



Introduction to SAS[®] 9.4 Platform Graphing

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A Quick Look at the SAS Graphing Software

SAS Platform Graphing Software

Regardless of your level of proficiency with SAS, you can use ODS Graphics or SAS/GRAPH software to develop a wide variety of graphs. These can range from simple plots to complex, multi-cell graphs. The SAS Platform provides the following main graph software systems:

ODS Graphics

produce a wide variety of graphics through the Output Delivery System (ODS) in industry-standard image formats such as PNG and SVG. SAS provides a suite of ODS Graphics software that you can use to create maps and template-based graphs. In addition, many analytical procedures also use ODS Graphics to produce graphs automatically by default.

ODS Graphics is installed as part of Base SAS.

SAS/GRAPH

produces maps and a variety of charts and plots using devices to generate output in formats such as PNG, PDF, and SVG. Most procedures that produce device-based graphics also produce GRSEG catalog entries in addition to any image files, vector files, or displayed output. See [“SAS/GRAPH” on page 5](#).

SAS/GRAPH is an optional product. It might not be available at your site.

ODS Graphics

A Quick Overview of ODS Graphics

SAS ODS Graphics, sometimes called SAS ODS Statistical Graphics, is an extension of the SAS Output Delivery System (ODS). ODS Graphics provides SAS analytical procedures to create complex analytical graphs that deliver the analysis results with clarity and without clutter. ODS Graphics provides relevant graphs automatically as part of these analytical procedures. In addition, you have easy-to-use tools for creating related graphs for previewing the data or for creating graphs from the results of multiple analyses.

ODS Graphics is driven by the Graph Template Language (GTL), which provides the power and flexibility to create many complex graphs. For SAS analytical procedures that support ODS Graphics, standard GTL templates that generate graphics output are delivered with SAS. You can modify these templates in order to customize the appearance of the graphics output of these procedures. You can also use GTL to create your own templates for creating custom graphics. Because of the power and flexibility of the GTL language, modifying or creating template code can be a complex task. Typically, working with GTL is a task for advanced graph programmers.

You can use ODS Graphics software to generate commonly used graphs independent of SAS analytical procedures. Although ODS Graphics software was initially designed to facilitate the production of statistical graphs, its capabilities are also well suited for the production of non-statistical, business graphs. These graphs can be used for the preliminary exploration of data and the construction of specialized displays for analyses.

ODS Graphics Software

The ODS Graphics system contains the following software:

ODS GRAPHICS statement

controls the graphics capabilities of SAS analytical and Base procedures that support ODS Graphics. The statement enables or disables ODS Graphics processing and sets graphics environment options. ODS Graphics is enabled by default on all platforms except z/OS.

You can use the ODS GRAPHICS statement options to control many aspects of your graphics. For example, you can use options to specify the size and format of your output images. The settings that you specify remain in effect for all graphics until you exit the session. Within the

session, they remain in effect until you change them or reset these settings with another ODS GRAPHICS statement.

SAS ODS Graphics procedures

provide a concise syntax for creating effective statistical graphs. The SGPLOT, SGPANEL, and SGSCATTER procedures provide access to the most commonly used features of the SAS Graph Template Language. These procedures enable you to create single-cell plots and charts, multi-page classification panels, comparative scatter plots, and scatter plot matrices. The procedures provide many options for customizing the appearance of your graphs.

Starting with SAS 9.4M6, a new SGPIE procedure enables you to create pie and donut charts. This procedure is preproduction.

Starting with SAS 9.4M5, ODS Graphics software includes the capability to render maps. The SGMAP procedure is based on the functionality of ODS Graphics. Use the SGMAP procedure to create maps and then overlay plots such as text, scatter, or bubble plots.

Graph Template Language (GTL)

provides the power and flexibility to create advanced statistical graphics. Advanced graph programmers can create customized layouts and graphs with Graph Template Language.

SAS ODS Graphics Designer

enables you to interactively create and design custom graphs. The ODS Graphics Designer provides a graphical user interface for designing graphs easily without having to know the details of the Graph Template Language.

Note: Starting with SAS 9.4M8, the ODS Graphics Designer no longer ships with SAS. It is available in SAS 9.4M7 and earlier releases.

SAS ODS Graphics Editor

enables you to edit and enhance graphs that are produced by the ODS Graphics procedures or by the Graph Template Language. The ODS Graphics Editor is an interactive editor. It enables you to modify the elements of a graph or to add new features, such as titles, arrows, and text boxes.

Note: Starting with SAS 9.4M8, the ODS Graphics Editor no longer ships with SAS. It is available in SAS 9.4M7 and earlier releases.

Automatic ODS Graphics from SAS Analytical Procedures

The SAS analytical procedures that support ODS Graphics can produce graphs automatically when ODS Graphics is enabled in SAS code. When ODS Graphics is enabled, the graphs specified as part of any procedure's output are written to the active ODS destinations. You can control the specific graphs that are produced by using the PLOTS= options in the procedure statement or by using the ODS SELECT and ODS EXCLUDE statements. When ODS Graphics is disabled, these procedures do not produce graphs.

In SAS 9.4 and later releases, ODS Graphics is enabled by default. To disable automatic graphics, use the following statement:

```
ods graphics off ;
```

To re-enable automatic graphics, use the following statement:

```
ods graphics <on> </ options >;
```

Base SAS statistical procedures CORR, FREQ, and UNIVARIATE support ODS Graphics. See *Base SAS Procedures Guide: Statistical Procedures* for more information. Many other SAS procedures

also support ODS Graphics. To determine whether the procedures that you are using support ODS Graphics, refer to the procedure documentation.

SAS/GRAPH

SAS/GRAPH is an optional software product that creates and delivers accurate, high-impact visuals. This enables decision makers to gain a quick understanding of critical business issues. SAS/GRAPH software produces a variety of graphs and maps using a device-based system.

Devices control the format of your graphics and determine the type of output. For example, devices determine whether SAS/GRAPH produces a PNG file or an SVG file. For device-based graphics, you can specify the graphical output environment such as the graphics output format, image size, and so on. For example, you can send the graphics output to a hard copy graphics output device such as a printer, plotter, or slide camera.

SAS/GRAPH creates presentation graphics. It can create text slides, display several graphics at one time, combine graphics and text in one display, and create automated presentations.

The variety of graphics output that is generated can be reviewed, displayed on your screen or in a web browser, or stored in catalogs.

Note: SAS/GRAPH requires a separate license to install. It might not be installed at your site.

The SAS/GRAPH system contains the following software:

Statements used by SAS/GRAPH

global and local statements provided by SAS/GRAPH and by Base SAS enable you to enhance the appearance of graphical output by selecting text fonts, colors, patterns, and line styles.

SAS/GRAPH procedures

organize the presentation of your data and visually represent the relationship between data values as two- or three-dimensional graphs, including charts, plots, and maps. SAS/GRAPH provides GMAP, a robust mapping procedure that can create block, choropleth, prism, and surface maps. SAS/GRAPH also provides utility procedures and statements to manage the output.

SAS/GRAPH annotate facility

enables you to generate a special data set of graphics commands from which you can produce graphics output. The Annotate data set is used to generate custom graphics or to enhance graphics output from many device-based SAS/GRAPH procedures.

SAS Studio

SAS Studio is a development application for SAS that you access through your web browser. With SAS Studio, you can access your data files, libraries, and existing programs, and you can write new programs. You can also use the predefined tasks in SAS Studio to generate SAS code.

SAS Enterprise Guide

SAS Enterprise Guide is a project-oriented Windows application that provides a programmer and end-user interface to the SAS system. The point-and-click interface gives access to SAS and CAS data files, data in other software vendors' formats, and data in other operating systems. Use the predefined graph tasks in SAS Enterprise Guide to generate SAS code and produce graphics. In order to create any graph except a scatter plot matrix with this visual tool, you must license the SAS/GRAPH software product. If SAS Visual Analytics is installed at your site, you can upload data to a SAS LASR Analytic Server and access that data in SAS Visual Analytics.

Selecting the Graphing Software To Use

Now that you are familiar with the graphing software available, you can begin to decide which software can best help you create the graph that you need. The following list steps you through the decision process. Following this list is a cross-reference chart that visually correlates a given plot or chart type to the recommended graphing software.

The following cross-reference chart offers a visual aid for selecting a graph product based on plot or chart type. The chart links to the gallery depicting each type.

- 1 Select the plot or chart type that you want to create.
- 2 Decide whether to create the plot or chart with visual software or with software that enables you to write a program.
- 3 To visually create a plot or chart, it is recommended to use SAS Studio for those graph tasks that are supported. If SAS Studio does not support the graph type, then use SAS Enterprise Guide. If SAS Enterprise Guide does not support the graph type, then use ODS Graphics Designer. If the graph type is not supported by ODS Graphics Designer, then you must create the graph programmatically using SAS graphing software and its procedures.
- 4 If the graph type is supported by ODS Graphics, use one of its procedures to programmatically create it.
 - a If the graph can be created with the SGPLOT, SGPANEL, or SGSCATTER procedure, use one of them.
 - b Otherwise, use Graph Template Language (GTL).
- 5 If the graph type is supported only by SAS/GRAPH, use SAS/GRAPH graphing software.

Note: SAS/GRAPH requires a separate installation license, and might not be installed at your site.

To help you determine the SAS graphing software that meets your basic graph needs, [Table 1 on page 7](#) provides a cross-reference of graph types to SAS graphing software. The cross-reference is subdivided into SAS procedures and SAS visual tools. SAS procedures represents the programming software, including ODS Graphics, GTL, and SAS/GRAPH.

The ODS Graphics Graph Template Language (GTL) is used to define ODS statistical graphics templates. GTL enables advanced SAS programmers to create templates for their own advanced statistical graphics. It also enables them to customize the predefined templates that are used by SAS analytic procedures that generate ODS Graphics. GTL templates are compiled by the TEMPLATE procedure and are rendered by the SGRENDER procedure. Because the TEMPLATE and SGRENDER procedures are necessary in order to generate graphs from GTL, GTL is listed in the cross-reference under SAS procedures.

For the visual tools, SAS Studio and SAS Enterprise Guide offer graph tasks that run procedures transparently. They both have the capability to process CAS data and SAS Studio runs in SAS Viya, whereas ODS Graphics Designer has neither capability.

