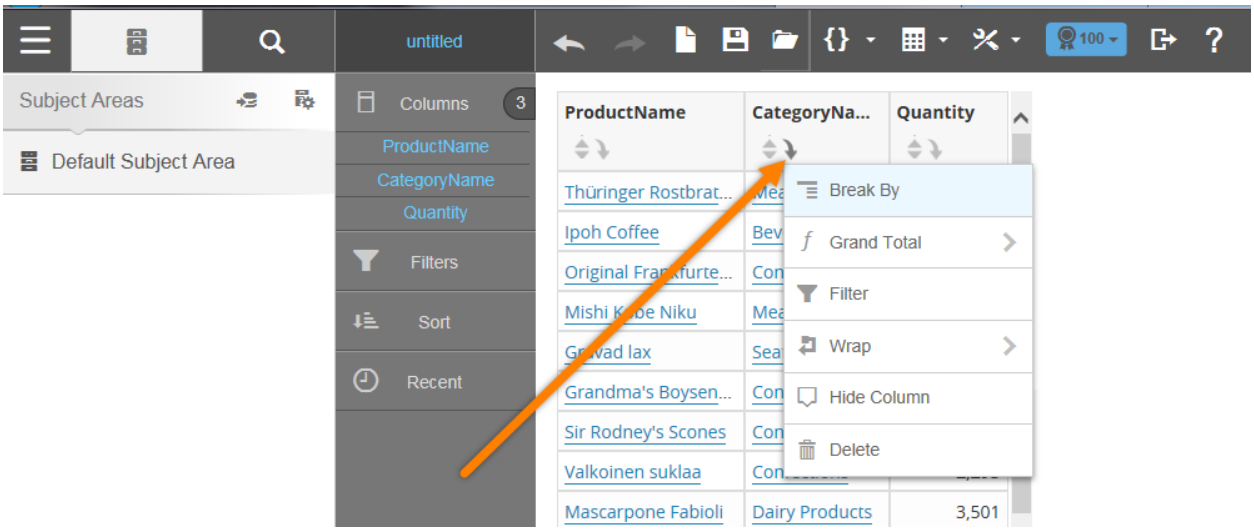

The report will create sub section based on the Break by attribute selected. In this case By Category Name.

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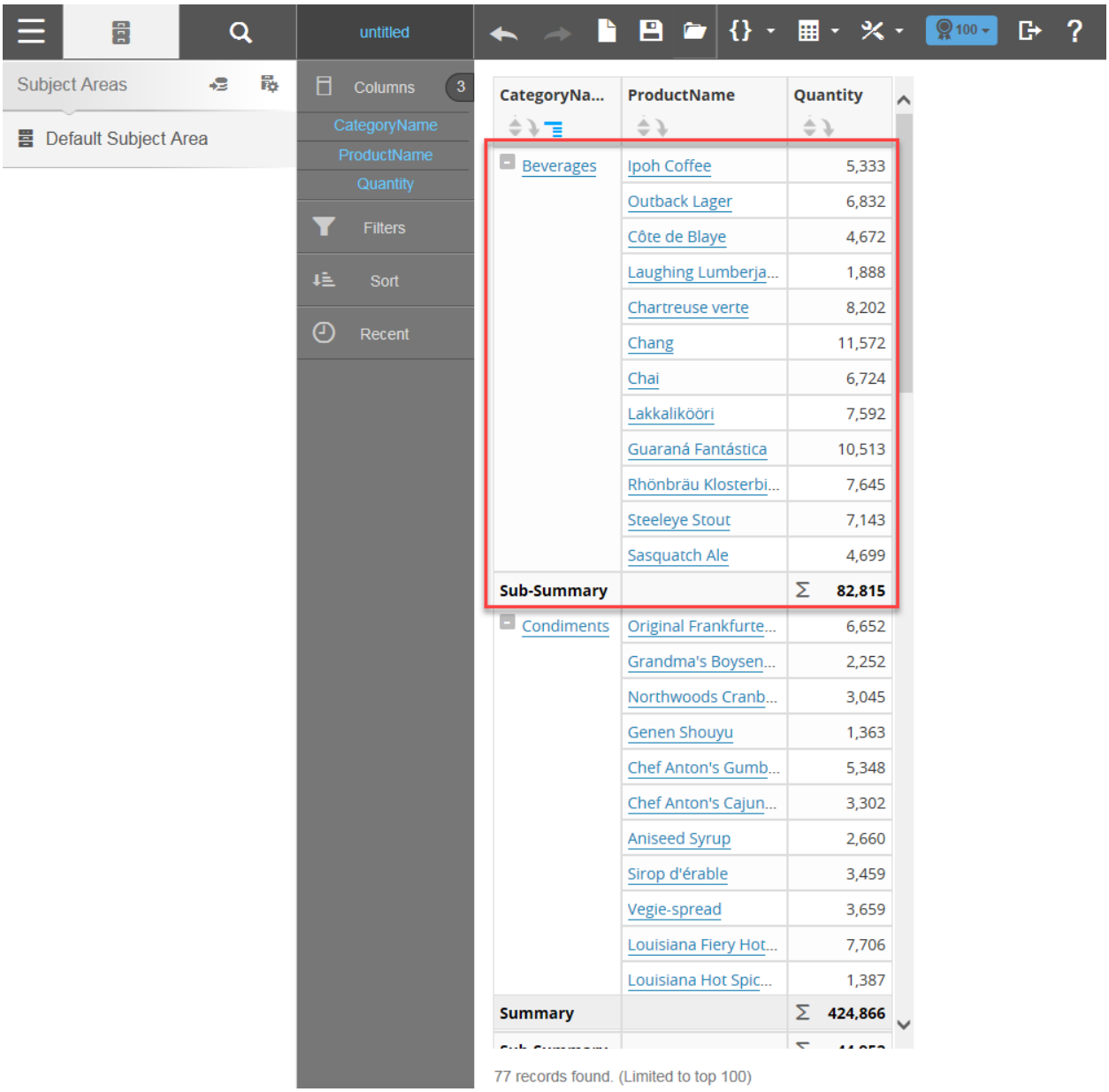

Note: It is possible to expand and collapse all Break by sections.

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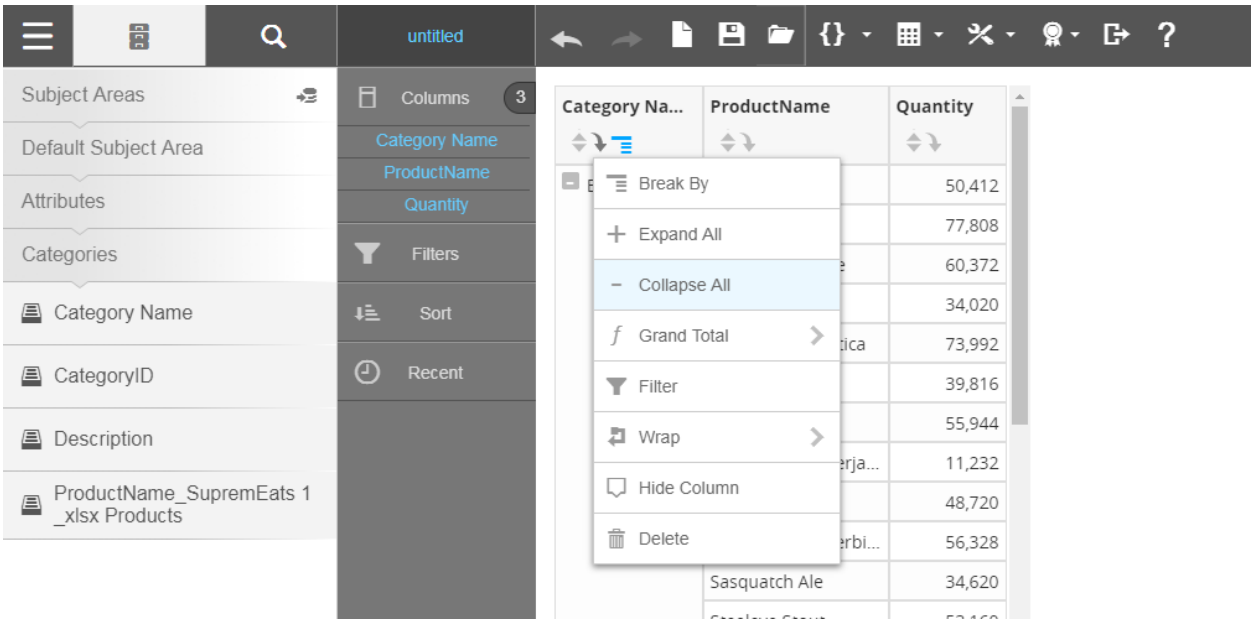

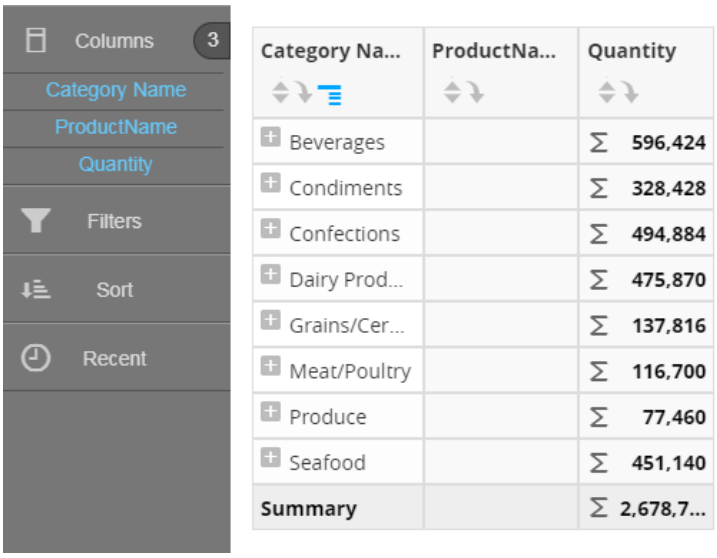

Previously, you could only expand and collapse one section at a time by clicking the hash mark next to the Break by category.

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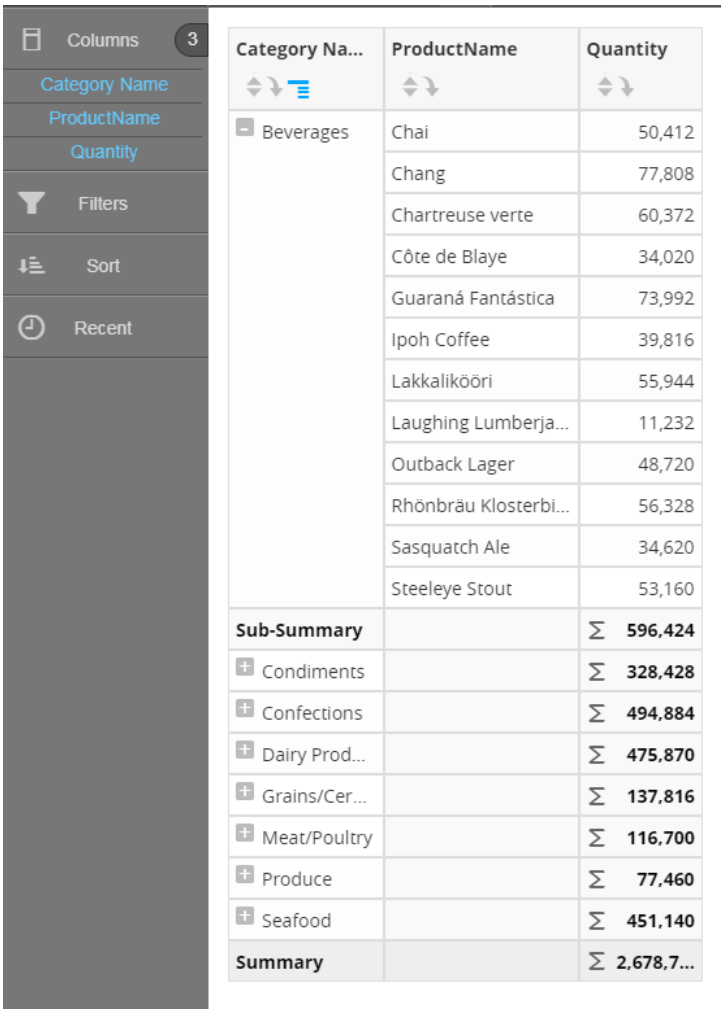

Category Na...	ProductName	Quantity
Beverages	Chai	50,412
	Chang	77,808
	Chartreuse verte	60,372
	Côte de Blaye	34,020
	Guaraná Fantástica	73,992
	Ipoh Coffee	39,816
	Lakkalikööri	55,944
	Laughing Lumberja...	11,232
	Outback Lager	48,720
	Rhönbräu Klosterbi...	56,328
	Sasquatch Ale	34,620
	Steeleye Stout	53,160
Sub-Summary		**Σ 596,424**
Condiments		**Σ 328,428**
Confections		**Σ 494,884**
Dairy Prod...		**Σ 475,870**
Grains/Cer...		**Σ 137,816**
Meat/Poultry		**Σ 116,700**
Produce		**Σ 77,460**
Seafood		**Σ 451,140**
Summary		**Σ 2,678,7...**

Tips:

- Underneath the table, Visualizer displays the number of rows returned.
- By default, Visualizer limits the number of rows to 100. This is for convenience while designing as well as for performance reasons. You can change this in the Top N Results menu.
- When there are a lot of rows in a table Visualizer automatically adds a scroll bar. The size of the scrolling area is based on the size of your browser window.
- By default Visualizer adds a Grand Summary at the bottom of measure columns. To toggle this option, click Table Settings - Grand Summary - Column Summary.
- If the text or numbers in a column exceed the column width, you can hover over the column and a tooltip displays the full text or all of the number.
- Visualizer has a 50,000 row limit for tabular data.

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Formatting Visualizer Tabular Reports

Tables and crosstab reports use similar formatting techniques.

Some formatting activities you perform directly on the table column including:

- Show/hide Grand Summary
- Wrap headers and cells
- Change label
- Resize column width
- Reorder columns

Some column formatting options you access from menus in the column header, including:

- Sort
- Break By (group rows)
- Filter
- Add percentage
- Summary for a column based on an expression
- Hide and show a column
- Delete
- Summary rows
- Access general formatting options for a table as a whole from the Table Formatting menu. (Most of these do not apply to crosstab reports.)

To show/hide the default Grand Summary

By default Visualizer adds a Grand Summary at the bottom of measure columns. To toggle this option, click Table Settings - Grand Summary and toggle the relevant option.

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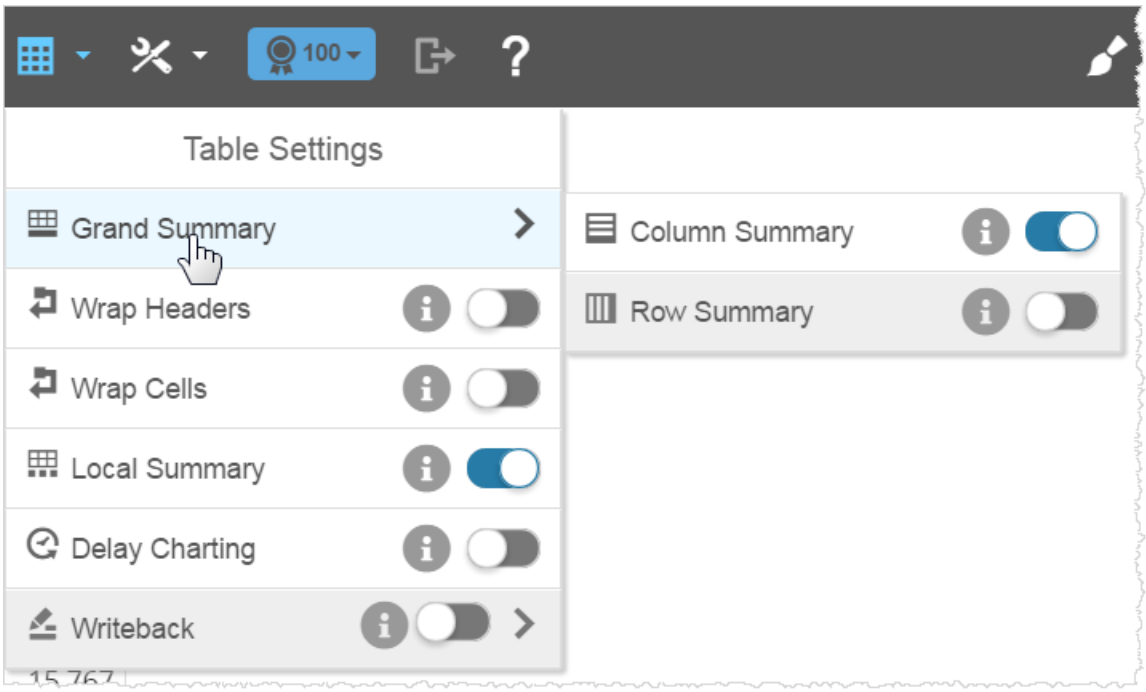
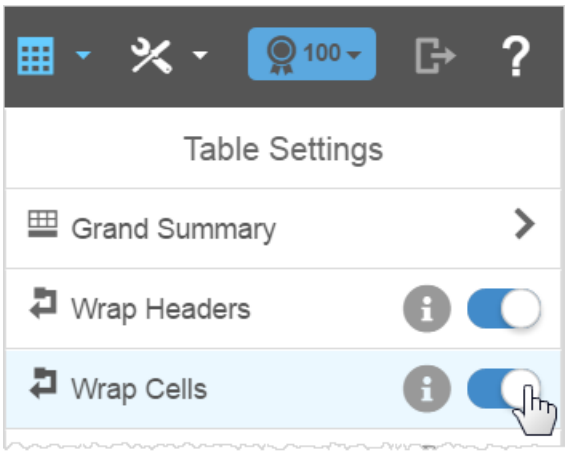


To wrap headers and cells

The Table Settings wrap options apply to entire tables or crosstabs. When headers are too long, toggle Table Settings - Wrap Headers. For cells, toggle wrap cells.



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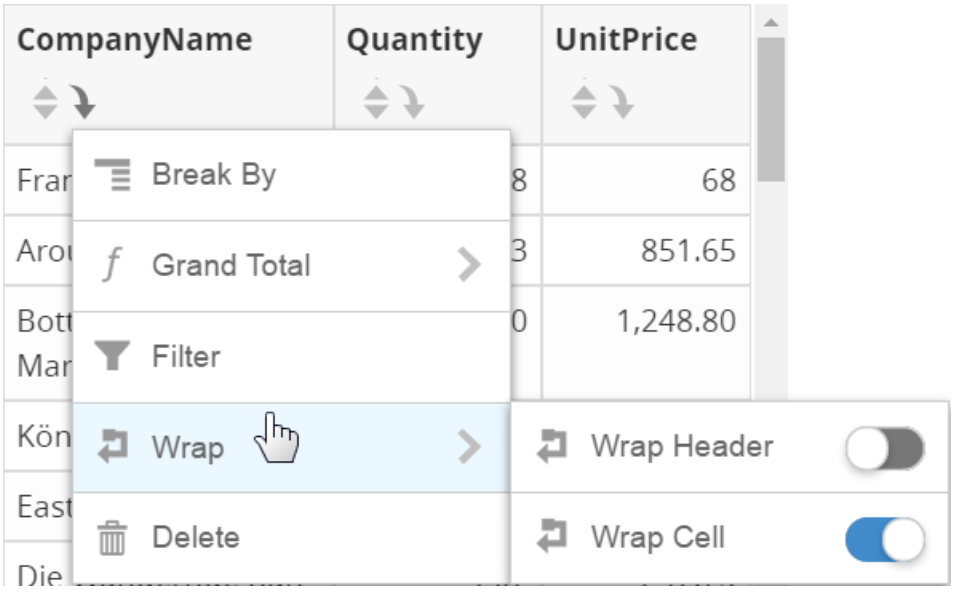
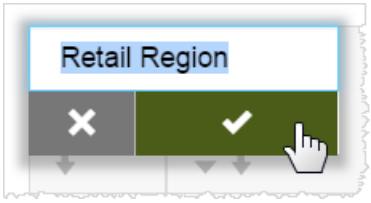
To wrap headers and cells of individual columns, use the column formatting menu options.



To edit a label

Change the label of a column by double-clicking on it, entering the new value, and clicking the check box.



To change column width

The default column width is 95 pixels. The shortest width is 40 pixels.

Resize width by dragging the column edge in the header.

When a column is narrow, the table Sorting option moves into the Column formatting dropdown menu.

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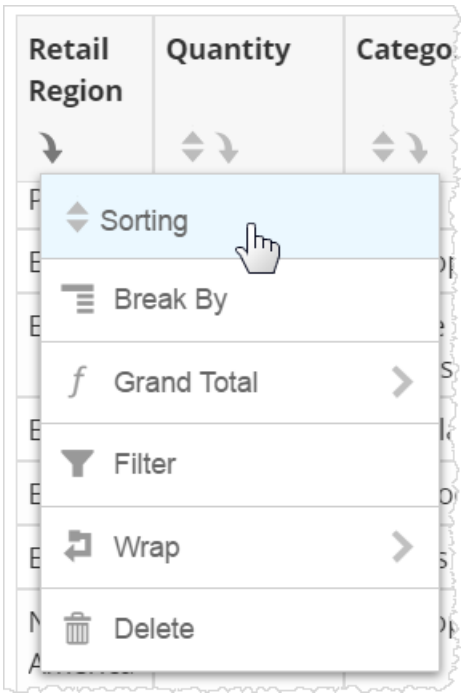
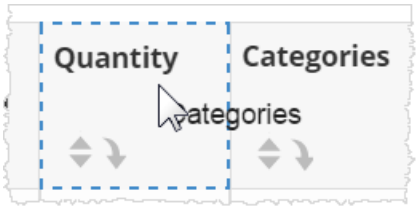


To reorder columns

Reorder the columns by hovering in the header to reveal the Reorder . button. The pointer changes to indicate that you have selected the column and you can drag it to another location. A blue bounding box shows where the column will move.



To sort the column data

Sort the data in a column by clicking the Sort icon in the column header.

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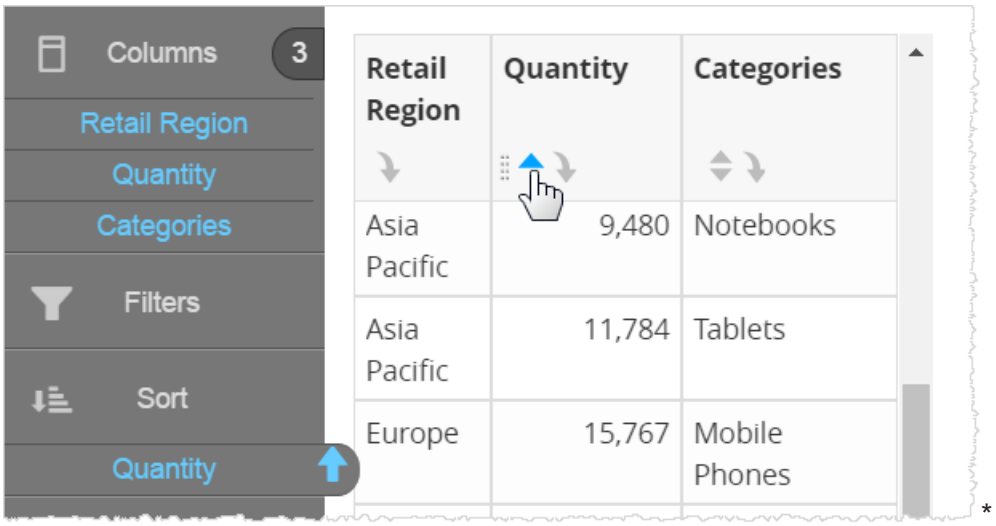
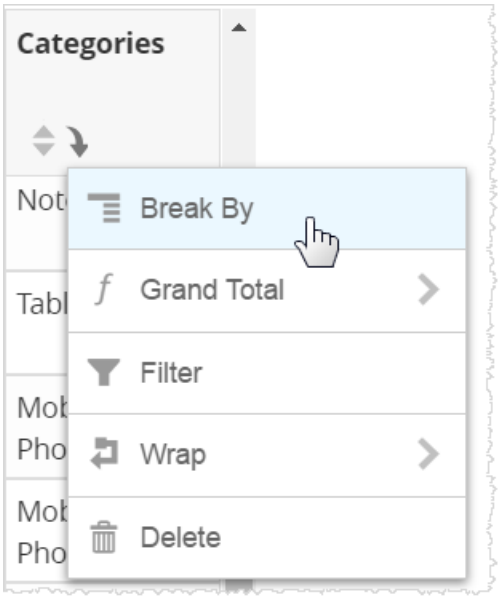
Chart Builder adds the column to the Sort section, with an up arrow.



To group rows based on attributes (break-by)

To group the table rows based on attributes and view summaries for each group in a column, click the Column menu in the column header and select Break By.



Break By adds expand/collapse button and sub-summaries for each break. Click the hash mark by the category to collapse or expand the results in the table.

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Categories	Retail Region	Quantity
Desktops	Asia Pacific	6,741
	Sub-Summary	Σ **6,741**
	Europe	4,790
	Sub-Summary	Σ **4,790**
	North America	62,954
	Sub-Summary	Σ **62,954**
Sub-Summary		Σ **74,485**
MP3 Players	Asia Pacific	8,593
	Sub-Summary	Σ **8,593**

Tip: If you don't want to see sub-summaries at all, you can turn them off using the Table Settings - Sub-Summary toggle.

Categories	Retail Region	Quantity
Desktops	Asia Pacific	6,741
	Europe	4,790
	North America	62,954
MP3 Players	Asia Pacific	8,593

Collapse and Expand all Break by report sections

You can "Collapse All" or "Expand All" Break by categories.

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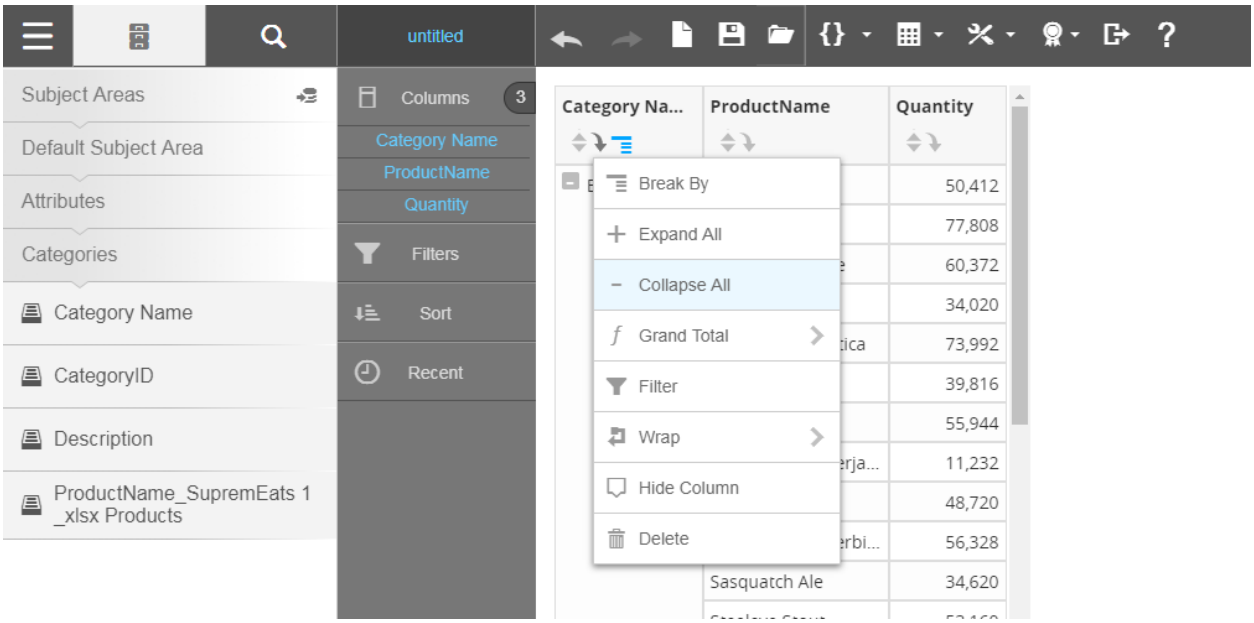

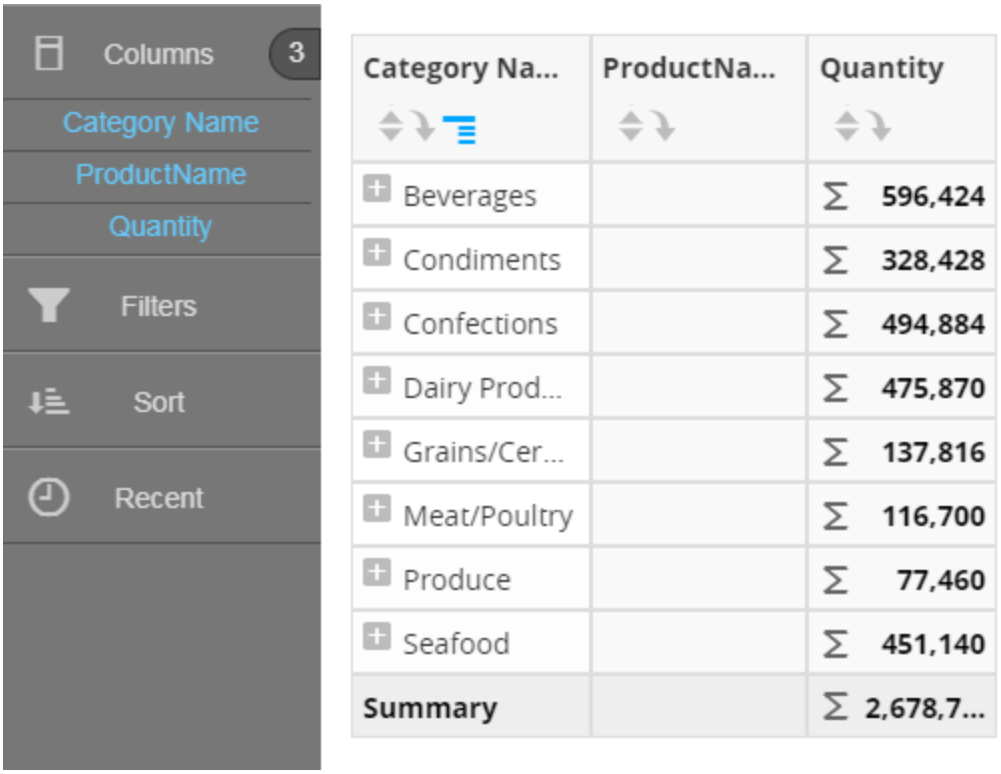

To expand one category at a time, simply click the hash or 'plus' icon to expand that selected category. For example, Beverages is expanded while the other categories remain collapsed.

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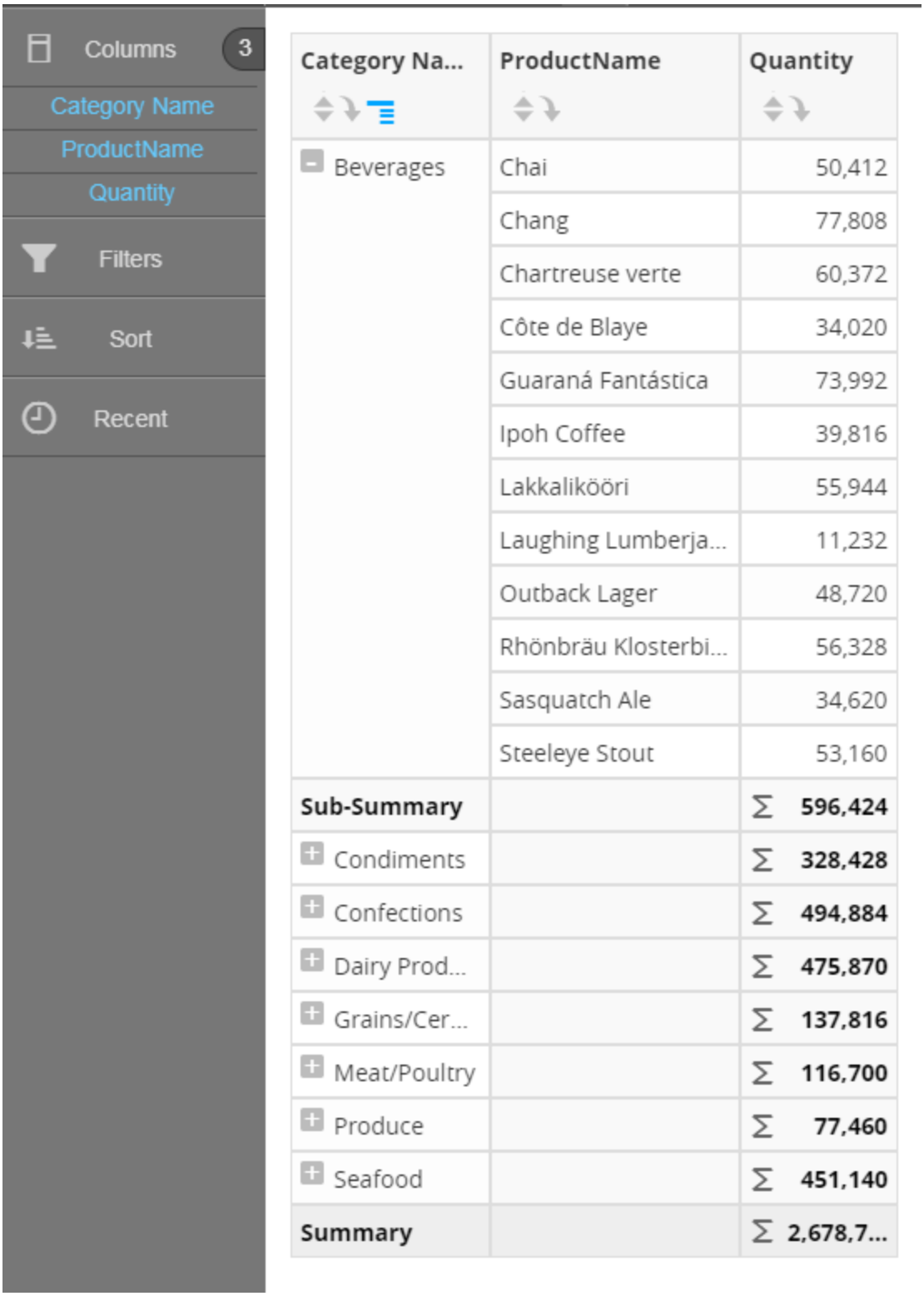

Category Na...	ProductName	Quantity
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Grains/Cer...		**Σ 137,816**
Meat/Poultry		**Σ 116,700**
Produce		**Σ 77,460**
Seafood		**Σ 451,140**
Summary		**Σ 2,678,7...**

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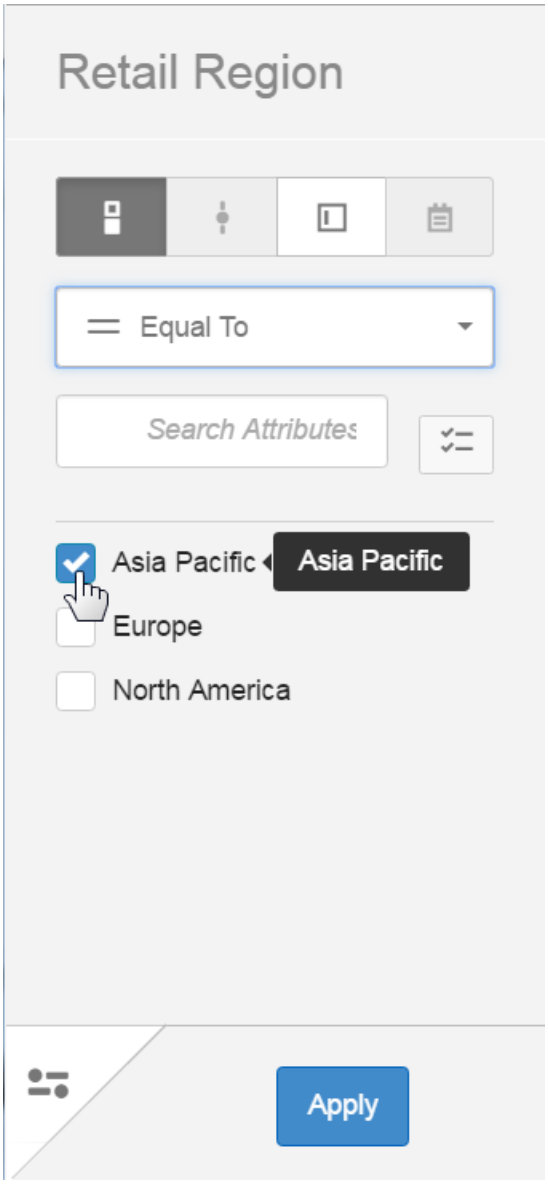
To filter column data

1. To filter a column click the Column menu in the column header and select Filter. The Filter properties for the column display in the left panel.



