SAS® Visual Analytics 8.2: Getting Started with Reports

Introduction

Reporting

The SAS Visual Analytics tools give you everything you need to produce and distribute clear and compelling reports.

- SAS Visual Analytics enables you to select data, create reports, email report links to users, and print reports to PDF.
- SAS Visual Analytics Viewer (the viewer) enables users to view and interact with reports using a web browser.
- SAS Mobile BI enables mobile device users to view and interact with reports.

Data Exploration

The SAS Visual Analytics tools are well suited to the tasks of familiarizing yourself with your data and using that data to inform your decisions. They provide:

- fast, visual responses so that you can use an iterative approach to exploring the data
- a plethora of visualizations so that you can adapt as you have insights
- advanced analytical tools (such as forecasting, correlations, and fit lines) to further guide and refine the exploration process

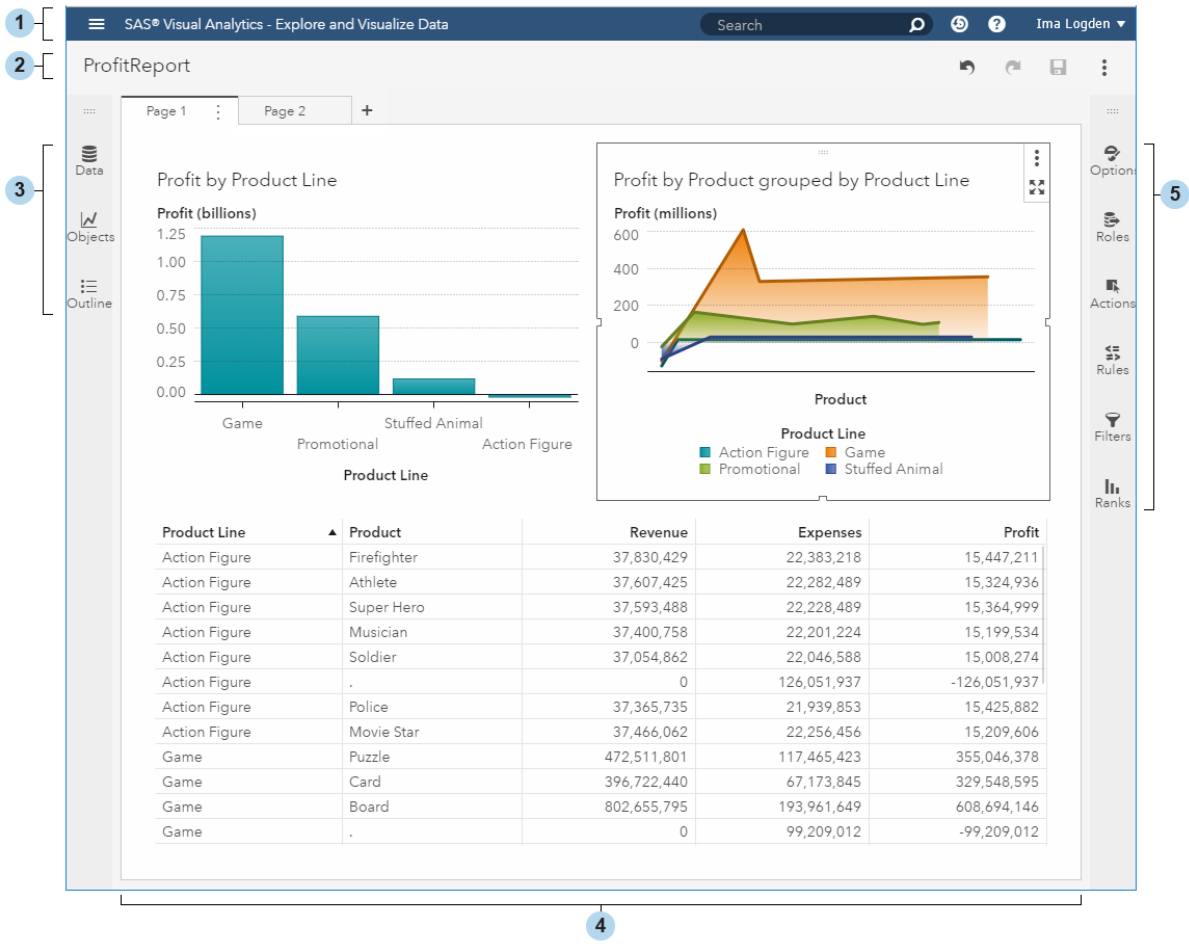
Note: If SAS Visual Statistics is licensed at your site, then visualizations are available for performing statistical modeling. SAS Visual Statistics supports prediction variable generation. For more information about getting started with modeling and prediction variable generation, see *SAS Visual Analytics: Getting Started with Analytical Models*.

Start SAS Visual Analytics

From SAS Home, start SAS Visual Analytics from the side menu. Click ≡ in the upper left of the page, and then click **Explore and Visualize Data**.

The SAS Visual Analytics Interface

Figure A.1 *SAS Visual Analytics Interface*



Product Line	Product	Revenue	Expenses	Profit
Action Figure	Firefighter	37,830,429	22,383,218	15,447,211
Action Figure	Athlete	37,607,425	22,282,489	15,324,936
Action Figure	Super Hero	37,593,488	22,228,489	15,364,999
Action Figure	Musician	37,400,758	22,201,224	15,199,534
Action Figure	Soldier	37,054,862	22,046,588	15,008,274
Action Figure	.	0	126,051,937	-126,051,937
Action Figure	Police	37,365,735	21,939,853	15,425,882
Action Figure	Movie Star	37,466,062	22,256,456	15,209,606
Game	Puzzle	472,511,801	117,465,423	355,046,378
Game	Card	396,722,440	67,173,845	329,548,595
Game	Board	802,655,795	193,961,649	608,694,146
Game	.	0	99,209,012	-99,209,012

1 The application bar enables you to access other SAS applications. You can search for items, see your recent items, access help, update your settings, and sign out of SAS Visual Analytics.