Note: Advanced graphs are not covered in this document.

Note: Certain procedures and graphing software statements cannot work with data stored on servers that distribute data, such as SAS LASR Analytic Server, Teradata server, or SAS CAS server. The procedure documentation provides such detail, and is linked to from this document.

The following icons are used in the cross-reference:


-  indicates that the graphing software is recommended for that graph type when using SAS procedures or a SAS visual tool to generate your graphs. This icon links to information about how to create that graph using the graphing software or visual tool.
- ✓ indicates that the graphing software supports that graph type.
- × indicates that the graphing software does not support that graph type.

Table 1 Chart and Plot Type to SAS Graphing Software Cross-Reference













Chart or Plot	SAS Graphing Software Support					
	SAS Procedures			SAS Visual Tools		
	ODS Graphics	GTL	SAS/GRAPH	SAS Studio	ODS Graphics Designer ³	SAS Enterprise Guide
Area bar chart	×	×		×	×	×
Area plot (Line, step, and spline)	×	✓ ²		×	×	
Band plot		✓	×	×		×
Bar chart		✓	✓		✓	✓
Bar-line chart		✓	✓		✓	✓
Block chart	×	×		×	×	×
Block plot		✓	×	×		×

Chart or Plot	SAS Graphing Software Support					
	SAS Procedures			SAS Visual Tools		
	ODS Graphics	GTL	SAS/GRAPH	SAS Studio	ODS Graphics Designer ³	SAS Enterprise Guide
Box plot	✓	✓	✓	✓	✓	✓
Bubble plot	✓	✓	✓	✓	×	✓
Contour plot	×	✓	✓	×	✓	✓
Dendrogram	×	✓	×	×	×	×
Density plot	✓	✓	×	×	✓	×
Donut chart	✓	×	✓	×	×	✓
Dot plot	✓	×	×	×	×	×
Ellipse plot	✓	✓	×	×	✓	×
Fringe plot	✓	✓	×	×	✓	×
Geographical Map ¹	✓	×	✓	✓	×	✓
Heat map	✓	✓	×	✓	×	×
High-low plot	✓	✓	✓	×	✓	×
Histogram, univariate	✓	✓	×	✓	✓	×
Histogram, bivariate	×	✓	×	×	×	×
Line chart or line plot	✓	✓	✓	✓	×	✓
Loess plot	✓	✓	×	×	✓	×
Model band plot	✓	✓	×	×	✓	×
Mosaic plot	×	✓	×	✓	×	×
Needle plot	✓	✓	✓	×	✓	✓
Penalized B-spline plot	✓	✓	×	×	✓	×

Chart or Plot	SAS Graphing Software Support					
	SAS Procedures			SAS Visual Tools		
	ODS Graphics	GTL	SAS/GRAPH	SAS Studio	ODS Graphics Designer ³	SAS Enterprise Guide
Pie chart	✓	✓	✓	✓	×	✓
Polygon plot	✓	✓	✓	×	×	✓
Radar chart	×	×	✓	×	×	✓
Regression plot	✓	✓	✓	×	✓	×
Scatter plot	✓	✓	✓	✓	✓	✓
Scatter plot, 3-D	×	×	✓	×	×	✓
Series plot	✓	✓	✓	✓	✓	×
Spline plot	✓	✓	✓	×	×	✓
Star chart	×	×	✓	×	×	×
Step plot	✓	✓	✓	×	✓	✓
Straight-line plot (point and slope)	✓	✓	×	×	✓	×
Surface plot	×	✓	✓	×	×	✓
Text plot	✓	✓	×	×	×	×
Tile chart	×	×	✓	×	×	✓
Vector plot	✓	✓	×	×	✓	×
Waterfall chart	✓	✓	×	×	×	×

- 1 Geographical Maps refer to the maps produced by SAS/GRAPH PROC GMAP and ODS Graphics PROC SGMAP. The Base mapping procedures that are used to prepare map data are not covered in this cross-reference table.
- 2 ODS Graphics GTL can create a line area plot, but not a step area plot or a spline area plot.
- 3 Starting with SAS 9.4M8, the ODS Graphics Designer no longer ships with SAS. It is available in SAS 9.4M7 and earlier releases.

Gallery of Basic Single-Cell Graphs

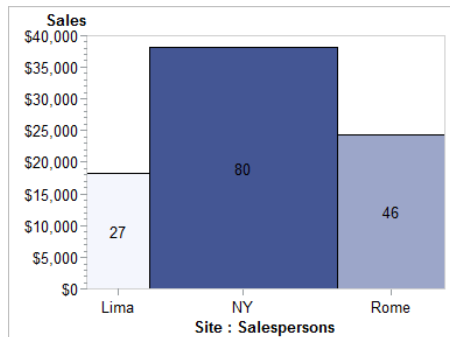
About This Gallery

This gallery shows examples of basic graphs that can be created using the SAS Platform graphing software. The recommended SAS procedure and all of the applicable visual tools that you can use to create each graph are also listed. In cases where multiple SAS procedures can be used to generate a graph, only the most suitable procedure is listed.

Area Bar Charts

An area bar chart is a bar chart in which the length or height of the bar represents the value of a chart statistic for each category of data. A second statistic is represented by the width of each bar. Area bar charts are generated by SAS/GRAPH. Here is a sample.

Figure 1 SAS/GRAPH Area Bar Chart



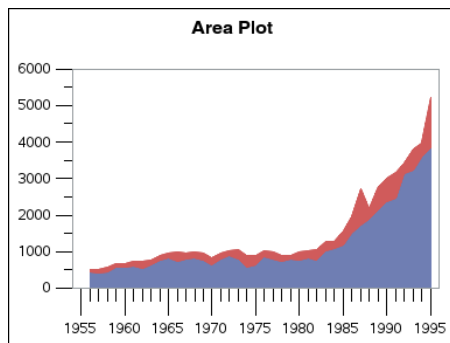
In SAS 9.4M7 and prior releases, use the SAS/GRAPH GAREABAR procedure to create an area bar chart. See [SAS/GRAPH: Reference](#).

Note:

Starting with SAS 9.4M8, the SAS/GRAPH GAREABAR procedure is obsolete. In SAS 9.4M8 and later releases, you can use the ODS Graphics SGPLOT procedure POLYGON statement to create basic area bar charts. See the post [Area Bar Charts using SGPLOT](#) on the [Graphically Speaking](#) blog. See also [SAS ODS Graphics: Procedures Guide](#).

Area Plot

An area plot is a line, step, or spline plot where the area between the line and the category axis is filled with a color, pattern, or both. They are typically used to visualize quantitative data over time. Area plots are generated by SAS/GRAPH. Here is a sample.



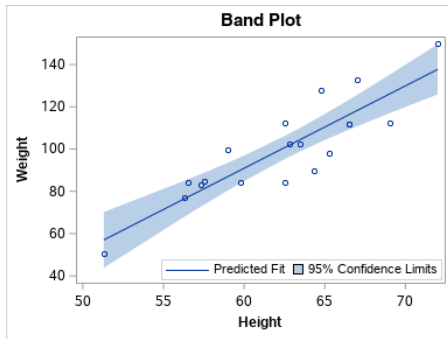
Refer to the following table for information about how to create an area plot.

Method for Creating the Plot	What to Use
SAS procedure	<p>Use the SAS/GRAPH GPLOT procedure PLOT statement with the AREAS= option and a SYMBOL statement that specifies JOIN, SPLINE, or STEP interpolation. See SAS/GRAPH: Reference.</p> <p>Note: If SAS/GRAPH is not installed at your site, you can use the ODS Graphics GTL LINECHART statement with the DISPLAY=ALL or DISPLAY=(FILL LINE) option to create an area plot. See SAS Graph Template Language: User's Guide. ODS Graphics GTL does not support spline or step area plots.</p>
Visual tool	<p>Use the Enterprise Guide Area Plot graph task. Refer to the Enterprise Guide Help for information about using the Area Plot task.</p> <p>Note: A SAS/GRAPH license is required to use the Enterprise Guide Area Plot task.</p>

Band Plots

A band plot is typically used to display confidence or prediction limits as a band along the X or Y axis. The plot data provides the X or Y values, and the high and low values that are required in order to draw the band. Band plots are generated by ODS Graphics. Here is a sample.

Figure 2 ODS Graphics Band Plot

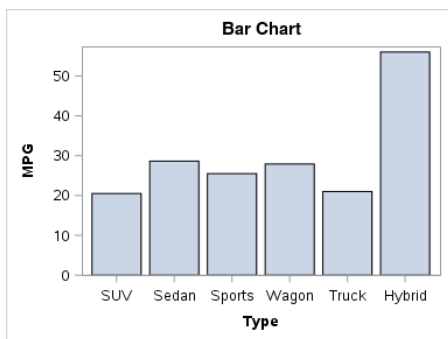


Refer to the following table for information about how to create a band plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure BAND statement. See SAS ODS Graphics: Procedures Guide . Note: The example shown uses the BAND statement with the SCATTER and SERIES statements.
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8 , the ODS Graphics Designer is a retired product and no longer ships with SAS.

Bar Charts

Bar charts use vertical or horizontal bars to represent statistics based on the values of a category variable. You can also provide a response variable. Bar charts can be generated by ODS Graphics. Here is an ODS Graphics sample.

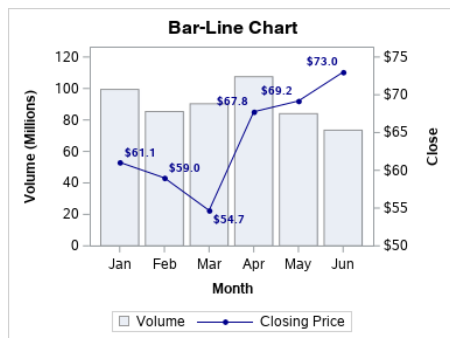


Refer to the following table for information about how to create a bar chart.

Method for Creating the Chart	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure HBAR statement to create a horizontal bar chart or use the VBAR statement to create a vertical bar chart. See SAS ODS Graphics: Procedures Guide .
Visual tool	Use the SAS Studio Bar Chart graph task. See <i>SAS Studio: User's Guide</i> for your version of SAS Studio on the SAS Studio documentation page on support.sas.com. In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS. Use the Enterprise Guide Bar Chart graph task. Refer to the Enterprise Guide Help for information about using the Bar Chart task. Note: A SAS/GRAPH license is required to use the Enterprise Guide Bar Chart task.