2. Choose from a variety of filter display options that match the type of data, such as check list, slider, text input, or calendar.
3. You can choose the filter operator, such as Equal To, Greater Than, etc.
4. Below that, Visualizer lists the possible attribute values you can select for the filter.

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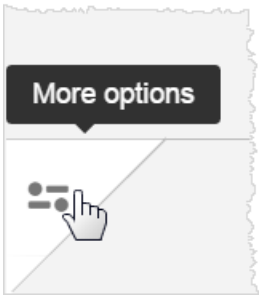
5. The More Options menu has the Use as display filter toggle. By default the table filter is applied on the database. Toggle this On to apply the filter on the data in memory.



6. Click Apply to see the filter applied to the table.

Categories	Retail Region	Quantity
Desktops	Asia Pacific	6,741
MP3 Players	Asia Pacific	8,593
Mobile Phones	Asia Pacific	20,448
Notebooks	Asia Pacific	9,480
Tablets	Asia Pacific	11,784

Additional Filter Tips:

- See Filtering Data in Visualizer.
- To change the filter, click the filter icon in the column header.

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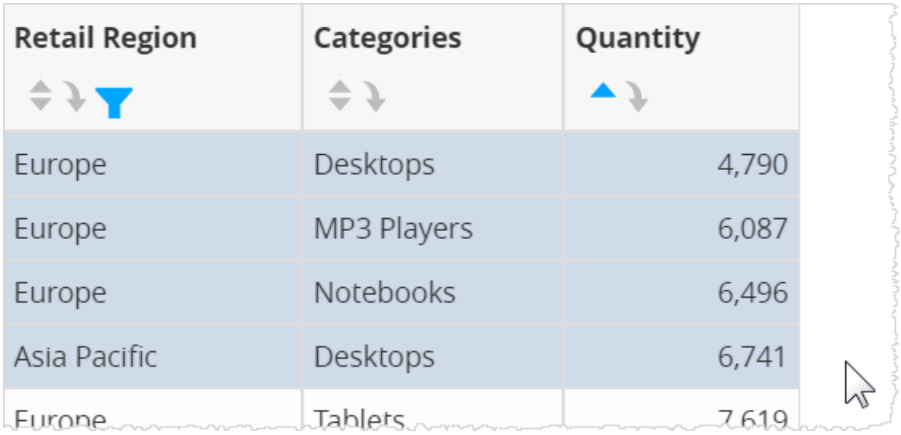
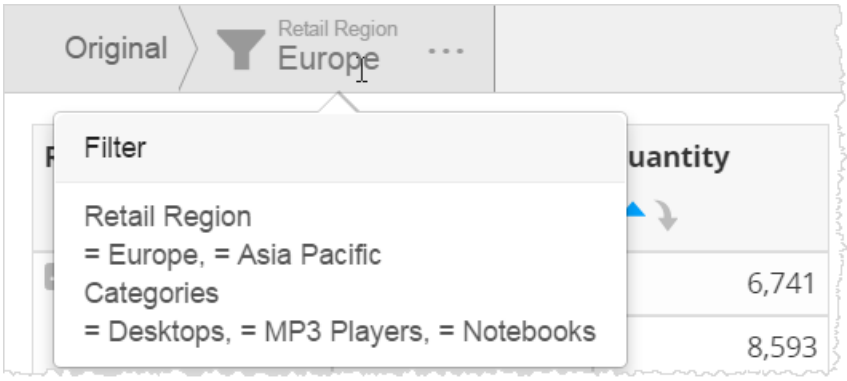
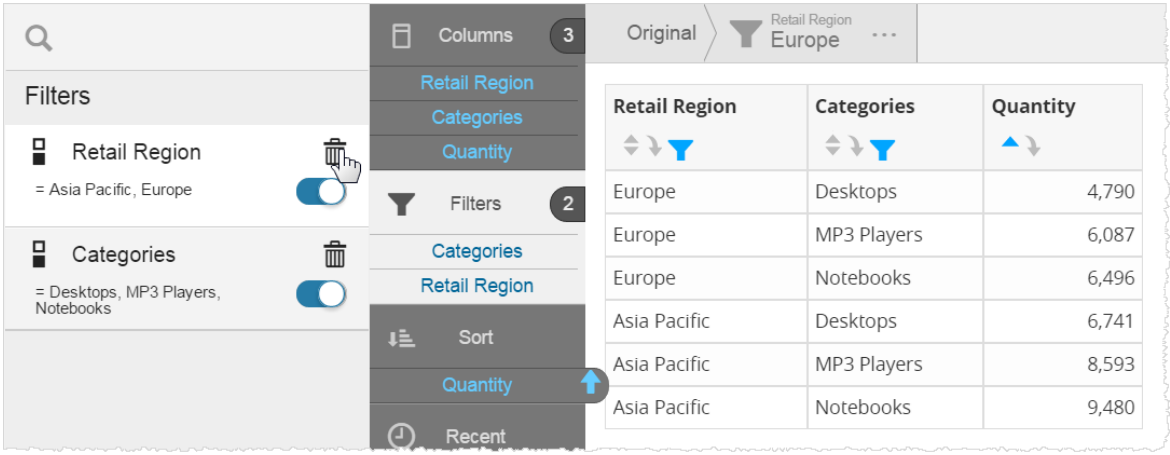
- Drag-select a set of rows to instantly filter a table.



The filters that have been applied in the filter drill path at the top. Hover to see the filters applied, and click on a node to go to a previous state.



- To toggle a filter Off or delete it altogether, click Filters in the Chart Builder.



To add a percentage column for a measure

Visualizer can automatically calculate percentages and create a percentage column for a measure.

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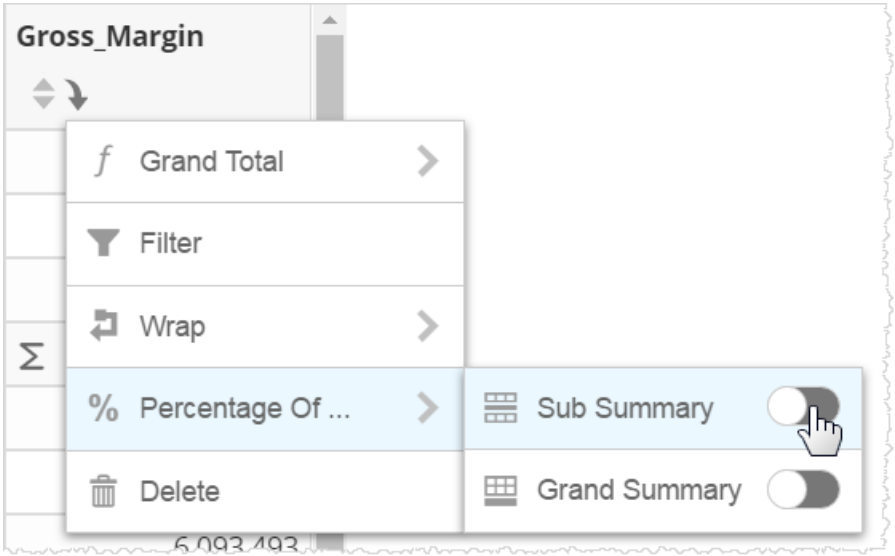
Tip: The Table Settings - Grand Summary or Sub-Summary must be toggled On when using a percentage column.

1. To add a percentage column click the Column menu in the measure column header and select % of either the grand summary or, if available, a sub-summary.



Visualizer adds a new percentage column next to the measure.

Gross_Margin	Sub %
2,532,189	6.01%
3,673,695	8.72%
35,901,807	85.26%
Σ **42,107,691**	Σ **100%**
380,519	5.41%
553,551	7.88%
6,093,493	86.71%
Σ **7,027,563**	Σ **100%**

To use a summary for a column based on an expression

1. Create a column based on an expression.

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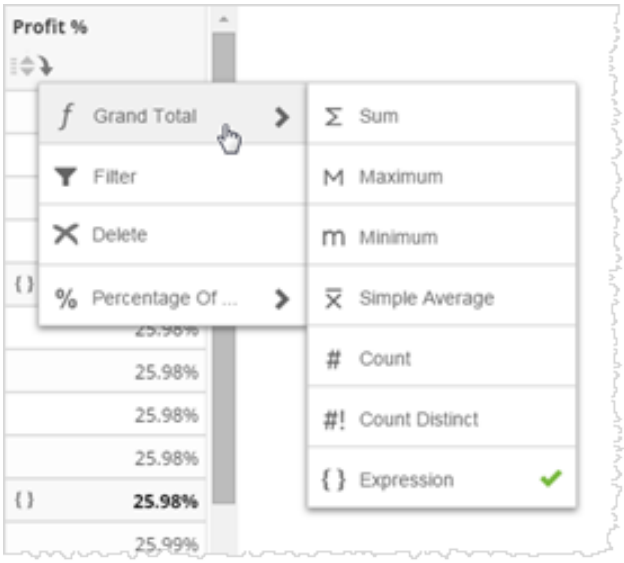
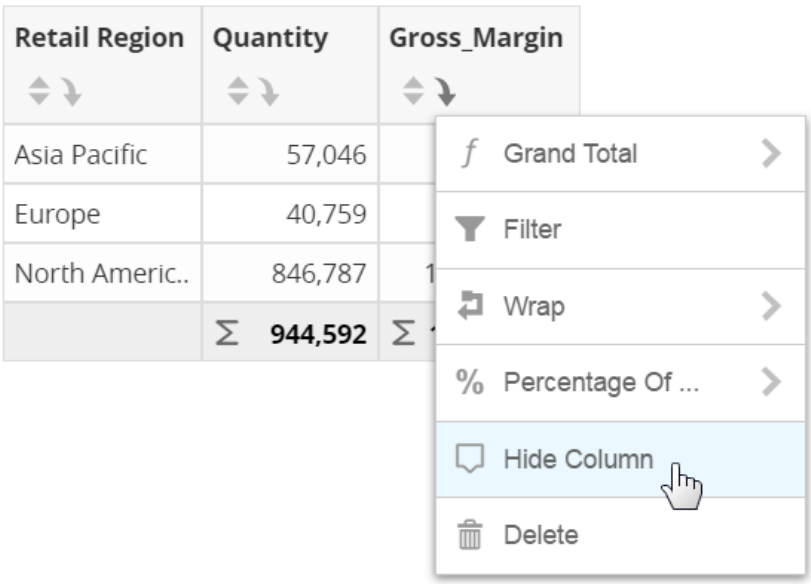
2. Click the column Grand Total menu and select Expression.



To hide and show a column

If you don't want to display a column that is in a report, use the column menu to hide it.



The column does not show in the table. However it is still in the Chart Builder and its name is grayed out. You can still see its information in a popup.

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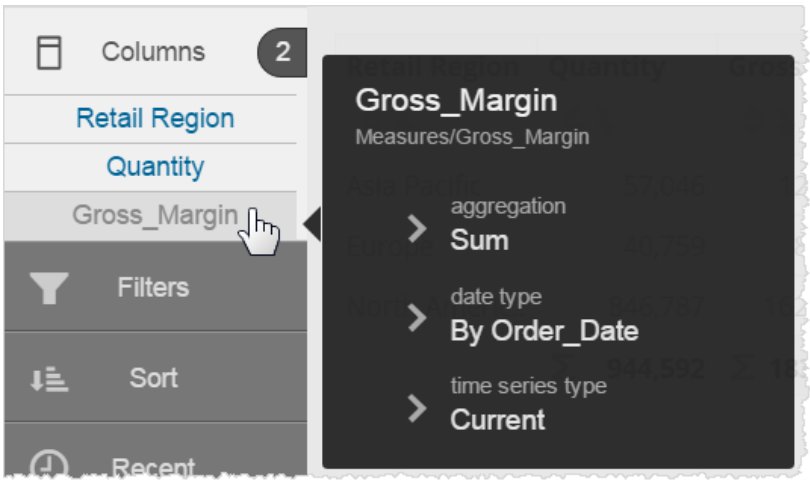
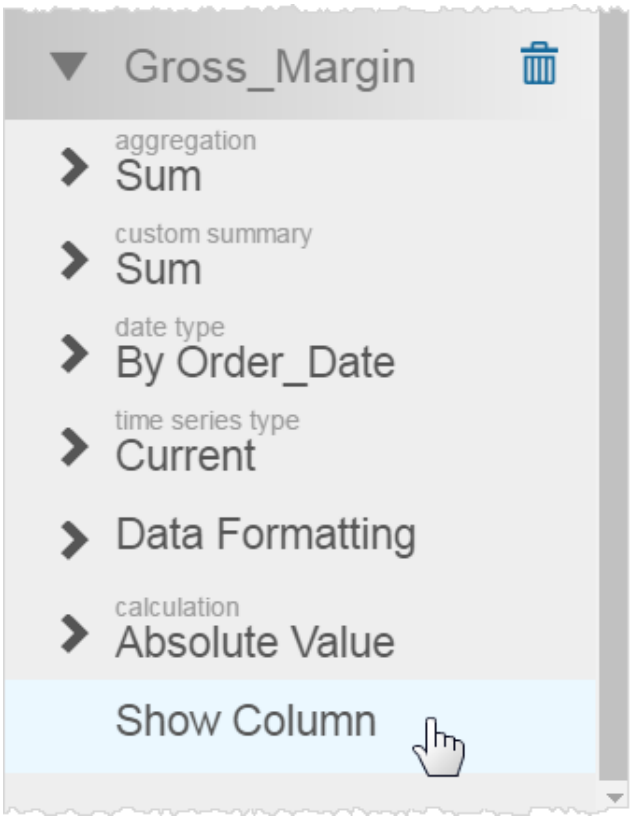


To show it again, click its grayed-out name in the Chart Builder. Then in the left panel, at the bottom, click Show Column.



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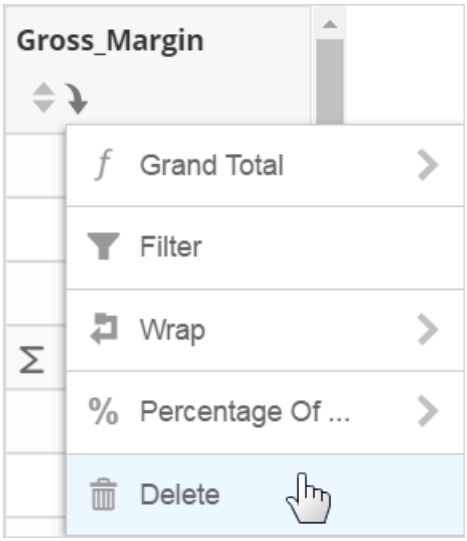
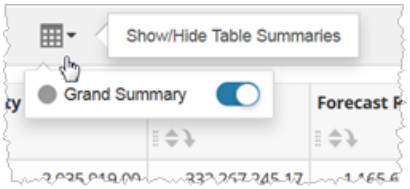
To delete a column

To delete a column click the icon in the column header.

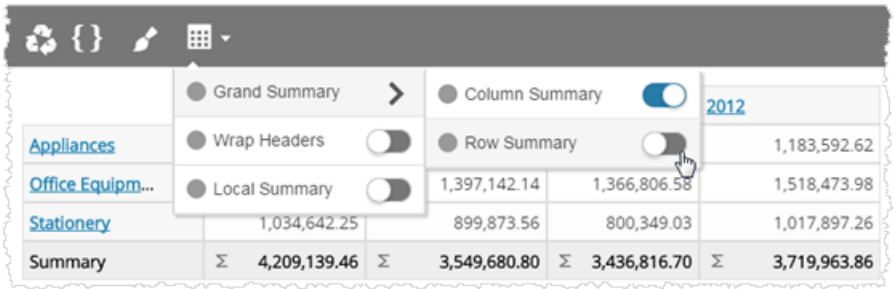


To format table summaries

1. By default Visualizer adds a Grand Summary at the bottom of measure columns. To toggle this option, click Show/Hide Table Summaries.



For crosstab reports you can control the visibility of row and grand summaries.



2. To change the default auto-summary for a measure column click the icon in the column header and select a Grand Total option.

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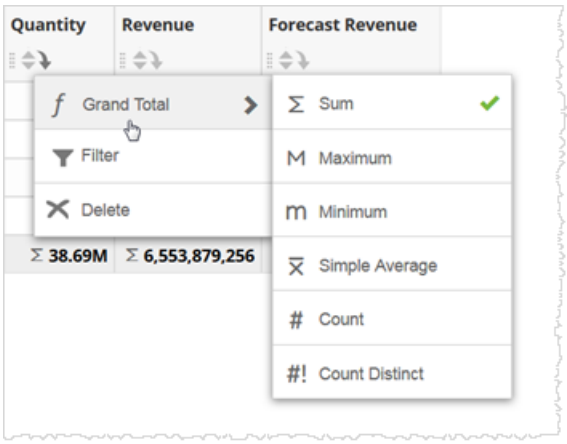

Tip: To change the label of an auto-summary row click Table Formatting .

To change general table formatting

Important: Many of these options are not available for crosstab reports, even though they appear in the options.

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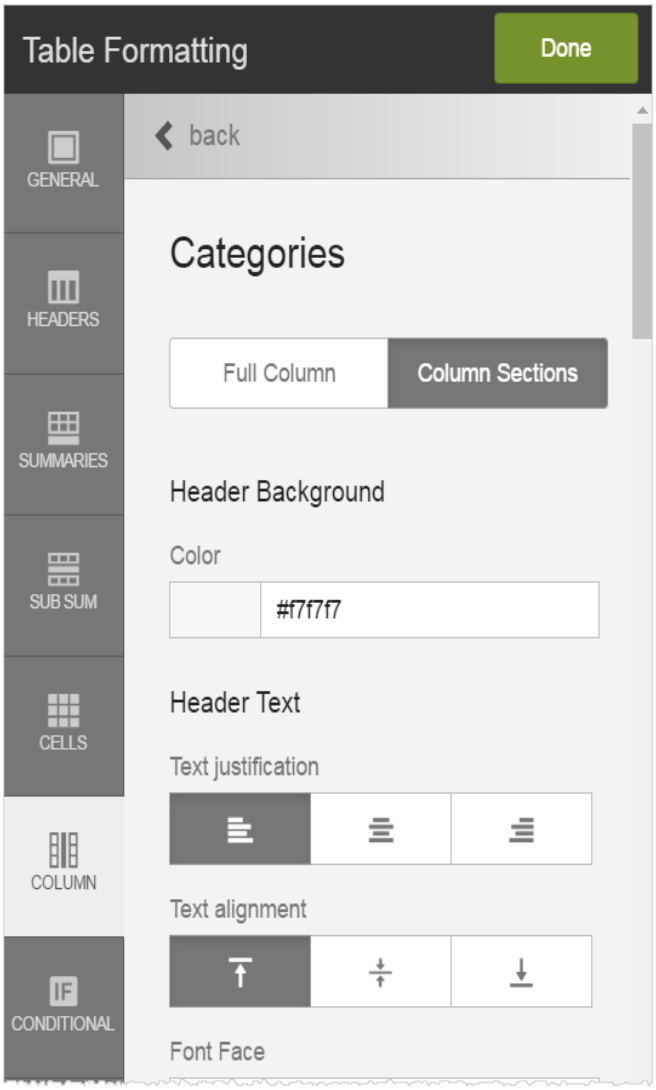
1. To change the table formatting click edit Table Formatting . The Table Formatting panel opens.



- As you select options, Visualizer previews the changes. Options include:
- Border on/off toggle, color and size
- Alternating rows on/off toggle, row colors
- Header background color
- Header text font, color, background color, size, style
- Summary background color

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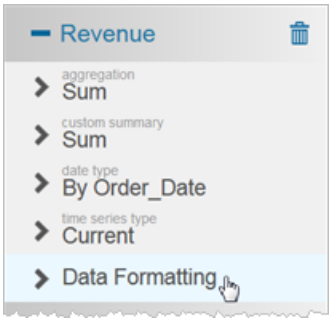
- Summary text font, color, background color, size, style
- Sub Summary background color
- Sub Summary text font, color, background color, size, style
- Cell text font, color, background color, size, style
- Per-column formatting, either the whole column or sections (header, summary, sub summary, cells)
- Conditional formatting, see Conditional Formatting for Tables and Crosstabs.

2. When you like the formatting click Done.
3. To specify the number of decimal places or add a currency symbol for a measure, click the measure in Columns and select the Data Formatting option. See Formatting Data in a Visualizer Table.



4. Click Save .

Formatting Data in a Visualizer Table

Visualizer provides formatting options for data displayed in visualizations. You can format:

- Suffixes that represent magnitude, such as M for millions, to display in tooltips.
- Currency symbols for measure values to display in tooltips and axis labels.
- The number of decimal places to display in tooltips.

You can format currency symbols and decimal places for any measures, including:

- Measure type expressions created in Visualizer.
- Saved expressions created in Designer and listed as Other Expressions in the Subject Area.

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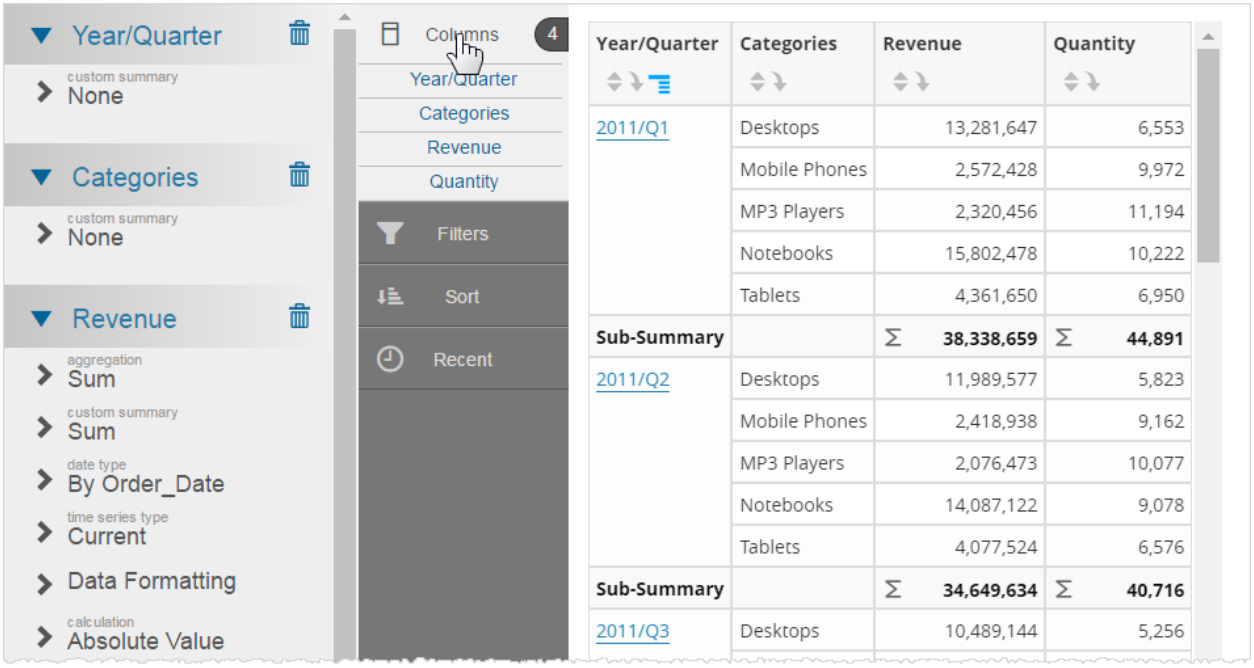
- Custom measures created in the Admin module.

For other table formatting options, such as the default Grand Total for measures, see Creating a Table in Visualizer.

Tip: Currency and date formatting also depends on the user's language locale setting. In the Help see Changing the Language.

To format the measure values in a Visualizer table

1. Create a table in Visualizer
2. Click Columns in Chart Builder. An options menu for each column displays.



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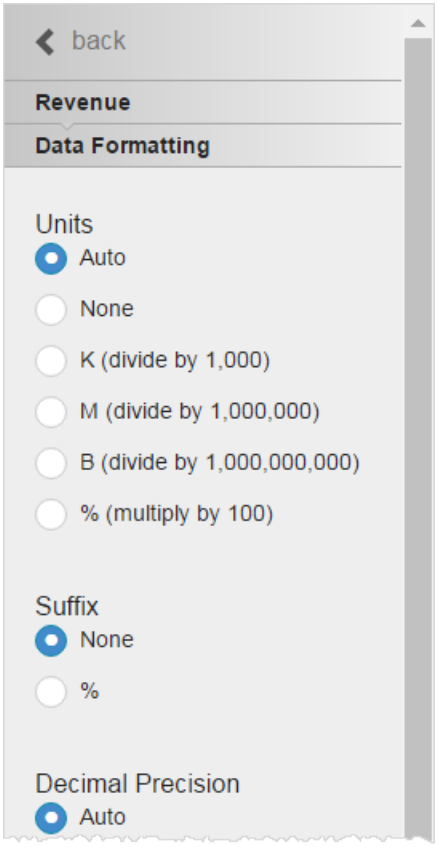
3. Click Data Formatting for the column you want to change. Chart Builder displays the options with the defaults highlighted.



4. Select the suffix to format numbers. Options include:

   - Auto default - commas (13,281,647)
   - None - no commas (13281647)
   - K - divide by 1,000 (13,281.65K)
   - M - divide by 1,000,000 (13.28M)
   - B - divide by 1,000,000,000 (0.01B)
   - % - multiply by 100 (1,328,164,700%)

When you select an option, Visualizer immediately updates the table.

5. Select the decimal precision. Options include:

   - Auto default
   - All (695.5091224)
   - 0 Decimal (695)

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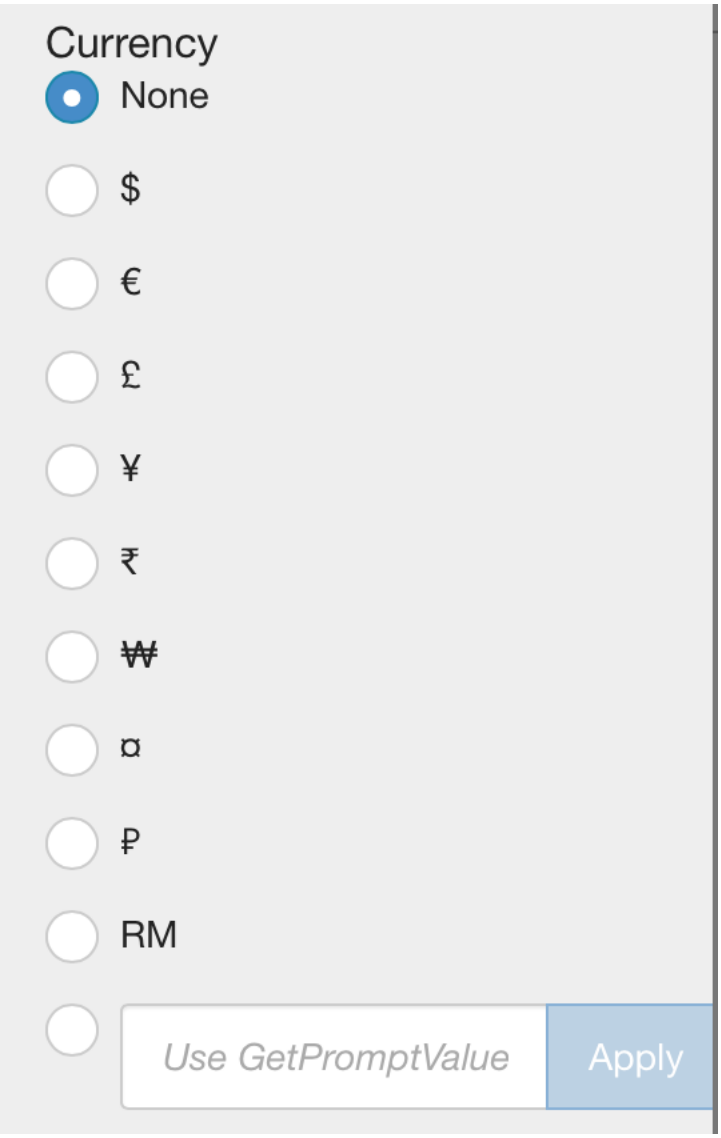
- 1 Decimal (695.5)
- 2 Decimals (695.50)
- 3 Decimals (695.509)

Chart Builder applies the decimal precision to the column.

6. Select a currency symbol. This is for display only, it does not change the data.



Tips:

- The default value is None.
- Dynamic currency symbols using GetVariable is not supported in the Pro version.

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- Visualizer supports dynamic currency symbols. You can define a variable and use it as the currency format by entering the `GetVariable('variable_name')` syntax. See Using Variables.

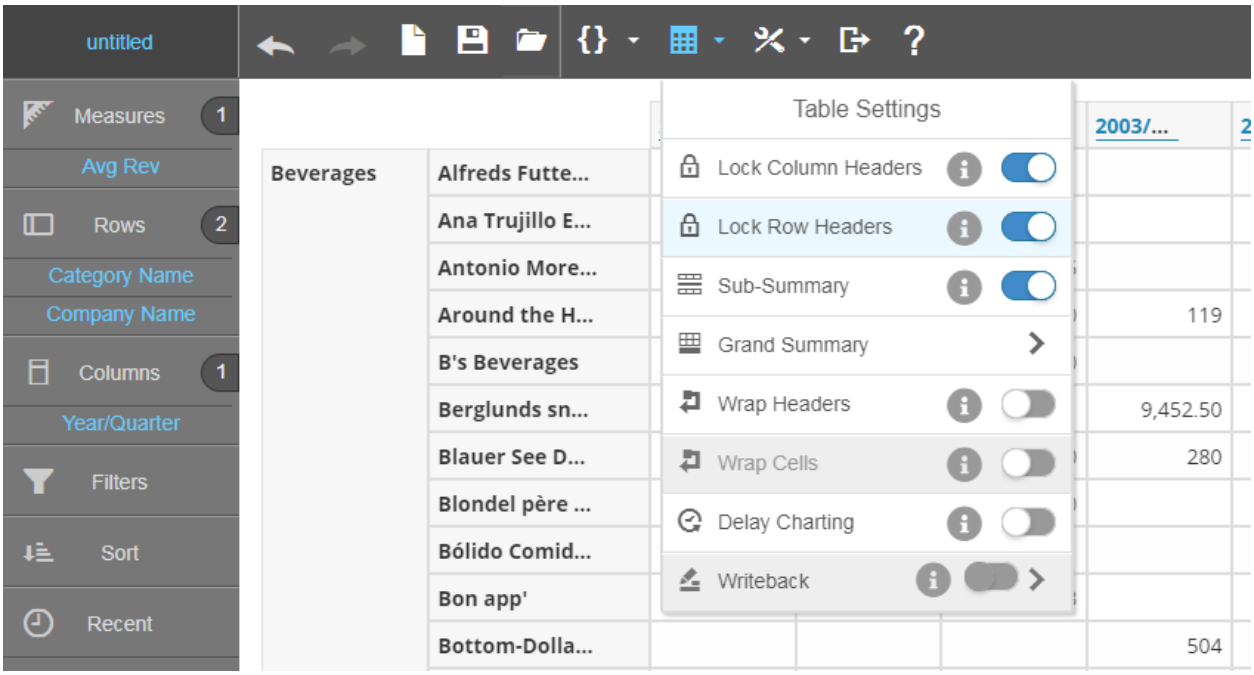
7. Apply data formatting to other columns.
8. Click Save .

Creating a Crosstab Report in Visualizer

A crosstab report is a table made of multiple measures, attributes, and summaries. A crosstab can be thought of as a concatenation of related simpler tables, and is sometimes called a pivot table. When you provide a Visualizer crosstab report on a dashboard, users can sort on rows, columns, or summaries to see details.

The basics of creating and formatting a crosstab report are the same as that of a table. See Creating a Table in Visualizer.

Tip: You can now lock cross tab column and row headers using the Chart Settings feature Lock Column Headers and Lock Row Headers. This is the default behavior.



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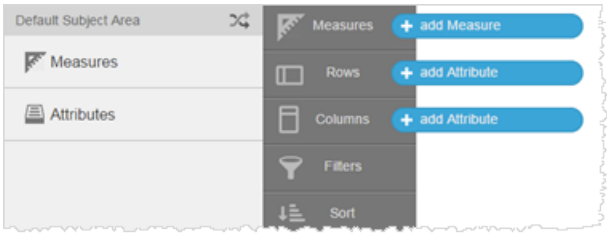
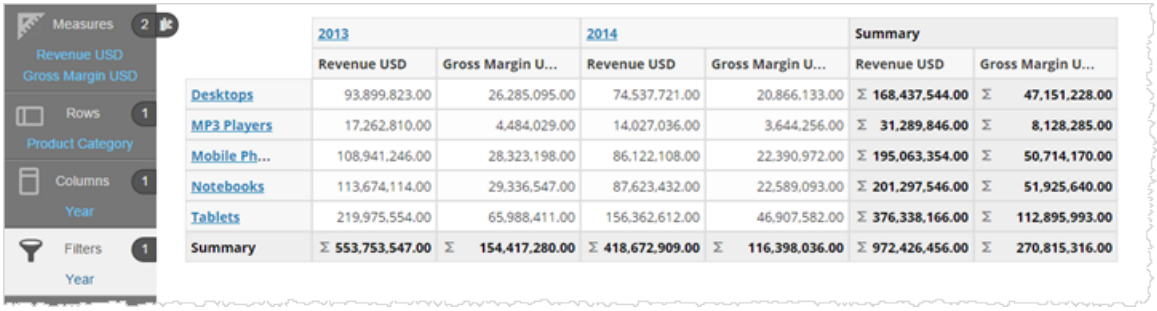
To create a crosstab report

1. From Guided Mode select crosstab. The Chart Builder prompts you to select the minimum two attributes and one measure required for the report.

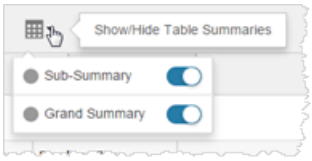


2. Add measures and attributes to the table from the Subject Area. For example, Revenue and Gross Margin per Product Category by Year.



	2013		2014		Summary	
	Revenue USD	Gross Margin U...	Revenue USD	Gross Margin U...	Revenue USD	Gross Margin U...
Desktops	93,899,823.00	26,285,095.00	74,537,721.00	20,866,133.00	Σ 168,437,544.00	Σ 47,151,228.00
MP3 Players	17,262,810.00	4,484,029.00	14,027,036.00	3,644,256.00	Σ 31,289,846.00	Σ 8,128,285.00
Mobile Ph...	108,941,246.00	28,323,198.00	86,122,108.00	22,390,972.00	Σ 195,063,354.00	Σ 50,714,170.00
Notebooks	113,674,114.00	29,336,547.00	87,623,432.00	22,589,093.00	Σ 201,297,546.00	Σ 51,925,640.00
Tablets	219,975,554.00	65,988,411.00	156,362,612.00	46,907,582.00	Σ 376,338,166.00	Σ 112,895,993.00
Summary	Σ 553,753,547.00	Σ 154,417,280.00	Σ 418,672,909.00	Σ 116,398,036.00	Σ 972,426,456.00	Σ 270,815,316.00

Like it does for tables, Visualizer automatically adds summary and grand summary data. Click the table icon to toggle the summaries.