2 The menu bar displays the report name; enables you to undo, redo, and save; and manage and print your reports.

3 The left pane enables you to work with data, add objects, and use the report outline to organize your content.

4 The canvas is the workspace for building a report. The appearance of the canvas is affected by the report theme. A report can have multiple pages.

5 The right pane enables you to work with details about a report and its objects.

Create and View a Report

Create a Report

1 From SAS Home, click **Explore and Visualize Data**. SAS Visual Analytics opens.

2 Click **New**.

3 On the left side of the window, click **Objects**.

4 Drag and drop an object, such as a bar chart, onto the canvas.

5 Add data.

   a Click **Data** (on the left).

   From the **Available** data sources, select a data source, and click **OK**.

   b Drag and drop a category ( ) from the **Data** pane onto the bar chart.

   A category has alphanumeric, date, datetime, time, and numeric values that can be used as discrete groupings. For example, the values in a product category might include shoes and belts.

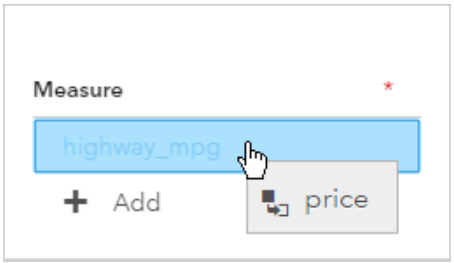
   c Drag and drop a measure ( ) from the **Data** pane onto the bar chart.

   A measure has numeric values. For example, the values in a sales measure might specify the quantity of units sold.

6 Replace the previous measure.

   a Drag and drop a different measure from the **Data** pane onto the bar chart, holding your pointer over the bar chart until the Measure window appears.

   b Drop the new measure onto the existing measure to replace it.



7 Click in the upper right to save.

   In the Save As window, select **My Folder**, and enter the filename. Click **Save**.

   Unsaved changes are lost if your session times out due to inactivity.

8 In the upper left corner, click ≡, and then select **Home**.

9 On SAS Home, notice that the saved report is in the **Recent** list.

View a Report

To open a report in SAS Report Viewer (the report viewer) from SAS Home, click on the report. Or, from SAS Visual Analytics, click ⋮ in the upper right, and select **View report**.

To open a report in a mobile app, launch the SAS Mobile BI app on the device, connect to a server, navigate to the report, and open it. Instructions vary by device. See *SAS Report Viewer Documentation* and the SAS support site. The SAS Mobile BI app is available from:

- Apple iTunes
- Google Play
- Microsoft Store

Tasks

This chapter highlights the core functionality of SAS Visual Analytics.

For additional instructions, see the **Help** menu or the SAS support site.

Availability of Tasks

What you can do depends on several factors:

- Your permissions.
- The currently selected object.
- Whether data has been defined. For example, you must add a data source before you can define filters.
- Whether a data item is already in use. For example, you cannot change a data item's role while it is being used as a category in a chart.

Data Tasks

Data-related tasks are initiated from the left pane.

Data Task	How to Initiate
Add a data source.	In the **Data** pane, click , and then select **Add data source**.
Insert a data display object (such as a table, graph, or gauge).	Drag and drop the object from the **Objects** pane onto the report.
Specify which report objects are displayed in the **Objects** pane.	At the top of the **Objects** pane, click ⋮ , and then select **Show or hide objects**.
Create a distinct count from a category.	In the **Data** pane, right-click on a category (or date) data item, and then select **New calculation**. Name the new calculation, and then click **OK** to accept the default **Distinct count** type.
Change the format of a measure, date, or numeric category.	In the **Data** pane, click ⌄ to the right of the data item.

Data Task	How to Initiate
Create a new custom category.	In the **Data** pane, click **New data item**, and then select **Custom category**.
Create a hierarchy for drill-down functionality.	In the **Data** pane, click **New data item**, and then select **Hierarchy**.
Hide a data item.	In the **Data** pane, click ⋮, and then select **Show or hide data items**. Alternatively, right-click a data item, and then select **Hide**.
Create a custom sort.	In the **Data** pane, right-click on a category data item, and then select **Custom sort**.
Exclude a subset of data from the entire data source.	In the **Data** pane, click, and then select **Apply data source filter**.
Get basic statistics about all measures.	In the **Data** pane, click, and then select **View measure details**.
Get additional statistics about a particular measure.	In the **Data** pane, click, and then select **View measure details**. Select the measure to view its details.
Change the data source for the current report.	In the **Data** pane, click, and then select **Change data source**.
Show multiple aggregations (or multiple formats) for a measure.	Right-click on the measure , select **Duplicate**, and then change the aggregation or format..
Create a custom geography data item.	In the **Data** pane, click **New data item**, and then select **Geography item**.
Display a geographic map with a bubble plot overlay, coordinates, or colored regions.	From the **Objects** pane **Graphs** list, drag and drop a geo map onto the canvas. Use the **Options** pane to specify the map type (Bubbles, Coordinates, or Regions). From the **Data** pane, drag a geographic data item onto the map.
Create the percentage of total for a measure.	In the **Data** pane, right-click on a measure (with a current default target aggregation of Sum or Count), and then select **New calculation**. For **Type**, select **Percent of total - Sum**.
Toggle automatically updating the report after each change.	Click ⋮ in the upper right of the report, and then select **Disable auto-refresh**. To enable, select **Enable auto-refresh**.
Export data from an object to a Microsoft Excel workbook, tab-separated, or comma-separated format.	Right-click on the object, and then select **Export data**.

Presentation Tasks

Presentation-related tasks are initiated from the right pane.