Bar-Line Charts

A bar-line chart is a vertical bar chart with one or more line-plot overlays. This chart graphically represents the value of a statistic calculated for one or more variables in an input SAS data set. Bar-line charts can be generated by ODS Graphics. Here is a sample.



Refer to the following table for information about how to create a bar-line chart.

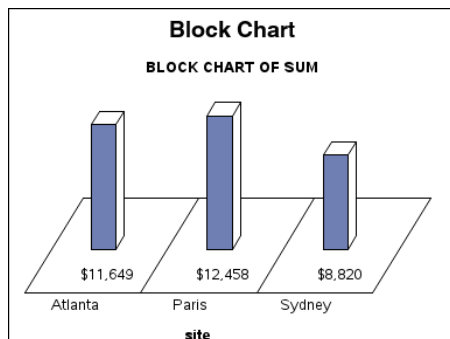
Method for Creating the Chart	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure VBAR and VLINE statements to create a vertical bar-line chart. Use the HBAR and HLINE statements to create a horizontal bar-line chart. See SAS ODS Graphics: Procedures Guide .

Method for Creating the Chart	What to Use
Visual tool	<p>Use the SAS Studio Bar-Line Chart graph task. See <i>SAS Studio: User's Guide</i> for your version of SAS Studio on the SAS Studio documentation page on support.sas.com.</p> <hr/> <p>In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See <i>SAS ODS Graphics Designer: User's Guide</i>. Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.</p> <hr/> <p>Use the Enterprise Guide Bar-Line Chart graph task. Refer to the Enterprise Guide Help for information about using the Bar-Line Chart task.</p> <p>Note: A SAS/GRAPH license is required to use the Enterprise Guide Bar-Line Chart task.</p>

Block Charts

Block charts display the relative magnitude of data with blocks of varying height, each set in a square that represents a category of data (midpoint). Because block charts do not use axes, they are most useful when the relative magnitude of the blocks is more significant than the exact magnitude of any particular block. Block charts are generated by SAS/GRAPH. Here is a sample.

Figure 3 SAS/GRAPH Block Chart



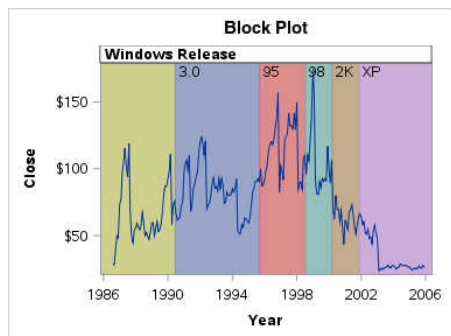
Use the SAS/GRAPH GCHART procedure BLOCK statement to create a block chart. See [SAS/GRAPH: Reference](#).

Block Plots

A block plot consists of rectangular strips at specific intervals along the X axis. The intervals are provided in the plot data. Each block can display the X-axis boundary value for that block. The block

can also display an alternate text value for that X-value that is also provided in the plot data. Block plots are generated by ODS Graphics. Here is a sample.

Figure 4 ODS Graphics Block Plot

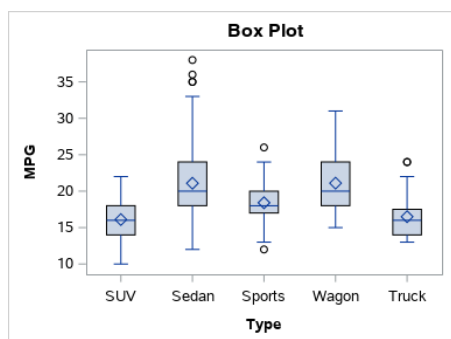


Refer to the following table for information about how to create a block plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure BLOCK statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8 , the ODS Graphics Designer is a retired product and no longer ships with SAS.

Box Plots

A box plot summarizes the data and indicates the median, upper and lower quartiles, and minimum and maximum values. The plot provides a quick visual summary that easily shows center, spread, range, and any outliers. Box plots can be vertical or horizontal. Box plots can be generated by ODS Graphics. Here is a sample.

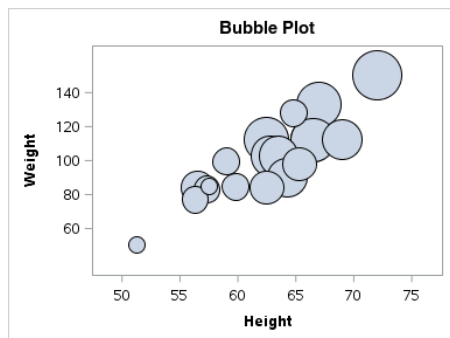


Refer to the following table for information about how to create a box plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure VBOX statement to create a vertical box plot. Use the HBOX statement to create a horizontal box plot. See SAS ODS Graphics: Procedures Guide .
Visual tool	Use the SAS Studio Box Plot graph task. See <i>SAS Studio: User's Guide</i> for your version of SAS Studio on the SAS Studio documentation page on support.sas.com. In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS. Use the Enterprise Guide Box Plot graph task. Refer to the Enterprise Guide Help for information about using the Box Plot task. Note: A SAS/GRAPH license is required to use the Enterprise Guide Box Plot task.

Bubble Plots

A bubble plot consists of X and Y values, which specify the location of the center of each bubble. It can also consist of the value of a third variable that determines the size of the bubble. Bubble plots can be generated by ODS Graphics. Here is a sample.



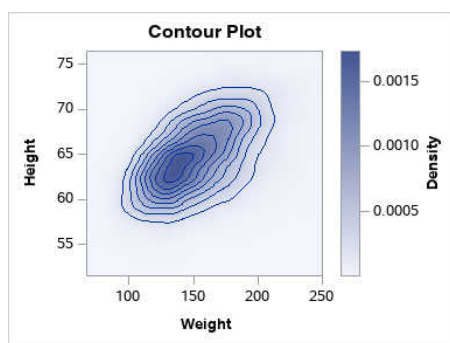
Refer to the following table for information about how to create a bubble plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure BUBBLE statement. See SAS ODS Graphics: Procedures Guide .

Method for Creating the Plot	What to Use
Visual tool	<p>Use the SAS Studio Bubble Plot graph task. See <i>SAS Studio: User's Guide</i> for your version of SAS Studio on the SAS Studio documentation page on support.sas.com.</p> <hr/> <p>In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See <i>SAS ODS Graphics Designer: User's Guide</i>. Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.</p> <hr/> <p>Use the Enterprise Guide Bubble Plot graph task. Refer to the Enterprise Guide Help for information about using the Bubble Plot task.</p> <p>Note: A SAS/GRAPH license is required to use the Enterprise Guide Bubble Plot task.</p>

Contour Plots

A contour plot represents a three-dimensional surface by plotting Z values on a two-dimensional format. The data provides the X, Y, and Z values. Contour plots can be generated by ODS Graphics. Here is a sample.



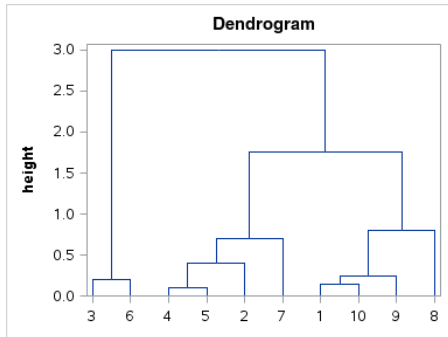
Refer to the following table for information about how to create a contour plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics GTL CONTOURPLOTPARM statement. See <i>SAS Graph Template Language: User's Guide</i> .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See <i>SAS ODS Graphics Designer: User's Guide</i> . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Dendrograms

A dendrogram is a tree diagram that represents the results of a hierarchical clustering analysis. It is often used in conjunction with heat maps to visualize gene expression data. Dendrograms are generated by ODS Graphics. Here is a sample.

Figure 5 ODS Graphics Dendrogram

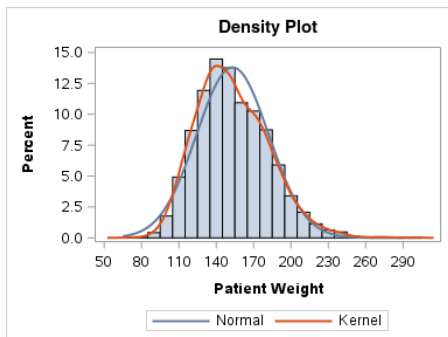


Use the ODS Graphics GTL DENDROGRAM statement to create a dendrogram. See [SAS Graph Template Language: User's Guide](#).

Density Plots

A density plot creates a density curve that shows the distribution of values for a numeric variable. The most common density plot uses the normal distribution, which is defined by the mean and the standard deviation. You can specify a KERNEL distribution. Density plots are generated by ODS Graphics. Here is a sample that is overlaid on a histogram.

Figure 6 ODS Graphics Density Plot



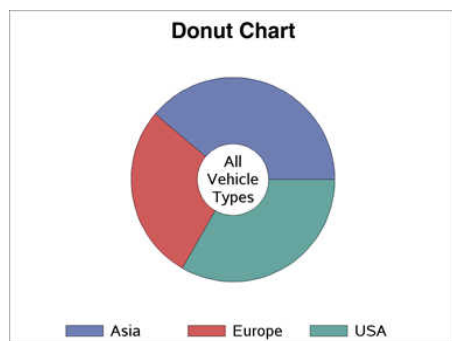
Refer to the following table for information about how to create a density plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure DENSITY statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Donut Charts

A donut chart is a variation of a pie chart, which represents the relative contribution of parts to the whole as wedge-shaped slices of a circle. Unlike a pie chart, a donut chart has a hole in the center in which you can add text. Donut charts can be generated by SAS/GRAPH. Here is a sample.

Figure 7 SAS/GRAPH Donut Chart



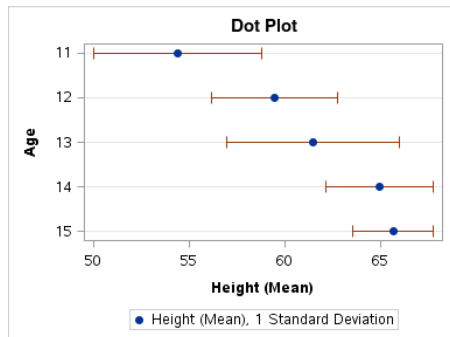
Refer to the following table for information about how to create a donut chart.