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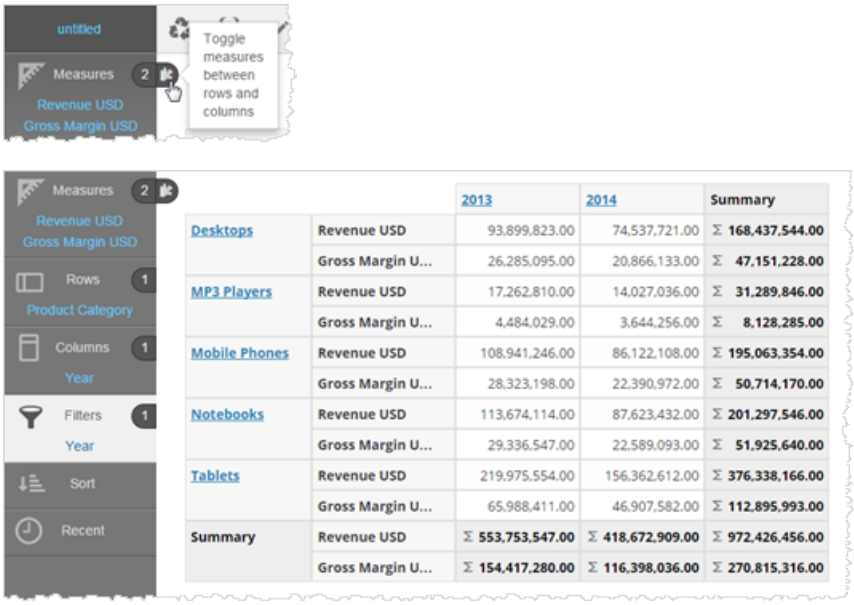
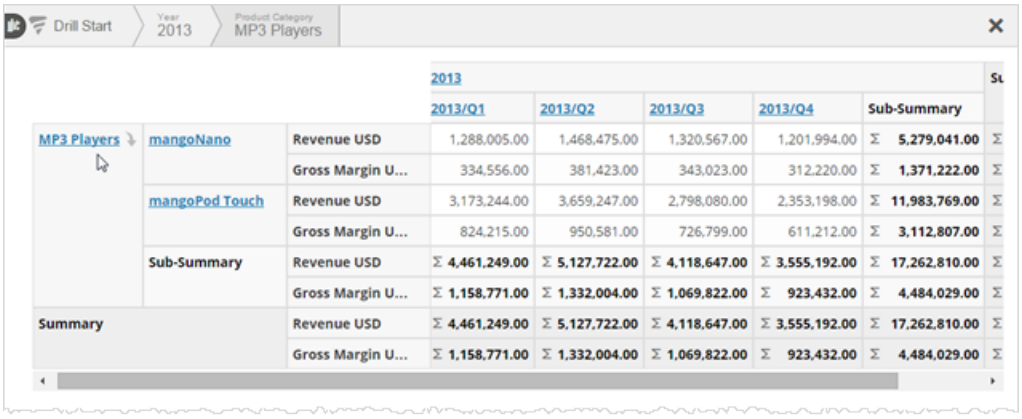
3. You can toggle measures between columns and rows.



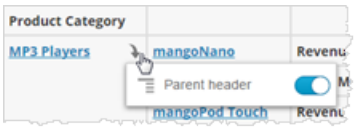
		2013	2014	Summary
Desktops	Revenue USD	93,899,823.00	74,537,721.00	Σ 168,437,544.00
	Gross Margin U...	26,285,095.00	20,866,133.00	Σ 47,151,228.00
MP3 Players	Revenue USD	17,262,810.00	14,027,036.00	Σ 31,289,846.00
	Gross Margin U...	4,484,029.00	3,644,256.00	Σ 8,128,285.00
Mobile Phones	Revenue USD	108,941,246.00	86,122,108.00	Σ 195,063,354.00
	Gross Margin U...	28,323,198.00	22,390,972.00	Σ 50,714,170.00
Notebooks	Revenue USD	113,674,114.00	87,623,432.00	Σ 201,297,546.00
	Gross Margin U...	29,336,547.00	22,589,093.00	Σ 51,925,640.00
Tablets	Revenue USD	219,975,554.00	156,362,612.00	Σ 376,338,166.00
	Gross Margin U...	65,988,411.00	46,907,582.00	Σ 112,895,993.00
Summary	Revenue USD	Σ 553,753,547.00	Σ 418,672,909.00	Σ 972,426,456.00
	Gross Margin U...	Σ 154,417,280.00	Σ 116,398,036.00	Σ 270,815,316.00

4. You can click the hyperlinked attributes to drill down and use the drill breadcrumbs to drill back.



			2013				Su
			2013/Q1	2013/Q2	2013/Q3	2013/Q4	Sub-Summary
MP3 Players	mangoNano	Revenue USD	1,288,005.00	1,468,475.00	1,320,567.00	1,201,994.00	Σ 5,279,041.00
		Gross Margin U...	334,556.00	381,423.00	343,023.00	312,220.00	Σ 1,371,222.00
	mangoPod Touch	Revenue USD	3,173,244.00	3,659,247.00	2,798,080.00	2,353,198.00	Σ 11,983,769.00
		Gross Margin U...	824,215.00	950,581.00	726,799.00	611,212.00	Σ 3,112,807.00
	Sub-Summary	Revenue USD	Σ 4,461,249.00	Σ 5,127,722.00	Σ 4,118,647.00	Σ 3,555,192.00	Σ 17,262,810.00
		Gross Margin U...	Σ 1,158,771.00	Σ 1,332,004.00	Σ 1,069,822.00	Σ 923,432.00	Σ 4,484,029.00
Summary		Revenue USD	Σ 4,461,249.00	Σ 5,127,722.00	Σ 4,118,647.00	Σ 3,555,192.00	Σ 17,262,810.00
		Gross Margin U...	Σ 1,158,771.00	Σ 1,332,004.00	Σ 1,069,822.00	Σ 923,432.00	Σ 4,484,029.00

5. Click the downward arrow on an attribute to toggle whether the column title appears.



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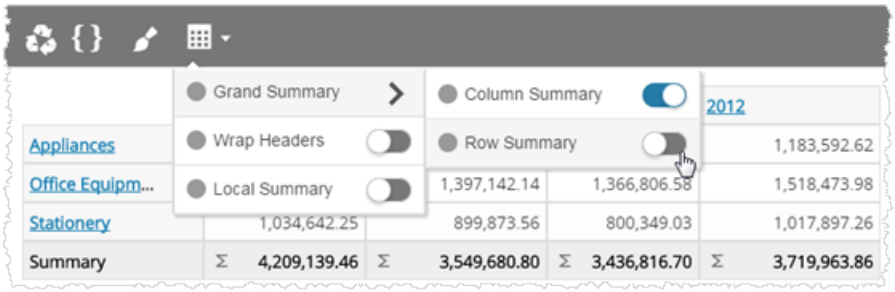
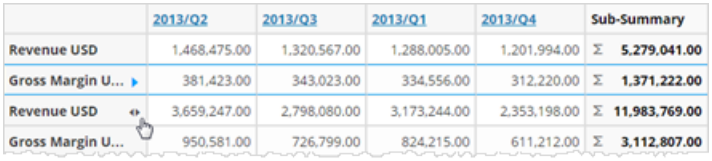
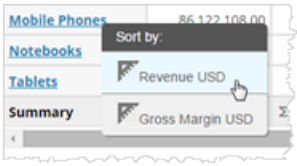
For larger crosstab reports you can control the visibility of row and grand summaries.



6. Click the sort icons to sort rows and columns by ascending or descending order.

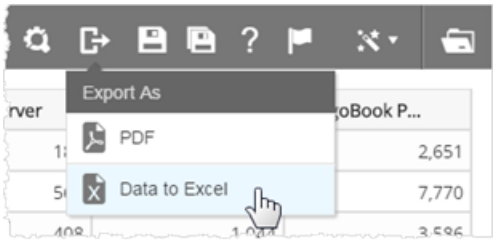


You can also sort an attribute by a measure. When there are multiple measures Visualizer prompts you to pick one.



7. Click Save .

Tip: You can export a crosstab report to PDF or Excel.



8. Use the crosstab report on a dashboard. See Adding a Visualizer Report to a Dashboard.

Like you, end users of the Visualizer crosstab report can also:

- Drill
- Sort
- Toggle headers

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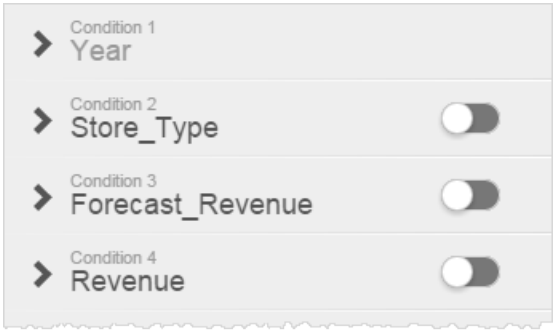
Conditional Formatting for Tables and Crosstabs

You can format tables and crosstabs based on conditional (IF) statements. The IF condition is based on the value of the column data.

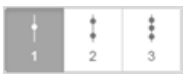
To format tables and crosstabs based on conditions

1. Click in a column of a table.
2. Click Table Formatting.

3. In the Table Formatting panel, click IF conditional.

   The Conditional Formatting menu opens. Visualizer lists the columns you can format.
   

   You can toggle formatting on or off, after you define the formatting, using the toggle button.

4. To define the formatting click one of the conditions. Visualizer shows the basic formatting options for the type of data in the column.
   Tip: If basic formatting options don't apply to the data, Visualizer shows the advanced formatting options, where you can enter an expression. See Step 6.
5. In basic formatting, you can format the data using one, two, or three intervals. The default is one.
   

   You can add an icon and change the color of the data in the cell. For example, Quantity over a

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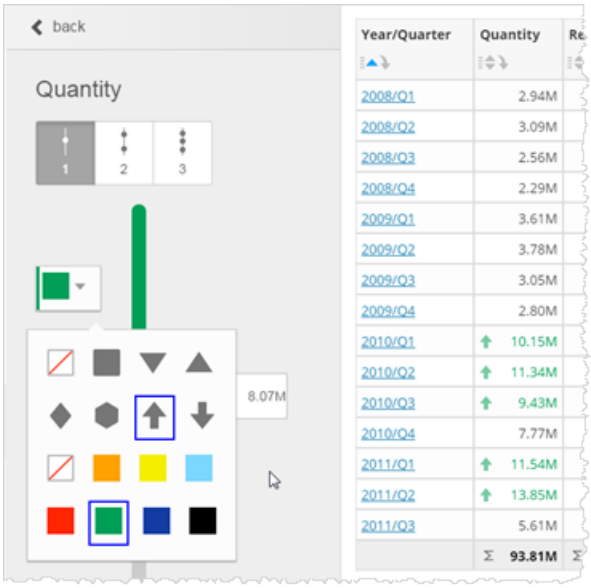
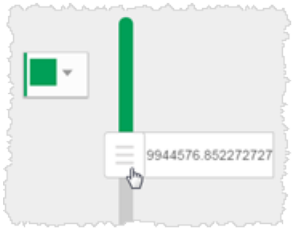
specified amount can show an Up arrow and be rendered in green.



Use the slider to set the conditional threshold.



You can also format the values below the threshold. For example, specify a color and icon for lower values.

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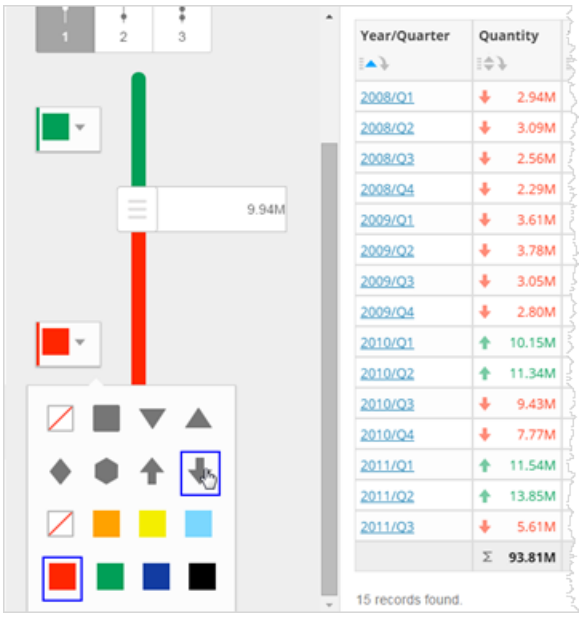
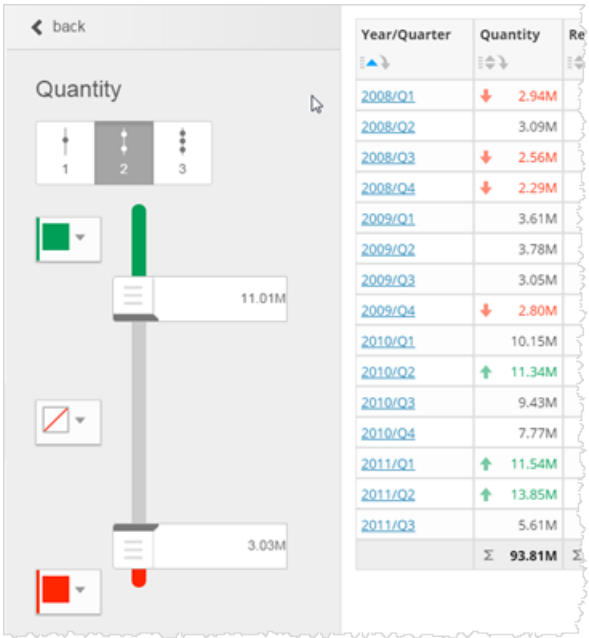


This technique formats every cell.

To add additional formatting or leave some cells plain, click the Interval icon for two or three intervals.

For example, to add a formatting to only the top and bottom ranges, select 2 intervals and format them.



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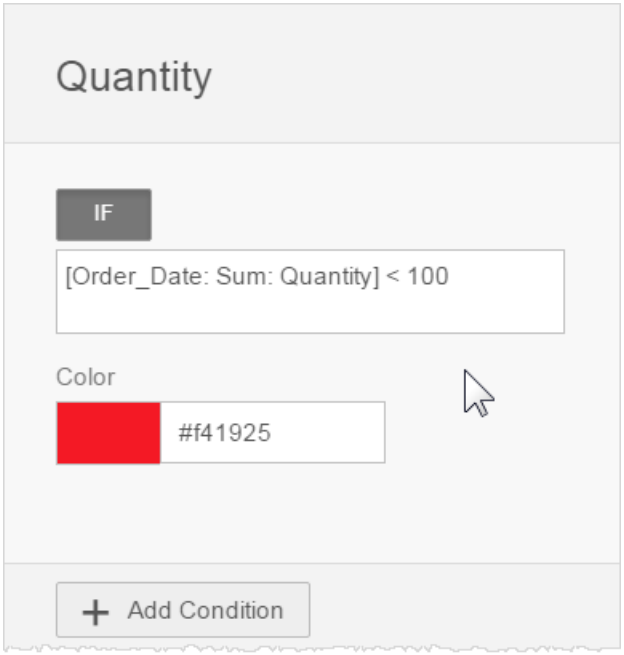
6. Optionally, use Advanced formatting and enter an expression or multiple expressions. Assign each expression a color and/or an indicator icon, and click Apply.



Tip: For help with expressions, see Supported Functions and Operators in Visualizer Expressions.

7. When you are finished defining conditional formatting, click Done.

Working With Geomap Reports

Visualizer provides the geomap report type that uses maps to display data. In addition to the pre-configured maps, Visualizer supports custom maps in KML format.

- Creating Geomap Reports
- Using Custom Geomaps
- Using Latitude and Longitude in Geomaps

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Creating Geomap Reports

Visualizer Geomaps let you display data by geographic regions in a map format, for example Sales by State or Region.

Important: Users working with the Visualizer Geomap feature should be aware of limitations in the number of data points that can be plotted using this type of visualization. Geomaps were built with use cases in mind where highly aggregated data is displayed using these maps. Geomaps perform best when the number of data points does not exceed 500 data points. Individual results can also be affected by the resources of the computer where the client is running. We suggest that when using Geomaps, you first start with a small number of data points and increase the number of data points incrementally. Geomaps display reduced performance, and potentially become unresponsive, when too many data points are being plotted. If users require data points that exceed the capabilities of Visualizer Geomap charts, they should use a third-party tool specifically built for mapping visualization and embed the charts generated from these tools into Birst.

- Create a geomap
- Change the layer type
- Change the colors
- Format the tooltips
- Save a default zoom level
- Overlay measures using layer types
- Multiple attributes and Layers in Geomaps
- Apply conditional formatting to layers

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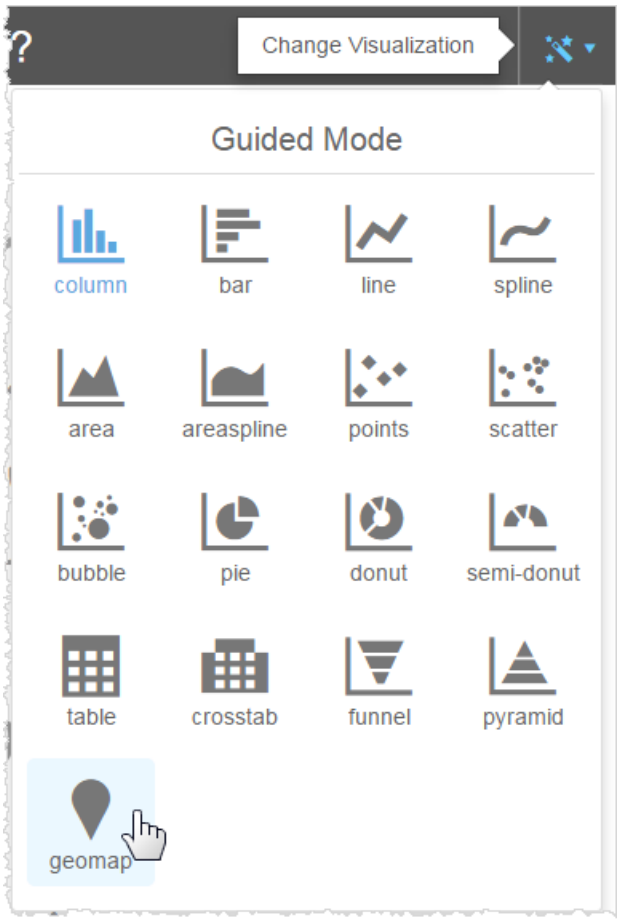
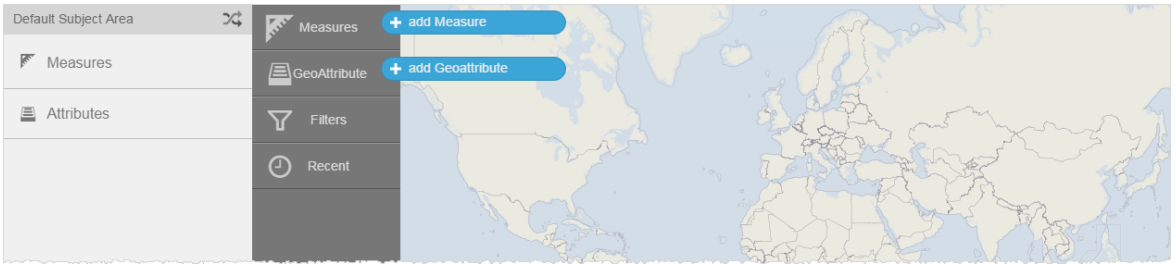
To create a geomap report

1. From the Guided Mode menu select Geomap.



The default map displays and Visualizer prompts you to add a measure and a geoattribute.



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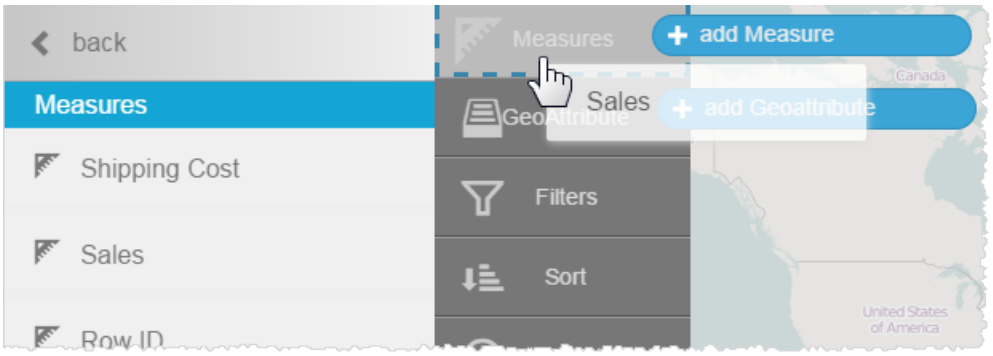
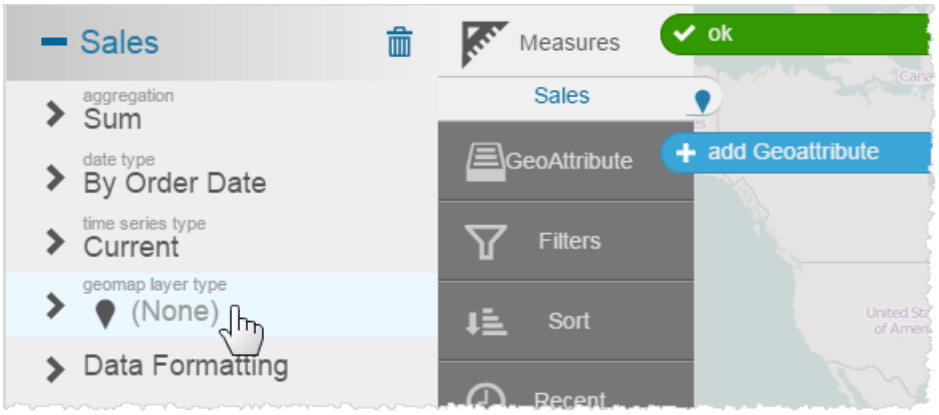
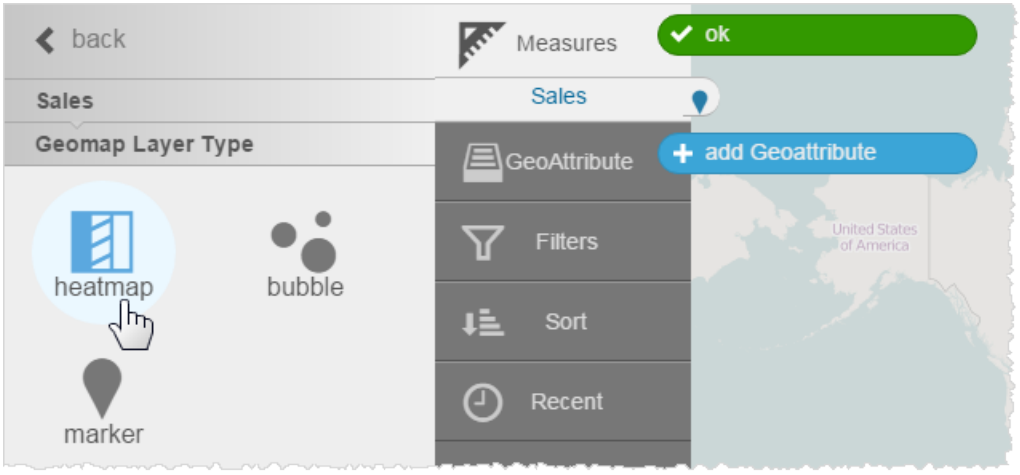
2. Add a measure, for example, Sales.



3. Set the Geomap Layer Type for the Sales measure.



4. Pick a layer type, for example Heatmap.



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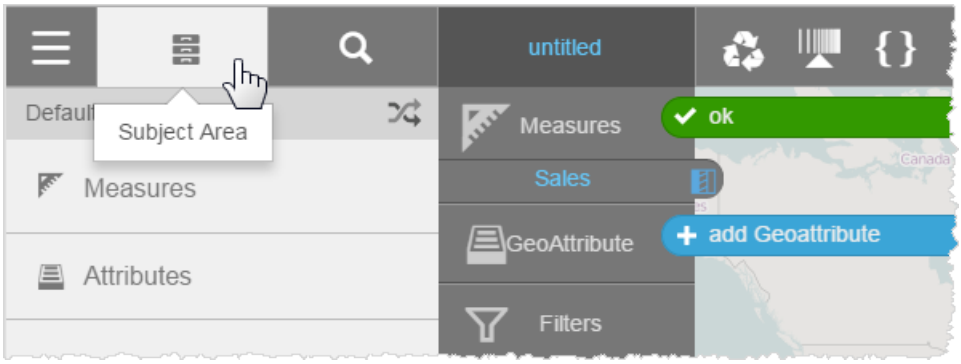
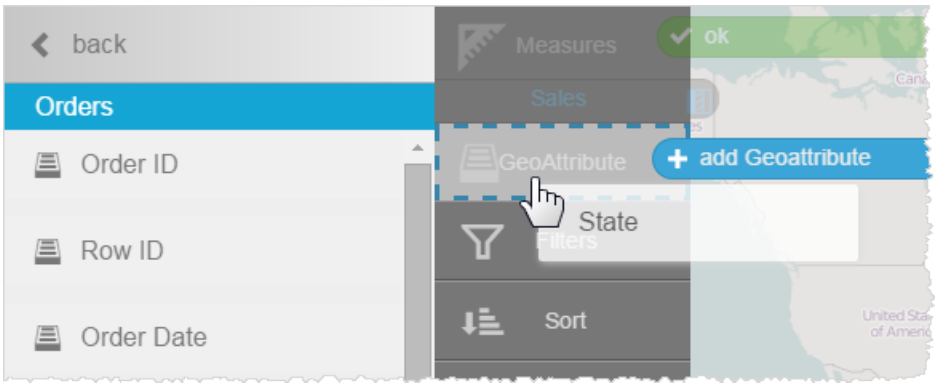
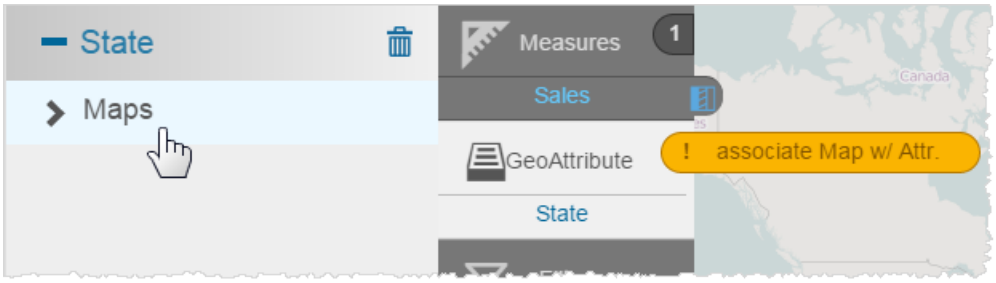
5. Return to the Subject Area. Notice that the Sales measure in the Chart Builder shows the heatmap icon.



6. Add a Geoattribute, for example, Orders.State.



Visualizer prompts you to associate a map with the attribute.



7. Click State.

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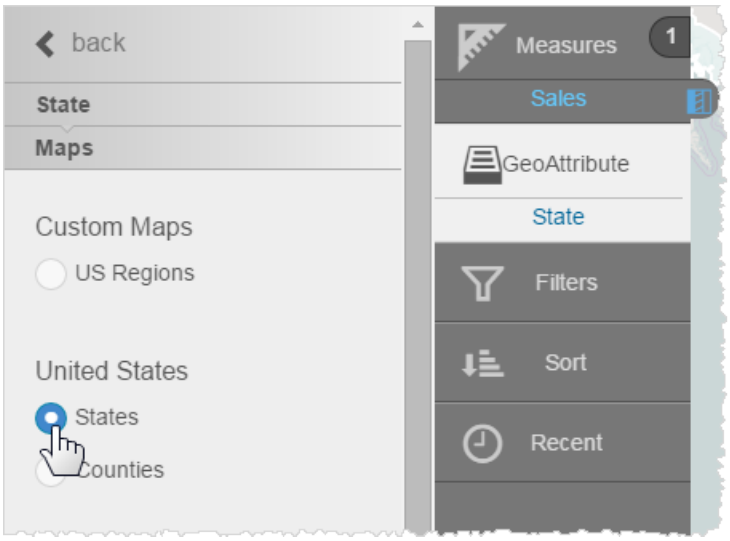
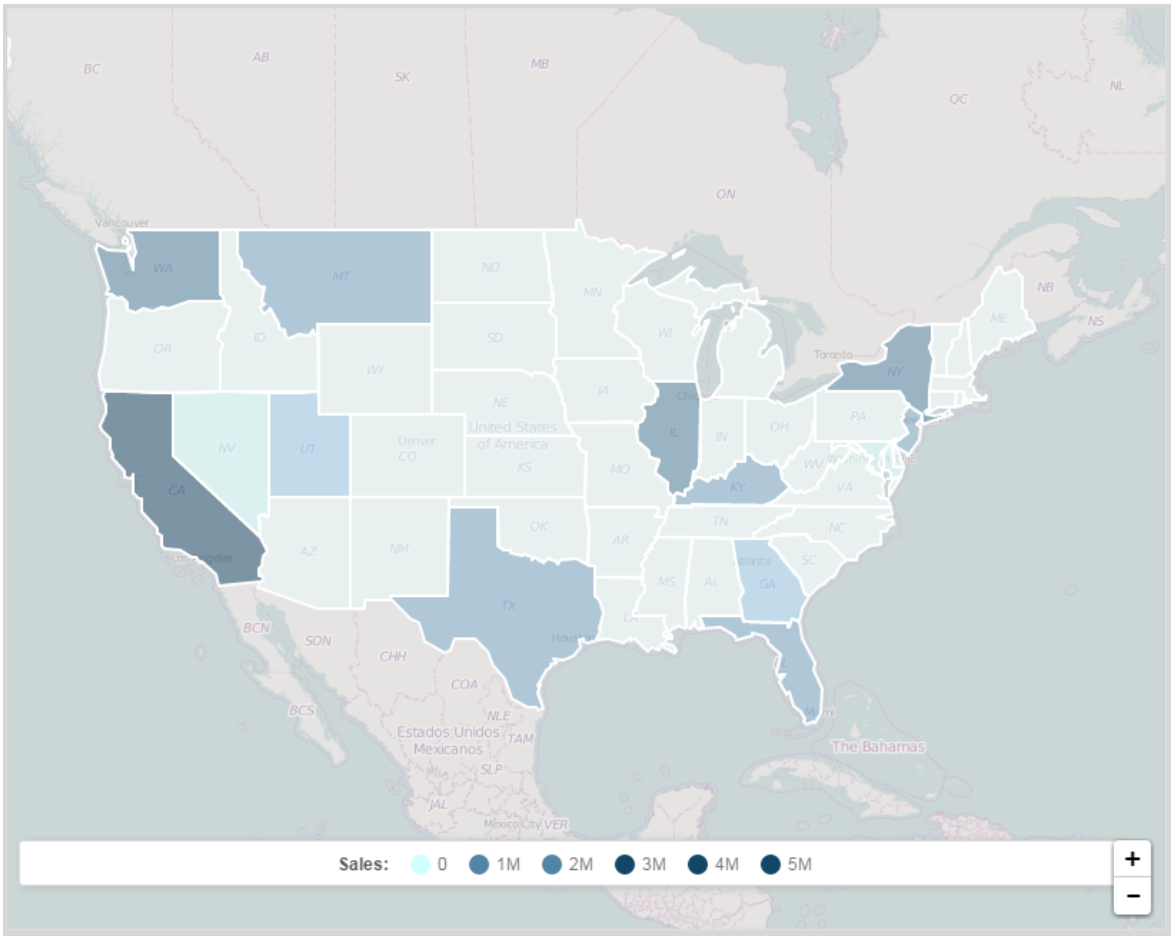
8. Click Maps and select one, for example, United States States.



Visualizer applies the Sales measure and the State attribute data to a heatmap.



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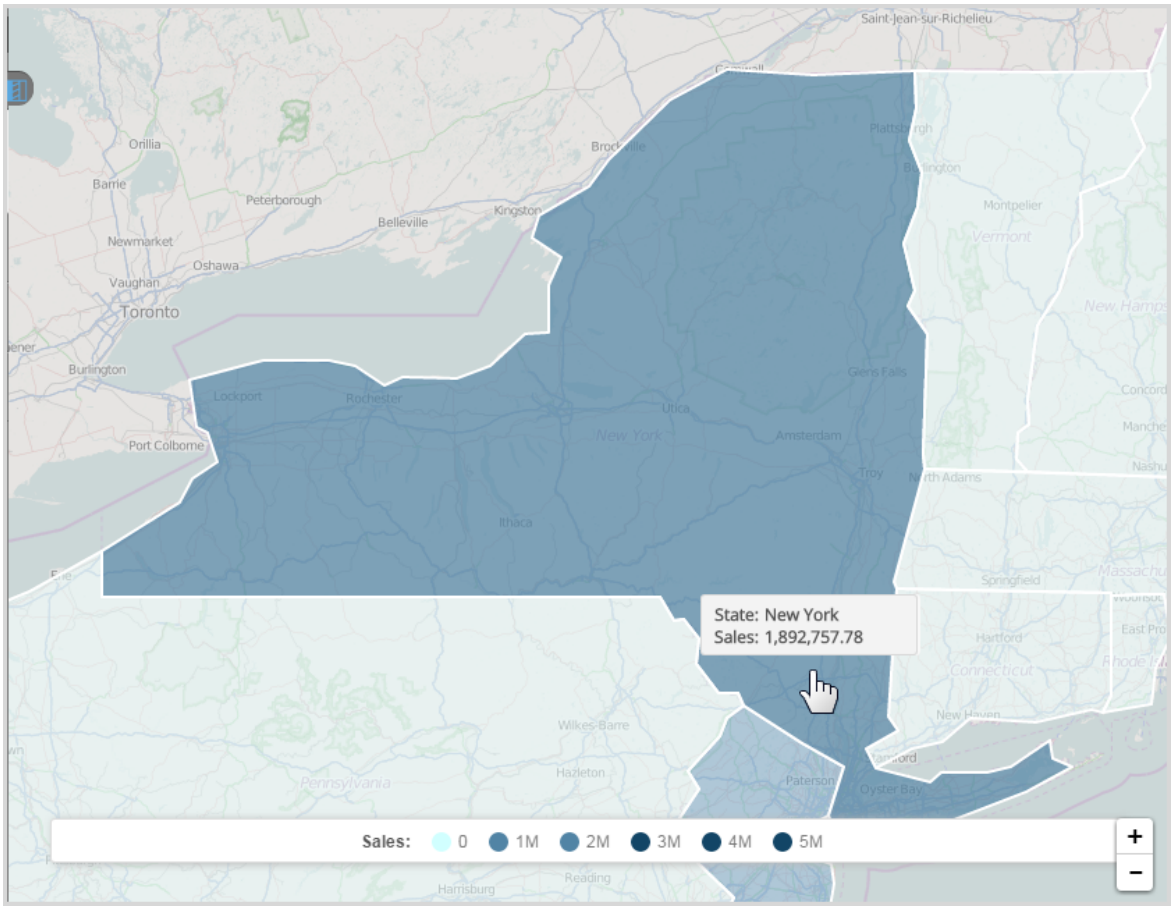
9. Hover over the map to see the data. Click a State to zoom. Use the zoom controls (+ and -) to resize the heatmap.



To change the geomap layer type

1. Click the measure in the Chart Builder column.
2. In its properties click Geomap Layer Type.

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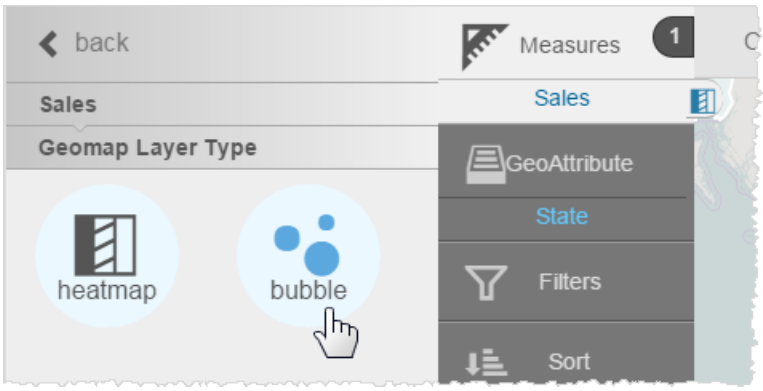
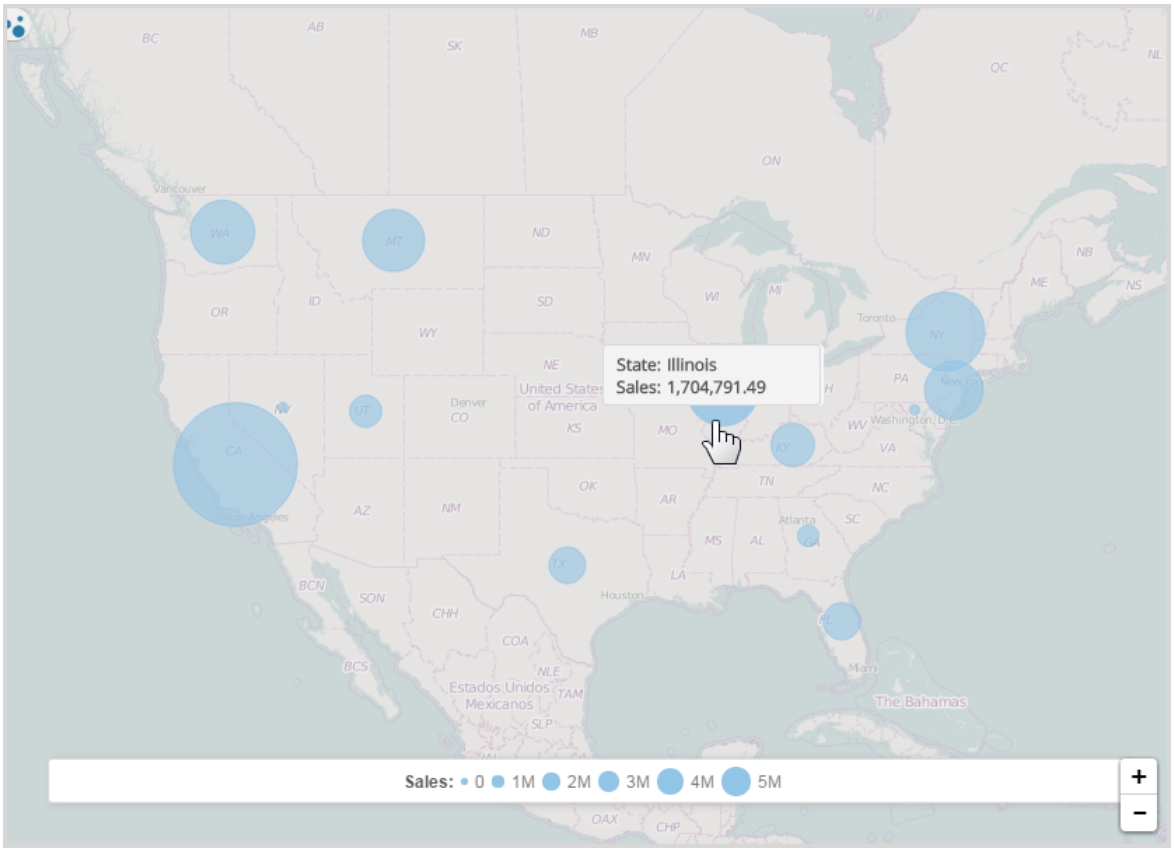
3. Choose another map style, for example Bubble.