Presentation Task	How to Initiate
Format a chart's title.	Select the chart, and then click **Options**.
Add a trend line to a list table.	In a table, right-click on a column, and then select **Add sparkline**. (The data source must include a date data item.)
Change a bar chart's orientation.	Select the bar chart, and then click **Options**. In the **Bar** section, specify **Direction**.
Change a chart's colors or styles.	Select the chart, and then click **Options**.
Set up report-level conditional highlighting.	Ensure that no object is selected, and then click **Rules**. Click **New rule**, select a color, and then enter a value.
Set up object-level conditional highlighting.	Select the object, and then click **Rules**. Click **New rule**, and then select a data item on which to base the rule.
Add a new page to a report.	At the top of the canvas, click **+**.
Hide a page.	Click ⋮ on the page tab, and then select **Hide page**. In the viewer, hidden pages are not displayed as tabs. When a user double-clicks data that is associated with a hidden page, the hidden page is displayed in a new window.
Set up view-time filters (prompts).	Click ⋮ on the page tab, and then select **Expand page controls**. From the **Objects** pane, drag and drop a control object (for example, a button bar) onto the revealed drop zone at the top of the page. Then, from the **Roles** pane, select a category for the control object.
Set up view-time actions (where an action on one object affects other objects).	Select an object on the canvas. In the **Actions** pane, select **New action**, and then select **Filter**. Select the target object whose data will be filtered. To see a graphical representation of the filter (which you can edit), click **View Diagram** at the top of the **Actions** pane.
Display totals for list tables.	Select the list table, and then click **Options**. In the **Totals** section, select **Totals**.
Display totals and subtotals for crosstabs.	Select the crosstab, and then click **Options**. In the **Totals and Subtotals** section, select the type of sum and the formatting.
Create a basic or advanced filter.	Select an object, click **Filters**, and then click **New filter**. Select a data item or **Advanced filter**.
Create links to reports, pages, hidden windows, or external URLs.	Select an object, click **Actions**, and then click **New action**. Select the type of link that you want to create.
Rank values.	Select an object, click **Ranks**, and then click **New rank**.
Email a link to the report.	Click ⋮ in the upper right of the report, and then select **Share report** ⇨ **Email**.
Print reports.	Click ⋮ in the upper right of the report, and then select **Print**.
Distribute reports on a schedule.	Click ⋮ in the upper right of the report, and then select **Distribute report**.

Presentation Task	How to Initiate
Delete a report.	Delete a report from the Open dialog box. Click ⋮ in the upper right of the report, and then select **Open**. Select the report that you want to delete, and then click 🗑 (**Delete**).
Save an image of an object as a PNG.	Click on the object, select ⋮, and then select **Save image**.

Quick Reference

Data Sources

Reports (and each page within a report) can have multiple data sources. Data used for reports must be loaded into memory on the SAS Cloud Analytic Services (CAS) server. Any data that is accessible to a SAS/ACCESS engine can be loaded (for example, SAS data sets, Microsoft Excel spreadsheets, and delimited files like CSV files).

Gallery

This is an illustrated guide of the available graph types.

The appearance and functionality of a report are affected by the underlying data and the styles that you apply.

Table A.1 *Displaying Data and Results*

Product Brand	Product Line	Product	Expenses	Revenue
Novelty			$223,822,373.76	813,699,290
Toy	Action Figure	.	$126,051,936.57	0
		Athlete	$22,282,489.38	37,607,425
		Firefighter	$22,383,218.09	37,830,429
		Movie Star	$22,256,456.08	37,466,062
		Musician	$22,201,223.75	37,400,758
		Police	$21,939,853.19	37,365,735
		Soldier	$22,046,587.69	37,054,862
		Super Hero	$22,228,489.07	37,593,488
	Game	.	$99,209,012.37	0
		Board	$193,961,649.02	802,655,795
		Card	$67,173,844.50	396,722,440

A crosstab shows an aggregate metric for the intersections of two or more categories.

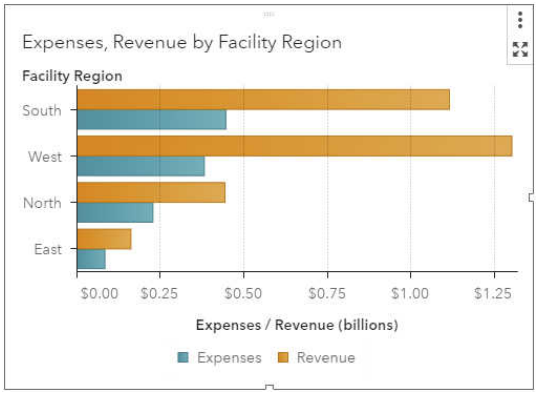
In a crosstab, categories are typically displayed in both the columns and the rows. Each cell value represents the aggregated measure from the intersection of the categories in the cell's row and column.

A crosstab uses less space than a traditional table and is easier to read because data is grouped both horizontally and vertically. A crosstab can use a hierarchy. Frequency is displayed when there are no measures in the crosstab.

Product Line	Revenue	Expenses	Profit	Profit Trend
Action Figure	262,318,761	$281,390,253.83	-19,071,493	
Game	1,671,890,035	$477,809,928.69	1,194,080,107	
Promotional	813,699,290	$223,822,373.76	589,876,916	
Stuffed Animal	276,990,966	$159,548,680.44	117,442,285	

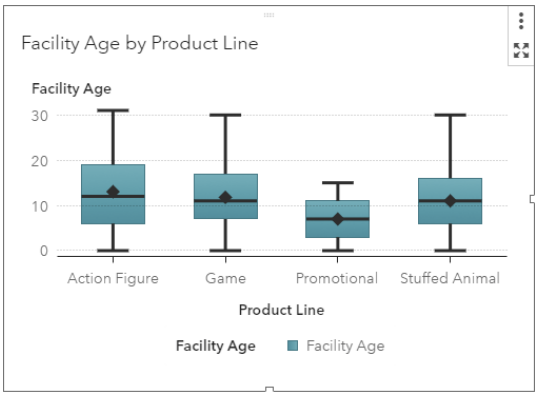
A list table is a two-dimensional representation of data. A list table cannot use a hierarchy.