Method for Creating the Plot	What to Use
SAS procedure	Use the SAS/GRAPH GCHART procedure DONUT statement. See SAS/GRAPH: Reference .
Visual tool	Use the Enterprise Guide Donut Chart graph task. Refer to the Enterprise Guide Help for information about using the Donut Chart task. Note: A SAS/GRAPH license is required to use the Enterprise Guide Donut Chart task.

Dot Plots

A dot plot summarizes horizontally the values of a category variable. By default, each dot represents the frequency for each value of the category variable. Dot plots are generated by ODS Graphics. Here is a sample.

Figure 8 ODS Graphics Dot Plot

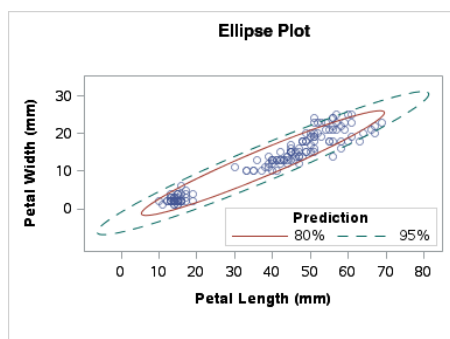


Use the ODS Graphics SGPLOT or the SGPANEL procedure DOT statement to create one or more dot plots. See [SAS ODS Graphics: Procedures Guide](#).

Ellipse Plots

An ellipse plot creates a confidence or prediction elliptical curve computed from input data. In order to produce useful output, the ellipse should be used with another plot statement that uses numeric axes. Ellipse plots are generated by ODS Graphics. Here is a sample.

Figure 9 ODS Graphics Ellipse Plot



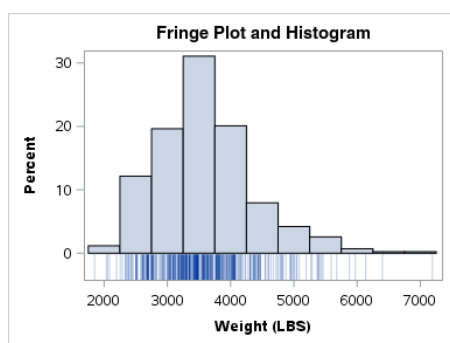
Refer to the following table for information about how to create an ellipse plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure ELLIPSE statement to create an ellipse plot from raw data. Use the ELLIPSEPARM statement to create an ellipse plot from preprocessed data. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8 , the ODS Graphics Designer is a retired product and no longer ships with SAS.

Fringe Plots

A fringe plot displays data values as a fringe on the X or X2 axis of the plot, and often is used to display each observation in the data. All of the fringe lines are of equal length. Fringe plots are generated by ODS Graphics. Here is a sample.

Figure 10 ODS Graphics Fringe Plot

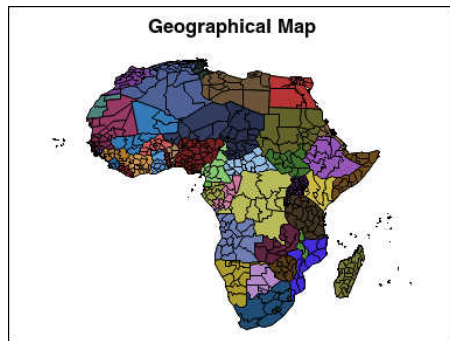


Refer to the following table for information about how to create a fringe plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure FRINGE statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8 , the ODS Graphics Designer is a retired product and no longer ships with SAS.

Geographical Maps

A geographical map displays values or attributes related to areas on the map. Map types include block, choropleth, prism, and surface. Maps can be generated by SAS/GRAPH. Here is a sample of a choropleth map.



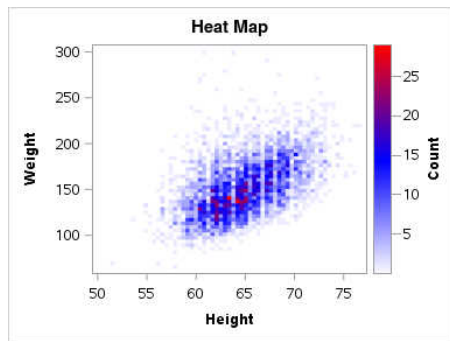
Refer to the following table for information about how to create a geographical map.

Method for Creating the Map	What to Use
SAS procedure	Use the SAS/GRAPH GMAP procedure and its BLOCK, CHORO, PRISM, or SURFACE statement to generate a geographical map. See SAS/GRAPH and Base SAS: Mapping Reference
Visual tool	<p>Use the SAS Studio Map tasks. See <i>SAS Studio: User's Guide</i> for your version of SAS Studio on the SAS Studio documentation page on support.sas.com.</p> <p>Use the Enterprise Guide Map Chart graph task. Refer to the Enterprise Guide Help for information about using the Map Chart task.</p> <p>Note: A SAS/GRAPH license is required to use the Enterprise Guide Map Chart task.</p>

Heat Maps

A heat map bins the data to produce a bivariate density plot. Each bin displays the frequency as a color. Heat maps are generated by ODS Graphics. Here is a sample.

Figure 11 ODS Graphics Heat Map

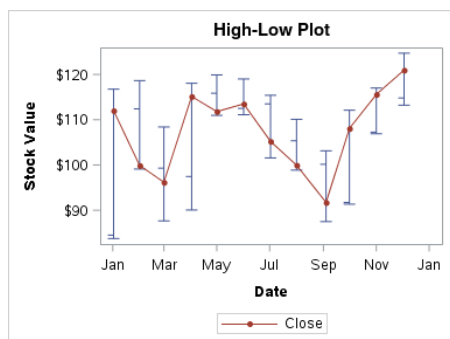


Refer to the following table for information about how to create a heat map.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure HEATMAP statement to create a heat map from raw data. Use the HEATMAPPARM statement to create a heat map from preprocessed data. See SAS ODS Graphics: Procedures Guide .
Visual tool	Use the SAS Studio Heat Map graph task. See <i>SAS Studio: User's Guide</i> for your version of SAS Studio on the SAS Studio documentation page on support.sas.com.

High-Low Plots

Creates a display of floating vertical or horizontal lines or bars that represent high and low values for each value of a variable. You can show tick marks for the open and closing values (shown here). You can display labels and arrowheads for the high and low values. High-low plots are generated by ODS Graphics. Here is a sample.



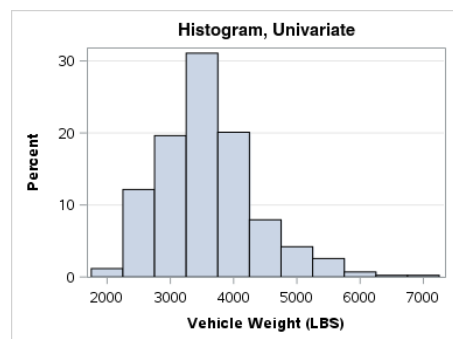
Refer to the following table for information about how to create a high-low plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure HIGHLOW statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Histograms, Univariate

A univariate histogram consists of a series of bins representing the frequency of a variable over a discrete interval or class. You can also specify a group variable. A univariate histogram is generated by ODS Graphics. Here is a sample.

Figure 12 ODS Graphics Univariate Histogram



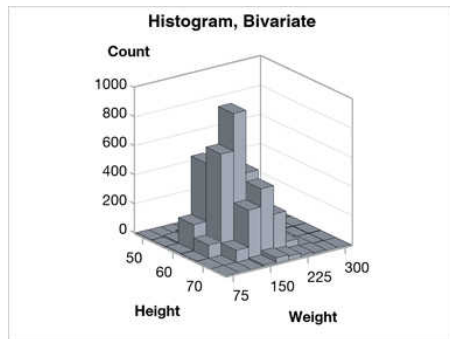
Refer to the following table for information about how to create a univariate histogram.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure HISTOGRAM statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	Use the SAS Studio Histogram graph task. See SAS Studio: User's Guide for your version of SAS Studio on the SAS Studio documentation page on support.sas.com.

Histograms, Bivariate

A 3-D histogram is a three-dimensional bivariate histogram of three variables X, Y, and Z, where the values of X and Y have already been gridded. The Z variable represents a response value for the frequency, percentage counts, or densities of each bin combination. A 3-D bivariate histogram is generated by ODS Graphics. Here is a sample.

Figure 13 ODS Graphics Bivariate Histogram

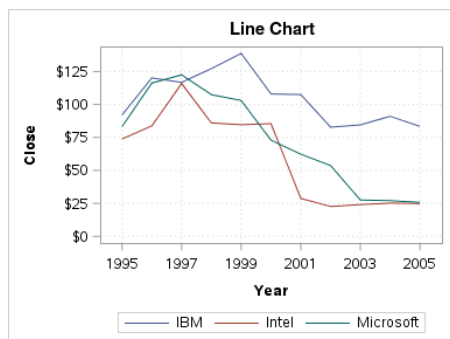


Use the ODS Graphics GTL BIHISTOGRAM3DPARM statement to create a 3-D bivariate histogram. See [SAS Graph Template Language: User's Guide](#).

Line Charts and Plots

A line chart or plot consists of straight-line segments that connect consecutive data points along an axis. They show the relationship of one variable to another. You can use the line chart with a bar chart to create a horizontal bar-line chart. Line charts or plots can be horizontal or vertical. Line charts can be generated by ODS Graphics. Here is a sample.

Figure 14 ODS Graphics Line Chart



Refer to the following table for information about how to create a line chart.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics SGPLOT procedure HLINE statement to create a horizontal line chart. Use its VLINE statement to create a vertical line chart. Use the ODS Graphics SGPANEL or the SGPLOT procedure SERIES statement to create a line plot. See SAS ODS Graphics: Procedures Guide .
Visual tool	Use the SAS Studio Line Chart graph task. See SAS Studio: User's Guide for your version of SAS Studio on the SAS Studio documentation page on support.sas.com. Use the Enterprise Guide Line Plot graph task. Refer to the Enterprise Guide Help for information about using the Line Plot task. Note: A SAS/GRAPH license is required to use the Enterprise Guide Line Plot task.