Visualizer applies the new bubble type.



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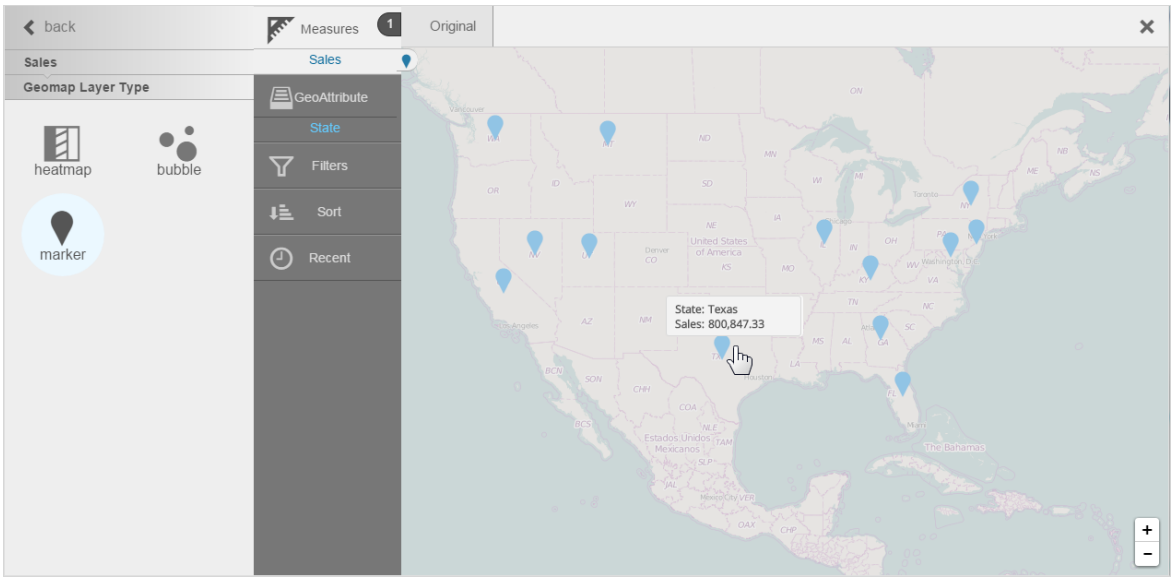
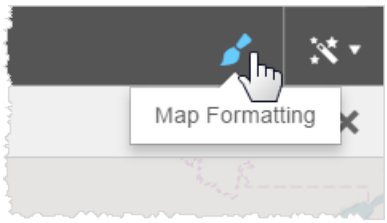
4. You could also use a marker type.

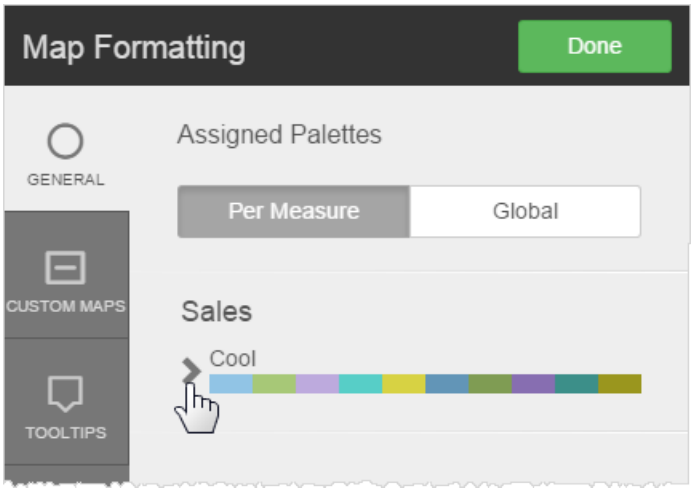


To change the colors of a geomap

1. Click Map Formatting.



2. In the properties click the arrow next to the palette.



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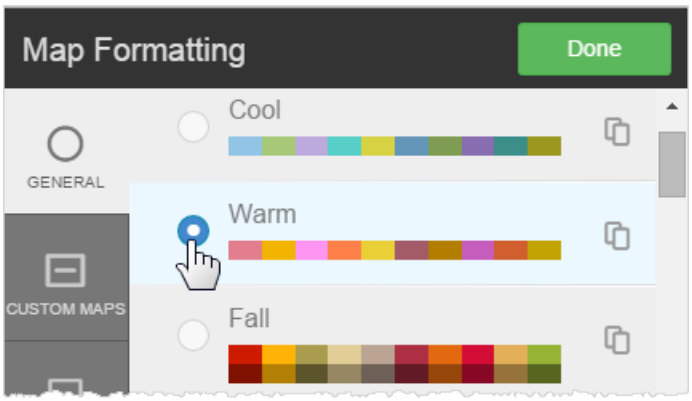
3. Select another palette.



Tip: Create and use a custom palette for your company. In the Help see *Formatting Visualizer Charts*.

4. Click Done.

To format geomap tooltips

You can apply tooltip formatting to geomaps, just like other types of reports.

1. Click Map Formatting.
2. Click Tooltips.
3. You can change:
    - Text formatting
    - Unit formats or percentage
    - Suffix
    - Decimal precision
    - Currency symbol
4. Click Done.

To save a geomap report at a particular zoom level

Visualizer retains the zoom level it is at when you save a geomap report. You can use this feature to set up a default map area, based on a built-in map, and let users zoom in or out from there.

1. Use the zoom control and move the map to the area you want as the default map.

   Zoom:

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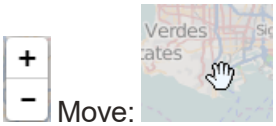
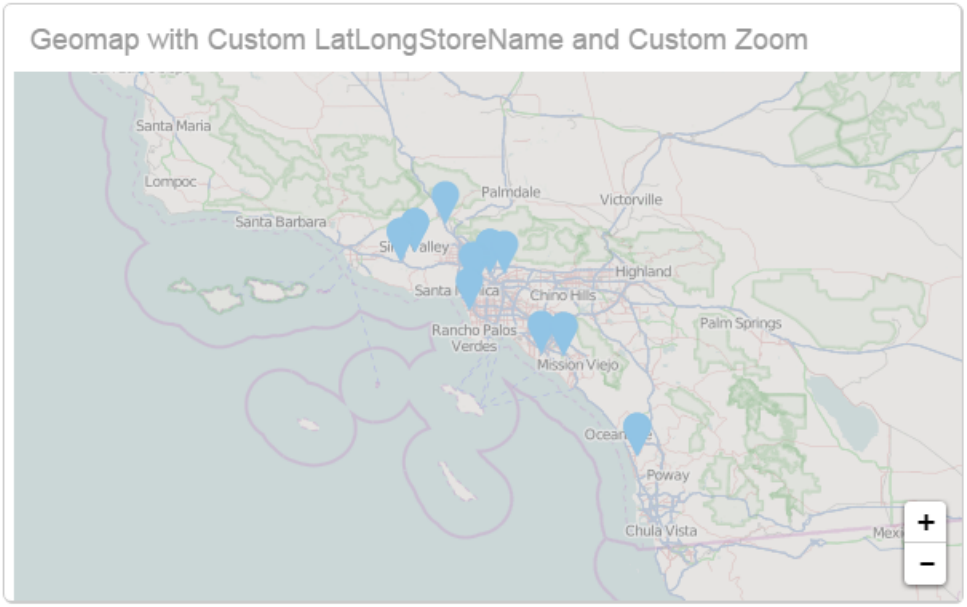
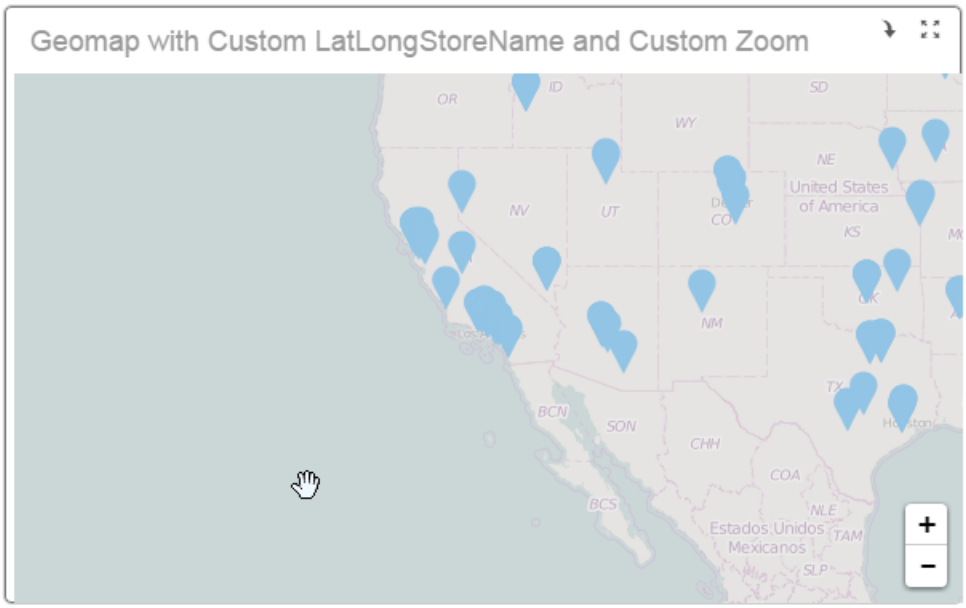


Move:

2. Save the report.

For example, you can save a map of Greater Los Angeles, based on a built-in map. In a dashboard users zoom out to see the West and more.





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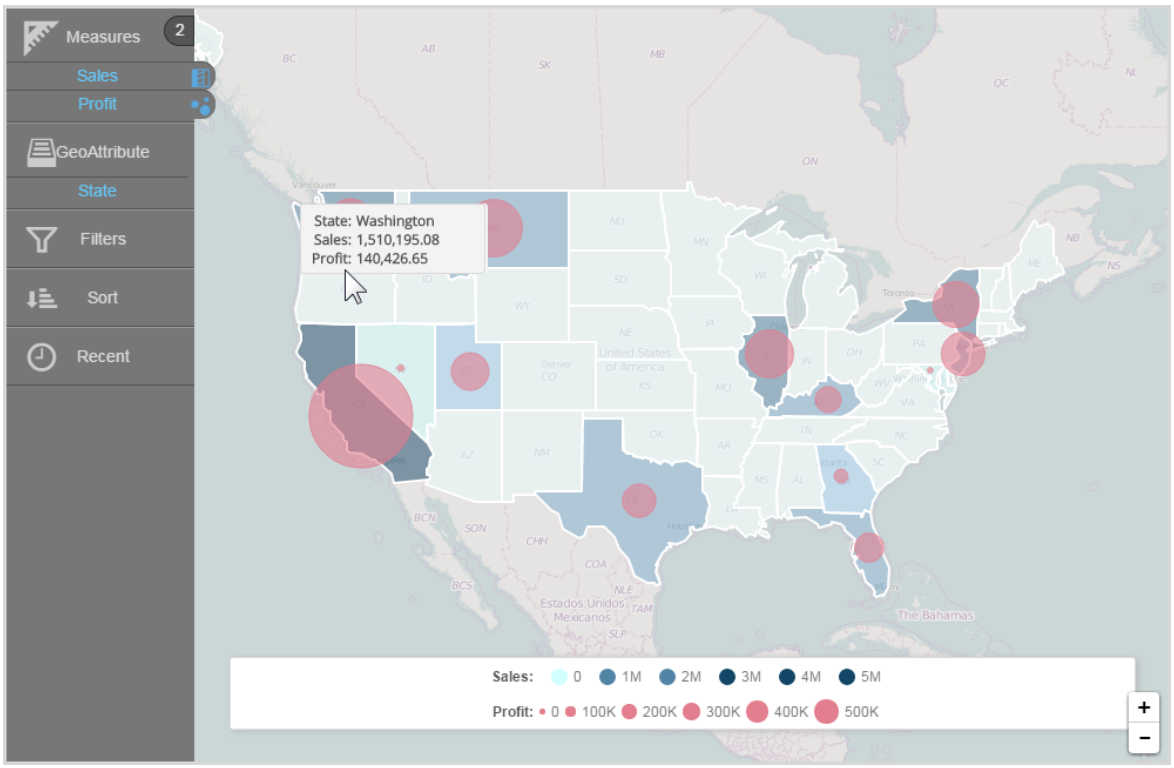
To overlay measures on a geomap

You can display one measure as a heatmap and another measure as a bubble map, and/or another as markers.

1. To an existing map, add a second measure, for example Profit.
2. Select the alternate chart type. Visualizer displays the two measures in two different chart layer styles.



Multiple attributes and Layers in Geomaps

With the 5.27 release, Geomaps can now contain multiple attributes, each associated with a measure and a layer type (bubble or marker).

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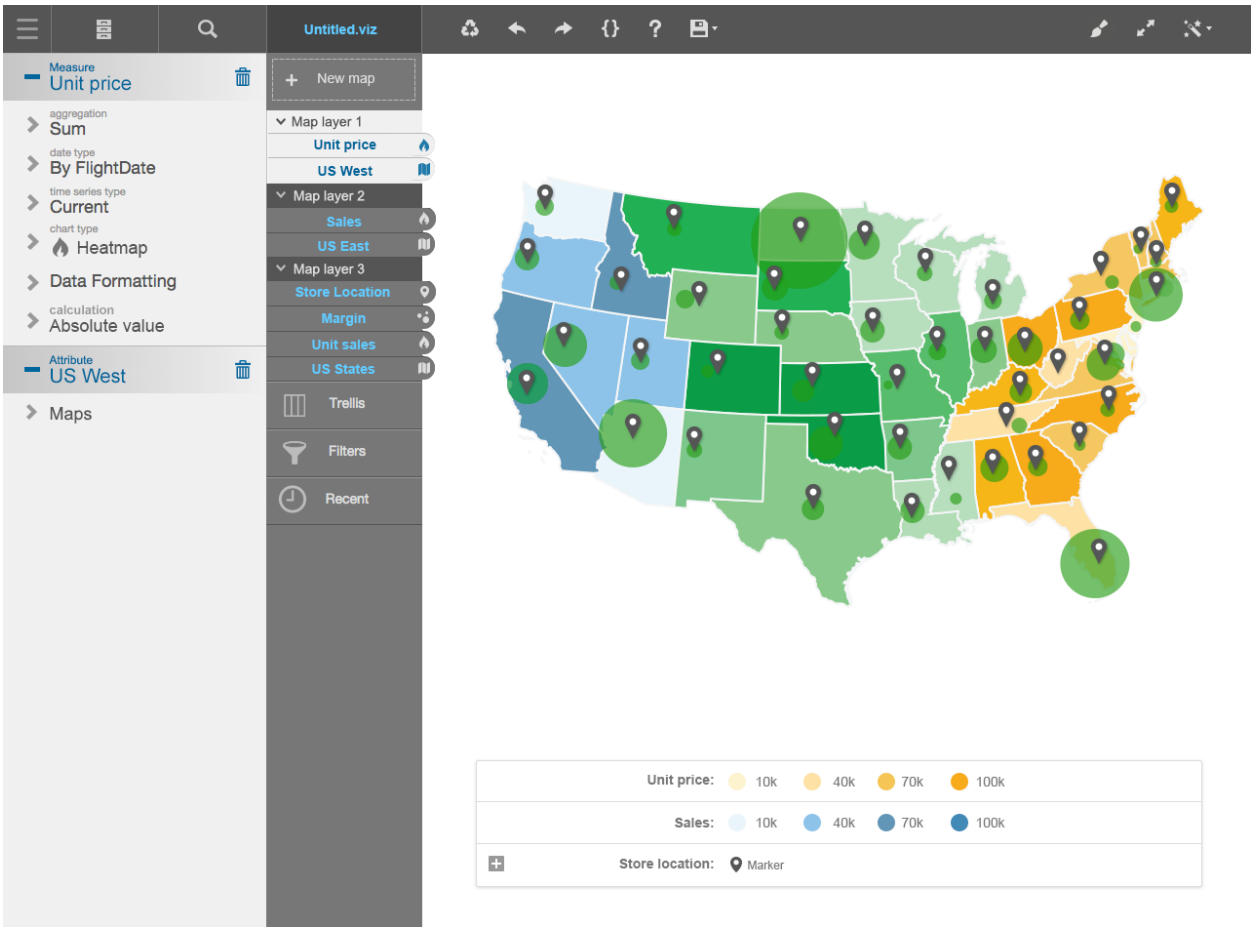

To apply conditional formatting to a measure on a geomap

You can apply conditional formatting to geomaps using BQL and IF/ELSE IF/ELSE syntax and color. This applies to any layer type. The following example uses the heatmap layer type.

1. Click Map Formatting.
2. Click Conditional.
3. Select the measure.
4. Enter the BQL expression for the condition.

   Tip: The BQL expression can be any expression that you like and it does not have to include the measure of the layer.
5. Select the color to apply when the condition is met.

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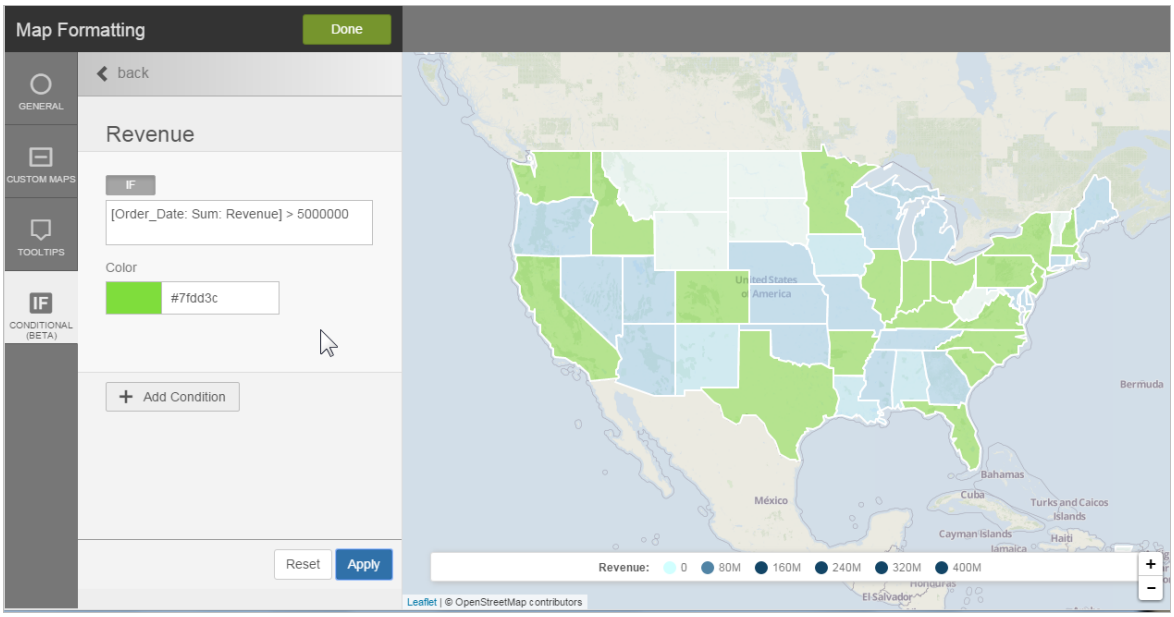
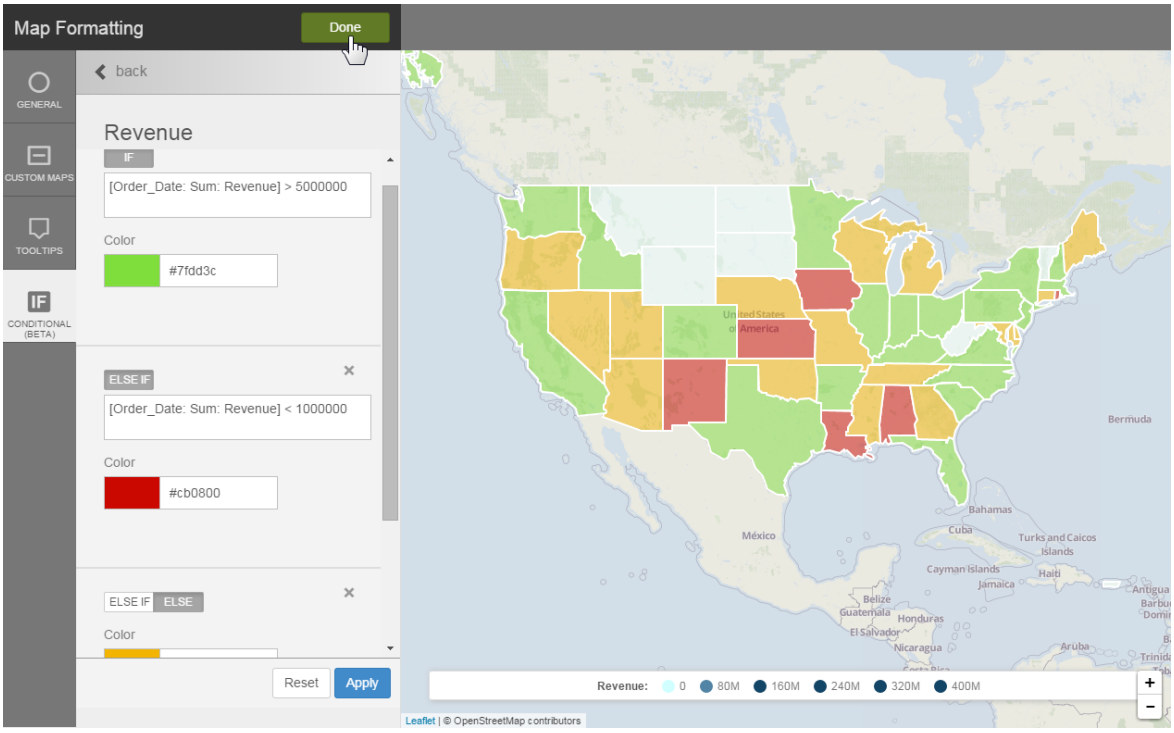
6. Click Apply to preview the geomap conditional formatting.



7. Optionally, add another condition.



8. Click Done.

Tip: Overlay measures and apply conditional formatting to each for a more interesting visualization.

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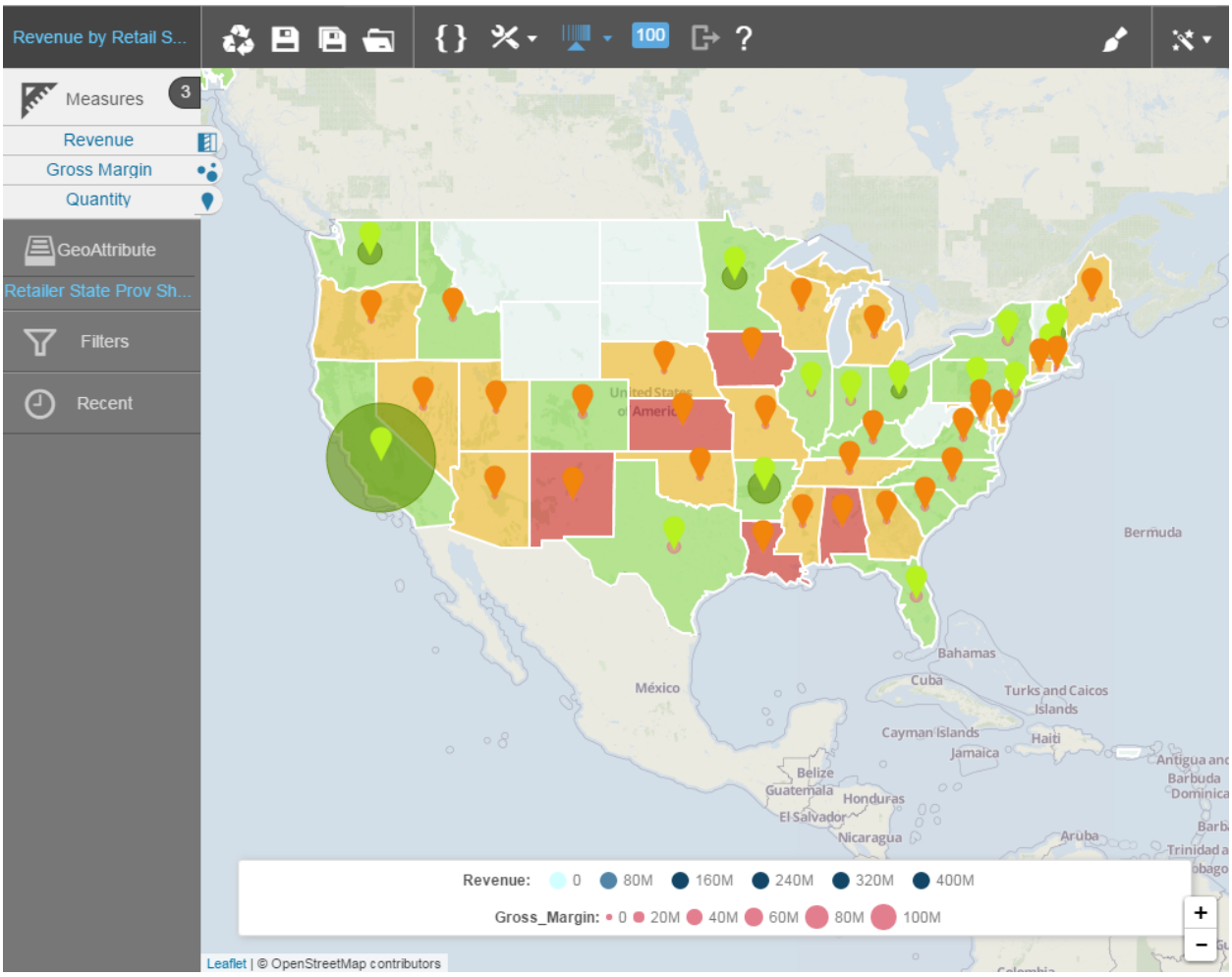
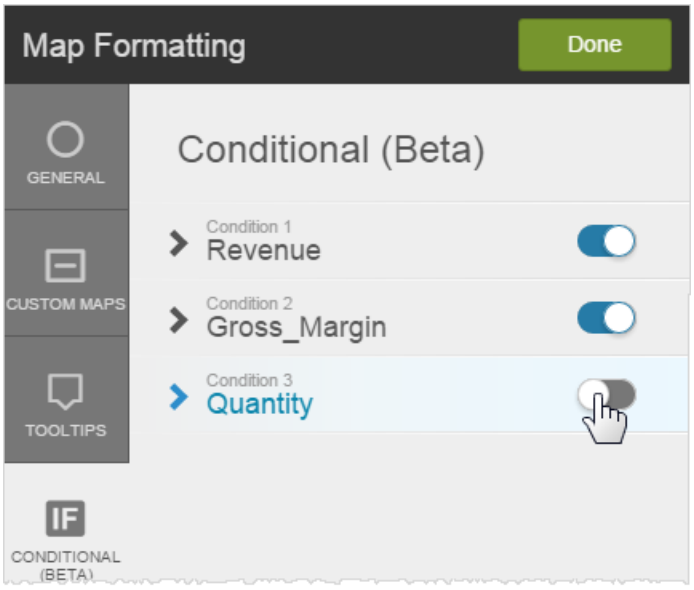


Tip: You can toggle conditional formats on and off in the Map Formatting - Conditional tab.



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Using Custom KML Geomaps

Visualizer supports custom geomaps. For cases where the built-in geomaps do not provide the geography you need, use a custom map. Custom geomaps are supported using the Keyhole Markup Language (KML) format.

- Prerequisites
- To add a custom map
- To apply a custom map to a geomap

Prerequisites

Before creating a geomap with a custom map file:

- Create or obtain a map in KML format that corresponds to the data in the relevant attribute. For example, since there is no standard definition for United States regions, the built-in maps do not support a United States Region attribute, and therefore a custom KML file is needed.
- The KML file size must be 20MB or less.
- Visualizer requires that the KML files have the following structure:

```
<kml>
   <Document>
      <Placemark>
      </Placemark>
      <Placemark>
      </Placemark>
      ...
   </Document>
</kml>
```

OR:

```
<kml>
   <Document>
      <Folder>
         <Placemark>
         </Placemark>
         <Placemark>
```

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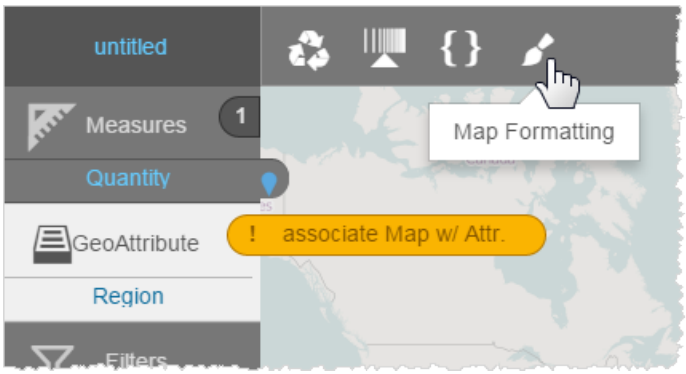
```
            </Placemark>
            ...
        </Document>
        </Folder>
        <Folder>
        </Folder>
        ...
    <Document>
</kml>
```

To add a custom map

1. Create a report of type geomap and add a measure and attribute. For example, Quantity by Region.

   Tip: If there is no map associated with the attribute, Visualizer displays a warning message. This message will go away once you upload the KML file and associate the custom map with the attribute.

2. Click Map Formatting.



3. Click Custom Maps.
4. Click Upload Custom Map.

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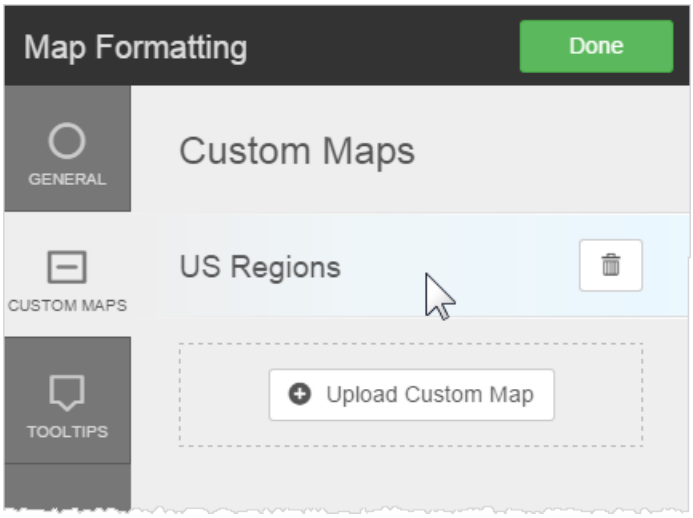
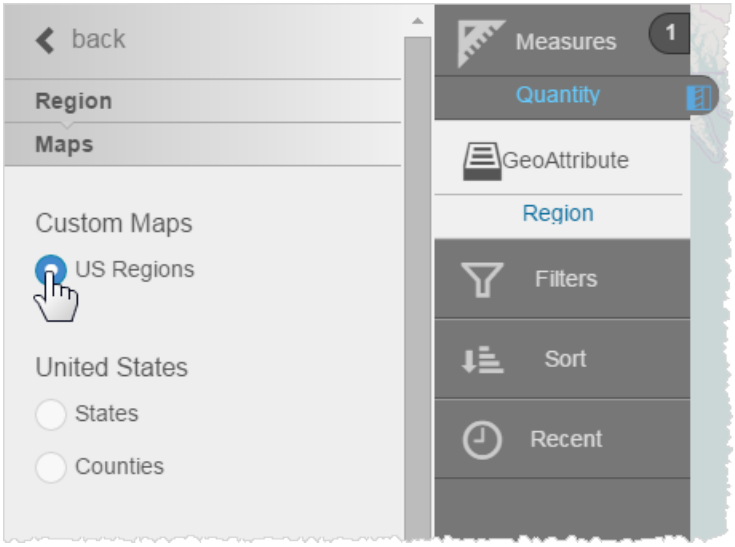
5. Navigate to the KML file and click Open. Visualizer uploads the map file and adds it to the Custom Maps list.



6. Click Done.

To apply a custom map to a geomap

1. Select the attribute in Chart Builder and see its properties.
2. Click Maps.
3. Assign the custom map to the attribute.



The geomap updates, for example with Quantity measure and the Region attribute using the new US Regions geomap.

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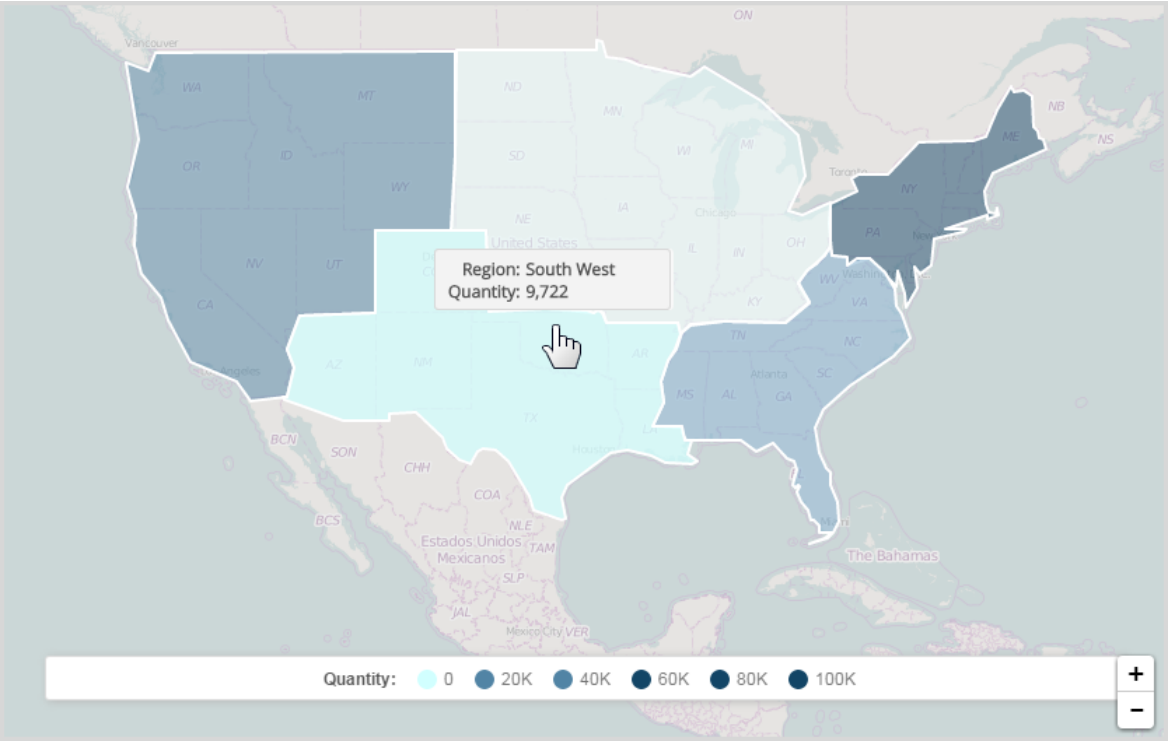

Using Latitude and Longitude in Geomaps

If you have latitude and longitude data that you want to use in geomaps, you can create a custom geoattribute for it.