List tables contain aggregated data (unless the **Detail data** option is selected). You can add sparklines to a column.



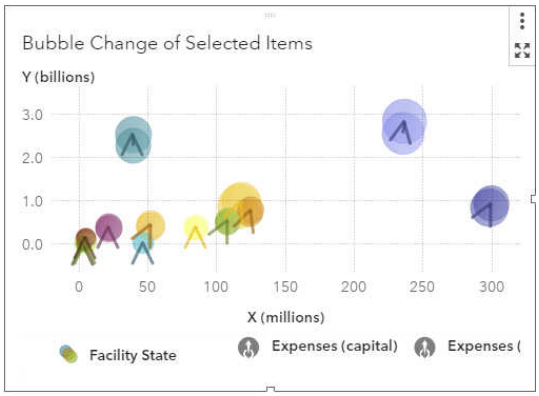
A bar chart displays bars that represent quantitative data.

You can apply grouping and create lattices.

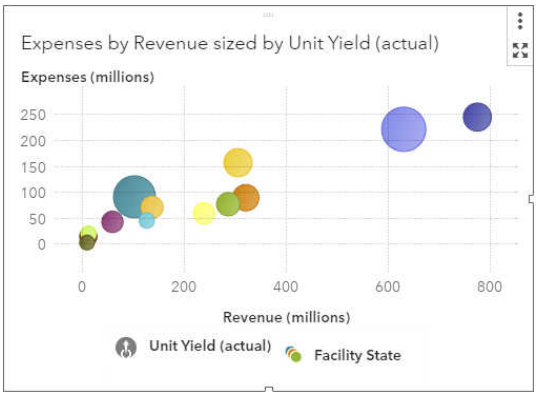


A box plot displays the distribution of values for a single measure. The size and location of the box indicate the range of values that are between the 25th and 75th percentile. The whiskers usually indicate the minimum and maximum of all data values, but can represent other ranges.

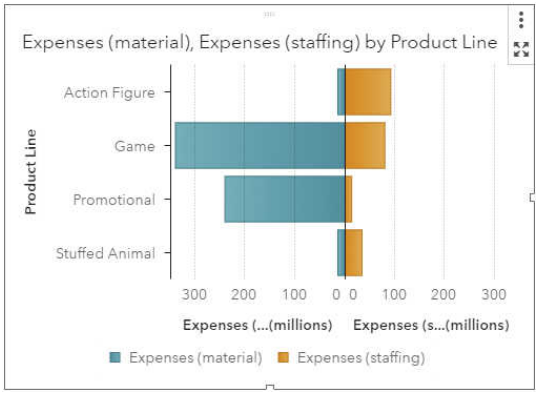
You can create lattices and specify whether the average value and outliers are displayed.



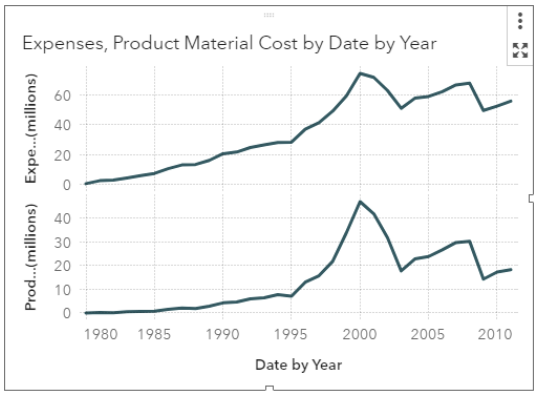
A bubble change plot displays the difference between two sets of measures.



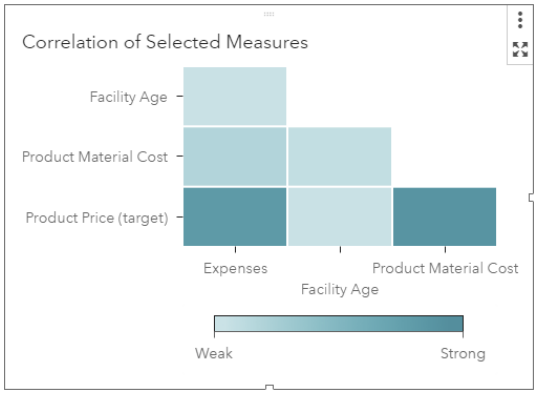
A bubble plot displays the relationships among at least three measures. Two measures are represented by the plot axes, and the third measure is represented by the size of the plot markers. Each bubble represents an observation. Bubble plots support grouping, lattices, and animation to display changes in the data over time.



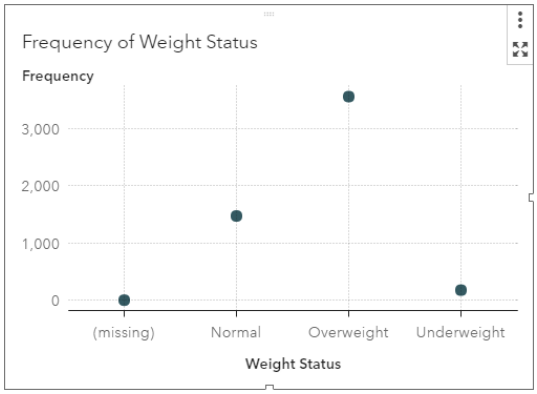
A butterfly chart compares two measures for a category of values.



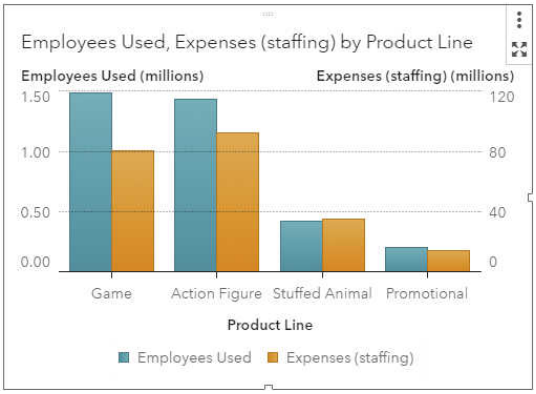
A comparative time series plot displays two measures on different scales over time.