Loess Plots

A loess plot is a nonlinear fit line that enables you to perform locally weighted polynomial regression. You can include a scatter plot of two numeric variables, and you can include confidence limits. Loess plots are generated by ODS Graphics. Here is a sample.

Figure 15 ODS Graphics Loess Plot



Refer to the following table for information about how to create a loess plot.

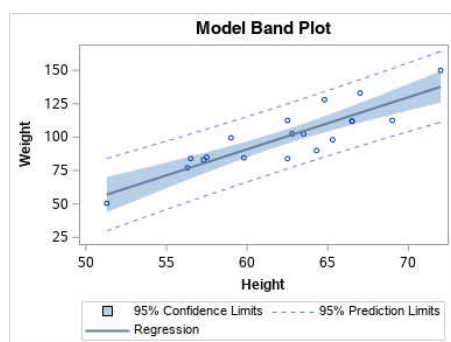
Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure LOESS statement. See SAS ODS Graphics: Procedures Guide . Note: ODS Graphics Loess plots do not support CAS tables.
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS

Method for Creating the Plot	What to Use
	9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Model Band Plots

A model band shows the confidence limits for an associated smoother plot such as a regression plot. The model band must be associated with a smoother statement that specifies a fitted model and a type of confidence level to compute. Model band plots are generated by ODS Graphics. Here is a sample.

Figure 16 ODS Graphics Model Band Plot



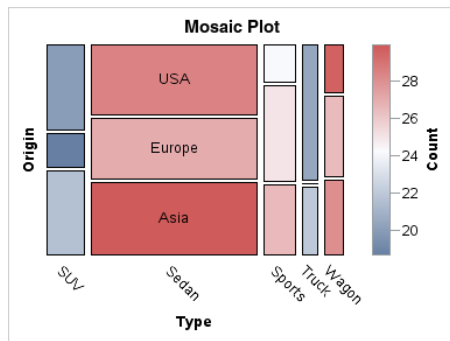
Refer to the following table for information about how to create a model band plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure LOESS, PBSPLINE, or REG statement with the CLM and CLI options. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Mosaic Plots

A mosaic plot displays relative frequencies for the categorical variables. Each crossing of the categorical values is represented by a tile. The area of each tile is proportional to the frequency of that crossing. The tile colors can be mapped to a numeric variable. Mosaic plots are generated by ODS Graphics. Here is a sample.

Figure 17 ODS Graphics Mosaic Plot

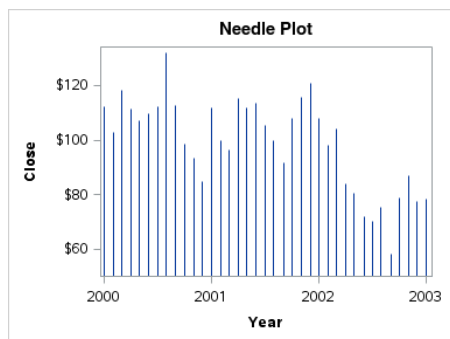


Refer to the following table for information about how to create a mosaic plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics GTL MOSAICPLOTPARM statement. See SAS Graph Template Language: User's Guide .
Visual tool	Use the SAS Studio Mosaic Plot graph task. See SAS Studio: User's Guide for your version of SAS Studio on the SAS Studio documentation page on support.sas.com.

Needle Plots

A needle plot uses vertical line segments, or needles, to connect each data point to a baseline. Needle plots can be generated by ODS Graphics. Here is a sample.



Refer to the following table for information about how to create a needle plot.

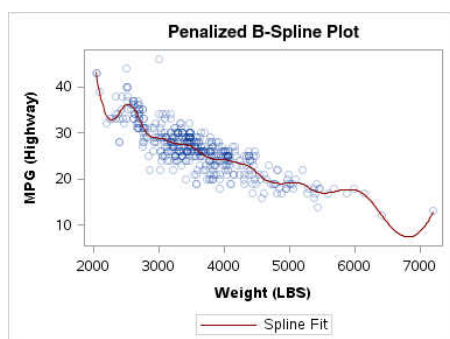
Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure NEEDLE statement. See SAS ODS Graphics: Procedures Guide .

Method for Creating the Plot	What to Use
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Penalized B-Spline Plots

A penalized B-spline plot supports models of one independent and one dependent variable. The plot can compute confidence levels for the fit line. Penalized B spline plots are generated by ODS Graphics. Here is a sample.

Figure 18 ODS Graphics Penalized B-Spline Plot

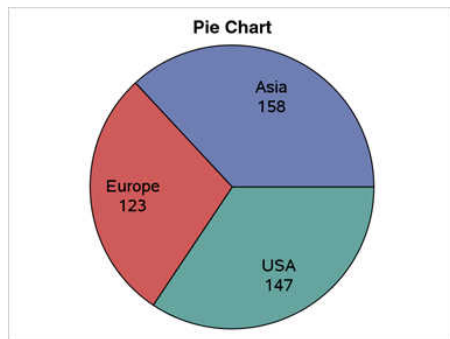


Refer to the following table for information about how to create a penalized B-spline plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure PBSPLINE statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Pie Charts

A pie chart represents input data as slices on the pie. Pie charts can be generated by SAS/GRAPH. Here is a sample.



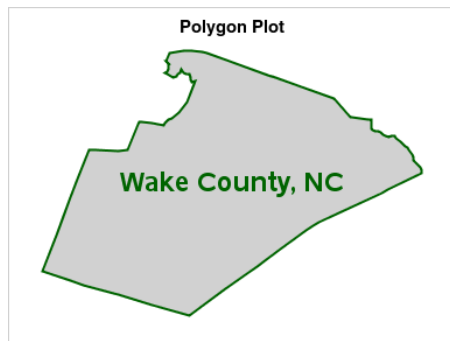
Refer to the following table for information about how to create a pie chart.

Method for Creating the Plot	What to Use
SAS procedure	<p>Use the SAS/GRAPH GCHART procedure PIE or PIE3D statement. See SAS/GRAPH: Reference.</p> <p>Note: If SAS/GRAPH is not installed at your site, you can use the ODS Graphics GTL PIECHART statement to create a 2-D pie chart. See SAS Graph Template Language: User's Guide.</p>
Visual tool	<p>Use the SAS Studio Pie Chart graph task. See <i>SAS Studio: User's Guide</i> for your version of SAS Studio on the SAS Studio documentation page on support.sas.com.</p> <p>Use the Enterprise Guide Pie Chart graph task. Refer to the Enterprise Guide Help for information about using the Pie Chart task.</p> <p>Note: A SAS/GRAPH license is required to use the Enterprise Guide Pie Chart task.</p>

Polygon Plots

A polygon plot contains one or more polygons. The polygons can be filled, outlined, or both. They can also be labeled. The polygon plot is useful for drawing shapes on your graphs that highlight data, outline boundaries, and so on. Polygon plots can be generated by ODS Graphics. Here is a sample that draws an outline of Wake County in North Carolina.

Figure 19 ODS Graphics Polygon Plot

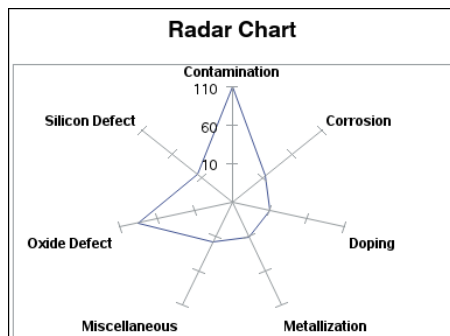


Use the SGPLOT procedure POLYGON statement to create a polygon plot. See [SAS ODS Graphics: Procedures Guide](#).

Radar Charts

A radar chart shows the relative frequency of data measures in quality control or market research problems. The chart statistics are displayed along spokes that radiate from the center of the chart. Radar charts are often overlaid with reference circles, which gives them the look of a radar screen. Radar charts are also referred to as star charts or spider charts, depending on the appearance of the chart and the variable types that the chart depicts. Radar charts are generated by SAS/GRAPH. Here is a sample.

Figure 20 SAS/GRAPH Radar Chart

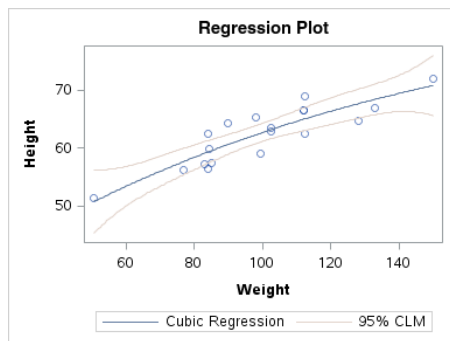


Refer to the following table for information about how to create a radar chart.

Method for Creating the Plot	What to Use
SAS procedure	Use the SAS/GRAPH GRADAR procedure CHART statement. See SAS/GRAPH: Reference .
Visual tool	Use the Enterprise Guide Radar Chart graph task. Refer to the Enterprise Guide Help for information about using the Radar Chart task. Note: A SAS/GRAPH license is required to use the Enterprise Guide Radar Chart task.

Regression Plots

A regression plot includes a scatter plot of two numeric variables along with an overlaid linear or nonlinear fit line that enables you to perform a regression analysis. You can specify with the DEGREE option range of 1–10 a certain type of regression equation. Examples are linear (DEGREE=1), quadratic (DEGREE=2), or cubic (DEGREE=3). You can display confidence limits for mean predicted values or individual predicted values. Regression plots can be generated by ODS Graphics. Here is a sample.

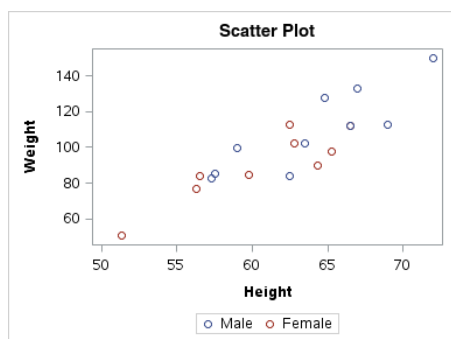


Refer to the following table for information about how to create a regression plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure REG statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Scatter Plots

A scatter plot generates a marker for each observation that has nonmissing X and Y values. Markers can be symbols or character strings. Symbol markers can be labeled. Scatter plots can be generated by ODS Graphics.