For example, you have two attributes, one with latitude data and one with longitude, you create a custom attribute based on an expression that concatenates the data. The new attribute can then be used with a geomap to precisely locate an entity such as a store, warehouse, etc.

The built-in Visualizer geomaps support the following syntax for latitude and longitude:

```
(LatitudeAttribute, LongitudeAttribute)
```

If you have an attribute that is already in this format you can use it with a built-in map. If you have separate attributes, use the Expression Builder to concatenate them.

- To create a custom geoattribute for latitude/longitude
- To change the display tooltip for a marker

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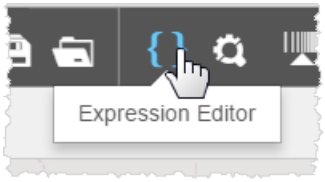
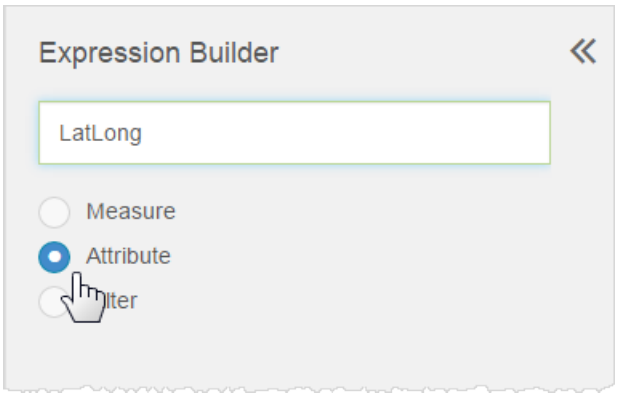
To create a custom geoattribute for latitude/longitude

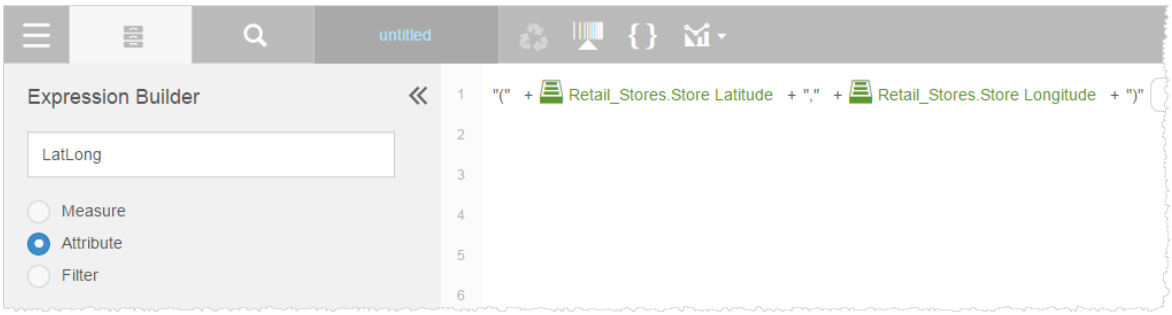
1. In Visualizer click Expression Editor.



2. In the Expression Editor name it and click Attribute.



3. Enter the expression to concatenate the base attributes. For example, in Basic mode:



In Advanced mode:

```
((((')' + [Retail_Stores.Store Latitude]) + ',') + [Retail_Stores.Store
Longitude]) + ')')
```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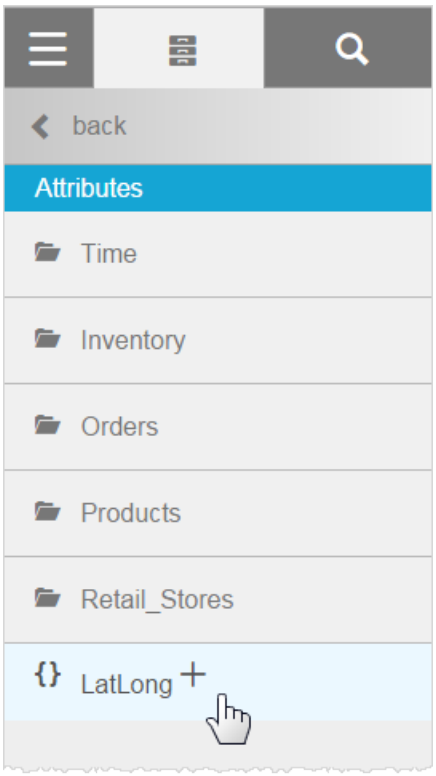
4. Click Save. The expression is listed in the Attributes list.



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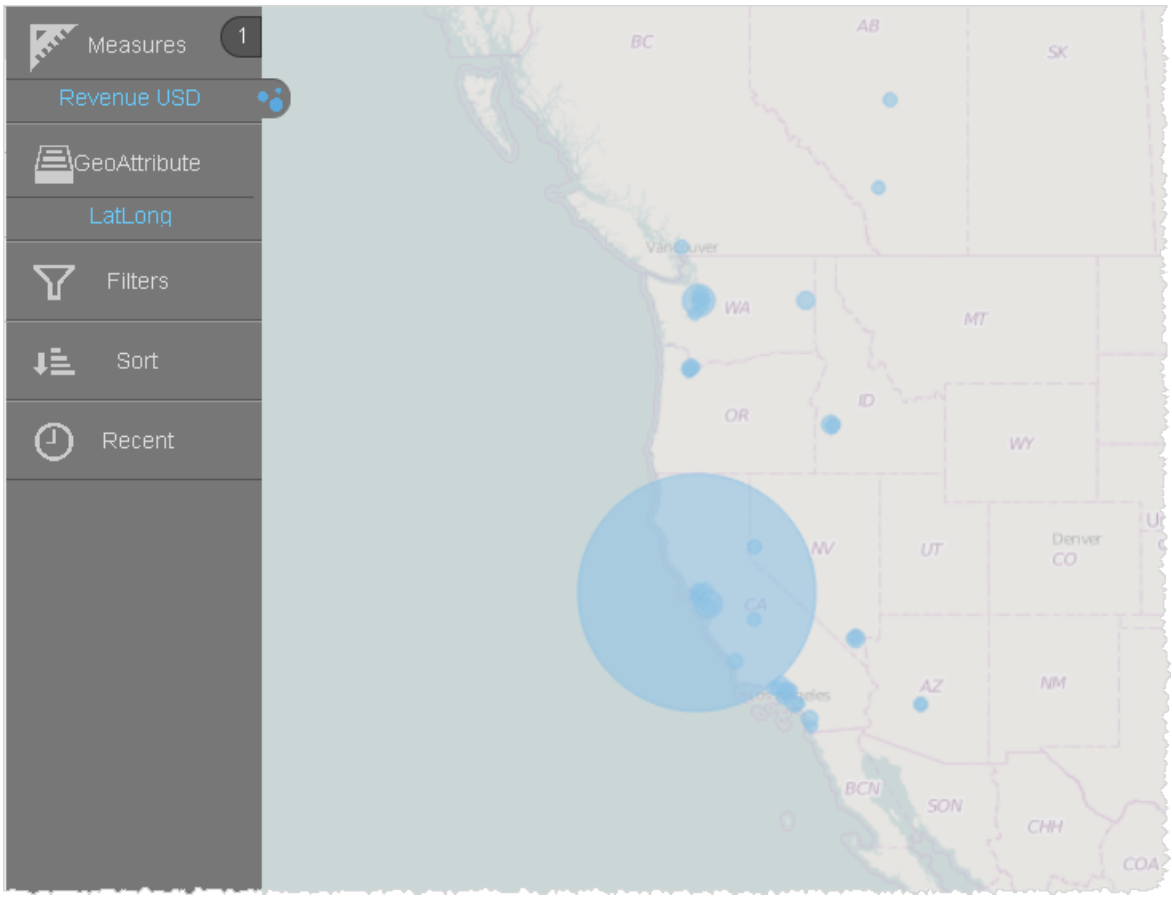
5. Use the new expression as the GeoAttribute. For example, on a bubble map.



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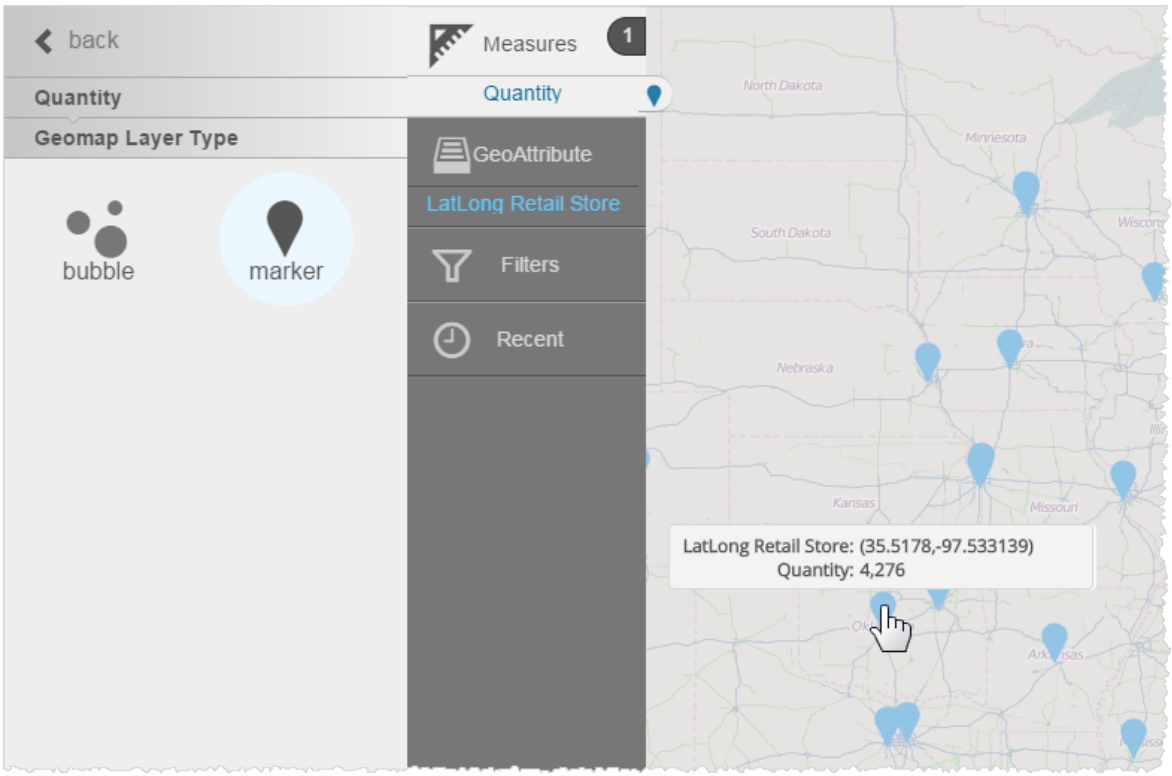
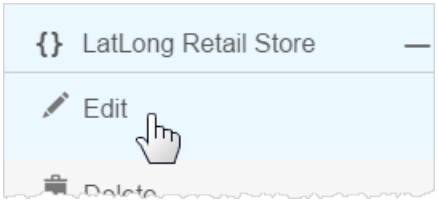
6. Alternatively, you could choose a marker layer type.



To change the display tooltip for a marker

In a marker-style map you may not want to display the latitude and longitude in the tooltip; rather, you may want to display something more descriptive, like the location or store name.

1. In the Subject Area Attributes list, select the expression and click Edit.



2. In the Expression Builder, add the Store_Name attribute and a pipe. The pipe will substitute the value of Store_Name in the tooltip. For example in Basic mode:

or in Advanced mode:

(((((Retail_Stores.Store_Name] + '|(' + [Retail_Stores.Store Latitude]) + ',') + [Retail_

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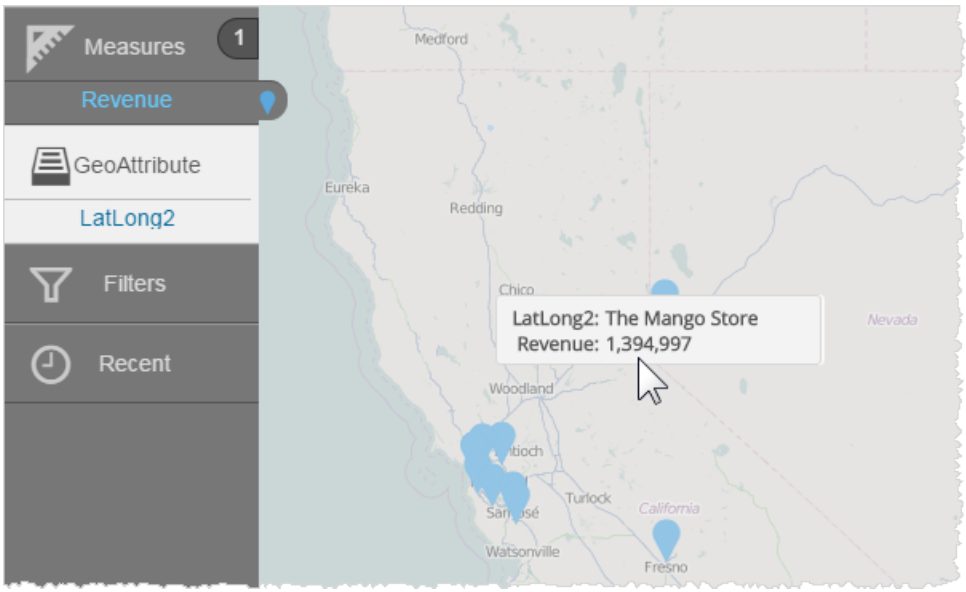
Stores.Store Longitude]) + ')'))

3. Save the expression, or save it under a different name.
4. Add it as a geoattribute in the Chart Builder. The expression evaluates as the Store Name in the tooltip.



Countries in Geomaps

The following countries are available in the default Visualizer Geomaps.

Visualizer geomaps support the 3 different ISO codes defined by ISO 3166-1:

- ISO 3166-1 alpha-2
- ISO 3166-1 alpha-3
- ISO 3166-1 numeric

Tip: Additional countries may be added to this list over time. For questions about a particular country contact your Birst representative.

Aruba (ISO Alternative Names: AW,ABW,533)
Afghanistan (ISO Alternative Names: AF,AFG,004)
Angola (ISO Alternative Names: AO,AGO,024)
Anguilla (ISO Alternative Names: AI,AIA,660)

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Albania (ISO Alternative Names: AL,ALB,008)

Aland (ISO Alternative Names: AX,ALA,248)

Andorra (ISO Alternative Names: AD,AND,020)

United Arab Emirates (ISO Alternative Names: AE,ARE,784)

Argentina (ISO Alternative Names: AR,ARG,032)

Armenia (ISO Alternative Names: AM,ARM,051)

American Samoa (ISO Alternative Names: AS,ASM,016)

Antarctica (ISO Alternative Names: AQ,ATA,010)

Ashmore and Cartier Is. (ISO Alternative Names: 036)

Fr. S. Antarctic Lands (ISO Alternative Names: TF,ATF,260)

Antigua and Barb. (ISO Alternative Names: AG,ATG,028)

Australia (ISO Alternative Names: AU,AUS,036)

Austria (ISO Alternative Names: AT,AUT,040)

Azerbaijan (ISO Alternative Names: AZ,AZE,031)

Burundi (ISO Alternative Names: BI,BDI,108)

Belgium (ISO Alternative Names: BE,BEL,056)

Benin (ISO Alternative Names: BJ,BEN,204)

Burkina Faso (ISO Alternative Names: BF,BFA,854)

Bangladesh (ISO Alternative Names: BD,BGD,050)

Bulgaria (ISO Alternative Names: BG,BGR,100)

Bahrain (ISO Alternative Names: BH,BHR,048)

Bahamas (ISO Alternative Names: BS,BHS,044)

Bosnia and Herz. (ISO Alternative Names: BA,BIH,070)

Bajo Nuevo Bank (Petrel Is.) (ISO Alternative Names:)

St-Barthélemy (ISO Alternative Names: BL,BLM,652)

Belarus (ISO Alternative Names: BY,BLR,112)

Belize (ISO Alternative Names: BZ,BLZ,084)

Bermuda (ISO Alternative Names: BM,BMU,060)

Bolivia (ISO Alternative Names: BO,BOL,068)

Brazil (ISO Alternative Names: BR,BRA,076)

Barbados (ISO Alternative Names: BB,BRB,052)

Brunei (ISO Alternative Names: BN,BRN,096)

Bhutan (ISO Alternative Names: BT,BTN,064)

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Botswana (ISO Alternative Names: BW,BWA,072)

Central African Rep. (ISO Alternative Names: CF,CAF,140)

Canada (ISO Alternative Names: CA,CAN,124)

Switzerland (ISO Alternative Names: CH,CHE,756)

Chile (ISO Alternative Names: CL,CHL,152)

China (ISO Alternative Names: CN,CHN,156)

Côte d'Ivoire (ISO Alternative Names: CI,CIV,384)

Clipperton I. (ISO Alternative Names:)

Cameroon (ISO Alternative Names: CM,CMR,120)

Cyprus U.N. Buffer Zone (ISO Alternative Names:)

Dem. Rep. Congo (ISO Alternative Names: CD,COD,180)

Congo (ISO Alternative Names: CG,COG,178)

Cook Is. (ISO Alternative Names: CK,COK,184)

Colombia (ISO Alternative Names: CO,COL,170)

Comoros (ISO Alternative Names: KM,COM,174)

Cape Verde (ISO Alternative Names: CV,CPV,132)

Costa Rica (ISO Alternative Names: CR,CRI,188)

Coral Sea Is. (ISO Alternative Names:)

Cuba (ISO Alternative Names: CU,CUB,192)

Curaçao (ISO Alternative Names: CW,CUW,531)

Cayman Is. (ISO Alternative Names: KY,CYM,136)

N. Cyprus (ISO Alternative Names:)

Cyprus (ISO Alternative Names: CY,CYP,196)

Czech Rep. (ISO Alternative Names: CZ,CZE,203)

Germany (ISO Alternative Names: DE,DEU,276)

Djibouti (ISO Alternative Names: DJ,DJI,262)

Dominica (ISO Alternative Names: DM,DMA,212)

Denmark (ISO Alternative Names: DK,DNK,208)

Dominican Rep. (ISO Alternative Names: DO,DOM,214)

Algeria (ISO Alternative Names: DZ,DZA,012)

Ecuador (ISO Alternative Names: EC,ECU,218)

Egypt (ISO Alternative Names: EG,EGY,818)

Eritrea (ISO Alternative Names: ER,ERI,232)

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Dhekelia (ISO Alternative Names:)

Spain (ISO Alternative Names: ES,ESP,724)

Estonia (ISO Alternative Names: EE,EST,233)

Ethiopia (ISO Alternative Names: ET,ETH,231)

Finland (ISO Alternative Names: FI,FIN,246)

Fiji (ISO Alternative Names: FJ,FJI,242)

Falkland Is. (ISO Alternative Names: FK,FLK,238)

France (ISO Alternative Names: FR,FRA,250)

Faeroe Is. (ISO Alternative Names: FO,FRO,234)

Micronesia (ISO Alternative Names: FM,FSM,583)

Gabon (ISO Alternative Names: GA,GAB,266)

United Kingdom (Alternative Names: UK) (ISO Alternative Names: GB,GBR,826)

Georgia (ISO Alternative Names: GE,GEO,268)

Guernsey (ISO Alternative Names: GG,GGY,831)

Ghana (ISO Alternative Names: GH,GHA,288)

Gibraltar (ISO Alternative Names: GI,GIB,292)

Guinea (ISO Alternative Names: GN,GIN,324)

Gambia (ISO Alternative Names: GM,GMB,270)

Guinea-Bissau (ISO Alternative Names: GW,GNB,624)

Eq. Guinea (ISO Alternative Names: GQ,GNQ,226)

Greece (ISO Alternative Names: GR,GRC,300)

Grenada (ISO Alternative Names: GD,GRD,308)

Greenland (ISO Alternative Names: GL,GRL,304)

Guatemala (ISO Alternative Names: GT,GTM,320)

Guam (ISO Alternative Names: GU,GUM,316)

Guyana (ISO Alternative Names: GY,GUY,328)

Hong Kong (ISO Alternative Names: HK,HKG,344)

Heard I. and McDonald Is. (ISO Alternative Names: HM,HMD,334)

Honduras (ISO Alternative Names: HN,HND,340)

Croatia (ISO Alternative Names: HR,HRV,191)

Haiti (ISO Alternative Names: HT,HTI,332)

Hungary (ISO Alternative Names: HU,HUN,348)

Indonesia (ISO Alternative Names: ID,IDN,360)

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Isle of Man (ISO Alternative Names: IM,IMN,833)

India (ISO Alternative Names: IN,IND,356)

Indian Ocean Ter. (ISO Alternative Names:)

Br. Indian Ocean Ter. (ISO Alternative Names: IO,IOT,086)

Ireland (ISO Alternative Names: IE,IRL,372)

Iran (ISO Alternative Names: IR,IRN,364)

Iraq (ISO Alternative Names: IQ,IRQ,368)

Iceland (ISO Alternative Names: IS,ISL,352)

Israel (ISO Alternative Names: IL,ISR,376)

Italy (ISO Alternative Names: IT,ITA,380)

Jamaica (ISO Alternative Names: JM,JAM,388)

Jersey (ISO Alternative Names: JE,JEY,832)

Jordan (ISO Alternative Names: JO,JOR,400)

Japan (ISO Alternative Names: JP,JPN,392)

Baikonur (ISO Alternative Names:)

Siachen Glacier (ISO Alternative Names:)

Kazakhstan (ISO Alternative Names: KZ,KAZ,398)

Kenya (ISO Alternative Names: KE,KEN,404)

Kyrgyzstan (ISO Alternative Names: KG,KGZ,417)

Cambodia (ISO Alternative Names: KH,KHM,116)

Kiribati (ISO Alternative Names: KI,KIR,296)

St. Kitts and Nevis (ISO Alternative Names: KN,KNA,659)

Korea (Alternative Names: South Korea) (ISO Alternative Names: KR,KOR,410)

Kosovo (ISO Alternative Names:)

Kuwait (ISO Alternative Names: KW,KWT,414)

Lao PDR (Alternative Names: Laos) (ISO Alternative Names: LA,LAO,418)

Lebanon (ISO Alternative Names: LB,LBN,422)

Liberia (ISO Alternative Names: LR,LBR,430)

Libya (ISO Alternative Names: LY,LBY,434)

Saint Lucia (ISO Alternative Names: LC,LCA,662)

Liechtenstein (ISO Alternative Names: LI,LIE,438)

Sri Lanka (ISO Alternative Names: LK,LKA,144)

Lesotho (ISO Alternative Names: LS,LSO,426)

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Lithuania (ISO Alternative Names: LT,LTU,440)

Luxembourg (ISO Alternative Names: LU,LUX,442)

Latvia (ISO Alternative Names: LV,LVA,428)

Macao (ISO Alternative Names: MO,MAC,446)

St-Martin (ISO Alternative Names: MF,MAF,663)

Morocco (ISO Alternative Names: MA,MAR,504)

Monaco (ISO Alternative Names: MC,MCO,492)

Moldova (ISO Alternative Names: MD,MDA,498)

Madagascar (ISO Alternative Names: MG,MDG,450)

Maldives (ISO Alternative Names: MV,MDV,462)

Mexico (ISO Alternative Names: MX,MEX,484)

Marshall Is. (ISO Alternative Names: MH,MHL,584)

Macedonia (ISO Alternative Names: MK,MKD,807)

Mali (ISO Alternative Names: ML,MLI,466)

Malta (ISO Alternative Names: MT,MLT,470)

Myanmar (Alternative Names: Burma) (ISO Alternative Names: MM,MMR,104)

Montenegro (ISO Alternative Names: ME,MNE,499)

Mongolia (ISO Alternative Names: MN,MNG,496)

N. Mariana Is. (ISO Alternative Names: MP,MNP,580)

Mozambique (ISO Alternative Names: MZ,MOZ,508)

Mauritania (ISO Alternative Names: MR,MRT,478)

Montserrat (ISO Alternative Names: MS,MSR,500)

Mauritius (ISO Alternative Names: MU,MUS,480)

Malawi (ISO Alternative Names: MW,MWI,454)

Malaysia (ISO Alternative Names: MY,MYS,458)

Namibia (ISO Alternative Names: NA,NAM,516)

New Caledonia (ISO Alternative Names: NC,NCL,540)

Niger (ISO Alternative Names: NE,NER,562)

Norfolk Island (ISO Alternative Names: NF,NFK,574)

Nigeria (ISO Alternative Names: NG,NGA,566)

Nicaragua (ISO Alternative Names: NI,NIC,558)

Niue (ISO Alternative Names: NU,NIU,570)

Netherlands (ISO Alternative Names: NL,NLD,528)

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Norway (ISO Alternative Names: NO,NOR,578)

Nepal (ISO Alternative Names: NP,NPL,524)

Nauru (ISO Alternative Names: NR,NRU,520)

New Zealand (ISO Alternative Names: NZ,NZL,554)

Oman (ISO Alternative Names: OM,OMN,512)

Pakistan (ISO Alternative Names: PK,PAK,586)

Panama (ISO Alternative Names: PA,PAN,591)

Pitcairn Is. (ISO Alternative Names: PN,PCN,612)

Peru (ISO Alternative Names: PE,PER,604)

Spratly Is. (ISO Alternative Names:)

Philippines (ISO Alternative Names: PH,PHL,608)

Palau (ISO Alternative Names: PW,PLW,585)

Papua New Guinea (ISO Alternative Names: PG,PNG,598)

Poland (ISO Alternative Names: PL,POL,616)

Puerto Rico (ISO Alternative Names: PR,PRI,630)

Dem. Rep. Korea (Alternative Names: North Korea) (ISO Alternative Names: KP,PRK,408)

Portugal (ISO Alternative Names: PT,PRT,620)

Paraguay (ISO Alternative Names: PY,PRY,600)

Palestine (ISO Alternative Names: PS,PSE,275)

Fr. Polynesia (ISO Alternative Names: PF,PYF,258)

Qatar (ISO Alternative Names: QA,QAT,634)

Romania (ISO Alternative Names: RO,ROU,642)

Russia (ISO Alternative Names: RU,RUS,643)

Rwanda (ISO Alternative Names: RW,RWA,646)

W. Sahara (ISO Alternative Names: EH,ESH,732)

Saudi Arabia (ISO Alternative Names: SA,SAU,682)

Scarborough Reef (ISO Alternative Names:)

Sudan (ISO Alternative Names: SD,SDN,729)

S. Sudan (ISO Alternative Names: SS,SSD,728)

Senegal (ISO Alternative Names: SN,SEN,686)

Serranilla Bank (ISO Alternative Names:)

Singapore (ISO Alternative Names: SG,SGP,702)

S. Geo. and S. Sandw. Is. (ISO Alternative Names: GS,SGS,239)

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Saint Helena (ISO Alternative Names: SH,SHN,654)

Solomon Is. (ISO Alternative Names: SB,SLB,090)

Sierra Leone (ISO Alternative Names: SL,SLE,694)

El Salvador (ISO Alternative Names: SV,SLV,222)

San Marino (ISO Alternative Names: SM,SMR,674)

Somaliland (ISO Alternative Names:)

Somalia (ISO Alternative Names: SO,SOM,706)

St. Pierre and Miquelon (ISO Alternative Names: PM,SPM,666)

Serbia (ISO Alternative Names: RS,SRB,688)

São Tomé and Principe (ISO Alternative Names: ST,STP,678)

Suriname (ISO Alternative Names: SR,SUR,740)

Slovakia (ISO Alternative Names: SK,SVK,703)

Slovenia (ISO Alternative Names: SI,SVN,705)

Sweden (ISO Alternative Names: SE,SWE,752)

Swaziland (ISO Alternative Names: SZ,SWZ,748)

Sint Maarten (ISO Alternative Names: SX,SXM,534)

Seychelles (ISO Alternative Names: SC,SYC,690)

Syria (ISO Alternative Names: SY,SYR,760)

Turks and Caicos Is. (ISO Alternative Names: TC,TCA,796)

Chad (ISO Alternative Names: TD,TCD,148)

Togo (ISO Alternative Names: TG,TGO,768)

Thailand (ISO Alternative Names: TH,THA,764)

Tajikistan (ISO Alternative Names: TJ,TJK,762)

Turkmenistan (ISO Alternative Names: TM,TKM,795)

Timor-Leste (ISO Alternative Names: TL,TLS,626)

Tonga (ISO Alternative Names: TO,TON,776)

Trinidad and Tobago (ISO Alternative Names: TT,TTO,780)

Tunisia (ISO Alternative Names: TN,TUN,788)

Turkey (ISO Alternative Names: TR,TUR,792)

Tuvalu (ISO Alternative Names: TV,TUV,798)

Taiwan (ISO Alternative Names: TW,TWN,158)

Tanzania (ISO Alternative Names: TZ,TZA,834)

Uganda (ISO Alternative Names: UG,UGA,800)

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Ukraine (ISO Alternative Names: UA,UKR,804)
U.S. Minor Outlying Is. (ISO Alternative Names: UM,UMI,581)
Uruguay (ISO Alternative Names: UY,URY,858)
United States (Alternative Names: United States of America, US of A) (ISO Alternative Names: US,USA,840)
USNB Guantanamo Bay (ISO Alternative Names:)
Uzbekistan (ISO Alternative Names: UZ,UZB,860)
Vatican (ISO Alternative Names: VA,VAT,336)
St. Vin. and Gren. (ISO Alternative Names: VC,VCT,670)
Venezuela (ISO Alternative Names: VE,VEN,862)
British Virgin Is. (ISO Alternative Names: VG,VGB,092)
U.S. Virgin Is. (ISO Alternative Names: VI,VIR,850)
Vietnam (ISO Alternative Names: VN,VNM,704)
Vanuatu (ISO Alternative Names: VU,VUT,548)
Wallis and Futuna Is. (ISO Alternative Names: WF,WLF,876)
Akrotiri (ISO Alternative Names:)
Samoa (ISO Alternative Names: WS,WSM,882)
Yemen (ISO Alternative Names: YE,YEM,887)
South Africa (ISO Alternative Names: ZA,ZAF,710)
Zambia (ISO Alternative Names: ZM,ZMB,894)
Zimbabwe (ISO Alternative Names: ZW,ZWE,716)

End User Data Blending (Limited Availability)

Tip: Contact your Birst representative for access to the End User Data Blending feature.

End user data blending is a process where users can blend data from a master space, such as a governed enterprise data store, with local data (sandbox) they upload from their desktops. This allows organizations to provide both self-service capability to their end users along with governed "single-version-of-the-truth" data to share. By assisting users to blend newly imported data with existing data, centralized IT teams can work in collaboration with end users.

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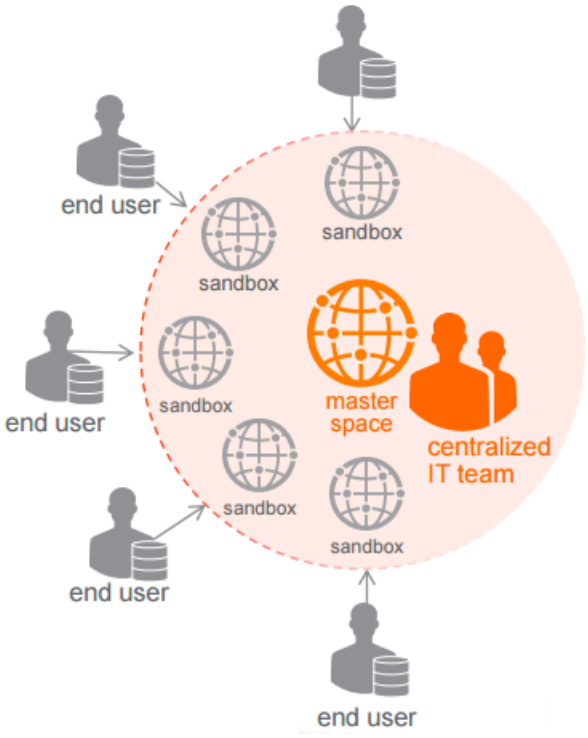

Visualizer is the entry point for end user data blending and self-service data preparation. Visualizer users can upload data on-the-fly and use it in Visualizer reports.

Important: End user data blending capabilities are not supported with Live Access sources.

Next Steps

To set up personal BI sandboxes see Preparing for End User Data Blending.

For instructions and tips for business users about using sandboxes see Business User Guide to End User Data Blending.

Preparing for End User Data Blending

This topic is for Account and Space Administrators, report authors, and dashboard designers to understand how to set up and prepare for business users to blend their own data with user data store (warehouse) data in Visualizer reports.

Important: End user data blending capabilities are not supported with Live Access sources.

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Example Usage Scenario

For the purposes of this discussion the following usage scenario applies:

A Sales Director wants to track the performance of her direct reports against their sales quota. Individual sales quotas change every quarter, and this information is not kept in the governed enterprise data store that holds actual sales records. To track performance against goals, the Sales Director:

1. Starts with a Dashboard showing current sales data.
2. Goes to Visualizer and upload the sales quota spreadsheet.
3. Calculates the spread between the quota and sales-to-date.
4. Formats a report.
5. Exports it as a local PDF file.

How Sandboxes Work

In the example scenario, the governed enterprise data is in the data store of a Birst space. It could be data from a Birst Connect JDBC source, an Application Connector, or any other supported data source (except Live Access). This is referred to as the "master space". End users access this space and use Visualizer as the entry point to upload their own files and explore the merged data in charts and tables.

When a user clicks Import Data, uploads a file, and specifies the joins in Visualizer, behind the scenes Birst creates an "imported data" space, then creates a package from it that is automatically associated with the master space.

The user sees the data from the imported data space in the Visualizer Subject Area of the master space and can create and save reports from both sources. Saved reports are located in the user's private folder under a .mashups folder of the master space.

The Space Administrator will not see the imported data in the Data Flow tab of the master space; the imported data is shown in its own space. By default the imported data space is named after the base space with the string "imported data" appended.

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Prerequisites for End User Data Blending

Important: At this time end user data blending is enabled by Account Administrators in the User Management - Feature Management tab. If you are not an Account Administrator contact your Birst representative.

To set up the conditions for successful end user data blending, follow these prerequisites and tips.

Have a space with existing data

Normally, this is governed enterprise data from a Birst data store. Business users will access this space from the Visualizer Subject Area.

Tips:

- Use a Custom Subject Area in this space to create user-friendly attributes and measures.
- Pre-populate a Dashboards 2.0 dashboard with Visualizer reports that represent high-level corporate data. Your business users can see this data and complement it with their own.
- Create user-friendly labels and titles.

Set up user account permissions

Set up the access and permissions for the business users.

- Give the business user accounts access to the space. Go to User Management - Search/Modify Users, select users and Add to Space.
  Tip: If a business user will want to share their sandbox with other users, those users must also have access to the space.
- Ensure that the user accounts have permission to create a space. By default all users have this permission, however it may have been changed. Go to User Management - Search/Modify Users, select users, and verify that the Allow Add Space column icon is green. If it is not, click Set Add Space to change it.
- Give the user accounts Dashboards 2.0 access. Go to User Management - Search/Modify Users, select users, and click Set Dashboard View.
- Give the user accounts Visualizer access. Create a group with Visualizer access (at Admin - Manage Access - Manage Groups) and add the user accounts to the group.

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Requirements for the spreadsheet

Review a sample of an Excel spreadsheet that represents what the business user will update and upload into their sandbox. The data must relate to the existing data.

Spreadsheet requirements include:

- The spreadsheet file should not be larger than 20MB.
- Make sure there is at least one column from each source that can be used to join, or connect the data from the two. They must use the same datatype.
- Consider the time relationships. In many scenarios you need a date or datetime column to correlate with information in the enterprise data store.

Tips:

- Create a spreadsheet template that includes the join column and let your business users start with the template.
- Let your business users know that they can change the data in the spreadsheet and re-upload the file again and again.
- Caution your business users not to delete the join column or its data.
- End user data blending can be helpful when prototyping your own work. Before you upload new data into the user data store, you can upload a prototype spreadsheet and create sample reports.

Business User Guide to End User Data Blending
(Limited Availability)

This guide for end users assumes that you have some familiarity with using Visualizer.

Data blending is a way for you to blend data from a Birst space with data from your local spreadsheet.

You can upload data from an Excel file into your own "sandbox" and use it with your existing Birst data to create new Visualizer reports. For example, you may have corporate sales data in your Birst space where you can create reports.