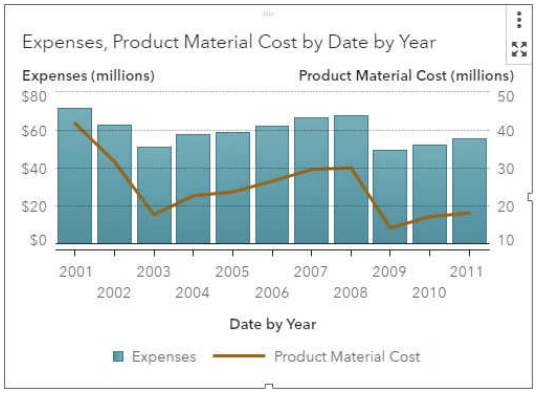
A correlation matrix displays the degree of correlation between measures as rectangular cells. Each cell in the matrix represents the intersection of two measures. The color of the cell indicates the degree of correlation between those two measures.



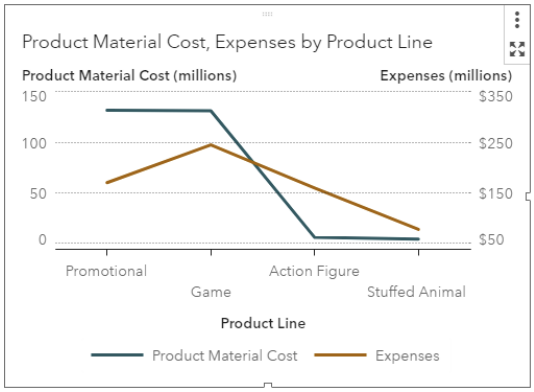
A dot plot displays the data for each value of a category.



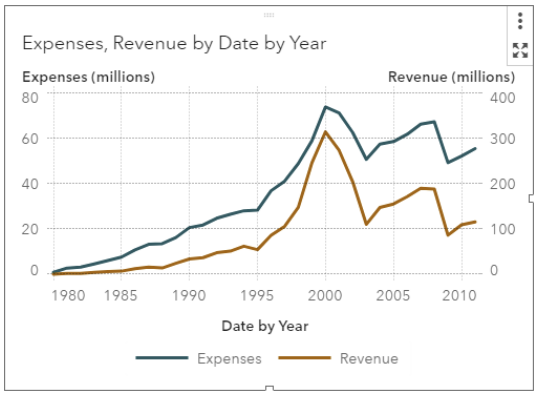
A dual axis bar chart displays two measures, one on each axis.



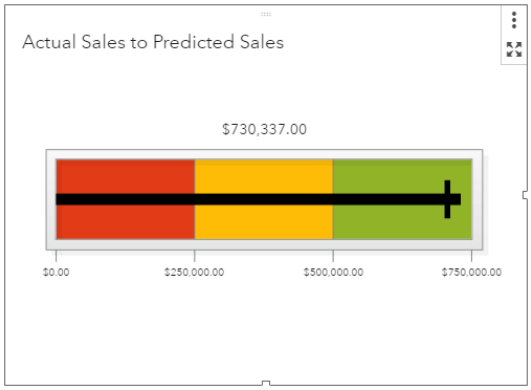
A dual axis bar-line chart displays two measures, one on each axis, with a line chart laid over the bar chart. The two measures in a dual axis bar-line chart have separate Y axes.



A dual axis line chart displays two measures, one on each axis. The relationship between two measures can be examined on two different scales in a dual axis line chart.

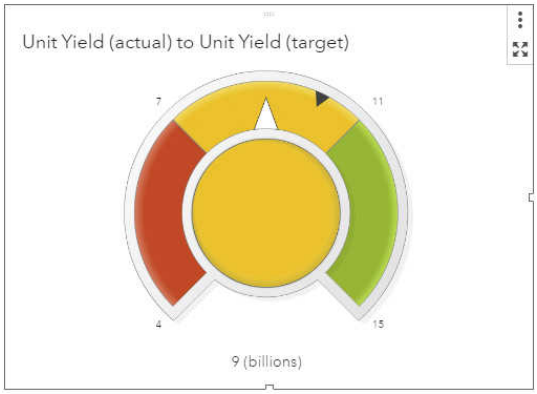


A dual axis time series plot displays two measures, on the left and right side of the Y axis.



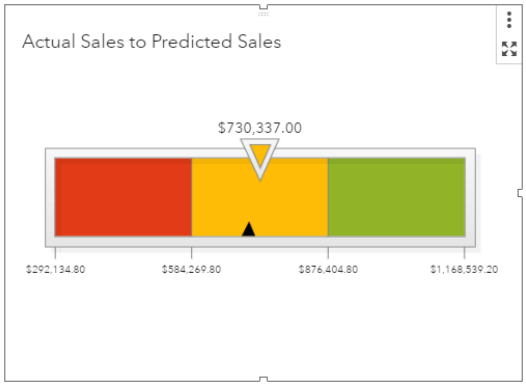
A gauge of type bullet compares an actual value to a target value. The target value is indicated by a line and the actual value is indicated by a bar.

The type of gauge is specified in the object's options.



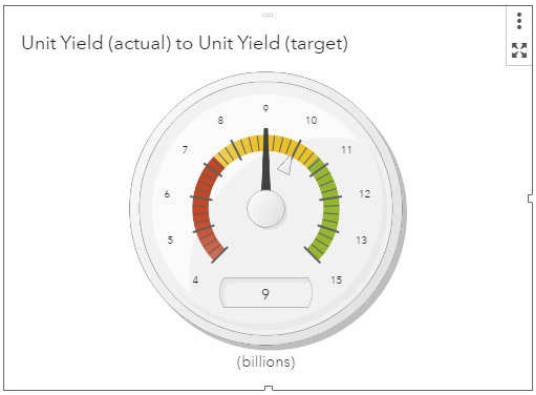
A gauge of type dial compares an actual value to a target value. The target value is indicated by a black arrow pointing inward. The actual value is indicated by a white arrow pointing outward.