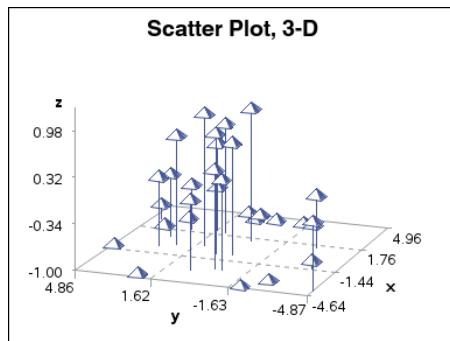
Refer to the following table for information about how to create a scatter plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure SCATTER statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	<p>Use the SAS Studio Scatter Plot graph task. See <i>SAS Studio: User's Guide</i> for your version of SAS Studio on the SAS Studio documentation page on support.sas.com.</p> <p>In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide. Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.</p> <p>Use the Enterprise Guide Scatter Plot graph task. Refer to the Enterprise Guide Help for information about using the Scatter Plot task.</p> <p>Note: A SAS/GRAPH license is required to use the Enterprise Guide Scatter Plot task.</p>

Scatter Plots, 3-D

A 3-D scatter plot generates a marker for each observation that has nonmissing values for three variables. Markers can be symbols or character strings. Symbol markers can be labeled. Three-dimensional scatter plots are generated by SAS/GRAPH. Here is a sample.

Figure 21 SAS/GRAPH 3-D Scatter Plot

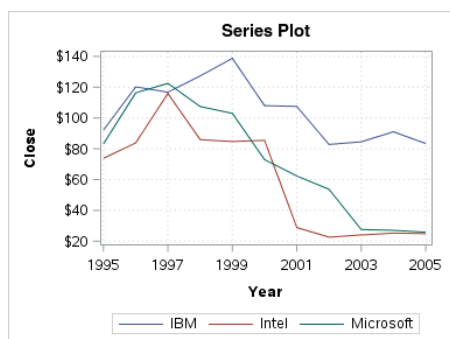


Refer to the following table for information about how to create a scatter plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SAS/GRAPH G3D procedure SCATTER statement to create a 3-D scatter plot. See SAS/GRAPH: Reference .
Visual tool	Use the Enterprise Guide Scatter Plot graph task. Refer to the Enterprise Guide Help for information about using the Scatter Plot task. Note: A SAS/GRAPH license is required to use the Enterprise Guide Scatter Plot task.

Series Plots

A series plot, also referred to as a line plot, displays a series of line segments that connect observations of input data. Series plots can be generated by ODS Graphics. Here is a sample.



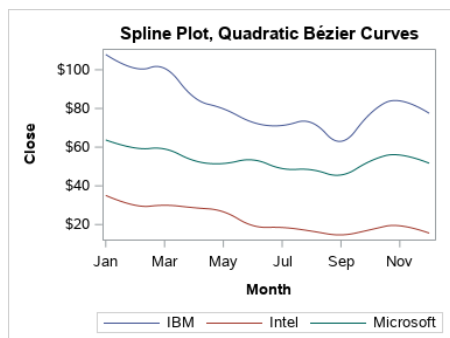
Refer to the following table for information about how to create a series plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure SERIES statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	Use the SAS Studio Series Plot graph task. See SAS Studio: User's Guide for your version of SAS Studio on the SAS Studio documentation page on support.sas.com. In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Spline Plots

A spline plot is a series plot with a quadratic Bézier spline interpolation that produces smooth curves. Spline plots can be generated by ODS Graphics. Here is a sample.

Figure 22 ODS Graphics Spline Plot



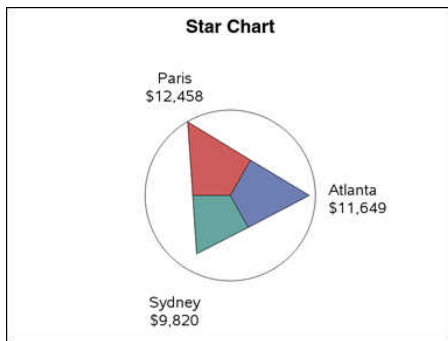
Refer to the following table for information about how to create a spline plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure SPLINE statement to create a spline plot. See SAS ODS Graphics: Procedures Guide .
Visual tool	Use the Enterprise Guide Line Plot graph task. Refer to the Enterprise Guide Help for information about using the Line Plot task. Note: A SAS/GRAPH license is required to use the Enterprise Guide Line Plot task.

Star Charts

Star charts display data as lines (“spines”) radiating from the center of a circle toward the perimeter. Each spine represents a category of data (midpoint). The length of a spine represents the magnitude of the chart statistic for that midpoint starting at the center of the circle, which by default represents 0. The radius of the circle is the length of the longest spine (greatest statistic value) in the chart. Star charts are generated by SAS/GRAPH. Here is a sample.

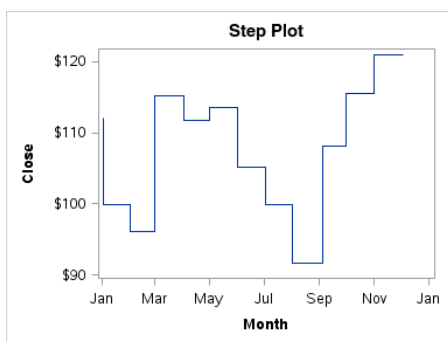
Figure 23 SAS/GRAPH Star Chart



Use the SAS/GRAPH GCHART procedure STAR statement to create a start chart. See [SAS/GRAPH: Reference](#).

Step Plots

A step plot displays a series of horizontal and vertical line segments that connect observations of input data. The plots use a step function to connect the data points. The vertical line can change at each step. Step plots can be generated by ODS Graphics. Here is a sample.

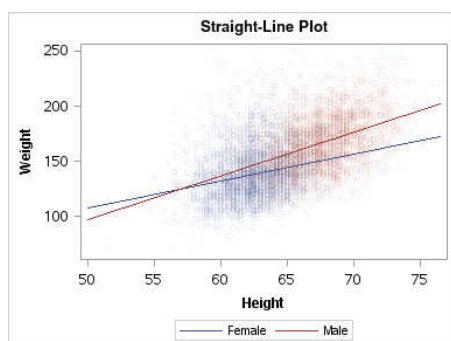


Refer to the following table for information about how to create a step plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure STEP statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Straight-Line Plot (Point and Slope)

A straight-line plot is a straight line of a specified slope and intercept point. Straight-line plots are generated by ODS Graphics. Here is a sample.

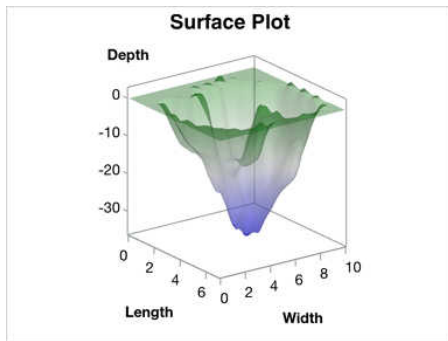


X and Y variables specify the coordinates for the intercept point, and a slope variable specifies the line slope. You can specify a numeric value or expression as the argument value, or you can specify a numeric column as the argument value. Refer to the following table for information about how to create a straight-line plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure LINEPARM statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Surface Plots

A 3-D surface plot forms an evenly spaced grid of horizontal values (X and Y) and one or more vertical values (Z) for each combination. The input data must be sorted by Y and X in order to obtain the correct lighting. Surface plots can be generated by ODS Graphics. Here is a sample.

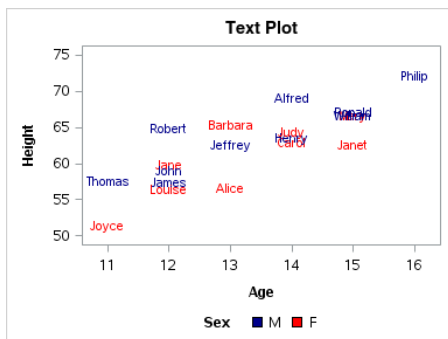


Refer to the following table for information about how to create a surface plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the ODS Graphics GTL SURFACEPLOTPARM statement. See SAS Graph Template Language: User's Guide .
Visual tool	Use the Enterprise Guide Surface Plot graph task. Refer to the Enterprise Guide Help for information about using the Surface Plot task. Note: A SAS/GRAPH license is required to use the Enterprise Guide Surface Plot task.

Text Plots

A text plot displays the associated text values at (X, Y) locations in the graph. The text can be numbers or characters. Text plots are generated by ODS Graphics. Here is a sample.

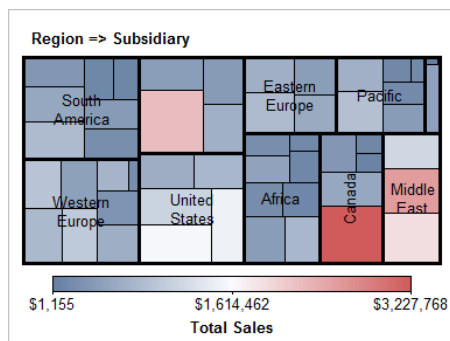


Use the SGPLOT procedure TEXT statement to create a text plot. See [SAS ODS Graphics: Procedures Guide](#).

Tile Charts

A tile chart consists of rectangles or squares that are divided into tile-shaped segments. A tile chart is also known as a rectangular treemap. The chart represents the relative sizes of the tiles to one another and to the whole. A tile chart is generated by SAS/GRAPH. Here is a sample.

Figure 24 SAS/GRAPH Tile Chart



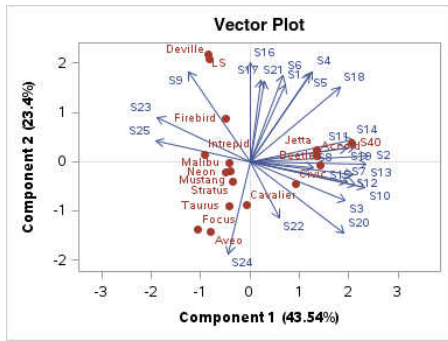
Refer to the following table for information about how to create a tile chart.