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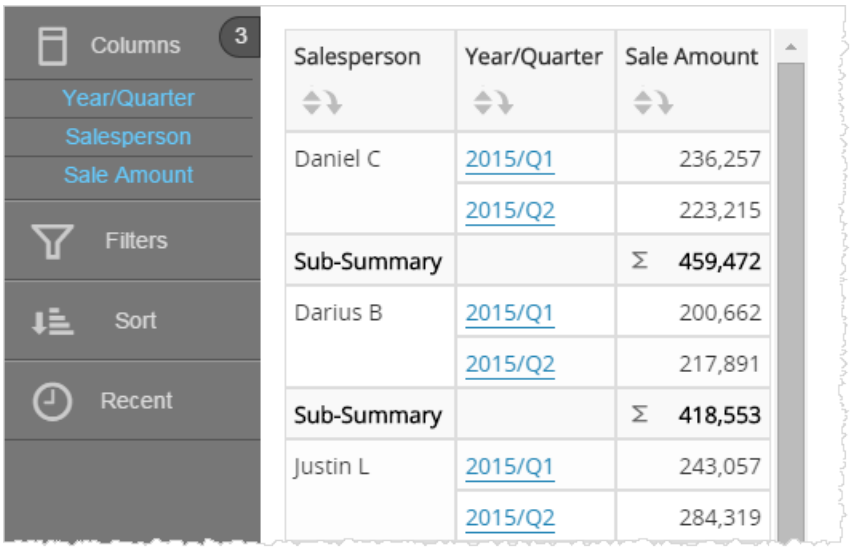

Perhaps you also keep quota goals in a local spreadsheet. You can upload that data and merge the results into a new report. In this example, Salesperson is the column that matches between the two data sets and allows the information to merge together.

To import data directly to Visualizer

1. At the bottom of the Default Subject Area click Import Data.

2. In the Import Data page, drag-and-drop or browse to select an Excel file.

Tips:

- The Excel file must include a column that matches an existing column in the space. The column name may be different but the type of data (text, numeric) must be the same.
- By default the first row is considered a header. If the first row of the spreadsheet has data, click Configure Import to change the setting.

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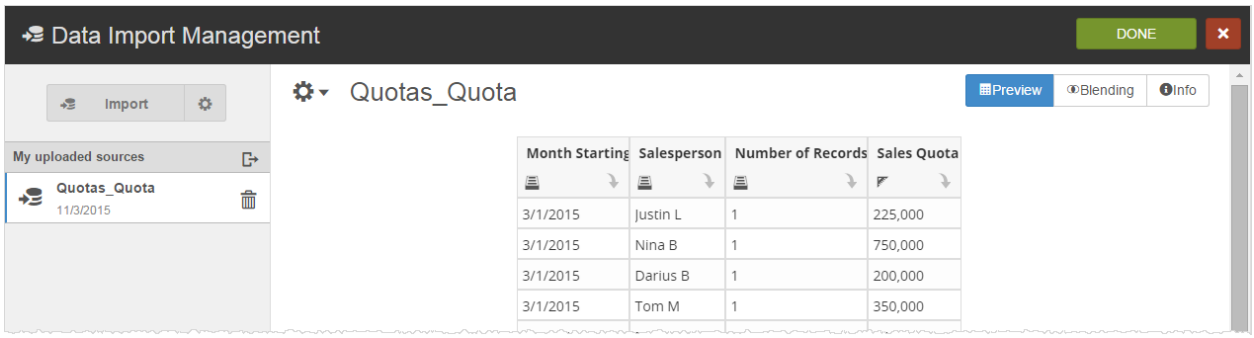
- Birst uploads up to 50,000 rows.
- Birst analyzes the uploaded data and determines, based on datatype, whether a column is an attribute or a measure.

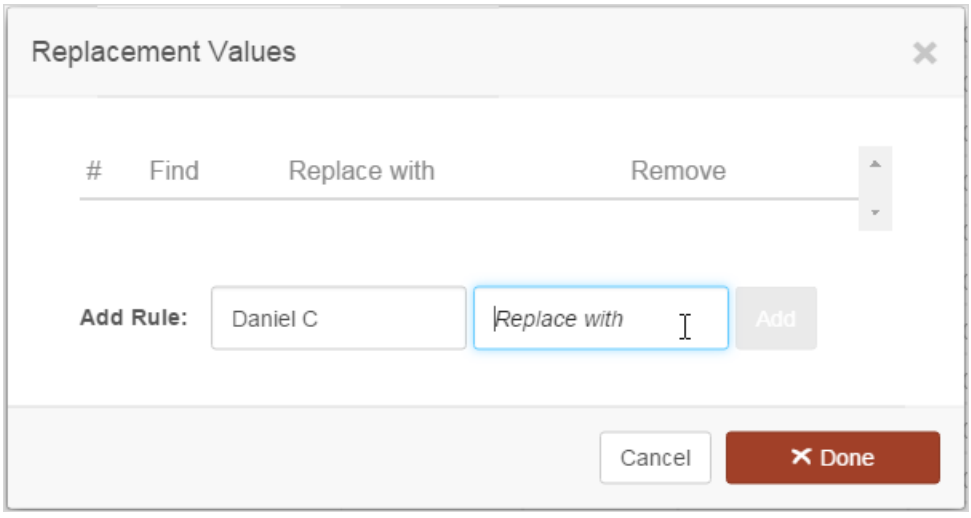
  The Preview shows the data you just uploaded.



3. In some cases you may want to replace values in the imported data.

   a. Click Configure - Replacement Values to specify rules for replacing text.

   b. In the Replacement Values screen enter the text to find and the text that will replace it.



   c. Click Add.

   d. Add more rules if needed.

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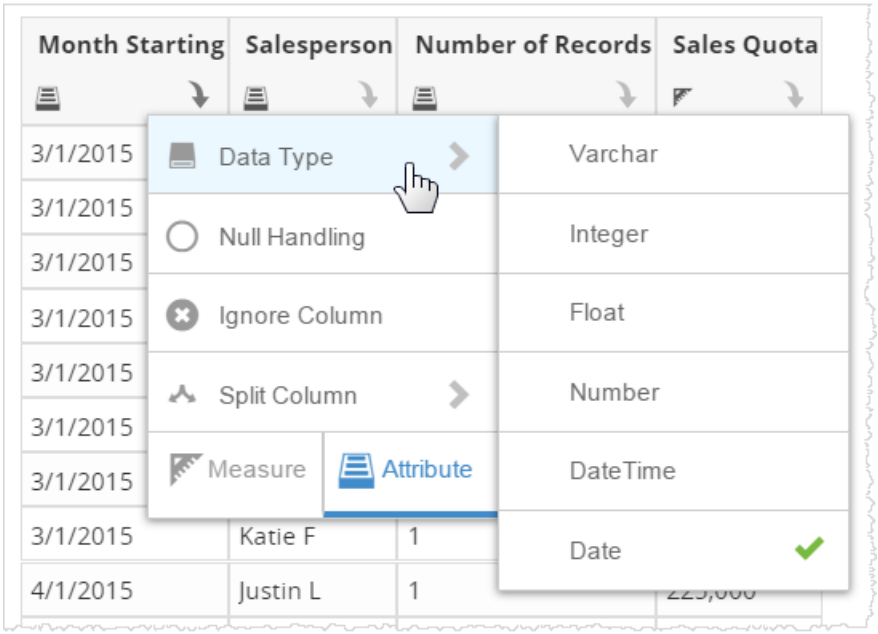
e. Click Done.

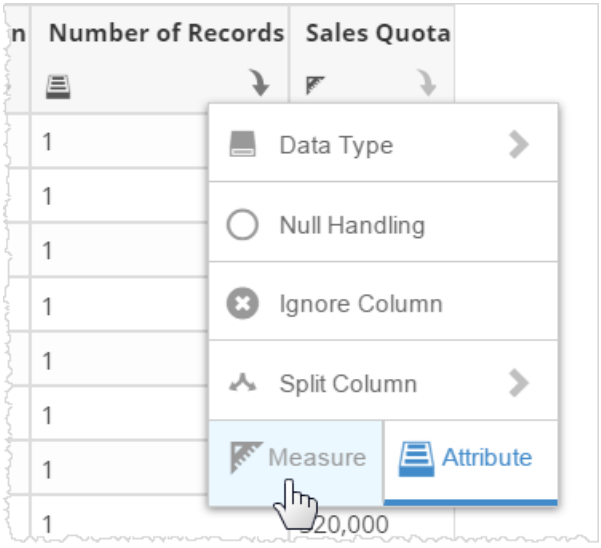
When the spreadsheet data is imported, the substitutions will be made.

6. In the Preview for each column, you can:

- Change the datatype of an imported column.



- Change whether the column represents an attribute or a measure.



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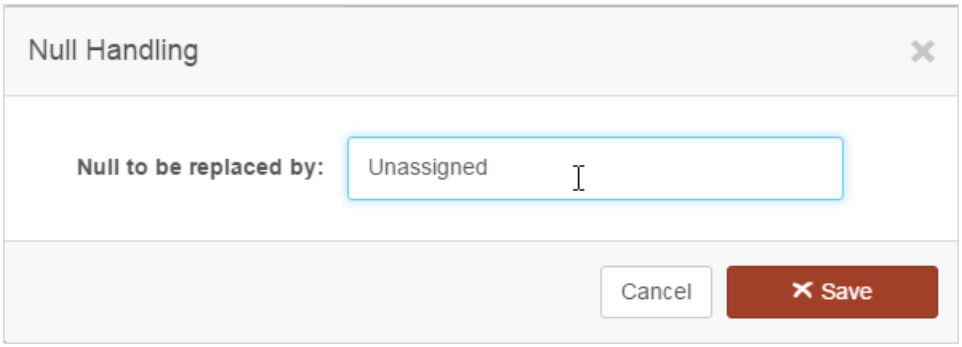
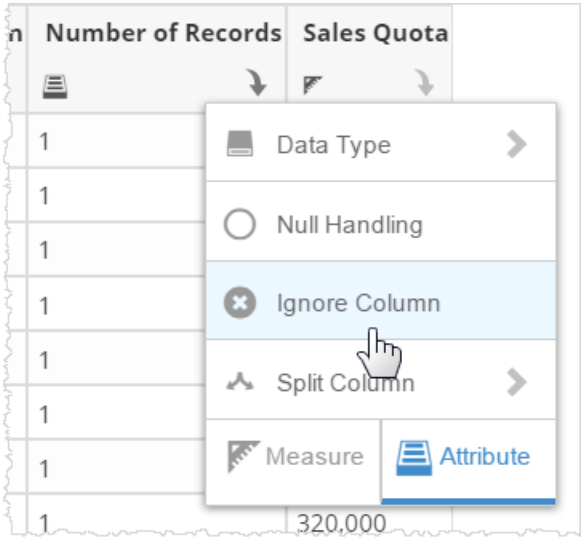
- Specify a value to replace any Null values in the spreadsheet column. For example, if a Salesperson is not assigned and the spreadsheet cell is blank, you could set the Null to "Unassigned".

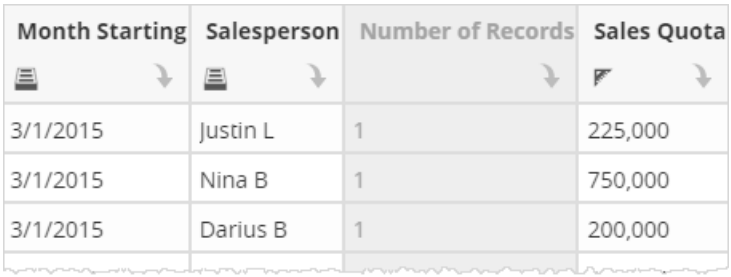


Tip: Birst automatically interprets empty cells (nulls) on an integer column as 0 (zero), so you do not have to set that yourself.

- Tell Visualizer to ignore the column.



Ignored columns are grayed out in the preview.



Month Starting	Salesperson	Number of Records	Sales Quota
3/1/2015	Justin L	1	225,000
3/1/2015	Nina B	1	750,000
3/1/2015	Darius B	1	200,000

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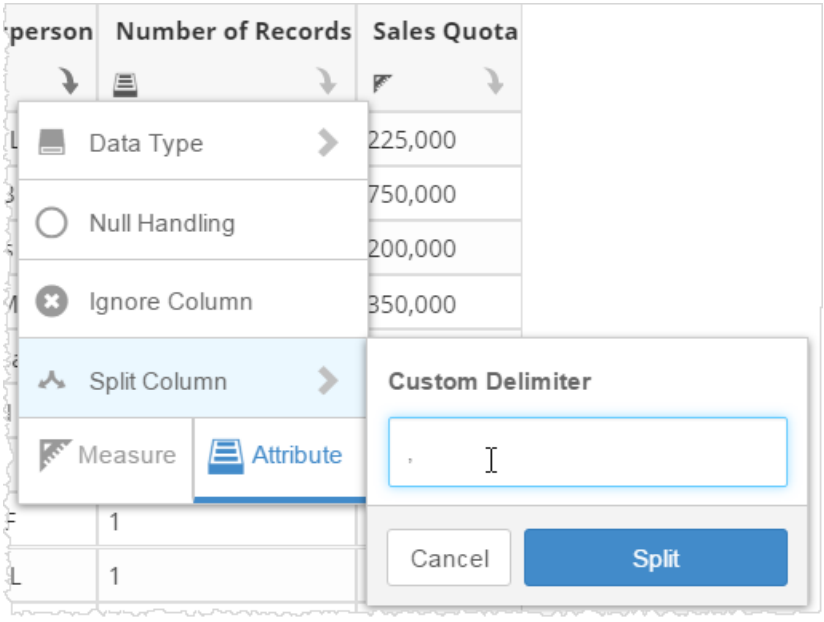
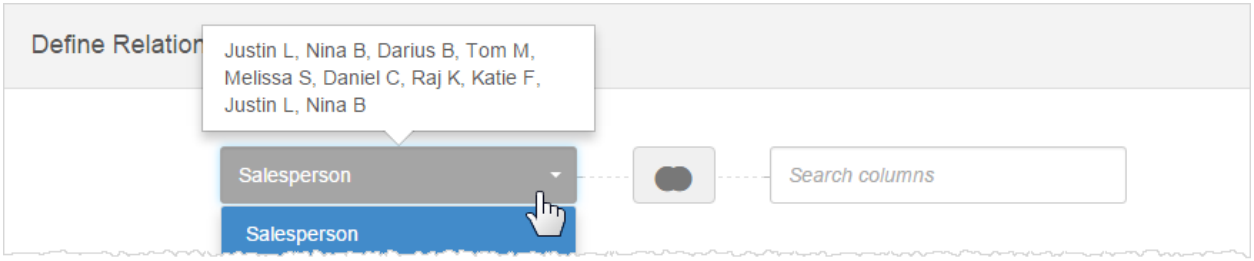
- Tell Visualizer to "split" the data from one into two columns, based on a delimiter such as a period or comma. This works for text columns only, not for date or numeric columns.
  For example, a spreadsheet may include a single column with Last_Name, First_Name format. You can separate Last_Name and First_Name into two separate columns.



7. Click Blending to specify connections between the uploaded data and the data already in the Default Subject Area.

8. Select a column from the imported file. This column must match a column in the existing space.



Tip: Hover over the column name to see some of the data in the rows.

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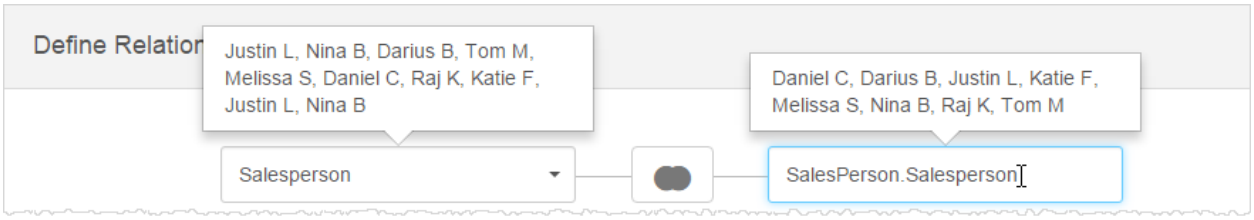
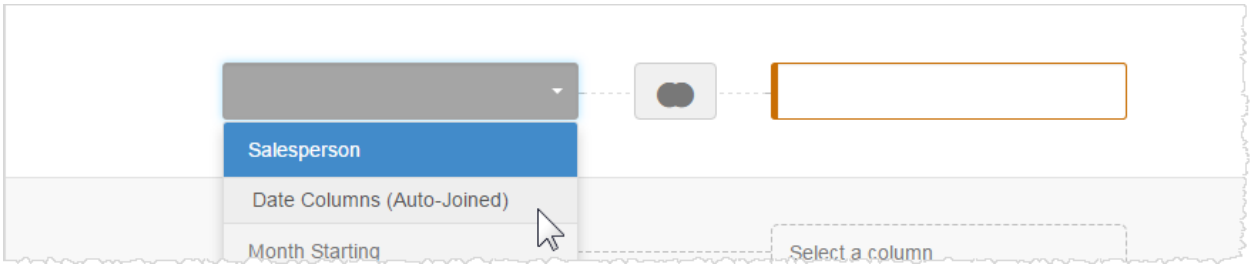
9. Use Search and select the matching column from the space.



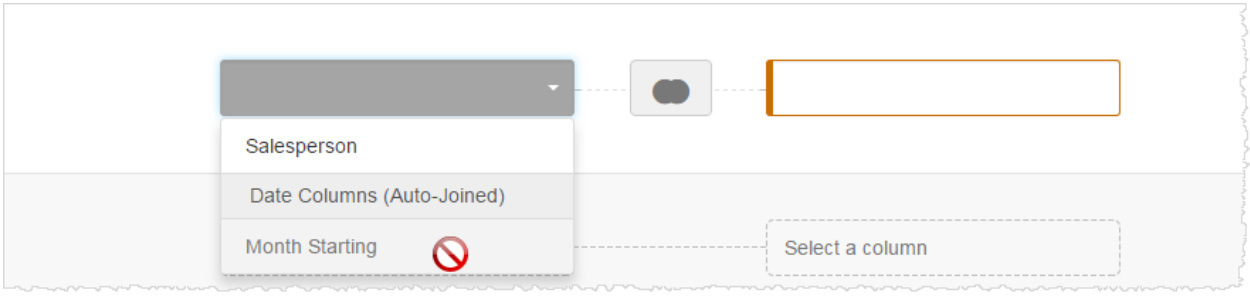
Tip: The matching column may not have the exact same title text as your spreadsheet. As long as you know that the space data matches, it is OK if the column names are different. Use the hovers to preview the data and compare it.

10. Optionally, if more than one column can match, click Extend to specify additional relationships.

Tips: Visualizer automatically joins matching date columns, so you do not have to do those joins yourself.



Imported columns that cannot be matched to a column in the space are grayed out and you cannot use them for joins.



11. Decide whether the imported data will append or overwrite previously imported data. This doesn't matter the first time you do an import, but it does matter on subsequent imports. By default Visualizer will overwrite the data every time you import an Excel file of the same name. To change this:

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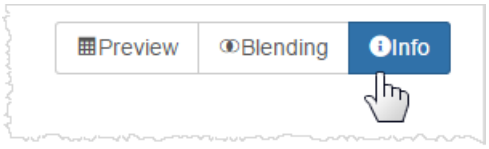
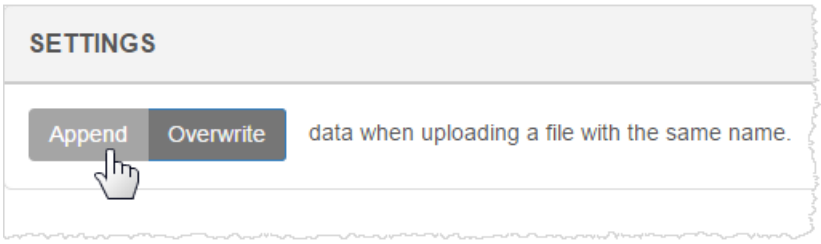
12. Click Info.

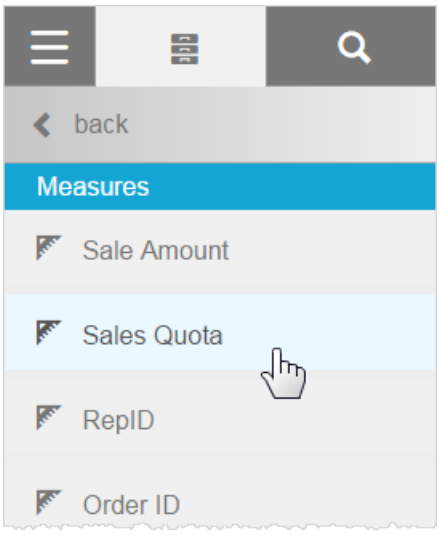


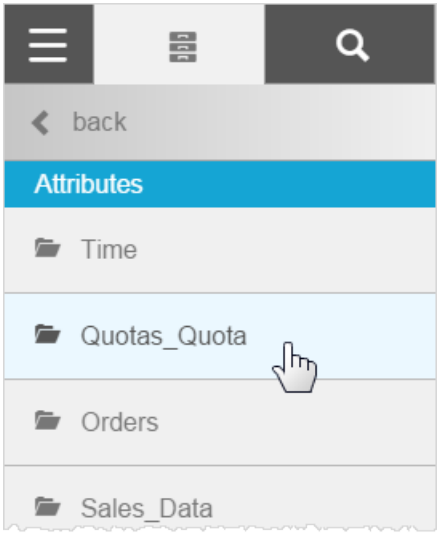
13. Click Append.



14. Click Done.

The Visualizer main window opens again. The imported columns are listed in the Subject Area as measures and attributes, along with the pre-existing ones.





To share your sandbox

Once you have created a sandbox, you can share it with other users. These users must also have permissions to access the space and to use Visualizer.

1. Go to the main Visualizer window and click Import Data.

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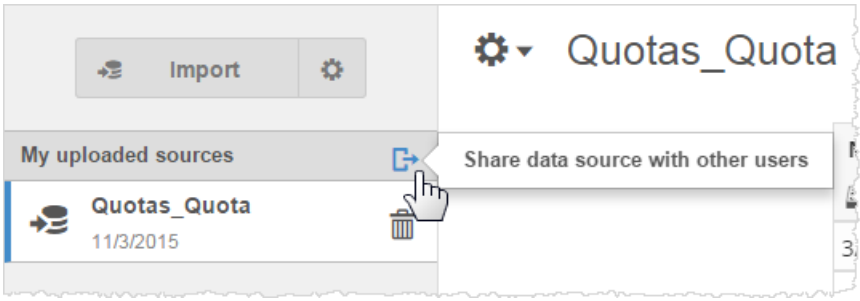
2. Click Share Data Source.



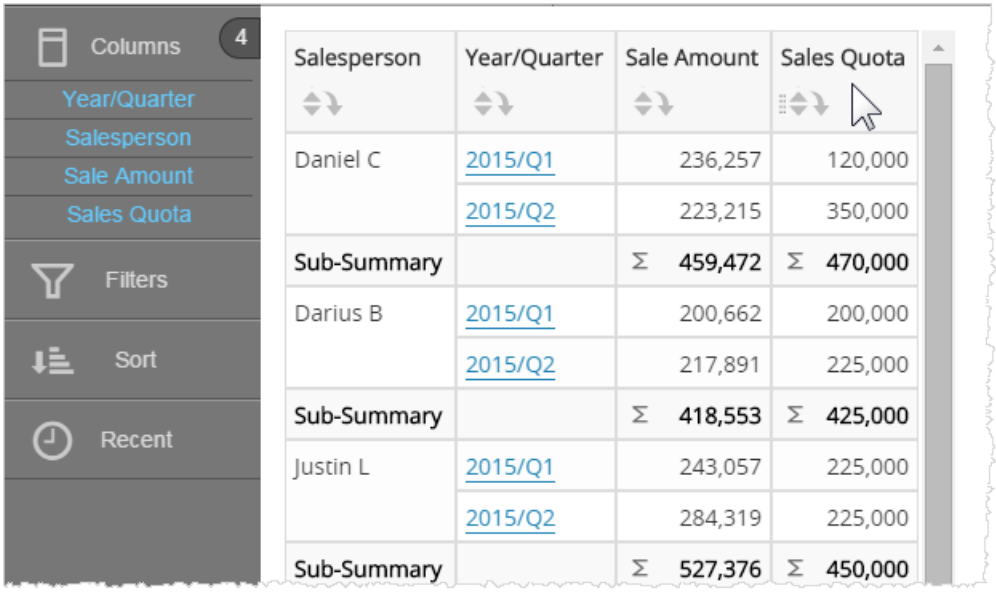
3. Enter a user name and click Share.

Next steps

This section assumes you are familiar with Visualizer.

Create your report in Visualizer

For example, the chart could show the Sales per Salesperson from the Default Subject Area, along with the Quota from the uploaded file.



Salesperson	Year/Quarter	Sale Amount	Sales Quota
Daniel C	2015/Q1	236,257	120,000
	2015/Q2	223,215	350,000
Sub-Summary		**Σ 459,472**	**Σ 470,000**
Darius B	2015/Q1	200,662	200,000
	2015/Q2	217,891	225,000
Sub-Summary		**Σ 418,553**	**Σ 425,000**
Justin L	2015/Q1	243,057	225,000
	2015/Q2	284,319	225,000
Sub-Summary		**Σ 527,376**	**Σ 450,000**

You can create new expressions using the base data and your spreadsheet data. Typically an expression is used for calculating new columns. For example, you may want to calculate the difference between the Sales Amount and the Quota. Click the Expression Editor:

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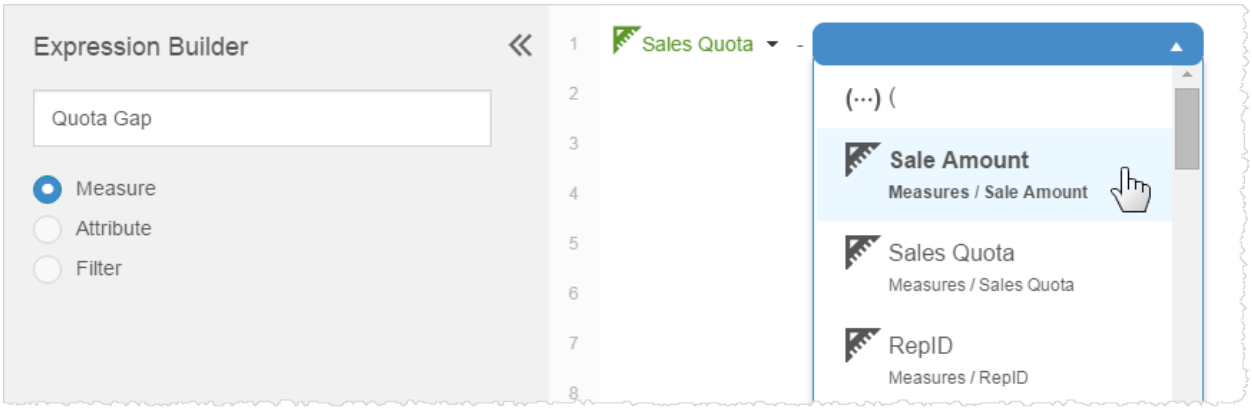
and create an expression, such as:

```
Sales Quota - Sales Amount
```



Visualizer lists the new expression in the Measures column. Just drag it onto the Chart Builder to add it to your report.

Click Table Formatting:

and you can format it to quickly show who is below or above quota.

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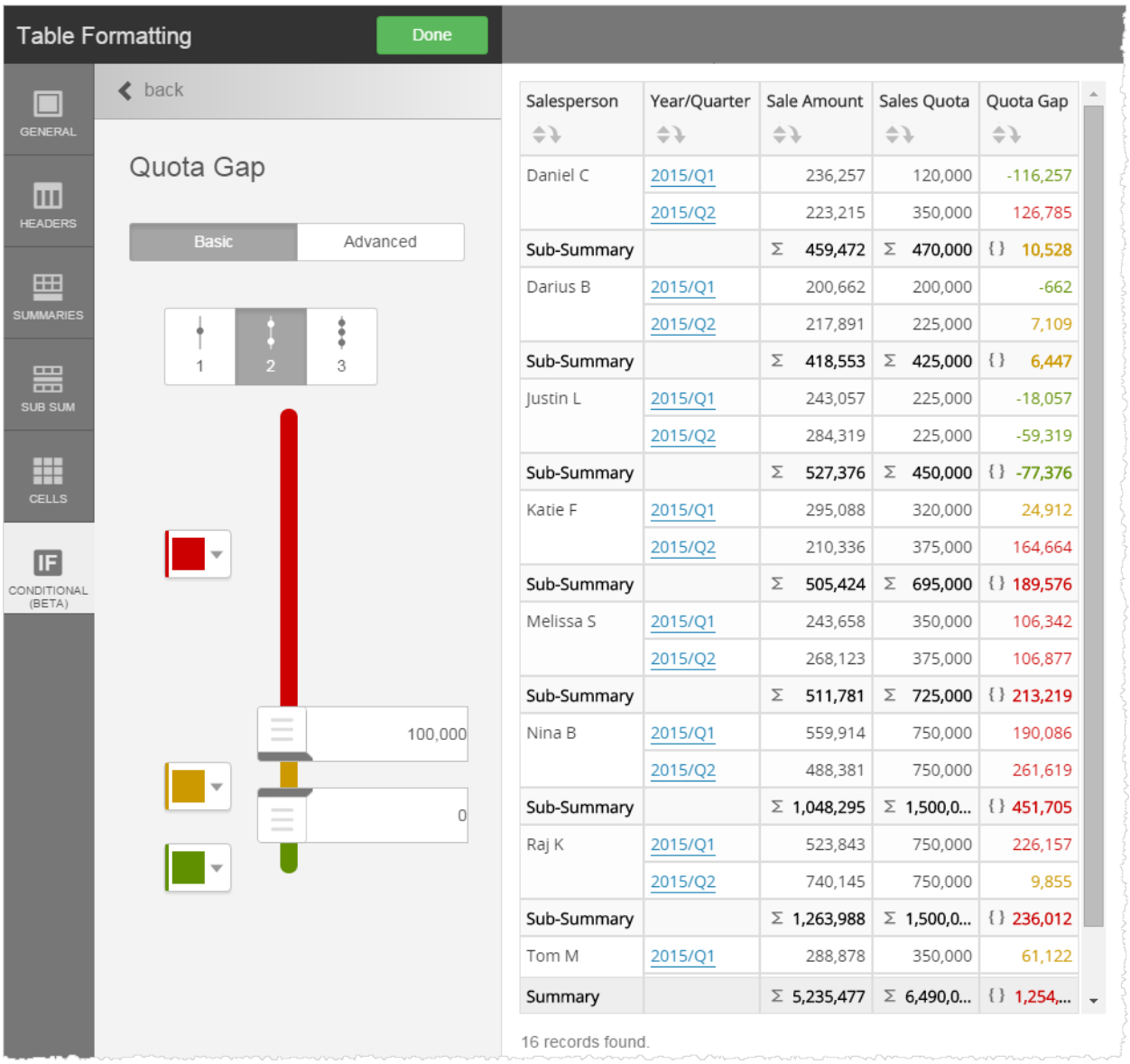
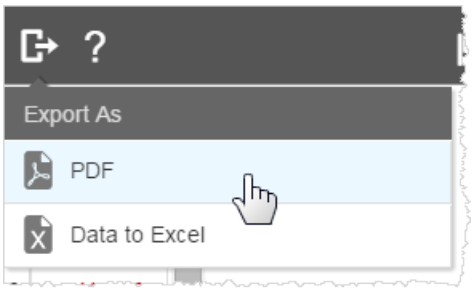


Export your report to PDF or Excel

Use the Export menu to create a PDF or Excel version of your report.



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Visualizer Reference

The following topics are reference materials for Visualizer:

- Using Log History
- Color Reference
- Supported Functions and Operators in Visualizer Expressions
- Keyboard Shortcuts

The following reference materials are relevant to both Visualizer and Designer reports:

- Designer vs Visualizer Reports
- Subject Areas
- Supported Report Types
- Report Export Formats
- Pre-Aggregate Report Expressions
- Pattern String Formats

Using Log History

Dashboards 2.0 and Visualizer provide access to both the raw system logs and to the BQL query logs.

These logs can help you discover:

- What queries were run in order to render the dashboard?
- Did the queries run against the cache or against the database?
- How long did it take to get results?

This information can help you optimize your reports and queries. For more information, see the Query Log Viewer tutorial. You might also enjoy the Cache and Query Optimization video. This video discusses discuses data Vs display filters and their impact on performance. The Birst Community also has many discussions about how to optimize query performance.

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To use Log History in Dashboards 2.0, your user account must belong to a group that has Edit Dashboard privileges. To use Log History in Visualizer, your user account must belong to a group that has Visualizer Access privileges. In the Help see *Creating Groups and Adding Users to Groups*.

In Log History you can:

- Set a start and end date for the time frame of the logs you want to view.
- Sort by:
  - **Timestamp**: newest to oldest or vice versa.
  - **Source**: what is tracked in the logs, such as a Visualizer report, KPI, etc.
  - **Runtime**: the duration in milliseconds of how long it took the submitted report query to return results.
  - **Cache Hit**: whether or not the query was run against the cache, or against the database. In some cases the report or filter was changed, and those results are in cache. Subsequent queries may be executed against the cached results. In the Help see *Clearing Query and Dashboard Caches*.
- Search by type of source or report name.
- View the BQL query definition.
- View the raw DEBUG and INFO log files.
- Refresh the log list to see the most recent logs.

To access the logs

1. Either:
   a. Click Logs in Dashboards 2.0.

   Or:

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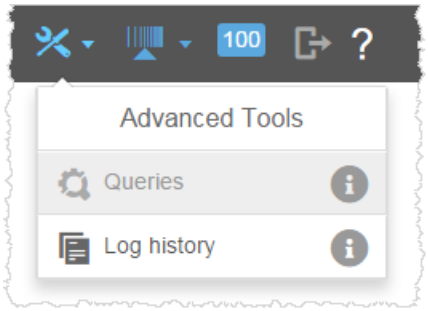
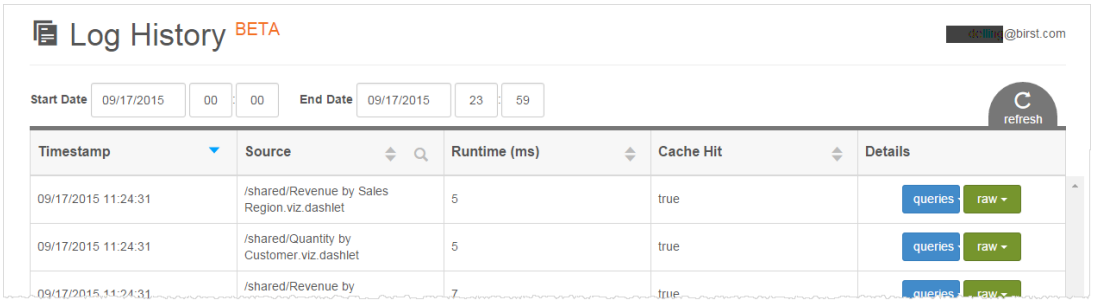
b. Click Advanced Tools - Log History in Visualizer.



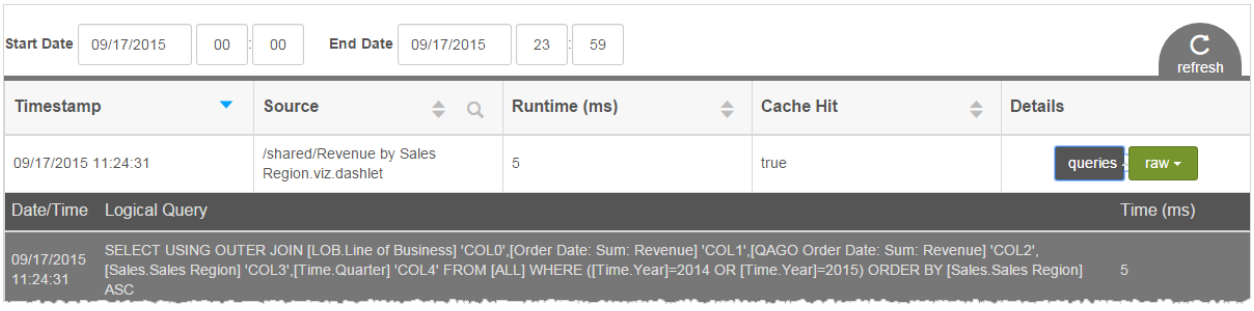
A new tab opens showing the Log History application.



2. Sort the logs by Start and End dates.
3. Click Refresh to get the latest logs.

To view BQL query logs

Click Queries to see the logical query log.



To view raw logs

Click the raw button to see the DEBUG and INFO logs for a particular row.