The type of gauge is specified in the object's options.



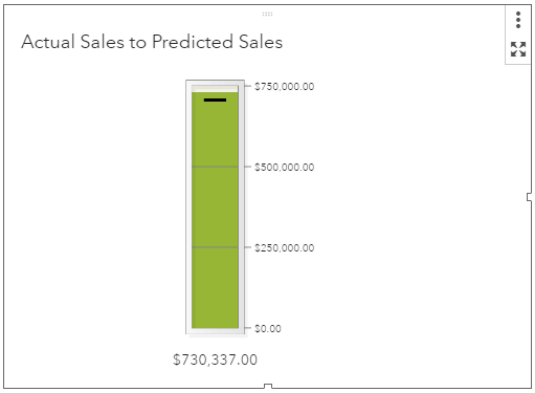
A gauge of type slider compares an actual value to a target value. The target value is indicated by a small black arrow. The actual value is indicated by a large arrow.

The type of gauge is specified in the object's options.



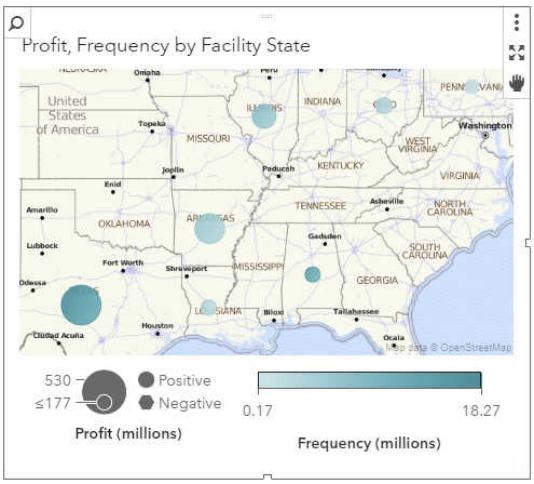
A gauge of type speedometer compares an actual value to a target value. The target value is indicated by a small white triangle. The actual value is indicated by a black pointer.

The type of gauge is specified in the object's options.



A gauge of type thermometer compares an actual value to a target value. The target value is indicated by a line. The actual value is indicated by the background bar.

The type of gauge is specified in the object's options.

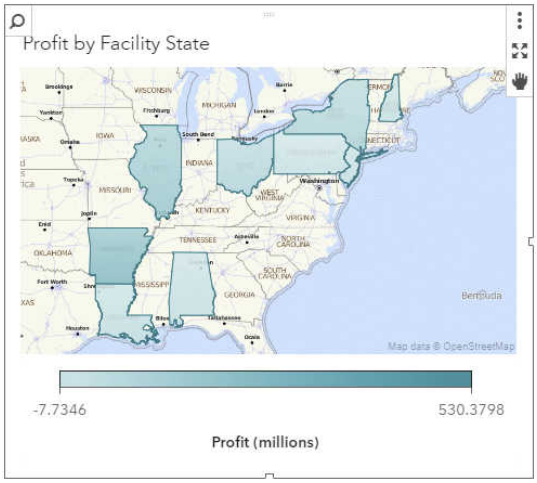


A geo map of type bubbles displays data as bubbles that are overlaid on a geographic map. Each bubble is located at a geographic location or at the center of a geographical region.

The type of geo map is specified in the object's options.

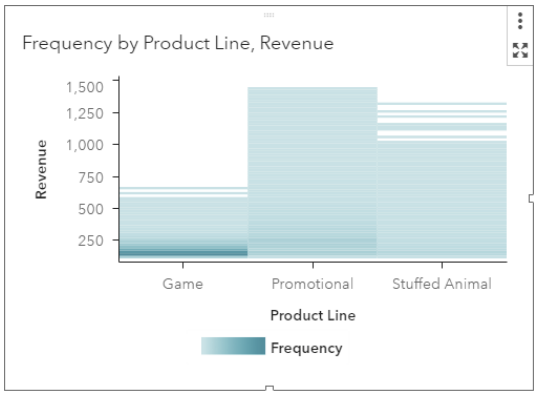
A geo map of type coordinates is a scatter plot that is overlaid on a geographic map. Each point is located at a geographic location or at the center of a geographical region.

The type of geo map is specified in the object's options.

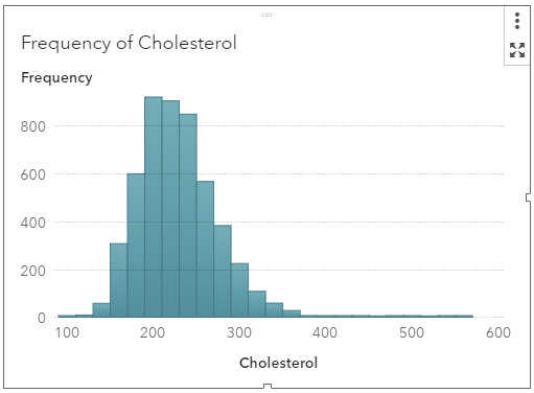


A geo map of type regions (also known as a choropleth map) displays data as colored regions. You can fill geographical boundaries (for example, a country or a state) on a map with color, based on measure values that are aggregated to the level defined by a geographical boundary.

The type of geo map is specified in the object's options.