Method for Creating the Plot	What to Use
SAS procedure	Use the SAS/GRAPH GTILE procedure TILE statement. See SAS/GRAPH: Reference . Note: Starting with SAS 9.4M8, the SAS/GRAPH GTILE procedure no longer runs in the z/OS operating environment.
Visual tool	Use the Enterprise Guide Tile Chart graph task. Refer to the Enterprise Guide Help for information about using the Tile Chart task. Note: A SAS/GRAPH license is required to use the Enterprise Guide Tile Chart task.

Vector Plots

A vector plot draws arrows from a point of origin to each data point. Vectors are directed line segments. A vector plot uses vectors to represent both direction and magnitude at each point. Vector plots are generated by ODS Graphics. Here is a sample.

Figure 25 ODS Graphics Vector Plot



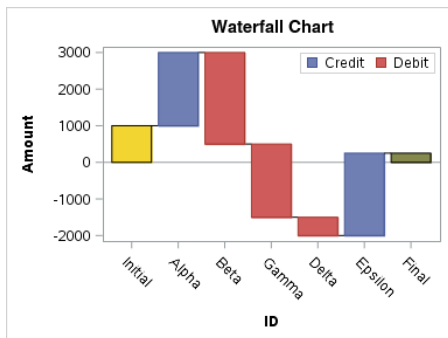
Refer to the following table for information about how to create a vector plot.

Method for Creating the Plot	What to Use
SAS procedure	Use the SGPLOT procedure VECTOR statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Waterfall Charts

A waterfall chart shows how the value of a variable increases or decreases until it reaches a final value. Waterfall charts are generated by ODS Graphics. Here is a sample.

Figure 26 ODS Graphics Waterfall Chart



In the chart, bars represent an initial value of Y and a series of intermediate values identified by X leading to a final value of Y. A waterfall chart is often used to show credit and debit transactions or successive changes to a given state. The bars are calculated from data that are called transaction bars. The transaction bars represent the values of the RESPONSE variable across a series of intermediate values for the specified CATEGORY variable.

Use the SGPLOT procedure WATERFALL statement to create a waterfall chart. See [SAS ODS Graphics: Procedures Guide](#).

Gallery of Multicell Graphs

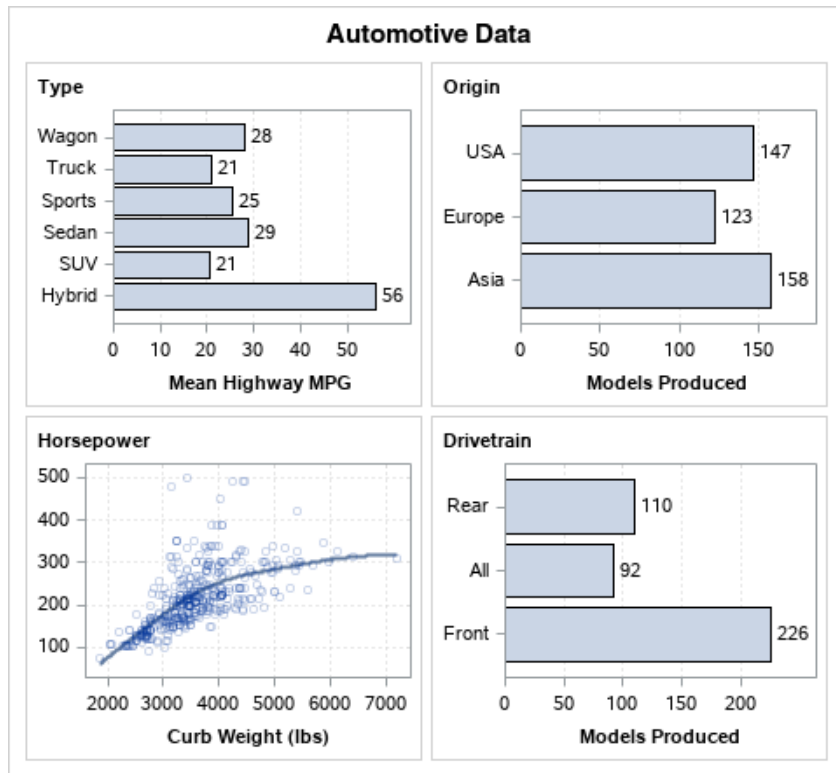
About this Gallery

This gallery shows examples of multicell graphs that can be created using the SAS Platform graphing software. The recommended SAS procedure and all of the applicable visual tools that you can use to create each graph are also listed. In cases where multiple SAS procedures can be used to generate a multicell graph, only the most suitable procedure is listed. The multicell graphs in this gallery include:

- Grid graphs
- Lattice graphs
- Data-driven lattice graphs
- Data-driven panel graphs
- Paneled graphs of scatter plots
- Scatter plot matrices

Grid Graphs

A grid graph is a simple grid of similar or different graphs. The graphs are placed in cells arranged in rows and columns. Columns have the same width and rows have the same height, which means that each cell is of the same size. The graphs in each cell are independent of the other graphs in the grid. Here is an example.

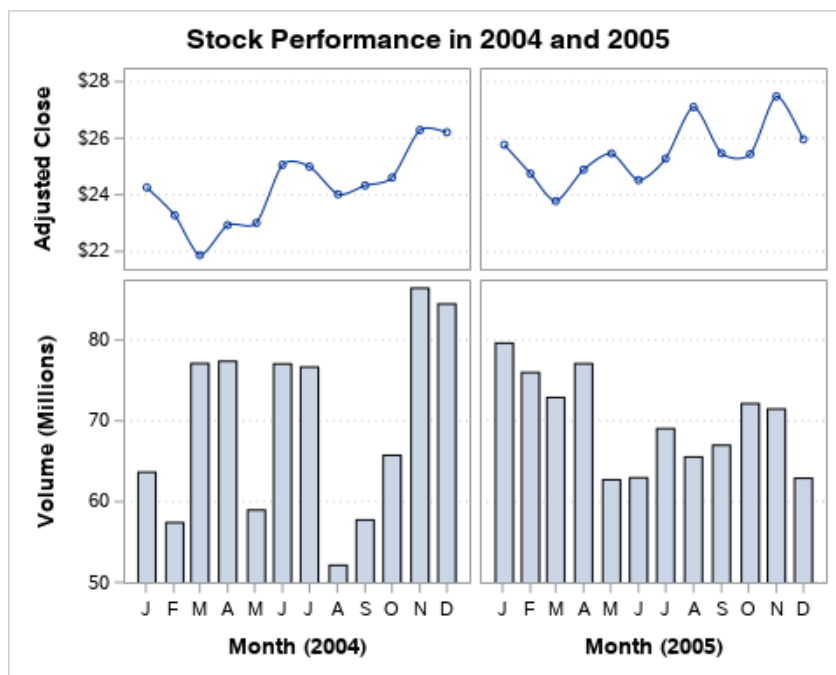


Refer to the following table for information about how to create a grid graph.

Method for Creating the Graph	What to Use
SAS procedure	Use the ODS Graphics GTL LAYOUT GRIDDED statement. See SAS Graph Template Language: User's Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Lattice Graphs

A lattice graph is a lattice of similar or different graphs. The graphs are placed in cells arranged in rows and columns. By default, columns are of the same width and rows are of the same height. However, you can alter the width of individual columns and the height of individual rows to vary cell sizes. The graphs in each cell can be independent or they can share common axes with the other graphs in the lattice. Here is an example.

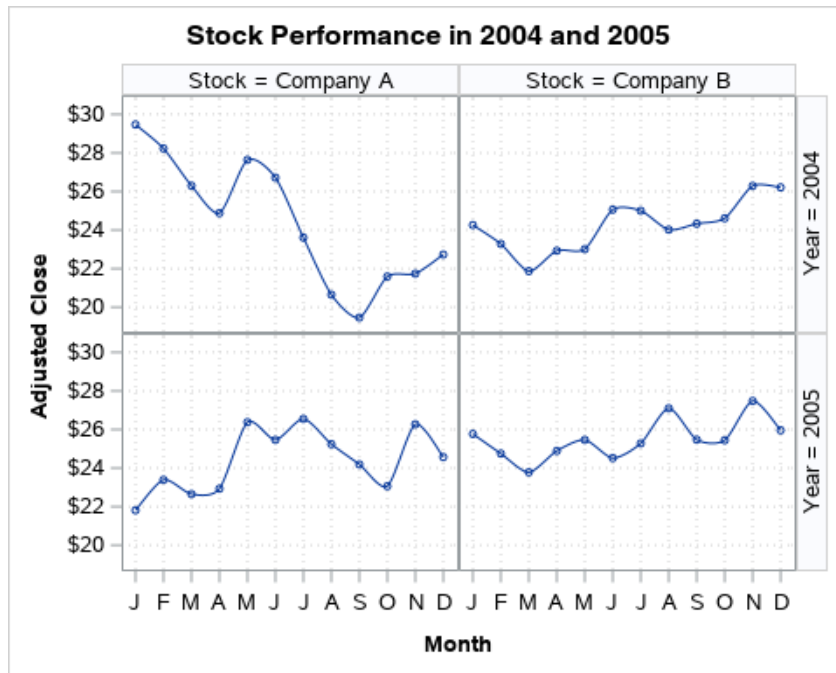


Refer to the following table for information about how to create a lattice graph.

Method for Creating the Graph	What to Use
SAS procedure	Use the ODS Graphics GTL LAYOUT LATTICE statement. See SAS Graph Template Language: User's Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8 , the ODS Graphics Designer is a retired product and no longer ships with SAS.

Data-Driven Lattice Graphs

A data-driven lattice graph is a lattice of similar graphs that is generated from a row variable and a column variable. The row and column variable values that intersect a cell are used to generate the graph in that cell. The graphs in the lattice share common row and column axes. Here is an example.