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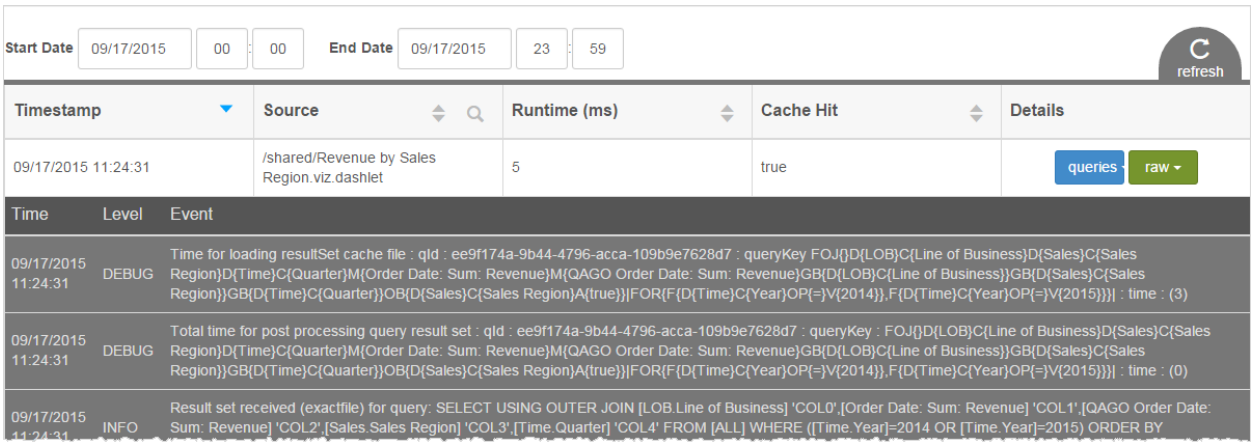

Metadata Localization and Business Translations for Reports

Important: This feature is not available to Trial or Professional Edition users. You must be a Space Administrator to set up this feature.

A common situation for OEM or enterprise reporting solutions is that different subsets of users require different views of the same report. The data is the same for all users, but the metadata may need to be different. One difference can be the language, such as when the titles of columns need to be changed for different language readers. Other differences may reflect a business context, such as when different groups use different terminology to describe the same column.

Birst provides both language and terminology customization for a Visualizer report's attribute, expression, or measure names, without duplicating the report. For the default or a custom subject area, you map an original name to another name. You create a set of these mappings in a specific file format and upload it to Birst and mark it as a Discovery source. You create query-based session variables that return the mapped names from the mapping file, and then assign the variables to subject areas. Users can see the mapped names in subject areas and in report listings, labels, and filters.

Tips:

- Not every name must be mapped. Both mapped and unmapped names can appear in the same report.

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- If there is no mapping, users will see the original name.
- Dashboards 2.0 filters show the mapped names, unless another name is assigned for the filter in Dashboards 2.0.
- You can change the mappings at any time in the Discovery source.
- Designer reports are not supported.

Note: To translate the Birst user interface, see the Changing the Language online help topic.

There are three main steps to setting it up:

1. Create and upload a file containing the mapping information. Set it as a Discovery source.
2. Create one or more query-based session variables that call the file.
3. In Visualizer, assign the variable to a subject area.

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To set up the mapping file

1. Create a file following a specific format.

Index	Subject Area Name	Fully Qualified Object Name (attribute, measure, or expression)	Mapped Name	TenantID	Locale
1	Default Subject Area	Attributes.Categories.CategoryID	Kategorie ID	101	de_DE
2	Default Subject Area	Measures.Quantity	Anzahl	101	de_DE
3	Custom Subject Area 1	Products.ProductName	Prod2	102	en_IN
4	Custom Subject Area 1	Products.Description	Desc2	102	en_IN

File format rules and tips include:

- The fully qualified object name and mapped name columns are required.
- The subject area column is optional if you have only one subject area.
  - The fully qualified object name syntax is as follows for the default subject area:
    - `Measures.`*`MeasureName`*
    - `Attributes.`*`DimensionName.AttributeName`*
    - `GlobalExpressions.`*`ExpressionName`* (these are Visualizer variables that have been marked "Make Global".

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- The fully qualified object name syntax for custom subject areas uses the folder structure, for example:
  - *FolderName.MeasureName*
  - *FolderName.FolderName.MeasureName*
  - *FolderName.FolderName.AttributeName*

- The subject area column is optional if you have only one subject area.
- It is helpful to add an index column in case you need a primary key.
- If you will define a query session variable geared towards individual users, set up a Locale column with the values of the Birst language setting. Do one of the following to get the Locale values:
  - Go to Admin - Manage Space - Command Window and run the listlanguages command to get the internal code used for a language. Then substitute the hyphen with an underscore (en-US becomes en_US).
  - Go to Admin - Define Sources - Query Admin and run the following query: `SELECT 'V{UserLocale$}' FROM [ALL]`. This shows the current possible values of UserLocales$ in the current space.

  Later in the query variable use the UserLocale$ built-in session variable, which returns the value of the user's Language setting, in a WHERE clause.

- If you are in an OEM multi-tenant environment, you can use a TenantID or equivalent column in a WHERE clause.

2. Enter the terminology and mappings into the file, as per the example.
3. Upload the file. You can use Birst Connect, web services, or Admin - Define Sources - Upload File.
4. In Admin - Define Sources - Data Flow, right-click on the source and check it as a Discovery source.

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To create the query variables

1. In Admin - Customize Space - Variables, click Create. Enter an expression that returns the mapped data.

   Example query for a multi-tenant environment, using a variable you created that returns the tenant ID:

   ```
   SELECT [MyMapping.FullyQualifiedName], [MyMapping.MappedName] FROM [ALL]
   WHERE MyMapping.TenantID=GetVariable('MyTenant')
   ```

   Example query for user-based localization:

   ```
   SELECT [MyMapping.FullyQualifiedName], [MyMapping.MappedName] FROM [ALL]
   WHERE MyMapping.Locale=GetVariable('UserLocale$')
   ```

   Tip: For multiple subject areas, when you want to provide different mapping for the same field in different custom subject areas, you can provide that information in a Subject Area column in the source and then add it to the WHERE clause.

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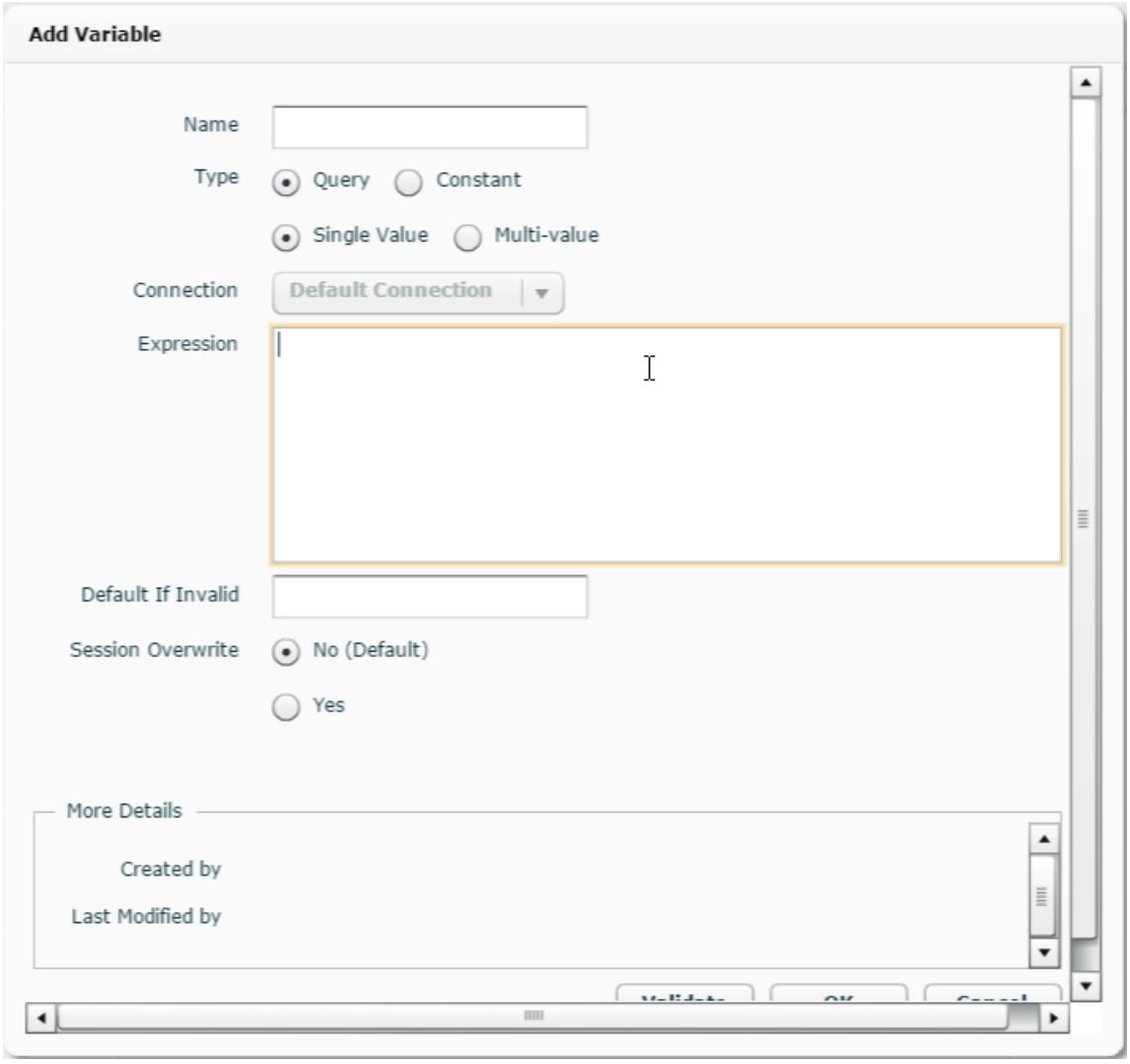

2. Click Validate.
3. Click OK.

To assign a variable to a subject area

In Visualizer, you associate a subject area with a variable that returns the results from the Discovery source.

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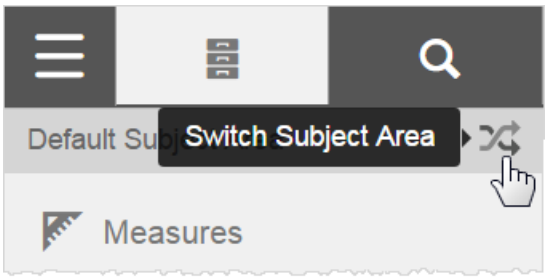
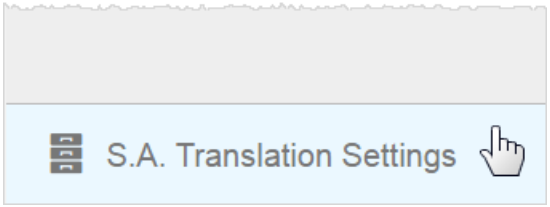
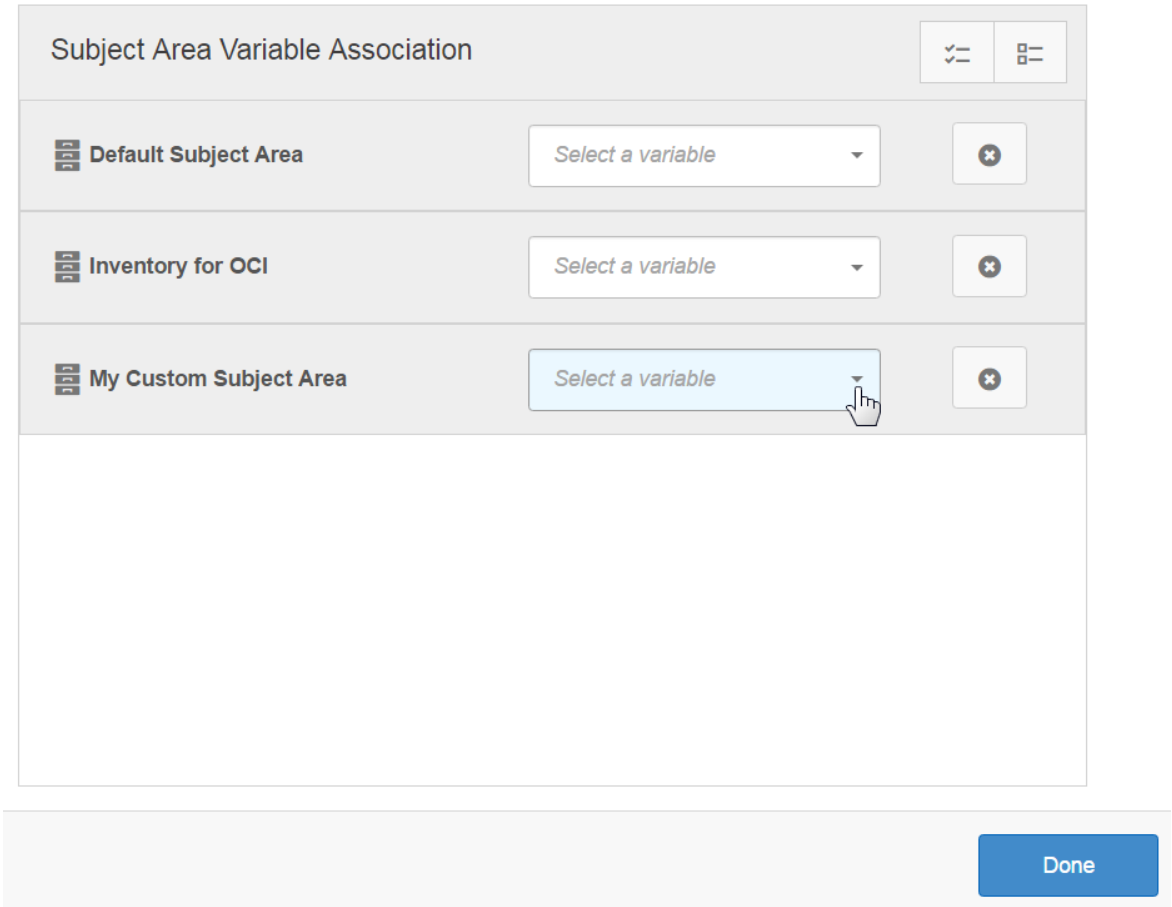
1. Click Change Subject Area.



2. At the bottom of the list, click S.A. Translation Settings.



3. For the subject area, select the variable that calls the mapping file.



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4. Click Done.

Color Reference

Here are the HEX codes for the Visualizer color palettes. Use them to unify your color schemes across reports and dashboards.

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Birst

#91c4e5	#a7c877	#e37e8f	#f3b400	#bdaadd	#fe7f48	#57cec7	#c7a083	#fe95f3	#b9baba
#6295b7	#7f9c53	#a35b67	#7f9c53	#876eb1	#d15f2e	#3c8f89	#876d59	#c65dbc	#797a7a

Cold

#91c4e5	#a7c877	#bdaadd	#57cec7	#d7d243
#6295b7	#7f9c53	#876eb1	#3c8f89	#9a961e

Warm

#e37e8f	#f3b400	#fe95f3	#fe7f48	#ead037
#a35b67	#b37e00	#c65dbc	#d15f2e	#c1a401

Dull

#c7a083	#a6c2d4	#d9c5d9	#c8ceae	#b9baba	#ba8872	#89b2b0	#94aa8f	#cf9797	#b9c87f
#876d59	#6d808c	#958095	#888c76	#797a7a	#876252	#62807e	#687865	#9c7272	#89945d

Strong

#1f93d7	#dd9f09	#2cb345	#7200ab	#dc0044	#e064ca	#96ba27	#00deec	#dfef2a	#954eff
#135e8a	#916706	#1a6628	#440066	#8f002d	#944385	#586e17	#0096a1	#98a31d	#6937b3

Neon

#aaff00	#ffaa00	#ff00aa	#aa00ff	#00aaff	#00ffaa	#ff0055	#ffff00	#00ffff	#55ff00
#77b300	#b37700	#b30077	#7700b3	#0077b3	#00b377	#b3003c	#b2b300	#00b3b3	#3cb300

Pastels

#fe6a6a	#ed91b6	#ccfca6	#df93ff	#b0cffe	#a7fcdb	#fcb96b	#f9ff91	#b691ff	#ffd7fc
#b04a4a	#a1627b	#8fb074	#9c68b3	#798fb0	#74b099	#b0804a	#afb366	#7f66b3	#b396b1

Aquatic

#0a6dbf	#76b6c4	#7fcdff	#21c0ff	#56d2b6	#b5d7e5	#618b9c	#91ffec	#8fb4ec	#75aad6
#064273	#486f78	#5990b3	#1786b3	#368572	#799099	#31474f	#66b3a6	#627ba1	#4c6e8a

Fall

#cd1b00	#ffb307	#a99c4e	#e2cd96	#bba492	#ad2f44	#e26910	#d40d37	#e3af59	#97b336
#801100	#b37f05	#5c542a	#968863	#6e6056	#611a26	#96450b	#870824	#96733b	#57661f

Blu Corporate

#3891d9	#94b9db	#51c4ff	#859cb8	#91c4e5	#6b9fed	#4475e2	#76b6c4	#a2e0ff	#c5dde8
#255f8d	#61798f	#398ab3	#4d5b6b	#6295b7	#486ca1	#2d4e96	#486f78	#729db3	#84949c

Impact

#55b1b4	#dfcfbf	#e8334e	#8387f2	#efbf50	#45bbab	#d65075	#dc4123	#00e8b2	#e87b79
#316769	#91877d	#9c2234	#5b5da7	#a38236	#296e64	#8a334c	#8f2b17	#009c77	#9b5150

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Supported Functions and Operators in Visualizer Expressions

All functions and operators are supported in Advanced mode, with the exception of TRANSFORM.

A subset of BQL functions and operators are supported in the Visualizer Expression Builder Basic Mode, as listed below.

in the Help see *Adding an Expression in Visualizer* and *Logical Query Language Functions*.

Variable Syntax

When referencing a variable in BQL, for example in a report expression or an ETL script, use the GETVARIABLE function:

```
GETVARIABLE('variable_name')
```

Do not use the V{} syntax. In the Help see *Using Variables*.

Supported in Expression Builder Basic Mode

Logical

- IIF
- IFNULL
- ISNAN

Math

- ABS
- CEILING
- FLOOR
- SQRT
- EXP
- POW
- RSUM
- MEDIAN

Dates

- DATEADD
- DATEDIFF

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- DATETIME
- NOW
- NOWDATE

Strings

- FORMAT
- TOLOWER
- TOUPPER
- SUBSTRING
- LENGTH
- TRIM

Lookups

- STAT

Rank

- RANK

Prompts and Variables

- GETVARIABLE
- GETPROMPTVALUE

Operators

- +
- -
- *
- /
- =
- <
- >
- <>
- <=
- >=
- AND
- IS NULL
- IS NOT NULL
- LIKE

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- NOT LIKE
- OR

Visualizer Keyboard Shortcuts

To boost your productivity, Visualizer provides keyboard shortcuts (hot keys) for common actions that you perform when creating reports. In addition there are shortcuts for the Change Visualization/Guided Mode menu, so you can quickly preview or change the type of chart applied to your report.

By default, Visualizer keyboard shortcuts are enabled.

Visualizer ignores keyboard shortcuts when text boxes, search boxes, or other selection elements have focus. To remove focus, press Escape (Esc).

The Visualizer keyboard shortcuts are case sensitive.

General Visualizer Keyboard Shortcuts

Shortcut	Behavior
esc	Remove focus from search input
` (backtick)	Focus on search input
shift+d	Toggle Display Values
shift+p	Toggle Delay Charting
shift+n	New Chart
ctrl+s, cmd+s	Save
ctrl+shift+s, cmd+shift+s	Save As

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Shortcut	Behavior
ctrl+o, cmd+o	Open Report Navigator
shift+e	Open Expression Editor
shift+a	Top N - Show All
shift+q	Toggle Query View

Shortcuts to Change the Chart Type

To use keyboard shortcuts for chart types, press "g" and then press the relevant keyboard lowercase letter or combination.

Shortcut	Chart Type
g c	Column
g b	Bar
g l	Line
g shift+l	Spline
g a	Area
g shift+a	Area Spline
g o	Points
g s	Scatter
g u	Bubble
g p	Pie

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Shortcut	Chart Type
g d	Donut
g shift+d	Semi Donut
g t	Table
g shift+t	Pivot
g h	Heat Map
g e	Tree Map
g w	Waterfall - Vertical
g shift+w	Waterfall - Horizontal
g g	Geomap
gb	

Designer vs Visualizer Reports

Both Designer and Visualizer reports are both very powerful, and each have their strengths. When would you use Visualizer and when would you use Designer?

- Visualizer Highlights
- Designer Highlights
- Chart Types

Visualizer Highlights

By contrast, Visualizer is designed to be used by any business user for exploring data and sharing insights via dashboards. Visualizer helps business users to rapidly answer questions and discover information. You can add Visualizer reports to dashboards in the same way as Designer reports. Visualizer reports cannot be directly printed.

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Interactive design: Visualizer has an intuitive interface that includes a search bar to easily find data elements, drag-and-drop design canvas, and rapid rendering so you can quickly see your visualizations.

Guided mode: Visualizer suggests chart types based on data combinations. Pick your data first, and let Visualizer help you make it look great.

Dashboards 2.0 integration: Visualizer reports are more tightly integrated with the new Dashboards 2.0.

- **Responsive design, adaptive layout**: Along with Dashboards 2.0, Visualizer reports automatically adapt to various screen sizes to better support mobile viewing.
- **Edit in Visualizer**: From a dashboard you can select a Visualizer report, edit it, and quickly return to the dashboard.
- **Export**: You can export a Visualizer report from Dashboards 2.0 in Excel and PDF formats.
- **Productivity features**: Visualizer includes productivity enhancers such as color palettes, percentage-across calculations, and quick access to the underlying BQL queries.

Designer Highlights

Use Designer to develop highly formatted enterprise reports that you want to print in a precise format, schedule for email delivery, or export. Designer is essentially a “design studio” for data analysts and other data savvy users to build rich and specific applications.

Pixel-perfect printing: Designer provides pixel-perfect, also called banded, layout capabilities.

Schedule and deliver: Designer provides advanced scheduling features including report-driven report distribution.

Subreports: Designer lets you put a report inside another report.

Export: Designer exports to CSV, Excel, PDF, and PowerPoint formats. In Dashboards 2.0 you can export Visualizer reports to PDF and Excel. In the Help see *Dashboards 2.0 Report Export Formats*.

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Pivot control: Designer provides a pivot control widget to help you add attributes and measures, reorder columns, and change the structure to a pivot table. In Visualizer these features are supported by drag-and-drop and guided modes.

Chart Types

Commonly-used charts and tabular reports are available in both modules. Designer supports some charts that Visualizer does not, and vice-versa. See Supported Report Types.

Subject Areas

Subject areas in Designer and Visualizer display the attributes and measures that exist in the data model for the space and are available for creating reports.

- Types of Subject Areas
- How Subject Areas Reflect the Data Store Model
- How the Subject Area Updates
  - Multiple Instances of the Same Measure in Designer

Types of Subject Areas

There are two types of subject areas:

- **Default**: The entire set of attributes and measures as defined in the model for the space. Space Administrators can see a diagram and manage the details of this at Admin - Define Sources.
- **Custom**: A set of attributes and measures that a Space Administrator can specify at Admin - Manage Access - Custom Subject Areas. It is a best practice to provide report developers with a custom subject area that shows only what is needed for reporting, has user-friendly labeling, and can be restricted to certain groups. In the Help see *Creating a Custom Subject Area*.

How Subject Areas Reflect the Model

Measures and attributes have relationships as defined in the model; at the data store level this means that there are joins between the tables. The model as shown in Admin is very informative

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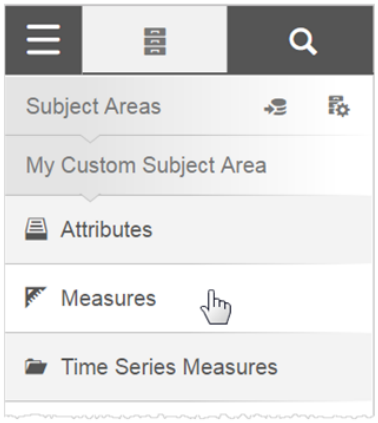
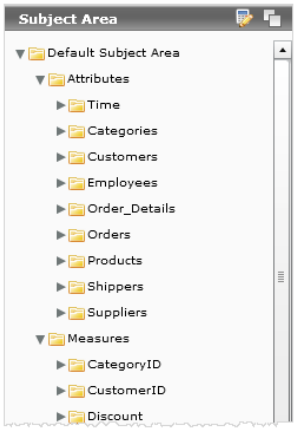
however it can become a bit complex. Subject areas simplify how measures and attributes are presented, for convenience when creating reports.

Visualizer Subject Area



Admin - Data Flow - Joins

Designer Subject Area

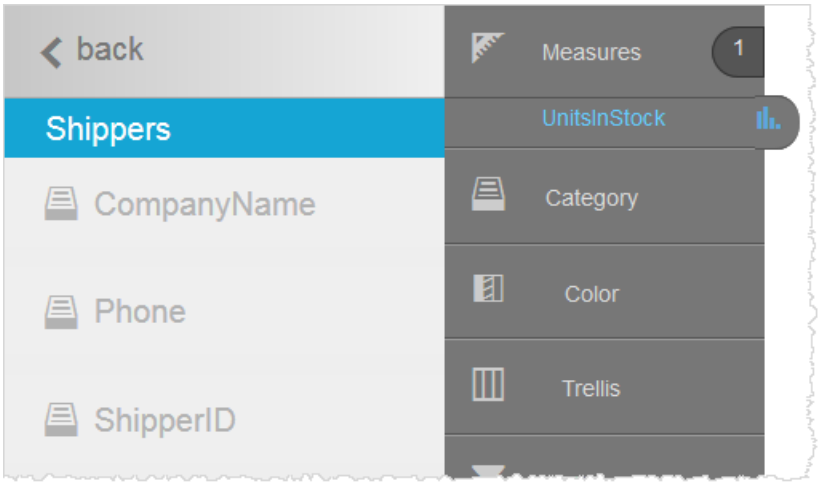


How the Subject Area Updates

When you add an attribute or measure to a report, the subject area updates to show which of the remaining attributes or measures are relevant to what you picked, and grays out those that are not.

When creating a new report, the best practice is to start with a measure. When you add a measure to the report, attributes and other measures that are not related to that measure are grayed out in the subject area. For example, UnitsInStock does not relate to Shippers.

In Visualizer the Shippers attributes are grayed out:



In Designer the Shippers folder is grayed out:

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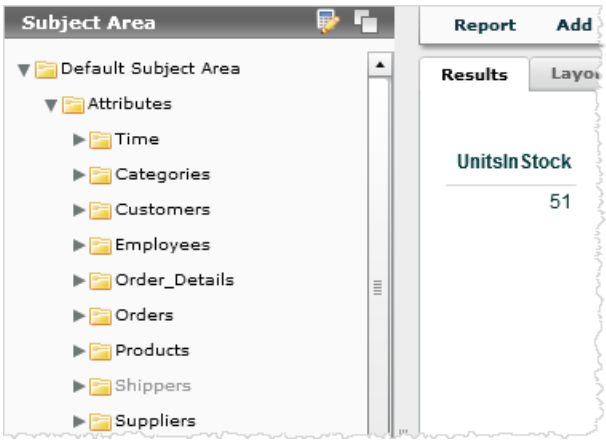

Similarly, when you add an attribute to the report, all measures that are not meaningful for that attribute are grayed out.

Multiple Instances of the Same Measure in Designer

A slightly different behavior occurs when you want to add two instances of the same measure to a Designer report, for example when you want to show two different date aggregations of the same measure.

In this case, you add the first version of the measure, at which point the other aggregations of the same measure gray out. For example, after you add UnitsInStock by Shipped Date, the other aggregations of UnitsInStock are grayed out.

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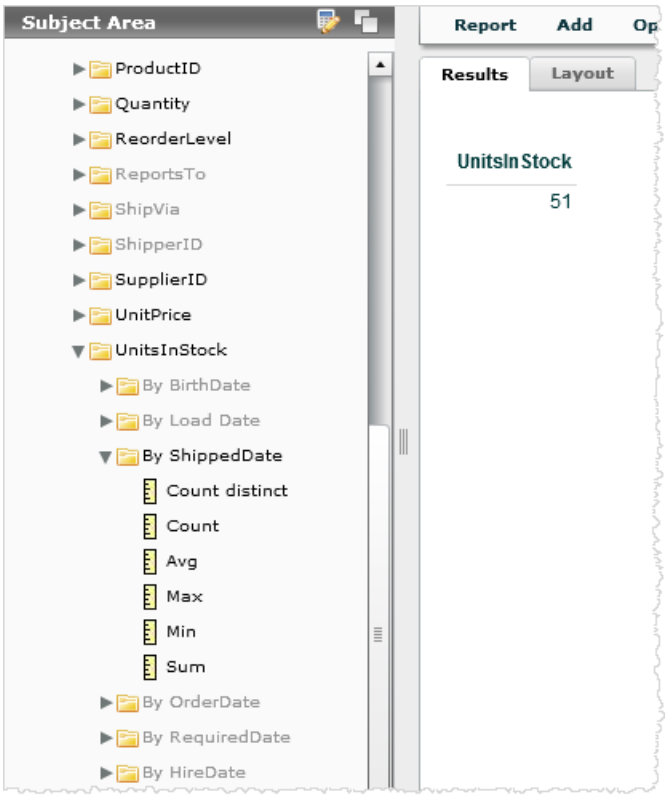
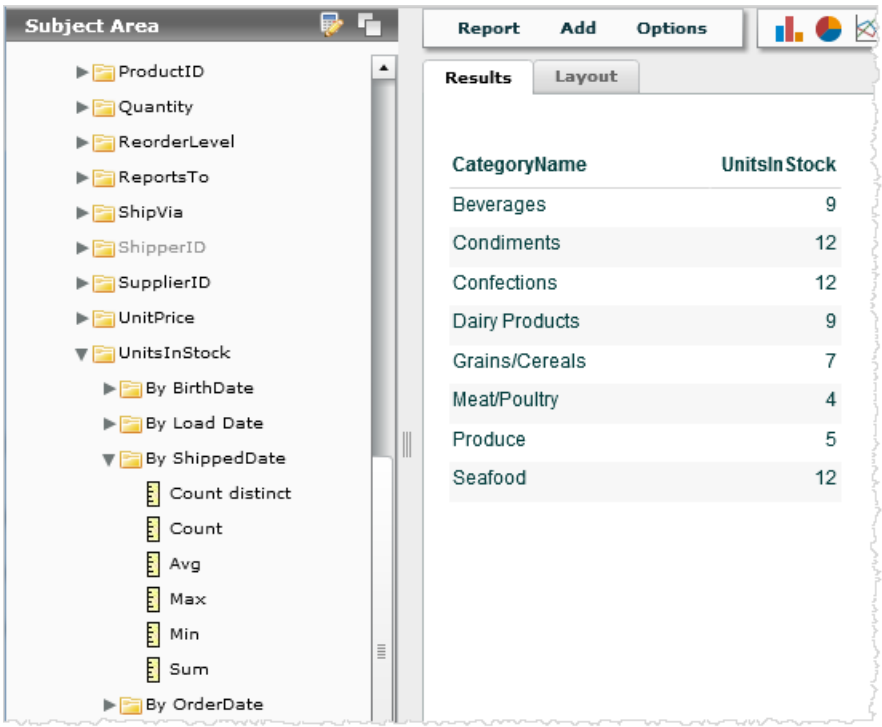


Then you add an attribute that relates to the first measure. The other aggregations become available again and you can add the second version of the measure.



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Supported Report Types

The Designer and Visualizer modules each support charts and tables (reports). The types of reports vary depending on the module. The underlying implementation of the report types is not the same, so there are visual differences.

Report Type	Designer	Visualizer
Area	X	X (Turbo)
Area Spline		X (Turbo)
Stacked Area	X	X (Turbo)
Bar	X	X (Turbo)
Range Bar	X	
Stacked Bar	X	X (Turbo)
100% Stacked Bar	X	X (Turbo)
Bing map (Requires license)	X	use Geomap
Bubble	X	X (Turbo)
Column	X	X (Turbo)
Range Column	X	
Stacke-	X	X (Turbo)

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Report Type	Designer	Visualizer
d Column		
100% Stacked Column	X	X (Turbo)
Crosstab	X	X
Doughnut	X	X (Turbo)
Half-donut		X (Turbo)
Funnel	X	X (Turbo)
Gauge	X	
Geo map	X	X
Heat map	X	X (Turbo)
Line	X	X (Turbo)
Meter	X	
Pie	X	X (Turbo)
Points		X (Turbo)
Pyramid	X	X
Radar (spider web)	X	
Scatter Plot	X	X (Turbo)
Spline		X (Turbo)
Table	X	X
Tree map	X	X (Turbo)
Trellis	X	X

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Report Type	Designer	Visualizer
Waterfall - horizontal		X (Turbo)
Waterfall - vertical	X	X (Turbo)

Dashboards 2.0 Report Export Formats

Business users can export reports from Dashboards 2.0 in a variety of formats, as listed in the following table.

Export Format	Designer Chart	Designer Table	Visualizer Chart	Visualizer Table	Visualizer Crosstab
PDF	✔	✔	✔	✔	✔
Data to Excel		✔	✔*	✔*	✔*
Image to Excel	✔				
Excel Pivot Table					✔
Comma-separated-values (CSV)		✔			
PowerPoint (PPT)	✔	✔	✔**	✔**	✔**

****Note:** As of 5.33 Limited Availability.

***Important:**

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- Visualizer charts exported to Excel do not look exactly like the report in Visualizer. For example, Visualizer reports exported to Excel do not support break-by sub-summaries.
- If the end user changes a Visualizer report format in Dashboards 2.0 using column selectors, those new styles will not be exported, only the original report style is exported.
- Visualizer reports exported to Excel are limited to 50,000 rows and 15 columns.
- You will not have an option to export a dashboard if one or more dashlets on that dashboard have disabled their "export as" option.

The following details will be included on an export:

- Collection Name
- Dashboard Name
- Applied Filters
- Export timestamp
- Page Numbers
- Report Name (Visualizer reports only)

Special Cases for Visualizer Table Exports and Excel

When exporting Visualizer reports to Excel, there could be discrepancies between summary totals in Visualizer versus Excel Summary Total. For columnar tables, the following use cases produced discrepancies for calculated Custom Summary Totals reported by the exported Excel reports due to their inability to apply formulas against the data in the database but rather against the values listed solely in the exported Visualizer report. In these uses case, Visualizer now employs a bare table export.

The use cases impacting Custom Summaries for columnar tables are as follows:

- Total Distinct Count
- Weighted Average
- Custom Summaries based on Expressions

In addition to columnar tables, Crosstab table exports were also impacted by the following uses cases.

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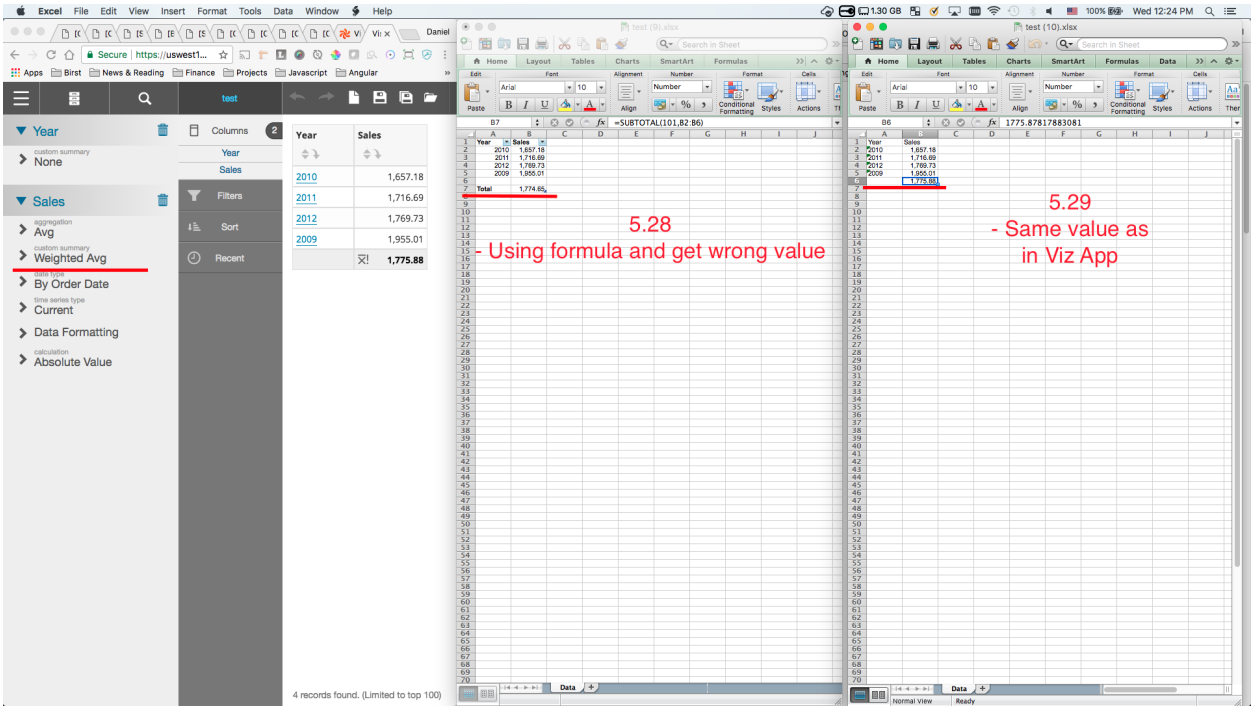
- Total Distinct Count
- Weighted Average
- Custom Summaries based on Expressions
- Count
- Count Distinct

In these use cases, Visualizer simply exports the tabular data to avoid the miscalculation of the custom summaries.