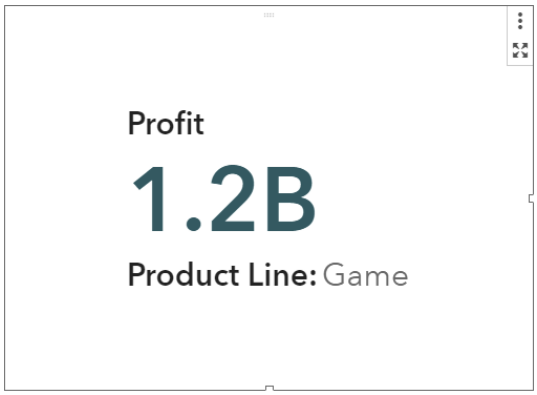


A heat map displays the distribution of values for two data items by using a grid of colored cells.

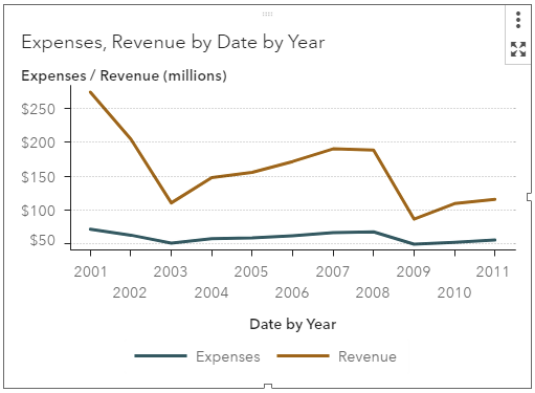


A histogram displays the distribution of values for a single measure.

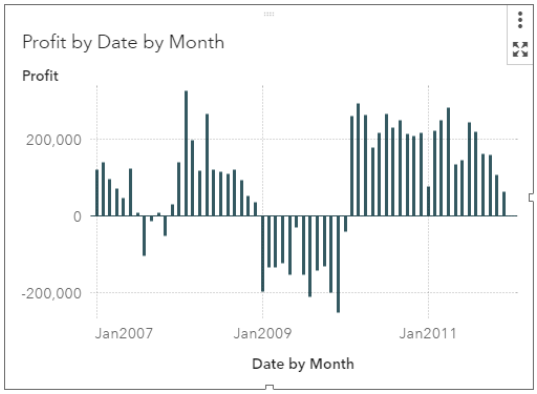
You can specify whether the values are displayed as a percentage or as a count.



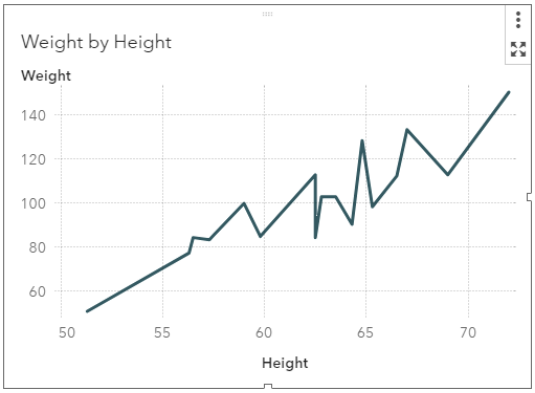
A key value displays a single aggregated value for a measure, a category, or both.



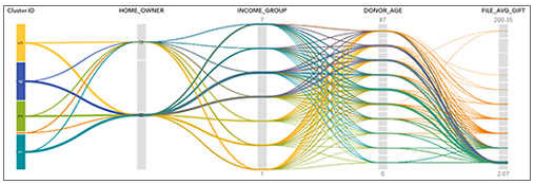
A line chart shows the relationship of one variable to another. Line charts support grouping, lattices, and time series.



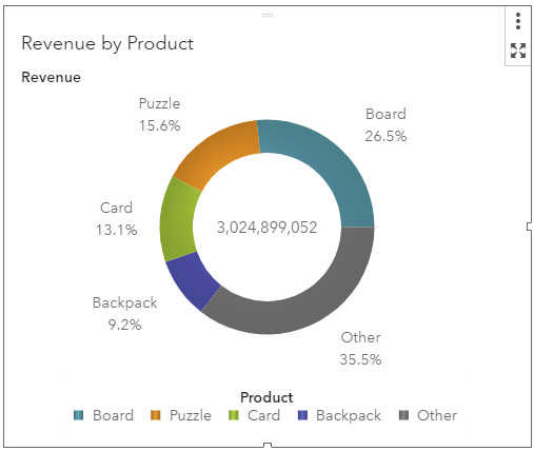
A needle plot displays data points that connect to a horizontal baseline. The baseline intersects the 0 value or the minimum value on the vertical axis.



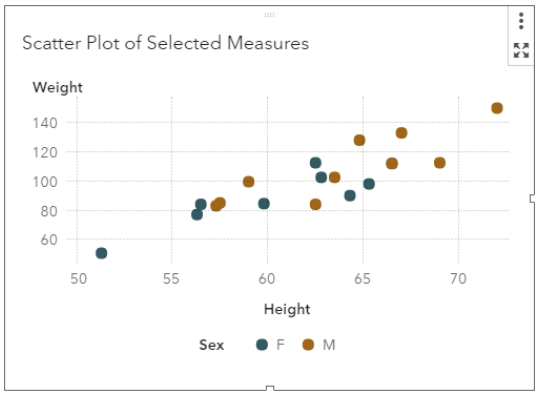
A numeric series plot shows the relationship of two or more measures.



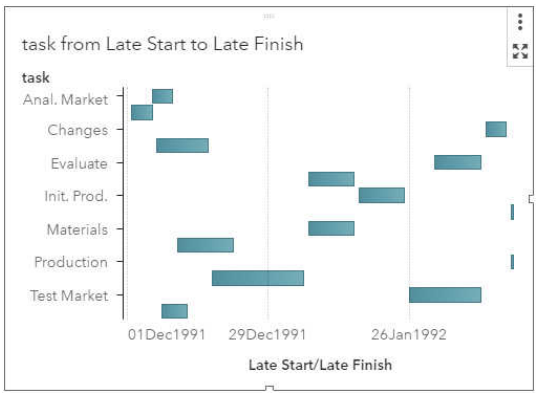
A parallel coordinates plot displays data as lines moving through categories and binned measures. The thickness of a line indicates the number of observations in that bin.