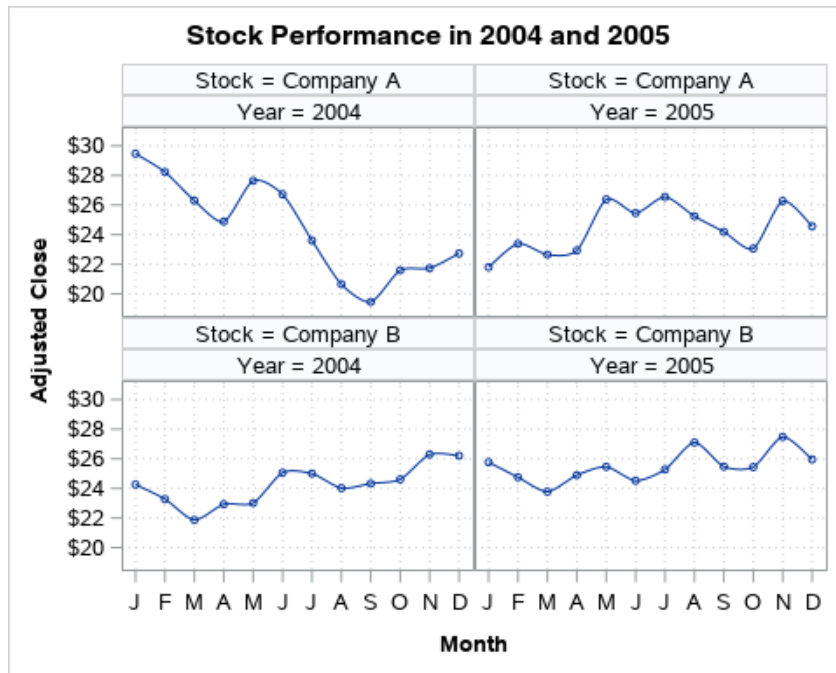


Refer to the following table for information about how to create a data-driven lattice graph.

Method for Creating the Graph	What to Use
SAS procedure	Use the ODS Graphics SGPANEL procedure PANELBY statement with the LAYOUT=LATTICE option, and with one or more plot statements. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8 , the ODS Graphics Designer is a retired product and no longer ships with SAS.

Data-Driven Panel Graphs

A data-driven panel graph is a panel of similar graphs that is generated from one or more classification variables. The classification variable values for a cell are used to generate the graph in that cell. The graphs in the panel share common row and column axes. Here is an example.

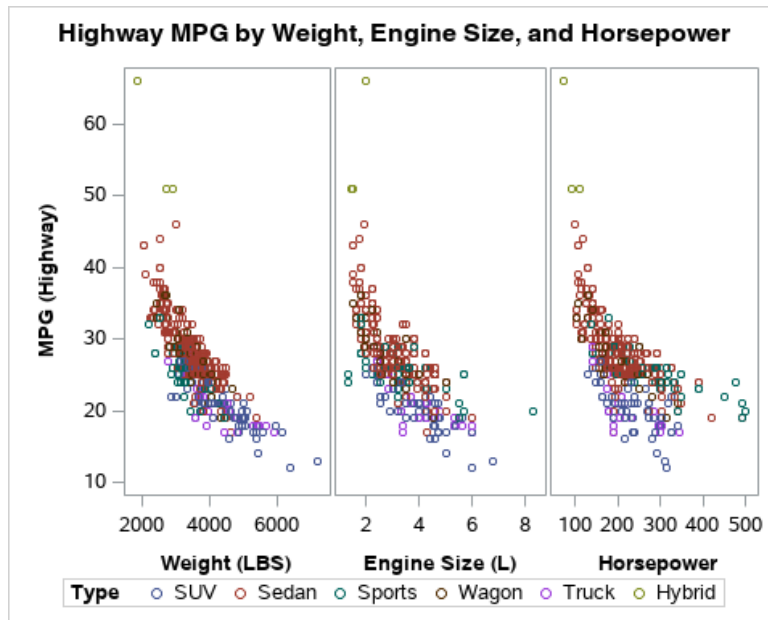


Refer to the following table for information about how to create a data-driven panel graph.

Method for Creating the Graph	What to Use
SAS procedure	Use the ODS Graphics SGPANEL procedure with a PANELBY statement and one or more plot statements. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Paneled Graphs of Scatter Plots

A paneled graph of scatter plots is a panel of scatter plots for multiple combinations of variables. Each plot can have independent axes or the plots in the panel can share common axes. Fit lines and ellipses can be overlaid on each plot. Here is an example.

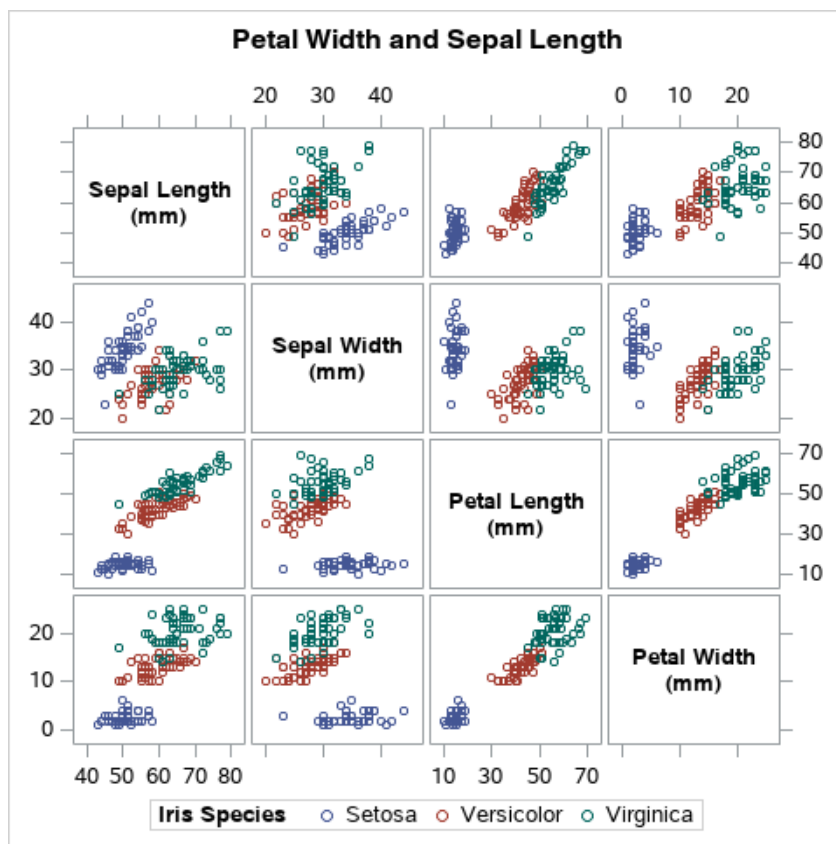


Refer to the following table for information about how to create a paneled graph of scatter plots.

Method for Creating the Graph	What to Use
SAS procedure	Use the ODS Graphics SGSCATTER procedure COMPARE statement. See SAS ODS Graphics: Procedures Guide .
Visual tool	In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See SAS ODS Graphics Designer: User's Guide . Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Scatter Plot Matrices

A scatter plot matrix is a panel graph of scatter plots for multiple combinations of variables. You can overlay fit plots and ellipses on your scatter plots. Here is a sample.



Refer to the following table for information about how to create a scatter plot matrix.

Method for Creating the Graph

What to Use

SAS procedure

Use the ODS Graphics SGSCATTER procedure MATRIX statement. See [SAS ODS Graphics: Procedures Guide](#).

Visual tool

In SAS 9.4M7 and earlier releases, use the ODS Graphics Designer. See [SAS ODS Graphics Designer: User's Guide](#). Starting with SAS 9.4M8, the ODS Graphics Designer is a retired product and no longer ships with SAS.

Use the Enterprise Guide Scatter Plot Matrix graph task. Refer to the Enterprise Guide Help for information about using the Scatter Plot Matrix task.

Navigating to Platform Graphing Tasks

Get Started Using the SAS Output Delivery System (ODS)

Table 2 ODS Documentation

Task	Topics
Get started using ODS.	“Getting Started with the Output Delivery System” in SAS Output Delivery System: User’s Guide
Learn about the ODS styles that are recommended for graphs.	“Recommended ODS Styles” in SAS ODS Graphics: Procedures Guide

Perform ODS Graphics Tasks

Table 3 ODS Graphics Documentation

Task	Topics
Create graphs visually using the ODS Graphics Designer in SAS 9.4M7 and earlier releases. ¹	“Get Started Using the ODS Graphics Designer” in SAS ODS Graphics Designer: User’s Guide
Get started using the ODS Graphics procedures.	“Get Started Using the ODS Graphics Procedures” in SAS ODS Graphics: Procedures Guide
Get started using GTL (for advanced graphs).	“Get Started Using the Graph Template Language” in SAS Graph Template Language: User’s Guide
Control the graphical output environment. For example, specify graph size, output format, image name, drill-down capability, and more.	“ODS GRAPHICS Statement” in SAS Graph Template Language: Reference
Edit and annotate existing graphs using the ODS Graphics	“Getting Started with the ODS Graphics Editor” in SAS ODS Graphics Editor: User’s Guide

Task	Topics
Editor in SAS 9.4M7 and earlier releases.. ²	
Use ODS Graphics to visualize your CAS results. ³	<p>Using the ODS Graphics procedures: “Plotting a Cloud Analytic Services (CAS) In-Memory Table” in <i>SAS ODS Graphics: Procedures Guide</i></p> <p>Using GTL: “Plotting a SAS Cloud Analytic Services (CAS) In-Memory Table” in <i>SAS Graph Template Language: User’s Guide</i></p>

- 1 Starting with SAS 9.4M8, the ODS Graphics Designer no longer ships with SAS.
- 2 Starting with SAS 9.4M8, the ODS Graphics Editor no longer ships with SAS.
- 3 The ODS Graphics Designer cannot access CAS data.

Perform SAS/GRAPH Tasks

Table 4 SAS/GRAPH Documentation

Task	Topics
Get started using SAS/GRAPH.	“Get Started Using SAS/GRAPH” in <i>SAS/GRAPH: Reference</i>
Control the graphical output environment.	“Output Environment Tasks” in <i>SAS/GRAPH: Reference</i>
Create your SAS/GRAPH program.	“Graph Creation Tasks” in <i>SAS/GRAPH: Reference</i>
Enhance your graphs.	“Graph Enhancement Tasks” in <i>SAS/GRAPH: Reference</i>
Use SAS/GRAPH to visualize your CAS results.	“Plotting a Cloud Analytic Services (CAS) In-Memory Table” in <i>SAS/GRAPH: Reference</i>