The following example illustrates the behavior (before and after the fix) that occurs for calculating the Weighted Average custom summary where Excel was attempting to employ formulas against the data in the Visualizer in the tabular report whereas the Visualizer report could calculate the Custom Summary value against all the data in the database:



And here is a use case behavior (before and after the fix) for a Visualizer Crosstab report employing the Count Custom Summary:

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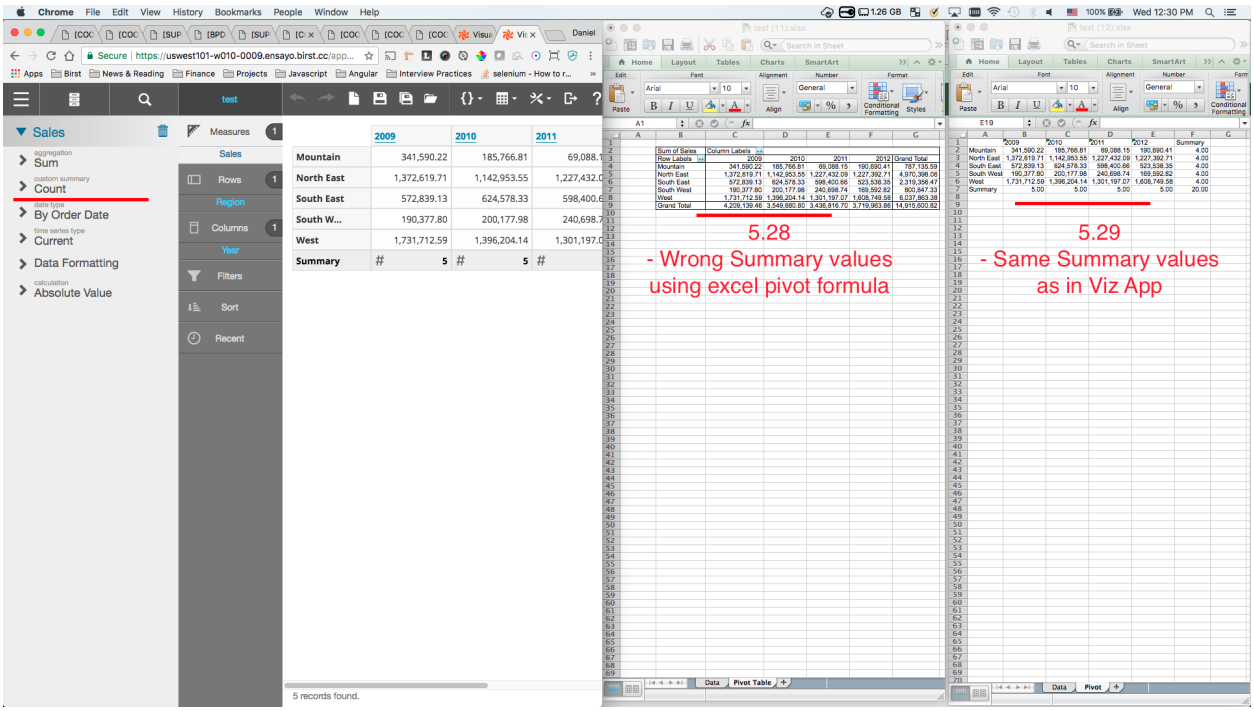

Pre-Aggregate Report Expressions

Report authors can create pre-aggregate expressions, also called "push-down expressions", in Visualizer and Designer. Pre-aggregate expressions are evaluated in the Birst database. Evaluating expressions at the database level improves performance, and provides support for complex expression logic to create custom attributes and custom measures.

Important: Prior to using this feature in the Help see *Pre-Aggregation vs Post-Aggregation Calculation*.

Pre-aggregated expressions apply at the space level and by default are disabled. You enable it in Admin - Manage Space - Space Properties - Push Down Expressions to Database.

Important:

- If enabled, expect the results of existing report expressions to change because the expression is now aggregated in the database.

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- The “Push Down Expressions to Database” feature supports all report expressions except those that include positional calculations and dimensional expressions. To use these, you must disable “Push Down Expressions to Database”.

Once enabled, you can create custom attributes and measures in the Visualizer Expression Builder or the Designer Expressions dialog.

Custom attributes and measures are based on BQL expressions syntax.

Aggregation Rule Operators

For custom measures, aggregation rule operators perform the equivalent of specifying aggregation rules.

The entire BQL expression is enclosed using an aggregate rule operator.

For example, a SUM aggregation:

```
SUM([Order_Date: Sum: Quantity]*2)
```

For another example, an AVG aggregation:

```
AVG([Order_Date: Sum: Quantity]*2)
```

If an aggregate operator is not specified, SUM is taken as the default aggregation.

Examples of Pre-Aggregate Report Expressions

Custom Attribute / Custom Group Example

Example Expression

```
IIF([Products.Product Category] IN ('Desktops','Notebooks'),'Computers
Group','Other Electronics Group')
```

Logical Query

```
SELECT USING OUTER JOIN IIF([Products.Product Category] IN
('Desktops','Notebooks'),'Computers Group','Other Electronics Group') 'COL0' ,
[Order_Date: Sum: Revenue USD] 'COL1' FROM [ALL]
```

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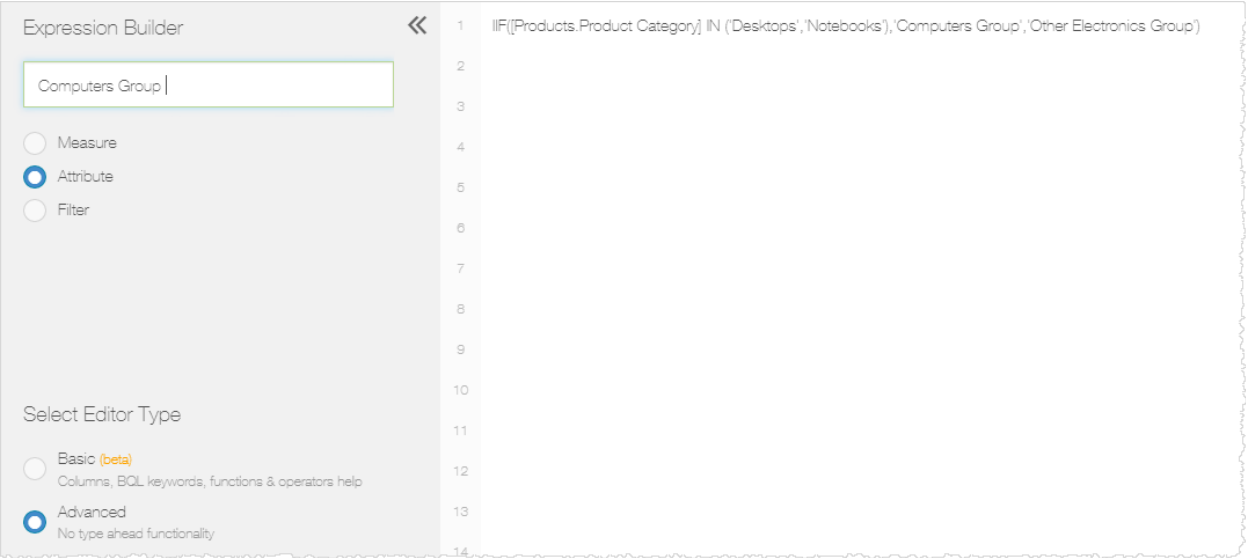
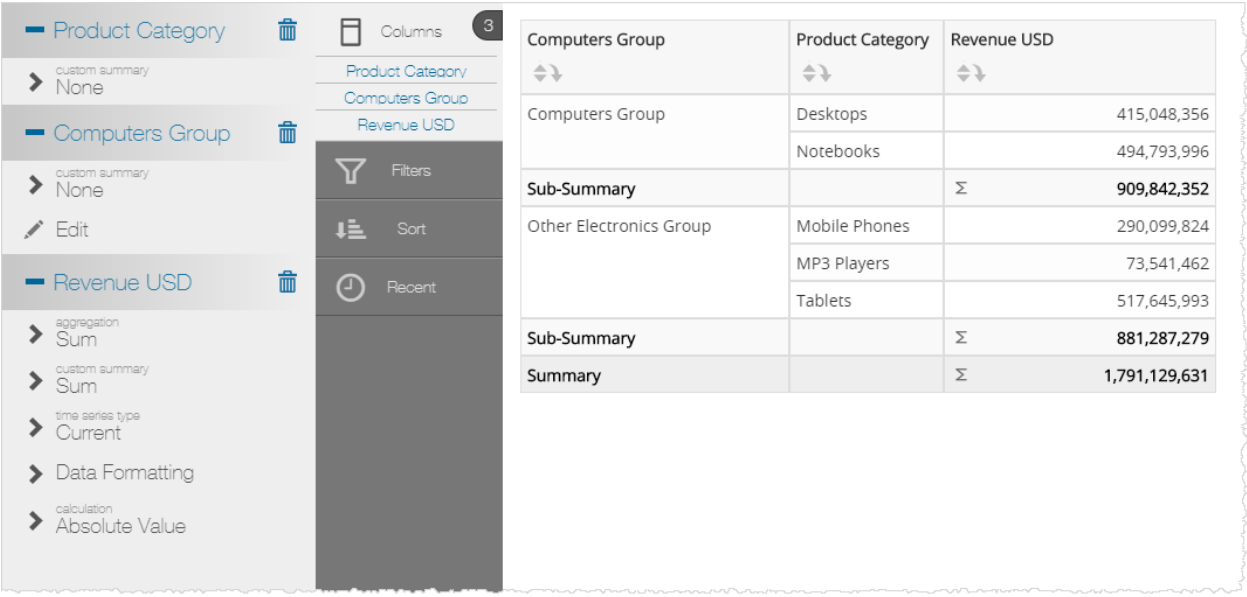
Expression in Visualizer



Results in a Visualizer Report



Cross-Hierarchy Custom Group Example

Expression

```
IIF([Products.Product Category] IN ('Desktops','Notebooks') AND [Stores.Store
Name] = 'Mango Online Store', 'Computers from Online Store','Electronics from
```

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```
other Stores')
```

Logical Query

```
SELECT USING OUTER JOIN IIF([Products.Product Category] IN
('Desktops','Notebooks') AND [Stores.Store Name] = 'Mango Online Store',
'Computers from Online Store','Electronics from other Stores') 'COL0' ,
[Order_Date: Sum: Revenue USD] 'COL1' FROM [ALL]
```

Expression in Visualizer

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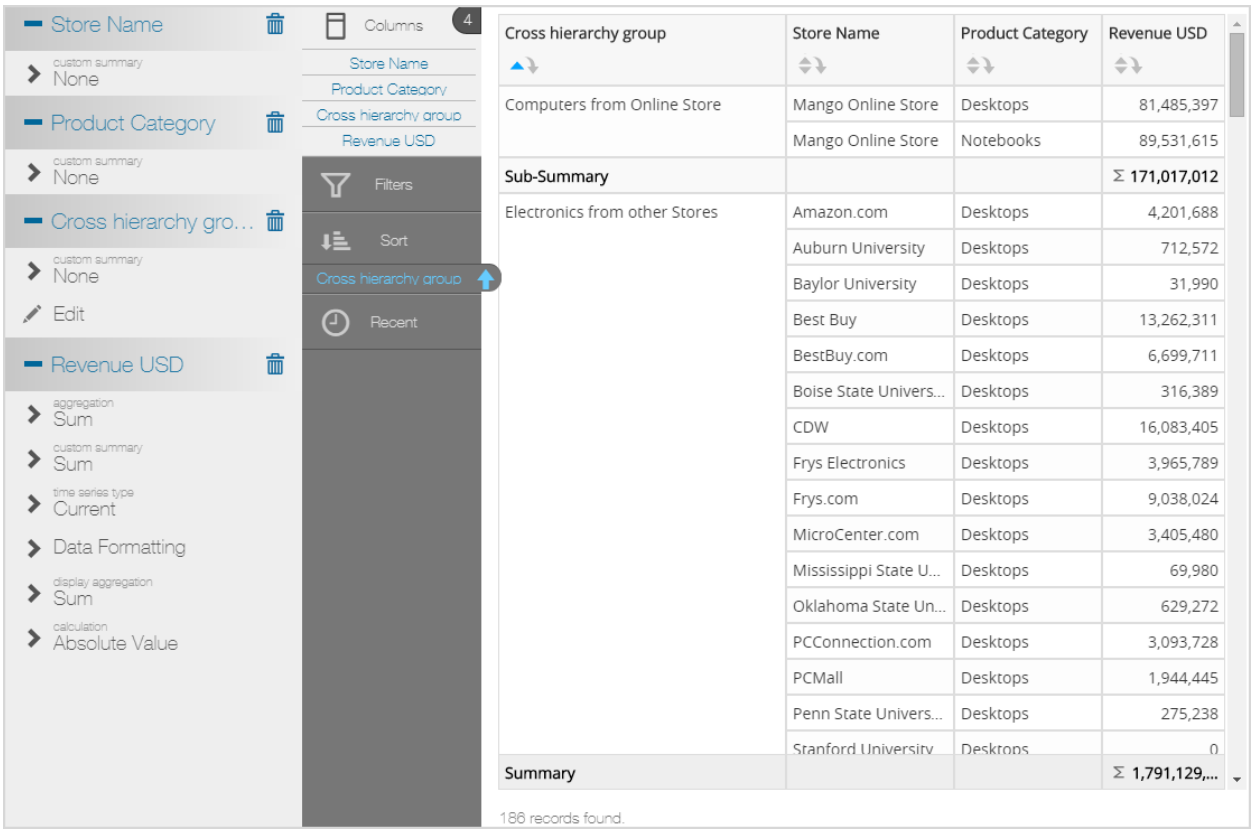
Results in a Visualizer Report



Custom Attribute Based on a Measure Example

Expression

```
IIF(Sum([Inventory_Date: Sum: Current_Inventory]) > 5000, 'More', 'Less')
```

Logical Query

```
SELECT USING OUTER JOIN IIF(Sum([Inventory_Date: Sum: Current_Inventory]) >
5000, 'High', 'Low') 'COL0' , [Inventory_Date: Sum: Current_Inventory] 'COL1'
, [Products.Product] 'COL2' FROM [ALL]
```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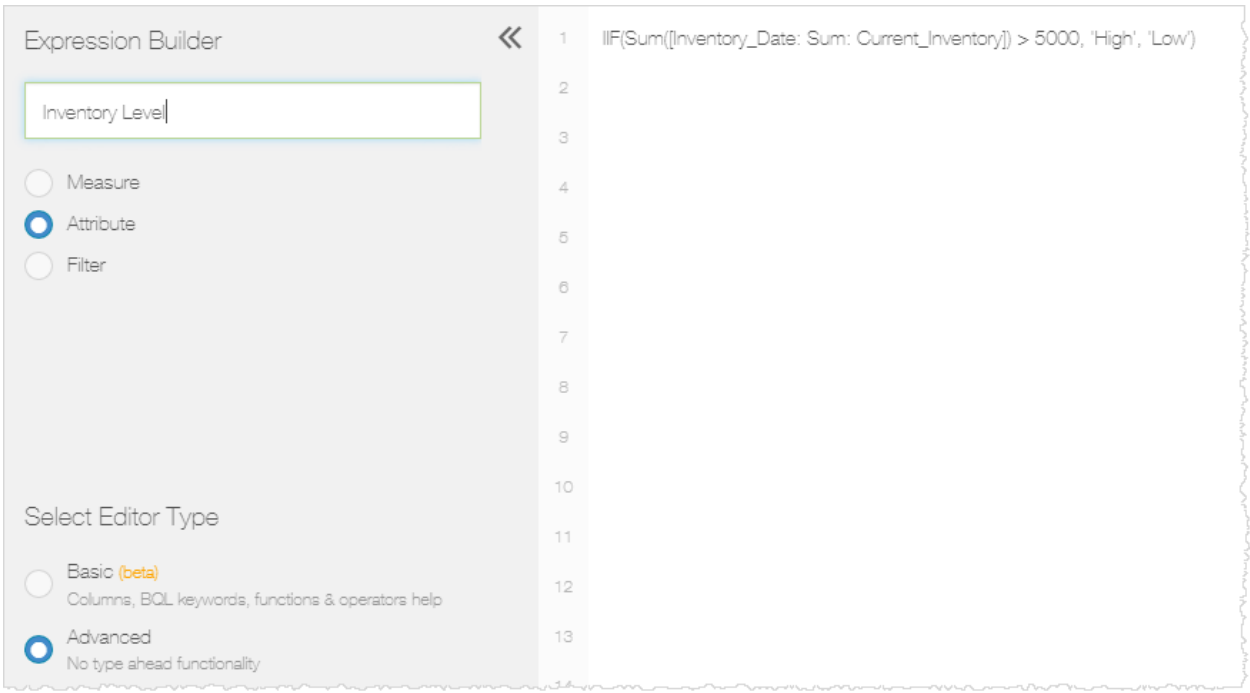
Expression in Visualizer



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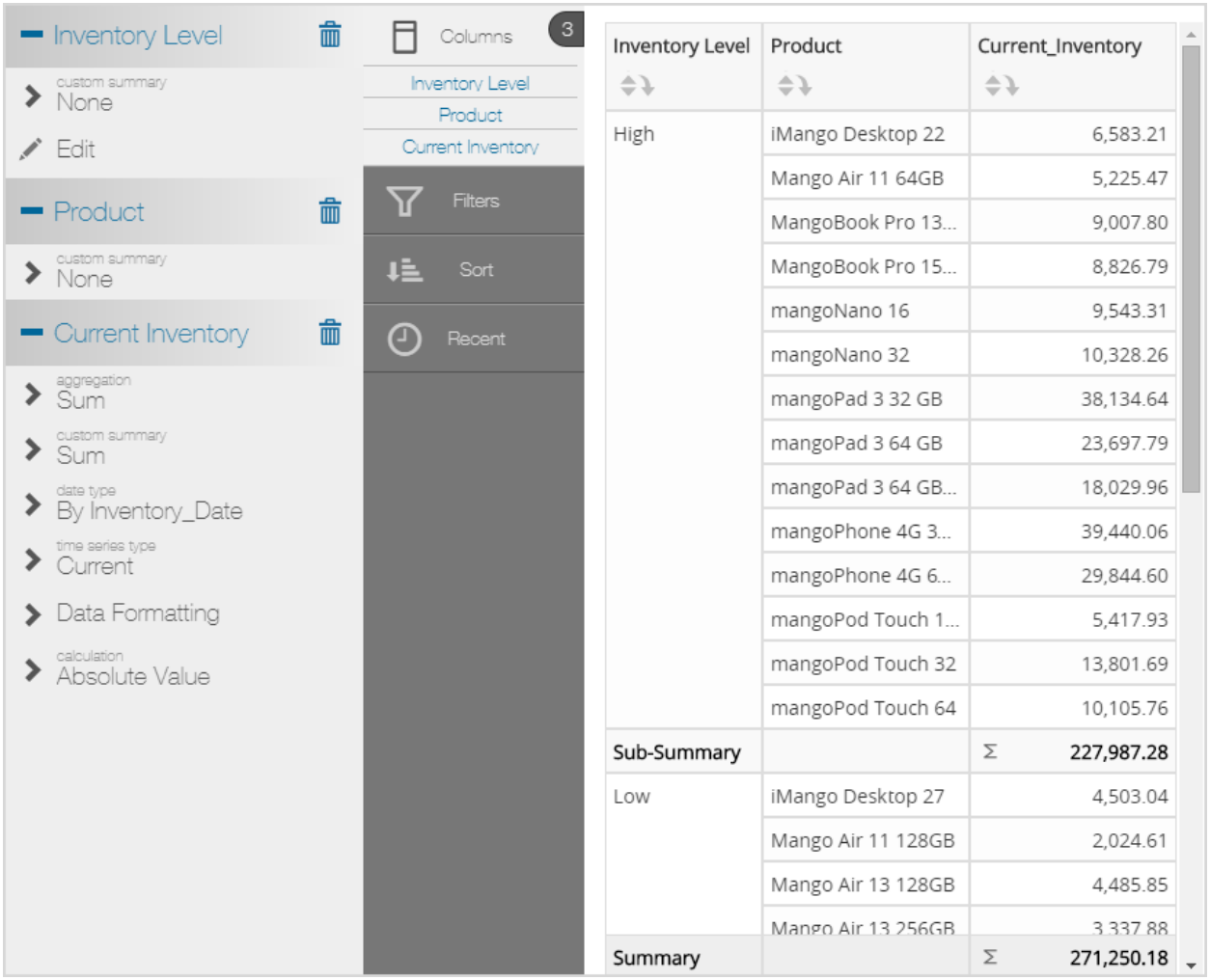
Results in a Visualizer Report



Custom Measure with Aggregate Rule Operator Example

This example shows both a custom measure and the Aggregate Rule operator comparing SUM and AVG.

SUM Expression

```
SUM([Order_Date: Sum: Quantity]*2)
```

AVG Expression

```
AVG([Order_Date: Sum: Quantity]*2)
```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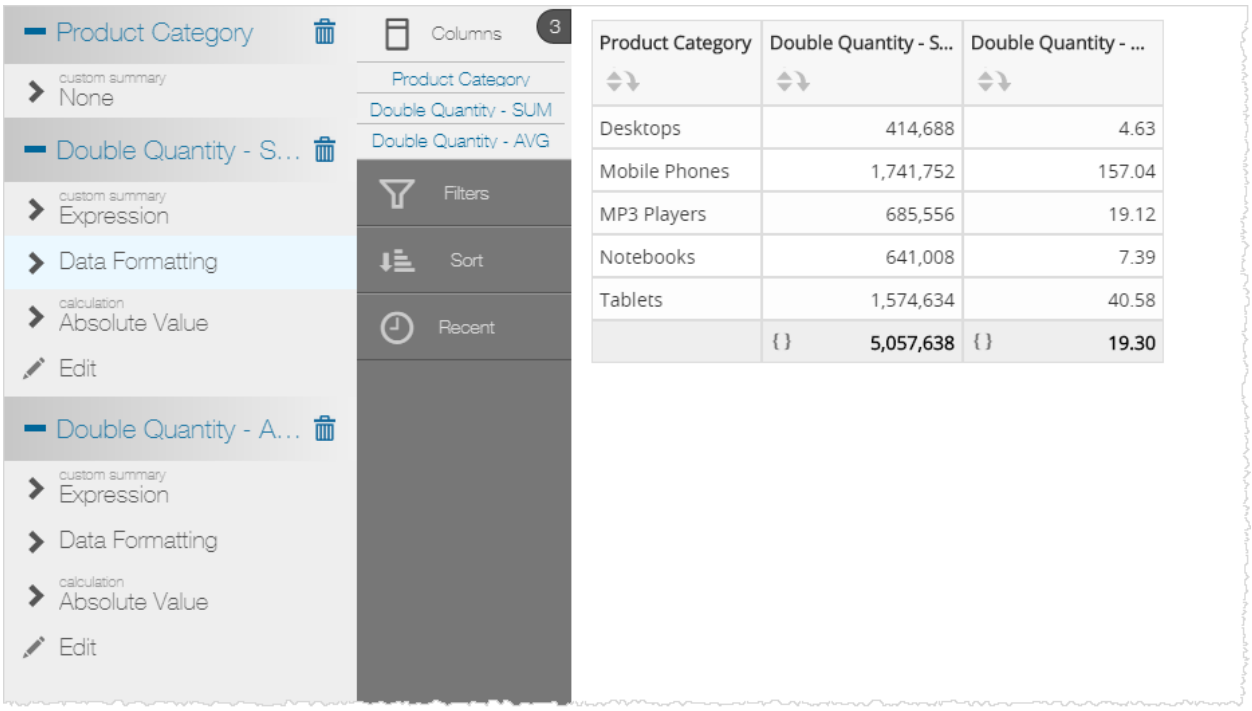
Logical Query

```
SELECT USING OUTER JOIN AVG([Order_Date: Sum: Quantity]*2) 'COL0' , SUM
([Order_Date: Sum: Quantity]*2) 'COL1' , [Products.Product Category] 'COL2'
FROM [ALL]
```

Results in a Visualizer Report



Custom Measure Based on an Attribute Example

Expression

```
Sum([Order_Date: Sum: Unit Cost]*[Accounts.Upsell Likelihood])
```

Logical Query

```
SELECT USING OUTER JOIN Sum([Order_Date: Sum: Unit Cost]*[Accounts.Upsell
Likelihood]) 'COL0' , [Products.Product] 'COL1' FROM [ALL]
```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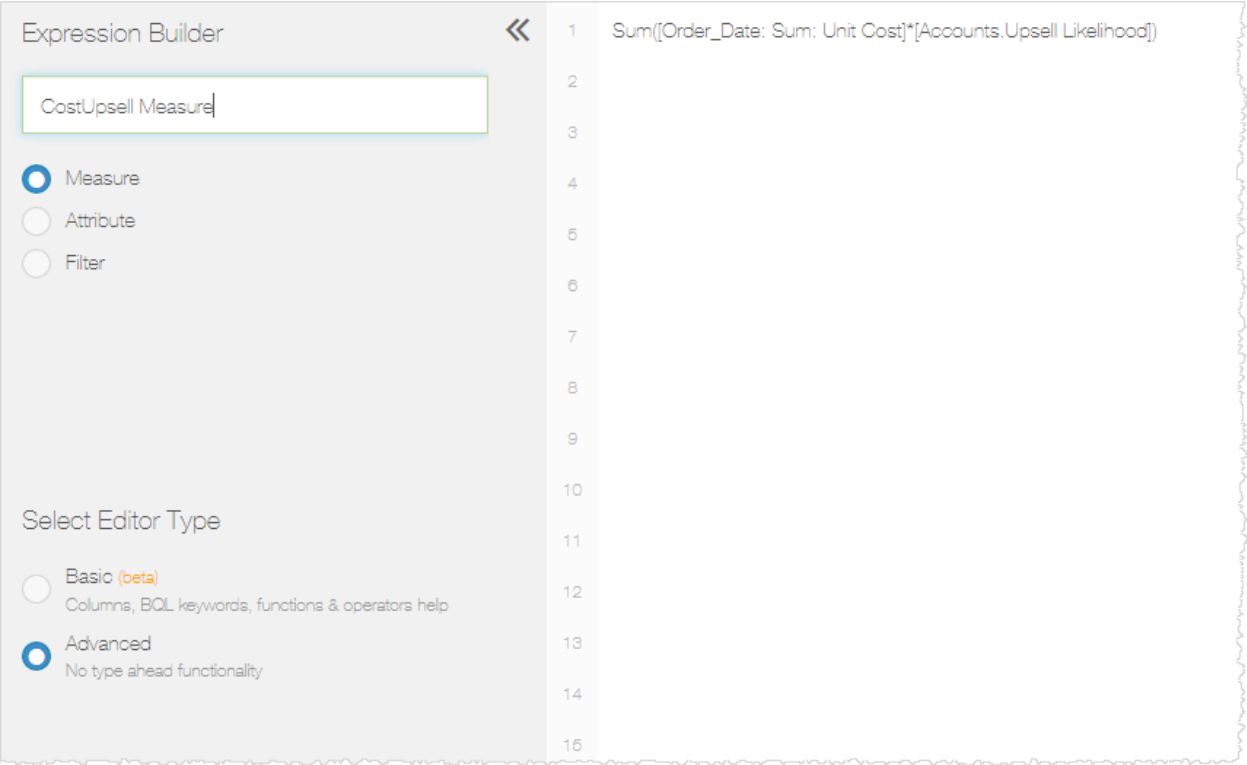
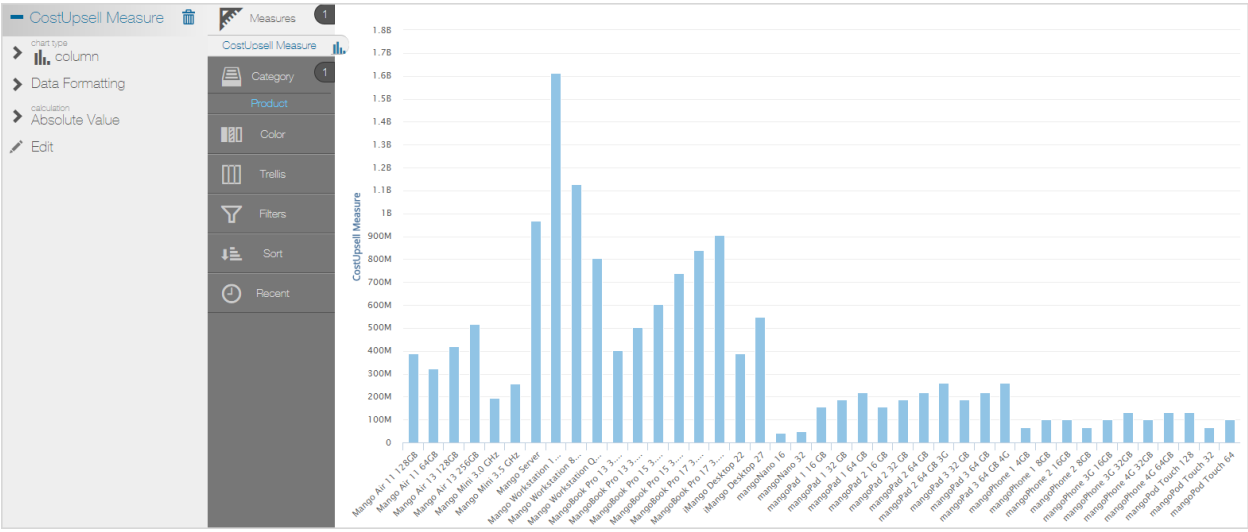
Expression in Visualizer



Results in a Visualizer Report



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Number, Date, and Time Pattern String Formats

BQL supports pattern string formatting for numbers, dates, and times. For example, using the FORMAT function in a BQL expression you can specify the format of the result of a SELECT statement. See .

In Designer you can specify, using pattern string notation, the formats to use for column values. In the Help see *Changing the Way Data is Formatted in a Designer Report*.

In Visualizer you select formats from the UI.

Birst supports the following pattern string formats.

- Number Formats
- Date and Time Formats
  - Date Format Examples
  - Tips for Formatting Dates

Number Formats

Number formats are used for amounts and percentages.

Format	Used For
#,###,###.##	Amounts. Will put a comma in for the 1000's and if there are decimals will only go two places.
#,###,###.00	Amounts. The zeros force two decimal places.
##,###,###.00%	Percentage (automatically multiplies by 100).
$##,###,###	Dollar amounts.

Date and Time Formats

Date and time formats are specified by date and time pattern strings. Within date and time pattern strings, unquoted letters from `A` to `Z` and from `a` to `z` are interpreted as pattern letters representing the components of a date or time string, as defined in the table below. Text that you want included in the output should be quoted using single quotes (`'`).

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Letter	Date or Time Component	Presentation	Examples
G	Era designator	Text	AD
y	Year	Year	1996; 96
Y	Week year	Year	2009; 09
M	Month in year	Month	July; Jul; 07
w	Week in year	Number	27
W	Week in month	Number	2
D	Day in year	Number	189
d	Day in month	Number	10
F	Day of week in month	Number	2
E	Day name in week	Text	Tuesday; Tue
u	Day number of week (1 = Monday, ..., 7 = Sunday)	Text	1
a	AM/PM marker	Text	PM
H	Hour in day (0-23)	Number	0
k	Hour in day (1-24)	Number	24
K	Hour in AM/PM (0-11)	Number	0
h	Hour in AM/PM (1-12)	Number	12
m	Minute in hour	Number	30

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Letter	Date or Time Component	Presentation	Examples
s	Second in minute	Number	55
S	Millisecond	Number	978
z	Time zone	General time zone	Pacific Standard Time; PST; GMT-08:00
Z	Time zone	RFC 822 time zone	-0800
X	Time zone	ISO 8601 time zone	-08; -0800; -08:00

The number of pattern letters determines the exact presentation:

- **Text:** If the number of pattern letters is 4 or more, the full form is used; otherwise a short or abbreviated form is used if available.
- **Number:** The number of pattern letters is the minimum number of digits, and shorter numbers are zero-padded to this amount.
- **Year:** If the number of pattern letters is 2, the year is truncated to 2 digits; otherwise it is interpreted as a number.
- **Month:** If the number of pattern letters is 3 or more, the month is interpreted as text; otherwise, it is interpreted as a number.
- **General time zone:** Time zones are interpreted as text if they have names. For time zones representing a GMT offset value, the following syntax is used:

```
GMTOffsetTimeZone:
        GMT  Sign  Hours  :  Minutes
```


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```
Sign: one of
        + -
Hours:
        Digit
        Digit  Digit
Minutes:
        Digit  Digit
Digit: one of
        0 1 2 3 4 5 6 7 8 9
```

Hours must be between 0 and 23, and **Minutes** must be between 00 and 59. The format is locale independent and digits must be taken from the Basic Latin block of the Unicode standard.

For parsing, RFC 822 time zones are also accepted.

- **RFC 822 time zone:** For formatting, the RFC 822 4-digit time zone format is used:

```
RFC822TimeZone:
        Sign  TwoDigitHours  Minutes
TwoDigitHours:
        Digit Digit
```

TwoDigitHours must be between 00 and 23.

Date Format Examples

The following examples show how date and time patterns are interpreted in the U.S. locale. The date and time used for the examples is 2011-07-04 12:08:56 local time in the U.S. Pacific Time time zone.

Date and Time Pattern	Result
`EEEE, d MMM yyyy HH:mm:ss Z`	Wednesday, 4 Jul 2011 12:08:56 -0700

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Date and Time Pattern	Result
`yyyy-MM-dd`	2011-07-04
`MM/dd/yyyy`	07/04/2011
`EEE, d MMM yyyy HH:mm:ss Z`	Wed, 4 Jul 2011 12:08:56 -0700
`yyMMddHHmmssZ`	150704120856-0700
`yyyy.MM.dd G 'at' HH:mm:ss z`	2015.07.04 AD at 12:08:56 PDT
`EEE, MMM d, ''yy`	Wed, Jul 4,'15
`yyyyy.MMMMM.dd GGG hh:mm aaa`	02015.July.04 AD 12:08 PM
`h:mm a`	12:08 PM
`K:mm a, z`	0:08 PM, PDT
`hh 'o''clock' a, zzzz`	12 o'clock PM, Pacific Daylight Time

Tips for Formatting Dates

Sometimes the same character is used to identify very different fields, with capitalization or number instances creating the different variations. Here are some tips for formatting dates:

- `m` is for minutes, `M` is for months. `M` means the month number (7), `MM` means the month number with a leading zero (07), `MMM` means the abbreviated name of the month (Jul), `MMMM` means the full name of the month (July).
- `d` is for day of month (4), `dd` is the day number with a leading zero (04), `D` is for day of year. `D` is rarely used.
- `H` is 24 hour time, `h` is 12 hour time. Using `hh` without `aaa` can be very confusing.
- `Z` is for timezone offset from GMT (-0700), `z` is for the 3 character ISO timezone identifier

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(GMT), `zzzz` is for the long form name (Greenwich Mean Time).

- `EEE` is for the abbreviated name for the day of the week (Wed), `EEEE` is for the full name (Wednesday).
- For most numeric items, use 2 or 4 instances of the character to force a leading zero if the number can be 1 or 2 digits. Use 4 for year to make sure there is no confusion as to the century or confusion with year and month or day.

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