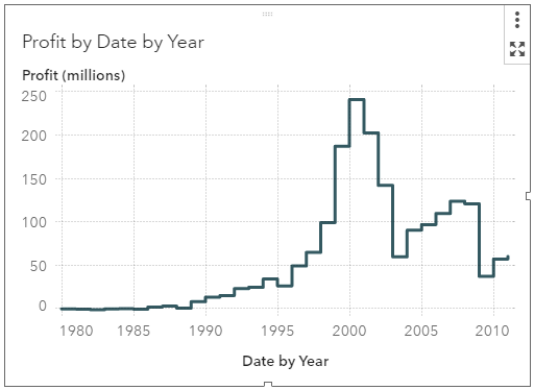
A pie chart displays sections that represent the relative contribution of each part to the whole.



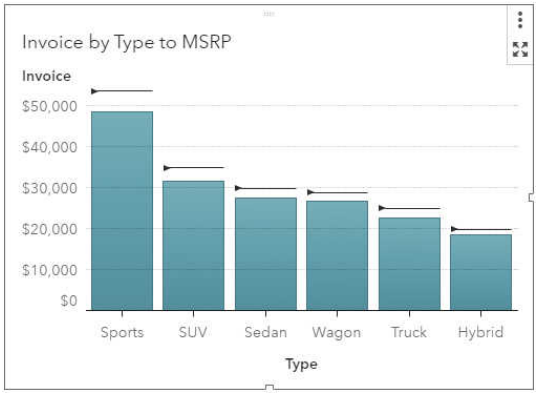
A scatter plot displays the relationship between two measures. Each marker represents an observation. The marker position indicates the value for each observation.



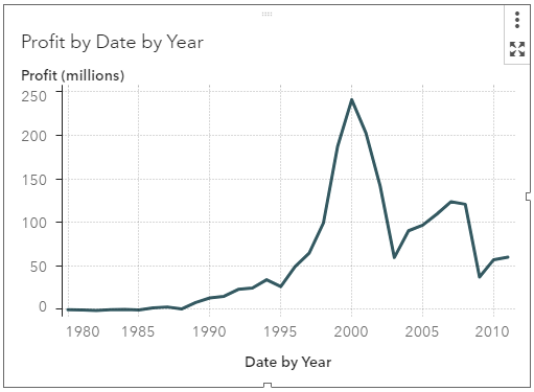
A schedule chart displays the duration of events.



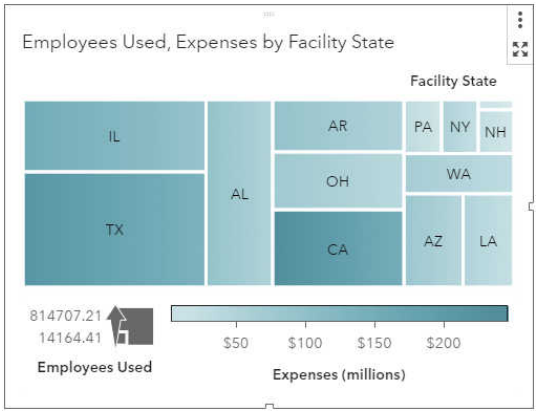
A step plot displays the point on the X axis when a change in the Y axis measure occurs.



A targeted bar chart is a bar chart that displays target values. In this example, the pointers appear above each bar.

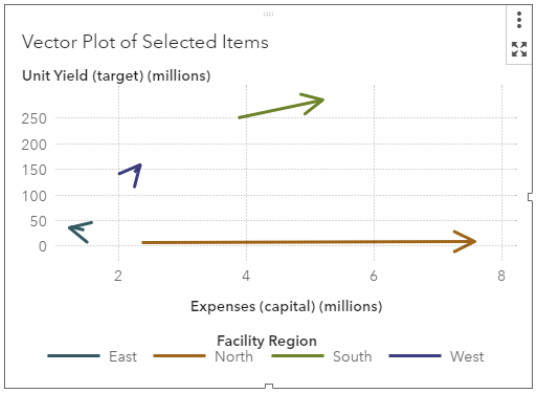


A time series plot displays a sequence of values observed at equally spaced time intervals.

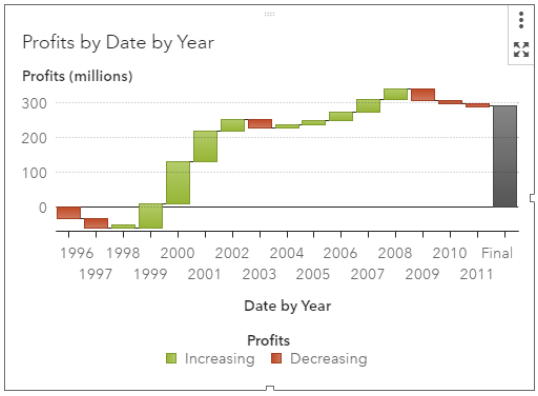


A treemap displays data as a set of rectangular tiles. Each tile represents a category or a hierarchy node. The color of each tile represents the value of the first measure. The size of each tile represents the value of the second measure.

For example, a facility expense treemap might have tile sizes that represent the number of employees and tile colors that represent the amount spent.



A vector plot displays the change in data by using line segments or vectors to represent both direction and magnitude.



A waterfall chart (also known as a progressive bar chart) displays how incremental changes lead to the final value of the measure.

The first bar begins at the initial value, and each subsequent bar begins where the previous bar ends. The length and direction of a bar indicate the magnitude and type of change (positive or negative).

A word cloud displays a set of category values as text. The size of each word in the cloud can indicate the frequency of the word in a category, the relevance of the word to a topic, or the value of a measure.

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